HD490 iCap™ Software
## Realtime IP Captioning Module for the HD490 Closed Caption Encoder

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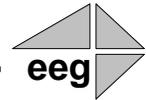
Section 1: Introduction

System Overview

The EEG HD490 iCap™ Software module enables secure remote real time captioning over IP networks, with built-in streaming audio delivery and access to all the features of the iCap Closed Captioning Suite.

The iCap-equipped HD490 connects to EEG's remote iCap service with a unique and secure login code, and sends encrypted audio and live caption monitoring up to the server for distribution to a remote captioner. The remote captioner, after being authenticated by the iCap service, will receive live program audio and captions, and can send real time caption data back over the IP link to the HD490.

iCap Captioning is administered and logged through the iCap Administration site, accessible on the world wide web, and provides sophisticated logging tools and unprecedented configuration flexibility for real time captioning. Broadcaster pages on the iCap Administration site are password-protected over SSL, and feature lists of encoders, full activity logging, connection information, and secure permission settings to restrict access to trusted captioners and agencies.

iCap also provides broadcasters with a new opportunity to monitor the feedback data being sent to the remote captioner (both program audio and current captions), and see the data exactly as the captioner sees it, by using the iCap Captioner or Broadcast Monitor software on any network-connected PC. Software installs and documentation for these and other iCap tools can be obtained at www.eegent.com/portal .

This manual also covers ComCC, a dial-up modem backup system that uses iCap technology to enable flexible audio and caption routing across local networks, while providing external access through a password-protected dial-up system. No connection to remote iCap servers on the internet is required for broadcast facilities or captioners to exchange data through ComCC.

Section 2: HD490 Hardware Connections

Video Setup

Connect your HD-SDI or SD-SDI program video to the BNC connector marked Master In. The encoded video signal appears at the Master Out 1 and Master Out 2 outputs. The Master Out 1 signal is relay-bypass protected.

Audio Setup

The iCap system delivers your program audio to a remote captioner using an encrypted IP connection, without the need for any external hardware or phone connection. The program audio can be recovered from embedded audio data on the Master video input, or from a separate balanced analog or AES digital source connected to the rear-panel XLR connector marked Audio In.

Once you have connected your audio source, select your source from the front panel LCD menu by navigating to **Audio Setup | Input Select.**

If you are using embedded audio, you must additionally configure the HD490 to select the correct audio program from your embedded data. Use the **Audio Setup | Audio Group** setting to choose the embedded audio group your primary audio program is in, and use **Audio Setup | Audio Mix** to choose whether it is a stereo or surround sound program. For a stereo program, you can also use **Audio Setup | Stereo Channel** to specify whether the desired program is channels 1 & 2 within the selected audio group, or on channels 3 & 4. iCap™ uses this information to create a dialog-focused mono audio feed for the remote captioner, created by mixing together either the Left and Right pairs in a Stereo setting, or the Left, Right, and Center channels in a Surround setting.

After selecting your signal, verify the HD490's input level by navigating to **Audio Setup | Peak Level.** For optimal sound quality, the peak level bar should reach at least 60% across the screen, but should never display "Clipping!" To reach the optimal input level without adjusting the output level of your source, you can navigate to **Audio Setup | Scale Audio** to use the HD490's built-in digital input trim, which can boost or cut the iCap input level up by as much as 12 dB.

The HD490 does not currently support direct input of Dolby® E or other compressed audio signals.

iCap™ can deliver your program audio to the captioner in one of two bandwidth modes, one for minimal bandwidth and one for higher fidelity. For more information, see Section 3: Encoder Software Configuration.

For full information on the HD490 hardware specifications, including instructions for dial-up captioning and other features, please consult the HD490 Smart Encoder V Manual.

Network Setup

To connect to the iCap service, the HD490 must be assigned valid IP address, subnet mask, and gateway settings for your LAN, and must also be at a location on your network where outbound connections are permitted to the public internet. It is **not** necessary to permit inbound connections, or to provide the HD490 with a public IP address or a VPN connection. As a general guideline, the HD490 will be able to connect from most environments where you can access WWW websites from a PC.

Connect an Ethernet connector from your router or switch to the rear panel of the HD490. Use the front panel LCD menu to assign your encoder an IP address by navigating to **System Setup | Network Setup | IP Address**. This IP address must fall within your subnet and not overlap with an IP assigned to any other computers or equipment. You also need to set your subnet mask by navigating to **System Setup | Network Setup | Subnet Mask**, and your internet gateway address using **System Setup | Network Setup | Gateway.**

If your first attempts to connect to iCap do not work, you should check with your network administrator whether additional configuration of a router or firewall may be necessary. For more detailed information about network and firewall requirements for using iCap, please refer to the EEG Application Note *iCap Networking and Firewall Requirements*.

GPO Setup

If you wish to use the GPO status monitoring features of iCap, you may connect external devices to GPO switches 3 and 4 on the rear panel of the encoder. For complete pin-outs and electrical details, see the HD490 product manual.

Section 3: Encoder Software Configuration

Configuration of the iCap software on your HD490 encoder is done through the local web page hosted on your encoder, and is accessible from any local web browser through its IP address on your LAN.

Required configuration includes your company name and a unique iCap username for each HD490 encoder. You may find these usernames pre-configured on your encoder, in which case you will not need to perform all of the listed steps.

Connecting to the Configuration Page

1. Open a web browser on any PC on the same local network as your HD490. Navigate to the IP address that you configured on the encoder's front panel; for example, type **192.168.1.15** into the address bar of the browser if that is the address you entered into the front panel. If you cannot navigate to the page in your web browser, check with your network administrator that the IP Address and Subnet Mask you entered on the encoder front panel are valid parameters for your network, since individual settings vary.

2. If the iCap page is not the first page that comes up on your HD490, navigate to the iCap page by clicking on the link named **iCap** on the top toolbar.

iCap Login Settings

1. In the **Login** section, check the fields for **Company Name, User Name, Password**. These fields may be pre-configured for your encoder. If they are not, or if you would like to change the settings, you will first need to create a new encoder username on EEG's centralized iCap Admin page, and then enter the new settings into the HD490 Configuration page. For information on accessing the centralized iCap Admin page, see Section 4, *Using the iCap Administration Site*.
2. In the **Server Address** field, enter the address for the iCap authentication service you will be connecting to. For standard installations, use the address "64.71.155.196" (eegicap.com).
3. Press the **Apply** button to save your settings.

iCap GPO Settings

1. In the **GPO Monitoring** section, you can enable or disable GPO activity from iCap. Checking **Monitor connection on GPO 3** will cause the HD490 GPO Switch 3 to close when your encoder has a valid connection to an iCap server, and open when iCap is not connected. Checking **Monitor S1 activity on GPO 4** will cause the HD490 GPO Switch 4 to close when your encoder is receiving real-time caption data for CC1/S1 through iCap, and open when the iCap connection is idle.
2. If you disable either or both GPOs, iCap will not send signals on those GPOs, leaving them free for use by other HD490 applications.
3. Press the **Apply** button to save your settings.

iCap Audio Settings

Beginning with iCap™ software version 2.6.0, two quality modes are available on the HD490 for audio delivery to the remote captioner. The lower bandwidth mode (which matches the "classic" codec prior to 2.6.0) operates at approximately 15 kbps. The high bandwidth mode operates at approximately 45 kbps. For most applications, the high bandwidth mode is recommended as it optimizes speech clarity, particularly for programs that include prominent music, sound effects, or audience noise.

Starting and Stopping iCap

On the lower-right of the configuration page, there are iCap Client **Start** and **Stop** buttons. Use these buttons to start, stop, or reset the software that connects to the iCap service. If the software is running, you will see **iCap Running : Yes** in the status section. If the software is not running, you will see **iCap Running : No**.

To use your new login settings and connect to the iCap service, start iCap using the **Start** button. You should see the **Status** indicator change to indicate progress connecting to the service. Within a few seconds, the status should change to "Connected". This means the encoder is connected to the iCap service and ready to accept caption data.

If you continue to see a message other than "Connected", this may indicate a problem connecting due to incorrect login or network settings. The message will assist in identify this problem, but sometimes there is more than one possible cause. A message that stays on "Connecting…" for an extended period indicates that your encoder can not reach the iCap service – check your HD490 gateway setting, or the problem may be related to firewall or router configurations if you have never connected to iCap successfully from this location before.

Reading the Encoder Status Section

The **Remote Status** field indicates whether the HD490 is successfully connected to the remote iCap service.

The **Server Type** field will normally read "Main" when connected to the remote server, but may show "Backup" if the server configured in "Server Address" could not be reached but a valid backup has been found on the iCap network. The field may also show "Local" if a privately maintained local iCap cluster is in use.

The **Relay ID** field shows a unique numerical ID for the data relay site the encoder is currently communicating with. This value can be useful when debugging connection performance; it should be non-zero for a proper connection, and may refresh periodically to improve performance.

The **Audio Packets Sent** field shows how many audio frames have been sent over iCap since the last restart. The count will increment once every several seconds when an iCap user is listening to this encoder's data. To conserve bandwidth, no audio packets are sent

unless an authorized user is logged into an access code that requests audio from this encoder.

The **ComCC Status** field shows whether the encoder is connected to a local ComCC Hub. For more information, see the ComCC web page tab, or the ComCC section of this manual.

The **Version** field shows the version of the iCap software your HD490 is currently running. If this version is out-of-date, a message may appear on the page below the **Start/Stop** buttons indicating that a newer version is available for download.

The **iCap Running** field indicates whether or not the iCap software is currently running on your encoder. This field will toggle when you use the **Start/Stop** buttons below. When the iCap software is not running, your encoder will not be available for captioning through iCap and will generate no iCap-related network traffic. All other features of the HD490 encoder, including modem captioning and other installed software clients, will work as normal.

Logs

A daily low-level event log for the iCap software is accessible from the "Logs" tab on the HD490 LAN page. These logs show software traces, warnings, and errors, and can be helpful when debugging any problems with the HD490 iCap software.

For logs showing any captioner connections to the encoder, or any connectivity disruptions with the iCap service, the iCap Admin page (next section) will generally provide more concise and useful information.

Section 4: ComCC Software Configuration

When used in conjunction with iCap, the ComCC system provides an alternate, fully redundant, backup path for caption connectivity. Captioners receive audio and send captions over a pair of telco lines connected to a ComCC 1250 OpenGear frame card in the broadcast plant. The ComCC card then sends the caption data to one or more HD490 encoders over the LAN.

ComCC uses intelligent routing based on iCap access codes, so that each phone line pair can be used to access multiple encoders simultaneously, or to access different encoders at different times of the day. The specific routing is chosen by the caption provider using touch-tone phone commands, based on a set of choices configured by the receiving broadcaster.

ComCC can be used as a backup or alternate connection methodology to iCap, as it does not require either the broadcast encoder or the caption provider to maintain continuous internet connection to each other or to the central iCap cloud.

A full ComCC setup consists of one or more ComCC 1250 frame cards, plus one or more HD490 encoders licensed for the ComCC module.

HD490 ComCC Configuration Page

Open a web browser on any PC on the same local network as your HD490 and navigate to the IP address that you configured on the encoder's front panel. (For connection troubleshooting, see the section above titled "Connecting to the Configuration Page"). Use the toolbar to navigate to the "ComCC" tab.

If the ComCC page asks for a license key, enter the license key provided by EEG Support to continue.

Once the ComCC module is licensed, you will be able to enable direct connection to the ComCC Hub, and edit ComCC settings.

ComCC Module Settings

To enable the ComCC module, check "Enable iCap fallback to local ComCC server?" This will enable the HD490 to simultaneously connect directly to a local ComCC Hub, and to the central iCap site.

Make sure to press "Apply" before leaving the ComCC Module Settings page to ensure that your settings go into effect!

The HD490 automatically discovers ComCC hubs on its local subnet. If you have multiple ComCC cards on the network, one card will automatically become the Master Hub which encoders will connect to. The current IP address of the Master Hub is listed in the field "Current ComCC Hub IP".

To continue with all ComCC cards and HD490s on your local network in the same ComCC cluster (recommended), leave the Group Discovery Port at its default setting of 21000. However, if you wish to separate your ComCC cards and HD490s into separate groups that communicate independently of each other, these groups can be configured by setting all encoders and ComCC cards in each group to have the same Group Discovery Port number, and setting a different number for each desired group. **Configuring multiple ComCC groups will prevent you from accessing all encoders on your LAN through each ComCC dial-up card – only cards in the same group will be able to dial each encoder.**

If no ComCC cards are found using the current Group Discovery Port setting, the HD490 will not be able to participate in a ComCC cluster.

To check the status of the ComCC connection, go to the iCap tab (after applying any changes to your settings), and check the "ComCC Status" field for connection information. If the HD490 reports an error message, you may need to check the configuration of your ComCC 1250 cards. Possible problems include a ComCC card that isn't running, isn't connected to the LAN, has a different Group Discovery Port configured, or does not have an entry for this encoder in its local user permissions database. For troubleshooting on these issues, see the ComCC 1250 manual.

Section 5: Using the iCap Administration Site

Additional settings and features for iCap that are not configured locally on the HD490 are available on the centralized iCap Admin site, located at www.eegicap.com. When you purchased your encoder or requested an iCap account, you should have received an administrative password for your company's account on the iCap Admin system. If you do not have a password, you can contact support@eegent.com to request a new account or a password reset.

The following sections cover basic features on the iCap Admin site to configure and monitor your encoder. For full information on using the site, refer to the *iCap Administration Manual* available from the EEG support webpage.

If you are using iCap with a ComCC system, changes to your central account will be automatically synchronized to all ComCC 1250 Hub cards whenever the hubs are able to connect with the central iCap cloud. If the ComCC cards are not configured to interact with the iCap cloud, changes must be entered manually using the tools on each local card. For more information on this process, please see the ComCC 1250 manual.

Creating or Changing an Encoder Account

To connect to the iCap service, each encoder must have a unique username that does match the username for any other encoder that will be connected simultaneously. (It is permissible to configure an inactive spare encoder with the same username as an active encoder, but you will encounter problems if you try to connect these both to iCap at the same time.)

The username for your encoder may be pre-configured when you receive it, in which case it is not necessary to make any changes to these settings before connecting.

After connecting to the iCap Admin page and logging in, perform the following steps to create a new encoder account:

1. Navigate to the **Users** tab, and click the **Add** button.
2. Choose a username for the encoder. This can be any alphanumeric string that will identify the encoder for you.
3. Choose a password for the encoder. This password will be entered into the LAN page when configuring your HD490

as in Section 3, and prevents any unauthorized users from receiving data intended for your encoder.

4. Select "encoder" for **User Type**.
5. Click **Create New User**.

You should now see the new username you created appear in the list on the **Users** page.

To edit or remove an existing username, highlight that user in the list, and then click the **Edit** or **Remove** button.

Creating or Changing Access Codes

An iCap access code is the string or passphrase that captioners will provide to the iCap service in order to be connected to your encoder to provide closed caption data. In this way, an iCap access code has a similar role to the telephone number of your encoder in dial-up modem captioning, although an iCap access code is both more flexible and more secure.

For a captioner to connect to your encoder, you must create an access code that points to the encoder, give iCap permission to let your captioning contractor(s) connect to this access code, and then tell your contractor(s) the name of the access code you created. Some or all of these steps may be pre-configured based on your input when you purchase a new encoder.

After connecting to the iCap Admin page and logging in, perform the following steps to create and share a new access code:

1. Navigate to the **Access Codes** tab, and click the **Add** button.
2. Select a name for the new access code. This can be any alphanumeric string, but it is suggested that you provide the captioner a phrase with mnemonic value, for example by including your station name and/or a designation of a particular feed or program that the access code will be used for.
3. Select the **CC Service** for the access code. Select "S1" for primary language captioning to be encoded into CC1/S1, or "S2" for secondary language captioning to be encoded into CC2/CC3/S2. Please note that regardless of this setting, the captioner must continue to send correct control commands for the desired CC channel, using the same practices as for modem captioning. Click **Next**.
4. Select a **Primary Encoder** from the drop-down list of your company's encoder. The primary encoder provides an audio

feed to the remote captioner and receives caption data in return. If you are only configuring a single encoder for this access code, select that encoder here.

5. If you are configuring multiple encoders in a single access code, add them by selecting their names one at a time from the **Add Secondary Encoder** dropdown, and then clicking **Add to List**. Secondary encoders receive all caption data sent to the access code, but only provide audio data if the Primary Encoder is not online. Secondary Encoders can be used either to have an automatic backup if the Primary Encoder fails or is unable to connect, or in situations where it is desirable for multiple encoders to receive the same caption data without requiring the use of serial or modem repeaters. The bottom pane shows a cumulative list of all secondary encoders added; select a name and click **Remove Selected** to remove an encoder from this list.

6. When you are done adding encoders click **Next**.

7. On the final page, you will be prompted to select caption providers who you wish to allow to use the newly created access codes. Enter the iCap company name for the provider, which you can get from the provider or EEG support, and click **Add to List**. Only users with active accounts from these companies will be able to use iCap to send or receive data to your encoders using this access code. The bottom pane shows a cumulate list of the companies you have authorized; select a name and click **Remove Selected** to remove a company's authorization to connect to your access code.

8. When you are done click **Finish**.

You should now see the new username you created appear in the list on the **Access Codes** page.

To edit or remove an existing access code, highlight that access code in the list, and then click the **Edit** or **Remove** button.

Viewing Encoder Logs

The iCap system logs all caption connections to your encoder, as well as any interruptions in your encoder's connection to the iCap service. These logs are permanent and available at any time from the iCap Admin site, providing a valuable resource unavailable with dialup captioning.

After connecting to the iCap Admin page and logging in, perform the following steps to view your logs:

1. Navigate to the tab marked **Logs**.
2. In the **View Logs** menu, select whether you want to view logs by encoder username, or by access code name. Then select one of your company's encoders or access codes to view the logs. The encoder logs show messages when the encoder first connects or disconnects from the iCap service, and when a user begins and ends captioning to the encoder through iCap. The access code logs show messages each time a user joins or leaves the access code, and each time a user begins or ends captioning on that access code.
3. The **Timeframe** field can be used to filter the log results shown by date, while the **Event Types** field can be used to restrict the results to specific types of events only.
4. Use the **Save As** button to save the logs as a file to your PC, or the **Print** button to print a copy of the currently displayed results.

Setting up Email Notifications

The iCap system provides the option of receiving via email a daily log of encoder use for your company's account, plus automatic notifications if your encoder becomes disconnected from the iCap service.

After connecting to the iCap Admin page and logging in, perform the following steps to configure your email settings:

1. Navigate to the **Email Alerts** tab and click the **Add** button.
2. In the **Email Address** field, enter the email address where you would like to receive alerts.
3. Next select the username(s) you would like to receive status updates for. Select "All Users" to receive notifications when any user from your company signs in or out of iCap, "All Encoders" to receive notifications when any encoder from your company connects or disconnects from iCap, or "Single User" to select an individual user from your list.
4. Select whether or not you want to receive a daily caption log detailing start and end times for any caption activity in your company's account over the past 24 hours.
5. If you would like to add additional email addresses to the system with the same alert settings, click the **Add Another Email** button, and then enter the additional addresses on at a time into the lower **Email Address** field, clicking **Add to List** to place the current address in the bottom panel.

6. Click **Create new email alert** to save your settings.

To edit or remove email settings, select the line in the **Email Alerts** pane that you want to change and click the **Edit** or **Remove** button.

Live Monitoring with the iCap Admin Site

The iCap Admin site also provides live feedback on the status of your encoders and access codes. This instant monitoring provides a valuable tool for QA, troubleshooting, and confirming encoder status during setup. The default update rate of the iCap Admin pages is about once per minute, but you can view more up-to-date information by clicking the refresh button at the bottom of the data view. **Do not use the refresh button in your browser toolbar, as in many browsers this will reload the entire site, and you will be returned to the initial login page.**

On the **Users** page, all encoders currently connected to the iCap service will appear at the top of the page, with a green "Yes" in the **Online** column. If a captioner is currently captioning to the encoder using iCap, the **CC Activity** column will also display text in green, indicating whether the captioner is active in S1, S2, or both. Finally, the **Audio Status** column will display "Audio OK" if the iCap system is steadily delivering audio from your encoder to the captioner. If the status reads "No Listeners", this indicates that no captioners have connected to your encoder recently, and so no audio is being sent at this time and the status cannot be determined; if it reads "No Audio" or "Check Firewall", there may be a problem with your configuration.

On the **Access Code** page, the names of all encoders that are currently connected to the iCap service are highlighted in green. The **Active Users** column provides a count of the current number of captioners connected and listening to this access code. The **CC Activity** column shows if there is a captioner currently active to send caption data to encoders on the access code.

Section 6: Additional iCap Monitoring Tools

In addition to the tools available on the HD490 local status page, and the centralized iCap Admin tools, the iCap system includes several other innovative options for monitoring your closed captioning systems.
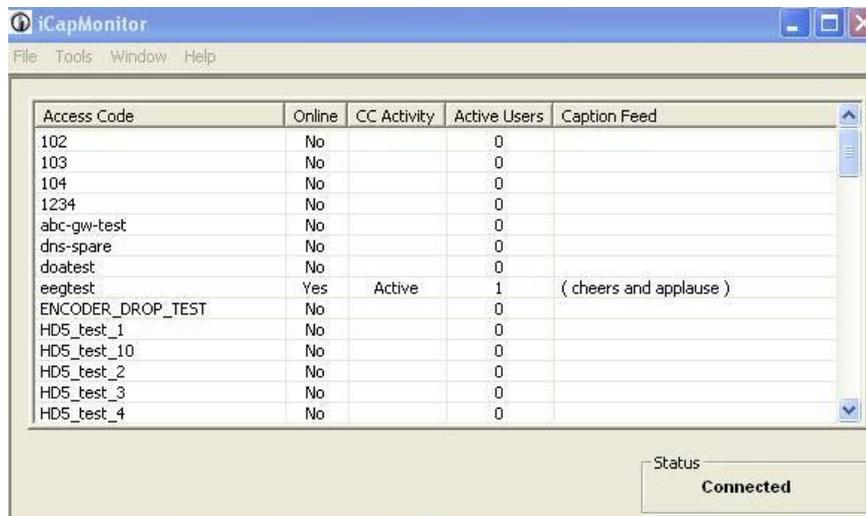
iCap Captioner PC Software

The iCap Captioner PC software is the tool used by captioners to connect to iCap encoders, decode their audio feeds, and send caption data back in return. This software can also be a useful tool for broadcast monitoring and QA - a user in the master control or a remote location can log in securely to iCap, select one of the broadcaster's access codes, hear the audio as the captioner is hearing it, and monitor the live CC return feed coming back from the encoder. If enabled by the caption agency, it is also possible for broadcast users to use the iCap Chat feature to communicate directly with the captioner through the embedded text window in the event of a problem.

The iCap Captioner software also provides a tool for broadcasters to send a simple test caption to their encoder with no additional

stenographic skills or software, perfect for testing basic iCap functionality before an external caption provider becomes involved.

The iCap Captioner PC software is available free with registration at www.eegent.com. A separate manual detailing the features is also available from EEG Support.

iCap Broadcast Monitor Software

The iCap Broadcast Monitor is a professional broadcast tool that enhances the functionality of the iCap Captioner software for complex broadcast environments where simultaneous QA monitoring of multiple closed captioning feeds and iCap access code setups is required. The iCap Broadcast Monitor includes the individual access code audio and CC monitoring features of the iCap Captioner software package, plus a full simultaneous view of all broadcaster access codes detailing attached encoders and captioners, plus a scrolling caption feed for each access code. Master control staff can use the Broadcast Monitor software to QA multiple channels of captioning in one PC window, opening to a more detailed view of any channel at any time.

For further information on the iCap Broadcast Monitor Software, contact sales@eegent.com or support@eegent.com with your questions.

iCap CaptionCast
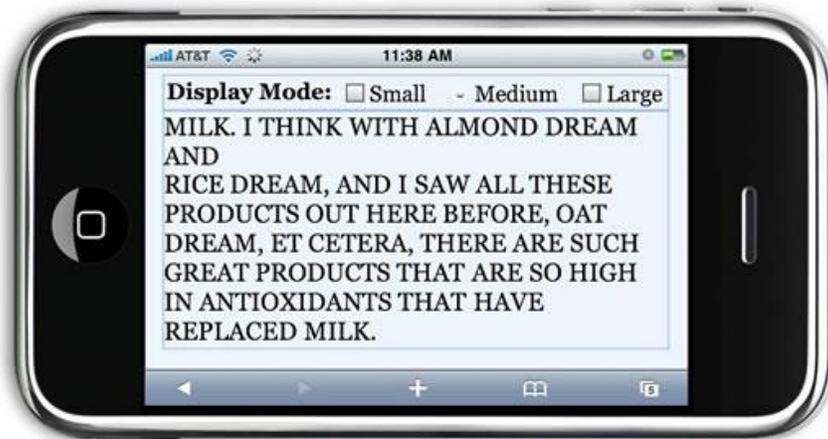
iCap CaptionCast is an iCap-powered service that provides accessible text displays to mobile browsers. Any iCap access code can be made into a CaptionCast in seconds, using a simple interface through the iCap Admin site.

Originally designed as an effective but inexpensive accessibility solution for conferences, stadiums, and other public events, CaptionCast can also be used by broadcast engineers for mobile closed captioning monitoring. The designated CaptionCast "Event ID" can be shared with as many or as few people as desired, and changed at any point for increased security.

To get started with CaptionCast, contact sales@eegent.com or support@eegent.com with your questions.