

Introduction of iP47 Block Diagram

AM ANT:

Function: AM loop antenna

FM ANT:

Function: Pigtail type FM antenna

BPF:

Part Name: FF853

Location: U313

Function: Band Pass Filter for FM signal

AM FM TUNER:

Part Name: NS9542

Location: U308

External Crystal: 19.2MHz

Function: AM/FM stereo decoder

LINE IN:

Function: 3.5mm line in jack

IPHONE / IPOD:

Function: Playback the files stored in iPhone or iPod and charge iPhone or iPod

BT MODULE:

Part Name: MB0302

Location: U204

External Crystal 26MHz

Function: Bluetooth audio multimedia application module.

MIC IN:

Function: Microphone for Bluetooth headset mode

IR SENOR:

Part Name: HM538R

Location: IC104

Function: Infrared senor

KEY:

Function: Key control

OP AMP:

Part Name: NJM4580M

Location: U311, U203

Function: Preamps of the audio signals from iPhone / iPod and Bluetooth channels

SOUND PROCESSOR:

Part Name: BD3490FV

Location: U306

Function: It is a 4 inputs and 1 output multiplexer to select the desired channel. And it supports volume control function.

ANALOG SWITCH:

Part Name: BU4066BCF

Location: U312

Function: Select whether iPhone / iPod or Bluetooth audio output is being detected.

QUAD OP AMP:

Part Name: LM324

Location: U307

Function: Detect the sound level of the selected channel.

MAIN MCU:

Part Name: UPD78F0533

Location: U201

Internal Oscillating Frequency: 8MHz

Function: Control the whole system.

APPLE AUTH:

Part Name: iPod Authentication Coprocessor 2.0B

Location: U202

Function: This is the apple authentication IC. Once an iPhone or iPod is docked, the authentication progresses. Authentication must be passed so as to allow to control iPhone and iPod.

OP AMP:

Part Name: NJM4580

Location: U304

Function: High pass filter pre amp before power amplifier.

POWER AMPLIFIER:

Part Name: TDA1517P

Location: U305

Function: Stereo power amplifier.

I/O EXPANDER:

Part Name: GPBA02A

Location: IC103

Function: Provide extra I/O ports for LCD MCU.

LCD MCU:

Part Name: GPLB27AV

Location: IC101

External Crystal: 32.768kHz

Function: Control the LCD display and provide the clock alarm function.

BACKLIGHT:

Location: D101

Function: Backlight for the LCD display

LCD:

Function: LCD module

BUZZER:

Function: Buzzer for alarm and key sound

12V:

Function: DC output of AC adaptor

BATTERY:

Function: DC supply by 3 X AA size batteries

1.5V:

Function: Supply bias voltage for microphone

5V REGULATOR:

Part Name: LM78M05CT

Location: U303

Function: Supply 5V to charge iPhone or iPod

ADJ REGULATOR:

Part Name: LM317DCYG3

Location: U310

Function: Adjustable regulator for 6.0V DC supply

3.3V LDO:

Part Name: AP130

Location: U302, U301

Function: 3.3V low dropout linear regulator for 3.3V DC supply

Description of Functional Blocks - Bluetooth Module MB0302

2.1 RF Receiver

The receiver features a near-zero Intermediate Frequency ($IF = 1.5\text{MHz}$) architecture that allows the channel filters to be integrated on to the die. Sufficient out-of-band blocking specification at the Low Noise Amplifier (LNA) input allows the radio to be used in close proximity to Global System for Mobile Communications (GSM) and Wideband Code Division Multiple Access (W-CDMA) cellular phone transmitters without being desensitised. The use of a digital Frequency Shift Keying (FSK) discriminator means that no discriminator tank is needed and its excellent performance in the presence of noise allows BlueCore3-Multimedia External to exceed the Bluetooth requirements for co-channel and adjacent channel rejection.

2.1.1 Low Noise Amplifier

The Low Noise Amplifier (LNA) can be configured to operate in single-ended or differential mode. Single-ended mode is used for Class 1 Bluetooth operation; differential mode is used for Class 2 operation.

2.1.2 Analogue to Digital Converter

The Analogue to Digital Converter (ADC) is used to implement fast Automatic Gain Control (AGC). The ADC samples the Received Signal Strength Indicator (RSSI) voltage on a slot-by-slot basis. The front-end LNA gain is changed according to the measured RSSI value, keeping the first mixer input signal within a limited range. This improves the dynamic range of the receiver, improving performance in interference limited environments.

2.2 RF Transmitter

2.2.1 IQ Modulator

The transmitter features a direct IQ modulator to minimise the frequency drift during a transmit timeslot, which results in a controlled modulation index. Digital baseband transmit circuitry provides the required spectral shaping.

2.2.2 Power Amplifier

The internal Power Amplifier (PA) has a maximum output power of +6dBm allowing BlueCore3-Multimedia External to be used in Class 2 and Class 3 radios without an external RF PA. Support for transmit power control allows a simple implementation for Class 1 with an external RF PA.

2.2.3 Auxiliary DAC

An 8-bit voltage Auxiliary DAC is provided for power control of an external PA for Class 1 operation or any other customer specific application.

2.3 RF Synthesiser

The radio synthesiser is fully integrated onto the die with no requirement for an external Voltage Controlled Oscillator (VCO) screening can, varactor tuning diodes, LC resonators or loop filter. RF Synthesiser have Internal Clock Generator(VCO) that it's Frequency is 1.2GHz. The synthesiser is guaranteed to lock in sufficient time across the guaranteed temperature range to meet the Bluetooth v1.2 specification.

2.4 RF Operation.

RF signal can get through Band Pass Filter(Lcb21b2459q1) which have 2.4GHz to 2.5GHz Bandwidth, MB0302 IC only support differential RF, Balun Filter is going to process for differential signal, 79Ch number is going to operate between Balun Filter and TX_A/TX_B- RF Frequency Range 2.402 to 2.480, It means that bandwidth of 1 Ch is 1MHz, as Receiver 2.4GHz Bandwidth, It is going to reach LNA (Low Noise Amplifier) then get IF(1.5MHz) through MIXER. Internal Synthesiser generate 2.402 to 2.480GHz minus 1.5Mhz to get 1.5MHz IF. Finally it will be demodulated by Demodulator (64xOverSample). As transmit data from DSP, it will generate 1.5 MHz and get RF Bandwidth by Mixer, in case of RF Transmitter Synthesiser is going to generate clock source 2.4GHz.