



# RomPlug®

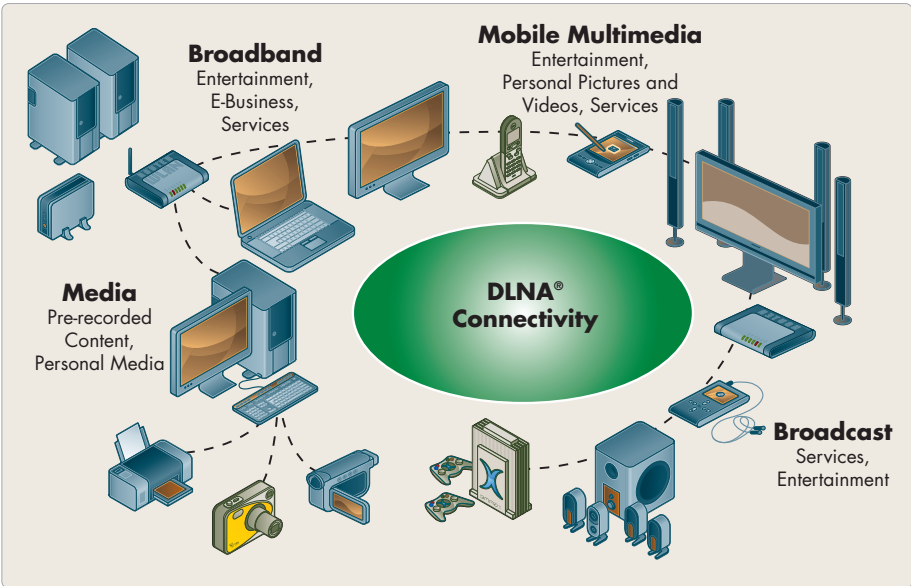
Flexible Embedded UPnP™ and DLNA® Toolkits for Connected Consumer Electronics

## Toolkits for Connected CE

Consumers now acquire, enjoy and manage an ever increasing amount of digital content with consumer electronics. The scale, options and size of content will only grow over the coming years as consumers look to UPnP and DLNA technology to deliver a seamless interoperable network throughout the home. Allegro's RomPlug suite of development toolkits offer your engineering team flexible and robust tools to create state of the art UPnP and DLNA enabled consumer electronics and mobile devices. Engineers save time and money with Allegro's proven and stable implementations of industry standard protocols that comprise the UPnP and DLNA architecture. Allegro's RomPlug Basic, Advanced and Control toolkits along with the Internet Gateway (IGD), Media (DMP, DMS, DMR and DMC) and Link Protection (DTCP and WMDRM) toolkits all meet the latest interoperability guidelines and are field proven in shipping products as well as ongoing industry interoperability plug fests.

### RomPlug Basic

The RomPlug Basic Toolkit enables your embedded device to fully comply with the UPnP Working Committee's definition of a Basic Device. Your engineering team can create devices that converse with UPnP Control Points such as Windows XP, Vista and 7. On systems with UPnP architecture Control capabilities, a device icon will automatically appear in "My Network Places". The device can then be accessed by clicking on the icon to view the embedded Web server HTML pages. 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 Advanced

The RomPlug Advanced toolkit provides tools to accelerate your development of UPnP certified devices. Building upon the functionality of the RomPlug Basic toolkit, the RomPlug Advanced toolkit enables your embedded device to fully support the UPnP architecture for Control and Eventing capabilities with support for XML, SOAP and GENA protocols.

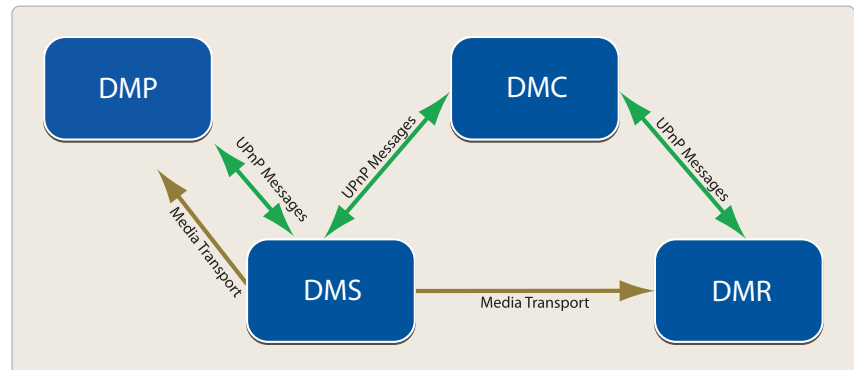
### RomPlug Control

Your engineering team will save months of development effort when building a fully certifiable UPnP Control Point or DLNA Digital Media Controller with the RomPlug Control toolkit. The Control 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.



### RomPlug Benefits

- Choice of toolkits to match your development needs
- Decrease time to market by leveraging proven UPnP and DLNA software technology
- Additional UPnP Application Toolkits available for Internet Gateway Devices, Media Renderer, Media Server, Media Player and Media Control Points
- Support for DLNA 1.0/1.5 DMP,DMS,DMR,DMC devices
- 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



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

### 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 1.5 guidelines



### RomPlug MediaServe Toolkit

Media Servers perform a significant role in all home networks. The CE competitive landscape requires device manufactures to be innovative with their feature sets for media servers. Allegro's RomPlug MediaServe 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 transparent 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 1.5 guidelines





# Toolkits for Connected CE

## 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 manufacturers 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 DTCP and WMDRM Toolkits

DLNA has chosen DTCP-IP and WMDRM for link protection for home networking environments. Allegro's RomPlug DTCP and WMDRM toolkits enable your design team to easily integrate DTCP and WMDRM-ND technology for streaming protected digital media content into their UPnP and DLNA enabled consumer electronics and mobile devices.



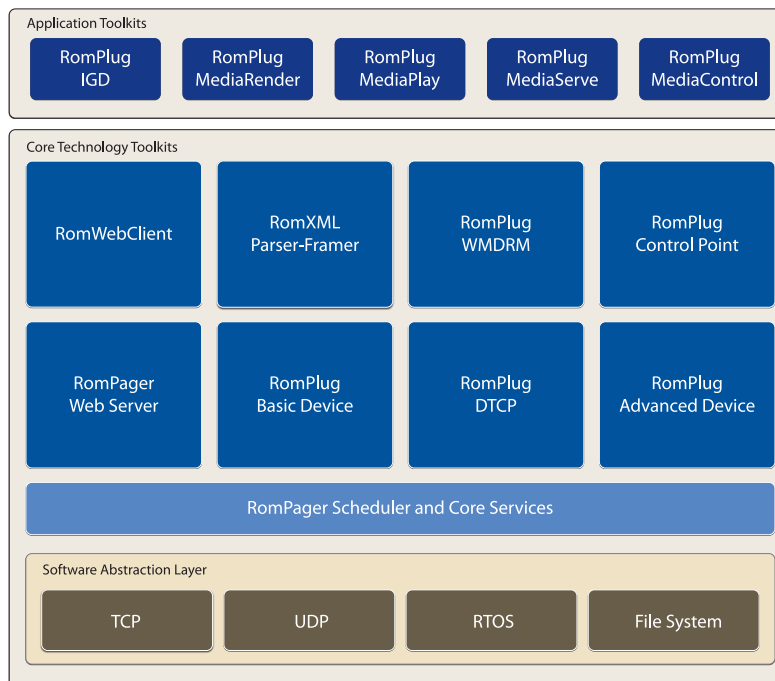
- Fully compliant implementations of DTCP and WMDRM-ND
- Routinely qualified at ongoing industry interoperability plug fests
- Fully integrated with the RomPlug suite of products



## 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



## 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 Working Group 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	Basic	Advanced	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)			✓
Optional MediaControl Application Toolkit			✓
Optional MediaPlayer Toolkit			✓
Optional MediaServe Application Toolkit		✓	
Optional MediaRender Application Toolkit		✓	
Optional Internet Gateway Device Toolkit		✓	
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	✓	✓	✓

