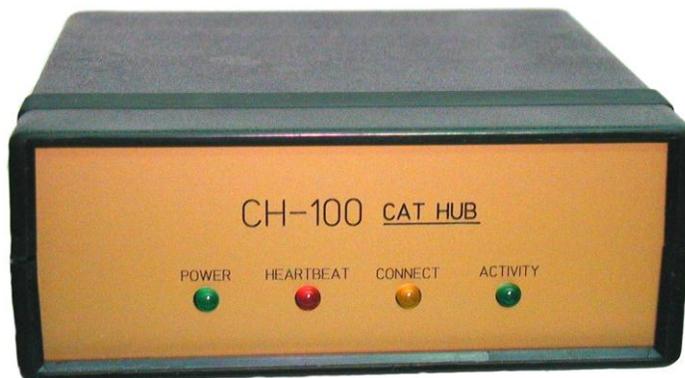# CH-100
Internet HUB Controller

Instruction Manual

Computer Automation Technology Inc.
4631 N.W. 31st. Avenue, Suite 142
Fort Lauderdale, Florida 33309
Phone: 954 978-6171 – Fax: 561-488-2894
Internet: www.catauto.com

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Introduction and Specifications

The CH-100 is a ROIP repeater HUB designed to support the operation of up to ten CL-100 units. Digital control and audio packets received from one CL-100 will be forwarded to up to nine other CL-100s. The CH-100 can be located anywhere a high-speed Internet connection is available. To support ten connections the Internet upload speed should be 1.5mbps.

The CH-100 has two modes of operation. In normal mode any CL-100 can connect to the HUB. In controlled mode a ten-position look-up table is provided to limit connections to the HUB.

Specifications

Microprocessor	TI ARM Cortex Processor
Memory Look-up Table	20 IP Addresses
Temperature Range	-15 to +55 degrees C
RS-232 Interface	115200 Baud 8N1 (No Flow Control)
Power	+9 to +15VDC at 150mA MAX
Size	5.0" x 5.0 x 2.0"

FCC Part 15 RF Interference

The CH-100 has been tested and found to meet the standards for a Class-A digital device, as specified in Part 15 of the FCC Rules. These specifications are designed to provide reasonable protection against such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation.

Dip Switch Settings

A four-position dipswitch configures various functions of the CH-100.
Switches 1 and **Switch 2** are reserved for future use.

Switch 3 is used to place the CH-100 in the RS-232 programming mode. Set this switch to ON and apply power to the CH-100. The RS-232 programming menu will be displayed on the computer screen.

Switch 4 is used to lock the CH-100 internal web page. This switch must be OFF to program the CH-100 with your web browser. Once programmed if you want to prevent access to the internal web page set dipswitch #4 to the ON position.

Power Requirements

DC power is supplied through coaxial power jack J3. In normal mode if a power failure occurs all of the CL-100s connected to the CH-100 will disconnect. To prevent loss of connection the CH-100 should be supplied with a constant 12VDC power.

Setup Using RS-232 Port

Connect a "direct" RS-232 cable between the RS-232 port on the CH-100 and your computer. Open your Terminal emulator program and select the active COMM port. Set the port for 115200 Baud 8N1. Set the Flow Control to NONE. To activate the RS-232 port, set dipswitch #3 to ON and apply DC power. The computer should display the CH-100 setup menu.

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------------------------------------------------
CH-100 processor initialization completed OK.. Version 2.03

Entering CH-100 parameters setup

CH-100 HUB Setup.
Default.....Load parameters with factory default values.
Exit...........Exit CH-100 Setup.
MyID/r.........Display HUB ID.
MyID/w.........Set HUB ID.
Mygw/r.........Display my Gateway address.
Mygw/w.........Set my Gateway address.
Myip/r.........Display my IP address.
Myip/w.........Set my IP address.
Mymask/r.......Display my Mask address.
Mymask/w.......Set my Mask address.
Pass/r.........Display Username and Password.
Pass/w.........Set Username and Password.
PortUDP/r......Read UDP Port Number.
PortUDP/w......Set UDP Port Number.
PortDisplay/r..Read UDP Port Number.
PortDisplay/w..Set UDP Port Number.
PortTCP/r......Read TCP Port Number.
PortTCP/w......Set TCP Port Number.
Save..........Save parameters to non volatile memory.
User/r.........Display white list users IP addresses.
User/e1-20.....Erase white list parameters #1-20.
User/w1-20.....Set white list parameters #1-20.
Ver...........Display firmware version.
Cmd >
```

Program IP Address If the CH-100 is connected to a router and the default IP address is 192.168.1.240 it is not necessary to change the address. If the CH-100 is directly connected to a DSL or cable modem enter the IP address assigned by your Internet provider. Use the **Myip/r** and **Myip/w** commands to display and program the IP Address. NOTE: The CH-100 requires a static IP address since this IP address will be stored in the IP address table of the CL-100 units wishing to connect to it.

Program Gateway Address If the CH-100 is connected to a router and the default GW address is 192.168.1.1 it's not necessary to change the address. If the CH-100 is directly connected to a DSL or cable modem enter the GW address assigned by your Internet provider. Use the **Mygw/r** and **Mygw/w** commands to display and program the Gateway Address.

Program MASK Address From the Programming menu use the **Mymask/r** and **Mymask/w** commands to display and program the Mask Address. The default MASK address is 255.255.255.0. It is not necessary to change this address unless the CH-100 is operating within a different sub-net.

Read MAC Address From the Programming menu use the **Mymac/r** command to display the Mac Address. This is a unique number assigned to any device that is connected to the Internet. This number can be used as an electronic serial number for your CH-100.

Program USERNAME and PASSWORD From the Programming menu use the **Pass/r** and **Pass/w** commands to display and program the CH-100's Username and Password. The default Username is "CATLINK" and the Password is "ch100". The Username and Password are used to access the CH-100's internal web page with your Internet browser.

Program PORTS The default UDP Port Number is 1450 and the TCP default Port Number is 80. If your system requires these port numbers to be changed use the **PortUDP/r, PortUDP/w** and the **PortTCP/r**, **PortTCP/w** commands.

NOTE: After making changes be sure to use the **Save** command before existing the RS232 setup mode.

Router Setup
When the CH-100 is connected to a router a port must be opened. The CH-100 is defaulted to port 1450. Use your Internet browser to access your router's setup page. In the case of a Linksys router select the tab called "Applications & Gaming". Enter port 1450 to 1450 and set the protocol to "UDP". Also check the enable box.

If you want to have access to the CH-100 through the Internet for control or programming make the second entry to the table. Enter port 80 to 80 and set the protocol to "Both". Also check the enable box.

The CH-100 uses JavaScript to exchange data with your web browser. The computer's security settings must have active scripting enabled. If active scripting is disabled, all of the data boxes will appear blank.

CH-100 Setup Using Web Browser

Use your Internet browser to program the codes, timer settings, call letter identification and IP look-up table. To access the CH-100's web page open your web browser and enter the Username **CATLINK** and the Password **ch100**.
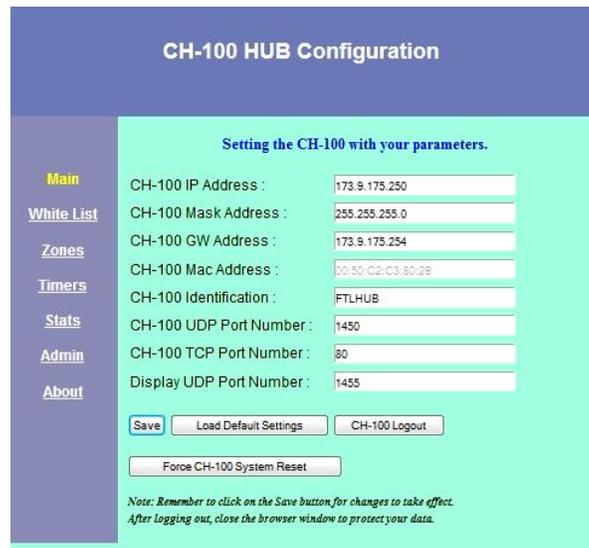

CH-100 Main Web Page

The **HUB IP Address** cell displays the IP address of the CH-100 as entered during the RS-232 Setup. NOTE: The CH-100 requires a static IP address since its IP address will be stored in the IP address table of the CL-100 units.

The **HUB MASK Address** cell displays the MASK address of 255.255.255.0. It is not necessary to change this address unless the CH-100 is connected to a Sub Net.

The **HUB GW Address** cell displays the GW address of the CH-100 as entered during the RS-232 Setup.

The **HUB MAC Address** cell displays the MAC Address. This address is assigned to every piece of equipment that connects to the Internet. This number cannot be changed and is the electronic serial number for your CH-100.

HUB Identification memory space is provided for eight letters or numbers. The default identification is: CH100. This identification will be used by a CL-100's voice synthesizer when there is a connect or disconnect.

HUB UDP Port Number The CH-100's factory default UDP port number is 1450. This port may be changed. Remember to open the new port number on your router.
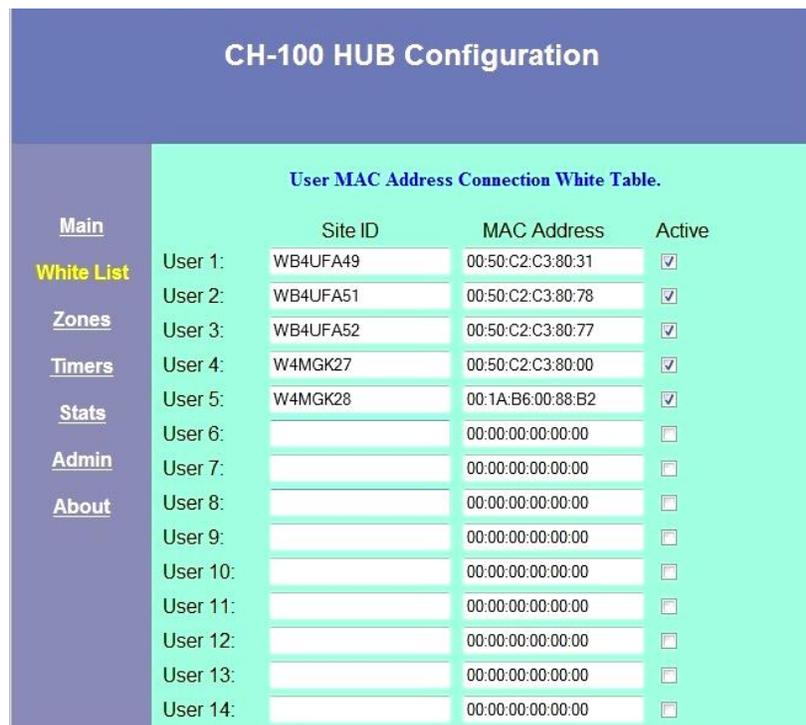
HUB TCP Port Number The CH-100's factory default TCP port number is 80. This port may be changed. Remember to open this port on your router if you wish to communicate with the CH-100 through the Internet using your web browser.

Load Default Settings If you want to return the CH-100 to the factory default settings by clicking the "Load Default Settings" button.

CH-100 System Reset To reset the CH-100, click the "CH-100 System Reset" button. This will cause the CH-100 to do a reset identical to applying power to the unit.

CH-100 White List
The white list provides a method of controlling who may connect to the HUB. Program the MAC addresses of the approved CATLINKs and check the Zone 1 Channel 2 box. The CH-100 will only accept units with their MAC addresses in the white table. If the Zone 1 Channel 2 box is unchecked any CL-100 will be accepted.

CH-100 HUB Configuration

User MAC Address Connection White Table.

	Site ID	MAC Address	Active
User 1:	WB4UFA49	00:50:C2:C3:80:31	☑
User 2:	WB4UFA51	00:50:C2:C3:80:78	☑
User 3:	WB4UFA52	00:50:C2:C3:80:77	☑
User 4:	W4MGK27	00:50:C2:C3:80:00	☑
User 5:	W4MGK28	00:1A:B6:00:88:B2	☑
User 6:		00:00:00:00:00:00	☐
User 7:		00:00:00:00:00:00	☐
User 8:		00:00:00:00:00:00	☐
User 9:		00:00:00:00:00:00	☐
User 10:		00:00:00:00:00:00	☐
User 11:		00:00:00:00:00:00	☐
User 12:		00:00:00:00:00:00	☐
User 13:		00:00:00:00:00:00	☐
User 14:		00:00:00:00:00:00	☐

Navigation menu: Main, White List, Zones, Timers, Stats, Admin, About

CH-100 Zone Web Page
Use this web page to display the Zone #1 and Zone #2 settings. By checking the boxes you can enable the various control functions.
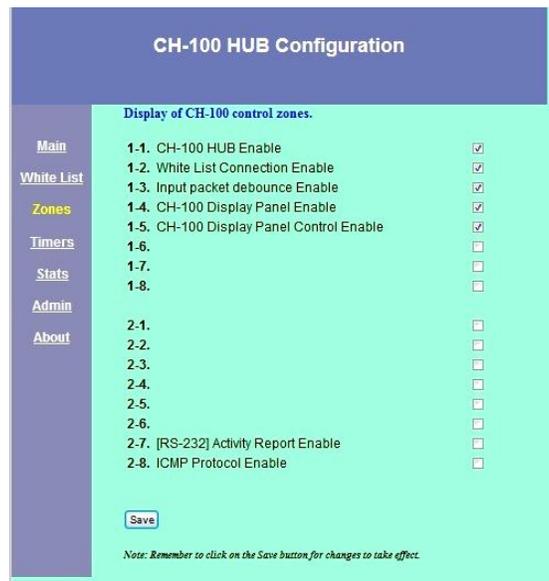
1-1 CH-100 Enable This box must be checked to enable the CH-100. To disable the CH-100 uncheck the box.

1-2 CH-100 White List Enable This box must be checked to enable the white list. When this box is checked only CL-100s with their MAC addresses stored in the table will be permitted to connect.

1-3 Input Packet De-bounce Enable When this channel is enabled the HUB will delay sending packets until a predetermined number of packets have been received from a CATLINK. Under Timers enter the number of packets in the Packet de-bounce counter. Each packet is 20 milliseconds.

1-4 Display Panel Enable When this channel is enabled the CH100 will transmit information data packets to as many as five users on Port 1455. The information will include the IP address, Port Number, and Identification of the CATLINKs that are connected to the HUB. When a CATLINK is transmitting its IP address and Identification will turn green.

1-5 Display Panel Control Enable When this channel is enabled the CH100 will respond when a user clicks on the DUMP or BLOCK switches.

2-7 RS-232 Report Enable When this box is checked and a computer is connected to the RS-232 port the CH-100 will display its step-by-step activity. When the link connects and disconnects, who established the link, which is the server and client. Every thirty seconds the units will perform a handshake. This will be displayed as "ping-pong". This feature is very handy in verifying proper system operation.

2-8 ICMP Protocol Enable ICMP is a network protocol test utility useful in testing the performance of the Internet connection. When this box is checked the CH-100 will interact with a test utility.

CH-100 Timer Web Page
This web page displays timer settings. The default setting of the "Web Configuration Timeout" timer is ten minutes. When a CL-100 connects to the CH-100, its ID is added to the CH-100's login table. If communication is lost between the CL-100 the CH-100 the CL-100 ID will be removed from the look-up table after the time period set by the Web Configuration Timeout timer.

The Key-up packet debounce counter determines how many packets the HUB must receive from the CATLINK before the HUB starts to resend the packets.

CH-100 Stats Web Page
This page displays the Software Version, HUB status, total connection time and the number of active connections. In addition the HUB Connection List will contain the identification of the CL-100s that are currently connected to the HUB. This information is stored in volatile memory and will clear if power is interrupted to the CH-100.

CH-100 Security
Access to the previous web pages is available through the Internet once a user name and password are entered. Once you have completed the programming if absolute security is required set dipswitch #4 to on before connecting the CH-100 to the Internet.

CH-100 Front Panel Display Indicators
Four LED indicators display the CH-100 activity. The green POWER LED will light when +12VDC is supplied to the CH-100. The red HEARTBEAT LED will flash once a second to indicate the CH-100 is executing its program. The yellow CONNECT LED will light when the CH-100 is connected to a DSL or CABLE modem. The green ACTIVE LED will flash when data is being sent or received.

CH-100 Rear Panel Connections
J1 is a 9 pin "D" connector used to program the CH-100 through its RS232 port. J2 is a RJ45 connector used to connector to the router or modem. J3 is a 2.5/5.5mm DC power connector. The center pin is (+).
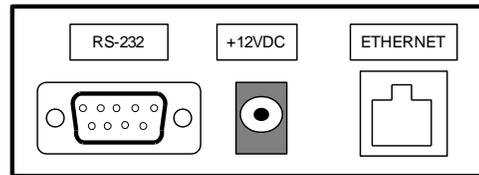

CH-100 Parameters Display
When Zone 1 Channel 4 is enabled the CH100 will transmit information data packets on UDP Port 1455. This display information is limited to a maximum of five users. This information will include the IP address, Port Number, and Identification of each CATLINK connected to the HUB. Install the "Parameters Display" program on your computer and open port 1455 on your router.

Start the program and click on the [CONNECT] button. A green box will appear to the left of the EXIT button. As each CL-100 pings, its ID will be displayed in the table. The flashing indicator represents a ping. When a CL-100 transmits, its ID will turn green.

Page 8
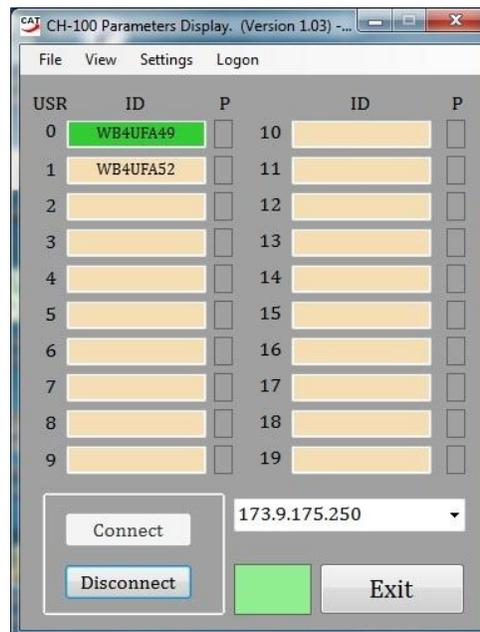
Parameters Display Security

For security purposes and to display the IP and PORT address of each CL-100, log in and enter the HUB's user name and password. The full data window will appear with the DUMP and BLOCK control buttons.
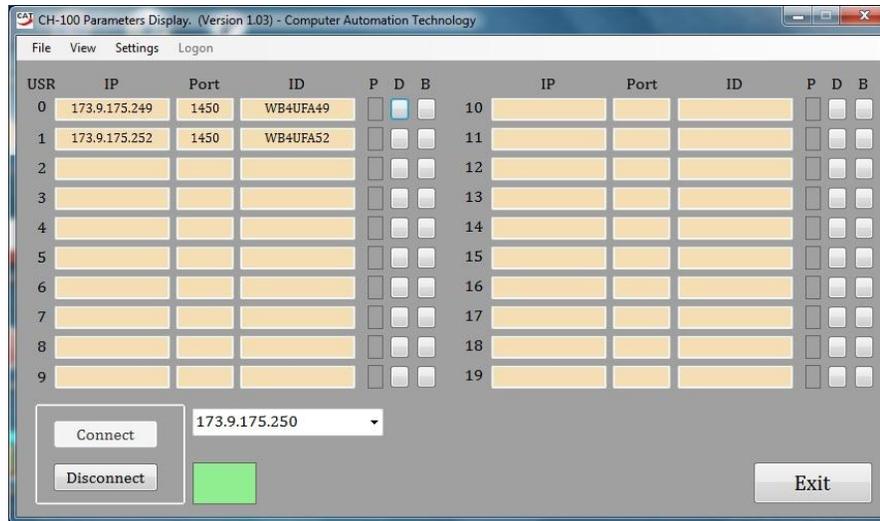
When a CATLINK transmits its IP address and Identification will turn green. The "P" or PING indicator will flash red each time the HUB exchanges pings with one of the CATLINKs. Zone 1 Channel 5 must be enabled for the CH100 to respond to control commands from the Parameters Display window. Clicking the "D" or DUMP switch will force the hub to disconnect from the CL-100. Clicking the "B" or BLOCK switch will block the HUB from forwarding PTT and audio packets to and from the CATLINK. The switch will turn red but the CATLINK will remain connected to the HUB. To unblock the CATLINK, click on the switch a second time. The switch will turn white and the block will be removed.

CH-100 Parameters Display Settings

Use the Display Settings window to list the IP address and Port numbers of any CH-100 HUBs you want to monitor. They will appear in the drop down box when you start the program. If the Display window on top box is checked when another program is opened the CH-100 Parameters Display window will remain the top window with the new program window underneath.

Display Hang Time

The display only turns green while packets are being received. A kerchunk will only represent a green flash of the display. To add a hang time to the display click on Settings and enter a number in the "Delay the un-key display" box and click DONE. When the receive packets stop the display will change to yellow for the duration of the hang time or until another CATLINK starts sending packets.