

DEVELOPING FOR VOICE AND HEAD GESTURE CONTROL

ENABLING HANDS-FREE APPLICATIONS

The Motorola HC1 headset computer changes how work gets done. This exciting new class of mobile computing device delivers true hands-free capabilities to a wide variety of industries. The HC1 is designed to support “big screen” applications and optimize productivity in difficult, remote or harsh environments. It connects wirelessly to other devices, servers and networks simultaneously, and replaces the need for a touch screen, touch pad, keyboard or mouse for data entry and navigation.

The Motorola HC1 headset computer is designed to give end users hands-free access to full voice, audio and PC capabilities. The HC1 offers a new software experience driven primarily by voice input and augmented by head gestures. Motorola partners can leverage these technologies to provide end users with applications that help mobile workers improve their focus on the task at hand.

Fully programmable and customizable, the HC1 includes built-in software for basic command and control. The HC1 enables applications using natural language voice recognition and simple head gesturing. This technical brief explains the basic software functionality of the HC1 and the operation of the built-in software.

This overview explains the tools needed to get a head start on developing next-generation applications for the HC1.

EXCLUSIVE FEATURES AND FUNCTIONALITY

The HC1 is essentially a Microsoft Windows CE 6.0 Professional computer augmented with a number of features that enable the device with natural hands-free operation.

These features are collectively known as the Golden-i Services provided by Kopin Corporation. These key features include:

- Automatic Speech Recognizer (ASR)
- Head Tracker
- Control Panel
- Wireless Connectivity

Combined, these features allow applications to be designed and implemented for the HC1 that are typically hands-free – voice driven and head gesture enabled.

VOICE DIRECTED USER INTERFACE

The HC1 features an advanced and naturally intuitive voice directed user interface. The HC1 uses the Nuance Vocon 3200 voice recognition engine and boasts a 98-99 percent accuracy rate, and no learning is required.

Voice direction on the HC1 works best with simple key words, distinct commands and focused vocabularies. The voice recognition and text-to-speech API is set for voice enabling applications and supported by the following enabling hardware characteristics:

- Dual bi-directional noise-canceling microphones
- Near-ear loudspeaker, which can be replaced with noise-isolating ear buds

HEAD GESTURE SYSTEM

The HC1 head tracking system offers a panoramic 360-degree viewing experience and supersedes mouse or touch control with gesture-based commands. The omni-directional head tracker can detect freedom of movement in any direction, and built-in accelerometers, gyroscopes and digital compass provide smooth gesture control and accurate direction and position orientation for enhanced navigation through applications.

Developers can program slight head movements to customize display views and allow for the scroll, pan, zoom, tilt, rotate or freeze of documents, images and other relevant data or video. The HC1 head gesture module includes:

- 9-axis head tracker with digital compass
- 3D graphic accelerator

ENHANCED SOFTWARE SERVICES

The HC1's unique API and feature sets required for hands-free mobile computing are built into the Golden-i Operating System and are always running as system level services.

Accessing these shared services is quick and easy, and form the OS shell called Golden-i Services. Golden-i Services sit on top of the WinCE operating system and are always available as shared resources to all applications running on the HC1.

GOLDEN-I SERVICES

When powered on, the HC1 starts a number of core services critical to main system operation and necessary to enable hands-free applications. The OS shell then transforms the HC1 from a Windows CE 6.0 device into a distinctive hands-free mobile computer.

The HC1 SDK exposes Golden-i Services and allows programmatic access to the Automatic Speech Recognizer (ASR), head tracker and wireless connectivity. The SDK libraries support C++ and C# programming languages, and applications communicate with singleton services via messages, all in a Microsoft Visual Studio 2008 environment.

The default boot mode is to Windows CE desktop, and all Golden-i Services start automatically and are ready for use. The HC1 can also be easily configured to boot to different modes. A separate auto exec text file acts as a launcher script to set applications to start automatically when the device boots up.

AUTOMATIC SPEECH RECOGNIZER (ASR)

The ASR is automatically started at boot-time and made available for all applications to use as a single shared resource. The ASR is capable of handling context switching and understands when multiple windows are open to support multi-tasking. The ASR actively listens for verbal commands associated with the current, or foreground, application window to support user control and system navigation.

The ASR is supported by natural language software for responsive application command and control and requires proper positioning of the ear speaker module to ensure that voice commands can be "heard" clearly.

Teaching users how to operate the HC1 by voice command is easy. Users can simply begin by speaking in their natural language, as the ASR and text-to-speech APIs are automatically set for voice enabling applications.

For example, users can open a folder containing files by simply saying the following commands:

- "My Files" (opens file folder)
- "File 1" (displays file contents)

The HC1 supports six languages, including English, French, German, Italian, Portuguese, and Spanish.

HEAD TRACKER

The head tracker is also automatically started at boot-time and made available for all applications to use as a single shared resource. Similar to the ASR model, the head tracker is capable of handling context switching and understands how and when to apply head gesture commands to the current, or foreground, application window to support user control and system navigation.

Users can easily navigate applications using the head tracking system by slowing turning their heads up, down, left or right to view panoramic or a catalogue of information. Similarly, the HC1 can interpret body movement with its onboard sensors. The HC1 understands user speed, direction and acceleration to help determine or set motion thresholds and accurate position orientation.

CONTROL PANEL

Golden-i Services run as a single shared service available to application developers via a single SDK. One of the primary applications developed with the SDK is a set of "always-on" control panels.

The control panels are voice driven applications that can be called up at any time when using the HC1. There are currently four HC1 control panels.

- General Controls (for speaker volumes, screen brightness, language selection, etc.)
- Wi-Fi Controls (for Wi-Fi configuration)
- Bluetooth Controls (for Bluetooth configuration)
- Telephone Controls (for communication with a WAN mobile gateway over the Bluetooth hands-free protocol)

In the HC1 default configuration, these four control panels can be accessed at any time by saying the following basic commands:

- "My Controls"
- "My Network"
- "My Bluetooth"
- "My Telephone"

HC1 TECHNICAL BRIEF

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POWERFUL HANDS-FREE ADVANTAGE

The HC1 offers tacit enterprise advantages. The HC1 enables a new type of connected mobile workforce and changes the dynamic of having to hold, type, or touch a radio, tablet, laptop or smartphone – while still connecting and working with handheld devices and networks.

The HC1 has a powerful system processor running at fast speeds to support today's application needs. The device's modular accessory interface provides USB connectivity for "snap on" peripherals such as a point-of-view camera to connect live with remote experts while fixing machines, helping people or saving lives.

Motorola is leading the way for a new kind of practical and enterprise-grade form of wearable mobile computing for business and government organizations.

WORLD CLASS PARTNERS

Motorola's award-winning partner ecosystem offers a best-in-class, broad set of ready-to-go and custom applications for a wide variety of industries, minimizing deployment time and cost.

For more information on becoming a Motorola partner or finding an existing application partner for the HC1, please contact the Motorola PartnerEmpower program at www.motorola.com/Business/US-EN/PartnerEmpower.

WORLD CLASS SUPPORT

Motorola offers a support plan to help keep your HC1 up and running at peak performance. The Motorola Service from the Start with Comprehensive Coverage program is a unique and all-inclusive service to significantly reduce unforeseen repair expenses by covering normal wear and tear, as well as internal and external components damaged through accidental breakage – all at no additional charge. Options such as Commissioning Service and Express Shipping help to further minimize downtime in the unlikely event your HC1 requires repair.

For more information regarding product support, please connect the Motorola Support Central team at www.motorola.com/Business/US-EN/Support.

For more information, please visit us on the web at www.motorolasolutions.com/HC1 or access our global contact directory at www.motorola.com/enterprisemobility/contactus.

Kopin Corporation

For more SDK support, please visit us on the web at www.mygoldeni.com to access the Kopin Golden-i developer package, user guide and programming guide.



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