

GL2RF9 User Manual

1) FCC Interference Statement (Part 15.105 (b))

This 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 this 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 of the following measures:

Reorient 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.

2) FCC Part 15 Clause 15.21:

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

3) FCC Part 15.19(a) [interference compliance statement],:-

"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."

4) ISED RSS-Gen Notice:

"This device complies with Industry Canada's licence-exempt RSSs. 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;
- 2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement."

5) ISED Canada ICES-003 Compliance Label (CAN BE PROVIDED ON LABEL OR in MANUAL):

"CAN ICES-3 (B)/NMB-3(B)"

6) RF Exposure Guidance

In order to comply with FCC / ISED RF Exposure requirements, this device must be installed to provide at least 20 cm separation from the human body at all times.

"Afin de se conformer aux exigences d'exposition RF FCC / ISED, cet appareil doit être installé pour fournir au moins 20 cm de séparation du corps humain en tout temps."

7) ANTENNA

The GL2RF9 is designed to be used with the following antenna,

- a) A Dipole 2.1 dBi.
- b) A Yagi 12dBi.

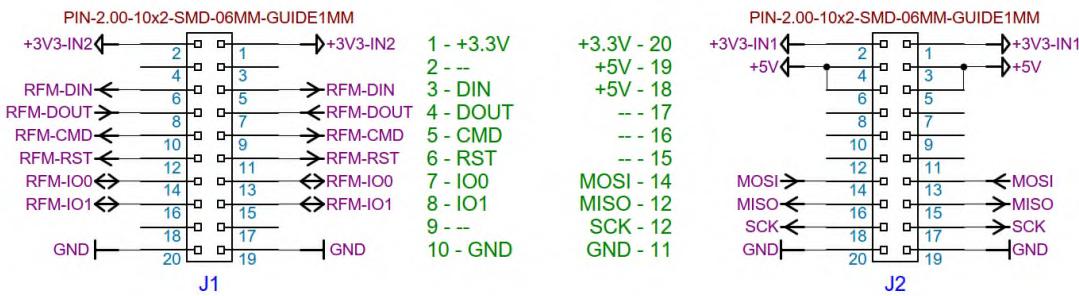
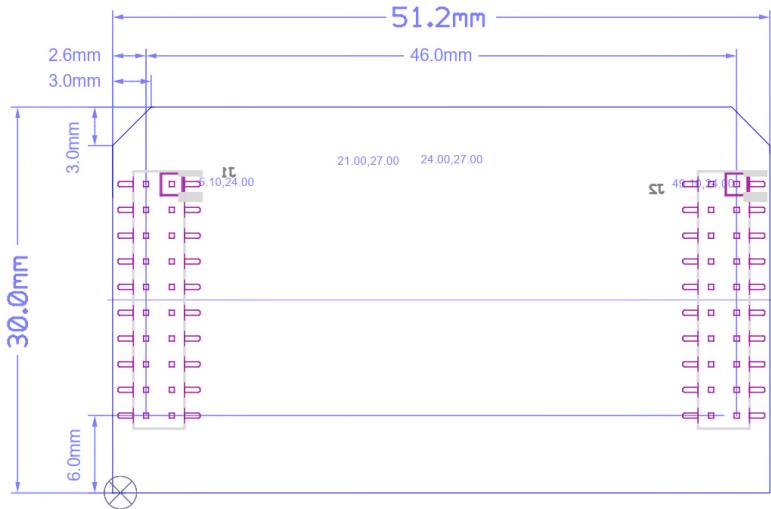
8) Host Manufacturers – must provide a physical label with the following information

Contains FCC ID: 2A3JY2RF9

Contains IC:28118-2RF9.

1 GL2RF9 Dimensions and Pinout

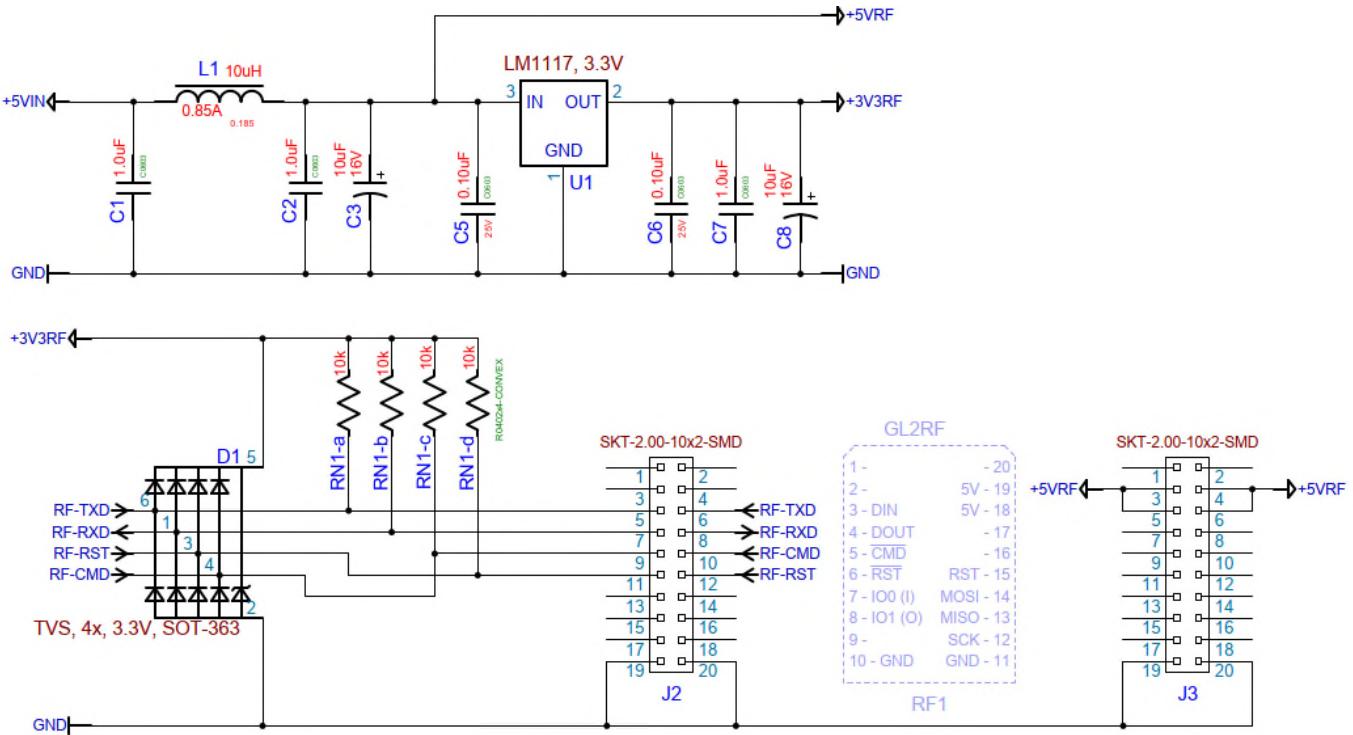
Top view, connectors are on the bottom.



Notes:

- 1) +3.3V pins are not connected
- 2) MOSI, MISO, SCK are used during production only. Do not connect in application.
- 3) IO0, IO1 pins are not used. Do not connect in application.

2 GL2RF9 Typical Use Connections



Power supply (+5VRF) voltage range is 4.0-5.5V.

3 GL2RF9 UART Communication

Power-up UART settings:
38400, 8, N, 1

Configuration is not stored inside RF module.
Host needs to configure RF module after every reset.

Entering command mode:
<wait ATBT milliseconds>+++<wait ATAT milliseconds>

RF module response:
OK<0xD0>

Exiting command mode:
ATCN<0x0D>

4 GL2RF9 Command Set

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-----
ATAT  After Time
        Time after "+++" in 100ms units)
-----
ATBL  Software build
        Result:Software build (4 hex digits)
        Example:
            ATBL
            374
```

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;-----
ATBR  Set baudrate (baudrate value)
Baudrate will be changed only after ATCN command.
Format: ATBR[BAUDRATE]
[BAUDRATE] is a baudrate value in ASCII hex format.
Return values: 8 digits in ASCII hex format.
                Returned value is the closest actual value of baudrate and may differ from
                Value passed as [BAUDRATE] argument.
Example:
ATBR2000
OK
ATBR
2015
ATCN
;-----
ATBT  Before Time
Time before "+++" in 100ms units)
;-----
ATCH  Set or get RF channel.
Format: ATCH[CHANNEL NUMBER]
[CHANNEL NUMBER] : channel number in ASCII hex format
Example:
ATCH0A
OK
ATCH
0A
;-----
ATCN  Exit command mode
;-----
ATDM  Set or get current Data Mode state
Format: ATDM[STATE]
0 - OFF: Data exchange is disabled;
1 - Stream Mode, Fixed packet length (only for GLxRF4)
2 - Packet mode, RF4 - Fixed length, RF8,RF9 - Variable (same as DM4)
3 - Stream Mode, Variable packet length (only for GL2RF9)
4 - Packet mode, Variable packet length

```

While the Packet mode is on:

- Command Timeout is disabled between the commands and is active only while the command is being received from the host(UART interface).
- LED behaviour is similar to STREAM mode.
- received data packages will be redirected to the host(UART interface) in format:
+RX[LENGTH],[DATA]
[LENGTH] : data length
[DATA] : set of data bytes, each byte is represented by 2 characters in ASCII hex format (0x13 as 13, 0xF1 as F1)
Example: +RX05,A1B4F122E4
- ATCN command stays in Packet mode, but update baudrate after "OK"

Example:

```

+++
OK
ATDM2
OK
ATDM
2
+RX05,A1B4F122E4
+RX01,12
+RX03,FF00FF
+RX02,1234
ATDM0
OK
ATDM
0

```

```

;-----
ATHP  Hopping Channel
;-----
ATHR  Hardware Rev.
    Result: 1 char. Possible values are: digit or symbol.
    Example:
        ATHR
        A
;
ATHW  Hardware PN
    Result: 6 chars
    Example:
        ATHW
        200131
;
ATMJ  Software Major version
    Result: 1 char
    Example:
        ATMJ
        1
;
ATMN  Software Minor version
    Result: 1 char
    Example:
        ATMN
        3
;
ATNS  read current RSSI level
Format: ATNS
OR: ATNS[CHANNEL]
    [CHANNEL] : the number of RF channel (RF channel will be switched
                to and kept for
                the further operations)
Result: 4 chars (2-bytes hex value in two's complement format).
Before using it's necessary to turn on RSSI measuring mode with ATRM1 command.

Example:
    ATRM1
    OK
    ATNS
    FF8F
    ATNS
    FF93
    ATRM0
    OK
OR:
    ATRM1
    OK
    ATNS0A
    FF93
    ATNS
    FF93
    ATNS
    FF94
    ATNS33
    FFE6
    ATNS
    FFE7
    ATNS
    FFE7

```

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;-----
ATRC      Set or get Radio Config index
New Radio Config becomes active after ATCN or ATDM2 command
Format: ATRC[IDX]
[IDX] : 0 - 20kBod,  BW < 250kHz, freq. hopping, 50 channels      (GL2RF9)
Example:
+++  

ATRC2  

OK  

ATRC  

2

;-----
ATRE      Reset parameters to default values
;-----
ATRO      Packetization timeout (ms)
;-----
ATRS      RSSI level of the last received message.
Result: 4 chars (2-bytes hex value in two's complement format).
If no messages were received before, command returns 8000 (minimal negative value)
Example:
ATRS  

8000  

It means no messages were received before.
ATRS  

FFFE  

It means the last message was received with -2dBm RSSI level.

;-----
ATRX      Set or get current state of Rx-While-In-Command-Mode.
Format: ATRX[STATE]
[STATE] : 0 is off; 1 is on
The mode "Rx-While-In-Command-Mode" adds the ability to receive data packages
in Command Mode. While the mode is on:
- Command Timeout is disabled between the commands and is active only while
  the command is receiving from the host(UART interface).
- LED behaviour is similar to STREAM mode.
- received data packages will be redirected to the host(UART interface)
  in format: +RX[LENGTH],[DATA]
  [LENGTH] : data length
  [DATA]   : set of data bytes, each byte is represented by 2 characters
            in ASCII hex format (0x13 as 13, 0xF1 as F1)
  Example: +RX05,A1B4F122E4
- ATCN command will cancel Rx-While-In-Command-Mode
Example:
+++  

OK  

ATRF1  

OK  

ATRF  

1  

+RX05,A1B4F122E4  

+RX01,12  

+RX03,FF00FF  

+RX02,1234  

ATRF0  

OK  

ATRF  

0  

ATCN  

OK

```

```
-----  
ATSH  Serial number / high word  
-----  
ATSL  Serial number / low word  
-----  
ATSW  Software PN  
  Result: 6 chars  
  Example:  
    ATHW  
    300172  
-----  
ATTX  Transmit data package in Packet Mode.  
  Format: ATTX[LENGTH],[DATA]  
    [LENGTH]: number of bytes to transmit  
    [DATA]  : set of data bytes, each byte is represented by 2 characters  
              in ASCII hex  
              format (0x13 as 13, 0xF1 as F1)  
  Example:  
    ATTX05,A1B4F122E4  
-----  
ATVR  Firmware version  
-----
```

5 Channel Select Example

[Tx]	[Rx]
<wait 300 ms>	
+++	
<wait 300 ms>	
OK	
ATCH0002	OK
OK	
ATHP0002	OK
OK	
ATCN	OK