

# Linux Machine (Wi-Fi Bridge) Manual, User



**PETRA  
SYSTEMS**

OEM/Integrators Installations Manual

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DOCUMENT NO.: 911.10530.0001 REV B

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| Rev. | Date       | Description of changes                        | Doc By         | Chk/Aprvd By   |
|------|------------|---|----------------|----------------|
| A    | 08/27/2015 | Initial Release. Draft.                       | T.Russo        | TLR/JB, 9-8-15 |
| B    | 09/9/2015  | ECO.20150902.002 ---- revised for FCC- Public | TLR/JB, 9-9-15 | TLR/JB, 9-9-15 |

# 1 Overview (Operational)

The Linux Machine (also referred to as Wi-Fi Bridge) is a standalone PCB assembly which provides a Linux Machine with Wi-Fi capabilities. It provides the capability to connect other devices via Ethernet, USB, or Serial interface. It is a modular design that can be used in a variety of applications. Typical applications include the integration into Petra System's Smart Lighting Controller 2.0 and Network Communicator 2.0 products.

This product has a FCC modular certification for EMC, immunity, and has FCC and ICES IDs #; allowing for installations in to multiple product applications, when in accordance to FCC / IC requirements.

## 2 Product Brief

### 2.1 EMC Compliance (North America and Canada)

|           |   |
|-----------|---|
| Emissions | FCC Part 15 & ICES-003, CLASS B<br>FCC ID 2AE5F2105300001 / IC 20319-2105300001 |
|-----------|---|

### 2.2 Data Communications

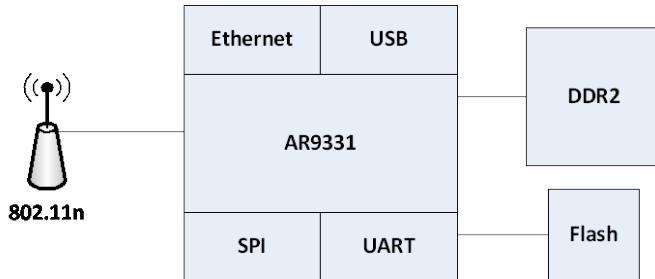
|                         |                           |
|-------------------------|---------------------------|
| Standard                | 802.11s 2.4GHz            |
| Data Encryption         | SAE                       |
| Network Type            | Self-forming mesh network |
| Network Fault Tolerance | Self-healing mesh network |
| Range                   | 1000' line of sight       |
| Bandwidth               | Up to 150Mbps             |

### 2.3 Features

| Features          |              |
|-------------------|--------------|
| Remote FW upgrade | All firmware |
| Data Storage      | 16MB         |

### 3 Hardware Overview

Figure 1 - Hardware Overview depicts the Linux Machine hardware.



[Figure 1 - Hardware Overview](#)

The Linux Machine hardware consists of the following major functional blocks

- CPU - AR9331 , 400MHz clock
- 64MB DDR2
- 16MB Flash
- SPI Interface
- UART Interface
- Ethernet Interface
- USB 2.0 Interface
- Wi-Fi Radio (802.11n, 2.4GHz, 1x1, 150Mbps max data rate)
- Antenna

Examples of Petra Systems product applications where this certified modular product are utilized are noted below (Refer to the following diagrams and photos for additional details). These are just a sampling of potential applications and the Linux Machine can be used as a module in a variety of other applications.

#### Application Examples:

- As an optional add-on to the Smart Lighting Controller 2.0 to enable Wi-Fi connectivity
- As a required add-on to the Network Communicator 2.0 providing Wi-Fi connectivity and Gateway functionality

## 4 I/O Pin Functions: (See Section 5 for board outline details)

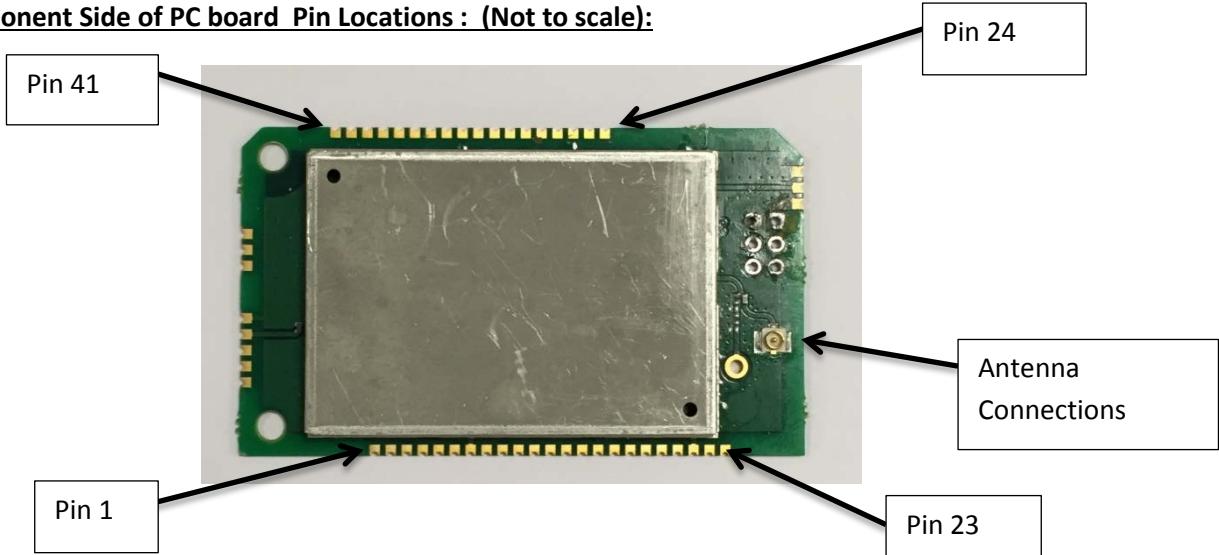
| Pin No. | Function | Pin No. | Function   |
|---------|----------|---------|------------|
| 1       | GPIO23   | 21      | GPIO11     |
| 2       | GPIO22   | 22      | GPIO12     |
| 3       | GPIO21   | 23      | GND        |
| 4       | GPIO20   | 24      | RF EXT ANT |
| 5       | GPIO19   | 25      | GND        |
| 6       | GPIO18   | 26      | RESET      |
| 7       | GND      | 27      | LED 6      |
| 8       | P1 RX P  | 28      | LED 5      |
| 9       | P1 RX N  | 29      | LED 4      |
| 10      | P1 TX P  | 30      | P1 LED     |
| 11      | P1 TX N  | 31      | P0 LED     |
| 12      | P0 RX P  | 32      | LED 1      |
| 13      | P0 RX N  | 33      | LED 0      |
| 14      | P0 TX P  | 34      | GND        |
| 15      | P0 TX N  | 35      | UART RX D  |
| 16      | SPI MOSI | 36      | UART TXD   |
| 17      | SPI CLK  | 37      | GND        |
| 18      | SPIMISO  | 38      | GND        |
| 19      | USB P    | 39      | 2VO        |
| 20      | USB N    | 40      | GND        |
|         |          | 41      | 3.3V       |
|         |          |         |            |
|         |          |         |            |
|         |          |         |            |
|         |          |         |            |
|         |          |         |            |
|         |          |         |            |

## 5 Board outline and images: (Linux Machine Ckt. Card.)

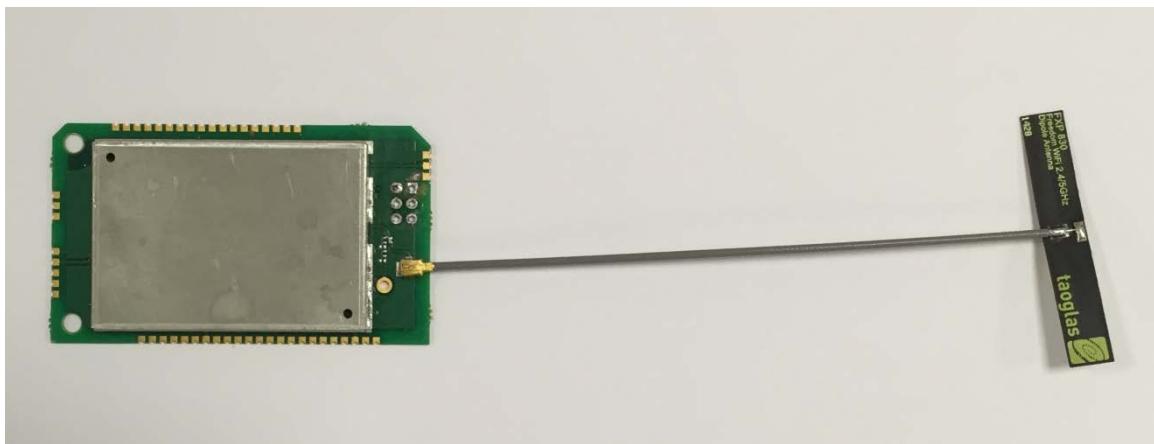
(Board outline dimensions 36.10 mm X 62.00 mm)

Soldering method to host assembly shall be per IPC – Castellation method.

**Component Side of PC board Pin Locations : (Not to scale):**



PC Assembly shown with Antenna : (Not to scale):



## 6 Certifications

- FCC CFR Title 47 Part 15 Subpart C Section 15.247, FCC Part Subpart B Class B.

FCC ID: 2AE5F2105300001

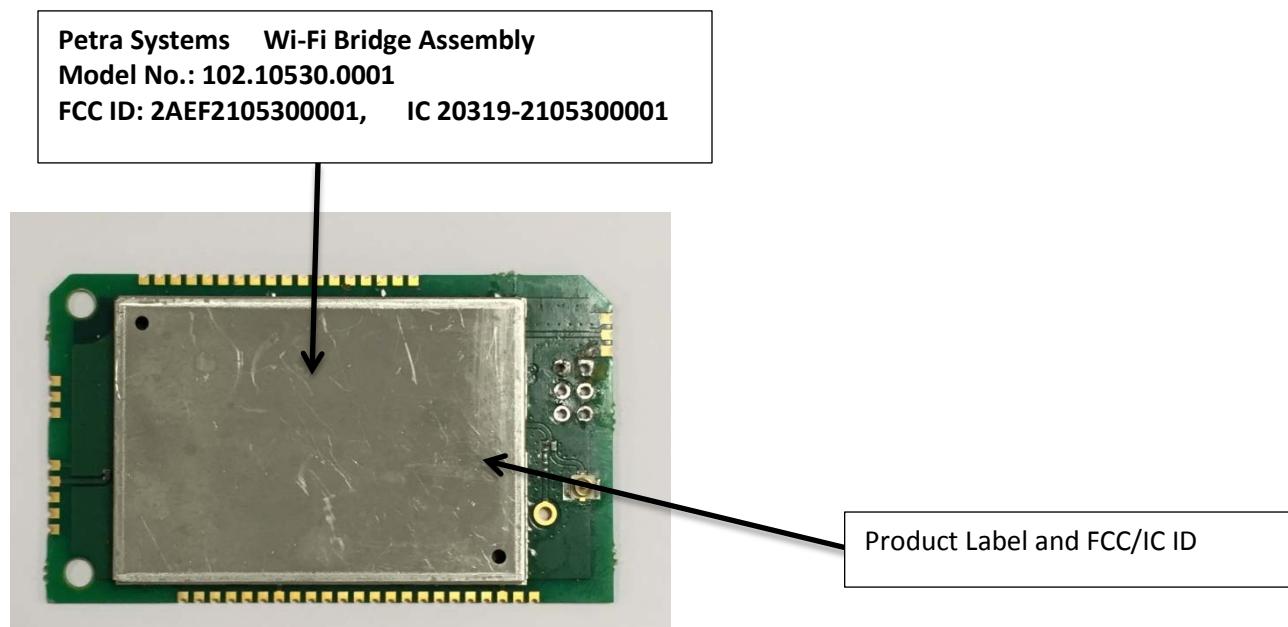
- Industry of Canada: RSS-210, ICES-003 Class B. IC: 20319-2105300001

The module is limited to installation in mobile or fixed application. The minimum separation distance from Human is 20 cm in order to comply with FCC/IC RF Exposure safety requirement.

Petra System will offer assistance to OEM installer for compliance to Part 15B requirements. The separate approval is required for all other operating configuration, including portable configurations with respect to Part 2.1093 and different antenna configurations.

The module is limited to OEM installation ONLY. The OEM integrators are responsible for ensuring that the end-user has no manual instruction to remove or install the module.

FCC Label on Module: (See page 8 for complete FCC- IC statements)



For OEM, FCC/IC Label on Hosting device label:

Company Name

Product Name / Model Number

Contains FCC ID: 2AE5F2105300001, IC: 20319-2105300001

Proper FCC/ IC Statement shall be shown on the label or in its manual.

For WiFi Bridge Assembly, FCC ID: 2AE5F2105300001 IC: 20319-2105300001

**FCC Statements:**

This device complies with Part 15 of the Federal Communications Commission (FCC) Rules.

Operation is subject to the following two conditions:

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

**CAUTION:**

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

**IC statements:**

*- This device complies with Industry Canada license-exempt RSS standard(s). Operation is Subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired Operation of the device.*

*- Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*