Allegro

RomPlug®

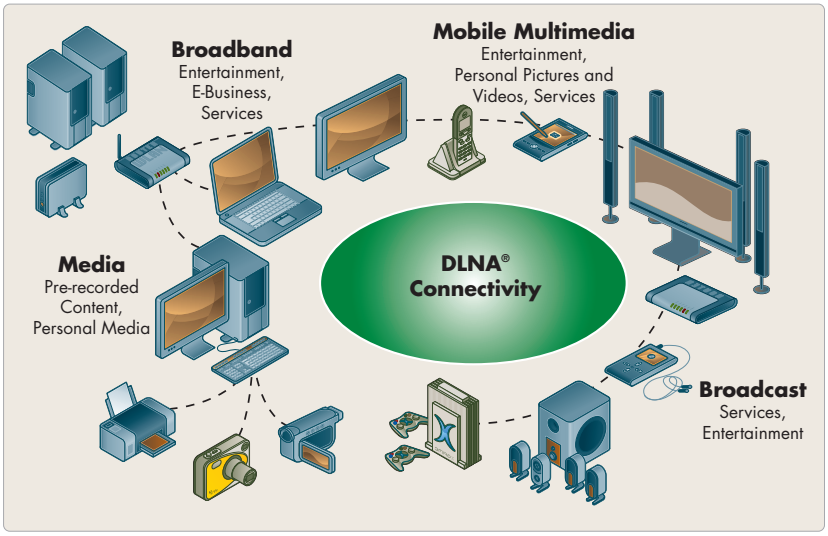
Flexible Embedded UPnP® and DLNA® Toolkits for Connected Consumer Electronic Devices

RomPlug Benefits

- Choice of toolkits to match your development needs
- Decrease time to market by leveraging proven UPnP and DLNA software technology
- Additional DLNA Application Toolkits available for Internet Gateway Devices, Media Renderer, Media Server, Media Player, Media Printer, Media Control Points and VidiPath™
- Support for DLNA DMP,DMS,DMR,DMC devices
- HTML5/RUI support
- Diagnostic (DIAG) support
- Authentication (AUTH) support
- Interoperability routinely tested and verified at DLNA and UPnP plug fests
- Simple development model
- Small RAM/ROM footprint
- Highly portable via field proven abstraction layer (Hardware, RTOS and TCP/IP stack)
- Interface files for leading RTOS vendors provided
- ANSI-C source distribution
- Compilation switches for size and speed trade-offs
- PlugBuilder Compiler simplifies SOAP parsing and framing process
- Toolkits provide full software capabilities to achieve DLNA and UPnP certification

Toolkits for Connected CE Devices

Consumers expect their network-enabled devices to easily discover, join and fully interoperate with the networks available in the environments around them. The UPnP Forum and DLNA provide open frameworks to allow control devices, applications and many types of servers to discover, configure and control devices on a local network. Allegro's RomPlug suite of development toolkits enable engineering teams with flexible and robust tools to create state of the art UPnP and DLNA connected consumer electronics and mobile devices. Engineers save significant time, effort and money by using Allegro's proven and stable implementations of UPnP and DLNA industry standard protocols.



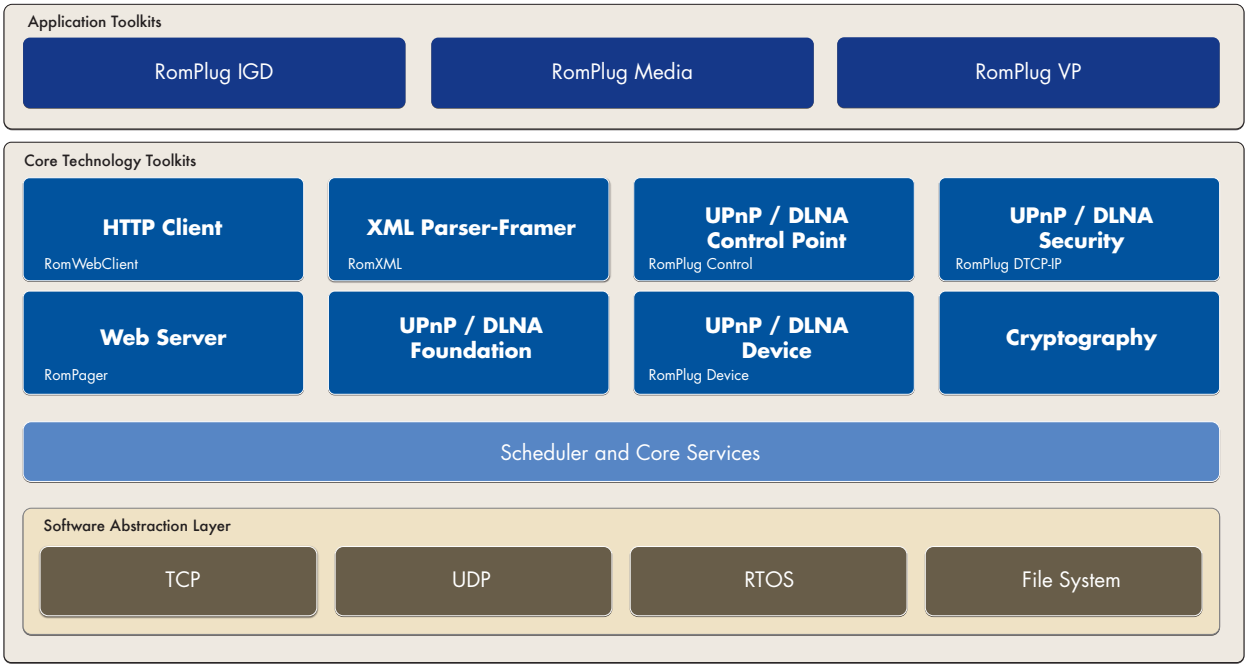
RomPlug Device

Using the RomPlug Device Toolkit, your engineering team can create a broad range of UPnP enabled products. On one end of the spectrum, your team can easily create a product that fully complies with the UPnP Forum's definition of a Basic Device and can be easily discovered and controlled with UPnP technology. On the other end of the spectrum, sophisticated servers and renderers can be built to make full use of UPnP Control and Eventing capabilities based on embedded XML, SOAP, and GENA protocols. Delivered as ANSI-C source code, the toolkit provides the Discovery, Description and Presentation components of the UPnP architecture which are built upon a highly portable and field proven abstraction layer enabling it to work with any OS or TCP/IP stack.

RomPlug Control

Your engineering team will save months of development effort when building a fully certifiable UPnP Control Point with the RomPlug Control toolkit. This toolkit provides a comprehensive solution for products that will discover and control UPnP or DLNA devices by implementing the full Discovery, Description, Presentation, Control and Eventing layers of the architecture.

Toolkits for Connected CE Devices



RomPlug MediaPlay Toolkit

Digital Media Players (DMP) closely model how audio video devices perform today with the simplicity of the DLNA 2 box model. DMPs discover and browse content on Media Servers much like using a program guide and then play selected content. Allegro's RomPlug MediaPlay Toolkit combines the benefits and features found in the RomPlug MediaControl for discovery and browsing content and MediaRender toolkits for controlling playback of content from media servers.

- API to retrieve and parse device and service descriptions
- API for event subscriptions
- Flexible framework to create a DMP that complies with DLNA DMP guidelines

RomPlug MediaServe Toolkit

Media Servers perform a significant role in all home networks. The CE competitive landscape requires device vendors to be innovative with their feature sets for media servers. Allegro's RomPlug MediaSeve toolkit enables developers with a rich API and flexibility to support and foster product differentiation within a DLNA network.

- Serves device and service descriptions without application interactions
- Event subscriptions are initiated and renewed without application interaction
- State variable changes are automatically communicated to control points transparently to the application
- Toolkit provides a rich API for device specific actions

RomPlug MediaRender Toolkit

In the competitive arena of home networking and DLNA devices, companies creating Media Renderers differentiate their products with advanced intellectual property to produce compelling products. Allegro's MediaRender Toolkit provides the framework and flexibility to create innovative Media Renders that endorse DLNA networking throughout a home.

- Serves device and service descriptions without application interactions
- Many Control Point actions handled by the toolkit without application interaction
- Toolkit provides a rich API for device specific actions
- DMR easily complies with DLNA DMR guidelines
- DMR supports Microsoft "Play To" capabilities

Toolkits for Connected CE Devices

RomPlug MediaControl Toolkit

In a DLNA home network with potential for gigabytes of digital audio, video and photos a Digital Media Controller (DMC) is critical to managing available content on the network. Building a reliable and robust DMC that can discover media servers and browse content in addition to discovering media renderers and their capabilities presents a significant challenge. Allegro's RomPlug MediaControl toolkit enables device manufactures to focus their efforts on product differentiation rather than concentrating on the intricate details of media control UPnP/DLNA communications.

- API to retrieve and parse device and service descriptions
- API for event subscriptions
- Event messages are automatically parsed and passed to the application
- Extremely flexible with API for device specific actions

RomPlug VP Toolkit

The RomPlug VP Toolkit extends Allegro's DLNA support for VidiPath, the latest DLNA interoperability standard. The RomPlug suite of software toolkits provides OEM developers with a rich framework to support the underlying requirements of VidiPath, such as: DTCP-IP for Protected Streaming, HTML5/RUI for Distributed User Experience, UPnP Energy Management for sleep mode support, DASH for adaptive delivery, client authentication technology, and transport and link layer diagnostics technology.

- Fully integrated with UPnP/DLNA protocols
- Integrated framework
- HTML5/RUI support
- Diagnostic (DIAG) support
- Authentication (AUTH) support

RomPlug DTCP-IP Toolkit

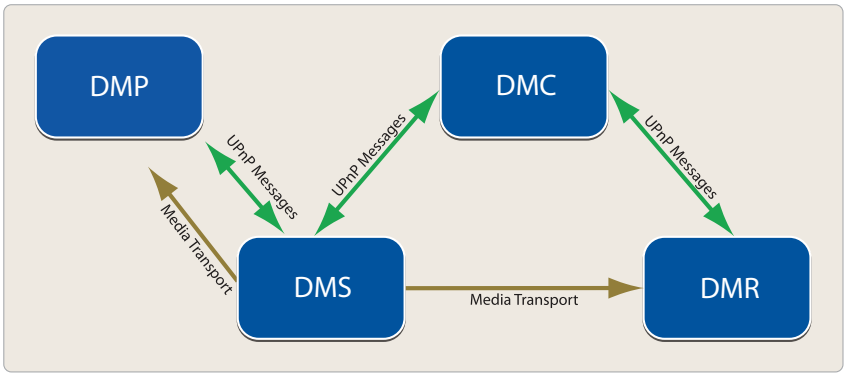
DLNA has chosen DTCP-IP for link protection for home networking environments. Allegro's RomPlug DTCP-IP toolkit enables your design team to easily integrate DTCP-IP security technology for streaming protected digital media content to DLNA enabled consumer electronics and mobile devices.

- Fully compliant implementations of DTLA DTCP-IP
- Routinely qualified at ongoing industry interoperability plug fests
- Fully integrated with the RomPlug suite of products

RomPlug IGD Toolkit

Internet Gateways are essential network components for accessing wide area networks. Allegro's Internet Gateway Device (IGD) toolkit provides a networking framework to create UPnP based IGD products that are easy to use.

- API for service action events (Layer 3 forwarding, WAN Configuration, etc.)
- Evented variables automatically communicated to subscribers
- Flexible framework for creating IGD products



DLNA Architecture illustrating interoperability between a Digital Media Player (DMP), Digital Media Server (DMS), Digital Media Controller (DMC) and Digital Media Renderer (DMR)

PlugBuilder Compiler

All RomPlug toolkits include the PlugBuilder Compiler, which speeds your product development by simplifying the SOAP parsing and framing process. PlugBuilder processes the device and service templates defined by the UPnP Forum to create application stub functions as well as SOAP parsing and framing control data. At run-time, RomPlug automatically parses incoming SOAP messages, delivering data structures to application functions. This tool allows your application developers to focus their development time on their device-specific functions rather than the details of SOAP message parsing and framing.

Simple Development Model

The RomPlug toolkits provide a simple development model for your engineering team. The application programming interface (API) calls to control the RomPlug toolkits provide a simple yet comprehensive method to construct powerful UPnP architecture devices and control points without getting involved with the complexities of the UPnP protocols. Sophisticated compiler option flags allow maximum code-sharing to provide the smallest possible footprint and best performance.

Design Flexibility

Designing unique value-added capabilities into your product is critical to market differentiation. Allegro's RomPlug toolkits offer access to full web technology allowing your development team to utilize the RomPager Web Server, RomWebClient and RomXML toolkits outside the context of UPnP support. Your engineering team can jointly leverage the field proven UPnP technology in addition to offering design flexibility to provide the unique value of added functionality.

Highly Portable

All RomPlug Toolkits are highly portable across RTOS and processor families. Delivered in ANSI-C source code, all products utilize a field proven abstraction layer to enable portability with any RTOS, TCP/IP and file system environment. Interface files for leading RTOS environments are provided.

Feature	Device	Control
Full source code	✓	✓
Flexible licensing	✓	✓
Fully customizable	✓	✓
Hardware and software abstraction layer	✓	✓
Ability to run without RTOS	✓	✓
Sample RTOS integration files	✓	✓
Full electronic documentation	✓	✓
Sample code (Basic Device)	✓	
Sample code (Advanced Device)	✓	
Sample code (Control Point)		✓
Interoperability testing (UPnP and DLNA)	✓	✓
Small RAM/ROM Footprint	✓	✓
UPnP Discovery and Description	✓	✓
UPnP Presentation	✓	
UPnP Control	✓	✓
UPnP Eventing	✓	✓
XML support	✓	✓
GENA support	✓	✓
SOAP support	✓	✓
SSDP support	✓	✓
PlugBuilder Compiler	✓	✓
Rich API to support full customization	✓	✓
ANSI-C source code available	✓	✓
HTTP 1.0	✓	✓
HTTP 1.1	✓	✓
Optional File System	✓	✓

Application Toolkit	Device	Control
MediaControl Application Toolkit		✓
MediaPlay Application Toolkit		✓
MediaServe Application Toolkit	✓	
MediaRender Application Toolkit	✓	
Internet Gateway Device Toolkit	✓	
HTML5/RUI	✓	✓
Diagnostic (DIAG) support	✓	✓
Authentication (AUTH) support	✓	✓

dlna™ TECHNOLOGY COMPONENT

UPnP™ FORUM MEMBER

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