General Description

K2 is an all-in-one solution designed by Advanced Linux Design to enable manufacturers to develop competitive Global streaming audio products with minimal engineering resources and a shortened time-to-market. With its wide range of functionalities, K2 offers a versatile and flexible platform for streaming Internet radio, podcasts, music from local networks, music from smart phones and PCs and playback from CD, USB thumb drive and SD card.

Key Features

- Real-time streaming of over 34,000 global Internet radio stations
- On-demand listening of 400,000+ podcast episodes with daily additions
- Advanced caching scheme for fast browsing of large numbers of podcast episodes
- Fast skip forward and backward in listening to podcast episodes, audiobooks, and music files
- Versatile remote firmware updates for bug fixes and new feature implementations
- Supports customer-provided menu icons for brand identification
- Bluetooth 5.3 support for beaming music from smartphones (compatible with Spotify and other music services)
- DAB+, DAB and FM with RDS from terrestrial broadcasts
- Play music from SD cards, USB drives, CDs, and LPs
- Users can add and maintain their own favorite radio stations without the need for an aggregator server
- The chip-based design of K2 minimizes the PCB footprint, allowing for the creation of even hand-held Internet radios easily
- Chips can be supplied in as little as a couple of days, instead of the typical 3+ weeks for module deliveries, offering maximum flexibility in product marketing for the final products.

Hardware features

Wi-Fi	IEEE 8.2.11 b/g/n compliant, up to 150 Mbps (1T1R)
	Supports 20 MHz and 40 MHz bandwidth in 2.4 GHz band
	A-MPDU and A-MSDU; fragmentation and defragmentation; 0.4 uS guard interval support
	Reliable and space saving printed PCB antenna with optional IPEX antenna
	Power efficient design (150 mA @3.7V for Wi-Fi streaming with headphone output, 20 mA @5V when in standby with clock display)
Ethernet	Optional SPI bus DM9051
Bluetooth (BP1048)	Bluetooth v 5.3 (downward compatible with v4.2 EDR)
	A2DP and HFP modes
	Maximum transmit power 10 dBm, supports class1, class2 and class3
Audio processor (BP1048)	I2S interface codec with 10-band EQ control and EQ presets
	16-bit audio with sampling rate at 22.05, 24.0, 44.1 and 48.0 KHz
	S/PDIF output in optical and co-axial
	Integrated headphone amplifier for 32/64 Ohm headphone
LCD	SPI interface TFT LCD up to 320x240 and STN LCD up to 128x64
	LCD backlight can be tuned down to 1% of full brightness for listening at night
Key input	Up to 2 rotary encoders and 20 tactile switches
USB 2.0 (Full Speed)	Supports USB thumb drive playback up to 12 Mbps
SD card	Supports SDHC and SDXC up to 256 GB
CD	Optional CD solutions by ALI, Silan and Sun Plus
DAB+/DAB	Optional band III DAB/DAB+ reception with DLS and slide-show support
FM RDS	Optional Worldwide FM band with RDS
AM radio	Optional AM radio support based on Silicon Lab AM/FM receiver chip

# Systems and Skytune backend server features

RTOS design	Compact and reliable RTOS, enabling ultra-fast boot-to-play in less than 10 seconds
Auto firmware update	Radio gets update pack and executes firmware update automatically on power up
Network provisioning	Auto-scan of available Wi-Fi network on first setup Push button WPS setup for secure Wi-Fi network (WPA2, WPA and WEP protection schemes) BLE-based Wi-Fi provisioning with iOS and Android smart devices DHCP for hassle-free network setup (auto setup of IP, GW, NW and DNS) Wi-Fi signal display to help achieve best-possible Wi-Fi connection Network connection test to identify Internet connection failure while Wi-Fi connection is OK
Time & Date	Uses network time (NTP) to identify location and setup local time Supports Daylight Saving Time and 12/24 hour modes
Languages	14 languages (English, German, French, Spanish, Italian, Dutch, Polish, Russian, Hungarian, Slovak, Romanian, Croatian, Simplified Chinese)
File system	exFAT supports up to 16 exabytes of storage
ERP setup	Option to power down after 15 or 30 minutes of no media playback or user action
Internet radio directory	34,000+ free Internet radio stations listed according to location of station or station genre Computer generated most popular stations list worldwide, in a country or in a state Entry of part of a station name for station search User suggested station via Skytune web input or embedded server in radio device
Podcast directory	18 Podcast classes and 120+ Podcast sub-classes for easier selection of podcast to listen Over 400,000 podcast episodes available (increasing with daily addition) State-of-the-art Episode indexing scheme for fastest browsing of large number of episodes in a Podcast Daily addition and update of episode lists
Server farms	Dual, mutually backed-up server farms in first class Datacenter and local premise

Media streaming/playback and various features

Audio format	MP3, AAC, HE AAC, FLAC OGG, WAV
Stream format	HTTP, HLS, ShouCast, IceCast Supports decoding of ID3 meta data embedded in audio data
Playlist	PLS, M3U, M3U8
Favorite stations	200 station memories for all radio types (Internet, DAB+ and FM) under one roof for easier access 2-level folder for favorite stations to better manage 200 station memories Favorite stations can be renamed for better retrieval Pop up window in device or Skytune web page to move to Top/Bottom, move up/down in the Favorite list 100 memories for history of radio stations listened to No connecting server is required for radio to play the stations stored in Favorite and manage the station memories for ultimate peace of mind
Now playing screen	Toggle to display different information pages or Big clock (analog clock or digital clock)
IP address display	Time-multiplex display of local IP address on the top, status bar makes it easy to use the embedded server of the radio to control playback of radio and manage the Favorite storage
Podcast streaming	State-of-the-art indexing scheme for episode list eliminates the long loading time for podcasts with large number of episodes (over 3,000 for some podcasts) "Listen again" plays from where the user left in the last listening "Subscribed" list for storage of Podcast of interest "History" list for episodes listened to before Skip forward/backward in 15 seconds or choose from Time Bar where to listen
UPnP/DLNA streaming	Act as Integrated Controller/Renderer to stream music from smart phone, tablet, PC and other media servers Supports UPnP renderer to stream music as directed by other UPnP/DLNA control points
Bluetooth streaming	Bluetooth V 5.3 A2DP mode to stream music from Bluetooth-enabled phones, tablets and PCs Displays meta data such as artist and music title when stream-playing music Optional support of HFP calling
USB and SD card playback	Supports folder and song browsing and ID3 meta data display Up to 4,000 songs under 400 folders
Dual alarm	Wake to station or tone Alarm volume ramping up slowly to avoid shocking impact

Timer	Single (or dual) timer to remind user of things to tend to (sample use is Kitchen timer)
Sleep timer	Set the radio to turn off in 15/30/45/60/90/180 minutes Slow ramping down of volume to avoid waking the user

System block diagram
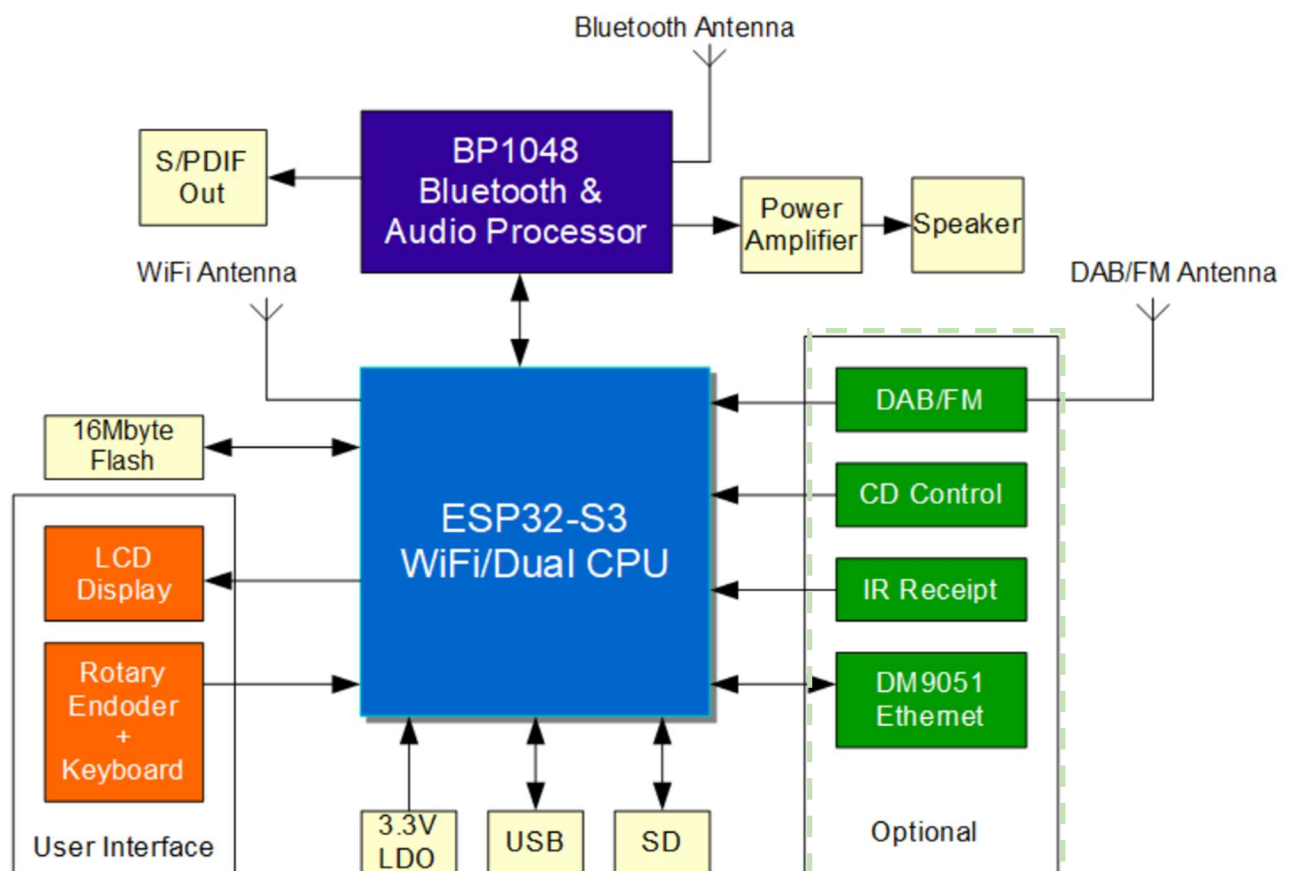
Example of application system block diagram

Sample UI Screens