FCC ID: MYF-WL2401
BLOCK DIAGRAM DESCRIPTIONS

Overall System

The overall system is comprised of the following basic components:

WaveLAN PC Card Radio
0.5 meter Jumper Cable
DC Injector/Lightning Protector
50 foot Cable
Amplifier
Antenna

The block first diagram shows the connection of the above system components.

The PC Card radio is connected to the “TO RADIO” connector of the DJ Injector by way of the 0.5 meter jumper cable. The DC Power Supply is connected to the “12 VDC” connection on the DC Injector. The DC Injector then supplies both the RF signal as well as DC power to the Amplifier by way of the 50 foot cable. The Antenna is connected to the Amplifier’s “TO ANTENNA” connector.

Each of the system components is described in the detailed block diagrams which follow.

DESCRIPTION OF THE BLOCK DIAGRAM

The various parts of the Block diagram are numbered and an explanation is given of these blocks.

First the transmitter will be described:

A) Digital Signal Processor. (22)

Function : Generate spreaded signal with an Barker sequence of 11, the original raw data rate of 1, 2, 5.5 or 11 Megabits is transformed to a symbol rate of one MegaBaud and multiplied with eleven and modulated with a DQPSK (Differential Quadrature Phase Shift Keying) Modulation for 1 and 2 Mbps or DQPSKCCK (CCK = Complementary Code Keying) for 5.5 and 11 Mbps. The unfiltered data comes out of I and Q and goes to the up/down mixer (6)

B) The above signals are mixed in (6) in a so called quadrature modulator with the Intermediate Frequency (IF) of 352 MHz.

C) The upmixer is fed by the VCO of 704 MHz, which is divided by 2 to 352 MHz.
D) The SAW (8) filters all unwanted mixing products, such that only the 352 MHz band remains.
E) This signal goes into the RF upmixer (9) SA2420 were it is mixed with the RF VCO with a range of 2050 to 2150 MHz.
F) The Rx/Tx switch (17) brings the signal to the variable attenuator (10), where the output level is controlled.
G) The signal is fed through a 2.4- 2.5 GHz bandpass filter (11) to remove all unwanted mixer products, and thus to get a clean signal for further processing.
H) The signal is amplified in (12), with approx 23 dB to an output level of approx. 15 dBm
I) This signal goes to the RX/TX antenna (23/24) via the special connector with a switch inside to disable the antenna.
J) The output power is controlled with a so called power feed back loop (15) in which the output power is compared with a DAC value from (10)

Receiver functions.

K) The receive signal enters the antenna passes the RX/TX switch (14) and (13) this is set to RX mode.
L) The signal goes through the 2.4 GHz filter (16) to remove all unwanted spectral components in order to deliver a clean signal for the receiver.
M) A Low Noise Amplifiers (LNA) (in 9) is used to amplify the weak signal to a level fitted for down mixing.
N) The AGC (27) can amplify or attenuate the signal according to the Digital signal processor required input with a step size of 26 dB.
O) Again the Rx/Tx switch in the Rx mode is passed and also the same filter as in transmit mode (18).
P) The down mixer (9) mixes the 2.4 GHz with the 2.1 GHz to the 352 MHz IF.
Q) The signal of 352 MHz is amplified again (9) and filtered by a SAW filter (19) to give a clean signal for the second mixer.

R) The Downmixer (6) mixes the 352 MHz signal down to the I and Q signals, also the auto gain control can increase the level to the required level via line 20.

S) The very low amplitude baseband I and Q signal is amplified in the AMPs (6) to a level fitted for the Analog to Digital converters (22), which make it a proper signal for the digital signal processor.

T) The digital signal processor (22) removes the spreading as present on the signal with a so called autocorrelation function. The resulting output of the processor is a received data rate of 1, 2, 5.5 or 11 Megabits.

VCO , PLL and OSC.

U) These three form one entity to generate a single tone signal for down mixing.
There are two of these blocks available, one for the IF LO (7 and 6) (352MHz) and one for the RF LO (25 and 26) of 2050 to 2150 MHz.

V) All the PLL's and the processor (2) have one reference Crystal of 22 MHz (4) with an accuracy of 25 ppm.

General circuits:

W)Antenna Diversity.
This functin may be placed on the radio board or on extended board (as part of external antenna.
Depending on the signal strength and signal quality the Digital processor (22) can choose between the two antenna's (23) and (24) which gives the best signal. This is done initial during the training sequence in the received signal.

X) Automatic Gain control.
Depending on the signal strength and signal quality the Digital processor (22) can choose to increase or decrease the signal level at the digital input, this is done by reducing or increasing the gain in the receiver via the LNA-AGC (in 9).

Y) The Signal processor (22) can read via the MAC (2) the registers for programming all parameters for transmit/receive functions

Z) The MAC is used to do the handshaking with the PCMCIA bus (1) and handling the IEEE protocol. Also used to load the PLL frequencies and dividers, also used to interface to the FlashROM which contains all parameters for the PLL's and the Callcode.

AA) Not shown is the regulator to supply the 3.3 Volt out of the 5 Volt out of the PCMCIA Bus (1)

Guus Jansen

Rev. A 12Apr99/BVos

INDICATION MAIN PARTS

Rev. A 12Apr99/BVos

2: HERMES

3. AT29C010

4 CDFDCJ2

5. KM68V1000

6. SA1630

7. MQE 901-704

8 + 19. L545D

9. SA2420

11 + 18. LFSN30N17C2450B

12. BFP420 + BFP450

13 + 17. BAR63

14. BAR80

16. LFJ30-07B2450

22. THESEUS-HS (High Sped)

25. MQG101-2098

26. UMA1021

Remote Power Amplifier

The Remote Power Amplifier provides the final-stage amplifier as well as a low-noise pre-amplifier (LNA) and pre-selector filter.

The RF connection to the DC Injector/Lightning Protector and PC Card radio is at J1. This connection also supplies DC power to the Remote Power Unit.

The RF connection to the antennae is at J2.

In quiescent mode (no transmission taking place) the Remote Power Unit is in "Receive Mode" whereby RF Switches SW1 and SW2 are selected to the receive path. In this mode the LNA is active. The receive signal enters from the antenna at J2 and passes through switch SW2 and the pre-selector filter. The signal is then amplified by the LNA and passes through switch SW1 and finally passes to connector J1.

In the Transmit Mode the RF Detector Circuit senses the transmit signal generated by the PC Card transmitter. Upon detection of transmit power present the driver circuit causes the RF switches SW1 and SW2 to select the "Transmit" signal path. The transmit signal is amplified by a linear final-stage amplifier PA1 to a factory-configured power level. The signal then passes through switch SW2 and to the antenna connection J2. In this mode the Transmit LED is illuminated.

Upon detection that no transmit power is present from the PC Card transmitter the RF switches SW1 and SW2 return to the "Receive Path" mode, and the Receive LNA is activated.

DC Injector/Lightning Protector

The DC Injector/Lightning Protector Model BT2404 provides DC power to the Remote Power Unit and Diagnostic LEDs. It also provides lightning protection for the PC Card and Remote Power Unit.

Connection J1 is the connection to the PC Card. This connection is made with a pigtail cable part number CA-WL2CABLE4.

Connection J2 is the connection to the Remote Power Unit. This connection is made using a 50 foot low-loss cable part number CA3N050.

Connection J3 is the power connection which is connected to the DC power supply.

There are three (3) indicator LEDs on the DC Injector/Lightning Protector: POWER, TRANSMIT, and RECEIVE. The POWER LED is illuminated when the DC power supply is connected at J3.

In the quiescent mode (no transmission taking place) the DC Injector detects the presence of the Remote Power Unit by sensing the current drawn by the LNA. In this mode the Receive LED will illuminate.

In the transmit mode the DC Injector detects the current drawn by the Remote Power Unit's PA and illuminates the Transmit LED.