Technical description of Thin Ethernet-to-ZigBee gateway

The Thin Ethernet-to-ZigBee gateway is a reference design for a low-cost device which allows a ZigBee network to communicate with Ethernet-connected networks and, in particular, to be Internet-connected. The gateway uses a Silicon Labs EM3587 or EM3588 system-on-chip (SoC) as both its ZigBee radio and its control processor. For Ethernet connectivity, the gateway uses a Micrel KSZ8851SNL Ethernet MAC+PHY chip which allows Ethernet connection using the 10BASE-T or 100BASE-TX standard. The radio uses a Planar Inverted-F Antenna (PIFA) implemented as a trace on the printed circuit board. A Skyworks SE2432L front-end module is used to filter, impedance-match, and amplify the RF signals to and from the SoC. The device includes an 8 megabit serial flash integrated circuit to allow storage of a firmware image to be used to update the SoC's on-board firmware, as well as for storage of any other data (such as an event log) which might need to survive a power cycle. This device is compliant with the IEEE 802.15.4 and ZigBee standards.

Other than the 24 MHz and 25 MHz crystals used by the SoC and the Ethernet MAC+PHY, respectively, the following frequencies are internal to the SoC:

-4.8 GHz (radio VCO and loop filter)
-12 MHz RC oscillator (system clock if 24 MHz crystal is not used)
-6 MHz (peripheral clock; derived by dividing system clock by 2)
-4 MHz (IF mixer used by radio receiver)
-10 kHz RC oscillator (alternative low-power system clock)
-1 kHz RC oscillator (sleep mode timer)