
3. SGH-P777 Circuit Description

1) RF Circuit Description of SGH-P777

1. FEM (F400)

==> Switching Tx, Rx path for GSM850, DCS1800 and PCS1900 is controlled by logic.
RX SAW Filters of GSM850, DCS1800 and PCS1900 are Integrated in FEM.

To convert Electromagnetic Field Wave to Acoustic Wave and the pass the specific frequency band.

- for filtering the frequency band 824 ~ 849 / 869 ~ 894 MHz
- for filtering the frequency band 1710 ~ 1785 / 1805 ~ 1880 MHz
- for filtering the frequency band 1850 ~ 1910 / 1930 ~ 1990 MHz

2. FEM Control Logic

==> Truth Table

	VC1	VC2
GSM850 Rx Mode	L	L
PCS/DCS RX Mode	L	L
GSM850 TX Mode	H	L
PCS/DCS TX Mode	L	H

3. VC-TCXO(OSC601)

==> To generate the 26 MHz reference clock to drive the logic and RF.

After additional process, the reference clock applies to the U603 VCXOB pin to modulate TXIQ and demodulate RXIQ.

4. HD155154NP (U603)

==> The HD155154NP is a RF transceiver IC for GS850, DCS1800 and PCS1900 triple band cellular systems, and incorporates EDGE transceiver capability, and integrates most of the low power silicon functions of a transceiver.

The HD155154NP incorporates triple RF LNAs, direct conversion mixers which are IQ demodulator, an auto offset calibrated programmable gain amplifier with baseband filter for both IQ chains, RF architecture for the transmitter.

Moreover the HD155154NP includes power mode controller to optimize the power consumption. These functions can operate down to 2.7V and are housed in a 48-pin DPE QFN SMD package.

- RX Function
 - Differential Low Noise Amplifiers
 - Direct Conversion mixer and IQ demodulator with 90 degree phase splitter.

- Auto offset calibrated programmable gain amplifier with baseband filter(PGA)
- TX Function
 - I/Q modulator with 90degree phase splitter
 - Offset PLL
 - Phase comparator included fast lock system (Digital phase detector)
 - Polar loop
 - Lineariser
 - Voltage gain amplifier
 - Inverse voltage gain amplifier
 - Down converter
 - AM detector
 - PLL Synthesiser
 - RF Synthesiser for RX/TX RF local included fast lock system
 - 400kHz comparison frequency to achieve faster lock-up time

5. POWER AMP (U604)

==> The PF09016B is a high-power, high-efficiency power amplifier module with integrated power control

- Quad band Polar Loop Amplifier for GSM850 (824 to 849 MHz), GSM900(880 to 915 MHz), DCS1800(1710 to 1785 MHz) and PCS1900 (1850 to 1910 MHz).
- For 3.5 V normal operation
- Built in LDO
- Superb output linearity
- High gain 3-stage amplifier : +5dBm input typical
- GPRS / EGPRS Operation Compatible
- Small package : 8.0 X 13.75 mm

2) Baseband Circuit Description of SGH-P777

1. CSP2750 (U101)

==> The CSP2750 has two major logical components power management and conversion
signal processing.

The PSC component is responsible for all power-related functionality, including the following;

- Power management for RF, BB and ancillary devices within the GSM/GPRS
- Battery-charge management
- Reset control
- SIM card voltage-level shifting

The CSP component is responsible for the following ;

- Intraframe event scheduling
- Voice band processing, including voice band ADC and DAC
- Analog baseband processing, including baseband ADC and DAC
- Providing RF interface for Trident digital baseband device
- Transmitter Power control
- Automatic frequency control
- A5 ciphering
- Low-power sleep mode and wake-up control

The CSP2750 has the following major physical components;

- Timing and control unit
- RF serial interface
- Low-power sleep mode controller
- Baseband Transmitter / Receiver
- Voice input and output

2. YMU765(U102)

==> YMU765 is a synthesizer LSI for mobile phones.

It has a built-in speaker amplifier, and thus, is an ideal device for outputting sounds that are used by mobile phones in addition to game sounds and ringing melodies that are played by a synthesizer. The synthesizer section adopts "stereophonic hybrid synthesizer system" that are given advantages of both FM synthesizers and Wave Table synthesizers to allow simultaneous generation of up to 32 FM voices and 32 Wave Table voices. Furthermore, AL (Analog Lite) synthesizer function is newly equipped.

YMU765 has a built-in hardware sequencer that helps to realize complex play without heavily loading the host CPU. And this device also has a built-in circuit for controlling vibrators and LEDs synchronizing with play of music. The consumed electric current can be stopped to the minimum by power down mode when not operating.

- Simultaneous generation of up to 64 tones by stereophonic hybrid synthesizer.
- FM synthesizer : The maximum simultaneous pronunciation number is 16 tones with 4OP voice, 32 tones with 2OP voice.
- Wave Table synthesizer : The maximum simultaneous pronunciation number is 32 tones.
- Stream playback : The maximum simultaneous pronunciation number is 2 tones.
- AL synthesizer : The maximum simultaneous pronunciation number is 1 tone.
- Equipped with AL synthesizer function.
- Complies with the software processing load abatement.
- Compatible with the function and pin location of MA-3.
- Complies with TCXO (Temperature Compensated Crystal Oscillator).

3. HPE(U201)

==> The Trident-HPE digital baseband processor is a complete system IC designed for wireless terminals that includes two digital signal processor(DSP) cores optimized for low-power communications applications and a powerful, high-performance, industry-standard microcontroller core along with a rich set of peripherals.

The Trident-HPE digital baseband processor achieves best-in-class signal processing performance while maintaining the efficient software code density, low power consumption, and small physical size required for GSM/GPRS terminals ARM946E-S microcontroller core;

- 101 MHz system bus, 16 kbyte instruction and 16kbyte data caches.

- 8 kbyte tightly coupled zero wait-state instruction and 4kbyte tightly coupled zero wait-state data memory
- direct memory access controller for transparent transfer between memory and peripherals.
- External Memory interface with asynchronous burst mode support
- Synchronous serial port supporting
- Programmable 48-bit general-purpose IO unit, keyboard interface, programmable interval timer and real-time clock.
- SD/MMC controller that supports interfacing to secure digital/multimedia memory card.

Two DSP16000 dual-MAC DSP cores;

- Up to 404 million MACs per second at 101 MHz.
- Memory complement;
 - DSP0 : 144K X 16-bit ROM, 40k X 16-bit RAM.
 - DSP1 : 96K X 16-bit ROM, 16k X 16-bit RAM.

JTAG boundary scan and integrated H/W development system

Low power;

- Ultralow leakage process technology for best-in-class standby power
- Flexible power management modes to allow for maximum active power management

Interprocessor communication hardware support between ARM, DSP0 and DSP1.

Supported by Trident-HPE digital baseband processor software and hardware development tools as well as industry standard ARM software and hardware development tools

Two on-chip, programmable, PLL clock synthesizers;

- one for ARM and DSP, the other one for USB.

4. CL851S64(U301)

==> CL851S64 is a multimedia application processor. It is possible to capture the video

signal of up to CIF resolution and provides high video quality through cutting edge design technology using Hardware based MPEG4 codec in CL851S64. It offers six general purpose I/O pins.

In addition, MP3 decoder and AAC codec are mounted to playback digital sound source of various formats and audio codec interface is supported for playback.

- Fully hardwired MPEG4 and JPEG codec
- Standard SRAM interface(2-bit address & 16bit data) for CPU interface
- LCD & OSD buffer separated to prevent blocky effects

5. AK4640VG(U308)

==> It features a 16bit stereo CODEC with a built-in microphone-Amplifier, headphone-amplifier and speaker-amplifier. Input circuits include a microphone-amplifier and an auto level control circuit.