

Fusion Reference Designs

Fusion Voice Gateway Reference Design

The Fusion Voice Gateway/Terminal Adapter Reference Design (Fusion VoIP Gateway) combines VoIP capabilities that enable network operators to simultaneously support and manage high-volume, prioritized voice traffic and high-speed data service on their networks, an Internet router, a 4-Port Ethernet switch and runs on a single-core Blackfin[®] processor. The Fusion VoIP Gateway can be rapidly customized to quickly deploy a unique and differentiated Terminal Adapter to any market. The Fusion VoIP Gateway includes more features, better functionality, and ample memory and processor power for platform customization, all with the lowest BOM (Bill of Materials) possible.

Fusion IP Phone Reference Design

The Fusion IP Phone Reference Design is a complete software/silicon solution that offers a full-featured platform which supports current and emerging IP phone standards and has expansion capabilities for product differentiation. The Fusion IP Phone Reference Design reduces the BOM cost as well as the time and complexity typically associated with developing an IP Phone. Designed around the Analog Devices Blackfin ADSP-BF536, the reference design software delivers the critical processing (RTOS, call manager, voice algorithms, etc.); communication (TCP/IP, SIP, RTP, etc.), networking (SNMP support, FTP/TFTP firmware upgrade and configuration backup/restore, Command-Line Interpreter (CLI), Telnet remote management and a built-in diagnostic tool, as well as peripheral functions (LCD and keypad controllers, etc.) required to build a basic or advanced IP Phone.

Fusion Net Product Suite

Fusion TCP/IPv4/v6 Dual-Mode Stack

The Fusion Embedded TCP/IP Stack protocol suite provides developers with a highly portable source code stack designed specifically for embedded applications. The basic Fusion embedded TCP/IP stack includes source code for TCP, UDP, BootP, IPv4/IPv6, ICMP, IGMP, ARP, RARP and TFTP.

Fusion BOOTP

The Fusion BOOTP protocol is used by a client machine to locate its IP address and network mask. It also can be used to locate a server host and the name of a file to be loaded (bootstrapped) into the client machine for execution.

Fusion CIFS

Enabled with Fusion CIFS, embedded devices perform full client, server, and client/server platform-independent file sharing functions over a LAN or WAN. Fusion CIFS provides sophisticated file sharing and file transfer capabilities and is to enable all applications, not just Web browsers, to open and share files securely across the Internet.

Fusion DHCP Client/Server

The Fusion Dynamic Host Control Protocol (DHCP) Client and Server allow your network to automatically configure itself. With a centrally located DHCP Server, Client devices can be dynamically configured with the correct network parameters (e.g., IP address and subnet mask).

Fusion DNS

Fusion Dynamic Network Services (DNS) software is a resolver comprised of a library of easy-to-use routines that a client application can call to perform the domain name to IP address translation function. With only a few simple programmatic calls, it is easy to integrate a product that uses Fusion DNS functions to define a list of domain name servers, build a query to interrogate the servers, issue server requests and

process the responses. This enables a device or the device operator to have desktop-like network capability in an embedded product.

Fusion FTP

The Fusion File Transfer Protocol (FTP) source code Client and Server product is an application that allows the efficient sharing of files, programs or data between diverse host systems. Fusion FTP also provides a secure way to allow or deny access to specific files or directories between diverse systems. It is designed to be small and easy to implement.

Fusion NAT

Fusion Network Address Translation (NAT) Router software allows client IP hosts on a private network to access Internet hosts without having to obtain public IP addresses. It works by modifying the IP layer header's source address and selected fields in upper layer protocol so that the private internal IP address is replaced with a "Real" assigned IP address that can safely traverse the Internet. Once the NAT router is assigned at least one "Real" IP address, up to sixty-four thousand IP client machines can share this address simultaneously to access Internet hosts.

Fusion OSPF

Fusion Open Shortest Path First (OSPF) protocol is the source code implementation of Version 2 of the Open Shortest Path Routing Protocol (OSPF) per RFC 2328. It was designed specifically for operation in high performance routers.

Fusion PPP

Fusion Point to Point Protocol (PPP) source code is designed for serial links and provides a method for transmitting Datagrams over serial point-to-point links.

Fusion PPPoE

Fusion Point to Point Protocol over Ethernet (PPPoE) source code product is defined by RFC 2516, and allows devices connected over Ethernet to establish PPP links with one another. PPPoE is a protocol layer with its own header, which encapsulates the PPP protocol layer and is itself encapsulated within the Ethernet layer. Using PPPoE, multiple PPP sessions can be multiplexed between the same client/server pair over Ethernet.

Fusion RIP/RIP2

The Fusion RIP source code offering is a high-performance portable software engine that implements IP forwarding and route generation per industry standard RFCs.

Fusion RTP/RTCP

Fusion RTP (Real-time Transport Protocol) enables the transport of real-time data over packet-oriented data networks such as the Internet. Fusion RTCP (Real-time Transport Control Protocol) is a companion protocol that is used for gathering statistics on the performance of the connection. These statistics are used to dynamically adjust and optimize for current network conditions.

Fusion RTSP (Real Time Streaming Protocol)

Fusion RTSP is an application-level protocol for control over the delivery of data with real-time properties. Fusion RTSP controls multiple data delivery sessions, provide a means for choosing delivery channels such as UDP, multicast UDP and TCP and provide a means for choosing delivery mechanisms based upon RTP. Fusion RTSP serves as both a control protocol and a jumping off point for negotiating codecs from servers in a file format independent way. The Fusion RTSP Toolkit includes a set of intuitive APIs for developing multimedia streaming applications for mobile devices such as PDAs and IP telephony applications, as well as broadband IP-based solutions such as IP TV.

Fusion SIP

The Fusion SIP Module was designed for embedded devices. The main responsibility for SIP is to setup a call between other SIP clients.

Fusion SDP

The Fusion SDP Toolkit provides functions to parse Session Description Protocol (SDP) announcements, as specified in RFC 2327, into convenient C structures, and to build SDP announcements using the same C structures as inputs.

Fusion SNMPv1, v2 & v3

Fusion Simple Network Management Protocol (SNMP) enables a SNMP developer to generate C source code directly from MIB files. These files may be RFC listed or enterprise specific, which can be easily added to the SNMP agent by modifying a single source file. The MIB compiler strips comments and verifies the syntax of the compiled files.

Fusion SNTP

Fusion (Simple Network Time Protocol (SNTP) offers client and server services to obtain and set accurate date and time in network connected devices.

Fusion Telnet

Fusion Telnet Server is a generic telnet server that supports an application through the use of macros and API functions. The telnet server application may be any program that takes advantage of terminal-oriented or process-to-process communications.

Fusion TFTP

Fusion Trivial File Transfer Protocol (TFTP) software allows the efficient transferring of files between diverse host systems without the extended features and potential overhead associated with FTP.

Fusion RTOS Product Suite

Fusion RTOS

The Fusion Real Time Operating System (Fusion RTOS) is a Real Time Embedded OS designed and optimized for 16/32-bit microprocessor and Media Processors. It is priority based, pre-emptable, deterministic, and protects against priority inversion. Its strengths include small footprint, objects for streaming data, very low processor overhead, stack sharing capabilities, and fully integrated interrupt controls.

Fusion Web Product Suite

Fusion HTML GUI

The Fusion HTML GUI product is designed to provide a Rapid Application Development (RAD) environment to quickly develop high quality full-featured embedded user interface controls. HTML GUI allows standard HTML authoring tools to be used.

Fusion GUI Toolkit

The Fusion Embedded Graphical User Interface (GUI) Toolkit is a set of user interface software modules that can be used to build and manage an embedded graphical user interface in an embedded system environment. It is an object-oriented graphics device subsystem for embedded systems and Internet Appliances. The Fusion Embedded GUI Toolkit is device, processor, OS, display-size and platform independent.

Fusion Advanced Web Server

The Fusion Advanced Web server allows embedded products to be configured from any desktop computer using a standard Web browser. The Fusion Web Server provides full support for HTML (2.0, 3.2, and 4.0), multiple Web object sources, object compression, and advanced security. The Web Server product includes a Web Application Toolkit and the PC-Imager Compiler, which is used to build objects to be served by the Web Server. The PC-Imager takes input from Web pages (prepared with any Web page layout program), images, Java Applets, etc. and generates a highly compressed Web object library that is compiled and linked with the Web Server Engine.

Fusion HTTP Client & Server

The Fusion Embedded Hyper Text Transfer Protocol (HTTP) Server allows you to serve up user-friendly HTML pages with images and data to allow monitoring of your Information Appliance from any Web browser in the world. It also allows users to control the Internet Appliance through forms-based pages that interact with the Internet Appliance to change the state of the device.

Fusion SOAP Client & Server

Fusion Simple Object Access Protocol (SOAP) Client/Server provides a low level C language application program interface (API) for performing client and server Simple Object Access Protocol 1.1 communications.

Fusion WebPilot Embedded Browser

The Fusion WebPilot Embedded Browser is processor and compiler independent, and is portable across all platforms and any OS environment. Fusion WebPilot software was designed using ANSI C source code. This allows for small footprint and extremely quick display rendering. Fusion WebPilot can be placed onto any BSD socket TCP/IP stack; however, it has been fully optimized for our Fusion TCP/IPv4/v6 Stack. It is designed for, but not limited to, applications such as set-top boxes, phones, medical equipment, kiosks, office equipment and hand-held wireless devices. The WebPilot provides powerful embedded browsing functionality in source code to allow fast time-to-market solutions.

Fusion XML DOM Parser

The Fusion Embedded extensible Markup Language (XML) Document Object Model (DOM) parser provides instant access to the benefits of XML and brings your embedded device to a whole new level of connectivity. The Fusion Embedded XML DOM Parser is a small, fast, intuitive XML parser that decodes XML documents into C language structures. The parser uses the Fusion Unicode library that supports UTF-8 and other common Unicode formats. The API utilizes the UniChar abstract as defined in the Unicode library and therefore is internationalized and portable.

Fusion XML SAX Parser

The Fusion Real Time Embedded XML SAX Parser is a small, fast intuitive embedded XML parser that decodes XML documents into C language structures that are easy for designers to integrate into their embedded applications. The Fusion Embedded XML SAX Parser provides instant access to the benefits of XML and brings your embedded device to a whole new level of connectivity. The Fusion Embedded XML SAX Parser allows an embedded device to exchange information with an enterprise application such as accessing inventory records, personnel databases, security and access control records.

Fusion XML Schema Compiler

The Fusion XML Schema Compiler provides data mapping between XML and C language data structures. XML documents are automatically de-serialized into C structures/functions and C structures/functions are automatically serialized into XML using the XML Compiler.

Fusion SMTP Mail

The Fusion Simple Mail Transport Protocol (SMTP) client allows embedded devices to send e-mail to any SMTP server. This allows embedded devices to send status reports periodically and inform the recipient of an unexpected event.

Fusion POP3 Mail

The Fusion Post Office Protocol Version 3 (POP3) client allows embedded devices to receive e-mail from any POP3 server. Adding POP3 e-mail capability to an embedded device substantially enhances its functionality. Combining POP3 with SMTP provides for a simple method to communicate with embedded devices from any desktop environment.

Fusion Flash File System

Fusion Flash File System

The Fusion Embedded Flash File System is a small footprint; multi-threaded capable, FAT12/FAT16/FAT32 compatible embedded flash file system. It is targeted towards embedded applications where Flash, RAM or ROM is used for the file storage media. The Fusion Flash File System is capable of managing multiple independent volumes. It delivers a layered driver architecture using a simple binding model allowing for OS-agnostic portability. The Fusion Flash File System has a rugged design that supports wear-leveling, post error correction and file compression.

Fusion Security

Fusion IKE

IKE is a protocol that can be used to automatically IPsec security associations with other network nodes. IKE is a hybrid protocol that uses the framework defined by the Internet Security Association and Key Management Protocol (ISAKMP) together with key exchange concepts from the Oakley Key Determination Protocol (RFC 2412) and SKEME (A versatile and Secure Key Exchange Mechanism for the Internet) to obtain authenticated keying material for use with ISAKMP SAs and IPsec SAs. The Fusion implementation of the Internet Key Exchange (IKE) protocol is a high-performance, scalable, portable engine implementing the IKE protocol per RFCs 2407, 2408, and 2409. The code will also support version 2 of IKE when it becomes a standards track RFC.

Fusion IPsec

Fusion IPsec provides security for embedded networked devices. Internet communication has no data security built-in, i.e. the protocol is completely unprotected. The application and user data is sent in clear text; hence any person, organization, competitor etc. can see all information as the IP packets traverse the Internet. For example, your passwords are sent in the open and can be seen and used to hack your system. Adding IPsec to your system mitigates these threats because IPsec includes strong encryption, integrity, and authentication and replay protection.

Fusion SSL/TLS

The Fusion Secure Socket Layer (SSL) product is designed for embedded devices. SSL/TLS was originally intended for use with the HTTP protocol used by Web servers and browsers but has since evolved into an important component in all kinds of secure Internet communication.

Fusion HTTPS

The Fusion HTTPS software product is essentially our Fusion HTTP product combined with Fusion SSL/TLS. This allows for embedded products to implement secure connections over HTTP.

Fusion Algorithms & Codecs

Fusion G.168 Line Echo Canceller (LEC)

Fusion G.168 LEC is a line echo canceller (LEC) used to cancel echoes originating from 4-wire to 2-wire conversions in Public Switched Telephone Networks (PSTNs). LECs are used to eliminate electric echo created by the electrical circuitry connected to the wire lines. This kind of echo is common for videophones, E-mailers, and other telecom devices with video codecs and vocoders, and ISDN telephones.

Fusion G.168-2000 Sparse Network Line Echo Canceller

Fusion G.168-2000 Sparse Line Echo Canceller is ideal for gateways and central office equipment. In contrast to existing hardware solutions, it provides considerable cost effectiveness. Fusion G.168-2000 can also be used as a full taps echo canceller if maximum echo path is less than 32 ms. The canceller's design allows trade-off between MIPS consumption and echo path tail for each channel separately, without any code modification.

Fusion G.729AB Codec

Fusion G.729A is the reduced complexity version of G.729 recommendation and operates at 8 kbits/sec. G.729A uses Conjugate-Structure Algebraic-Code-Excited Linear Prediction (CS-ACELP) to compress speech sampled at 8 KHz to 8Kbps. The coder operates on 10ms frames with an algorithmic delay of 15 ms. Annex B implements silence compression techniques (Voice Activity Detection (VAD) algorithms and Comfort Noise) to reduce the transmitted bit rate during the silent intervals of speech.

Fusion G.723.1 Codec

Fusion G.723.1 is an audio codec for voice that compresses voice audio in chunks of 30 milliseconds. A look-ahead of 7.5 ms duration is also used. G.723.1 is mostly used in Voice over IP (VoIP) applications for its low bandwidth requirement. Fusion G.723.1 codec consists of a separate encoder and decoder. Each component is designed to support the different bit rates. The higher bit rate (6.3kbit/s) has greater quality. The lower bit rate (5.3kbit/s) still provides good quality but the performance is lower compared with the higher rate. Both rates are mandatory parts of the encoder and the decoder. The ITU-T recommendation specifies switching between the two rates on any frame boundary.

Fusion Acoustic Echo Canceller (AEC)

Fusion Acoustic Echo Canceller is designed to reduce acoustic echo that arises in communications products when a microphone and speaker are located relatively close together in an open field. Our algorithm is proven, fully tested, and ready for integration into your device. By using our AEC firmware in your device, you will save months of valuable product development time, while positioning your product ahead of your competition.

Fusion G.711 μ /A – Law Codec

Fusion G.711 is an implementation of the ITU-T G.711 recommendation. The encoder compresses linear PCM, sampled at 8 KHz using non linear quantization to 64Kbps. Two companding laws are supported, A-law (commonly used in Europe and some Asian countries) and μ -law (commonly used in North America), are supported.

Fusion Dual Tone Multi-Frequency (DTMF) Detector

Fusion DTMF tone detector algorithm determines the single generated digit by extracting the two frequencies from the input signal, allowing for tolerances such as frequency offset and distortion such as additive noise, and then checking them to see if together they qualify as one of the digits.

Fusion DTMF Tone Generator

Fusion Dual Tone Multi-Frequency (DTMF) software is an implementation of a Dual-Tone Multi-Frequency (DTMF) generator and decoder. DTMF is an international signaling standard for touch-tone telephones. Fusion DTMF generator generates standard telephone digits as the sum of two sinusoids corresponding to a frequency table for each digit. The DTMF decoder will take a digital signal as input and produce the decoded digit. Fusion DTMF software generates and decodes 8 KHz PCM samples.

Fusion Voice Activity Detector (VAD)

The Fusion VAD algorithm analyzes voice activity to detect silence intervals and sends silence descriptors to the Fusion Comfort Noise Generator (CNG) module. Voice activity detection (VAD) is an important enabling technology for a variety of speech-based applications including speech recognition, speech encoding, echo cancellation and hands-free telephony. The primary function of a voice activity detector is to provide an indication of speech presence in order to facilitate speech processing as well as possibly provide delimiters for the beginning and end of a speech segment.

Fusion Comfort Noise Generator (CNG)

The Fusion CNG algorithm generates comfort noise during the silence intervals, to avoid the "disconnected line" effect. Fusion CNG generates noise, distributed either uniformly or shaped according to the spectral envelope coefficients, which can be passed to CNG as parameters (up to 16 Linear Predictive Coding (LPC) coefficients).

Fusion DTX (Discontinuous Transmission)

Fusion DTX, CNG and VAD are used to reduce the transmission rate during inactive speech periods while maintaining an acceptable level of output quality. VAD classifies the input signal into active speech, inactive speech or background noise. Based on the VAD decisions, DTX inserts Silence Insertion Descriptor (SID) frames during the silence intervals. During silence, SID's are periodically sent to the CNG module, which generates ambient noise during periods of inactive speech on the receive side.

Fusion Call Progress Tones (CPT)

Call Progress Tones are audible tones set from switching systems to calling parties to show the status of calls. Fusion CPT generator is an integral part of the Fusion VoIP Gateway and, in conjunction with the DTMF tone generation, is used to generate the tones to be sent to the Terminal Equipment). CPT detectors are used in Terminal Equipments for machine recognition of tones.

Fusion T.38 Fax Relay

T.38 is an ITU recommendation for the transfer of real-time fax communications between two Group 3 fax terminal endpoints via an IP network. Fusion T.38 is the implementation of that standard licensed to developers of IP-PSTN gateways that require fax transport that meets PSTN standards.

Fusion G.722 Wide Band Support

ITU-T G.722 is the benchmark coder for wideband speech coding quality. Like all wideband speech coders, in G.722, the speech signal is sampled at 16KHz. Fusion G.722 can handle speech and audio signal bandwidth up to 7 KHz, compared to 3.6 KHz in narrow band speech coders. Fusion G.722 coder is based on the principle of Sub Band - Adaptive Differential Pulse Code Modulation (SB-ADPCM). The signal is split into two sub bands and samples from both bands are coded using ADPCM techniques. The system involving G.722 coder can be used to work in three modes 64, 56 and 48 kbit/s. 56 and 48 kbit/s modes will allow an auxiliary data channel of 8 and 16 kbit/s respectively, within the 64 kbit/s channel.

Fusion Full-Duplex Speakerphone Algorithms

Fusion Full-Duplex Speakerphone software is the highest quality full-duplex echo cancellation and voice clarity software for mobile phones. Fusion Full-Duplex Speakerphone provides a combination of echo

cancellation, noise cancellation, and sound enhancement along with sophisticated monitoring and control algorithms. The software is optimized to provide a high quality voice solution with minimal MIPS and memory usage. Fusion software improves speech intelligibility, full-duplex operation, and speaker volume, enabling natural flowing communication for mobile video conferencing and hands-free speakerphone operation.

Fusion T.30 Fax Termination

Fusion T.30 Fax Termination software supports analog Group-3 facsimile (fax) machines. Fax termination is used for fax server dial-in and dial-out services over a LAN, whereby users can send and receive faxes with their PCs. Fax termination can also be used to implement store-and-forward fax services as well as fax-to-e-mail services.

Fusion Automatic Gain Control (AGC)

Fusion Automatic Gain Control (AGC) software is designed for speech processing applications. It adaptively controls the dynamic range of a speech signal without amplifying the noise between words and phrases. It consists of two parts: voice activity detection and gain control. Fusion AGC is the ideal solution for applications requiring consistent audio levels. Fusion AGC consists of two user-callable functions, AGCinit and AGC.