## Introduction

Please read this document and the data sheets on the devices
Before use!

The kit is intended for evaluation purposes only; this may include test, experimentation and verification of performance. It is not intended for incorporation into an end product.

This kit allows users to quickly evaluate the performance of the Micrel MICRF001 QwikRadio™ Receiver/Data Demodulator in a typical application. The receiver IC is mounted in a socket on the AM Receiver Evaluation board which is fitted with a decoder that drives an LED to indicate reception of a valid code.

A simple two button AM Transmitter, which is manufactured by Ming Microsystems, is included in the evaluation kit. A Holtek encoder is used in the transmitter providing selectable modes of operation. Data and circuitry are provided for all units.
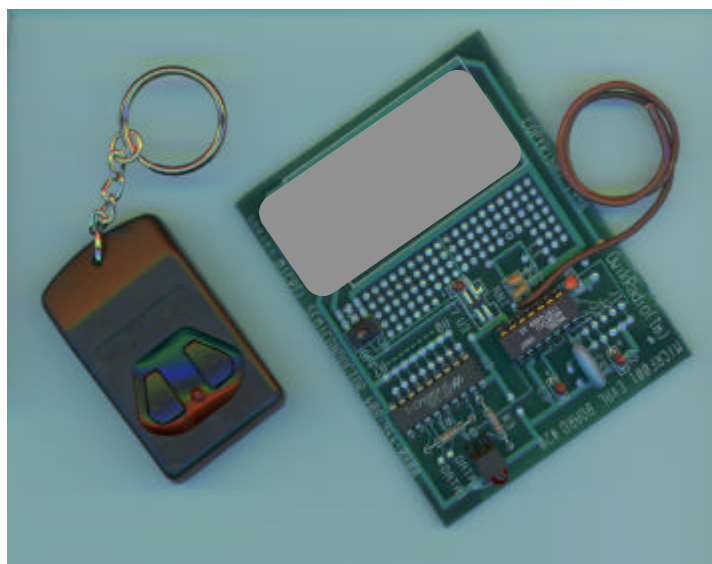
Please check that the evaluation kit contains the following items:

Qnty	Description	
1	Micrel MICRF001 Receiver module	✓
1	Ming Microsystems TX KeyFob	✓
2	9V Alkaline PP3 Battery	✓
1	Micrel MICRF001 Receiver QwikRadio Handbook	✓

This kit operates on 315MHz

Operation and Use

The primary function of this kit is to demonstrate the physical distance (range) over which reliable communications can be obtained from the Micrel MICRF001 receiver IC when used in combination with a common type of transmitter operating the US at the typical power levels allowed by the statutory bodies , the this case the FCC.

The performance of any radio system cannot accurately be predicted or guaranteed; laboratory figures can be misleading and it is only by real world testing that confidence can be achieved. The 'range test' provides the user with a practical 'feel' for the reliability and performance of a radio link in their applications environment.

It is strongly recommended that users assess the performance of these units in the intended environment of use. While it is possible to obtain typical ranges of about 100 meters with the typical Keyfob included in the system, these ranges will be modified by the local conditions. In open ground with aerials one-to two meters above ground better ranges can be obtained than from room to room, through partitions or walls, inside an office or a factory. Additionally, users can note how the aerial type or position and its proximity to large metallic objects affect range. The effect of interference sources such as other radio devices (intentional radiators) or for example, local microprocessor clocks (unintentional radiators) can also be assessed.

AM Receiver Evaluation Board

A 9V PP3 battery clips into the battery holder.   A slide on/off switch connects the battery via reverse polarity protection diode to a MIC 5203 5v 100mA regulator that provides power to the receiver module and the Holtek ™ HT12D decoder IC.

Clock frequency of the decoder IC is set by resistor R1 and is set to match the transmitter data rate. The module digital data output drives the DIN of the decoder.

The 'valid code' LED lights on an address match only. The data bit outputs are neither used nor connected

Operation

Carefully plug the 9v battery into the battery socket and switch on.   Using the enclosed Ming Microsystem's Keyfob transmitter, follow the Range Testing directions in the following section. The Ming Microsystems Transmitter Keyfob is intended for demonstration and experimentation use only.

Please note: When a valid code is being received the LED will light. (See Range Testing) The receiver module takes some time to 'warm up' when initially powered ! This is due to the AGC capacitor charging to its operating voltage.

Range Testing

1. Check that the transmitter and receiver are operating correctly at close distance.
2. Find a large clear open air space that has no obstructions such as a park or field. Ensure that there are no power lines, radio transmitters (cellular, broadcast, taxi, and radar) or other local sources of interference.
3. Check that the operating frequency is clear of interference with a hobby type 'scanner' type receiver.
4. Depress either transmitter button and hold the transmitter at least one meter above ground.
5. Hold the receiver at waist height with the aerial held vertically and well away from your body, observe the regular 'Valid Code' signal being received and indicated by the LED.
6. Slowly walk away until reception becomes intermittent. Reorient the aerial and note how the proximity of your body to the aerial affects reception.
7. When no more range can be achieved, switch off, pace out and note the distance back to the transmitter. This provides a useful reference.

8. Now perform a similar test within a building. An electrically quiet environment such as an office should be used initially. The effect of walls, doors, windows and large metallic surfaces such as filing cabinets should be observed. At the limits of range note how moving even a very short distance (2-3") causes the signal to 'fade out'. This is due to reflections that may add or subtract from the direct signal.
9. After this exercise place the receiver beside your favorite 300MHz PC microprocessor board and take the transmitter for a short walk. Does it work better with the processor running or when it is switched off? Why? Will the screening can help? Might there be a better location for the aerial?

A little research, testing and application of the acquired knowledge will reap the reward of a radio link that works consistently well despite the considerations above.

Product Order Codes

Description	Order Code
Complete Kit as below inc. box etc	MICRFKIT001EU-433

Other Frequencies

The receiver module can be configured during manufacture to operate on any frequency between 300 and 440 Mhz. The transmitter module is provided to Micrel by Ming Microsystems and is available only available on limited frequencies.

Document History

Issue	Date	Revision
1.0	Jun-98	Advanced Information
1.1	Dec-98	Preliminary Information

Limitation of Use

The kit is intended for evaluation purposes only; this may include test, experimentation and verification of performance. It not intended for incorporation into an end product.

Design

The kit was designed and is manufactured by Micrel, Inc. and as such is intended for experimental and verification use only.

Warranty

The kit is guaranteed for a period of thirty days from date of purchase against manufacturing or component defects.

Disclaimer

The Micrel, Inc. has an ongoing policy to improve the performance and reliability of their products; we therefore reserve the right to make changes without notice. The information contained in this data sheet is believed to be accurate however we do not assume any responsibility for errors nor any liability arising from the application or use of any product or circuit described herein. This data sheet neither states nor implies warranty of any kind, including fitness for any particular application.

Radio can be subject to both unintentional and intentional interference and no guarantees are provided for the exclusive use of the low power radio bands by the regulatory authorities. Some bands in some parts of the world may also be shared with high power users. Radio should be thought of as a 'statistical communication' medium and these limitations (of radio in general) should be carefully considered before incorporating radio technology into a product particularly if there may be any safety implications.

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