

### Customer

Canadian manufacturer of home multimedia solutions.

### Objective

The objective was to debug and eliminate errors in an Internet radio software stack used in electronic devices developed by the customer; to add new functional capabilities to the device and to re-design program modules and optimize interaction between them.

### Solution

The customer provided to Promwad's engineering team an Internet radio device capable of audio streams playback via Internet (including support of vTuner, UPnP, SHOUTcast servers), via FM, from USB flash stick and line input. The device supports different audio formats: mp3, wma, wav, m3u, plc, flac, ogg and others. Internet radio device can be connected both to Ethernet and Wi-Fi networks.

To increase performance of device's architecture and simplify the process of its further improvement, we redesigned the architecture of Internet-radio – rewrote architectural modules and optimized interaction between them.

The code was debugged and errors were eliminated in device's operation specified by the customer.

We significantly increased the list of supported languages (support for Bi-directional text was added). Also, possibility to automatically update the firmware remotely was added. To support new device models with redesigned look-and-feel, we made additional changes to video driver as well as added software support for digital S/PDIF audio output. We also improved the algorithms for working with the servers storing the lists of available Internet radio stations. WiFi support and stability was dramatically improved by implementation of wireless channel monitor and antenna diversity support.





We also developed SOAP SDK kit which allowed to have a remote control over device via SOAP requests: to control data stream received by IP-radio (to define the list of favourite radio stations), to set the order of tracks to be played back, to perform partial configuration of the device, etc.

### Benefits

- Support of most European, Eastern-European, Asian languages, including Bi-directional text;
- Possibility to automatically update the firmware remotely;
- Increased performance of the device;
- Software support for digital S/PDIF output
- Possibility of remote device control via SOAP queries.

Technologies	TCP/IP, UPnP, vTuner, Embedded Linux
Programming languages	C/C++
Development tools	Eclipse, gcc compiler
Efforts	80 man-days
Duration	4 months