Smart Gateway Ethernet Router

Overview

Small-office/home-office (SOHO) users and small- and medium-size businesses demand "business-class" performance, reliability and security from their local area networks (LANs). Ethernet routers have emerged as the optimal way to connect PCs, servers and peripherals and share information and resources across the LAN while accessing the Internet through an affordable DSL or broadband cable connection.

Customer premises equipment (CPE) manufacturers have responded to the need for speed within the home or small office by developing next-generation Ethernet routers that offer such features as a built-in firewall, VPN security, high-speed bridging, local and remote management, and more.

Key Benefits

> Allows the Ethernet connection to be shared among many home network devices, including PCs, laptops, and printers

> Supports optional VPN functionality

> Enables subscribers to connect with their workplace from home

> Allows home office connection from the external world

> Allows pass through for VPN clients

> Supports three types of VPN: PPTP, L2TP and IPsec

ETHERNET ROUTER CONFIGURATION WITH OPTIONAL VPN

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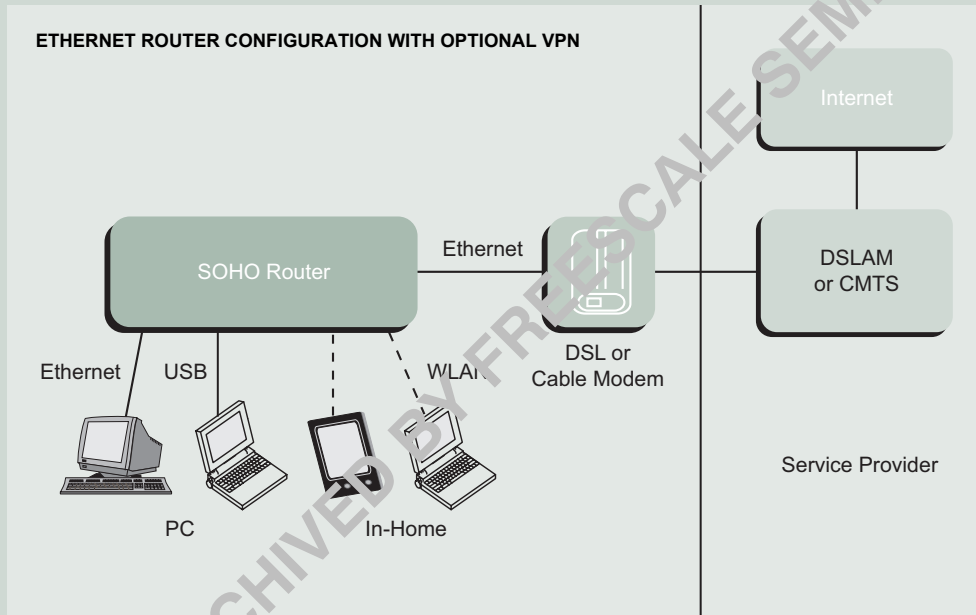
Freescale Ordering Information

Part Number	Product Highlights	Additional Information
DSP56L307	Programmable DSP	www.freescale.com[Note]
MPC180	Security Processor	
MPC857DSL	PowerQUICC™ Integrated Communications Processor	
MPC859DSL	PowerQUICC Integrated Communications Processor	
Note: Search on the listed part number.		

Design Challenges

Time-to-market and system cost are key considerations in designing Ethernet router products. Design cycles for routers are relatively short, which is typical for consumer electronics products. System developers often must speed CPE products to market in a matter of months to achieve revenue goals. Developing complex designs from scratch and having to work with multiple hardware and software vendors not only impacts time-to-market, but it can increase development costs. System integration involving operating systems, communication software stacks and board support packages (BSPs) also contributes to the burgeoning cost of creating new router applications. Increasing competition requires the timely delivery of Ethernet products to the router marketplace.
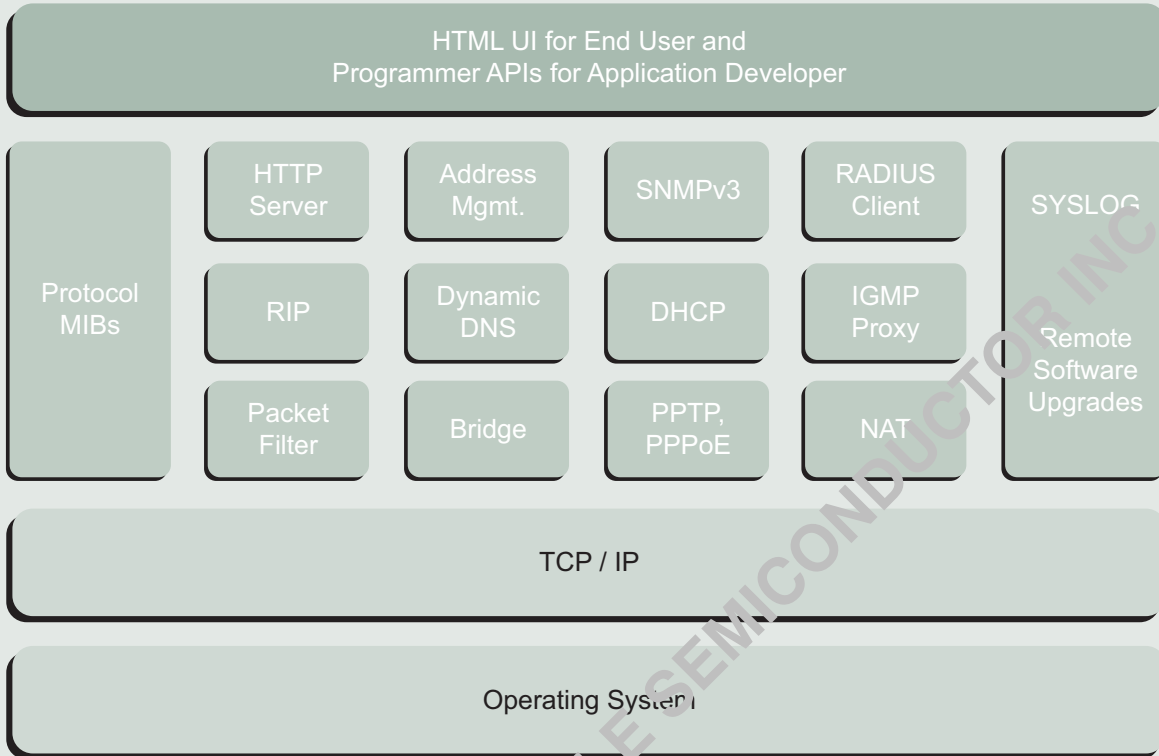
Freescale Semiconductor Solution

The solution is Ethernet router software from Metrowerks, a Freescale Semiconductor company. When combined with a Freescale Semiconductor Smart Gateway reference platform, Metrowerks' Ethernet router software provides a complete Linux® OS-based solution that enables developers to speed their router products to market.

Ethernet router software is a production-ready development environment for designers and manufacturers of Ethernet router equipment. It provides a complete set of protocol stacks for Ethernet CPE devices, including support for optional virtual private network (VPN) capability. Metrowerks' Ethernet router software leverages the scalability of Linux, is based on interoperable open standards, and includes an easy-to-use HTML interface for router configuration and administration.

PROTOCOL STACKS FOR ETHERNET ROUTER WITH OPTIONAL VPN

HTML UI for End User and
Programmer APIs for Application Developer

Protocol MIBs	HTTP Server	Address Mgmt.	SNMPv3	RADIUS Client	SYSLOG
	RIP	Dynamic DNS	DHCP	IGMP Proxy	Remote Software Upgrades
	Packet Filter	Bridge	PPTP, PPPoE	NAT	

TCP / IP

Operating System

Additional Benefits

> Provides IEEE 802.11b wireless LAN connectivity for multiple home network devices through wireless access point functionality

> Allows file/folder sharing in the home network LAN (Windows® OS file/print share)

> Enables Web server or application server hosting through DMZ configuration

> Stateful IP packet filter protects against malicious attacks

> Provides parental protection by blocking Web access for specified URLs

> Includes a Web-based UI for Ethernet router configuration and administration

> Supports SNMP-based remote management

> Includes convenient software upgrade procedure

Specifications

Bridging and Routing

> Bridges LAN-to-LAN traffic for in-home data transfer

> Bridging based on IEEE 802.1d protocol, RIP version 2.0 routing per RFC 2453

> Support for multicast and unicast filters based on source and destination MAC

> Support for multicast traffic through IGMP proxy

Optional VPN Software

> Supports three types of VPN: L2TP (RFC 2661), PPTP (RFC 2637), IPSec (RFC 2401, 2406)

> Provides software encryption libraries for SHA-1, MD5, 3DES and AES, and APIs for easy integration with third-party encryption software libraries

> Provides well-defined interfaces for using a hardware encryption processor for improved VPN performance

> Supports both manual and dynamic configuration of IPSec policies (using IKE)

> Supports MSCHAPv2 (RFC 2759), MPPE (RFC 3078) with RC4/ARC4 encryption

Address Management

> Supports WAN interface IP address acquisition through either DHCP (RFC 2131, 2132) or PPPoE
> Facilitates static IP addressing of the SOHO router WAN interface
> Supports dynamic and static addressing (mixed-mode addressing) of home network devices
> Supports host name based resolution in the home network through dynamic DNS (RFC 1034, 1035, 2136, 2535)
> Synchronized address management framework ensures address change notifications between DHCP, DNS, NAT and packet filter modules, which makes in-home device address configuration changes transparent to users
> PPP/PPPoE support (PPP: RFC 1661, PPPoE: RFC 2516, PAP: RFC 1334, CHAP: RFC 1994)

NAT and Firewall

> Robust NAT implementation per RFC 1631 and RFC 2993
> NAT supports both pass through and port forwarding
> Built-in NAT ALGs for PING, FTP, L2TP, PPTP, IPSec, SMTP, RTSP, RTP, H.323 applications, plus APIs for development of additional ALGs
> Robust implementation of stateful Layer 2 IP packet filter, provides protection against attacks: IP Spoof, SYN flood, IP Smurf, LAND, Ping of Death, UDP Echo Storm, Reassembly
> Packet filter rules are configurable through HTML UI, and all events related to packet filter policy violations or suspicious activities are appropriately logged

Remote Management

> SNMPv1/v2/v3 based management (RFC 1157, 2271-2274)

> Supports the following protocol MIBs:
  • MIB2–RFC 1213
  • NAT MIB–working group draft
  • RIP MIB–RFC 1724
  • DHCP MIB–working group draft
> User-initiated software and firmware upgrades

Local Management

> Provides a small-footprint HTTP1.1 Web server from Go-ahead.com
> Extensive HTML user interface for Ethernet router management and configuration by end user
> Parental protection URL filter through HTTP1.1 proxy
> RADIUS client-based user authentication (RFC 2865) for controlling access to router administration UI
> Restoration of factory default settings in case of incorrect user configurations

Development Tools

Tool Type	Product Name	Vendor	Description
Reference Design	RDMPC857IAD	Freescale Semiconductor	Smart Gateway 857 IAD Reference Platform

Development Support

Vendor	Description	Contact Information
Metrowerks	Ethernet Router Software Complied with Freescale Semiconductor Smart Gateway Reference Platform	www.metrowerks.com

Learn More: Contact the Technical Information Center at +1-800-521-6247 or +1-480-768-2130.

For more information about Freescale products, please visit **www.freescale.com**.

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