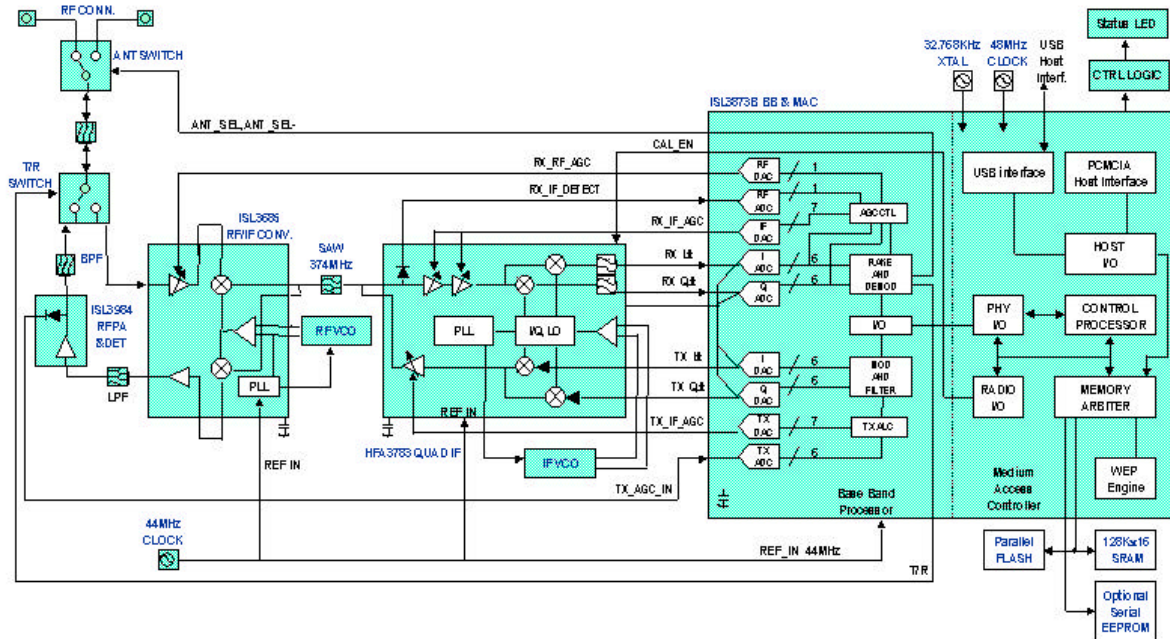# XI726 Circuit Description

**ZCOM/Gilbert Tsai**

## Block Diagram



## Key Component Description

## MAC & BBP ISL3873B:

U3 ISL3873B has both MAC (Media Access Controller) and BBP (Base Band Processor), it directly interfaces with the IF Qmodem (U8 HFA3783) and USB v1.1 interface. Adding RF/IF Converter (ISL3685) and Power amplifier (ISL3984) to offer the complete WLAN solution. IEEE802.11 Protocol and PHY support are implemented in firmware thus, supporting customization of the WLAN solution. The ISL3873B has on board A/Ds and D/A for analog I and Q inputs and outputs, for which the HFA3783 recommended. DBPSK and DQPSK with data scrambling capability, are available along with CCK to provide a variety of data rates. Both Receive and Transmit AGC functions with 7-bit AGC control obtain maximum performance in the analog portion of the transceiver.

## IF QMODEM HFA3783:

HFA3783 is a highly integrated and fully SiGe baseband converter for half duplex wireless application. It has integrated AGC receive IF amplifier and variety Transmit amplifier. Receive and Transmit paths share a common differential path. A pair of $2^{nd}$ order anti-aliasing filters with an integrated DC offset cancellation architecture is included in the AGC chain for threshold comparison. Up and down conversion are performed by doubly balanced mixer for I/Q IF processing.

## RF/IF Converter and Synthesizer ISL3685:

U14 ISL3685 includes a receive chain feature LNA and down-converter mixer. TX chain has an up-converter mixer and driver amplifier. RF synthesizer can phase lock the VCO at 2.1GHz and converts 374MHz IF and 2.4GHz RF through 2.1GHz LO.

## RF Power Amplifier ISL3984:

The U16 ISL3984 is a 2.4GHz RF power amplifier that amplifies the signal from ISL3685 transmit chain. ISL3984 includes both power amplifier and power detector that can perform ALC (Automatic Level Control) function.

## RF Filter FL4 MDR742F and FL2 MDR741F:

Pass the desired RF signal and reject spurious from transmit-chain mixer that ISL3685 polling out.
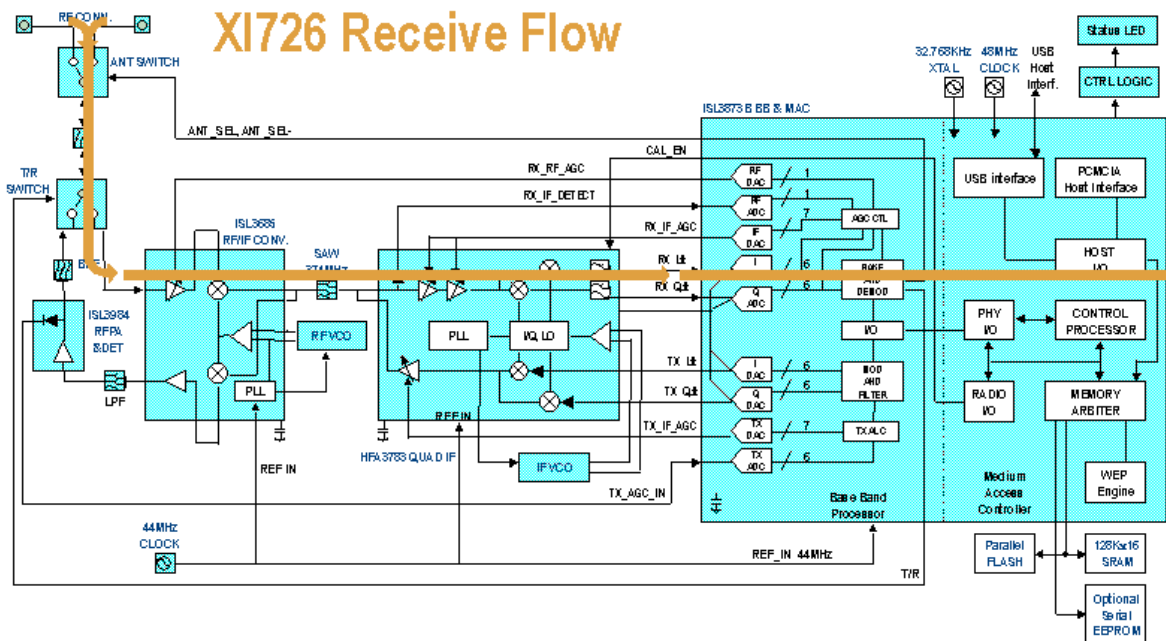
## Transmit/Receive Switch U11 NJG1533KB2:

Control RF signal to Receive or transmit path by ISL3873B.

## Antenna Switch U13 AS179-92:

Antenna controlled by ISL3873B, and can be configured by register setting

## RX Signal Flow



1. The signal is received by one of two antennas through ANT Switch
2. Signal passes to one BPF for image rejection, and then feeds to LNA for front-end signal amplification and raise the SNR
3. Down-convert the frequency from RF to IF in ISL3685
4. After ISL3685, SAW filter rejects image spurious with its sharp shape
5. HFA3783 can dynamic adjust variable 70dB gain according to receiving signal variation, and down-convert to baseband I/Q balanced signal
6. ISL3873 demodulates the data from I/Q signals to packet-form information, and passes the data to host via USB interface

## Transmit Signal Flow
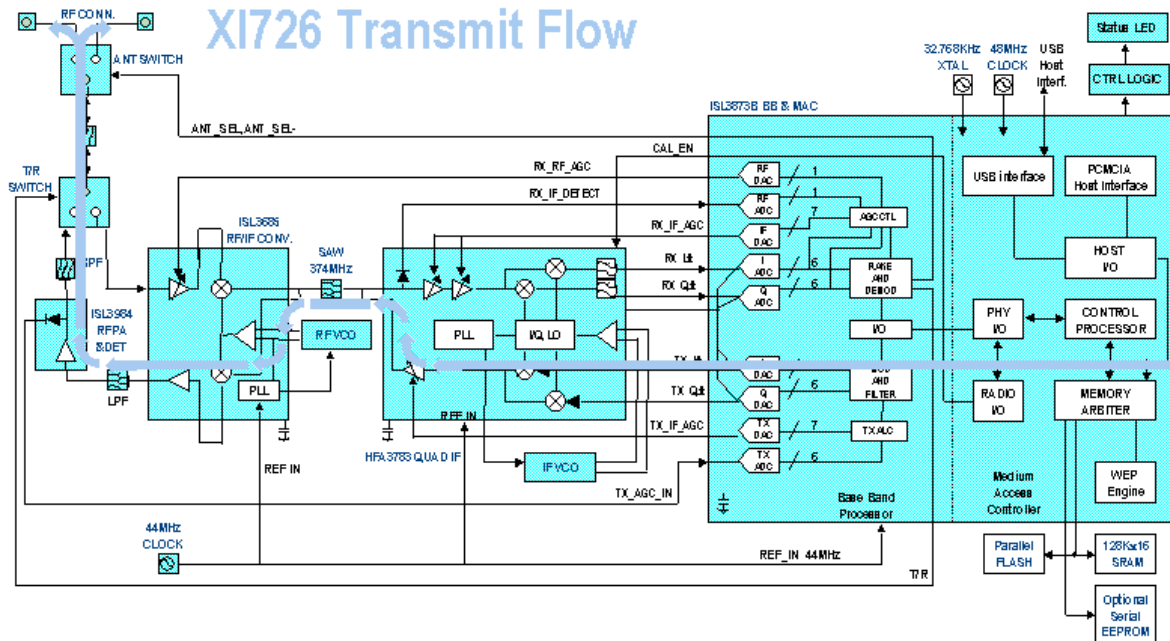


1. ISL3873B receives the data from host via USB interface. Also, packetizes to compliant with 802.11b and translates into BPSK, QPSK and CCK I/Q signal by different rate – 1, 2, 5.5 and 11Mbps

2. Up-convert the I/Q to IF 374MHz and a variable gain block amplifies the IF signal by TX close-loop control

3. Filtering the signal by SAW filter to reject the spurious

4. Channel can be settled by changing PLL lock frequency via 3-wire control. Then IF signal can be up-convert to RF in ISL3685

5. The unwanted signal is filtered out by a BPF and feeds into PA

6. After the power amplified, a BPF rejects the harmonics and spurious

7. One of two antennas is chose for diversity