

AarLogic Raspberry PI Extension Card

Product Manual

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Product Description

The AarLogic extension card for Raspberry Pi complements the popular minicomputer with a 4G, 3G or 2G modem & GPS functionality, enabling wireless communication over the mobile network.

This allows the user to communicate wirelessly with the Raspberry Pi at anytime and anywhere in the world and send and receive data in real time. The AarLogic expansion card is simply placed on the GPIOs of the Raspberry Pi. In the 4G version, the expansion card can be connected over USB to utilize the high data bandwidth. The AarLogic RPi Extension has a SIM card holder on board and is immediately ready for operation.

1 Device Variants

Available with modules from the Telit xE910 series.

Standard variants:

Order number	Module	Technology	Frequencies	GNSS	Up Link	Down Link	Availability
EXT-RPI-2G-D	GE910-QUAD	2G	GSM:850/900/1800/1900	n/a	40 Kbps	80 Kbps	Global
EXT-RPI-2G-DG	GE910-GNSS	2G	GSM:850/900/1800/1900	GPS Glonass	40 Kbps	80 Kbps	Global
EXT-RPI-3G-D	HE910-D	3G	UMTS:800/850/900/AWS/1900/2100 GSM:850/900/1800/1900	n/a	5,76 Mbps	21,0 Mbps	Global
EXT-RPI-3G-DG	HE910-DG	3G	UMTS:800/850/900/AWS/1900/2100 GSM:850/900/1800/1900	GPS	5,76 Mbps	21,0 Mbps	Global
EXT-RPI-4G-EUV2	LE910-EU V2	4G	LTE:2100(B1)/1800(B3)/2600(B7)/ 900(B8)/800(B20) UMTS:800/850/900/AWS/1900/2100 GSM:850/900/1800/1900	n/a	50 Mbps	100 Mbps	Europe

Please ask for other Telit xE910 family modules.

Optional: customization possible, please tell us your desire and we will design your own version.

2 Key Benefits

- Easy to integrate in your Linux Application.
- Connect to Cloud and IoT Platforms
- Great and famous community of Raspberry PI
- Raspberry Pi GPIO ports are looped through.
- Standard tty drivers for serial and USB ports
- Increased connectivity performance with 2G/3G/4G
- Ideal platform for m2m applications and mobile data
- Easy programmable
- Combines high-speed wireless connectivity combined with embedded multi-constellation high-sensitivity positioning GPS + GLONASS receiver
- Internet friendly with integrated TCP/IP and UDP/IP stacks
- Simple drop-in migration and technology design reuse path to 2G, 3G and 4G with any Telit xE910 cellular module

- Nano SIM card holder – SIM On Chip Footprint available for 1000+ Quantity orders
- Powered by GPIO port from Raspberry Pi
- Standard enclosures for Raspberry Pi possible if no USB connector is added

3 Interfaces

- USB 2.0 interface
- UART Interface (integrated in 40 Pin GPIO)
- Nano SIM-card Holder
- 40 Pin GPIO looped trough from Raspberry PI
- Antenna Connectors
 - GSM: U.FL Connector
 - Cellular Aux :UFL Connector
 - GNSS: U.FL Connector



4 First Start

This manual is based on Raspberry Pi 3 with pre-installed Raspbian operating system, see www.raspberrypi.org.

Plug Raspberry Pi extension card on top the 40 Pin connector of the Raspberry Pi. Now your extension card will be powered by your Raspberry Pi and is connected via serial. Special drivers are not needed, because extension card is uses the standard tty drivers.

We recommend using a 5V power supply equal or more than 2,5A, especially for Raspberry Pi 3, to avoid problem caused by power.

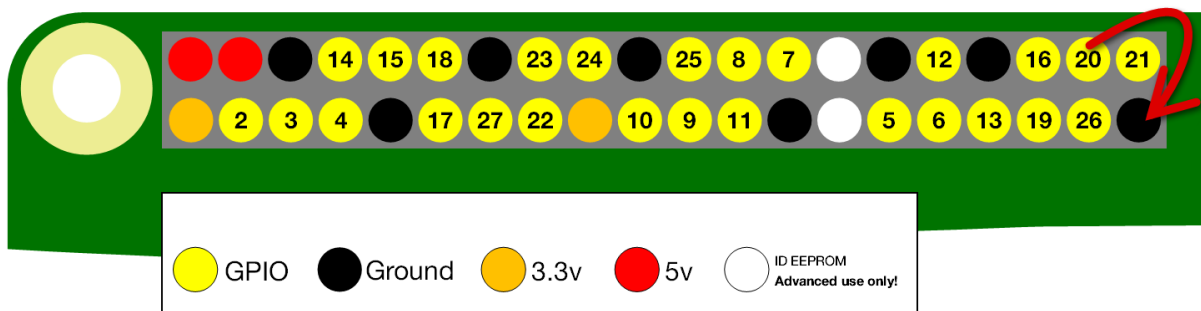
It is necessary to switch off or to reconfigure your Bluetooth port at Raspberry Pi 3, as it is using ttyAMA0. Several Forums and online tutorials are available online to show how this is done.

One possibility to switch off Bluetooth is to change config.txt with following entries:

```
dtoverlay=pi3-disable-bt  
systemctl disable hciuart
```

To power on extension card the GPIO20 pin on the Raspberry Pi should be switched to high. The microcontroller needs about 2 sec. to turn on or off.

Manually:



One simple way to do it is by using the Python Shell. Here's how it is done:

```
import RPi.GPIO as GPIO
import serial
import time

def SendATCommand(arg):
    port.write(arg)
    time.sleep(0.2)
    readbbytes = port.inWaiting()
    ATAnswer = port.read(readbbytes)
    print ATAnswer

GPIO.setmode(GPIO.BCM)
GPIO.setwarnings(False)
try:
    GPIO.setup(20,GPIO.OUT)
except:
    pass
GPIO.output(20, True)
time.sleep(8) # initialisation time to turn on, before you can send AT commands
port = serial.Serial("/dev/ttyAMA0", baudrate=115200, timeout=0)

SendATCommand("AT\r")
SendATCommand("AT+CMEE=2\r")
SendATCommand("AT+CPIN?\r")
SendATCommand("AT\r")

print 'Script is complete'
```

You can download the Python script [here](#).

You can check your serial port with dmesg command to find correct name of your serial port:

```
$ dmesg | grep tty
```

Output ports for example:

```
ttyAMA0
```

```
ttyS0
```

```
ttyUSB0
```

ttyUSB1
ttyUSB2
ttyUSB3
ttyUSB4

If your script did not work, one possibility is that access rights for ttyAMA0 are wrong, please change them:

```
cd /dev
sudo chmod 666 ttyAMA0
```

If you connect your AarLogic Raspberry PI Extension Card also with an USB cable or swivel, you can use also ttyUSB3 as connection, which is recommended if you need faster connection for 4G and 3G modules.

To send AT commands to module you can use any kind of terminal software like minicom or putty

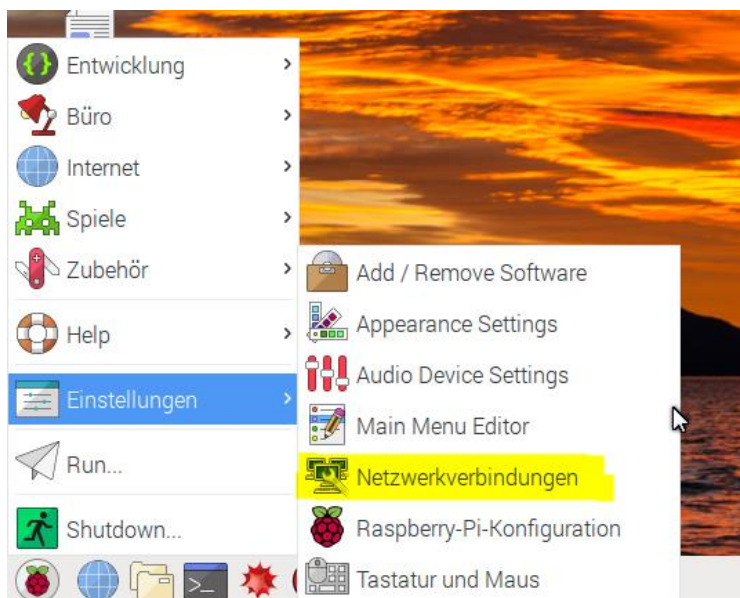
The status LED is not programmed and must be set with AT commands:

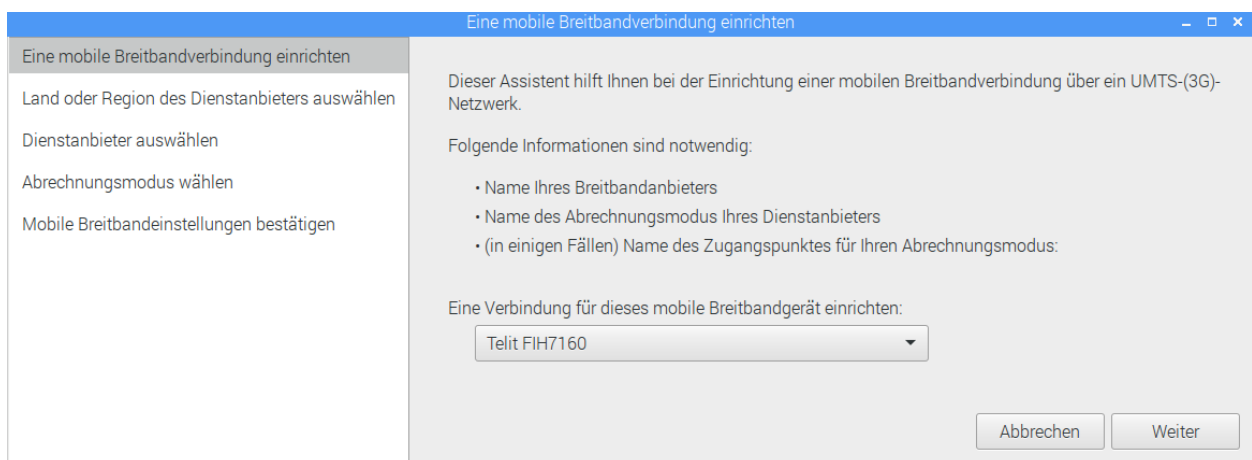
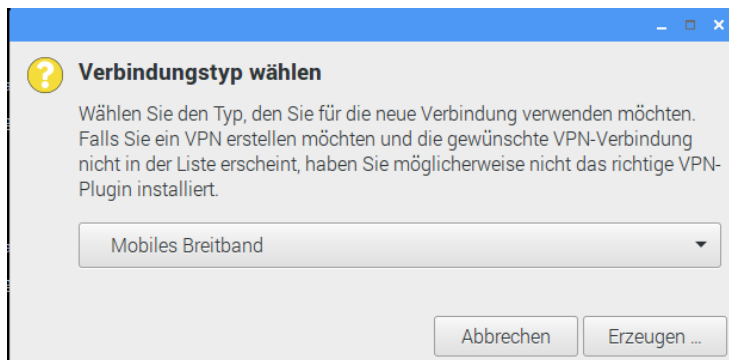
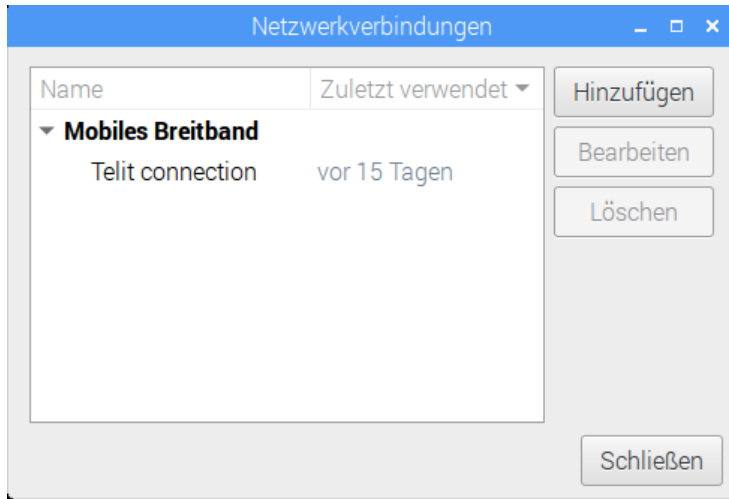
```
AT#GPIO=1,0,2
AT#SLED=2
AT#SLEDSAV
```

4.1 Network connection

If you connect also USB, you can use Network manager to establish an internet connection:

Installation: `sudo apt-get install network-manager`





Follow the instructions and put your APN and connection Data from your SIM/Network provider









5 Development Environment

The AarLogic Raspberry PI Extension Card devices come as Out Of The Box ready devices but also ready for programming in Python or Telit App Zone C. Please consult with Round Solutions on your project and we will advise how to move forward. The client can develop the apps or can commission Round Solutions to do it.

6 USB Driver

The Telit module on the Raspberry Pi expansion card standard tty ports that the user can use to communicate with the module. The tty drivers are included in most Linux distribution, no drivers needed. Two tty-ports are connected to an AT parser and one of these two can send and receive data from the script. For more details please look at "Telit_Modules_Linux_USB_Drivers_User_Guide_r0".

7 Useful documents

-  [Telit Modules Linux USB Drivers User Guide r0](#)
-  [Telit Modules Software User Guide 2G 3G 4G](#)
-  [Telit AT Commands Reference Guide r24](#) for 2g modules
-  [Telit 3G Modules AT Commands Reference Guide r11](#) for 3G modules
-  [AT Commands Reference Guide LE9x0 R14.1](#) for 4G modules
-  [Telit Easy Script Python 2.7 r6](#)
-  [Telit IP Easy User Guide r19](#)
-  [SSL-TLS User Guide r11](#)

8 AARLOGIC RASPBERRY PI EXTENSION CARD SAFETY INSTRUCTIONS MANUAL

8.1 INSTRUCTIONS FOR SAFE USE

To avoid malfunction or damage to your AarLogic Raspberry PI Extension Card please observe the following:

- Do not expose it to water, moisture or place on a conductive surface whilst in operation.

- Do not expose it to heat from any source; the AarLogic Raspberry PI Extension Card is designed for reliable operation at normal ambient room temperatures.
- Take care whilst handling to avoid mechanical or electrical damage to the printed circuit board and connectors.
- Avoid handling the printed circuit board while it is powered. Only handle by the edges to minimize the risk of electrostatic discharge damage.
- The AarLogic Raspberry PI Extension Card is not designed to be powered from a USB port on other connected equipment, if this is attempted it may malfunction.

8.2 COMPLIANCE INFORMATION

The AarLogic Raspberry PI Extension Card complies with the relevant provisions of the RoHS Directive for the European Union. In common with all Electrical and Electronic Equipment (EEE) the AarLogic Raspberry PI Extension Card should not be disposed of as household waste. Alternative arrangements may apply in other jurisdictions.

8.3 ELECTROMAGNETIC COMPATIBILITY

- This product is in conformity with the protection requirements of EU Council Directive 2014/30/EU on the approximation of the laws of the Member States relating to electromagnetic compatibility.
- This product has been tested and found to comply with the limits for Class II Information Technology Equipment according to the European Standard.



AarLogic

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