# Voice Communication Package V7.0
May 2012

Ultimate software solution for Bluetooth voice terminals

About CSR BC05MM and CSR 8670

CSR BlueCore5 Multimedia (BC05MM) and CSR 8670 are versatile programmable single-chip Bluetooth solutions with a powerful Kalimba DSP co-processor, audio CODEC and Flash memory.

About Kalimba VCP

Kalimba Voice Communication Package (K-VCP) combines Alango proprietary digital signal processing technologies for Kalimba DSP. K-VCP software solution enhances the voice quality of Bluetooth accessory devices such as headsets, hands-free car kits, VoIP telephones, speakerphones, etc.
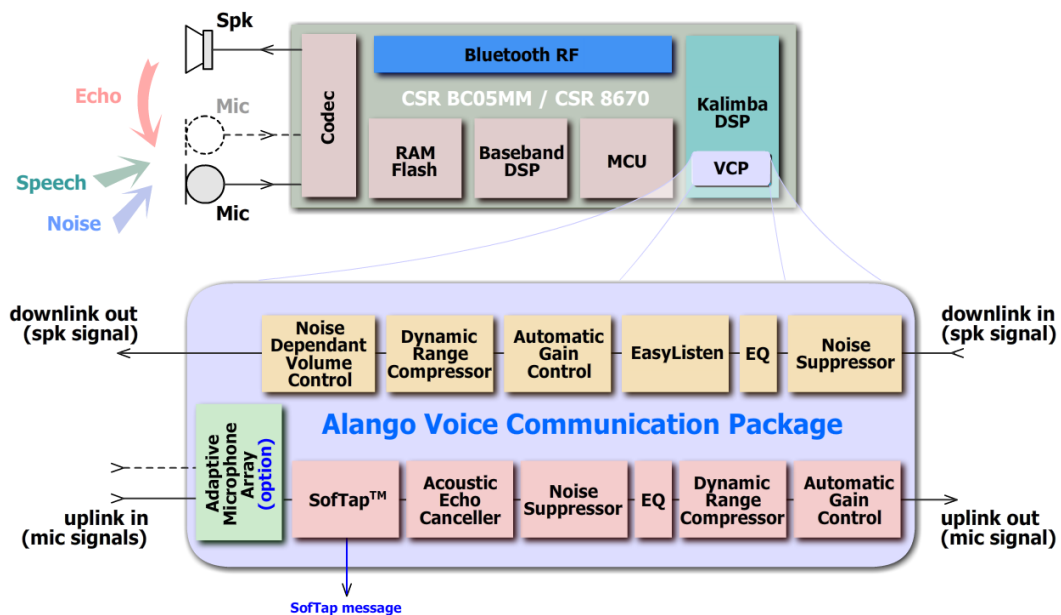
K-VCP technology is designed to deal with high acoustic and wind noises, strong echoes and large non-linear speaker distortions. This makes K-VCP technology ideal for using in all types of Bluetooth hands-free devices including headsets, car kits, car radios, portable navigation devices and speakerphones.

What's new in VCP v7.0
- SofTap™ technology
- High resolution noise suppression (new)
- Harmonic noise ("buzz") suppression (new)
- Close-talk dual microphone (new)
- Broad-side dual microphone (new)
- "Listen through" signal logging, recording, monitoring and analysis
- Improved echo cancellation with frequency selective configurability

- EasyListen™ technology on downlink channel slowing down speech in real-time (new)
- Advanced audio testing and debugging features
- New VCP Configurator with "Expert" and "Simple" modes for fast and efficient tuning

Integration and compatibility

K-VCP is fully compatible with all CSR SDK/ADKs and both CSR BC05MM and CSR 8670. K-VCP messaging interface corresponds to that of CSR CVC® technology simplifying VCP integration into customer products. The integration is completed by replacement of CVC.KAP library file with VCP.KAP file in the application project and writing optimal processing parameters values to the Persistent Store (Flash). The later can be easily performed with Alango VCP configuration utility.

Kalimba VCP technologies

- Tx: Adaptive dual microphone with far-field, close-talk and broad-side modes for noise and acoustic echo cancellation; wind noise suppression (optional)
- Tx: Subband acoustic echo canceller with subband residual echo suppressor technology enabling full-duplex, echo free voice communication in presence of strong echoes, large distortions and high ambient noises
- Tx, Rx: High resolution stationary and transient noise suppressor with fast adaptation time and suppression of harmonic noises ("buzzes")
- Tx, Rx: Automatic gain control and dynamic range compressor equalizing microphone and speaker signal levels
- Rx: Noise dependent volume control
- Tx, Rx: 32 band static equalizer (125 Hz band width)

Additional features:
- 1-PIO digital logging capability allowing to record and listen to input/output DSP audio signals in real time with advanced signal monitoring (including real time analysis of RX-to-TX "bulk" delay)
- special signal generation modes simplifying tuning process and debugging

Adaptive Dual Microphone technology

Alango proprietary Adaptive Dual Microphone (ADM) technology achieves up to 30 dB rejection of ambient noises while retaining high voice quality. ADM subband scheme allows simultaneous rejection of interfering sounds coming from different unwanted directions. ADM has four operational modes:
- far-field (BT headsets, stand-alone microphones, portable navigation devices)
- close-talk (hand-held devices held in a close proximity to user's mouth)
- broad-side (car cabin hands-free systems, stereo headsets, tablet computers)
- acoustic echo cancelling (achieving full duplex in portable devices with powerful speaker)

Adaptive Wind Noise Reduction

Adaptive Wind Noise Reduction (AWNR) detects and attenuates typical wind noises, while preserving speech quality in quite conditions. Frequency regions containing wind noise are detected and wind noise is suppressed in those frequency regions only. Other, clear frequency regions remain intact.
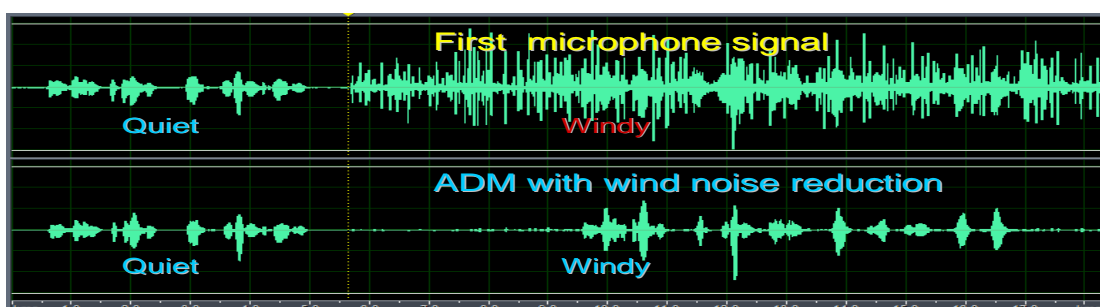
EasyListen™ - real time speech tempo modification

EasyListen slows down incoming speech in real time. Activating it improves intelligibility of fast talkers and understanding foreign languages, simplifies writing down or memorizing phone numbers, make it easier to get driving directions, etc. EasyListen does not stretch tones, noises and other irrelevant sounds. It performs a sophisticated speech analysis and stretches only those parts that are important for understanding

SofTap™ - tap recognition technology

Tap Control provides an alternative to control basic functionality of a mobile voice terminal. Instead of pressing small, inconvenient control buttons, the user can tap the device surface with a finger. For example, tapping the device two times can be used to answer/hold a call, tapping the device three times – to reject/end a call. The same principal can be used to pause/resume/next/previous song during a music play.

SofTap™ technology provides "software only" solution for Tap Control. SofTap™ detects vibrations analyzing microphone signals when the device has been struck by user's finger. The pattern, duration and frequency of these vibrations are utilized by Alango algorithm to avoid confusing "taps" with various ambient noises, speech, wind or other interferences.

Tapping a headset with a finger to answer/reject/end/hold calls

SofTap™ algorithm detects and differentiates "tap events" corresponding to single, double, triple or more taps. The interpretation of these events may vary for different applications or operational modes of a particular device.

Acoustic tuning

K-VCP is provided with a PC configuration utility with a simple and intuitive user interface featuring "Expert" and also "Simple" modes. After Kalimba VCP is integrated into an application, parameters can be changed on-the-fly without closing the SCO channel (i.e. a phone call). This greatly simplifies the acoustic tuning procedure because the result of parameters changing is verified immediately.
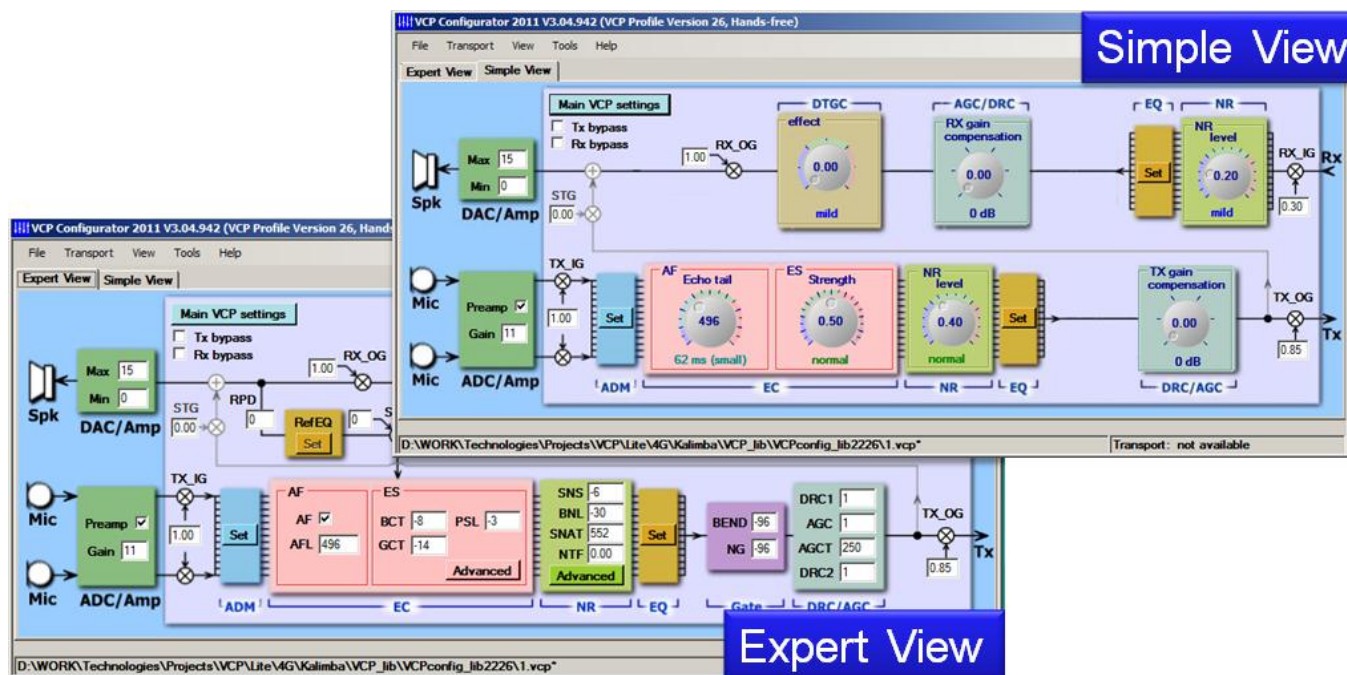
Signal logging capabilities (Alango Logger)

K-VCP is provided with a software plus hardware solution allowing recording of all K-VCP input and output signals on a host PC. The hardware interface utilizes just one user defined PIO line of the chip to transfer the VCP input and output signals to PC. In addition to recording the signals on PC, the Alango Logger tool also performs real time signal analysis such as automatic calculation of RX-to-TX bulk delay, monitoring of noise and voice levels, etc. It is also possible to listen to any input/output signal in real time during SCO connection.
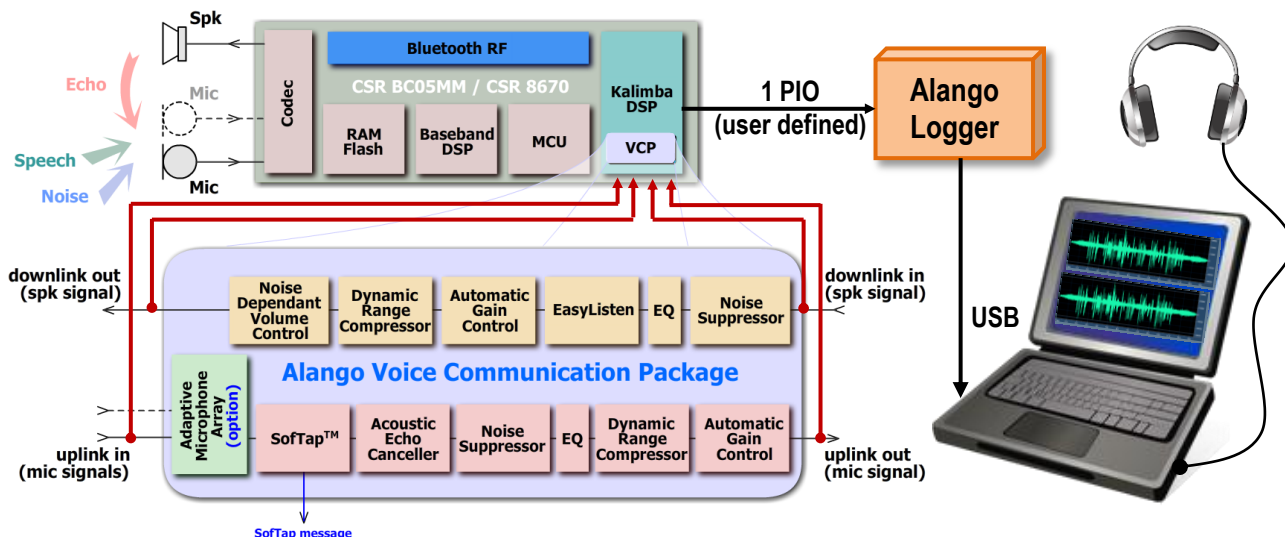
Main VCP advantages

- Fast converging, multi-mode dual microphone technology
- Robustness to strong echoes and non-linear speaker distortions
- Full duplex performance in portable devices*
- High resolution noise reduction with suppression of transient and buzz noises
- Fast and robust automatic gain control
- 32 band (125Hz band width) Tx and Rx equalizers
- Unique signal logging capabilities
- Debug modes for integration and hardware tests
- Ease of acoustic tuning (tuning service is provided by Alango Technologies)
- Ease of integration (full compatibility with CVC®)
    * with a good acoustic design

Contact information

Alango Technologies Ltd., 2 Etgar St., POB 62, Tirat Carmel 39100, Israel;
Web: www.alango.com; Email: info-il@alango.com;
Phone: +972 (4) 8580743, Fax: +972 (4) 8580621

Representatives (China, Japan, Korea, Taiwan): www.alango.com/company-contacts.php

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