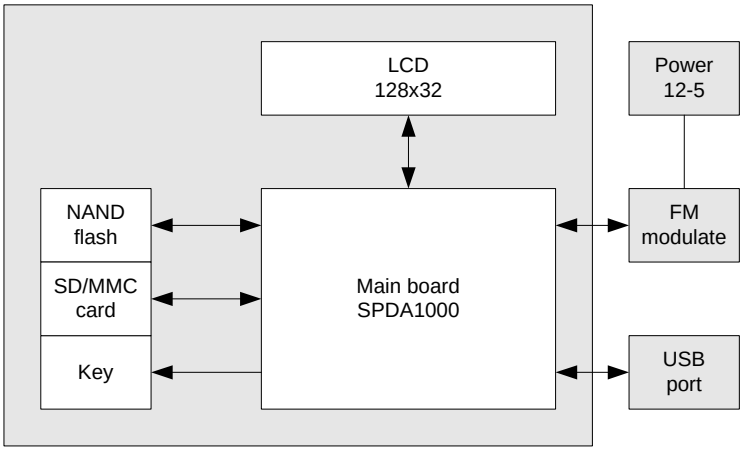
THE WORK FLOW OF EM193F：

The EM193F Car MP3 Player is mainly connect of four parts : 1: the main board part . 2: the FM modulator part . 3: the usb interface part.4:the power supply part .

BLOCK DIAGARAM of system



Part 1 :

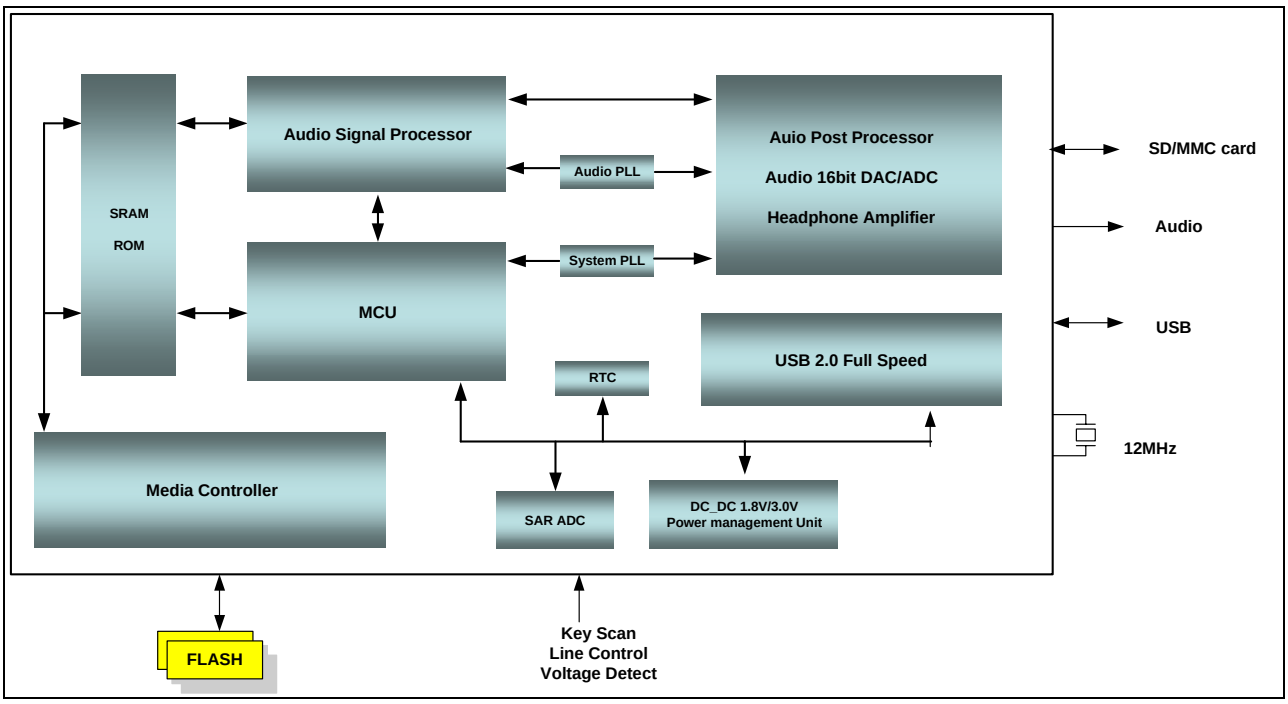
the main board include the center controller SPDA1000 and LCD display circuit . Refer the schematic and the block diagram, we can know that: the SPDA1000 is an embedded chip providing all system-required peripherals, The USB2.0 full-speed PHY can provide high speed interconnection with PC and conforming to mass storage for downloading and uploading audio/speech files. The mono ADC can support 16-bit 8-to-48 KHz sampling rate for voice recording which is based on the ADPCM algorithm for the compression of original voice into 32Kbps digital bit-stream while retaining good quality. The SPDA1000A has a 16-bit Σ-Δ DAC cascaded low distortion Headphone amplifier can directly drive 16/32Ω Headphone, and PLLs are able to synthesize the all system clocks using one 12.0MHz crystal oscillator, low speed SAR 8-bit ADC that can be used to be key scan . Multiple types of data Flash management can be utilized by and NAND/AND Flash controller. as default,the usb device is priority when both SD card and USB device are connect to the system.

the SPDA1000 Supports of digital audio decoding conforming to WMA and MPEG1/MPEG2 audio layer2/3[1)],Extension to MPEG lower sampling rates and variable bit rates and free-format bit-stream ,Supports WMA[2)] format from 8Kbps to 320Kbps.

The SPDA1000 is designed for 1.8V(Core)/3.3V(I/O) applications and the

built-in PLL' are able to synthesize the system clock and the audio clocks from 12 MHz crystal oscillator source.

BLOCK DIAGARAM of SPDA1000



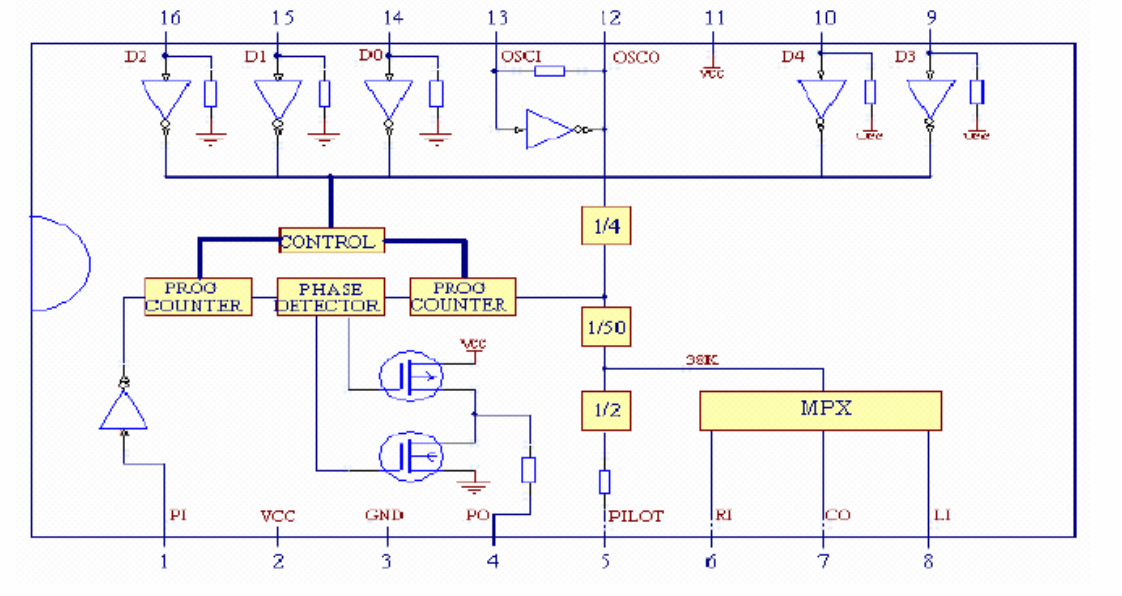
Part 2 :

The HY1417LP is a low-power stereo FM (frequency modulation) transmitter. It use CMOS technology, with supply voltage from 2.8V to 5.5V, and very low standard current of 2.5mA. So these devices are well suited for low voltage and battery powered applications. The HY1417LP consists of a stereo modulator for generating stereo composite signals and PLL (phase lock loop) circuit , and a FM transmitter for broadcasting a FM signal on the air. The HY1417LP IC is also have a built-in 38KHZ oscillator circuit and the programmable control circuit .Stereo audio signal from WM8759 (pin 6.9) and the 38KHz signal will be mixed and processed, then this stereo modulated signal will be add to the outside oscillator (L2,DF1,DF2,CX,Q1 and the assemble circuit). The voltage/frequency control pulse signal from pin5 will be add to there too. After amplified by Q2, the modulated radio signal be send to space by one antenna (The antenna is internal wire connect to transmitter PCB) at last. Stereo audio signal can also be input from the audio jack which connect to the outside audio player.

Change the voltage of the programmable control port, the output frequency from antenna could be change into below point :88.1MHz, 88.3MHz, 88.5MHz,

88.7MHz, 88.9MHz, 89.1MHz, 106.7MHz, 106.9MHz, 107.1MHz, 107.3MHz, 107.5MHz, 107.7MHz, 107.9MHz.

BLOCK DIAGRAM of HY1417LP

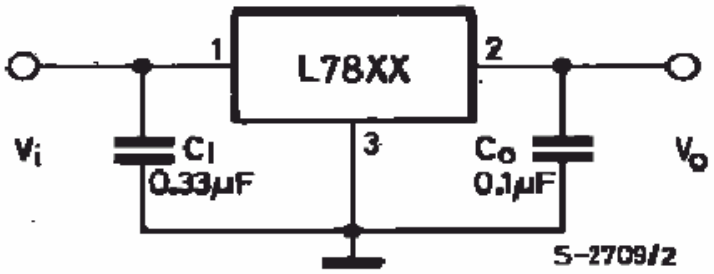


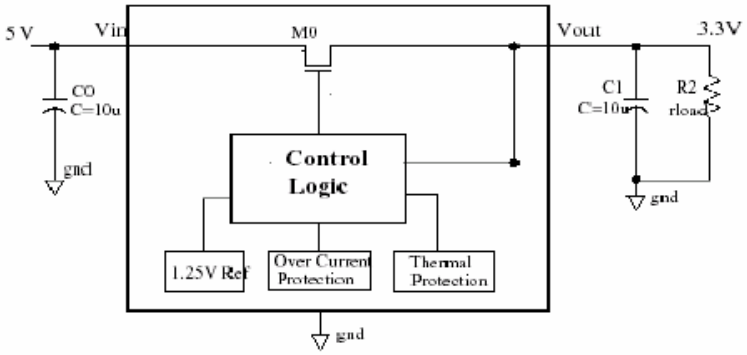
Part 3:

The USB board is a USB interface for extern storage device. It can provide high speed interconnection with PC and conforming to mass storage for downloading and uploading audio/speech files.

Part 4 :

The power supply circuit is mainly consist of two DC/DC converter UTC7805 and XC6201P182 and RT9169-30CV. 12V DC voltage from the battery of the car can be convert to +5V DC by the UTC7805, and then this voltage could be convert to 3.3V DC by the RT9169-30CV or 1.8V DC by the XC6201P182 So, this part can supply +5V and +3.3V and 1.8V voltage to all other IC and circuit to work.


L78XX
1
2
3
Vi
Ci
0.33µF
Co
0.1µF
Vo
S-2709/2


5 V
Vin
M0
Vout
3.3V
C0
C=10u
gnd
Control
Logic
C1
C=10u
R2
rload
gnd
1.25V Ref
Over Current
Protection
Thermal
Protection
gnd