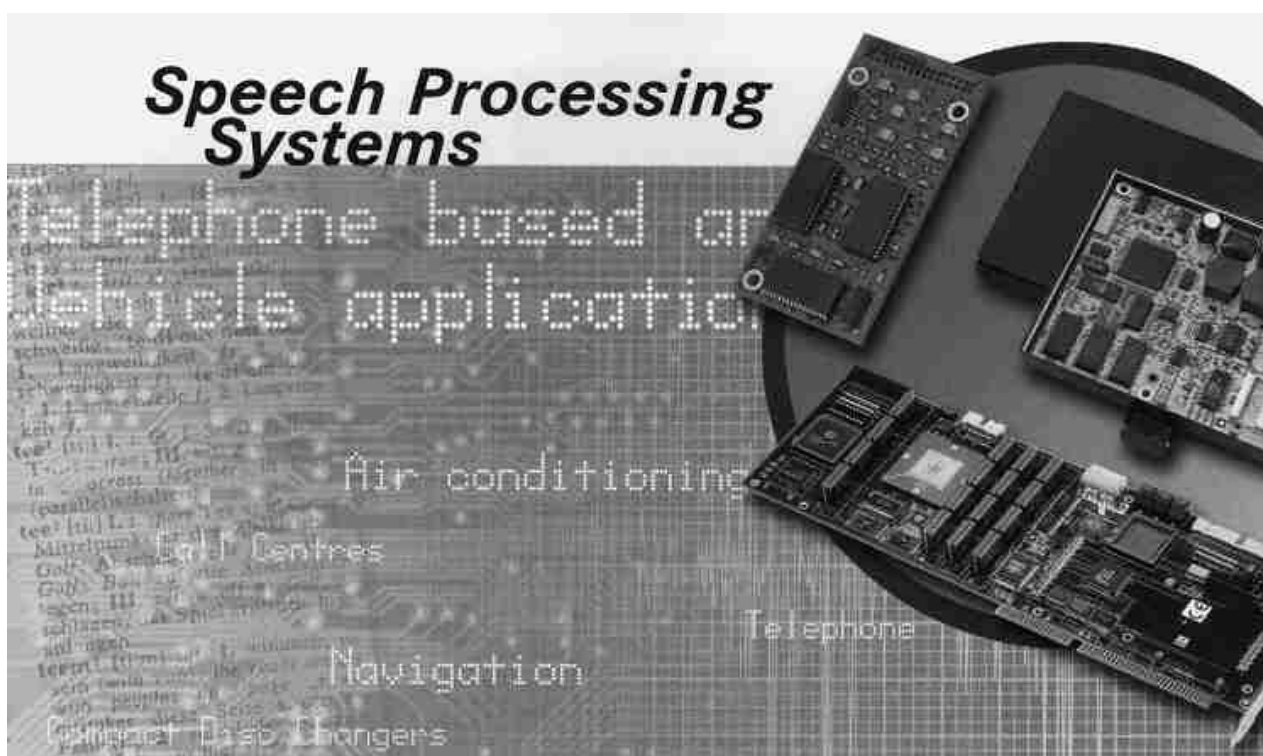


MULF2

BMW



User Manual

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1.4 Purpose of the document

User manual for the MULF2.

2 General

The MULF2 is not sold direct to the customer. The MULF2 will be delivered directly to the car manufacturer. MULF2 is manufactured for BMW AG.

BMW AG is responsible for the correct installation of the MULF2. This document is a guide for the correct use of the MULF2.

3 Power supply

Normal operation voltage of the MULF2 is 9V – 16V. The nominal supply current of the MULF2 is 180 mA at 14V. The MULF2 may only be operated on a fused power supply. The recommended fuse is a 10A Type.

4 Antenna

The MULF2 has an external antenna connector. The connector is a FAKRA type. Only the following antenna should be connected to the MULF2:

- 6 928 461 (BMW part number)

This antenna has a gain of 2,1 dBi.

It is possible, to connect the antenna via a coax cable.

5 Bluetooth

5.1 Generally

Bluetooth operates in the 2.4 GHz ISM (Industrial Scientific Medicine) band at 2.4 GHz. A frequency hop transceiver is applied to combat interference and fading. Modulation is GFSK (Gaussian Frequency Shift Keying) with a BT=0.5. The Modulation index is 0.32. A binary one is represented by a positive frequency deviation, and a binary zero is represented by a negative frequency deviation. The symbol rate is 1 Ms/s. For full duplex transmission, a Time-Division Duplex (TDD) scheme is used. On the channel, information is exchanged through packets. Each packet is transmitted on a different hop frequency. A packet nominally covers a single slot, but can be extended to cover up to five slots. The Bluetooth protocol uses a combination of circuit and packet switching. Slots can be reserved for synchronous packets. Bluetooth can support an asynchronous data channel, up to three simultaneous synchronous voice channels, or a channel which simultaneously supports asynchronous data and synchronous voice. Each voice channel supports a 64 kb/s synchronous (voice) channel in each direction. The asynchronous channel can support maximal 723.2 kb/s asymmetric (and still up to 57.6 kb/s in the return direction), or 433.9 kb/s symmetric.

5.2 Summary

- Modulation: GFSK, BT = 0,5
- Data rate: 1Mbit/s
- working frequency range: 2402 MHz to 2480 MHz
- frequency range with guard band: 2400 MHz to 2483,5 MHz

- Channels: 79 channels with 1 MHz channel spacing
- max output power: 4 dBm

6 FCC note

In the user manual should be the following text:

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.