



Delivering information

Wireless RF Transceiver

ISL024DB1 User's Guide

This document contains information about the hardware interface between ISL024DB1 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	09/09/2011	Vahid Tambe	Initial Release
0-2	29/09/2011	Rob Jevans	Removed antenna references

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	8
2.	ISL024DB1	9
3.	Theory of operation.....	9
3.1	Network Topologies.....	9
3.2	Point-To-Point.....	9
3.3	Point-to -Multipoint	10
3.4	Other network topologies.....	11
4.	Board Level Pin Assignments.....	13
5.	Specifications	14

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 #	FCC	
ISL024DB1	ZWZISL024DB1	

Approved Antenna List

The ISL024DB1 has been designed with an internal PCB antenna only.

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.

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

ISL024DB1

Part Number

250001

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

Print Name

Title

2. ISL024DB1

The ISL024DB1 transceiver is a narrowband radio designed for license-free operation in 900MHz ISM band.

The ISL024DB1 has a fixed 1mW of output power for use in the USA and Canada 902MHz – 928MHz ISM bands.

This is a half-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 ISL024DB1 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.



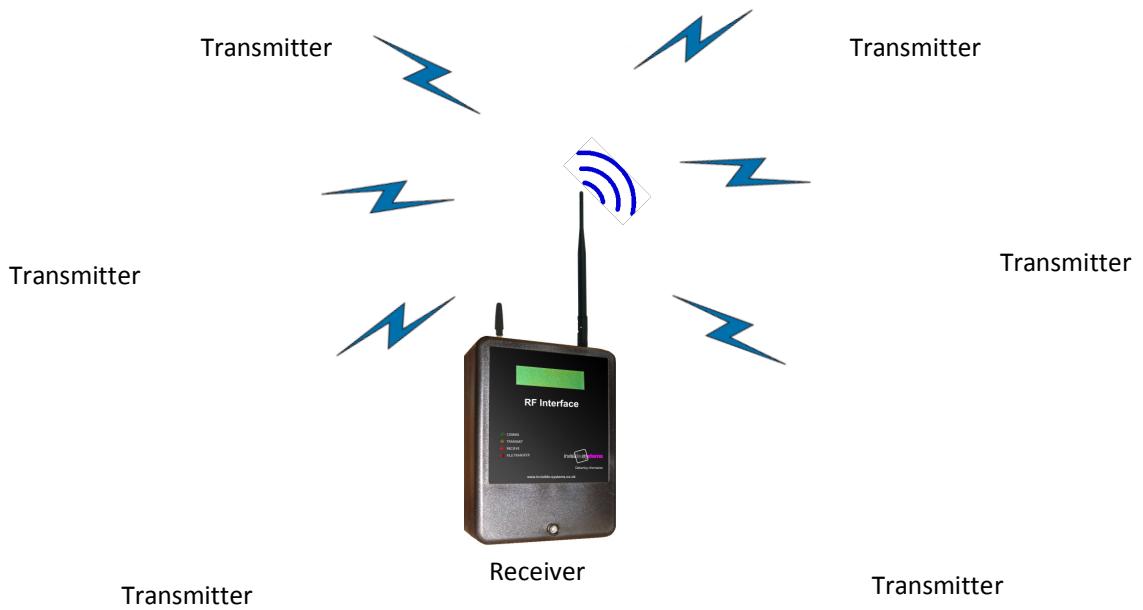
Transmitter

Receiver

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

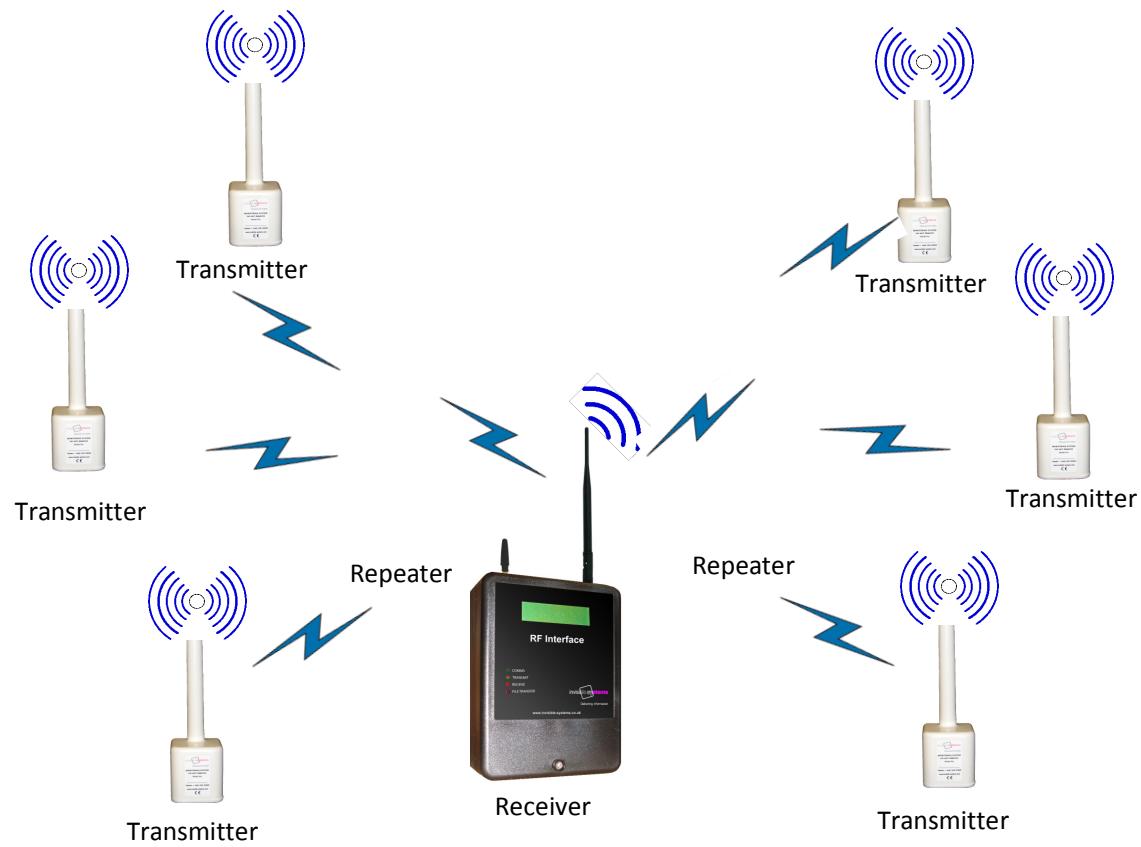
3.4.1 Repeater networks

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 ISL024DB1R product is setup as a repeater to act as the primary access point.

To cover additional areas, a repeater consisting of two ISL024DB1R can be added to the network.

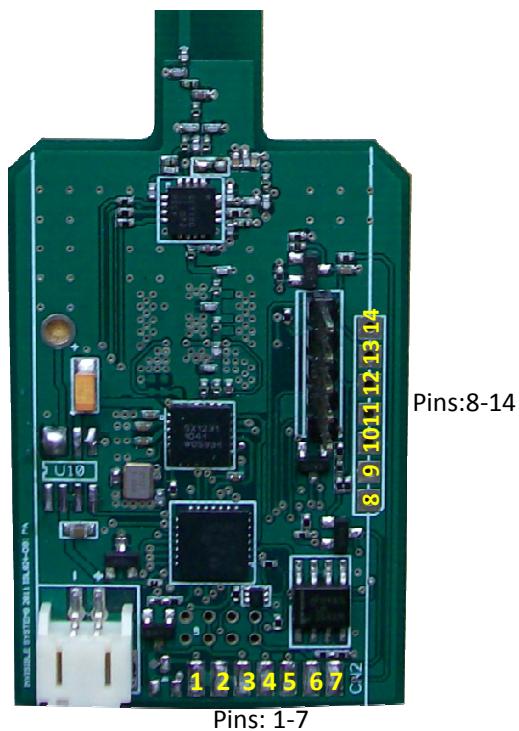


Limitations:

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 sufficiently.
- 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



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	Pulse Input 1	
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	

Appendix I Antennae Data sheets

HH-MMCXMSFB 25cm-174

5. Specifications

TABLE 1: ISL024DB1 DETAILED SPECIFICATIONS

INTERFACES	
RF Connector	None internal PCB antenna.
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	1mW
Maximum radiated power (EIRP)	45.13mV/m measured at 3 meter
Range Line of sight	Outdoor: up to 300m Indoor: up to 30m
Sensitivity	-115dBm at 2400kbps RF rate
ELECTRICAL/ENVIRONMENTAL	
Supply voltage	+3.6 v DC
Current consumption	35mA
Temperature (Operating)	-30°C to 75°C
Temperature (storage)	-50°C to 85°C
PHYSICAL	
Dimensions	35x50mm
Weight	8g
CERTIFICATIONS	
FCC	FCC ID: ZWZISL024DB1
CE	ANSI C63.10:2009
ROHS	yes