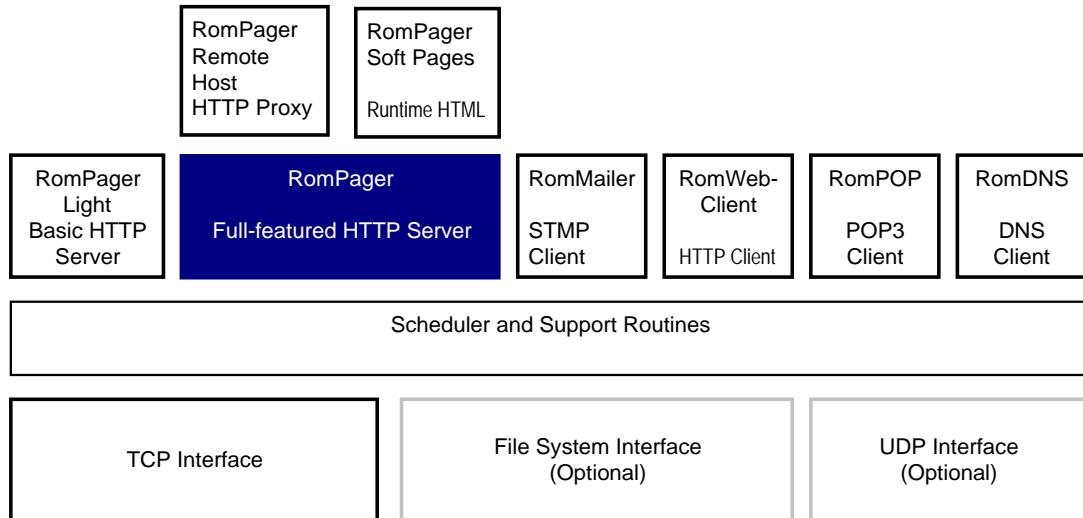




RomPager

A full featured embedded Web server to enable access and control of devices through standard desktop browsers.



Benefits

A complete HTTP or Web server for your intelligent devices

No more developing unique user interfaces for every hardware or software platform.

A complete Web server with HTML application pages fits in only 30 kbytes. Requires little additional hardware to keep your recurrent cost low.

Displays your dynamic data on any commercial Web browser.

Makes your intelligent device proactive by incorporating embedded email.

Uses standard off-the-shelf Web design programs to create your own unique user interface.

Integrated with all leading RealTime Operating Systems (RTOS) but does not require an RTOS. This permits you to select the type of kernel most appropriate to your product.

No royalties to pay – RomPager is provided as C source code. Again, keeps your recurrent cost low.

RomPager Embedded Web Server Toolkit

The Allegro RomPager® toolkit is a set of development tools and sources to create the finest embedded Web server for intelligent devices. It can be used for any device with a network interface making that device accessible to the many commercial Web browsers. RomPager includes an embedded HTTP server that is compatible with all standard browsers including Internet Explorer, Netscape Navigator or Communicator, Hot Java, and Mosaic, on all platforms, allowing any network-connected browser user to easily access and control your device.

The RomPager Web server has been ported to all leading embedded kernels and realtime operating systems (RTOS). Support for most kernels is included in the toolkit. If your device or application does not require the support provided by a RTOS, the RomPager Web server can still be easily integrated with your embedded application.

Internationalization Support

Dynamically selectable user phrase dictionaries make for easy support of internationalized pages. Since a page is stored only once with multiple phrase libraries, your application can provide comprehensive international support while using significantly less memory than other approaches. RomPager comes with standard error messages included for French, German, Italian, Portuguese, and Spanish as well as English.

Sample Pages Included

The RomPager toolkit comes with a rich set of sample pages consisting of over 100 HTML pages, images, and Java applets. These demonstration pages show a complex application that illustrates the full set of RomPager capabilities. There is also a set of validation pages that each tests a single HTML function. They may also be used to learn about a particular capability. Since the sample pages use all the facilities of the RomPager engine they may be also be used test the robustness of the port to your environment.

HTTP 1.1 Support

The RomPager Web server support matches current specifications of HTTP 1.1 (RFC 2068 and drafts) and can provide improved page loading times and network efficiency. RomPager provides full interoperability with Microsoft Internet Explorer 4.0 (the first leading browser to support HTTP 1.1). Digest Authentication (RFC 2069) is also supported, although the major browser vendors may not yet support this capability.

A flexible, powerful interface to SNMP-style set and get routines maximizes use of your existing software investment. Direct access of SNMP variables via MIB Object ID pointers is supported for the SNMP Research EMANATE product line.

HTML – Levels 2.0, 3.2, 4.0

Support for HTML levels 2.0, 3.2, and 4.0 including Netscape and Microsoft extensions so that your pages can present information effectively. This includes page and forms processing support for <INPUT>, (Button, Checkbox, Form, Hidden, Password, Radio, Reset, Submit, and Text types) <TEXTAREA>, <SELECT>, and Image Map elements.

Specifications

- *HTTP 1.0/1.1 compatible*
- *Small footprint – 9 to 25 kb ROM code, 4 kb ROM data, 1 kb basic engine RAM, and 3 to 5 kb RAM per simultaneous HTTP request.*
- *Multiple concurrent requests.*
- *GET, HEAD, POST support.*
- *Optional file system support.*
- *HTML levels 2.0, 3.2, 4.0.*
- *Dynamic HTML and Forms processing support.*
- *ANSI-C compliant source code.*
- *Ported to all leading RTOS kernels but no RTOS is required.*
- *Ported to all leading TCP stacks with socket or non-socket support.*
- *Standards compliant :RFC 1867, RFC 1945, RFC 2068, RFC 2069*

The RomPager server engine is invoked with just a few lines of code. The following lines of code can be used even where there is no operating system.

```
TheTaskDataPtr = AllegroTaskInit();
while (theTaskDataPtr != (void *) 0) {
    /*
        Wait here for time or event message.
        And give up time to other threads.
    */
    if (!AllegroMainTask(theTaskDataPtr, &theHttpTasks,
                         &theTcpTasks)) {
        AllegroTaskDeInit(theTaskDataPtr);
        theTaskDataPtr == (void *) 0;
    }
}
```

The RomPager software uses a single process thread or task with multiple TCP connections maintained in the TCP layer and multiple overlapping HTTP requests supported by the RomPager engine using internal request control blocks and a lightweight scheduler. The engine uses polling or a message-passing model to interface with the TCP/IP interface and timer services. If a message-passing model is used, messages are passed to the thread from the TCP interface for packet activity. The HTTP protocol is not very time sensitive, so the RomPager thread can be run at a low priority.

Minimum Footprint Through Intelligent Compression

Included with the RomPager Web Server Toolkit is the PageBuilder HTML compiler. The PageBuilder HTML compiler pre-processes and compresses your Web pages and HTML tools, and images into compilable ANSI-C code. This allows pages to be developed using standard stored internally in a patent-pending memory efficient format. Both standard HTML and user phrases are tokenized to use runtime phrase dictionaries. Common page elements are stored once and shared across multiple pages. Shared and nested pointer techniques are used for additional memory savings. These various techniques yield a smaller Web application footprint than any other vendor does.

Display Dynamic Data

Your device may be collecting data, either numeric or text, and this needs to be displayed at the user's browser on request. Dynamic HTML creation includes support for index-based variables, so that tables and other repeating groups of HTML may be created easily in a memory-efficient manner.

The built-in numeric-conversion routines between HTML text format and internal numeric formats eliminate device-specific conversion routines. The format conversions include support for 8, 16, 32, and 64-bit signed and unsigned integers, ASCII text, Boolean, Hex display, separated Hex display, and TCP/IP dotted decimal display.

Flexible Security

Sensitive pages can be protected as a group (a

session protection realm) rather than requiring a password per page. Eight separate realms are supported with optional overlapping, for superset realm creation. Security functions include realm timeout with password re-challenge support. User exit routines are provided for maintenance of the realmname, username, and password variables so that these values can be managed from Web pages or other management services.

External security support provides for security verification using an external verification source such as a RADIUS server rather than the RomPager internal security tables.

HTTP Headers

RomPager serves objects including HTML pages, standard images, and Java applets with the appropriate MIME types. Caching support is provided for static and dynamic objects using the appropriate HTTP headers. Date header generation is controlled using calendar clock, realtime clock, or clockless environments.

Netscape-style dynamic pages (using Client-Pull or Server-Push techniques) are supported for automatically updated pages. Netscape-style persistent connections using the Keep-Alive header are available to reduce connection overhead.

The RomPager Web Server has image mapping support of rectangle, circle, and polygon elements.

File System support with RomPager allows you to serve or receive an arbitrary data stream from RAM, flash, disk, or the network. This allows additional HTML pages, graphics or Java applets to be served without using ROM memory resources. File System support also allows uploading and downloading files to and from your device from any browser. Upload support requires an HTML 3.2 compliant browser that supports RFC 1867. The File System support offers a generalized asynchronous I/O interface to any file system environment including support for all latency issues.

The RomPager code has compilation options for speed/memory/feature tradeoffs so that the package may be optimized for your Web-based management application. Engine working memory may be allocated statically or dynamically. Compilation options provide control over buffer sizing, number of simultaneous HTTP requests, index depth, clock support, and security features such as session timeouts and password groups. Additional flags control inclusion/exclusion of image map support, individual HTML form element support, JavaScript support, MIME type checking, and a variety of other options.

Additional RomPager Functions

Internet Printing Protocol

Internet Printing Protocol (IPP) support is provided. RomPager recognizes and passes IPP packets through HTTP 1.1 to an IPP parser process. The parser process returns IPP responses and RomPager provides the appropriate HTTP 1.1 transport to the IPP client.

URL State Management

This feature provides support for state passing between pages using state variables in the URL.

The Remote Host feature uses an optional embedded HTTP client to redirect a request from the embedded device to another server on the network to retrieve applets, graphics, and other large objects. This is sometimes called proxy services. This feature allows devices with limited memory to still present large graphics or applets to the user. This is particularly important for applets, since Java security requires that applets can only talk with the device that served the applet.

Optional Allegro Web Functions

The following software functions are available from Allegro Software Development and can be integrated with either RomPager or run as independent programs with your embedded applications.

Email

Allegro Software Development offers two embedded email products that can be integrated with the RomPager Web server or run as a stand-alone product with your embedded application. The RomPOP POP3 client will permit your application to receive Internet email messages with any MIME format binary attachment.

The Allegro RomMailer is a toolkit for building a Simple Mail Transfer Protocol (SMTP) client so your intelligent device can send Internet email.

Domain Name Services

The RomDNS client is a Domain Name Services (DNS) client providing your devices to perform lookups of a variety of DNS records. You may use it to simplify configuration for RomMailer and RomPOP or to provide server addresses for RomWebClient.

HTTP Client

Rather than use the complex NFS or FTP protocols Allegro Software Development provides the RomWebClient HTTP client software. This provides your devices the ability to retrieve remote objects from Web servers using the HTTP protocol. The received objects can be in any format and are returned in a buffer or stored in the optional files system.

Proxy Services

The RomPager Remote Host provides your device with integrated proxy services to support redirection of HTTP requests to another Web server. This service is used for retrieving objects too large to store on your intelligent device.

SoftPages

The RomPager SoftPages parse adds an HTML parser to the RomPager Web server allowing your device to support runtime source changes to HTML pages. HTML pages prepared for use with SoftPages use special XML tags to identify dynamic values that RomPager will insert when the page is requested.

Java Graphlets

The RomPager Java Graphlets Toolkit consists of a series of Java applets that interface with the embedded Web server to retrieve variable information and display it graphically. The applets are parameter driven and may be configured externally (without modifying the Java source code) to display different variables, data ranges, colors, titles, etc.

RomPager Light

Often you will have need for a basic web server. RomPager Light provides an HTTP 1.0/1.1 compliant Web server with CGI-style user exit support and optional file system support. RomPager Light uses from 7 kb to 12 kb of ROM code – including the scheduler – and provides you with a small powerful server for your low-end devices.

Internet Inside

Using the Allegro Software Development embedded Web server toolkits can make your intelligent devices Internet ready. No longer will you have to develop unique user interface for every software and hardware platform connecting to your product. Using commercial Web browsers as the GUI for your devices has never been easier.

The royalty-free RomPager Web server means your product can have these state-of-the-art technology functions with no incremental manufacturing cost for software.

Go to the Allegro Web (www.allegrosoft.com) site to request a demo or to obtain additional information. Better yet, call and order RomPager embedded Web server toolkit and label your devices Internet Inside.

Insert RomPager Architecture drawing

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