

## Introduction

The JukeBlox Platform is the industry’s most comprehensive Linux based Digital Media Player (DMP) software/middleware development platform, application code and SDK.

Using products build on BridgeCo's JukeBlox Software Development Kit, consumers are able to break away from their home offices and enjoy digital music anywhere in the home.

The JukeBlox Platform for Wi-Fi Audio DMP and Internet Radio products enables the delivery of digital content available from USB 2.0 storage, broadband Internet connection or the PC to consumer entertainment equipment. The platform also provides support for an Alarm clock and AM/FM Tuner (with or without RDS). The platform can support network connectivity through Wi-Fi and wired Ethernet, and is designed to comply with many industry standards (UPnP, DLNA, Play4Sure, etc).

The platform is optimized for digital rights management using a secure co-processor, offering a secure platform that supports current and future authentication and encryption schemes.

Based on BridgeCo’s extensive experience in audio streaming and networked home entertainment systems, the JukeBlox platform offers a proven, mature, and flexible platform to address the OEM’s and ODM’s needs.

The JukeBlox Platform is offered as a hardware evaluation board and Linux-based SDK with a sample application. The kit includes:

- JukeBlox SDK and documentation
- JukeBlox Applications to shorten design time to final product
- Linux base system on DM870 processor
- CE-2 evaluation board
- Schematics
- Layouts
- Hardware design guides

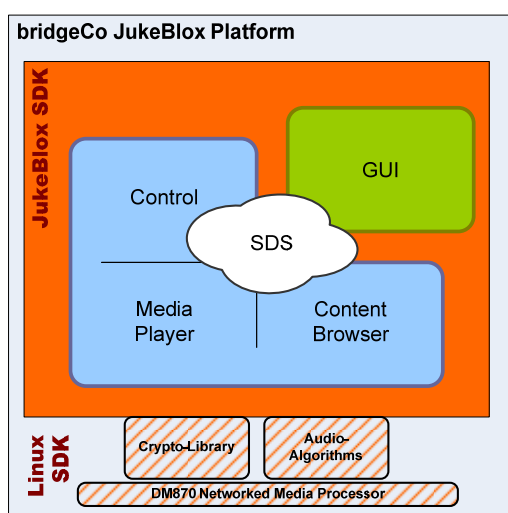


Figure 1  
JukeBlox Platform Architecture

## Platform Features

- Full function Sample Applications
- Easy UI customizations
- Digital Media Player/Adaptor
- Alarm Clock
- AM/FM/RDS Tuner support
- Linux 2.6 based SDK
- Local Color LCD
- Color Album Art
- USB 2.0 Host
- Firmware Updates
- Wi-Fi / Ethernet
- Wi-Fi compliant
- DLNA compliant
- Internet Radio with OEM-branded Portal
- Rhapsody DNA
- Pandora
- Any-song fingerprinting
- DRM with secure engine
- UPnP compliant
- Energy Star compliant

## System Overview

The JukeBlox Platform is compliant with industry standards published by the Digital Living Network Alliance Home (DLNA) and UPnP Forum. Using UPnP automatic discovery mechanisms, it bridges the content stored on the Internet, PC or an alternative server device, and provides the user interface for browsing entertainment content available on the network. Based on sophisticated radio station database management an automatically updated list of 10,000+ stations is available. Automatic network management provides easy setup functions on a Wi-Fi network. BridgeCo's JukeBlox Platform allows the use of a single software configurable platform for many consumer entertainment products. It provides a variety of software options to increase capability and functionality of the product.

The JukeBlox SDK consists of the following elements as shown in Figure 2.

- BridgeCo Core libraries providing common functions for the higher SW layers
- Middleware consisting of the Player for media decoding, playing, and streaming; Browser for Content access and navigation; Controller for overall system control; UPnP & DLNA stacks
- System Configuration for easy system-level customizations without programming
- Control&Command configuration files for managing and customizing remote control functions
- Resources containing all UI and system resources such as graphics, icons, fonts, language strings
- View Glue&UI for the UI look-and-feel

A comprehensive set of software modules is available with the JukeBlox SDK 4.0. The application software runs on Linux, and can be modified by the customer to meet the product needs. As part of the JukeBlox Platform, BridgeCo delivers also:

- Linux Kernel, standard Linux drivers, and BridgeCo DM870-specific hardware drivers including secure cryptographic libraries and non-Linux hardware drivers

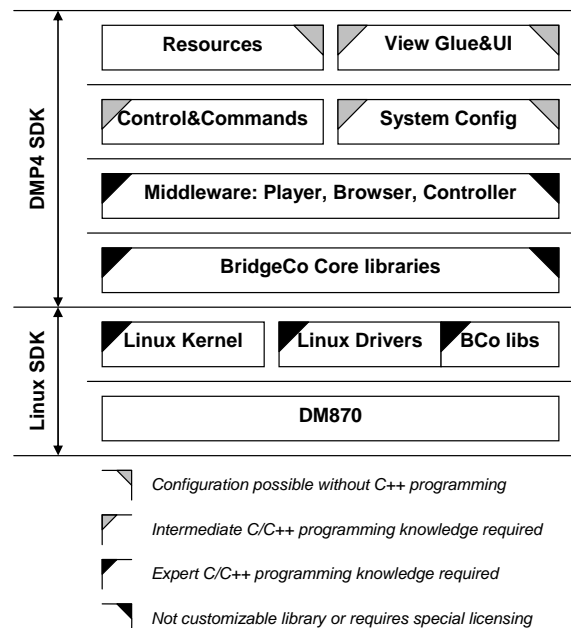


Figure 2

The Linux API provides abstracted access to all functions of the DM870. A comprehensive set of object-oriented software libraries is offered. This software framework supports typical interface functions, e.g. Infrared Remote Control, LEDs, LCD driver, and control and transport protocols including UPnP, TCP/IP and HTTP.

The tool chain provided with the SDK allows for several levels of customizations, depending on the need for changes and the expertise of the user.

At the simplest level the Configuration tools can be used to recompile the resources, such as text strings in different languages, splash screens, icons, device name, and device parameters, without the need to modify or recompile the binary application code.

When more complicated changes are needed, the source code can be changed and recompiling is needed. This can be done at several levels of increasing complexity:

- Enabling/disabling modules and features
- Modifying UI behavior of the application layer
- Adding additional modules such as Codecs
- Modifying source code of the Core functions

## Summary of Product Features

### Networking and Content Discovery

- UPnP AV 1.0
  - Media Server Control Point
  - Media Renderer
- Wireless 802.11b/g networking with WEP, WPA, and WPA2, Wi-Fi compliant
- Network site survey (SSID) and selection
- 10/100 base-T wired Ethernet
- Automatic switching between AutoIP and DHCP
- Multiple user-defined network profiles
- USB storage device
- Real-time browsing of 10,000+ radio stations

### Audio Support

- MP3, WMA, LPCM, WAV, AAC
- AM/FM Tuner (with or without RDS)
- Multi-channel support
- 32-96 kHz, with 16, 24, or 32 bit output
- SPDIF outputs

### Playlists

- PLS, M3U, ASX

### Server Interoperability

- Any DLNA 1.0 compliant server
- UPnP AV 1.0 Media Server

### Premium Content Services

- Real Rhapsody DNA
- Pandora
- vTuner Internet Radio with OEM-branded Portal
- Open API for custom Internet Radio lists

### Digital Rights Management

- Windows Media DRM10
- Rhapsody Radea DRM
- Pandora DRM

### International Language Support

- Display technology for West European and Asian languages (UTF8)

### User Interface

- Clock with Alarm Clock with multiple alarms
- Favorites/Tag list
- Recently Played list
- IR Remote control

### System Management

- Software upgrade direct from internet
- Web interface for device management
- Auto network discovery & configuration
- Installation Wizard for ease of product setup
- NTP and RDS time synchronization

### Industry Standards

- Wi-Fi Alliance
- DLNA (Digital Living Network Alliance)
- UPnP (Universal Plug and Play)

## SDK Modules

### Controller

Event dispatcher for all input and internal status events, translating them into internal commands and application status transitions (modes, like play mode, browse mode, error mode, etc).

### Player

Renders individual tracks (includes acquiring the data over the selected communication interface, decoding, effect handling, playing out)

### Content Browser

Provides access to content directories (e.g., UPnP, file system, etc)

## Linux Modules

Linux distribution with:

- Kernel 2.6
- DM870 Board Support Package

- Drivers: Audio, Ethernet, WiFi, USB, IDE, hardware Audio Engine, hardware cryptographic processor

## Software Development Tool Suite

### Bootloaders

- 1st level bootloader (BridgeCo) binary file
- 2nd level bootloader (RedBoot) binary file

### SDK Tools

- JRE distribution for MediaResource Compilation.
- RedBoot
- RedBoot sources
- DM870 specific drivers (Ethernet, Wi-Fi, UART)

### GNU-based Development Tools

- Cross Compilation Tool Chain for DM870 (GCC).

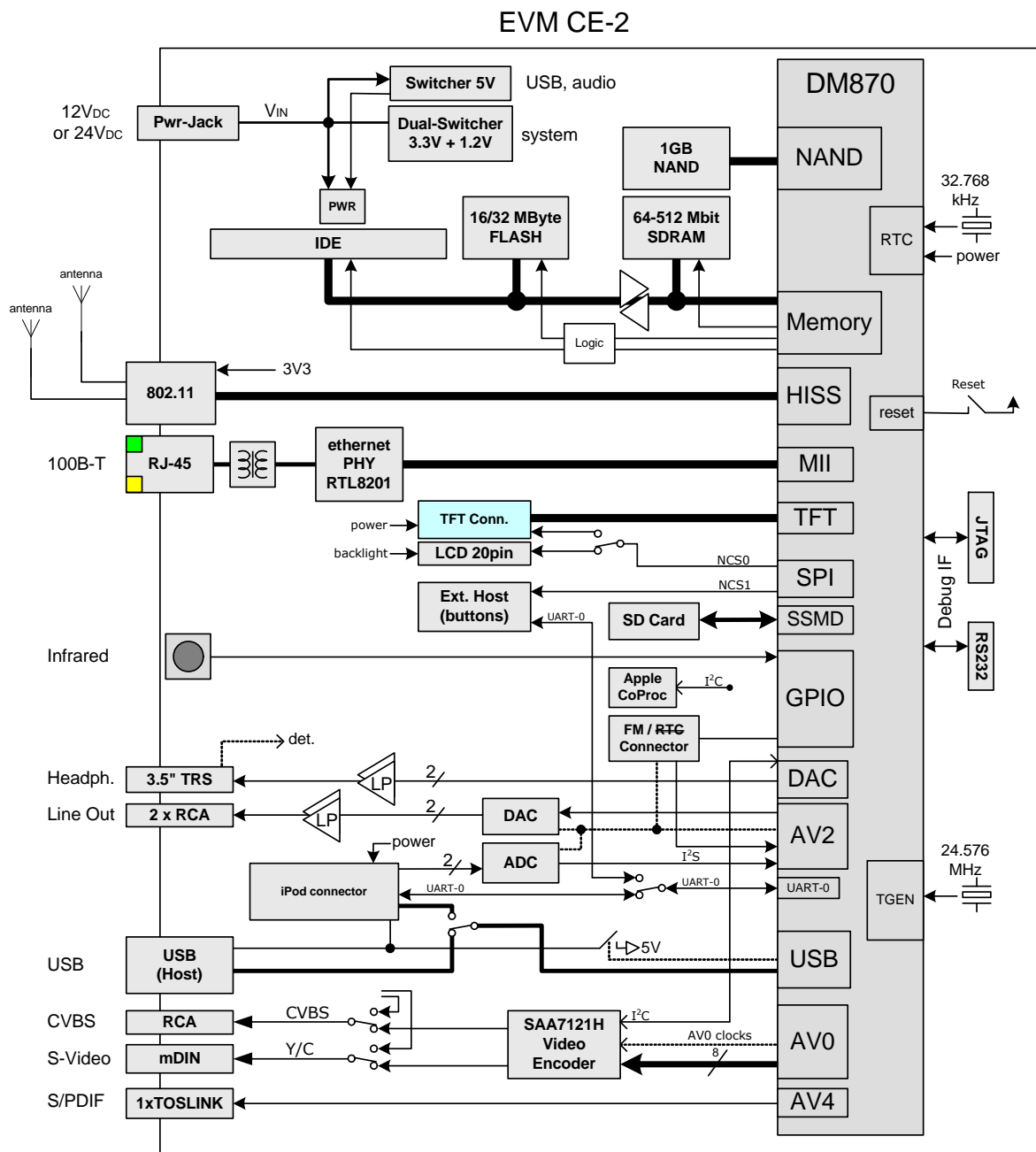


Figure 3

Evaluation and Development Hardware Platform

Note: Headphone output will be enabled in future firmware release.

## Development Options

### BridgeCo JukeBlox SDK Reference Design Software

The BridgeCo SDK offers a ready-made application that enables a customer to easily make limited customizations to the BridgeCo Wi-Fi Audio DMP application software. This software is designed for compatible hardware designs, and provides a quick time to market for a product with proven functionality and features, while giving it a custom look-and-feel.

### Evaluation Board Wi-Fi Audio DMP

The JukeBlox Platform evaluation board (CE-2) makes it possible to explore all the capabilities of the DM870 IC and the JukeBlox software.

### Software License

All software delivered and used in conjunction with the JukeBlox SDK is covered by BridgeCo's software license.

### DM870 Network and Signal Processor

The DM870 Networked Media Processor is a highly flexible interface processor optimized for secure, real-time encoding / decoding and processing of multi-channel audio media content. It features an on-chip Ethernet MAC, Wi-Fi MAC and Baseband, USB 2.0 Controller and PHY, and a direct, glueless interface to the 802.11b/g RF transceiver.

For further details, please see the DM870 Product Information brochure.

### Prerequisites

The JukeBlox SDK is designed for developers with at least intermediate C++ programming skills, understanding of memory management concepts in C++ and a basic understanding of threading concepts. For making changes to the SDK core modules, an in-depth knowledge of these concepts is needed.

The development environment for the JukeBlox SDK is tested with Fedora Core 5 and 6 Linux host environments.

### SDK Levels

The JukeBlox SDK is offered at two levels, depending on your customization and development needs.

SDK Level 1 enables the customer to modify the UI look and feel. It includes the UI modules in Source Code, as well as a resource compiler to enable GUI customization without C++ programming. This package includes 3 day SDK training and 50 hours of technical support.

The specific modules to be included as source code for Level 1 are:

- DMP4TestInterface
- DRCEventHandler
- DRCViewGlue
- IREventHandler
- MenuEventHandler
- defaultmodeobserver
- bare, dmp4, dmp4\_api
- maincontroller
- modecontrols
- screencontrol
- utils
- viewglue
- viewmodeobserver

SDK Level 2 enables the customer to add or modify Internet Radio, Music Services, Audio Codecs, and Sound effects running on the ARM 9 core, in addition to the Level 1 capabilities. Applicable modules of the Streaming framework and Codecs will be delivered in source code. This package includes 10 day SDK training and 100 hours of technical support. As an example, additional modules to be included as source code for adding customer-own sound effects are:

- AVInputContentReader
- AVStreamContentReader
- AudioCDContentReader
- WavContentHeaderParser
- audioDecoderLPCM
- dummyContentHeaderParser
- dummydrmservice

Please refer to SDK API document for further functional description of these modules.

## Ordering Information

The following ordering codes should be used to specify JukeBlox SDK products when ordering from BridgeCo.

Product Description	Ordering Code
CE2 board with JukeBlox demo application	CE2 Board
CE2 board, SDK Level 1 on DVD-ROM, 50 hours Technical Support	JukeBlox SDK Level 1 <sup>1</sup>
CE2 board, SDK Level 2 on DVD-ROM, 100 hours Technical Support	JukeBlox SDK Level 2 <sup>1</sup>
Additional 100 hours of Technical Support	JukeBlox SDK Technical Support 100 hours

<sup>1</sup> Requires signed Technology Development License Agreement and fee prior to delivery

For information on additional software modules, integrated software application packages, or pricing and order enquiries, please contact BridgeCo directly:

BridgeCo AG  
 Ringstrasse 14  
 CH-8600 Duebendorf  
 Zurich, Switzerland

Phone: +41 44 802 3333  
 Fax: +41 44 802 3339  
 Email: [sales@bridgeco.net](mailto:sales@bridgeco.net)  
 Website: [www.bridgeco.com](http://www.bridgeco.com)

Please refer to the website for further contact information.

The names of products of BridgeCo AG or other vendors and suppliers appearing in this document may be trademarks or service marks of their respective owners which may be registered in some jurisdictions. Copyright 2008 by BridgeCo AG, Dübendorf, Switzerland. All rights reserved. Reproduction of part or all of the contents in any form is expressly prohibited without the prior written consent of BridgeCo AG. BridgeCo AG has used its discretion, best judgments and efforts in preparing this document. All information contained in this document is provided without warranty of any kind. BridgeCo AG hereby disclaims any liability to any person for any kind of damage. BridgeCo AG may make improvements and/or changes to this document at any time.