

 jukeblox 2.0

Introduction

JukeBlox 2.0 is a complete Hardware and Software solution for enabling home CE products to connect to the internet and home network, allowing access to internet radio and music services along with home network media.

This comprehensive second generation platform leverages 6 years of software feature development and architectural evolution along with BridgeCo's 3rd generation media processors, modules and hardware designs .

The new JukeBlox 2.0 software platform and SDK combines many features from JukeBlox 1.0 and previous "DMP3.x" BridgeCo platforms. It brings these together in a "best of both worlds" approach to provide the broadest and most proven feature set along SDK development and customization capabilities all optimized with faster boot time and real-time operations. We have also optimized our Network Media Module designs and memory utilization to allow for even more system level cost reductions. We offer an extensive application stack as well as a comprehensive SDK and tool set to bring you the industry's most advanced, powerful, robust and flexible platform ever.

Platform Features

- Comprehensive connectivity solutions
 - Processors, Modules, Software, SDKs, Designs
 - Cost effective, feature rich WiFi/Ethernet solutions
- Unequaled music content & premium services
 - Internet radio with over 10,000 stations
 - Pandora, Rhapsody, Sirius, Napster, LastFM & more
- DLNA 1.5, uPnP, Win7 interoperability
 - Connect, control, stream from PCs & uPnP devices
 - Interoperable, certified, full DMC and DMR support
- Compelling color UI with icon navigation & album art
 - Rich 3.5" QVGA color display and TV out UI options
- Comprehensive solutions for all applications, with
 - Embedded/slave and standalone/SOC platforms
- Extensive peripheral options with full HW+SW support
 - AM/FM/RDS, DAB/DAB+/DMB, iPod with Auth. CP
 - USB2.0, SD Card, Clock and alarms
- Powered by BridgeCo's DM870 network media IC
 - Triple-core processor with integrated WiFi
- Complete WiFi Module subassembly offering
 - Cost effective, certified, complete, turnkey
- Extensive system & firmware upgrade/management
- Unique "Whole Home Audio" technology
 - Device discovery, grouping and control
 - Synchronized multi-zone streaming (party mode)

Solutions Options

In order to significantly accelerate product development as well as deliver you a plethora of integrated DMP features, BridgeCo has packaged up comprehensive solutions for two classes of products. These are the **aDMP Standalone/SOC** implementation and **eDMP embedded/slave** implementation.

Take advantage of full networking and DMP features as well as high value system management and control capabilities. The BridgeCo software application stack permits rich-customization of user interfaces, enabling rapid development of unique, branded end products by OEMs and ODMs. Reference designs are available.

Solution	Description	Product Applications
eDMP	For Embedded / Slave implementations <ul style="list-style-type: none"> • Brings full DMP capability into existing or complex products • Provides all interface/control protocols and registers for system micro controller interface and communication • Supports extensive peripheral (iPod, USB, SD) and system level features (FW upgrade/management, remote device control, etc) 	A/V Receivers, Mini-Component systems, Televisions, Speaker Bars, CEDIA style systems, complex radio/audio products
aDMP	For Standalone / SOC implementations <ul style="list-style-type: none"> • Provides complete DMP, UI and product level features all based on just the BridgeCo processors • Provides all interface/control protocols and registers for system micro controller interface and communication • Supports extensive DMP and system level features 	iPod docks, Clock Radios, Table Top Radios, Mini-Systems, Media Adapters

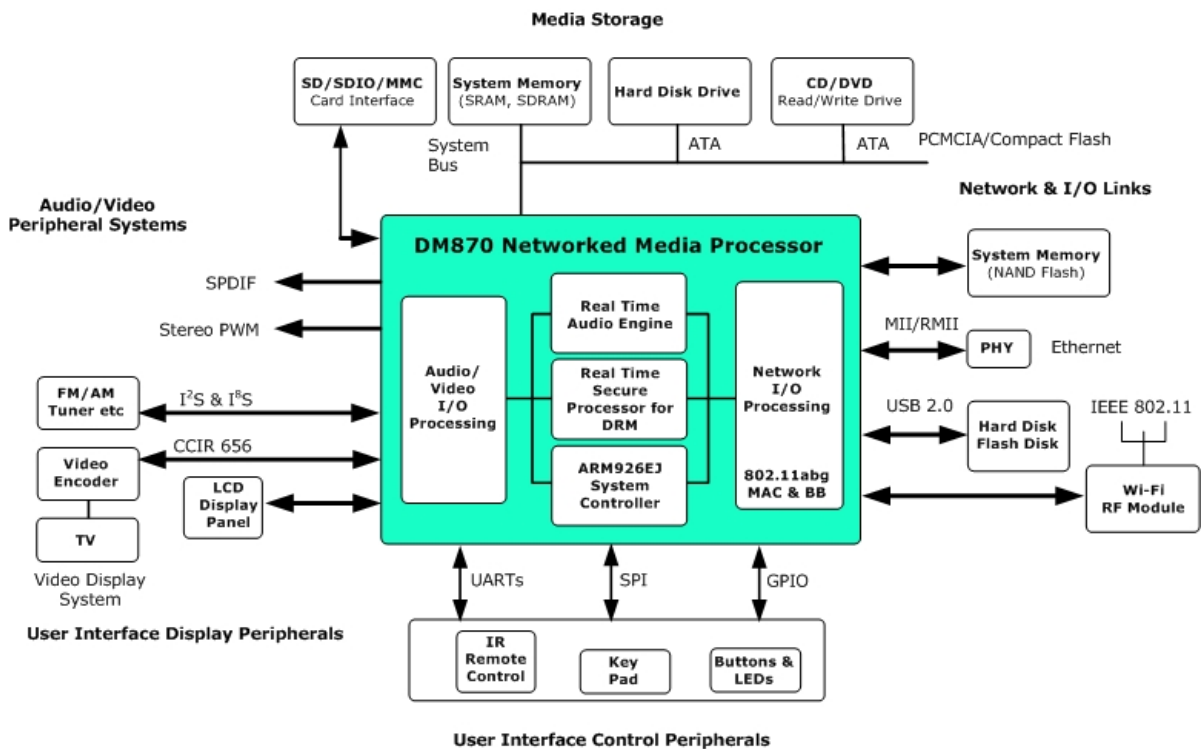
Network Media Processors

With 3 generations of evolution, our processors have evolved to deliver optimum performance and I/O, featuring a system integration to provide cost effective yet powerful feature-rich connectivity for your audio centric products. Based around our ARM9 processors, we've developed highly optimized busses and I/O structures for managing high bit-rate, high-bandwidth digital audio with high quality and low noise and jitter. We've integrated the primary interfaces like Ethernet, USB2.0, S/PDIF, LCD controller, CCIR656 (for TV UI's) and even WiFi MAC/Baseband so you can develop low cost yet feature rich products. Our latest generation processors feature a "Triple Core" architecture that provides over 1000 MIPS of combined processing power and separate proprietary cores for Security and Audio processing features/capabilities.

Table - Network Media Processors Summary

Product	Processor(s)	Integrated WiFi	Ethernet	LCD	CCIR656	USB2.0	S/PDIF	SD/SDIO
DM870	Triple Core, 3 rd Gen <ul style="list-style-type: none"> ARM9-240MHz Security Core-160MHz Audio Engine-160MHz 	X	X	X	X	X	X	X
DM860	Triple Core, 3 rd Gen <ul style="list-style-type: none"> ARM9-240MHz Security Core-160MHz Audio Engine-160MHz 		X	X	X	X	X	X
DM850	Dual Core, 2 nd Gen <ul style="list-style-type: none"> ARM9-160MHz Security Core-160MHz 		X		X	X	X	X

Figure - DM870 Processor Functional/Application Overview



Network Media Modules

BridgeCo now offers a complete and certified DMP (Digital Media Player) system on a miniature PCB. Featured below is our new CR870 module with full WiFi certification, FCC compliance and DAB/DAB+/DMB option. Our modules provide you a headache free and cost effective approach to bringing all the capabilities of the JukeBlox platform to your system without the complexities and costs of RF design, compliance and certification. Plus, with our matrix of feature/population options, you can leverage one product design to service an entire product lineup. Leverage our design expertise as well as our aggregated volume to get high value connectivity with low risk and low cost.

Primary Module Features

- Complete, certified DMP subassembly
- Compact 90.9mm x 67.6mm (3.5 x 2.7 inches)
- Supports full features for both aDMP & eDMP use
- DM870/DM860 Media Processor in 292 mBGA
- Onboard Ethernet and integrated WiFi options
- Includes SDRAM and FLASH memory systems
- WiFi includes low cost on-board PIFA antenna option
- DAB/DAB+/DMB population option
- Connects with standard header connectors
- Comprehensive design, quality and reliability validations
- WiFi certified, FCC compliant, RoHS compliant

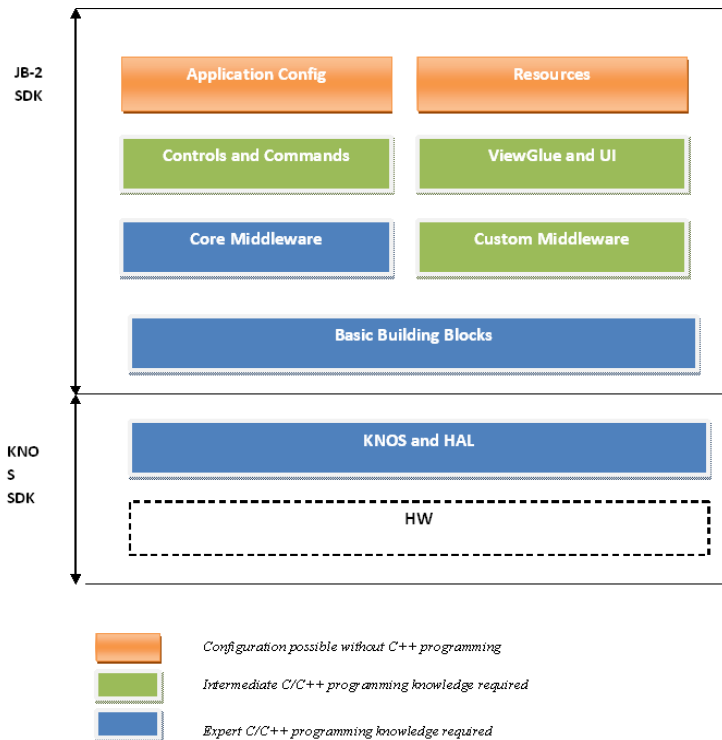


JukeBlox 2.0 Software and SDK

The JukeBlox Platform is the industry's most comprehensive SDK based Digital Media Player (DMP) software/middleware development platform. It provides low level interfaces and a fast real-time ThreadX based OS up through an extensive application layer. The platform is architected for digital rights management using a secure co-processor, offering a secure platform that supports current and future authentication and encryption schemes. 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 and metadata 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 as well as support for WiFi Protected Setup (WPS) implementations. BridgeCo's JukeBlox Platform allows the use of a single software configurable platform for both embedded/slave and stand-alone/SOC implementations in consumer entertainment products. It provides a variety of software options and customization capabilities to increase customize the functionality of the product.

The JukeBlox SDK consists of the following elements as shown in the Figure below:

- 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 and Apple Authentication processor and MFI, WWI complaint protocol stack and control Software and DAB/DAB+/DMB stack
- 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.



The SDK Framework and API 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
- Modifying source code of the Core functions (eg: GPIO control, additional remote control registers, etc)

Summary of Features

Networking and Content Discovery

- UPnP AV 1.0
 - Media Server Control Point
 - Media Renderer
- Wireless 802.11b/g networking
- WEP, WPA, and WPA2, Wi-Fi compliant
- WiFi Protected Setup (WPS) support
- 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, AAC+
- Ogg Vorbis, FLAC, FLAC HD
- AM/FM Tuner (with or without RDS)
- DAB/DAB+/DMB support
- Multi-channel support
- 32-96 kHz, with 16, 24, or 32 bit output
- SPDIF outputs

Playlists

- PLS, M3U, ASX

Server Interoperability

- Any DLNA 1.0/1.5 compliant server
- UPnP AV 1.0 Media Server

Premium Content Services

- Rhapsody DNA
- Pandora
- vTuner Internet Radio with OEM-branded Portal
- Napster
- LastFM
- Sirius-XM

Unique "Whole Home Audio" technology

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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)
- Full DMC & DMR support
- Win7 certified

System Components

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, Music Services, etc)

Software Development Tool Suite

Bootloaders

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

GNU-based Development Tools

- Cross Compilation Tool Chain for DM870 (GCC).

SDK Tools

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

Build Tools Required (Customer provided)

- RVDS 2.2 (or higher - 3.1 recommended) along with ARM license
- Microsoft Visual Studio 2005 (or later version)
- Visual MaX 0.37
- BridgeCoToolChain2.2.1.2
- Perl 5.10.0
- Python 2.6.2.2
- Microsoft Java Virtual Machine [msjvax86]

The JukeBlox Development and Evaluation Kit

The JukeBlox development hardware platform, the "CE-2" board, consists of the optimized DM870 core-module and a CE-2 base board that includes virtually every option for supporting the complete JukeBlox feature set. The following diagram shows the EVM CE-2 hardware platform that will be included in the SDK kit and our evaluation packages. The on-board QVGA color display and the many I/O options provide a superset of capabilities that supports almost any product application. BridgeCo will also provide the EVM CE-2 associated schematics, layout and Gerber files to aid in the development of customer projects.

CE-2 Hardware Features

- DM870 Media Processor in 292 mBGA
- Certified Core Module with DM870 and integrated WiFi
- Supports development of aDMP or eDMP implementation
- Ethernet port
- QVGA color LCD display
- Color TV out UI support – composite, S-Video, NTSC/PAL
- S/PDIF out support (directly supported in DM870)
- Analog audio out – line level RCA, headphone mini-jack
- iPod support thru iPod connector or USB (with Auth. CP)
- I/O Media Ports: USB2.0 HS, SDCard, IDE
- AM/FM/RDS daughter board
- DAB/DAB+/DMB support option on Core Module
- IR remote sensor
- RS-232 Serial Port (for development interface)
- Board size: 170mm x 174mm (6.7 x 6.8 inches)



Figure – CE2 board layout

