

CH6650 iMONITOR

Autonomous E-Mail Alert Message Transmission Module



The Cernetek CH6650 iMonitor Module is a fully functional Internet enabled device that sends E-mail alert notifications when AC power is interrupted and restored. It is designed expressly for automated and embedded applications located in areas with access to standard PSTN telephone lines. Additionally, various user supplied inputs can be used to trigger E-mail alert notifications independent of the power monitoring function.

Although primarily intended for deployment in applications requiring autonomous operation, the CH6650 is, nonetheless, a versatile data transfer tool. With user application programs running on the internal Motorola Coldfire® μ P, the CH6650 will transfer E-Mail, run standard Internet applications, store E-Mail and other data, and

implement custom Internet applications using I-Sockets.

The CH6650 leverages the commercially available Internet Service Provider (ISP) Point of Presence (POP) infrastructure to autonomously send E-Mail alert notifications. Protocol operations are transparent to custom user applications.

If needed, data can be exchanged between a local host and the CH6650. The CH6650 employs the same Application Programming Interface (API) used by the other members of the Cernetek iModem family. Host communication is conducted over a standard USB 2.0 serial interface.

The CH6650 is ideally suited for user applications: that lack a host CPU thereby requiring autonomous generation of notification E-Mail messages, where the host CPU has limited bandwidth, where user requirements dictate that a fully autonomous E-Mail alert message system operate independently of/or concurrently with existing systems, and where user applications demand the use of standard PSTN telephone lines for external access and Internet connectivity.

FEATURES

- Fully autonomous E-mail alert notification.
- Multiple E-mail destination addresses.
- Transparent Internet operations with Domain Name Resolution (DNS), Send E-mail (SMTP), Retrieve E-mail (POP3), TCP/IP and UDP protocols. Authenticated SMTP supported.
- Send pre-stored E-mail up to 150K bytes from static memory or up to 1.4M bytes from volatile memory.
- Send/Retrieve streaming E-mail of unlimited length.
- Communication via a USB 2.0 compliant interface port at 19.2.kbps (default data rate).
- FCC Part 68 approval.
- UL 60950 Registration (pending).
- 110V AC or 220V AC operation.
- Battery backup for continuous operation when power lost.
- Connectivity with most Internet Service Providers (ISP).
- Low cost, shared ISP accounts possible.
- CH6650 operation does not divert CPU resources from host user applications.
- Up to 56K bps data transmission rate.
- Password controlled dial-up access to remotely located units.
- Custom on-board CH6650 applications available. Contact Cernetek for details.
- Event Driven user configurable hardware interface ports provided: 3 Digital Inputs, 1 Analog Input, 1 Digital Output.

AUTONOMOUS OPERATION

Cernetek's CH6650 iMonitor is designed to operate in a fully autonomous mode. No intervention from a supervising host is required.

However, for custom applications, the CH6650 also contains a robust and user friendly API ~ application

interface ~ tailored to offer high performance in environments with low bandwidth CPUs, in environments requiring concurrent application execution, or in environments requiring multiple connections (including multiple internet connections). The CH6650 iMonitor API is identical to the API used in the CH2166/66A iModem products.

Configuration of user modifiable parameters is done over a standard USB 2.0 serial interface. If desired, data can be transferred from a local host to the CH6650 over the USB 2.0 serial port as well.

USER FRIENDLY INTERFACE LAYER

The CH6650's API facilitates the implementation of a wide variety of customer specific IP applications and insulates the user from complex internet networking details. This API consists of various @[®] commands that look and feel like conventional modem AT commands.

With the @[®] commands, the user can perform all standard SMTP and POP3 E-mail operations, including: sending, retrieving and deleting E-mail messages. The @[®] commands can also be used to establish BSD style socket connections. The CH6650 also supports AT like binary data transfer. Status results are conveyed via the iModem's USB 2.0 serial interface and can be monitored by using any commercially available terminal emulation program (e.g., HyperTerminal[®], Procom[®]).

Consult the factory for further details concerning custom applications for the CH6650.

OVERVIEW OF THE CH6650

The CH6650 product contains a Cermetek CH2166A iModem device. Consequently, the power of the CH2166A's Motorola Coldfire[®] μ P is available to the user for user application specific programs. Consult the factory for details.

A rechargeable NiCd battery pack and associated charging circuitry are housed within the iMonitor. This provides at least 1 hour of backup power to allow the CH6650 to transmit Power Outage E-Mail alert messages as well as service whatever user supplied Event Driven I/O alerts are activated via the Event Driven I/O ports.

As with all Internet enabled devices, the CH6650 requires internet and ISP configuration parameters. Configuration parameters are located in profiles stored on the CH6650. Parameters are easily modified using Cermetek's iNetWizard[®] configuration tool. Simply connect the CH6650's USB port to the USB port of any PC running iNetWizard[®], depress the "Programming" Push Button on the front panel of the CH6650 module

to activate the CH6650's programming function and then modify the parameters displayed in the dialog boxes, as appropriate. Depress the "Programming" Push Button a second time to disable the programming function and return the CH6650 to regular operation.

Configurable internet attributes include:

- Internet and DNS Server addresses.
- SMTP and POP3 Authentication.
- TCP/IP Network and Protocol Parameters.
- User configurable Application and Link profiles.
- E-mail Subject, Destination(s) and message body.

Additionally, the CH6650 contains a total of 5 Event Driven I/O ports: 3 Digital Inputs, 1 Digital Output and 1 Analog Input. These ports provide the user with the ability to trigger E-mail transmissions, collect and analyze data and set digital output levels via data presented to the I/O ports. This unprecedented control facilitates integration of the CH6650 into the user's hardware platform. iNetWizard[®] can be used to configure the Event Driven I/O ports and create the associated E-Mail alert messages.

Configurable Event Driven I/O ports include:

- 3 user definable digital Input (HIGH/LOW) ports.
- 1 dedicated digital Output (HIGH/LOW) port suitable for event triggering.
- 1 user definable analog Input (0V to +3.3V range) port.

Once deployed to the field, remotely located iMonitor devices can be accessed directly via the PSTN telephone line connection. Access is password controlled.

INETWIZARD[®] OVERVIEW

iNetWizard[®] is a Dialog Box driven API that runs on MSWindows[®] XP, XP Pro and Vista platforms. Cermetek provides this configuration tool free-of-charge to customers for use with all iModem based products. For more details, consult Cermetek Application Note # 329, [Using iNetWizard[®]](#) (Cermetek document 611-0329).

CUSTOM INTERNET APPLIANCE OPERATION

In addition to the user friendly API, the CH6650 comes with the μ Linux operating system. Customer application specific programs are written in C++ or C#. Access to the CH6650 commands is provided by simply invoking the desired commands from within the user's program.

Parametric and configuration information is organized into various internal Application and Link profiles on the CH6650. Refer to Cermetek document # 607-0023,

CH2166/A: High Speed Internet Modem Family, for more details.

Command Architecture. Profiles make it possible to access the contents of associated CH6650 internal Application and Link profiles by referencing only a single profile name. Parameters specified as part of a command have precedence over those specified in a profile. Command results, diagnostics, and error notifications are conveyed to the user via the USB port located on the Back Panel.

Send and Retrieve E-mail. The CH6650 has the ability to send and retrieve E-mail of unlimited length. Once a streaming E-mail transmission session is established, the user just sends data to the CH6650 ~ one line at a time ~ for as long as desired.

E-mail messages may include files from either static or dynamic RAM memory, and/or attached ASCII files, at the user's discretion.

EVENT DRIVEN I/O

The CH6650 provides the user with the ability to both collect external input data and set output data for use by external hardware/firmware applications. The input data can be optionally analyzed via user supplied API or simply used to trigger outgoing user configurable E-mail messages. The digital output values are user settable. iNetWizard® can be used to configure the Event Driven I/O ports and create the associated E-Mail alert messages.

The CH6650 will respond to digital HIGH (+5.0V), digital LOW (0.0V) and/or analog values (user defined -0V to +3.3V range) ~ as configured by the user ~ presented to the I/O ports on the CH6650 Back Panel.

The Event Driven I/O port connector is the 6 position Euro style terminal block. This connector was chosen for its robust construction and proven electrical reliability.

The user has full control over I/O port configuration and monitoring strategy. An onboard ADC converts analog port input values to a scalable digital number for use by internally operating user supplied API or to trigger E-mail message transmission.

Data presented to the CH6650 on the Event Driven I/O ports can be analyzed locally via user supplied API as well as stored locally for possible transmission via the internet at a future date.

REMOTE ACCESS

Field deployed CH6650 iMonitor devices can be accessed by direct dial-up via the PSTN telephone line

connection. This feature allows the user to remotely access an iMonitor and reconfigure the device *while still in the field*.

Access is password controlled. iNetWizard® can be used to facilitate a remote access connection. Simply connect a modem to any PC running iNetWizard®, click on the REMOTE ACCESS dialog window from within iNetWizard®, supply the required Password and iNetWizard will automatically connect to the remote iMonitor device. Modify the parameters displayed in the applicable dialog boxes, as appropriate.

HARDWARE DESCRIPTION

Each CH6650 iMonitor contains all the hardware and firmware needed for internet connectivity and functionality.

Storage Memory. A total of 150K bytes of Flash RAM (static memory) are available for permanent storage of files on the CH6650. The CH6650 also includes 1.4M bytes of volatile memory (dynamic RAM) available for temporary file storage.

iMonitor Hardware Configuration. The CH6650 iMonitor consists of:

- CH2166A iModem containing a Motorola Coldfire® μ P controller with associated internal logic, USB 2.0 Serial Port, 8 Mbytes of RAM (1.4MB available for user data and custom software) and 2 Mbytes of Flash RAM (150KB available for user data).
- NiCd Rechargeable battery pack and associated charging circuitry.
- 110/220 VAC monitoring circuitry.
- Supervisory circuitry.



CH6650 Front Panel



CH6650 Back Panel

Required External Connections. The following external connections are required:

- USB 2.0 type B male serial interface cable is required for connection to the CH6650 USB port (user supplied).
- Single 6 position Euro style terminal block male connector is required for connection to the Event Driven I/O ports (provided).
- Standard 110 VAC power cord is required for power (provided).
- PSTN telephone cable with RJ11 male connectors is required for connection to the PSTN telephone line (provided).

ADDITIONAL SOFTWARE

Each CH6650 iMonitor is supplied with a CD that contains a library of USB 2.0 drivers and copy of Cermetek's configuration tool iNetWizard®.

Approvals. The CH6650 iMonitor has the following approvals and Certifications:

USA: FCC Part 15 (pending).
 FCC Part 68 (Conveyed Approval).
 UL: UL 60950 and CSA C22.2 950 (Third Edition) (pending).
 CANADA: IC CS-03 approvable.

Physical Dimensions. The CH6650 is supplied in an extruded aluminum case measuring approximately 5.25" x 4.00" x 1.37" in size.

Physical Description. The front panel consists of the Programming Activation Push Button and the Reset Button. Note that the Reset Button is inset to minimize

occurrence of accidental reset. The following Status Indication LEDs are also present on the front panel:

- **POWER.** When the unit is operating (whether by AC power or internal batteries) this LED will illuminate GREEN.
- **PROGRAMMING ACTIVATION.** When in NORMAL mode this LED is not illuminated. When in PROGRAM mode, this LED will illuminate RED.
- **DIAGNOSTIC.** This is the primary status indicator and provides email transmission status indication.
 - NO illumination indicates iMonitor is in Standby state.
 - AMBER illumination indicates that the iMonitor is waiting to initiate outgoing call.
 - GREEN illumination indicates internet activity has been successfully completed.
 - RED illumination indicates that most recently attempted internet activity was not successful.

On the back panel find:

- **PSTN RJ11 Jack.** Used to connect to the PSTN telephone line.
- **Event Driven I/O ports** (5 individual connectors + 1 common connector). Used to supply incoming signals to control transmission of emails from external sensors.
- **AC POWER CONNECTOR.** Used to supply 110VAC or 220VAC power to iMonitor unit.
- **USB 2.0 PORT.** Used to connect to PC (or equivalent) for programming and/or monitoring of iModem ASCII status messages.

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