Operation/Circuit Description

PicoBlue

Bluetooth LAN Access Point

Pico Communications

20085 Stevens Creek Boulevard, Suite 100,
Cupertino, California 95014

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Table of Contents

1. Description of the product:

- Descriptive name: Bluetooth Network Access Point (PicoBlue)
- Model Number: PNAP-2007100
- Hardware version Number: B
  - Networking Board: Version B
  - Radio Board (PicoRadio): Version B

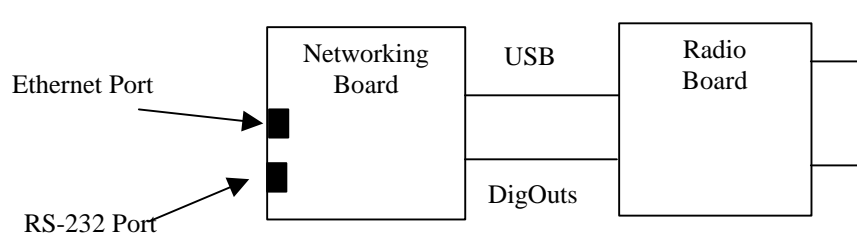# 2. Technical Documentation

2.1 Access Point

Fig. 1: HW Block Diagram

Figure 1 shows the access point hardware that consists of a networking board and a Bluetooth radio board. The networking board uses an USB interface to communicate with the Bluetooth radio. Digital outputs provide the functions of reset and antenna diversity.

2.2 Radio Specifications

Operating Range	2.402-2.480 GHz
RF Channels	f=2402+k MHz, k=0,…,78
Output power (conducted)	17.9 dBm
Antenna Gain	1.8 dBi

The frequency channels and hopping pattern are based on the Bluetooth specification (BLUETOOTH SPECIFICATION Version 1.1, February 22, 2001).

2.3 Networking Board

The detailed block diagram of the networking board is shown in Figure 2.

```
  +---------+        +-----------+
  |  Flash  |        | 11.52 MHz |
  |         |        |   Clock   |
  +---------+        +-----------+
                        +---------+
                        | 25 MHz  |
                        |  Clock  |
  +---------+           +---------+
  |  SDRAM  |        +-----------+
  |         |--------|  ARM 940  |---------+--------+
  +---------+        |           |         | RJ-45  |
                     +-----------+         +--------+
  +---------+            USB
  | EEPROM  |
  +---------+

  +------+  +-----------+        +-------------------+
  | RS-  |--|  RS232    |        | B-to-B connector  |
  | 232  |  | Transceiver|       +-------------------+
  +------+  +-----------+
```
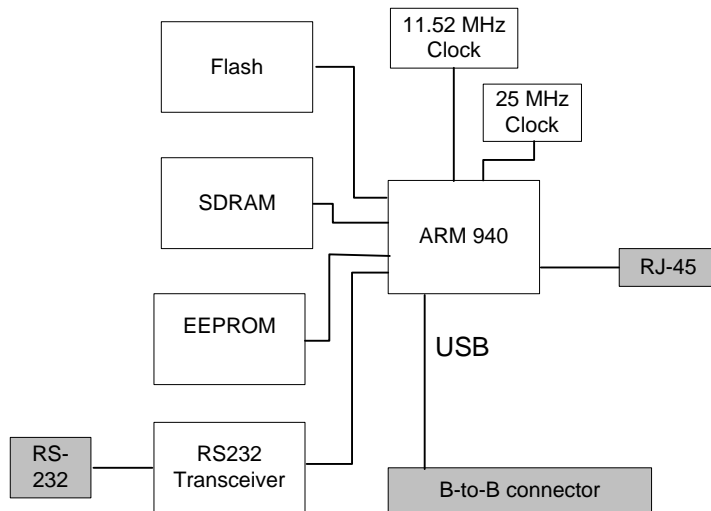
Figure 2: Networking board block diagram

The networking board is powered by an ARM9 processor chip, which is clocked by an 11.52 MHz oscillator. The ARM9 chip includes an ARM 940T core, Ethernet interface and one USB host controller interface. A 25 MHz clock is used to drive the Ethernet circuit. The memory section is composed of SRAM, Flash, and EEPROM. The networking board uses the USB interface to communicate with the PicoBlue radio.

2.4 Radio Board

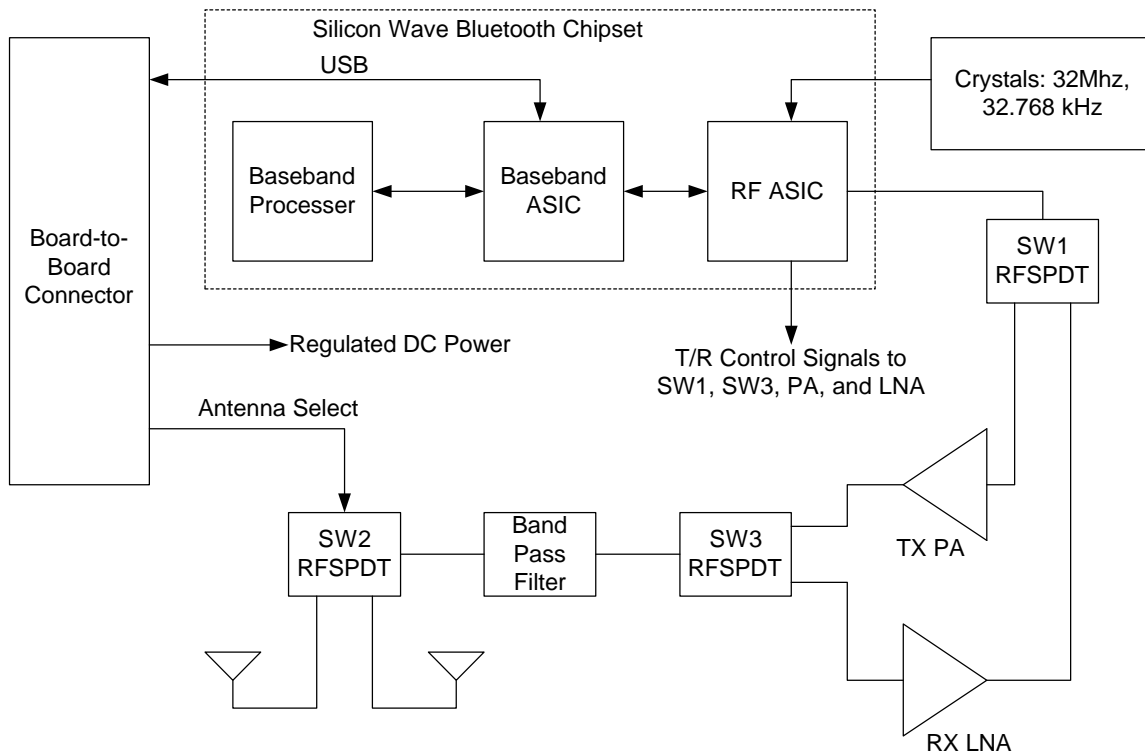Figure 3 is a block diagram of the PicoBlue Radio, showing the major components.

Figure 3. Functional blocks in PicoBlue Radio.

Figure 3 shows that while PicoBlue Radio is based on a Bluetooth chip set from Silicon Wave, it also carries a set of RF functions external to the chip set. These are referred to as RF enhancements in what follows. A transmit power amplifier (TX PA) boots the outgoing signal to approximately +18 dBm EIRP. A receive LNA (RX LNA) helps maintain a low noise figure and sensitivity of about –85 dBm in spite of the RF loss of the switches and the filter. Two RF, single-pole double-throw (RFSPDT) switches provide multiplexing for the TX PA and RX LNA, while a third switch allows for selection of either of two antennas for spatial diversity. A band pass filter helps protect the receiver against out-of-band interference, and it cuts down on radiation of transmitter harmonics.