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Logitech® Squeezebox™ Duet network music system

Reviewer's Guide



Images and resources are available online at <http://www.logitech.com/pressroom>, or from the Logitech contact listed contact below

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Part 1: Product Overview

1.1 Introduction

The Logitech® Squeezebox™ Duet network music system lets people listen to the music they love in any room in their home. Squeezebox Duet can access millions of songs – without the need for a computer. With Squeezebox Duet, people can enjoy crystal clear, CD-quality audio on a home theater system, on a bedroom stereo, and even on a kitchen mini-system – anywhere audio gear is installed.



A multi-room controller with 2.4-inch color display makes it easy to browse and play songs from people's personal collection, listen to Internet radio and even access online music services. To make navigation a breeze for even the most non-technical consumer, the stylish Squeezebox Duet handheld controller is designed with a convenient scroll wheel, familiar menus and intuitive buttons.

With the handheld Squeezebox controller and the Squeezebox receiver you can play music files from a computer system, play

Internet radio, and browse media collections by album, artist or even album art.

Wireless setup is a breeze. Squeezebox Duet uses true 802.11g wireless technology that completely eliminates the need to string wires just to listen to the music from a home computer. Setting up additional rooms is as simple as pushing a button – even on secure networks (additional hardware may be needed).

Squeezebox Duet carries a suggested retail price of \$399.99 (U.S.) and €399.99 (Europe).

Top Features: Logitech Squeezebox Duet

Wi-Fi/Ethernet music network	Connect Squeezebox to the stereo or powered speakers to create a musical oasis. Add more Squeezeboxes and listen to a different song in each room, or synchronize them and hear the same music everywhere.
Multi-room controller	Multi-room controller with 2.4-inch color display makes it easy to browse playlists, albums and artists.
True 802.11g Wi-Fi network music system	No need to string wires everywhere.
SqueezeNetwork™ online music center	Access thousands of radio stations and millions of songs without ever turning on your computer using Logitech's unique SqueezeNetwork™ Internet service. Even a personal music collection can be stored online in an MP3tunes.com music locker and played directly to Squeezebox.
Expandable platform	Easily add more Squeezebox players.
Familiar interface	Includes scroll wheel, familiar menus and intuitive buttons that allow people to easily browse, select and play music from the palm of their hand.
High-fidelity 24-bit DAC	Enjoy crystal clear CD-quality audio
Streamlined setup	Start listening to your tunes within minutes.

1.2 Brief Market Summary

Broadband and digitization are rapidly transforming how people listen to music. Today, of those people who use a computer at home or work, nearly 65 percent of adults and more than 86 percent of eighteen- to twenty-four-year-olds worldwide use the computer to access music, according to research firm IDC. And an additional 95 million people will pay for online music services in 2008.

Unfortunately, digital audio content has been stuck on a PC or on a digital music player. Until now. Before Squeezebox Duet, people had to be near their computers if they wanted to enjoy digital music. With Squeezebox Duet, that's no longer necessary. People can easily control digital music from the palm of their hand – anywhere in the home.

1.3 The Hardware

The Squeezebox Duet network music system consists of two hardware components: the handheld controller and the receiver, which connects to the network and the stereo system.

Squeezebox Controller

To simplify navigation of people's digital music collections, the Squeezebox handheld controller features a **2.4-inch color display**.

The multi-room controller uses a convenient scroll wheel, familiar menus and intuitive buttons that makes it easy for people to browse, select and play their personal music collection, **Internet radio stations**, and online subscription services, such as **Rhapsody, MP3tunes.com, Last.fm and Pandora**. With the controller, searching music by artist, album title, playlists, genres and other categories is a breeze.

The brilliant full-color screen displays album art and even allows people to choose their own wallpaper.



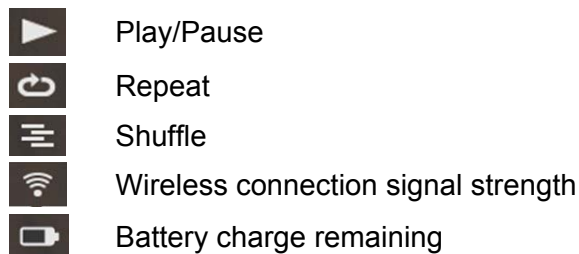
Note: for people who already own a Logitech® Squeezebox™ Classic or Logitech® Transporter™ network music system, a stand-alone Squeezebox™ controller will work with these legacy players and is available for purchase separately for \$299 (U.S.)



The color LCD is divided into three areas: a title bar which tells you which player you are controlling (i.e. the Squeezebox named 'kitchen' in the kitchen), a main content section and a status bar (at the bottom).

- **Now Playing** displays information about the current selection, including album art (if available).
- **My Music** accesses the owner's personal music library, organized by album, artist, genre or year.
- **Internet Radio** accesses ShoutCast, RadioTime, RadiolO, Live365 and other Internet radio stations.
- **Music Services** allows people to select Pandora, Rhapsody, and MP3tune subscription services.
- **Settings** are where Squeezebox Duet system configuration choices are made.
- **Choose Player** is for accessing additional players, if any, are installed on the network.

The status bar, displays a series of informational icons including



Squeezebox Receiver

With its sleek styling and ultra-low profile, the Squeezebox receiver builds on the control and excellent audio quality of its predecessor. The slim shape assures that it fits in any room in the home.

Leveraging Logitech's audio engineering expertise and employing sophisticated audio rendering technology provides first-rate enhanced sound clarity. Use of true 802.11g wireless technology eliminates the need to drag unsightly wires throughout the home just to listen to music from the computer.

Advanced users can control multiple music sources throughout their house by adding more receivers. With this arrangement, a different song can play in each room, or the receivers can be synchronized to play the same tune throughout the house.



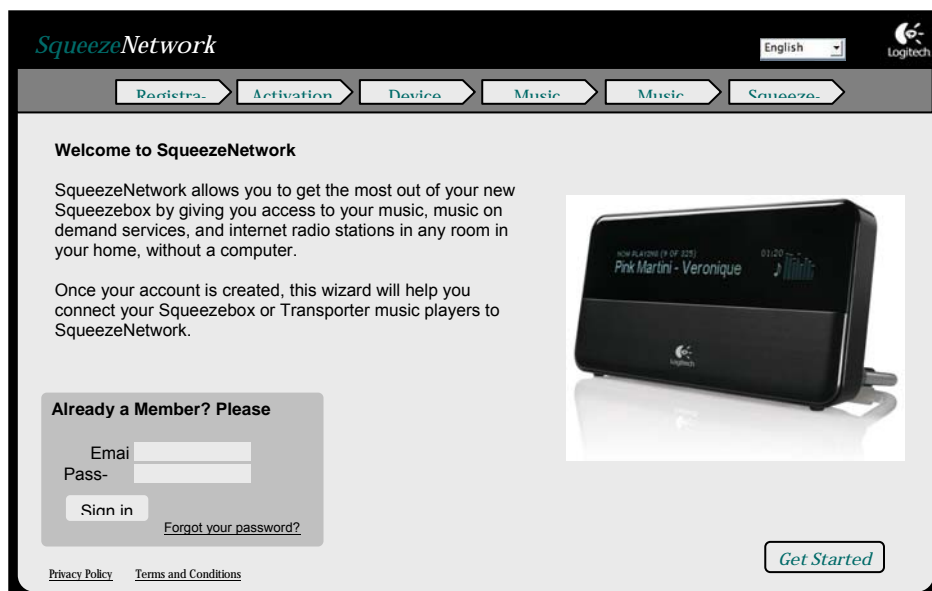
The LED on the front of the receiver is not just decorative. It provides detailed at-a-glance status information display. The LED also acts as a button control that can pause music playback or return to setup mode.

1.4 SqueezeNetwork

The real power behind the Squeezebox Duet is the SqueezeNetwork. While the Squeezebox Duet enables people to wirelessly browse, select and play their personal music collection from their PC or Mac to their existing stereo systems – the real fun comes from the SqueezeNetwork, which lets you play music from the Internet, even when the computer is off

Located at www.squeezenetwork.com, SqueezeNetwork allows people to listen to Internet radio stations and access music subscription services without using their computer. SqueezeNetwork does all the heavy lifting and presents online music programming instantly, allows people to save their favorites, and even allows people to share the same information across all the players they own.

Signing up for SqueezeNetwork is free.¹



The SqueezeNetwork is where Squeezebox Duet owners create an account that is the portal to both free and fee-based services, including Internet radio and on-demand music subscription services.

Music On Demand: SqueezeNetwork makes it a snap to access major online music services, including MP3tunes Music Locker, Rhapsody and Pandora.

Internet Radio: Connecting to popular Internet radio services takes just seconds. Services currently available include Slim Picks, Live365 Internet Radio, radiolO.com, Internet Radio Guide by RadioTime, and SHOUTcast Internet Radio.

¹ Some services provided through SqueezeNetwork require paid subscriptions, such as Pandora and MP3tunes.com.

Players: Link and delete players to your online account. By linking players, people can access the same favorites and services across each player.

Favorites: Similar to the favorites list on a computer's Web browser, SqueezeNetwork makes it easy to bookmark favorite radio streams, news feeds and podcasts for access from player devices.

1.5 Other Features

Wide Variety of Music Formats

It's a fact of life that many file formats exist for listening to music. The Squeezebox Duet supports many of these formats either directly in hardware or through powerful server-side software via transcoding.

- **Hardware-Based Support** for MP3, FLAC, WAV, AIFF, WMA (WMA CBR or VBR), and OGG relieves the SqueezeNetwork servers of doing this task, keeping resources available to maximize throughput.
- **Transcoding** uses servers on the SqueezeNetwork to decode the AAC (.M4A), Apple Lossless, WMA Lossless, APE, and MPC formats. This method allows the SqueezeNetwork to add new file formats at any time without requiring a firmware update of the Squeezebox hardware.

Playlists, Mixes, and Favorites

The menu structure of the Squeezebox controller adds great flexibility that is sure to fit the music listening habits of just about everyone.

With the Playlist feature, people can easily save a song, album, playlist or radio station directly from the Now Playing menu. Creating a random mix, available on the My Music menu, allows Squeezebox to choose from an entire personal collection or within a specific genre. Existing playlists in the .PLS, .M3U and .WPL formats are fully supported.

Advanced Architecture

The local Squeezebox is designed to leverage the capabilities of the SqueezeNetwork. This allows for the rapid development of new service enhancements without a firmware update. (see section 5 for additional information on the Squeezebox architecture)



Part 2: Setup and Use

2.1 What to Look For

Logitech believes that home entertainment products should look stylish and blend with the décor of any living room or den. The Logitech Squeezebox Duet network music system features sleek styling that complements even the most sophisticated rooms.

On the Squeezebox handheld controller, note the quality of the LCD. Bright and clear, this 2.4-inch display provides a rich visual way of seeing album art in addition to operating menus.

The Squeezebox controller offers convenient one-handed control. The buttons and controls on the handheld device are large enough to be operated by touch alone. Even when listening to music with the lights dimmed, there's little chance of an errant finger tap.

The Squeezebox receiver uses true 802.11g wireless technology. It doesn't require direct line of sight. Once you are on the SqueezeNetwork and registered with a music-on-demand service such as Pandora, you never have to enter a password again. Simply select Pandora on the controller and the SqueezeNetwork automatically signs you on.



2.2 Installation Tips

Installation takes just a few minutes. For complete details, please refer to the Squeezebox Duet Quick Start Guide that comes with the product.

Broadband Internet Connection

A broadband Internet connection is required to set up the Squeezebox. This allows people to listen to Internet radio, access online music services (such as Pandora, Rhapsody, etc.), and download the SqueezeCenter software.

Connecting to a Home Network

Squeezebox Duet works through an existing wireless access point (802.11g) or via a wired Ethernet connection. The receiver features an RJ-45 port for a direct wired connection.

- In a wireless configuration, both the handheld Squeezebox controller and Squeezebox receiver communicate directly with the wireless network. Signals sent from the handheld controller are relayed to the receiver (which is always connected to the stereo system). In this configuration, there's no need for the controller to communicate with the receiver.
- In a wired Ethernet configuration, you can choose to have the handheld controller communicate directly with the receiver or with the wireless network, if there is one. The receiver is always connected to the stereo system.

Installation consists of just a few steps. To simplify the process, Logitech recommends performing them in this order:

1. Charge the battery on the Squeezebox Controller
2. Acquire your network address
3. Set up a SqueezeNetwork account
4. Download and install SqueezeCenter
5. Connect the Squeezebox receiver
6. Connect the Squeezebox controller
7. Set up the Squeezebox receiver to the network

SqueezeNetwork Account

SqueezeNetwork.com is a 24/7 online music service operated by Logitech that offers a variety of different music services from one central site. You will need to create an account and register the Squeezebox Duet to that account to activate it. Activate SqueezeNetwork to access music services such as Pandora and Rhapsody or Internet Radio,

Listening to Music on a Computer

You can listen to your own music collection from your PC or Mac to any room in your home. Doing so requires installing the SqueezeCenter software. If you don't want to listen using your computer, there's no need to install the software. The software is available via download.

- The registration process presents an opportunity to download the software. Alternatively, to download the software manually at any time, go to www.slimdevices.com/download.
- SqueezeCenter can be installed on Windows®, Mac OS®, and Linux®. Be sure to download the correct version.

SqueezeCenter plays non-DRM² music from iTunes®.

2.3 Playing Internet Radio

The Logitech Squeezebox Duet plays Internet radio by first connecting to SqueezeNetwork.com. It provides access to a wide variety of radio and music. For detailed operating instructions, consult the Squeezebox Duet user guide.

There are thousands of Internet radio stations available. Access also is available to radio partners providing personalized radio stations and music-on-demand services. Squeezebox Duet plays these stations through the broadband Internet connection.

To play Internet radio, for example, follow these instructions:

1. Press the HOME (□) WRONG ICON button, scroll down to Internet Radio, press Center button
2. Go to Home > Internet Radio
3. Scroll through the provider list, select "Slim Picks," CHECK NAME press Center button
4. Scroll to "Best of Internet Radio," press the Center button
5. Scroll to "Slim Showcase: Miles Davis", press PLAY (▶)

The Internet radio station buffers and then plays.

² Squeezebox does not play DRM-protected music purchased from the iTunes Music Store.

MusicGiants, Last.fm, RadioTime, RadioIO, Live365, and Shoutcast

These providers offer a wide range of music genres. Subscribers can browse or search by artist, song, genre, and more. Learn more at www.musicgiants.com, www.lastfm.com, www.radiotime.com, www.radioio.com, www.live365.com, and www.shoutcast.com.



Part 3: Product Overview

Logitech® Squeezebox™ Duet Network Music System

Announcement Date: January 5, 2008

Shipping: February 2008

Price: \$399.99 (Controller and Receiver)³

Available at: www.logitech.com

Product Description

With the Logitech Squeezebox Duet, music lovers can listen to digital music on the home-entertainment system in their living room, the stereo system in their bedroom, even on the mini-system in their kitchen – anywhere they have audio gear. And control it all from the palm of their hand.

Features

- Multi-room controller with 2.4-inch color LCD screen
 - Convenient interface includes scroll wheel, familiar menus, intuitive buttons
 - Controller displays song titles, album art, personalized wallpapers and additional information including RSS feeds and radio station information⁴
- Support for a wide variety of digital music files, including uncompressed and lossless formats
- True 802.11g wireless networking and dual internal antennas
- Easy to add more Squeezebox receivers, allowing people to listen to a different song in each room, or synchronize their receivers to hear the same song throughout the house
- Connect to SqueezeNetwork, Logitech's always-on Internet radio and music aggregation service, which enables people to stream music – even with their computers turned off
 - Access a directory of thousands of Internet radio stations and subscription services including Pandora, MP3tunes, Slacker and Rhapsody

System Requirements:

- 256 MB RAM and 80 MB hard disk space
- Ethernet or wireless network
- Windows: 733 MHz Pentium running Windows NT/2000/XP
- Mac: OS X 10.3.5 or later
- Linux / BSD / Solaris / Other: Perl 5.8.3 or later

Warranty

- Two-year limited warranty

³ Controller and receiver can also be purchased separately at www.logitech.com.
Standalone Squeezebox Controller: \$299; Standalone Squeezebox Receiver: \$149

⁴ Only for radio stations that support Radio Data System (RDS)

Audio Outputs

<p>Analog RCA outputs</p> <ul style="list-style-type: none"> • High fidelity 24-bit Burr-Brown™ DAC • Two dedicated linear power regulators for DAC and line-out stages • Full 6.0 Vpp line-level signals • Signal-to-noise ratio: over 100 dB <p>Headphone output</p> <ul style="list-style-type: none"> • Standard 1/8-inch jack • Minimum headphone impedance: 16 ohms • Total harmonic distortion: less than 0.03% • Left/right crosstalk attenuation: 92 dB 	<p>Digital S/PDIF outputs</p> <ul style="list-style-type: none"> • Optical and coax digital connections • Dedicated high-precision crystal oscillators (no PLL, no resampling) • Standard IEC-958 (S/PDIF) encoding • Optical connector: TOSLINK 660 nm • Coax connector: RCA, 500 mVpp into 75 ohms • Sample rates: 44.1 Khz, 48 Khz • Audio format: linear PCM, 16 or 24 bits per sample • Intrinsic jitter: less than 50 ps
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Audio Formats

<p>Lossless formats (Apple Lossless, FLAC, WMA Lossless)</p> <ul style="list-style-type: none"> • Bit-perfect audio streaming with reduced storage and bandwidth usage • 2:1 compression ratio <p>Uncompressed formats (AIFF, WAV, PCM)</p> <ul style="list-style-type: none"> • Supports raw pass-through of uncompressed PCM audio formats • Digital pass through to S/PDIF for DTS 	<p>Compressed formats (MP3, AAC, Ogg Vorbis, MP2, MusePack, WMA)</p> <ul style="list-style-type: none"> • MPEG decoding uses MAD software • High accuracy 24-bit synthesis • Supports all MP3 data rates and sample rates, including VBR • May be streamed in PCM (raw), MP3 (transcoded), or FLAC (transcoded) • Sound Check and Replay Gain support for automatic volume control
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Network

<p>Wireless interface</p> <ul style="list-style-type: none"> • True 802.11g wireless networking • Bridging capability allows Ethernet devices to connect to the network • Dual antennas for improved range and throughput (Throughput up to 54 Mbps) • Internal antennas: planar inverted-F antenna • Supports WPA Personal, WPA2-AES and 64/128-bit WEP encryption 	<p>Ethernet interface</p> <ul style="list-style-type: none"> • True 100Mbps throughput • Shielded CAT5 RJ-45 connector • Connects to any 100 Mbps or 10 Mbps network • Auto-detects full duplex and half duplex modes • Maximum cable length: 100 meters (333 feet)
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Additional Information

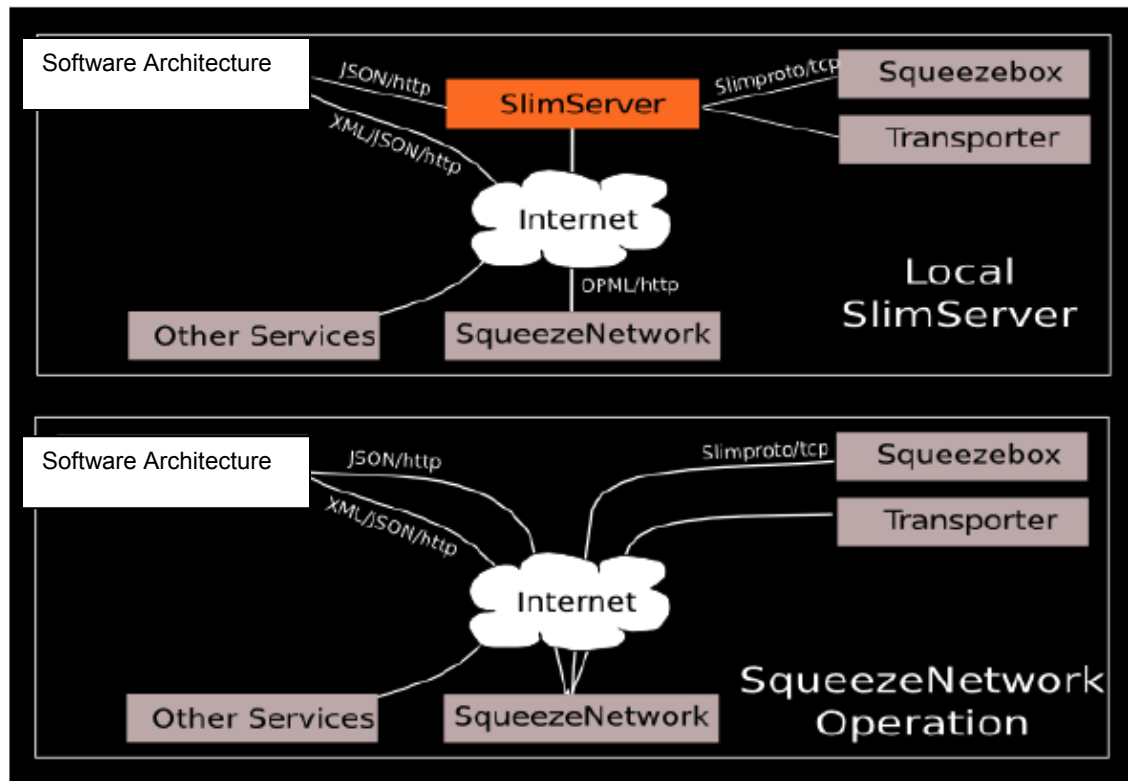
<p>Firmware</p> <ul style="list-style-type: none"> • Flash upgradeable firmware • Network settings are stored in non-volatile memory architecture • 250 MHz 8-way multithreaded RISC processor • Pure-software SlimDSP™ architecture • Field-upgradeable Xilinx CPLD • 64 Mb high-speed RAM • 16 Mb program flash 	<p>Power input</p> <ul style="list-style-type: none"> • 5.0 V DC, regulated • Center positive, sleeve ground • Connector: 2.5 mm ID, 5.5 mm OD, 11 mm long • Min supply rating: 1000 mA <p>Internet Radio</p> <ul style="list-style-type: none"> • "Always-on" Internet radio, powered by SqueezeNetwork, lets you tune in to Internet radio streams even when the home PC is switched off
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Part 4: Squeezebox Software Architecture

This portion of the Reviewer's Guide describes the Squeezebox Software Architecture.

The design of the architecture is intended to keep the Squeezebox software simple and leverage the capabilities of the SqueezeCenter (application software) and SqueezeNetwork (Internet access point). This design allows rapid development of new Squeezebox services and service enhancements without a Squeezebox firmware update.

The Squeezebox system diagram is shown below:



Squeezebox application software

The Squeezebox application software (SqueezeCenter) provides a framework for one or more applets to provide services to the user. The applets are implemented in Lua. Libraries for UI elements (using SDL) and network primitives enable rapid applet development. The applet manager will allow downloading new applets from SqueezeCenter or SqueezeNetwork to Squeezebox.

LUA

“Lua is a powerful light-weight programming language designed for extending applications. Lua combines simple procedural syntax with powerful data description constructs based on associative arrays and extensible semantics. Lua is dynamically typed, runs by interpreting bytecode for a register-based virtual machine, and has automatic memory management with incremental garbage collection, making it ideal for configuration, scripting, and rapid prototyping.”

<http://www.lua.org/about.html>

A lightweight framework enables management of Squeezebox applets. Applets are loaded on demand to make the optimum use of the available memory. Some Lua extensions are included in the Squeezebox application enabling threads, Unicode, bitwise operators, integer optimizations and hexadecimal to be supported.

Lua provides a suitable scripting language for development of additional services by community members and 3rd party companies for the Squeezebox system. Lua is already used in many commercial games, of note "World of Warcraft" has an active user community developing add-ons.

The Squeezebox User Interface is implemented in Lua and C using the SDL graphics library. "Simple DirectMedia Layer is a cross-platform multimedia library designed to provide low level access to audio, keyboard, mouse, joystick, 3D hardware via OpenGL, and 2D video framebuffer. SDL supports Linux, Windows, Windows CE, BeOS, MacOS, Mac OS X, FreeBSD, NetBSD, OpenBSD, IBS/OS, Solaris, IRIX, and QNX. SDL is written in C, but works with C++ natively, and has bindings to several other languages."

Squeezebox Applets

The following are examples of Squeezebox applets.

Default Skin

A device skin is implemented as an applet. This includes the images and the layout rules for the interface. As the skin is scripted in lua it allows interactive skin features to be developed. For example to allow selection of the skin's background image. New skins will be required for devices with different size displays. All the layout rules are included in the skin allowing easy customization for new devices.

Screen Savers

The Screen Saver applet allows the user to select the current screen saver and modify screen saver options (e.g. timeout). The screen savers are implemented as applets (see Bounce and Flickr).

Slim Discovery

The Slim Discovery applet finds SlimServers and players on the local network.

Slim Browser

The Slim Browser applet provides control of one or more players. This includes Now Playing, Browse, Search and Internet Radio.

Bounce Screensaver

The Bounce applet provides an example of how an animated screensaver can be developed.

Flickr Screensaver

The Flickr applet provides an example of how another Internet Service can be integrated on Squeezebox. This applet is a screensaver using photographs from the Flickr site.