



Delivering information

Wireless RF Transceiver

ISL067R User's Guide

This document contains information about the hardware interface between ISL067 transceiver and Receiver. Information includes the theory of operation, specifications, interface definitions, configuration information and mechanical drawings

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Revision History

Issue	Date	Author	Comments
0-1	02/05/14	C Boddy	Initial Release
0-2	15/05/14	V Tambe	Added FCC statement P6

Operation is subject to the following two conditions: this device may not cause harmful interference, and this device must accept any interference received, including interference that may cause undesired operation.

Caution: any changes or modifications not expressly approved by the Manufacturer could void the user's authority to operate the equipment.

Contents

1. Safety Information 5

DECLARATION OF CONFORMITY 9

2. ISL067..... 10

3. Theory of operation 10

 3.1 Network Topologies 10

 3.2 Point-To-Point 10

 3.3 Point-to -Multipoint..... 11

 3.4 Other network topologies 12

4. Board Level Pin Assignments 14

5. Specifications 15

1. Safety Information

FCC WARNING

This equipment generates or uses radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made

Agency Identification Numbers

Part #	ID	
ISL067R	ZWZ-ISL067	FCC
ISL067R	12053A-ISL067	Industry Canada

Approved Antenna List

This radio transmitter ISL067R has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Name / Model	Gain	Impedance
2J Antennae - 2J301M-300RG174-C143N	2dBi	50 ohms
2J Antennae - 2J310M-300RG174-C143N	5dBi	50 ohms
2J Antennae - 2JW031	0dBi	50 ohms
2J Antennae - 2J010	2.2dBi	50 ohms
2J Antennae - 2J020	2.2dBi	50 ohms

The ISL067 has been designed with an internal PCB antenna and external approved 2J antennas listed in the above table with reverse polarity male plugs.

Caution: Any changes or modifications not expressly approved by Invisible Systems could void the user's authority to operate the equipment.

FCC REQUIREMENTS

NOTE: 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.

This equipment generates, uses, and can radiate radio frequency energy. 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 not 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 or more of the following measures:

- Re-orient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment to an outlet on a circuit that is different from that to which the receiver is connected.

This module and its associated antenna must be installed so as to ensure a separation distance of 20cm to all persons in normal use.

IC REQUIREMENTS

Radio Warning statement

"Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication."

"This device complies with Industry Canada licence-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."

"To comply with Industry Canada RF radiation exposure limits for general population, the antenna(s) used for this transmitter must be installed such that a minimum separation distance of 20cm is maintained between the radiator (antenna) and all persons at all times and must not be co-located or operating in conjunction with any other antenna or transmitter."

OEM Responsibilities

The ISL067R Module has been certified for integration into products only by OEM integrators under the following conditions:

1. The antenna(s) must be installed such that a minimum separation distance of 20cm is maintained between the radiator (antenna) and all persons at all times.
2. The transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter.

As long as the two conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions can not be met (for certain configurations or co-location with another transmitter), then Industry Canada certification is no longer considered valid and the IC Certification Number can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Industry Canada authorization.

End Product Labeling

The ISL067R Module is labeled with its own IC Certification Number. If the IC Certification Number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. In that case, the final end product must be labeled in a visible area with the following:

"Contains Transmitter Module IC: 12053A-ISL067

or

"Contains IC: 12053A-ISL067"

The OEM of the ISL067R Module must only use the approved antenna(s) listed above, which have been certified with this module.

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module or change RF related parameters in the user's manual of the end product.

Replacing battery

!CAUTION:

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.

DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

WARNING!

Only qualified service personnel may install this equipment. The instructions in this manual are intended for use by qualified service personnel only.

Only qualified persons should service the system.

The installation and service of this hardware is to be performed only by service personnel having appropriate training and experience necessary to be aware of hazards to which they are exposed in performing a task and of measures to minimize the danger to themselves or other persons. Electrical shock hazards from the telecommunication network and AC mains are possible with this equipment. To minimize risk to service personnel and users, the system must be connected to an outlet with a third-wire Earth.

Service personnel must be alert to the possibility of high leakage currents becoming available on metal system surfaces during power line fault events near network lines.

These leakage currents normally safely flow to Protective Earth via the power cord.

Therefore, it is mandatory that connection to an earthed outlet is performed first and removed last when cabling to the unit. Specifically, operations requiring the unit to be powered down must have the network connections (exchange lines) removed first.

Intrinsic safety

Do not install the unit in conditions where there is a danger of electrically ignited explosions.

Exposure to sunlight, heat and moisture

Do not expose the unit to direct sunlight for long periods. Keep away from excessive heat and moisture.

Spare parts and accessories

Use only approved spare parts and accessories. The operation of non-approved parts cannot be guaranteed and may even cause damage.



DECLARATION OF CONFORMITY

Measurement Standard Applied

ANSI C63.10:2009

Manufacturer:

Invisible Systems Ltd
9 Beetham Rd
Milnthorpe
Cumbria
LA7 7QL
U.K

Product Description

925.78MHz Transceiver
designed for low cost solution
for wireless application

Product Model

ISL067

Part Number

?????

Test Laboratories



Unit E
South Orbital Trading Park
Hedon Road
Hull
HU9 1NJ
UK
T 01482 801801
F 01482 801806

STANDARDS TO WHICH CONFORMITY IS DECLARED

Part 15 Specific conditions for 900MHz

Title 47 CFR 15.209, 15.249 (a),(e), 15.215, 15.109, 15.203

I the undersigned, hereby declare that the equipment specified above conforms to the specified Directive and Standards.

Signature

Date 05/06/14

Print Name Pete Thompson

Title Mr

2. ISL067R

The ISL067R transceiver is a narrowband radio designed for license-free operation in 900MHz ISM band.

The ISL067R has a fixed 1mW of output power for use in the USA and Canada 902MHz – 928MHz ISM bands.

This is a full-duplex wireless data transceiver which is integrated with an ultra speed MCU and a powerful RF chip.

A software application is offered so that users can modify the settings of the module. Its slim size, and ultra long transmission distance makes itself the most popular selection of many applications in different fields.

3. Theory of operation

3.1 Network Topologies

Topology refers to the shape of a network or the network's layout. How different nodes communicate with each other is determined by the network topology. The ISL067R support a point-to-point and a point-to-multipoint network topology.

3.2 Point-To-Point

A point-to-point network consists of only two radios, one configured as a receiver and one configured as a transmitter. Sometimes referred to as a wireless bridge, a point-to-point link replaces a single communications cable.



Receiver

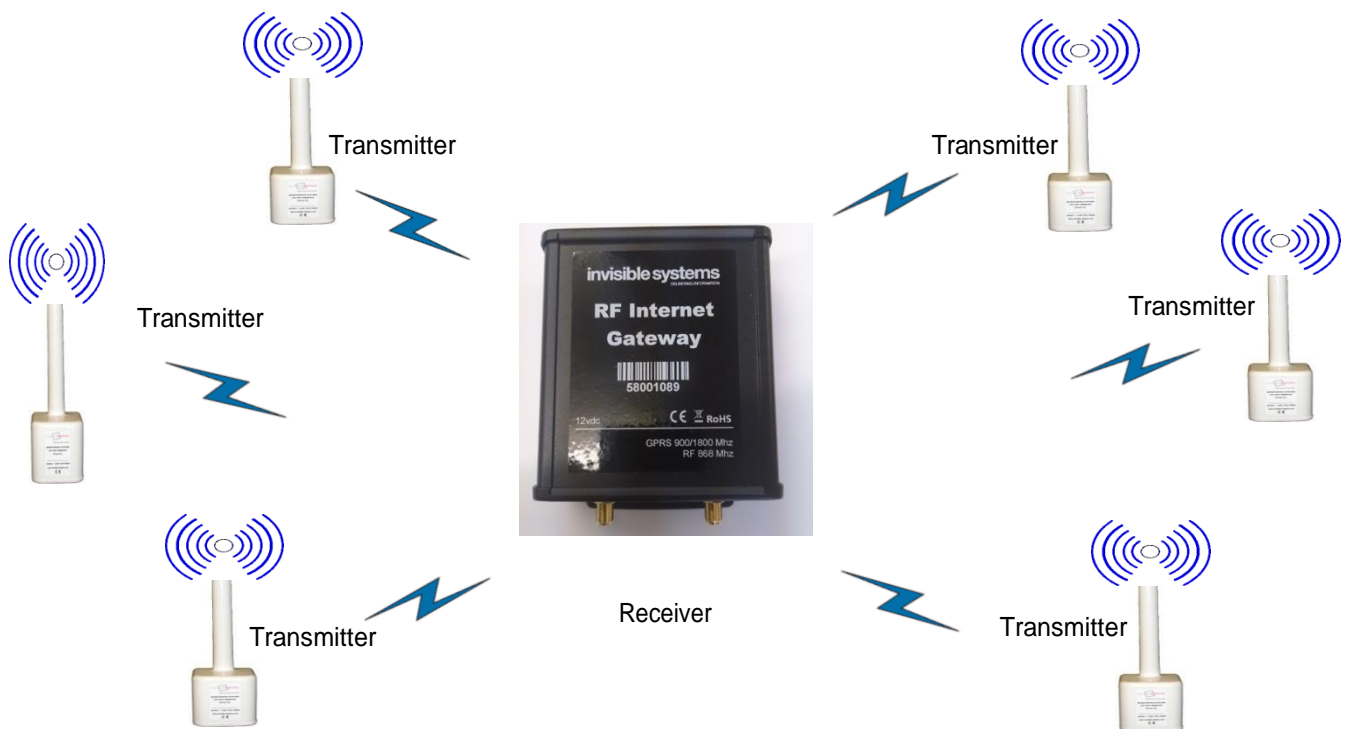


Transmitter

3.3 Point-to-Multipoint

Point-to-multipoint systems have one base station (receiver) that controls all communications with all of the other wireless nodes in the network. This allows for the creation of a wireless network consisting of multiple nodes. In a point-to-multipoint network the receiver would typically be set up as the access point and would be configured to receive data. The other nodes would be set up as transmitters.

There is a limit of 60 transmitters that can be configured in a point-to-multipoint network, but all radios would share the same bandwidth over the RF, so as more nodes were added care should be taken when transmitting data to prevent collisions.



3.4 Other network topologies

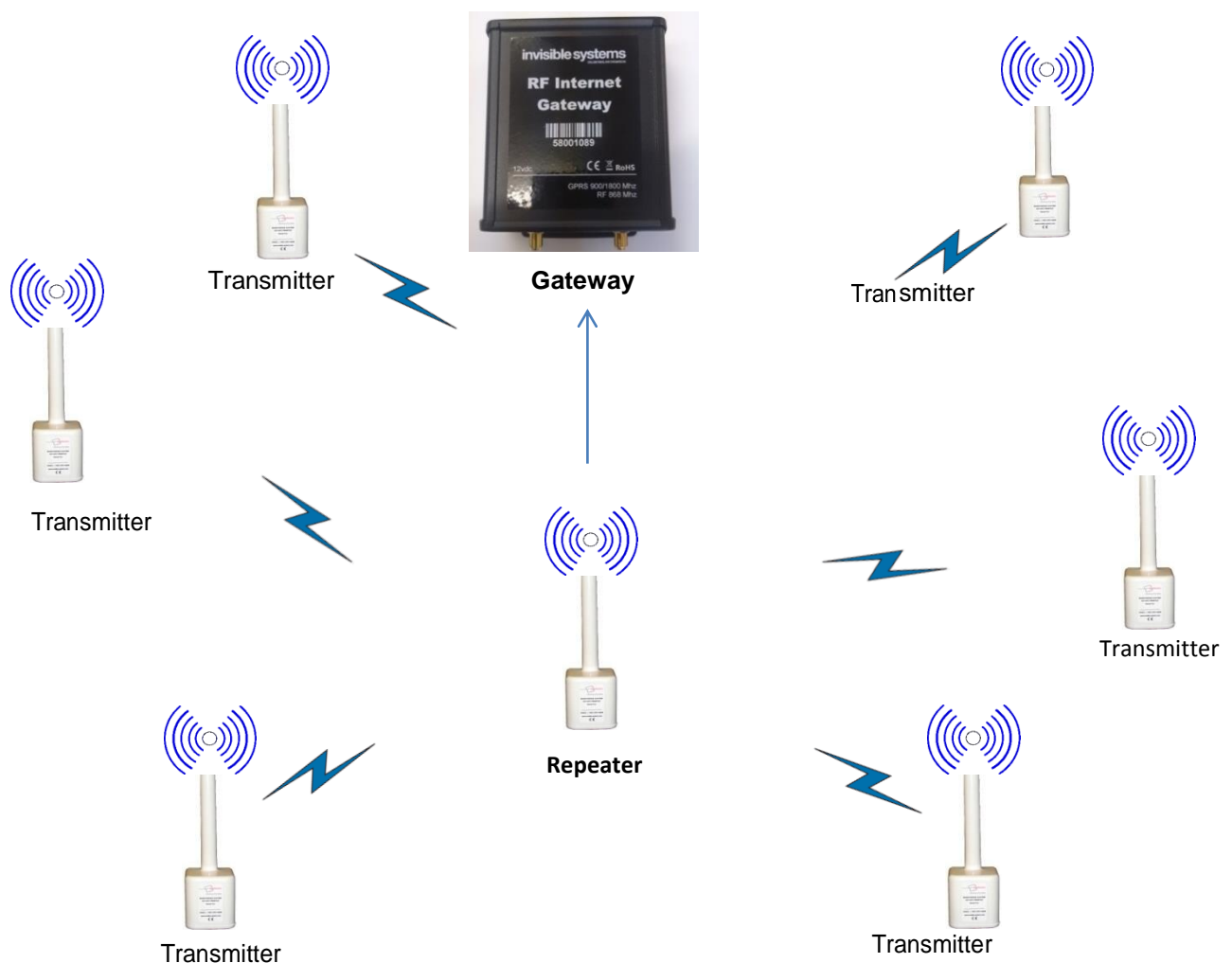
3.4.1 Repeater networks

Though there is no functionality for a transmitter to automatically forward a message along to another radio, repeater networks can be setup to provide for additional coverage.

This example of a repeater network would still be useful for a point-to-multipoint network where some of the transmitters are not in range of the primary access point.

In this network topology an ISL067R product is setup as a repeater to act as the primary access point.

To cover additional areas, a repeater consisting of two ISL067R can be added to the network.



Limitations:

There are some limitations to this setup.

- The addition of the repeaters requires additional radios which increases the cost of the systems.
- The repeater setup must be powered by the supplied 12v main adapter.
- The antennas of the transmitter and the receiver in the repeater should be positioned to minimize interference. For best performance the antennas should be placed more than 10ft from each other.
- There is some additional latency associated with the repeater; this latency is between 200 and 400ms typically

4. Board Level Pin Assignments



1 2 3 4 5 6 7

Pins: 1-7

Pin	Signal	Assignment	Color
1		Ground	
2		Ground	
3	Output	VSW switched VDD out	
4	Input	1 wire Data	
5	Input	Pulse Input 2	
6	Input	Analogue Input -	
7	Input	Analogue Input +	
8	Output	TX Out	
9	Input	Pulse Input 1	
10	Input	1 wire Data	
11	Input	Pulse Input 2	
12	Output	VDD	
13	Output	VSW switched VDD out	
14		Ground	

5. Specifications

TABLE 1: ISL067R DETAILED SPECIFICATIONS

INTERFACES	
RF Connector	Internal PCB antenna or UFL to SMA Reverse Polarity Female Jack
OPERATIONAL	
Network Topologies	Point-to-Point, Point-to-Multi Point
Security	N/A
Frequency Band	925.78MHz
RF Data rate	2400 kbps
RF Technology	Narrowband
Output Power	100mW
Maximum radiated power (EIRP)	45.13mV/m measured at 3 meter
Range Line of sight	Outdoor: up to 10km Indoor: up to 2km
Sensitivity	-115dBm at 2400kbps RF rate
ELECTRICAL/ENVIROMENTAL	
Supply voltage	+3.6 v DC
Current consumption	35mA
Temperature (Operating)	-20°C to +55°C
Temperature (storage)	-50°C to 85°C
PHYSICAL	
Dimensions	35x50mm
Weight	8g
CERTIFICATIONS	
FCC ID	ZWZ-ISL067
Industry Canada ID:	12053A-ISL067
CE	ANSIC63.10:2009
ROHS	YES