2ADCB-ACWIFI001 User's Manual

REVISION HISTORY

Date	Version	Description	Author
6/6/2016	1.0	Initial Draft	Kayvon Movahed
9/26/2016	1.2	FCC ID and antenna fixed	Kayvon Movahed
11/30/2016	1.3	Block Diagram	Kayvon Movahed
12/15/2016	1.4	FCC ID typo fixed	Kayvon Movahed
12/16/16	1.5	FCC and IC Compliance statements added	Kayvon Movahed

Background

The 2ADCB -ACWIFI001 radio module is intended for installation in wireless streetlight controls applications. The module has onboard regulated 3.3Vdc supply.

The module assembly comes with two different antennas; Laid MAF95310 Mini NanoBlade Flex with the gain of 2.79 dBi @ 2.4 GHz and 3.38 dBi @ 5 GHz, and Laird DCF5151C-FNM 1dBi @ 2.4GHz and 2.4 dBi at 5.0GHz.

Each variant is physically and electrically identical except for the antenna implementation.

Caution: the module assembly may not be used with other antenna types or with antennas of higher gain.

Modem User's Manual (not accessible to end-users).

1. Overview of the Radio Modem Hardware

The 2ADCB -ACWIFI001 modem is an 802.11 wireless module that allows wireless communication using a standard asynchronous serial data stream. The main features of the 2ADCB -ACWIFI001 radio modem are presented in the figures below. FCC ID label will be applied to the shield at a later date.
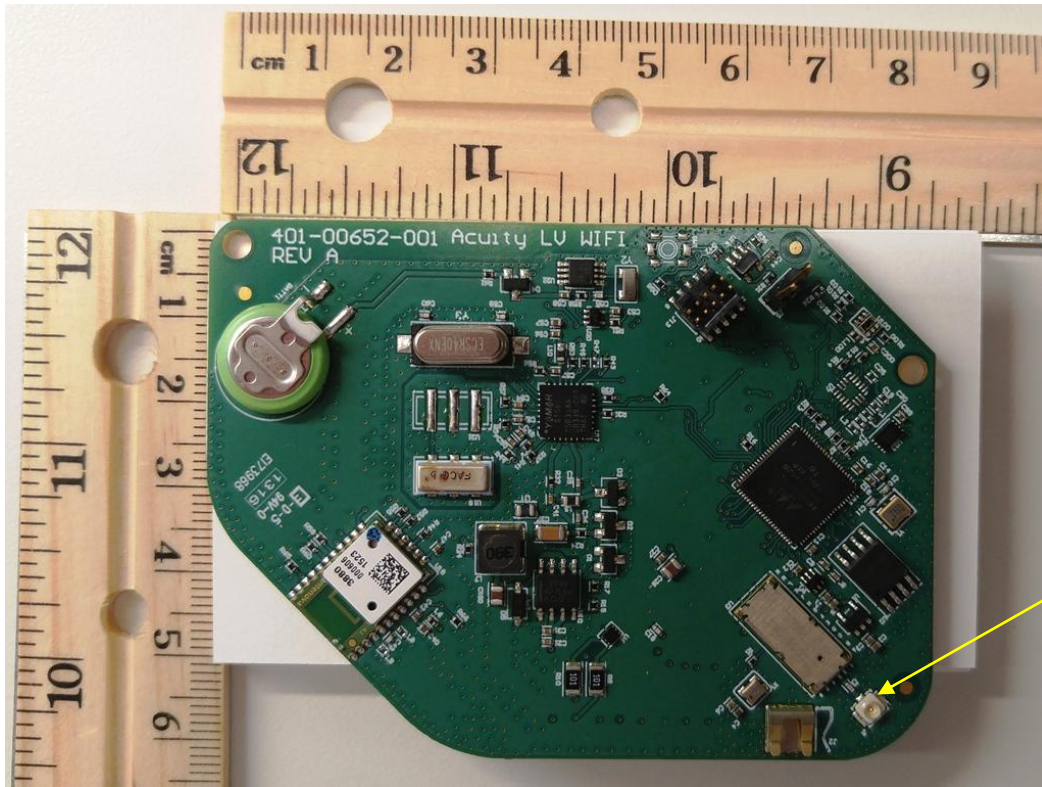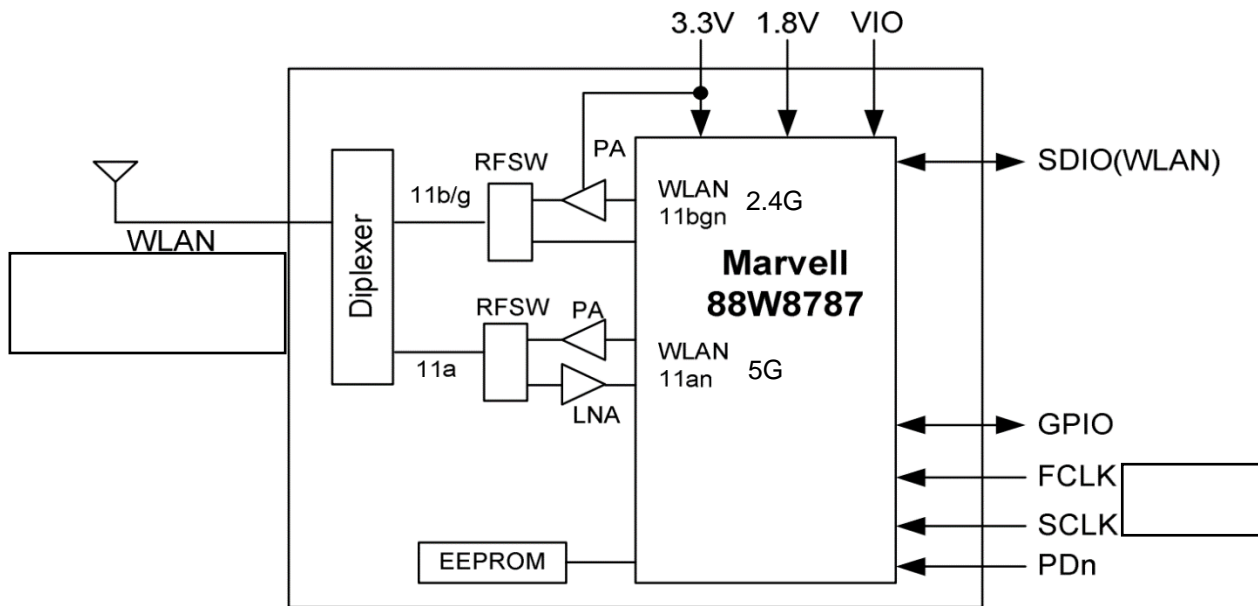
Antenna port
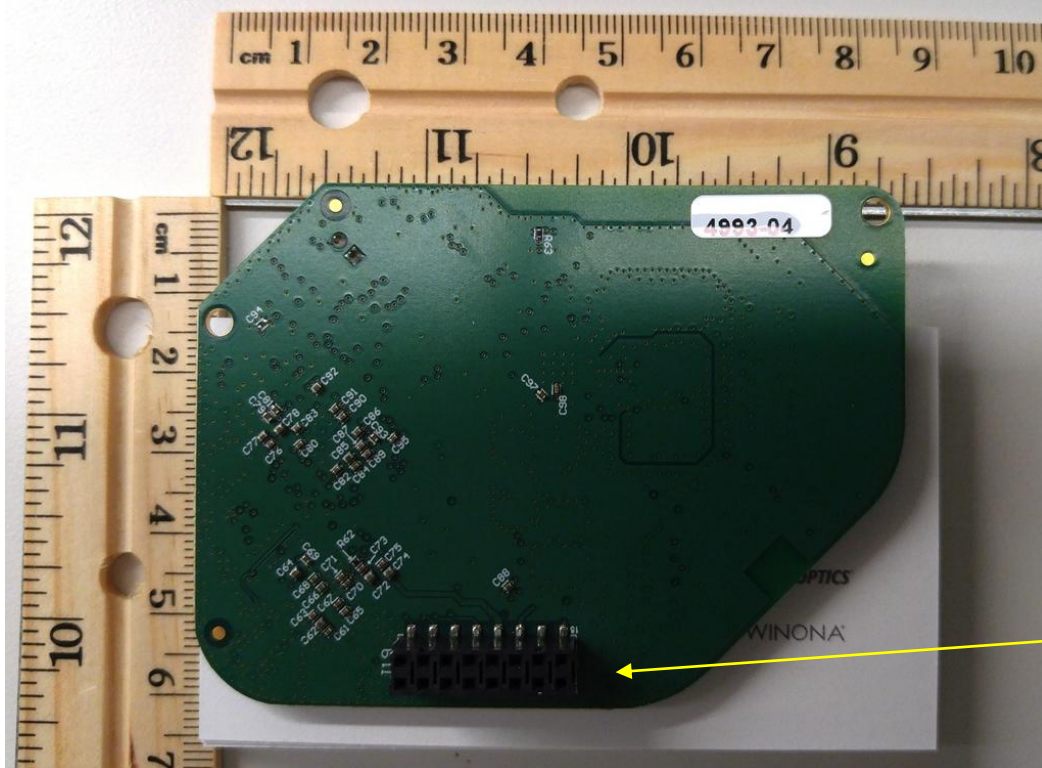
J19 connector

Functional Block Diagram of the 2ADCB -ACWIFI001 Module

The 2ADCB -ACWIFI001 radio module consists of three functional entities:
      1. Transceiver section – processor, RF transceiver
      2. RF section – BALUNs, RF PA, RF filters, RF switch
      3. Non-volatile storage – EEPROM

A table of the radio modem pins is provided below, describing the purpose and functionality of the pins and the max voltage range on the pins. Pin-out is identical for each of the above three module variants.

Pin number	Pin name	Function of Pin	Nominal Voltage	Max Voltage
1	PW_OFF_HIGH	Main relay control	3.3VDC	3.6VDC
2	PW_OFF_BOOST	Relay control	3.3VDC	3.6VDC
3	AUX_OFF_HIGH	Relay control	3.3VDC	3.6VDC
4	AUX_OFF_BOOST	Relay control	3.3VDC	3.6VDC
5	PM_DO	Power metering communication	3.3VDC	3.6VDC

6	GND	Ground	3.3VDC	3.6VDC
7	PM_TXD	Power metering communication	3.3VDC	3.6VDC
8	PM_RXD	Power metering communication	3.3VDC	3.6VDC
9	PWR	Power input 3.3VDC	3.3VDC	3.6VDC
10	PWR	Power input 3.3VDC	3.3VDC	3.6VDC
11	PMW1	0-10V dim control	3.3VDC	3.6VDC
12	PM_RST	Power metering communication	3.3VDC	3.6VDC
13	MCUDBGRX	UART debug RX	3.3VDC	3.6VDC
14	MCUDBGTX	UART debug TX	3.3VDC	3.6VDC
15	GND	DC communication Ground	3.3VDC	3.6VDC
16	YAMAR_DATA_PWR	DC communication Line	3.3VDC	3.6VDC

2. Operation of the 2ADCB -ACWIFI001 Radio Modem

Communication with the 2ADCB -ACWIFI001 radio modem happens through serial port. The baud rate is set to be 115200, 8N1.

2.1. Getting started

Open an instance of terminal software on a serial port with the above settings and connect to the RF modem. Any command is single line followed by enter command. Format of command is: command param1 param2 … <enter> At startup pushing the enter key a few times is necessary until the reception of the prompt string.

This device is always a WIFI client. The device will scan for AP starting from channel 1 to 11 then it will continue on 5GHz band. The default key and password is: XeraL2/kentspeed. This can be change after the device is connected.

PTS Commands description:

help
sdk-version
xlog-info
xlog-level [<new_level>]
xlog-prefix [<element> ...]

x-rtc-get
x-rtc-set <tm_sec>
x-rtc-usecs [<tm_usec>]
x-rtc-dump
xlog-dump
xlog-dump-event
xlog-dump-prev
xlog-set-event
x-dim <channel> [<value> [<rate up> [<rate down>]]]
x-dimmer <channel> <value>
x-adctest <channel>
x-swinfo
x-ldump
x-timesync
x-sens-list
x-sens-read
x-sens-read-ext
x-alarm-set <type> <severity> [text...]
x-alarm-dump
x-alarm-short
x-mem-dump <addr> <len>
x-poke <addr32> <val32>
x-flash-erase <dev> <addr> <len>
x-flash-dump <dev> <addr> <len>
x-eeprom-dump <addr> <len>
x-otafw <url>
x-fwflip
x-mem
x-rs-tx
x-rs-rx
x-get-mac
x-reboot
x-wdttout
x-get-tasks
x-get-stacks
x-debug 0|1
x-sd-dbg 0|1
x-psm-backup-module <dest_mod> <src_mod> [<erase?>]
x-psm-erase-module <module_name>
x-psm-format-module <module_name>
x-psm-delete-var <module_name> <var_name>
x-corrupt-module <module_name>
x-psm-dump-hex <module_name>

x-cfgget <var_name>
x-cfgset <var_name> <value>
x-atimer-info
psm-register <module> <partition-key>
psm-get <module> <variable>
psm-set <module> <variable> <value>
psm-del <module> <variable>
psm-erase
psm-dump <partition_no>
psm-get-free-space <module>
wlan-scan
wlan-add <profile_name> ssid <ssid> bssid...
wlan-remove <profile_name>
wlan-list
wlan-connect <profile_name>
wlan-disconnect
wlan-stat
wlan-info
wlan-address
wlan-mac
wlan-set-regioncode
wlan-get-regioncode
wlan-gethostbyname <hostname>
pm-wifi-pdn-enter (see pm-wifi-pdn-enter -h for details)
pm-wifi-pdn-exit
iwpriv Support for iwpriv commands
x-keyring-dump
x-cal-dump
x-cal-read
x-cal-write
x-energy-reset
x-cs5480-dump
x-cs5480-read
x-cs5480-write
x-cs5480-inst
x-cs5480-calmode
x-gps-dump
x-gps-reset
x-gps-stdby [<0|1>]
x-ymr <mode>
x-ymr-pwr [0|1]
x-ymr-freq [0|1]
x-ymr-stats [0]

x-ymr-sof <node>
x-nh-sens
x-nh-stats
x-nh-ver
x-nh-fwdl
x-nh-md <addr> <nb>
x-nh-peek <addr>
x-nh-peek8 <addr>
x-nh-poke <addr> <val>
x-nh-poke8 <addr> <val>
x-pwr-dump
x-pwr-aux-enable [0|1]

3. Antenna Information

To maintain compliance with FCC Rules and Regulations, only the following antenna types with gains no higher than what is indicated may be used with this product:

For 2.4 Ghz Operation:
Flex Trace, max gain: 2.79 dBi
Omni, max gain: 1.0 dBi

For 5 Ghz Operation:
Flex Trace, max gain: 3.38 dbi
Omni, max gain: 2.4 dBi

4. RF Exposure Limit Warning

To comply with FCC's RF exposure limits for general population / uncontrolled exposure, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Pour se conformer aux limites d'exposition aux RF pour la population générale / incontrôlée l'exposition, l'antenne (s) utilisée pour ce transmetteur doit être installé pour Prévu distance de séparation d'au moins 20cm de toutes les personnes et ne doit pas être situé ou opérant en conjonction avec une autre antenne ou émetteur.

5. Compliance Statement (Part 15.19)

This Device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

2ADCB -ACWIFI001 Frequency Selection

The 2ADCB -ACWIFI001 can select an unoccupied portion of the spectrum at startup. The module also uses DFS to avoid interfering with Radar signal in 5 GHz to 5.8 GHz band. The series uses a set of channels as defined by the IEEE 802.15.11 / standards which span a range from 2405 to 2475 MHz and 5170 MHz to 5825MHz. See below for the list of between channels:

Channel	Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462
36	5180
38	5190
40	5200
42	5210
44	5220
46	5230
48	5240
52	5260
54	5270
56	5280
60	5300
62	5310
64	5320
100	5500
102	5510
104	5520
108	5540
110	5550
112	5560
116	5580
118	5590
120	5600
124	5620
126	5630
128	5640
132	5660
134	5670
136	5680

140	5700
142	5710
144	5720
149	5745
151	5755
153	5765
157	5785
159	5795
161	5805
165	5825

The channel mask is the name used to describe the list of frequency channels that a radio can use. The default channel mask for client radios allows them to operate on any frequency from 2405 to 2475 MHz and 5180MHz to 5825 MHz.

6. Warning (Part 15.21)

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

7. Manufacturability

The manufacturer must follow the exact Gerber files that provided with the module. Any deviation is not acceptable. No change is allowed in TX, RX, Microprocessor and power supply portion of the module with the exception of the GPS module can be added or removed according to the need. The FCC label will go on the back of the PCB.

8. Compliance Statements (Industry Canada)

IC – Canada. 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. (3) this device meets RF exposure compliance of radio communication.

Le présent appareil est conforme aux CNR d'Industrie Canada applicablesaux appareils radio exempts de licence.L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil nedoit pas produire de brouillage, et (2)l'utilisateur de l'appareil doit accepter tout brouillage radio électrique subi, même si le brouillage est

susceptible d'encompromettre le fonctionnement.(3) Cet appareil répond à la conformité des communications radio.

For operation in the band 5150–5250 MHz , this device is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

The maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit (see antenna information above).

The maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate (see antenna information above).

 Be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

9. LABELING

Notice: the final product into which the module is installed must bear a visible label stating that the product "contains FCC ID: 2ADCB-ACWIFI001" and "contains IC: 6715A-ACWIFI001."

The product should also be labeled: "for indoor use only."