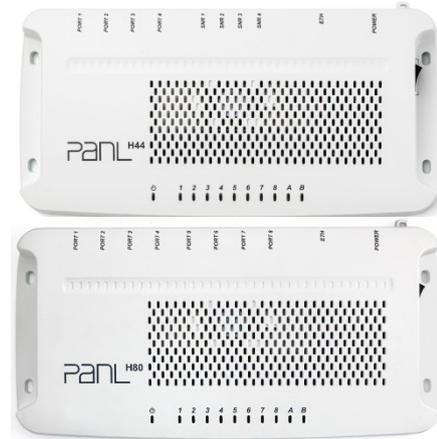


PanL Hub44-80 Datasheet



1 Introduction

PanL Hub is developed 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 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 10/100Base-T Ethernet Port or through the in-built Wi-Fi module.

1.1 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 x 4 Ports and RJ11x 4 Ports (PanL Hub44) / RJ45 x 8 Ports (PanL Hub80) supporting connection to various RS485 devices
- Power, Port Status and System Health Indicator LEDs
- Real Time Clock (RTC)
- Built-in Temperature sensor
- Wi-Fi 802.11 b/g/n
- Zigbee 3.0
- RF433
- Power switch
- DC power input: +24V/2.5A (PH44), 5A (PH80)
- Operating temperature: 0°C to +55°C

Visit <https://brtsys.com/resources> for more information.



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2 Part Numbers/Ordering Information

* Below Part Numbers apply to PanL Smart Living application unless stated otherwise.

Part#	Description
PH-4400-01A*	Without any wireless connectivity (for PanL Room Manager only)
PH-4400-00A	Without any wireless connectivity
PH-4401-00A	With Wi-Fi only
PH-4402-00A	With ZigBee only
PH-4403-00A	With Wi-Fi and ZigBee only
PH-4404-00A	With RF433 only
PH-4405-00A	With Wi-Fi and RF433 only
PH-4406-00A	With ZigBee and RF433 only
PH-4407-00A	With Wi-Fi, ZigBee and RF433

Table 1 - PanL Hub44 - Part Numbers / Ordering Information

Part#	Description
PH-8000-01A*	Without any wireless connectivity (for PanL Room Manager only)
PH-8000-00A	Without any wireless connectivity
PH-8001-00A	With Wi-Fi only
PH-8002-00A	With ZigBee only
PH-8003-00A	With Wi-Fi and ZigBee only
PH-8004-00A	With RF433 only
PH-8005-00A	With Wi-Fi and RF433 only
PH-8006-00A	With ZigBee and RF433 only
PH-8007-00A	With Wi-Fi, ZigBee and RF433

Table 2 - PanL Hub80 - Part Numbers / Ordering Information

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3 Specifications

Platform	OS	Linux		
	CPU	Quad Core 1.2GHz 64bit ARM Processor		
	Internal Memory	1GB RAM, 4GB eMMC Flash		
Wireless Connectivity	Wi-Fi	802.11 b/g/n (2.4GHz), up to 150 Mbps		
	ZigBee	802.15.4 (2.4GHz)		
	RF433	SRD 433.92MHz		
I/O Interface	Ethernet	1 x 10/100BASE TX		
	RJ45	4 x RJ45 Ports to support RS485		
	RJ11	4 x Rj11 Ports to support RS485		
Features	Temperature Sensor	Built-in		
	Crypto Authentication	Built-in		
	RTC	CR1225 Battery (Lasts ~3 Years)		
	Reset Button	Push Switch		
	Power ON/OFF Switch	Rocker Switch		
	Power Indicator LED	Red LED		
	Status Indicator LED	Health Status (A/B)	2 x RGB LEDs	
RJ45/RJ11 Ports		8 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	Polycarbonate 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	1 x PanL Hub44		
		1 x 60W Power Adapter		
		4 x RS485 PanL Terminators		

Table 3 - PanL Hub44 Specifications

Platform	OS	Linux	
	CPU	Quad Core 1.2GHz 64bit ARM Processor	
	Internal Memory	1GB RAM, 4GB eMMC Flash	
Wireless Connectivity	Wi-Fi	802.11 b/g/n (2.4GHz), up to 150 Mbps	
	ZigBee	802.15.4 (2.4GHz)	
	RF433	SRD 433.92MHz	
I/O Interface	Ethernet	1 x 10/100BASE TX	
	RJ45	8 x Ports to support RS485	
Features	Temperature Sensor	Built-in	
	Crypto Authentication	Built-in	
	RTC	CR1225 Battery (Lasts ~3 Years)	
	Reset Button	Push Switch	
	Power ON/OFF Switch	Rocker Switch	
	Power Indicator LED	Red LED	
	Status Indicator LED	Health Status (A/B)	2 x RGB LEDs
RJ45 Ports		8 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	
Physical Characteristics	Housing	Polycarbonate 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	1 x PanL Hub80	
		1 x 120W Power Adapter	
		8 x RS485 PanL Terminators	

Table 4 - PanL Hub80 Specifications

4 FCC Compliance Statement

This 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 residential installation. This 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 device and the user's body must be always maintained.

FCC Radiation Exposure Statement

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment and it also complies with Part 15 of the FCC RF Rules. This equipment must be installed and operated in accordance with the instructions provided and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and consider removing the no-collocation statement.

Caution

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



Contains FCC ID:
2ATZF-PH4404XXA (PH44)
QR4WF5370M08 (Wi-Fi)
Z7H-EMB2538PA (Zigbee)

5 Hardware Features

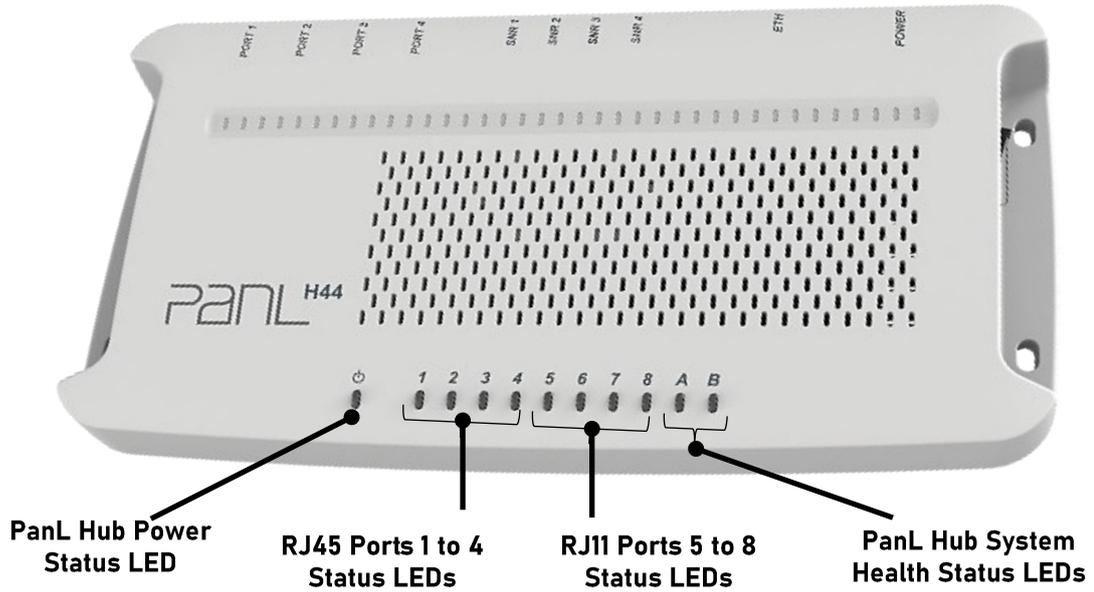


Figure 1 - PanL Hub44 Top View

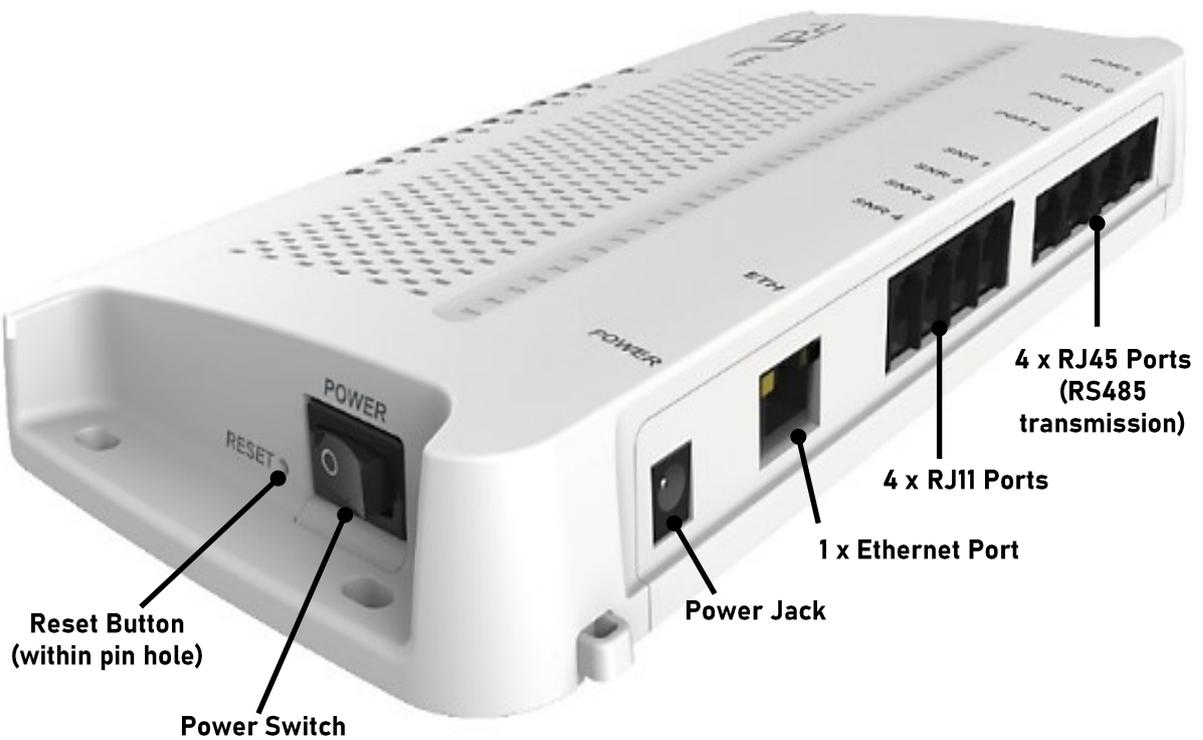


Figure 2 - PanL Hub44 Side View

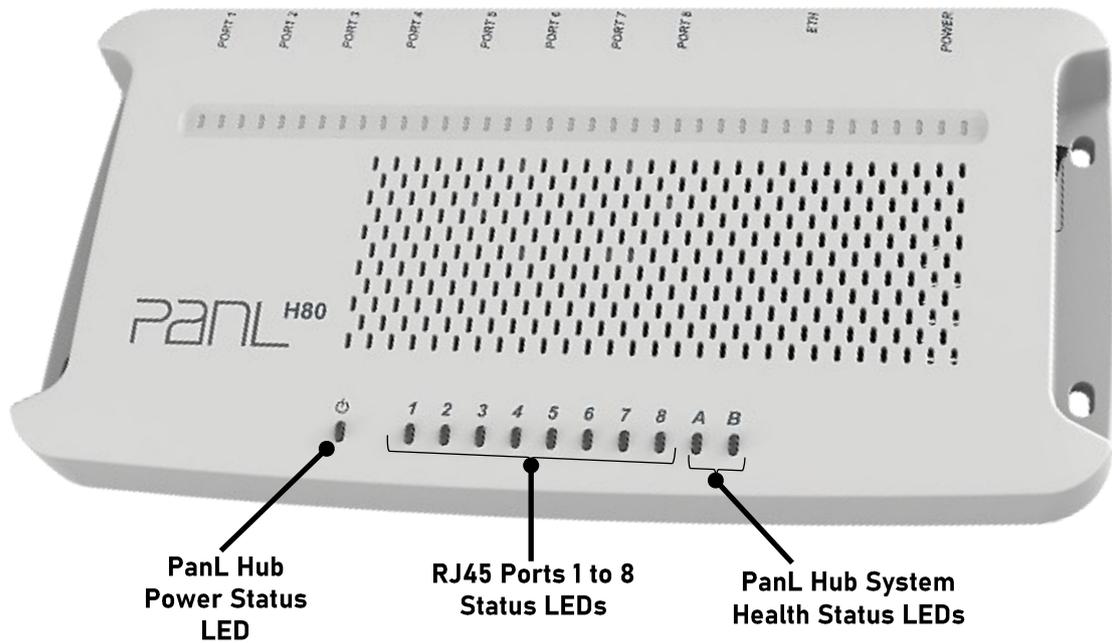


Figure 3 - PanL Hub80 Top View

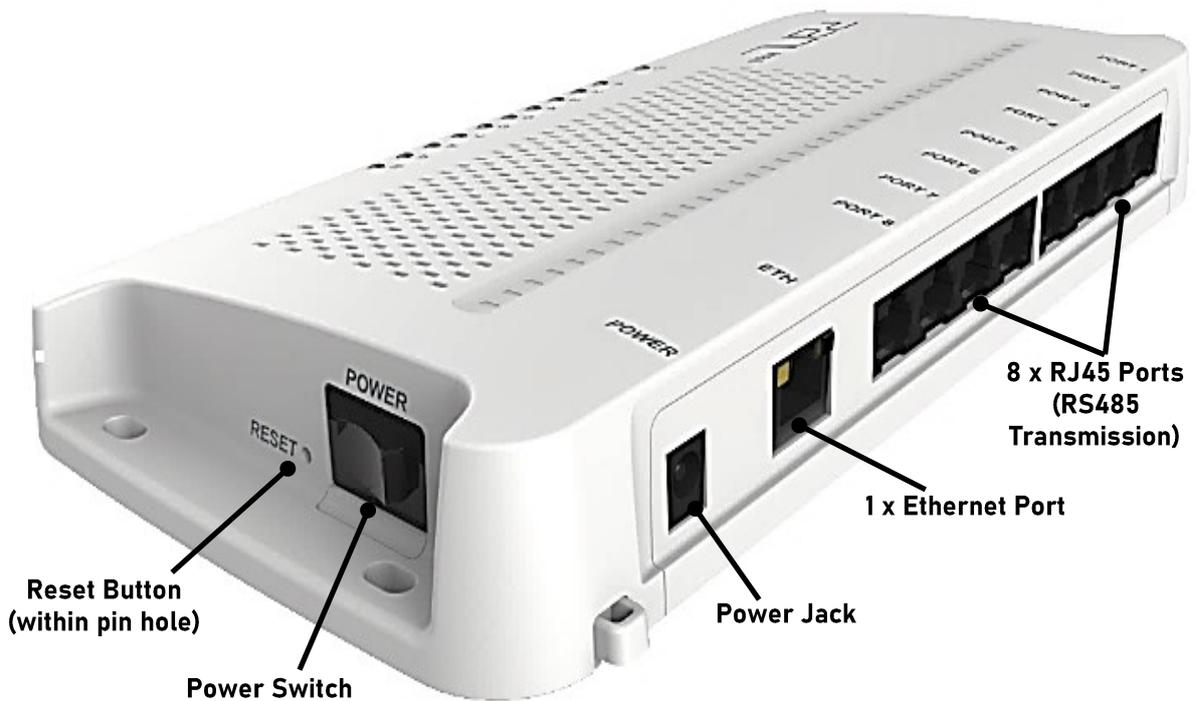


Figure 4 - PanL Hub80 Side View

5.1 Power Supply

PanL Hub44 is powered by a 24VDC/2.5A adaptor, while PanL Hub80 is powered by a 24VDC/5A adaptor that comes with the package. It is highly recommended to use a powered adapter with the recommended power rating (such as the one included with the package) to ensure the hub operates within its specified parameters. Power input from the Power Jack and switch ON/OFF by using the Power Switch.

5.2 CPU System

PanL Hub44 and PanL Hub80 run on Linux platforms and are powered by a Quad Core 1.2GHz 64bit ARM Processor.

5.3 Wireless Connectivity

PanL Hub44 and PanL Hub80 comes with three types of connectivity modules: Wi-Fi, Zigbee and RF433. Please refer to Section [2](#) for ordering information.

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 LED indicator indicates the power status (ON/OFF) of PanL Hub.

5.5 RGB LED Indicator

There is total 10 RGB LED indicators for user definition.

5.6 Ethernet Port

PanL Hub has 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 Ports (RS485 Transmission and Power)

There are four RJ45 ports (PORT1 to PORT4) available on PanL Hub44 (refer to Figure 2) and eight RJ45 ports (PORT 1 to PORT 8) available on PanL Hub80 (refer to Figure 9) providing both communication and power to any device with an RS485 interface powered by 24V DC.

A standard network CAT 8P8C cable can be used. The length of the RJ45 8P8C cables from the port should account for power drop and remain within the RS485 specification.

The length of the RJ45 8P8C cables does not exceed 100 meters from the port to the last wired device.

If 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 meters in cable length. The total combined cable length must not exceed 100 meters.

A maximum of one PanL PD100 is allowed per Hub port.

A maximum of four PanL PD40 (using 3-port junctions) is allowed per Hub port.

A maximum of eight PanL Mood Lighting Controllers (using daisy chain method) is allowed per Hub port.

A maximum of three devices is allowed for daisy chain if there are any combination of PanL PD40 or PanL Mood Lighting Controller (MLC).

5.7.1 Connecting With LDSBus Devices Via LDSBus Quad T-Junction (HVT)

Applicable for PanL Smart Living (PSL) ecosystem

The current method for connecting to LDSBus devices (that use RJ11 connectors) to PanL Hub is:

- a) Use an RJ45 cable to connect to any RJ45 Port through an LDSBus Quad T-Junction splitter (also known as HVT) which has 4 x RJ11 ports (Refer to Figure 7).
- b) Next, use an RJ11 cable to connect the LDSBus device to any one of the LDSU port at the LDSBus Quad T-Junction (Refer to Figure 7).

When LDSBus devices are physically connected to the PanL Hub port, ensure that each LDSBus device is configured by assigning a unique ID number and make sure that the last LDSBus device is "termination enabled" for the signals to operate properly on the LDSBus.

Please refer to [Appendix A – References](#) for the document references and the website address to download the utility tool for configuring LDSBus devices.

5.8 RJ11 Ports (RS485 Transmission and Power)

Refer to Figure 6. There are four x RJ11 ports (SNR1 to SNR4) available on PanL Hub 44 providing both communication and power to any device with an RS485 interface and powered by 5V DC.

(RJ11 port connection's application to support LDSBus Sensor with RJ11 is reserved for future development: Use a regular 6P4C 26AWG cable and ensure that the length of the cables does not exceed 50 meters from the port to the wired PanL Sensors. RJ11 ports are reserved for PanL Room Manager - PRM ecosystem).

6 Setup Instructions

6.1 PanL Hub44

1. Take note of the following recommendations when setting up PanL Hub:
 - a. Ensure the availability of an AC outlet nearby.
 - b. Place the hub on a flat surface area.
 - c. Best to place the hub in an open area with good ventilation.
 - d. Best to position the hub central to all wired or wireless devices (if any).
 - e. Place the hub near to Ethernet network point if using wired Ethernet connection.
 - f. Apply screws to the sides of the hub to secure the hub.
2. Uncover RTC switch compartment as shown below and switch ON the RTC backup battery.



Figure 5 - RTC Backup Battery Switch on PanL Hub Bottom View

3. Connect an RJ45 Ethernet cable (not included in PanL Hub package) to the Ethernet port of the hub. Alternatively, the hub can be connected to a wireless network if the Wi-Fi module is built-in the hub.
4. Connect PD100 devices to PanL Hub's RJ45 ports as required (refer to Section 5.7). For more information, refer to **PSL User Guide – 1. System Installation** in <https://brtsys.com/smart-living/#resources>.
5. (Reserved for future development) Connect wired devices to PanL Hub's RJ11 ports as required. Refer to Section 5.8 for details.
6. Any unused RJ45 ports must be fitted with the PanL terminators provided in PanL Hub package.
7. Currently, the default PanL Hub port settings for the 4 x RJ45 ports are:
 - Port 1: Modbus
 - Port 2: LDSBus
 - Port 3-4: BACnet

8. PanL (BACnet) and LDSBus wired devices may be connected to a PanL Hub as depicted in the following diagram:

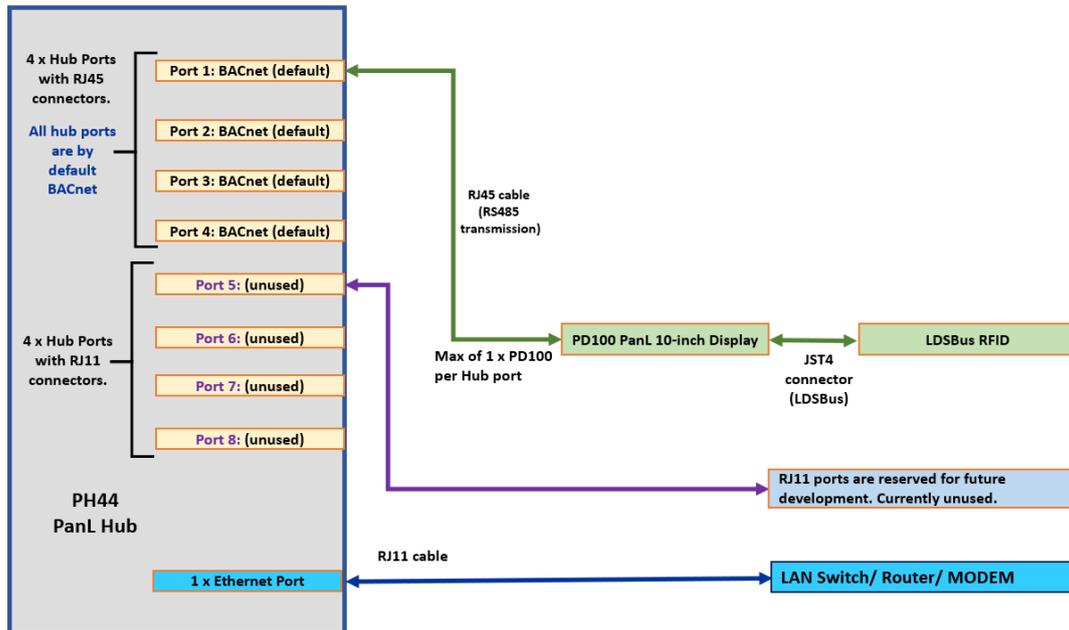


Figure 6 - PanL Hub44 Setup - Connecting Devices to PanL Hub (for PRM Version)

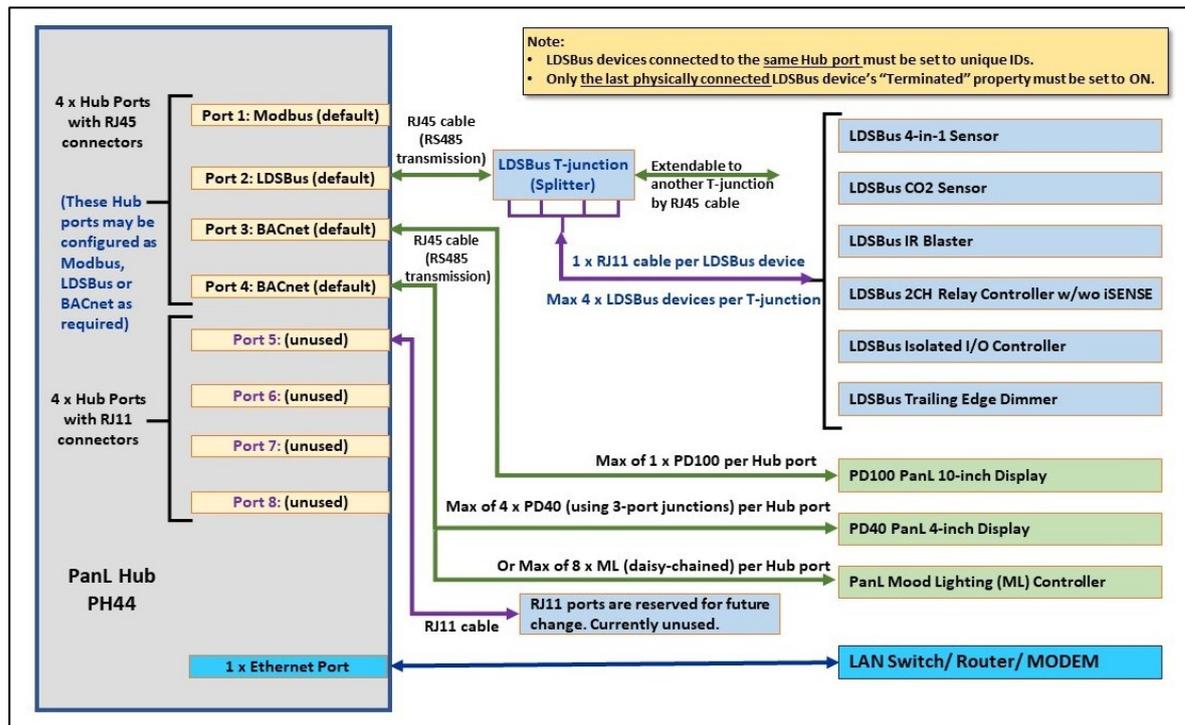


Figure 7 - PanL Hub44 Setup - Connecting Devices to PanL Hub (for PSL Version)

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

It is not advisable to add or remove any connected devices from the hub while the hub is in ON condition. Instead, switch OFF the power and plug in or out the PanL devices first if required.

- Next, use the power adapter (that is provided in PanL Hub package) to connect to PanL Hub's power jack as shown below. Switch ON PanL Hub via its power switch.



Figure 8 - PanL Hub80 Setup – Powering ON Hub

6.2 PanL Hub80

- Take note of the following recommendations when setting up PanL Hub:
 - Ensure the availability of an AC outlet nearby.
 - Place the hub on a flat surface area.
 - Best to place the hub in an open area with good ventilation.
 - Best to position the hub central to all wired or wireless devices (if any).
 - Place the hub near to Ethernet network point if using wired Ethernet connection.
 - Apply screws to the sides of the hub to secure the hub.
- Uncover RTC switch compartment as shown below and switch ON the RTC backup battery as shown in Figure 5.
- Next, use the power adapter (that is provided in PanL Hub package) to connect to PanL Hub's power jack as shown below. Switch ON PanL Hub via its power switch. Refer to Figure 8.
- For network connection, connect an RJ45 Ethernet cable (not included in hub package) 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.
- Connect wired devices to the hub's RJ45 ports as required (refer to Section 5.7). For more information, refer to **PSL User Guide – 1. System Installation** in <https://brtsys.com/smart-living/#resources>.
- Any unused RJ45 ports must be fitted with the PanL terminators provided in the PanL Hub package.

7. Currently, default hub port settings are:
 - PanL Smart Living (PSL)
 - Port1: Modbus
 - Port2: LDSBus
 - Port 3-8: BACnet
 - PanL Room Manager (PRM)
 - Port 1-8: BACnet
8. PanL (BACnet) and LDSBus wired devices may be connected to a PanL Hub as depicted in the following diagram.

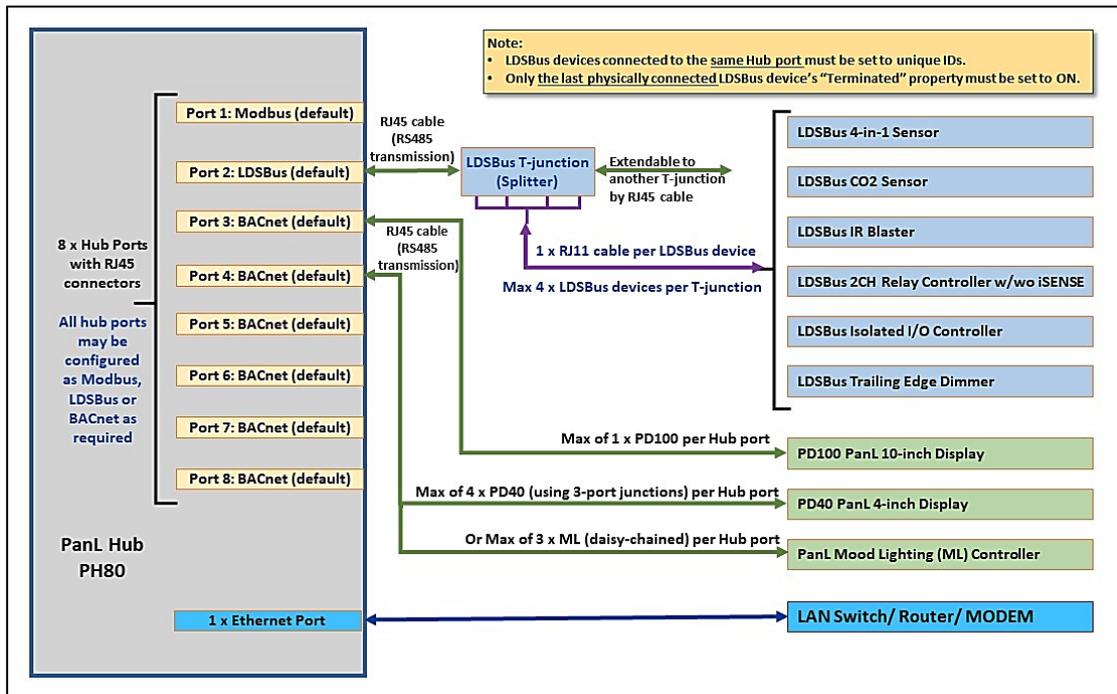


Figure 9 - PanL Hub PH80 Setup - Connecting Devices to PanL Hub

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

It is not advisable to add or remove any connected devices from the hub while the hub is in ON condition. Instead, switch OFF the power and plug in or out the PanL devices first if required.

7 Mechanical Dimensions

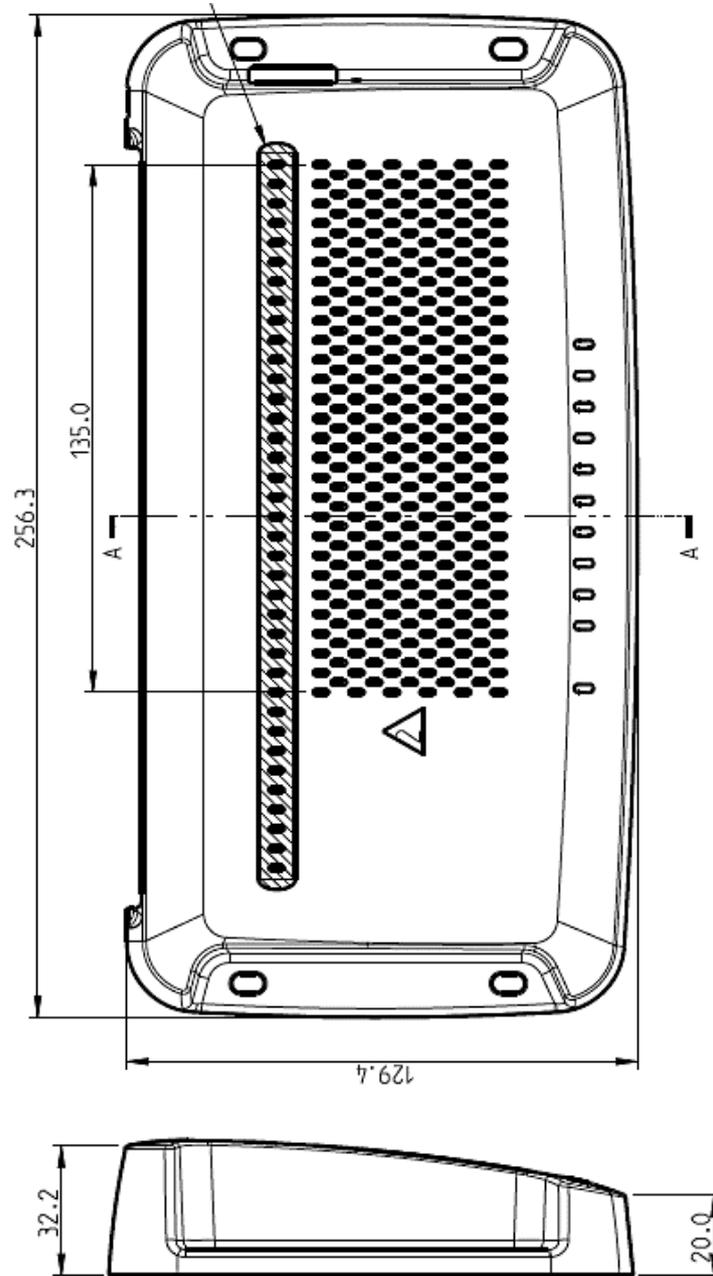


Figure 10 - PanL Hub Dimensions

8 Contact Information

Refer to <https://brtsys.com/contact-us/> for contact information.

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Appendix A – References

Document References

[BRTSYS_QSG_PanL_Hub44-80](#)

[LDSBus_Configuration_UTILITY_User_Guide](#)

Acronyms and Abbreviations

Term	Description
ARM	Advanced RISC Machine
eMMC	Embedded MultiMediaCard
FCC	Federal Communications Commission
IEEE	Institute of Electrical and Electronics Engineers
LED	Light Emitting Diode
LPDDR	Low Power Double Data Rate
Mbps	Mega bits per second
RAM	Random Access Memory
RGB	Red Green Blue
RTC	Real Time Clock
SOC	System On Chip
LDSBus	Long Distance Sensor Bus
BACnet	Building Automation and Control Network
PSL	PanL Smart Living
PRM	PanL Room Manager

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Appendix C – Revision History

Document Title: PanL Hub44-80 Datasheet
Document Reference No.: BRTSYS_000093
Clearance No.: BRTSYS#144
Product Page: <https://brtsys.com/product-category/hubs/>
Document Feedback: [Send Feedback](#)

Revision	Changes	Date
1.0	Initial Release under BRTChip	31-12-2019
1.1	Document migrated to BRTSys and updated	12-01-2026