Advertising display controller software

completed project - January 2008

Customer

Manufacturer of large and extra-large LED information and advertising displays.

Objective

Create a software platform for controlling high resolution and color quality displays. Besides, the platform should support LCD displays with big diagonals size as output devices. Software should contain display emulator with preview function. It is necessary to implement a possibility to work with layers and video and also provide platform scalability by means of applying Linux OS.

Solution

Hardware

Any x86 PC can be used as hardware platform, if it has the following recommended characteristics: RAM from 128 Mbytes, processor speed from 256 MHz, video card supporting framebuffer or DGA (Direct Graphic Access). Hardware capabilities must be enough for installing SUSE Linux 10.2 operating system.

Both standard LCD monitor and LED display, connected to a standard PC video output, can be used as output device.

Software

SUSE Linux10.2 is the operating system providing work of software. The OS installation is minimal, sufficient for the project: gcc compiler and framebuffer mode support. Application software package includes a special installer that installs necessary program libraries from OS distribution and configures project modules for a certain PC.

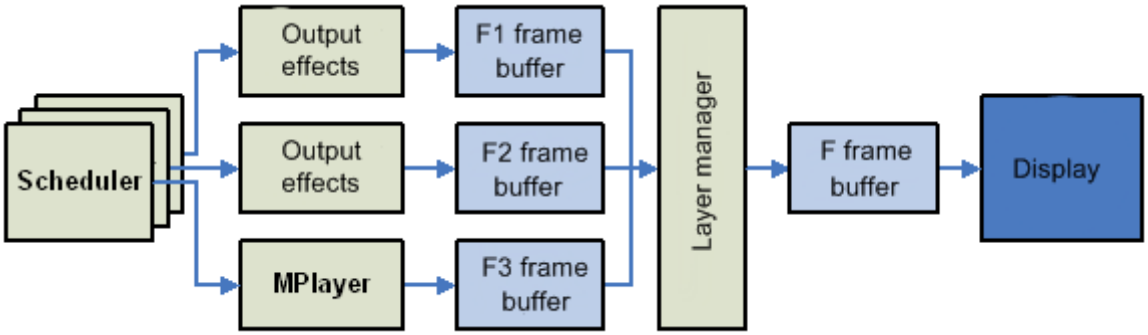
Software allows working with different resolutions of advertising displays and it supports various image color modes (bpp parameter - bits per pixel).

Operator's interface is implemented by applying modern Web-technologies. There is a Web-server working under SUSE Linux10.2 control. It provides user's interaction with internal functions of visualizer via graphical Web-interface.

The main functions of software are:

- Display control via Web-interface and information output;
- Controller configuration and setting display parameters: resolution of LED cells, number of cells horizontally and vertically, bpp parameter (bits per pixel);
- Division of access rights to user groups (operator, administrator, engineer);
- Scheduling advertising and information announcements;
- Performing more than 20 information output effects (creeping line, changing movement speed, various appearance effects, setting pauses, brightness control);
- Standard TrueType (TTF) fonts support;
- Graphical information output in BMP format;
- High-quality video image output;
- Information output to different layers (user can add, set sizes and activate layers "on the fly");
- Graphical information output to layer surface;
- Testing that information is displayed correctly via built-in display emulator;
- Availability of a special installation file that configures operating system and installs application software.

Output layers can differ in size and overlap, their number is limited only by PC's computing power; transparency of layers is supported. Layer manager was developed to arrange layers into a resulting frame.



SDL library is used to arrange images.

Mplayer is used for video ouput, and output plug-in was developed for it. It converts frames into SDL surface format.

Emulator represents ActiveX-component that allows playing visualization in MS Internet Explorer browser window. It displays the contents of all layers and visualizes text objects and images placed on these layers. Emulator's interface includes scrolling bar that allows scrolling preview forward and backward, i.e. start visualization from a certain frame. Also, there is a possibility to pause playback and renew it using the "pause/start" button.

Benefits

- Application of Linux operating system and ANSI C for programming provides portability of program code to other hardware platforms, absence of charges for licensed solutions.
- Universal support of LCD and LED displays.
- Web-interface allows working with display via Internet browser from any PC (mobile device). No additional software installation is required.

Technologies	Linux, SDL, COM, ActiveX
Programming languages	C, C++, PHP, Javascript
Interfaces	Ethernet, Linux framebuffer
Development tools	IDE KDevelop, GNU Toolchain (gcc, gdb), MS Visual Studio
Project management tools	dotProject, MSProject, CVS
Efforts	140 man-days
Project lead time	9 months