

# 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.

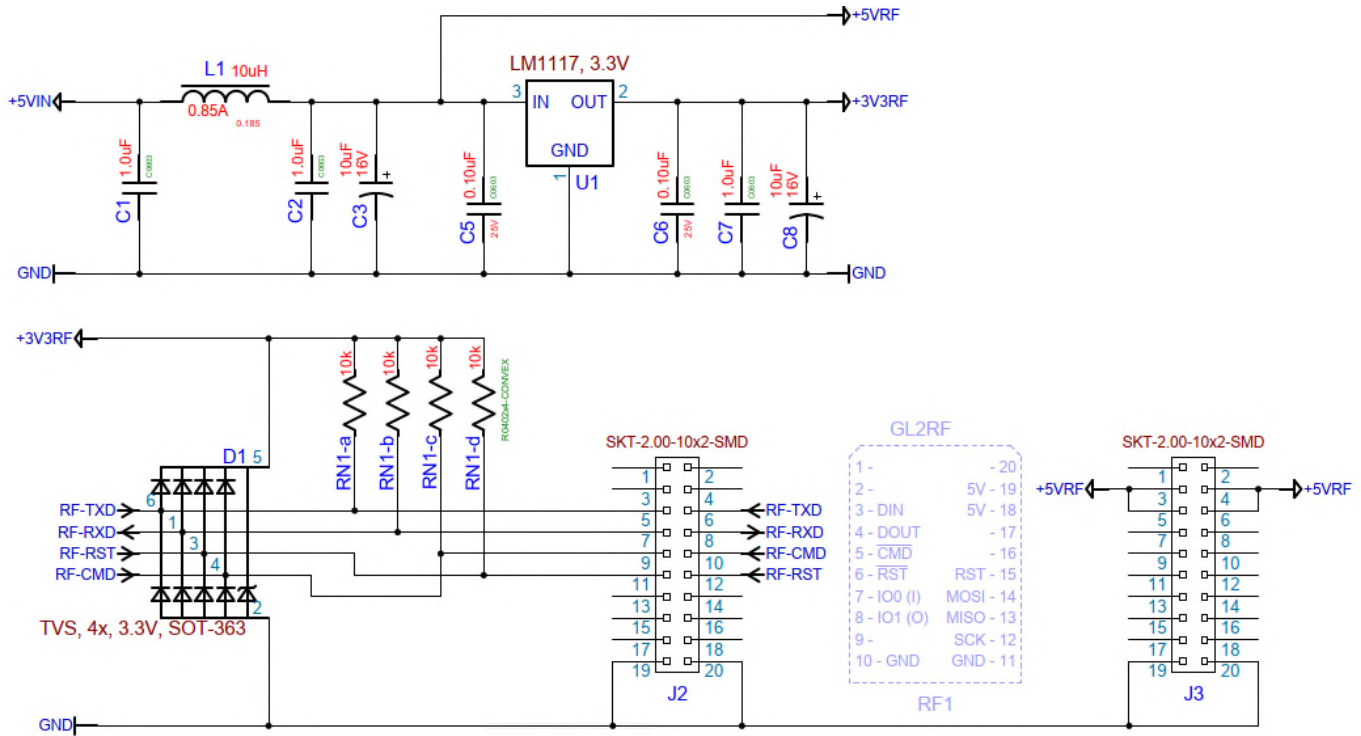
## 8) Host Manufacturers – must provide a physical label with the following information

Contains FCC ID: 2A3JY2RF9

Contains IC:28118-2RF9.



## 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 module:  
ATCN<0xD0>

## 4 GL2RF9 Command Set

```

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

```

;-----
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

```

```

;-----
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
ATHP0002
      OK
ATCN
      OK

```