# pbsBPI-6202

# pbssoftLogic runtime for BPI-6202 Ver 1.0 Dec-2024

### 1. Installation

This document describes how to use pbsSoftLogic for the BananaPI BPI-6202 board.

pbsSoftLogic can use the following BPI-6202 resources :

- PWR LED
- Run LED
- Func LED
- Modem
- Watch Dog
- Serial Ports
- CAN IO Card with pbsCAN Protocols

After installing Ubuntu MATE on the board, you need to enable the ssh server.

Connect the BPI-6202 to the monitor and keyboard and turn it on.

The username and password are as follows:

Username = scada

Password = Szscada@123

Log in to Ubuntu and set up the network to connect to the internet.

You can change the root password. The default root password is bananapi.

Launch the Linux terminal and install the following software:

apt-get update apt-get install openssh-server

edit /etc/ssh/sshd\_config by nano utility and change PermitRootLogin to yes: PermitRootLogin yes

Save the file and restart the BPI-6202.

You can connect to the BPI-6202 using an SSH client software such as Putty and Filezilla.

If you want to use Email Publishing Driver, SQLServer connection by TDS and MQTT in pbsSoftLogic, connect to BPI-6202 as root and install the following software, otherwise you do not need to install them.

for Email Publishing Driver install following modules on the BPI-6202 : apt-get install curl apt-get install python3-pycurl apt-get install libcurl4-openssl-dev

for SQLite Driver install following modules on the BPI-6202: apt-get install freetds-dev apt-get install freetds-bin

for MQTT Driver install following modules on the BPI-6202: apt-get install mosquitto-clients apt-get install mosquitto-dev apt-get install mosquitto apt-get install libmosquitto-dev

Unzip the pbsSoftLogic\_BPI6202.zip folder, which is the pbsSoftLogic runtime kernel for BPI-6202, and transfer it to the controller as follows:

Name	Date modified	Туре	Size
= etc	12/18/2024 10:54 AM	File folder	
🚞 home	12/18/2024 10:56 AM	File folder	
📒 mnt	12/18/2024 10:54 AM	File folder	
📔 readme.txt	12/20/2023 12:06 PM	TXT File	1 KB

Transfer content of the home folder to home folder of BPI-6202. Use filezilla Client for transferring to the controller.

When using filezilla, make sure the transfer type is set to binary, otherwise it will damage the transferred files. It is on Auto by default.



# In the home folder, you can see the following folders:

Name	Date modified	Туре
🧧 gspdata	9/27/2019 10:41 PM	File folder
🧧 iecdata	11/11/2019 7:32 PM	File folder
📒 openvpn	9/27/2021 10:15 AM	File folder
pbsLX	12/18/2024 10:57 AM	File folder
n sqldb	12/18/2024 10:54 AM	File folder
sqlsynclog	9/27/2019 10:41 PM	File folder
sqlsynclog2	9/27/2019 10:41 PM	File folder

The runtime core is the pbsLX folder. Other folders are for storing data if you are using some drivers.

For an explanation of the pbsLX folder, refer to the pbsSoftLogic user guide.

pbssoftLogic runtime requires ramdisk to run. So please create a folder in /mnt named ramdisk.



Using filezilla, edit the /etc/fstab file on BPI-6202 and add the following line to it:

LABEL=wri	table	/	ext4	defaults		0 0		
tmpfs	/mnt/r	amdis	s k	tmpfs	rw,	size=10M	0	0

This command will convert the /mnt/ramdisk folder as a real ramdisk in Linux.

In the unzipped pbsSoftLogic\_BPI6202.zip folder, you can see the etc/init.d folder. Copy the /etc/init.d/xpsle file to the same path on the BPI-6202.

Connect to the controller by putty utility by root user and execute following command :

chmod +x /etc/init.d/xpsle

In -s /etc/init.d/xpsle /etc/rc5.d/S97xpsle

This command executes pbsSLKLX, which is the pbsSoftLogic runtime kernel, at boot time.

You can restart the BPI-6202. The pbsSoftLogic runtime is now ready to use.

### 2 – Programming

To use pbsSoftLogic IDE, please refer to pbsSoftLogic User Guide. In this section, we will explain the local IO for BPI-6202.

In pbsSoftLogic, Local IO is a driver that manages all the resources placed on the main CPU, such as LED, GPIO, Modem, Watch dog, etc.

Run pbsSoftLogic and create a new project and open the project settings.

File Edit Project View Tools Help				- 8 ×
		🔴 🛎 🕞 🖋 员		
fee FB List @ MainPOU				× POUs 🖉
FBList     Comment     Guinessen     Guinessen     Guinessen     Guinessen     Guinessen     Guinessen     Guinessen     Guinessen     Forcess     Field	€ Options General Time Setting LAN Logic Scan Time(no) RTU RTU IP	Setting   Stats   Loonse   Kernel   100  BP1-6202 • 132 166 1 216 Exit	Driver       Image: Cooking of the priver         Driver       Image: Image: Cooking of the priver         Name       Image: Image: Cooking of the priver         Make Driver       Image: Cooking of the priver         Reset       Delete         Consider       Logic         Configuration	FB Instances Comments Vars Inputs Outputs Properties

Select BPI\_6202 as the RTU type and enter the controller IP address.

Right-click on the list of drivers and add a new Local\_IO to the project and name it LIO.

Options						-	×
General   Time Setting   LAI	N Setting   Stats   License   Kernel						
			Drivers L	ist			
		Name	Path	Туре	Enable		
Logic Scan Time(ms)	100	IEC104	\IEC104	IEC8705Slave	V		
		MM1	\MM1	ModbusMaster	•		
		Ms1	\Ms1	ModbusSlave	~		
		▶ LIO	\LIO	LOCAL_IO	<b>V</b>		
RTU	BP1-6202						
RTU IP	192 168 1 216						
Save	Exit	Reset Controller	Delete Logic	Delete Configuration			

Double-click on LIO Driver and you will see the following screen:

File	
Optio	ns
<	<pre>??xml version="1.0"?&gt;</pre>
<	OPCSrvTags>
	<version>1.0.0</version>
	<tag address="0" init="0" name="SYS.Reset" type="SYS"></tag>
	<tag address="1" init="60" name="SYS.WDTEnable" type="SYS"></tag>
	<tag address="2" init="0" name="SYS.ModemPW" type="SYS"></tag>
	<tag address="3" init="0" name="SYS.ModemConnectCmd" type="SYS"></tag>
	<tag address="4" init="0" name="SYS.ModemConnected" type="SYS"></tag>
	<tag address="5" init="0" name="SYS.ModemRSSI" type="SYS"></tag>
	<tag address="0" init="0" name="LED Pwr" type="DO"></tag>
	<tag address="1" init="0" name="LED_Run" type="DO"></tag>
	<tag address="2" init="0" name="LED Func" type="DO"></tag>
<	/OPCSrvTags>

You can use the above tags in your logic:

SYS.Reset : when SYS.Reset set to 1, for value more than watch dog time, will reset BPI-6202.

SYS.WDTEnable : if set to 0, WDT is disabled, when set to 60 for defining 30 sec WDT. If you need more WDT time, increase this value.

SYS.ModemPW: if Set to 0, Modem is disabled . if set to 1, modem is enabled.

SYS.ModemConnectCMD : Changing from 0 to 1 turns the modem on and tries to connect to the mobile network. Changing from 1 to 0 turns the modem off.

SYS.ModemConnected: When it changes to 1, it indicates that the modem is properly connected to the network.

SYS.ModemRSSI : Shows Modem RSSI signal .

LED\_Pwr: When you change to 1, the power LED turns on. When you change to 0, the power LED turns off. The power LED is a small LED on the board, not on the front LED.



LED\_Run: When you change to 1, the Run LED turns on. When you change to 0, the Run LED turns off. The Run LED is on the front side.

LED\_Func: When you change to 1, the Func LED turns on. When you change to 0, the Func LED turns off. The Func LED is on the front side.

Now suppose you want to create a pulse generator and connect it to the Run LED. From the Timer Function Blocks, drag and drop a PulseGen function and place it on the MainPOU.

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	× POUs
CAT Bill True True PuissGen CAT Tris Tris	<ul> <li>♥ FB Instances</li> <li>♥ Comments</li> <li>♥ Vers</li> <li>♥ Inputs</li> <li>♥ Outputs</li> <li>♥ Properties</li> <li>♥ I</li> <li>♥ Appearance</li> <li>Figure None</li> <li>EditPorts</li> <li>■ LetPorts</li> <li>¶ I</li> <li>● Y</li> <li>Appearance</li> <li>Figure None</li> <li>EditPorts</li> <li>I LetPorts</li> <li>¶ I</li> <li>■ Y</li> <li>Appearance</li> <li>Figure None</li> <li>EditPorts</li> <li>I LetPorts</li> <li>¶ I</li> <li>■ None</li>     &lt;</ul>
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Drag a Constant Bool and connect to Trg input of PulseGen FB.

Drag a constant time and connect to Time input of Pulsegen FB.

Drag an OutputSignal and connect to Q Output of FB.

Save the project and transfer the Logic and Configuration to the BPI-6202 and restart it.





It takes 40 seconds for the BPI-6202 to boot and run the pbsSoftlogic runtime kernel. After that, you can connect to it and monitor your logic.

Click on connect to controller button and it will monitor your logic.



And the BPI-6202 RUN LED flashes on and off every second.

In pbsSoftLogic, the default password for root is root. But if you change it, you need to change it in the tools option menu.

	1.000000		ers Gen		_	
	💀 pbsSoftLogic Op	tions	Q •	_		
CNT T#1s	FB Back Color LMP FB Back Color	FB Back Co	olor •			
	FTP/SFTP Port	22	Enable Encryption			
	☑ Use SSH	,	Encryption Key( 16 char)			-
	Linux User	root				
	User Password					
	LMP Time (msec)	50				
	LMP TCP Port	20001				
			Ok			

After changing the password, close and re-run pbsSoftLogic IDE.

# **3- Protocol Configuration**

To use protocols such as Modbus, DNP3, IEC104, MQTT, ... you need to add the appropriate driver to your project. For detailed explanations, please refer to the pbsSoftLogic user guide. In This section shows the serial port settings.

In the image below you can see the location, pins and names of the BPI-6202 serial ports.



When you want to use serial ports in pbsSoftLogic, you need to use the serial port names.

By default, the console is enabled for the RS232 port, if you want to use it as a regular RS232 port, you must first disable the console function in Ubuntu.

Suppose you want to define a Modbus Master for the RS485-1 port for the project.

Right-click in the driver list and add Modbus Master Driver. For example, name it MM1.

🖳 Options		- 🗆 X
General Time Setting LA	AN Setting Stats License Kernel	
		Drivers List
	100	ng pbsSoftLogic New Driver — 🗆 🗙
Logic Scan Time(ins)	100	
		Driver ModbusMaster
RTU	BPI-6202 💌	Name MM1
		Instance 1
RTU IP	192 168 1 216	
		Make Driver
Save	Exit	Reset Controller         Delete Logic         Delete Configuration

Add One Modbus Slave Driver and name it MS1.

🛃 Options		- 🗆 X
General Time Setting L	AN Setting Stats License Kernel	
		Drivers List
Logic Scan Time(ms)	100	🖳 pbsSoftLogic New Driver — 🗆 🗙
		Driver ModbusSlave -
RTU	BPI-6202 <b>•</b>	Name Ms1
		Instance 1
RIUIP	192  168  1  216	Make Driver
Save	Exit	Reset Delete Delete Logic Configuration

Keep the instance number 1 for both drivers. The instance number must be unique for a driver type. If you want to add another Modbus Master to the project, you must change the instance to 2 for the second driver.

Double-click on MM1 Driver and you will see the following screen:

bsSoftLogic Modbus Master Edito	r	- 0
ne Blocke Tees Hole		
ins blocks rags rielp		
		<pre></pre> ///
nysicai Layer	Serial ~	<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>
Serial		<pre></pre>
		<pre><desc>RS232 , RS485 , RS424 , TCP</desc></pre>
COM Port Name	/dev/ttyS1	<value>RS232</value>
Roud Data		<pre><li><li><li><li></li></li></li></li></pre>
Daud Rate	9600 ~	<pre>chame&gt;cutroits/name&gt; chame&gt;cham</pre>
Data Dit		<pre>chelpic/file</pre>
Data Bit	8 ~	
Stop Dit		<node></node>
эюр ыг	1 ×	<name>COMPortName</name>
Devite		<pre></pre> class=>Serial Port Name for Communication , if Blank Use COMPort Num
Parity	None	<value>/dev/ttySl</value>
		(Name)Raiv(Bate/ Name)
TCP		<pre><pre>&gt; 9600, 19200, 36600, 52700, 115200</pre></pre>
		<value>9600</value>
TCP Port	502	
		<node></node>
		<name>DataBit</name>
		<ul> <li></li> <li></li></ul>
Continuous Poll	True ~	
		<name>StopBit</name>
DiagMode	True ~	<desc>1,2</desc>
		<value>l</value>
Write By Change	True	
	The	<pre>cRode&gt;</pre>
Enable Buffering		<pre><wame>rarity</wame> </pre>
chable bullering	False ~	
Instance	1	<node></node>
		<name>Instance</name>
Webstle Obies		<desc>Instance</desc>
wakeup string		<value>l</value>
	Lindete	Choice / Chama > TrPBoyt / Nama >
	opulic	<pre>characteristics.com</pre>
		<value>502</value>
		<node></node>
		<name>ContPoll</name>
		<pre><desc>Continous polling of Slaves , l= Enable , 0 = Poll Slave by System.Poll Signal</desc></pre> /Desc>
		<value>l</value>
		Ande>
		(Name>HateInString(/Name>
		CDesc>will send to modbus slave for waking up device for communication .Only support for R5232 Mode .ContPoll must be 0
		dialana (s

You need to use the serial port name as the COM port name and set the other parameters.

Likewise, you should use the serial port name as the COM port name for modbus Slave Driver.

File Edit Help			🛃	Modbus
Parameters Tags				
Physical Layer	TCP Configuration		General Configuration	
• Serial O TCP	TCP Port	502	Slave Address	1
Serial Configuration			Timeout (s)	20
Com port COM1	<ul> <li>Protocol</li> </ul>	RTU ~	Physical Layer Scan Time (ms)	100
Com port Name /dev/ttyS2	Flow Control	None ~	Instance	1 ~
Baud Rate 9600	✓ Stop Bits	1 ~	Diagnostic Mode	False ~
Data Bit 8	∽ Parity	None ~		