Circuit Description

General

The LM 5845 and LM 5860 are identical hardware with the LM 5860 having an updated software to enable higher digital throughput. Both versions of this product family utilize identical hardware using a FCC modularly approved XR5 radio miniPCI radio card (802.11a) and identical Single Board Computer cards (SBC) (Jstream IXP425 processor based system) plus separate identical surge protect circuit boards.

The miniPCI card utilizes 802.11a protocol based on an Atheros AR5414 chipset with an additional RF power amplifier and Low Noise Amplifier.

The SBC is utilizes an IXP 425 Intel processor with an optimized bus for high throughput data for Ethernet routing and switching. It also can supports dual mini-PCI ports for radio cards or other applications. The system is tailored for low latency high capacity throughput.

Radio Module

The radio module is made up of a DSP based processor, RAM memory and flash memory. The firmware is stored in flash memory on the board. The board is based on the Atheros 5414 ASIC design which carries out signal processing (modulation-demodulation and generates or demodulates spread spectrum OFDM. An FPGA provides an ARM microprocessor to control the radio processes (MAC) and to interface with the SBC. The processor also controls and enables access to the PCI bus for the service data carried by the link The RF processing side is an integrated transceiver included in the ASIC providing frequency synthesis, up and down frequency conversion from the baseband IF which has frequencies content well below 200 MHz The radio is realized on a mini-pci board form factor design so it can be plugged into the SBC that hosts a miniPci socket. The SBC manages the radio systems via the integrated ARM processor as well as provides network functionality for the data services being provided

Single Board Computer

The INTEL IXP425 processor based SBC manages the Radio module and handles Network functions to covert radio carried traffic to Ethernet Traffic and vice versa. The main functions are to provide:

- configuration control for the radio system, (Channels, Band Range , BW)
- A full range networking functions, (Switching, bridging, routing, VLANs, DHCP, NAT Firewall etc.
- Quality of service
- management (SNMP) operation, - Performance monitoring, Alarms , remote configuration control, System monitoring,
- an operator Graphic User Interface
- system logs,

- set-up, storage and access to subscriber radio configuration information,
- authorization and Encryption functions and provides diagnostic routines
- Software and Firmware Upgrade Routines
- Radio Calibration SW

The LM-5800 can be locally or remotely managed via its SNMP system... The OS is Linux based and incorporates all the software functions to operate the radio. The system has flash memory that stores the SW, configuration files, Logs and other pertinent information. Up on start-up the OS sets-up automatically the configurations that are used for the radio link.

The SBC card has 2 RJ45 10/100BaseT Ethernet ports providing data as well as power over Ethernet (POE). A serial TTL level port is also provided for diagnostics and administration. A 16 Mb flash memory is used to store firmware which is expanded upon boot-up into 256 Mb of SDRAM. The SBC also incorporates two miniPCI connectors along with the miniPCI bus drivers. The SBC is powered by a DC to DC converter that provides power to the SBC and the miniPCI radio Module. The input voltage to the DC converter is 48 volts with it supplying 3.3 volts, and 5 volts

Connector Card

The connector card provides the I/O digital interface as well as the 48V termination for the power over Ethernet system (48 V). The card provides power surge protection induced by lighting or other causes. In addition lower voltage clamp system protects the data lines. The circuit incorporates EMI suppression using ferrite filters on the data lines and filter dual choke on the power lines. An additional interface is provided for diagnostic access to the SBC..

Enclosure

The entire radio system is contained in a metallic EMC shielded enclosure that is mast mounted. The enclosure provides grounding protection toe the mast via the metallic mast mount. This enclosure conforms to an IP67 environmental rating. The Antenna is connected by a short length of coaxial cable terminated with Type N connectors. The connectors used on the enclosure are also shielded.