TELEX Application Note

Incorporating Five-Tone Selective Calling and Message Signaling Into C-Soft

VOIProven TELEX Radio Dispatch

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Incorporating Five-Tone Selective Calling and Message Signaling Into C-Soft

1.0 General

With the introduction of C-Soft and IP-223 Versions 4.0 and later, Telex offers a versatile and scalable radio network interface employing five-tone selective calling (Selcall) and message signaling.

Due to the wide variety of five-tone formats, and diversity of network applications, no single implementation instruction is appropriate. Thus, this application note is intended to give general installation guidelines for Telex dispatch solutions within a five-tone environment. Features and functions of the Telex five-tone enabled products, C-Soft and IP-223, are described within the context of an example application.

2.0 Five-Tone Selective Calling

Five-tone Selcall is a radio bandwidth management technique devised to allow multiple radio networks to share the same bandwidth resource. Co-channel users are differentiated by individual and group identifiers, which are used in a tone squelch protocol.

Each radio resource on the network is uniquely identified by an alphanumeric code, its ID. Five (5) discrete audible tones, representing individual or group IDs, precede each voice call, to target a specific resource on a radio network, and initiate a private call. The call may be individual (point-to-point), or group (point-to-multipoint).

An individual radio's squelch is lifted, not merely by receive carrier signal strength, but by receipt of a valid individual or group ID. Radios not specified by their ID, or group ID, are not alerted to the call, and their receive audio path remains closed. In general, a group ID consists of those ID characters common to the group, with wildcard characters replacing those unique within the group.

Five-tone Selcall tones can carry information in addition to the called party/group ID, such as the ID of the calling party, and a predefined status message. Status messaging has been widely used to gain greater efficiency from the radio resource. Status or short text messages may take only a few milliseconds of air time to send, as opposed to voice calls, typically measured in tens of seconds.

Military and public safety organizations have come to rely heavily on the exchange of status and short text messages, yielding high efficiency from the available radio bandwidth, while affording an extra level of security.

Tones are also commonly used to carry network management commands, which are generally invisible to the user, such as terminal/radio stun, kill, and revive commands.

Five-tone Selcall is used widely throughout Europe and the Middle East, and is mandated by some national licensing authorities. However, no single standard is enforced, and five-tone exists in many different formats. These have evolved over time, influenced by brand/product differentiation rather than technology convergence. Within the tone format, the ID and status codes are largely user-defined, based on the user's environment and fleet characteristics.

Five-tone Selcall offers dispatchers sophisticated status messaging and automated acknowledgement functions, while delivering cost effective use of bandwidth resources.

The diverse formats and user-defined structures present a significant challenge to the delivery of a single five-tone solution. Telex has met this challenge by developing a flexible and highly scalable dispatch solution for five-tone users. The Telex solution is available in the C-Soft dispatch console and IP-223 remote ethernet radio adaptor panel versions 4.0 and later. The C-Soft offers the dispatcher complete call, message, and emergency management functionality.

In line with Telex's model for distributed network resources, the C-Soft deals with tone string encoding, while the IP-223 decodes and validates incoming strings.

3.0 Telex Five-Tone Dispatch Interface

To ensure universal compatibility within a five-tone network environment, Telex has created a versatile dispatch solution. Telex customers are familiar with our user-defined dispatcher interface. In the case of five-tone, Telex has extended user-defined parameters to the tone signaling interface. Thus, five-tone compatibility is designed into the dispatch solution by the installer or network manager.

This application note is intended to assist the implementation of an effective Telex dispatch solution for five-tone radio networks. Due to the diversity of such networks, no definitive method can be prescribed. To illustrate an appropriate implementation strategy, key configuration attributes are described within the context of a general, plausible application.

4.0 IP-223 Remote Ethernet Radio Adapter

The Telex IP-223 and C-Soft are responsible for tone decode and encode (respectively). Thus, the radios that interface the Telex dispatcher network to the radio network must be transparent to the tone signaling they transport.

No signaling protocol is required between the IP-223 and the attached radio. It is only necessary to pass TX/RX audio, and PTT commands, between the two (2) devices. Thus, the IP-223 should be configured in the normal manner for the model of radio in use.

REFERENCE: For more information, see the specific Telex application note and the radio manufacturer's technical documentation.

4.1 Multicast Setup Page

In the IP-223 Multicast setup, the radio type should be set to Local mode.

NAVIGATION: From TSM, select the **IP-223 to configure | Multicast**.

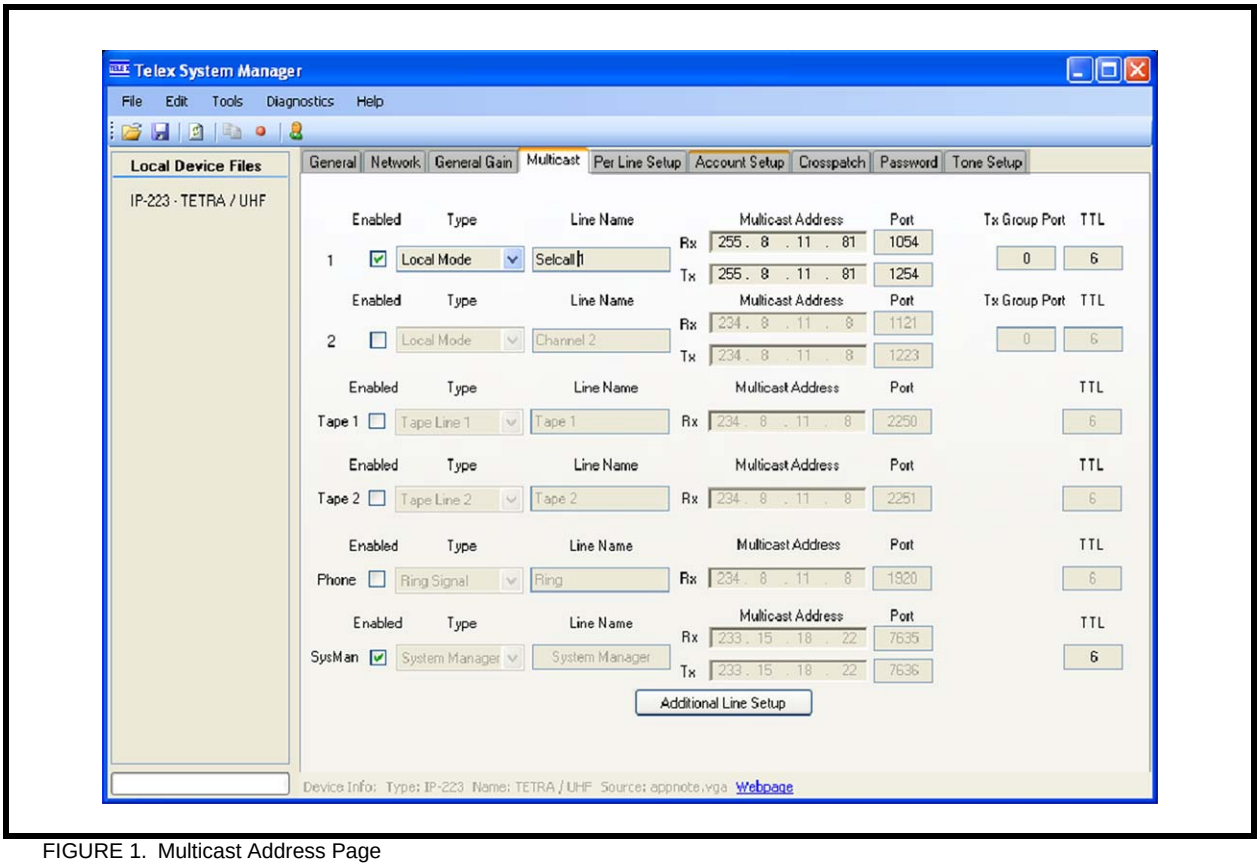

FIGURE 1. Multicast Address Page

The IP-223 configuration is shown using the **TSM** (Telex System Manager) application, distributed free with firmware release version 4.1. Alternatively, a web browser can be used to interrogate and update the IP-223 configuration.

REFERENCE:

- For more information, see the Telex System Manager Technical Manual (P/N LIT000259000). This document is available for download at www.telex.com/Downloads/.
- The Telex System Manager software is available for download at www.telex.com/Downloads/.

4.2 Signaling Options Page

The **Signaling Options** page is used to configure the tone signaling format in terms of tone type, durations and special digits.

NAVIGATION: From TSM, select the **IP-223 to configure | Per Line Setup | Configure | Signaling Options**.

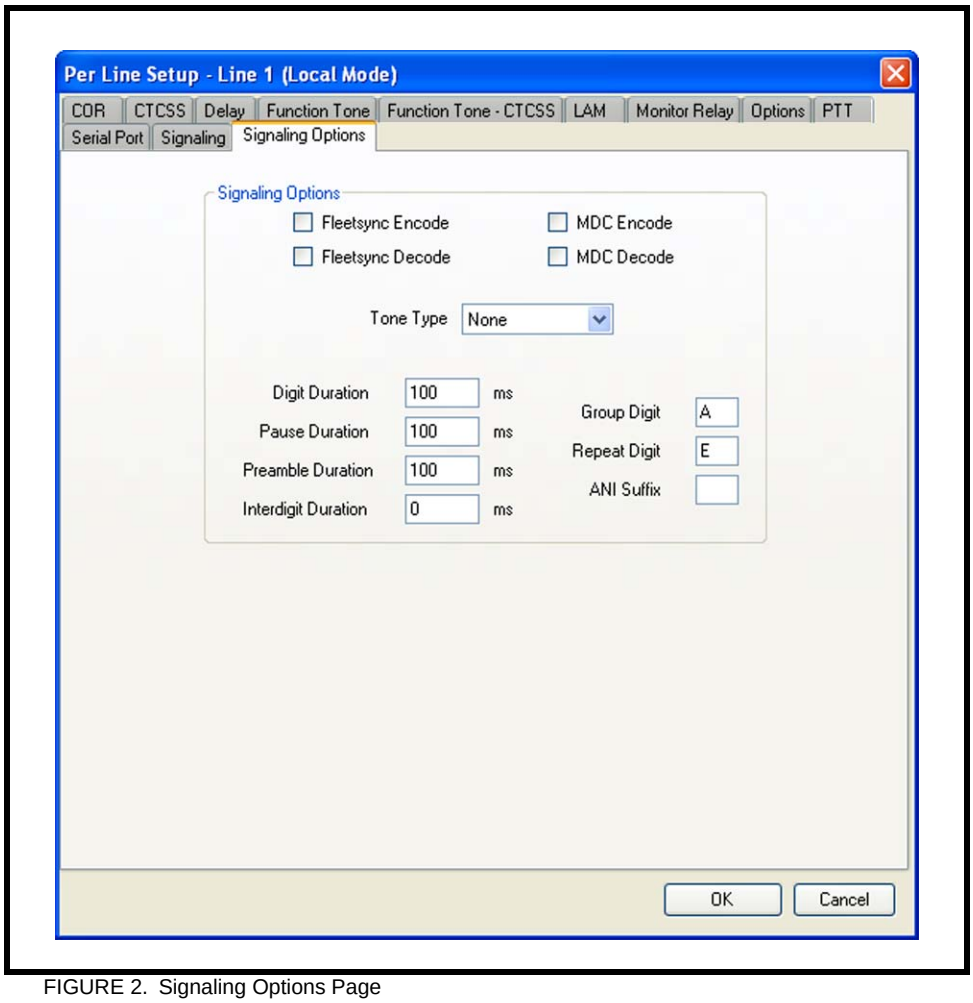

FIGURE 2. Signaling Options Page

NOTE: For the purpose of our five-tone application, ANI and ID are interchangeable labels. ID is the label commonly used with five-tone networks. **ANI** (Automatic Number Identification) is used within Telex products to refer to generic numerical identification systems.

4.2.1 Tone Type Drop Down Menu

The **Tone Type** drop down menu is used to define the tone type for the system. A full list of the five-tone formats supported, complete with tone attributes, is given in the IP-223 technical manual. In our example, tone format, ZVEI1, is employed. See Figure 2.

Within the example format, the leading tone's preamble duration is 100ms long, while all succeeding tones are 80ms. The radios on the network place a 100ms pause between five-tone blocks within the tone string. However, the IP-223 automatically senses pauses, based on the pause duration, so there is no need to define their positions within the ANI call format.

4.2.2 The Interdigit Duration

The **Interdigit Duration** field indicates the gap between each tone, used in legacy systems to delimit each tone. In our example there are no interdigit gaps.

4.2.3 Group Digit

The **Group Digit** field is used to represent a wildcard symbol covering all digits unique within a group.

In our example, the group digit is set to *A*. If a given group ID is 011AA it would address IDs in the range of 01100 to 01199.

4.2.4 Repeat Digit Field

The **Repeat Digit** field is used to replace repeated symbols. In order to differentiate a long tone transmission from two (2) or more tone transmissions, repeated tone transmissions are not allowed. The message string 01777, would be recorded for transmission as 017E7, where *E* is defined as the repeat digit.

4.2.5 ANI Suffix Field

The **ANI Suffix** field is used to configure fixed digits, at the end of a valid receive ANI string. This is used to distinguish callers on different networks, calling via disparate IP-223 lines, that share the same ANI.

This field can contain up to *3 digits*.

For example, if the ANI suffix is set as the digit 7, then an individual call sent from radio 121, would be presented to the console as a call from radio 1217.

4.2.6 Tone String Special Characters

G - Group digit used as wildcard to represent any ID digit. Define in ANI decode options. See Figure 3.

I - Caller ID. Digits that represent the ID.

R - Recipient ID.

S - Status.

P - *Pause. Used to separate ID and status blocks within a tone string*

4.3 Signaling Page

The **Signaling** page is used to define filters within the ANI Decoder. See Figure 3. Tone strings that do not adhere to the ANI call formats are rejected as invalid. Valid formats are categorized for processing purposes, as Emergency, Individual, Group, and Status. Since all status calls, with the exception of Emergency, are Individual or Group, the Status call version is not currently used.

NAVIGATION: From TSM select the **IP-223 to configure | Per Line Setup | Signaling**.

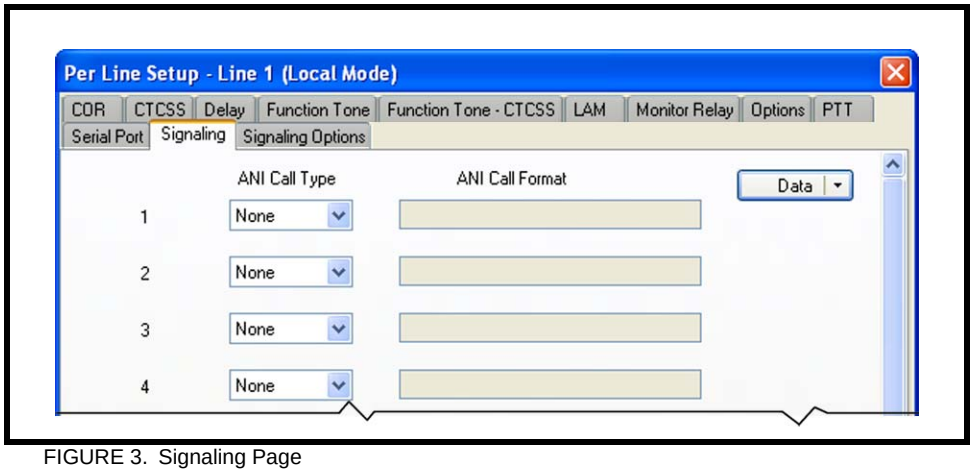

FIGURE 3. Signaling Page

4.3.1 ANI Call Version Drop Down Menu

The **ANI Call Version** drop down menu is used to define the ANI Call Format type.

Available selections for this menu are: *Emergency, Individual, Group,* and *None*.

4.3.2 ANI CAll Format Field

The **ANI Call Format** field defines the structure of an emergency call.

The leading block of five digits distinguishes this from all other call types.

The second block (02111) identifies the calling party, after a preamble of two fixed digits (02). This preamble is to help eliminate falsing.

The final block contains three fixed digits (919) followed by tow status digits. The status for an emergency cell, within our example is 19. Thus the IP-223 send the status digits 19 to the C-Soft packetized as an emergency call, to be presented with audible and visible alarms, and logging events to Active Emergency and Emergency History window, if applicable.

5.0 C-Soft Five-Tone Configuration

5.1 Per Line Parameters

The **Per Line Parameters** window is used to configure each line.

Ensure the Base IP Address field contains the IP Address of the IP-223 associated with the appropriate five-tone line. This is required to ensure correct routing of packets containing status messages.

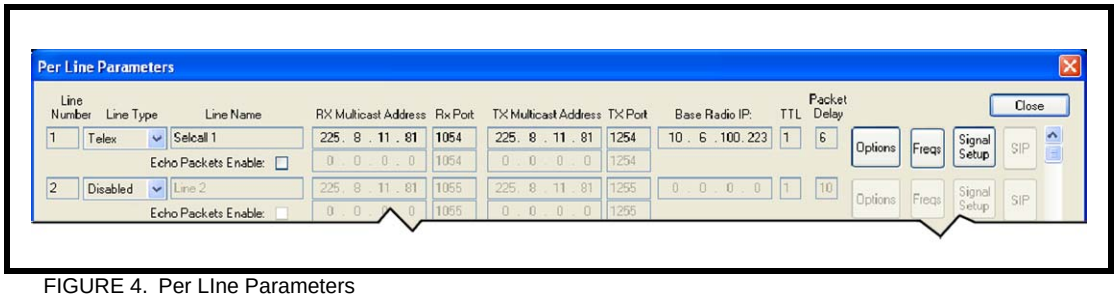

FIGURE 4. Per LIne Parameters

5.2 General Signal Setup

The **General Signal Setup** page is used to configure the system type and call logging.

NAVIGATION: From C-Soft Designer, select **Edit | Setup Per Line Parameters | Signal Setup**.

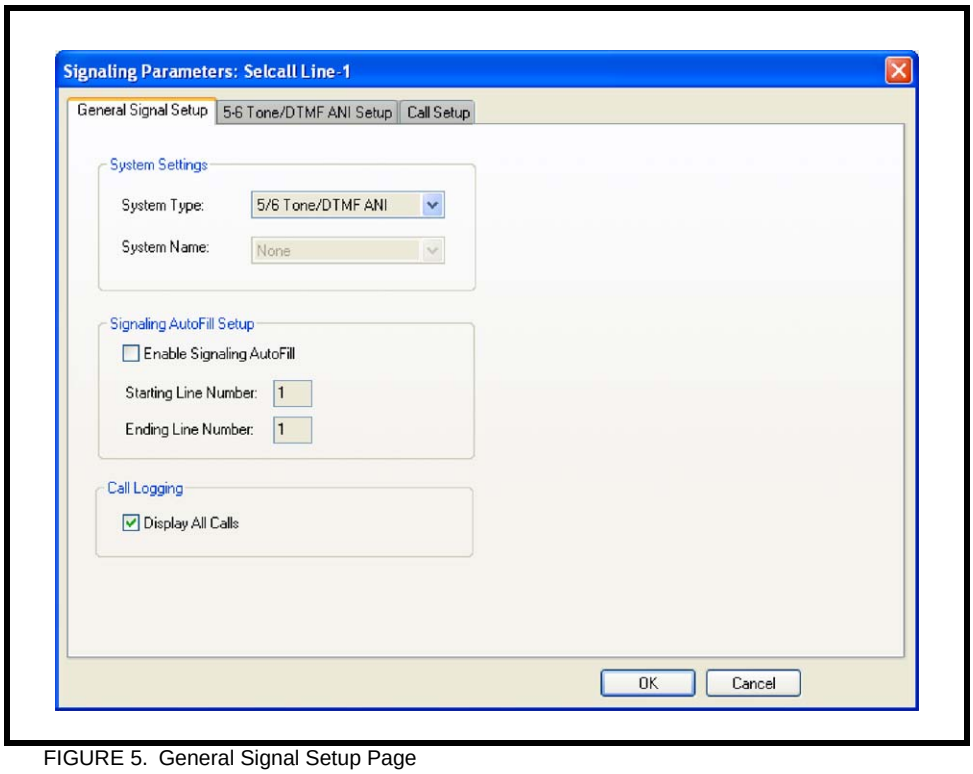

FIGURE 5. General Signal Setup Page

5.2.1 System Type Drop Down Menu

The **System Type** drop down menu is used to define the line's system type.

Select 5/6 Tone/DTMF ANI from the System Type drop down menu.

5.2.2 The Display All Calls Check Box

The **Display All Calls** check box indicates all calls appear in the Call History window in C-Soft Runtime. If this is unchecked, only calls targeted to the console's individual or group ID are displayed. The console ID is referred to as the unit ID. See Figure 6.

NOTE: For the purpose of initial setup, we recommended to show all calls.

Select the Display All Calls check box to show all calls in the Call History window.

5.3 5-6 Tone/DTMF ANI Setup Page

The **5-6 Tone/DTMF Setup** page is used to configure tone durations, delays, and acknowledgements.

NAVIGATION: From C-Soft Designer, select **Edit | Per Line Parameters | Signal Setup | 5-6 tone/DTMF ANI**.

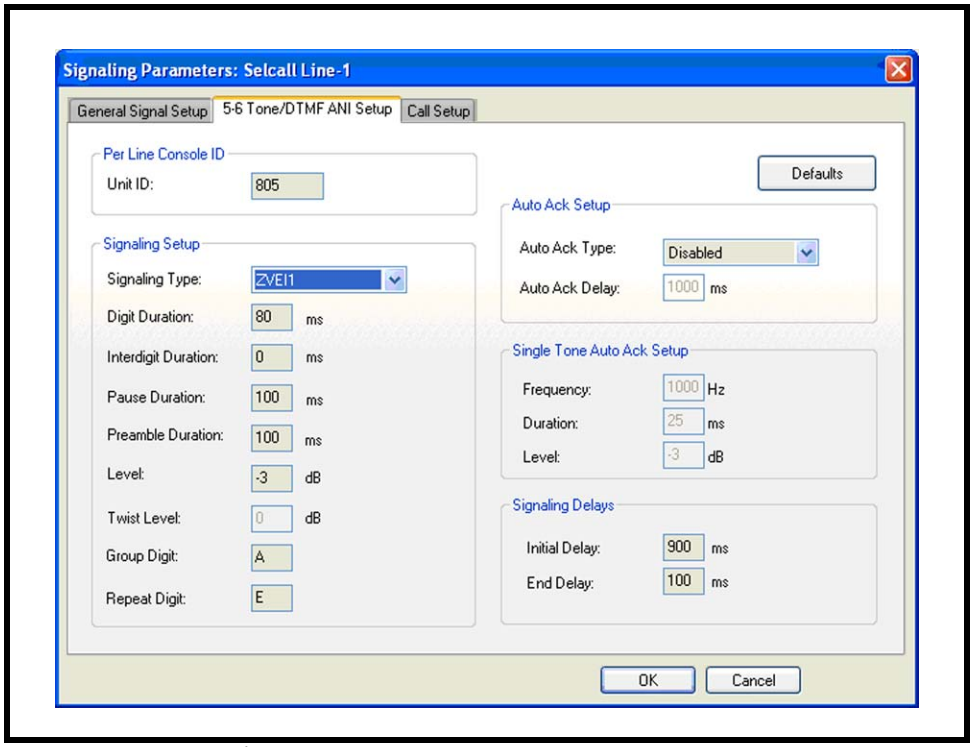

FIGURE 6. 5-6 Tone/DTMF ANI Setup Page

5.3.1 Unit ID Field

The **Unit ID** field is used to enter the dispatch console ID within the fleet. This is required if the console is to receive individual or group calls. Emergencies are passed to all consoles, regardless of ID.

5.3.2 Signaling Type Drop Down Menu

The **Signaling Type** drop down menu contains 15 different tone formats.

REFERENCE: For more information, see the IP-223 Technical Manual (P/N 803641). This document is available for download at www.telex.com/Downloads/.

5.3.3 Digit Duration Field

The **Digit Duration** field indicates the length in milliseconds, each symbol is to be represented by a specific tone during transition.

5.3.4 Interdigit Duration Field

The **Interdigit Duration** field indicates the time between tones

5.3.5 Pause Duration Field

The **Pause Duration** field indicates the space delimiting ID and/or status tone blocks, within a tone string.

5.3.6 Preamble Duration

The **Preamble Duration** field indicates the duration of the leading tone. In the example shown above, the leading tone is 100ms long, while all preceding tones are 80ms long. In some cases it may be necessary to extend the leading tone.

For example, if a preamble is required to wake a radio from battery saving mode, or to key a repeater. If battery saving is employed, a preamble tone is generally succeeded by a pause, before being followed by five (5) ID tones. Five-tone signaling is also known as 5/6-tone.

5.3.7 Twist Level Field

The **Twist Level** field is used only with DTMF signaling. Defining difference in dual tone levels.

5.3.8 Group Digit Field

The **Group Digit** field defines digits used to represent wildcard symbols when creating group calls.

5.3.9 Repeat Digit Field

The **Repeat Digit** field is used to replace repeated symbols. In order to differentiate a long tone transmission from two or more tone transmissions, repeated tone transmissions are not allowed. Thus, in the example above, the message string 01777, would be recorded for transmission as 017E7.

5.3.10 Auto Ack Type Drop Down Menu

The **Auto Ack Type** drop down menu contains auto acknowledgment options: *Single Tone, Signaling,* or *Disabled*. When the console receives an individual message, it responds with this type of Auto Ack, if enabled. The format for Signaling Auto Ack is defined within the Call Setup page.

5.3.11 Auto Ack Delay

The **Auto Ack Delay** field defines delay time between individual call receipt and Auto Ack response. Time may be required for originating portables to return to receive mode, or for repeaters to de-key.

5.3.12 Single Tone Auto Ack Setup

The **Single Tone Auto Ack Setup** group box Define single tone burst to be transmitted as automatic acknowledgment, in terms of frequency (Hz), duration (ms), and level (dB).

We recommended that the Auto Ack is not employed during initial five-tone dispatcher system setup. Automatic acknowledgments can cause co-channel interference, in the form of network collisions. If required, add automatic acknowledgments after the dispatch and manual messaging has been proven.

5.3.13 Initial Delay

The **Initial Delay** field indicated the delay between activation of PTT and transmission of leading tone. Allows time for transmitter to completely key-up.

5.3.14 End Delay

The **End Delay** field indicates the delay between the last tone in a string and PTT release. This field also acts to delimit the tone string, and must hold a non-zero value.

5.4 Call Setup Page

The **Call Setup** page is used to define the format for tone string encoding. A tone string can contain up to 32 characters, consisting of fixed digits (0–9), and/or special characters.

Tone strings can be sent as Auto Ack, in response to resolution of an emergency, at the **PTT BOT** (Push-To-Talk Beginning of a Transmission), or **PTT EOT** (Push-to-Talk End of Transmission). Tone strings can also be associated with any of the 10 buttons available in the Call History, Call List, or Manual Call List windows.These buttons are labeled here, within the call setup window.

NOTE: For more information see “Tone String Special Characters” on page 10.

NAVIGATION: From C-Soft Designer, select **Edit | Per Line Parameters | Signal Setup | Call Setup**.

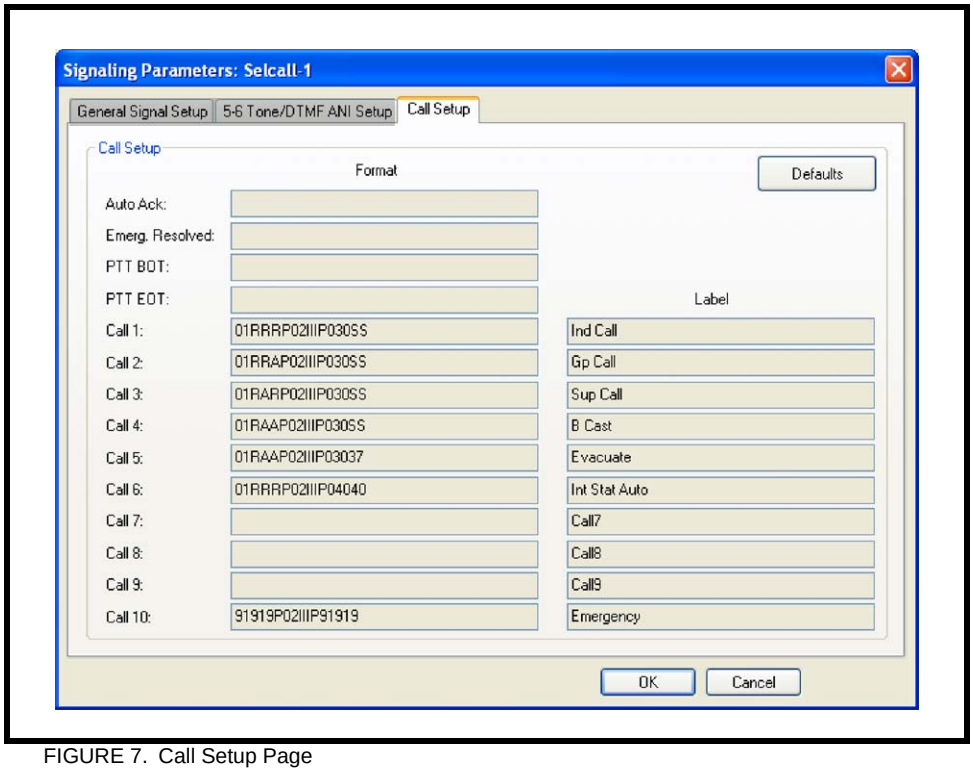

FIGURE 7. Call Setup Page

5.4.1 Auto Ack Field

The **Auto Ack** field is used to set up an automatic acknowledgement triggered by receipt of an individual message.

5.4.2 Emerge Resolve

The **Emerg Resolved** field is used to set up the message transmitted in response to an emergency being resolved at the console.

5.4.3 PTT BOT

The **PTT BOT** field is used to set up the message sent at the beginning or each transmission—at PTT key down.

5.4.4 PTT EOT

The **PTT EOT** field is used to set up the message sent at the end of each transmission—at PTT key release.

5.4.5 Call 1 to 10 Fields

The **Call 1 to 10** fields, shown in Figure 7, give some example strings which comprise recipients ID (5 characters) followed by caller ID (5 characters), followed by a status message (5 characters). Each separated by pauses, ID blocks are stuffed with two (2) initial fixed digits, which help prevent falsing. Status messages are stuffed with the three (3) initial digits.

5.4.5.1 Example

Call 1 is an individual call. It takes three recipient ID digits, allocated by the dispatcher during call setup, the three called ID digits from the console's Unit ID, and two status digits (again allocated by the dispatcher at call setup, and formats them into the tone string: 01RRR02III030SS.

All call to radio 134, from console 805, carrying status message 45 would be transmitted as: 01E34Pause02805Pause03045. Note repeat digit *E*.

When creating the IP-223 decode strings explicit placement of pauses was not required. Pauses, if employed in t he network signaling, must be correctly placed within the encode string.

We know from our configuration of the 5/6 Tone/DTMF ANI setup, see Figure 6, that the leading digit is 100ms long, all other digits are 80ms long and the two pauses are 100ms long. The transmitter is keyed for 900ms before the first digit is sent, and remains keyed 100ms after the last digit. This is in addition to any TX delay configured within the IP-223.

Calls 2, 3, and 4 are group calls. Following the same principle as call-1. Call-2 can be sent to any group comprising a maximum of ten radios. For example, a call to group 12A addresses radios 120 to 129, inclusive.

Call-3 is a group call to all supervisors. All radio IDs start with a 1 The supervisor's radio also end with 1 (1?1). Thus to create a supervisors group, and call all supervisors, we take the first and last ID digit from console input, and blank the middle digit with a wild card (group digit) thus RAR.

Call-4 is a broadcast to all radios in this network. All Is on the network start with 1, and the last two digits are irrelevant (RAA). Group call 1AA, is addressed to IDs 100 to 199.

Call-5 is a group call, similar to call-4. However, the status message is not set by the dispatcher during call setup, it is fixed at status 37. In this particular example status 37 translates to *evacuate*.

Call-6 is an individual call with a fixed status block (04040). This fixed block is specified in order to activate a function of the receiving radio. in our example, a radio unit decoding a valid individual call with the status block 04040, will RX/TX with another message call.

Call-10 also has a fixed status block. The status for an emergency message is 19. This is further differentiated from other status messages by incorporating a 919 preamble. The preamble is intended to eliminate falsing and possible misinterpretation of the message. Call-10 features a fixed recipient ID (91919). This is because call-10 is a broadcast, which is decoded by all network resources regardless of ID or group affiliation.

6.0 Console Design

A C-Soft console design containing five-tone calling features requires the following graphic user interface features:

- Select button—associated to the appropriate line.
- Call List Window button.
- Manual Call List button and or a Call History button.
- Emergency Acknowledge button—if emergency calls are provided on the radio network.
- Emergency Resolved button—if required.
- Active Emergency Window button—for emergency logging (optional).
- Emergency History Window button—for emergency logging (optional).

NOTE: Emergency Acknowledge and Emergency Resolved buttons can not coexist with Active Emergency or Emergency History window buttons.

6.1 User ID List

The **User ID List** window, shown in Figure 8, is used to configure ID and aliases that appear on the Call List window in C-Soft Runtime.

NOTE: Filters are not employed with five-tone IDs.

NAVIGATION: From C-Soft Designer, select **Edit | User ID List**.

If a Call List is to be used, IDs and aliases must be configured

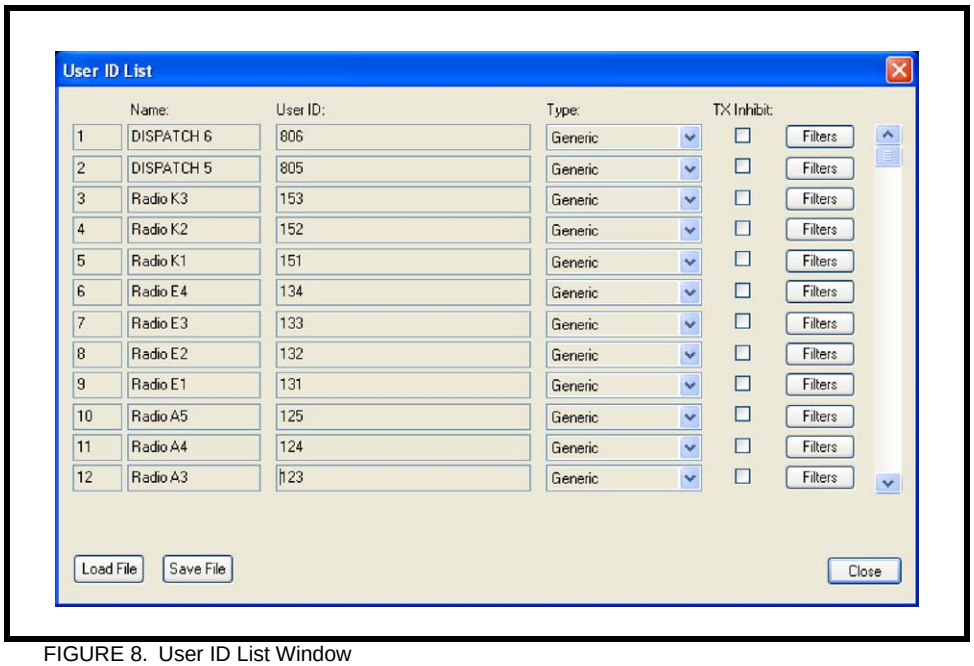

FIGURE 8. User ID List Window

6.2 Group ID List Window

The **Group ID List** window is used to configure ID and aliases that appear on the Call List window in C-Soft Runtime.

NAVIGATION: From C-Soft Designer, select **Edit | Group ID List**.

If a Group ID List is to be used, group and IDs must be configured.

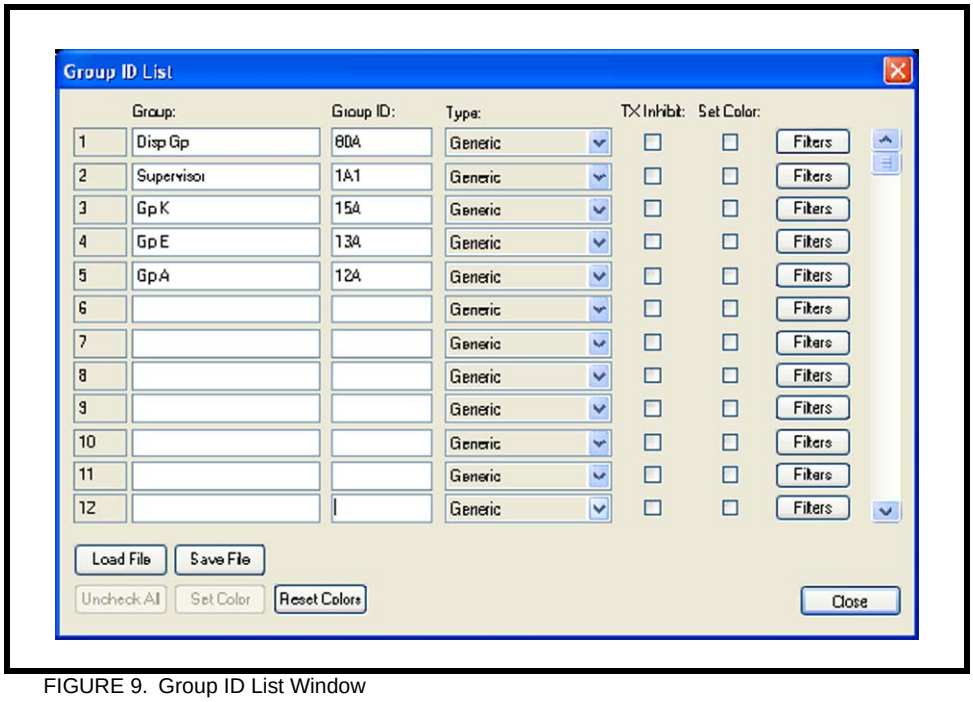

FIGURE 9. Group ID List Window

6.3 Status Message ID List

The **Status Message ID List** window, shown in Figure 10, is used to configure Status IDs and messages that appear on the Call List window in C-Soft Runtime.

NAVIGATION: From C-Soft Designer, select **Edit | Status Message ID List**.

If a Status Messages are to be used, messages and IDs must be configured.

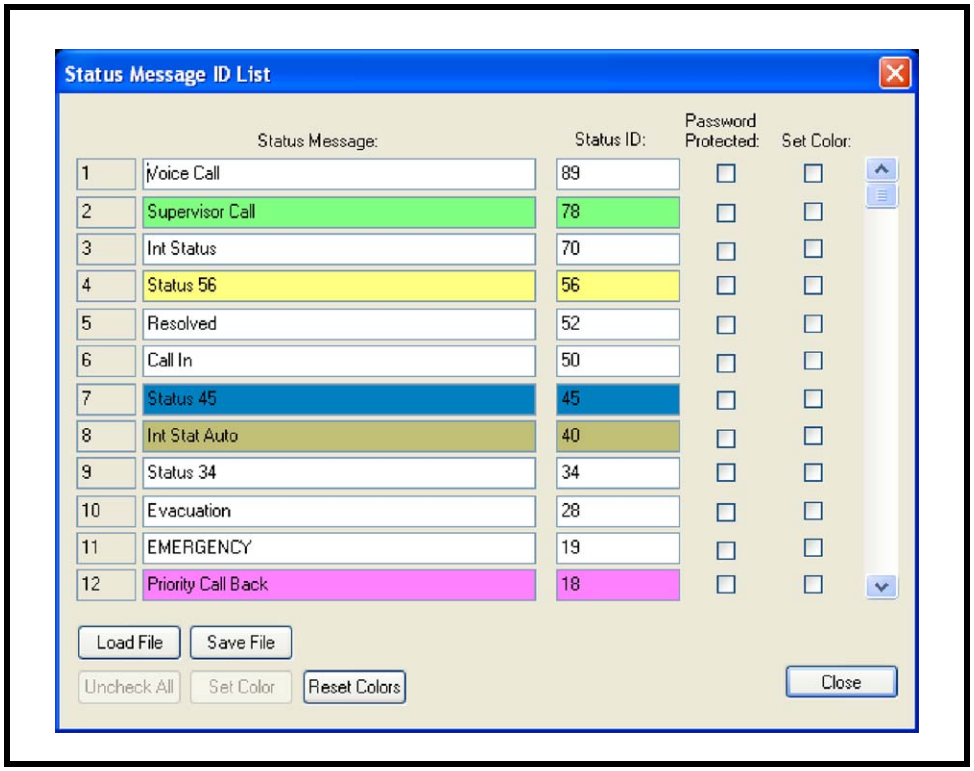

FIGURE 10. Status Message ID LIst Window

6.4 Color Coding Messages

Color coding can be applied to help highlight instances of that message within the Call History window. An example configuration is shown in Figure 10.

- If a group status message is received, the group color code overrides the status color code. Thus, we recommend color coding either the status codes or the group calls, but not both.
- By default, emergency messages are color-coded red and accompanied by an audible alarm.

REFERENCE: For more information, see the C-Soft Technical Manual (LIT000082000). This document is available for download at www.Telex.com/Downloads/.

7.0 Console Operation

The C-Soft console is configured in the C-Soft Designer application, shown in Figure 11. C-Soft's Console Operation is conducted from the C-Soft Runtime application, shown in Figure 12.

Save console design file from C-Soft Designer, open the file from C-Soft Runtime, and ensure basic communications are available.

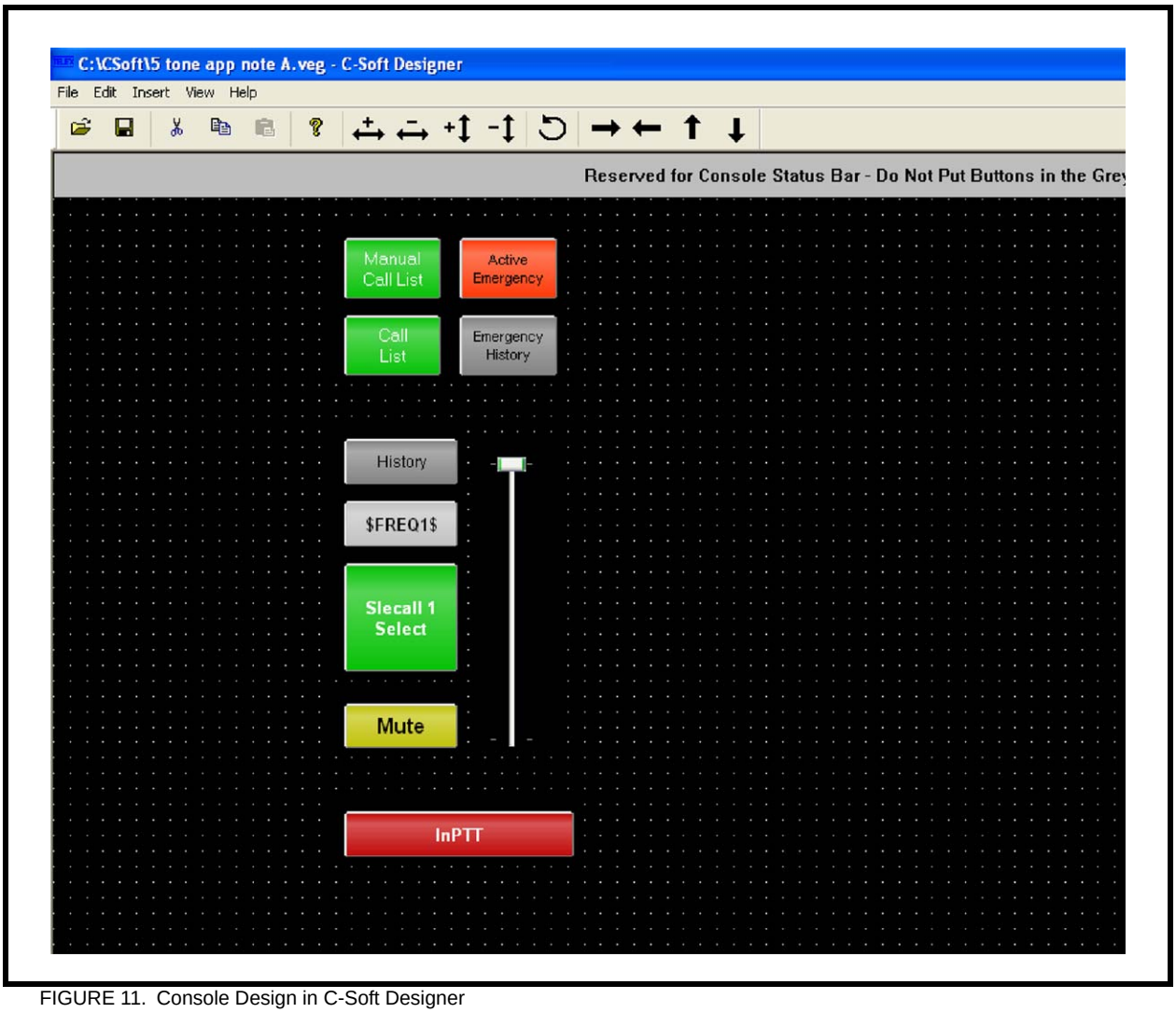

FIGURE 11. Console Design in C-Soft Designer

7.1 Placing Calls from the C-Soft Console

When the Call List button is selected, the title bar displays a *no line is selected* message. Click the Selcall line's Select button, the title bar indicates that a line is selected, and call buttons are made available. Select a recipient from the call list. Click the Set Status button to load an appropriate status message. The Status List window appears. Select a status and click Done to close the Status List window. Clicking an appropriate call button sends the composite five-tone message.

Having received a valid five-tone string, be it a complex status message or a simple Selcall ID, the recipients squelch is lifted, and the monitor audio path opened. Use the per line PTT button to continue a voice call, if required.

The duration that the squelch is lifted, the window of opportunity to continue a voice call, is defined within individual radio resources, not the Telex solution.

In the console example shown in Figure 12, dispatcher 5 and 6 are managing three (3) five-tone networks, on a single radio channel, with a single radio/IP-223 line

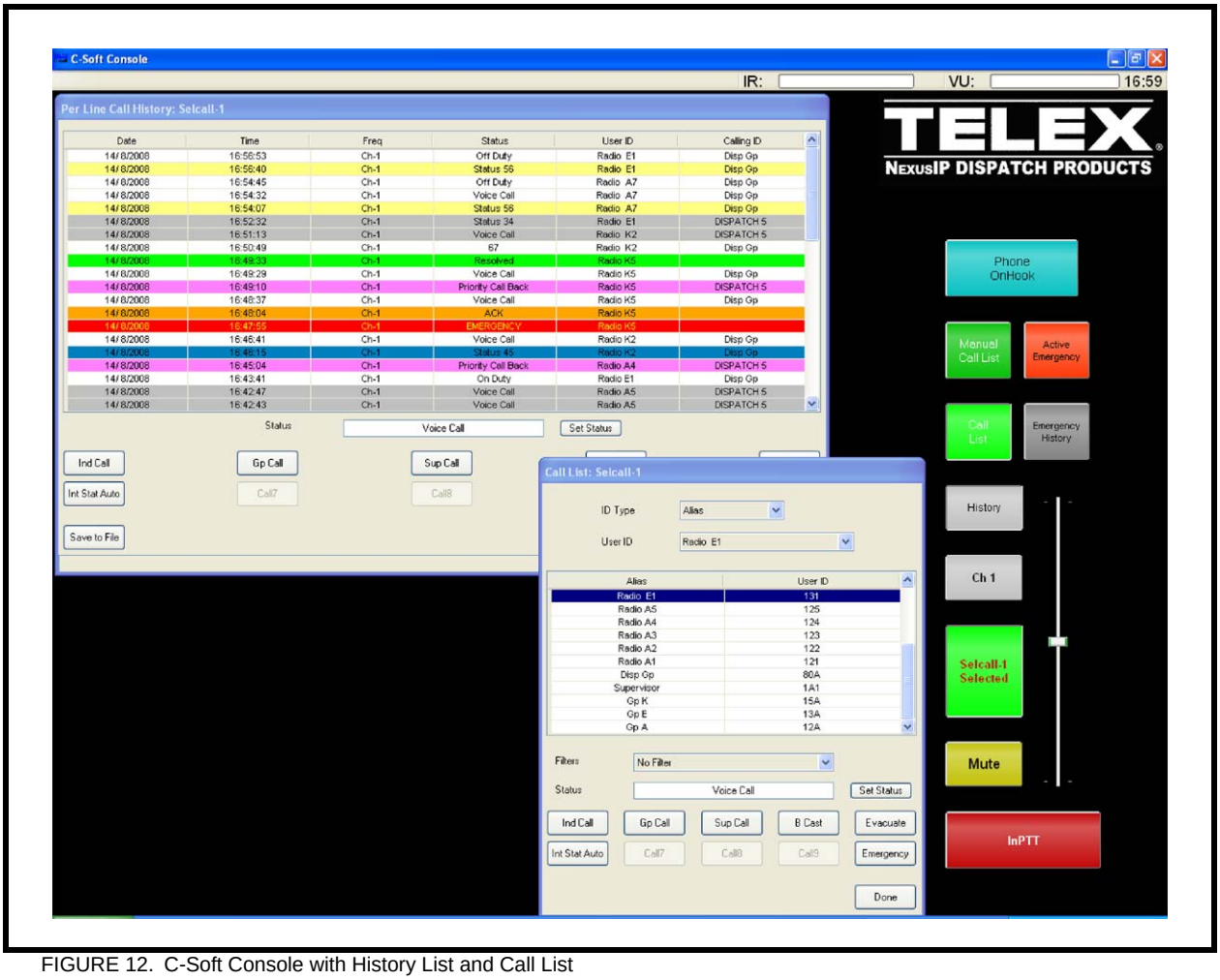

FIGURE 12. C-Soft Console with History List and Call List

7.2 The Radio Network

Dispatchers can monitor all voice, status, broadcast or individual calls, but generally choose not to.

7.2.1 Individual and Group Calls

Members of each group can make individual calls, group calls, and send status messages to other group members. They cannot communicate with other groups, without dispatcher intervention. Generally, group members make group voice calls, within the group.

7.2.2 Status Messages

Dispatchers are alerted when a radio user requires attention by a status message (e.g., a call-back status message) to the console. Similarity, dispatchers can request a user to call in, using a status message, or they can initiate a voice call (individual or group). Dispatchers can also request a status message on an individual basis, using an automated response mechanism configured within the radios. See call-6 in Figure 7.

7.2.3 Evacuation Status Messages

Dispatchers can activate an evacuate status message to any, or all groups. Evacuation messages can also be activated within a group by any group member. That message being received by the console and other members of that group. Any radio user can activate an emergency message which is then received by the console and all other radio users regardless of group.

7.2.4 Receiving Emergency Messages

On receipt of an emergency, the console terminal gives an audible and visual alarm. The emergency is logged in the Call History window and in the Active Emergency window which automatically pops up. The audible alarm is silenced when the emergency is acknowledged by a dispatcher by clicking the ACK button within the Active Emergency window. The acknowledgment is logged in the Call History and the Emergency History windows.

7.2.5 Resolving Emergency Messages

When the dispatcher resolves the emergency by clicking the resolve button within the Active Emergency window, resolution is logged in the Call History and the Emergency History windows. Clicking the resolve button could activate a five-tone status message to inform users that the incident is over. In our example, this feature is not used, because a voice broadcast is preferred.

8.0 Radio Configuration

In our example, the radios used by members of group E are Kenwood 3180 UHF handsets. Configuration attributes of these radios is used to further develop our explanation of Telex dispatch incorporating five-tone Selcall and message signaling. Only the configuration pages relevant to our explanation and specific radio model is discussed.

The example radio's unit ID is 131. See Figure 13. The unit ID is held within digits 3, 4, and 5 of any code block.

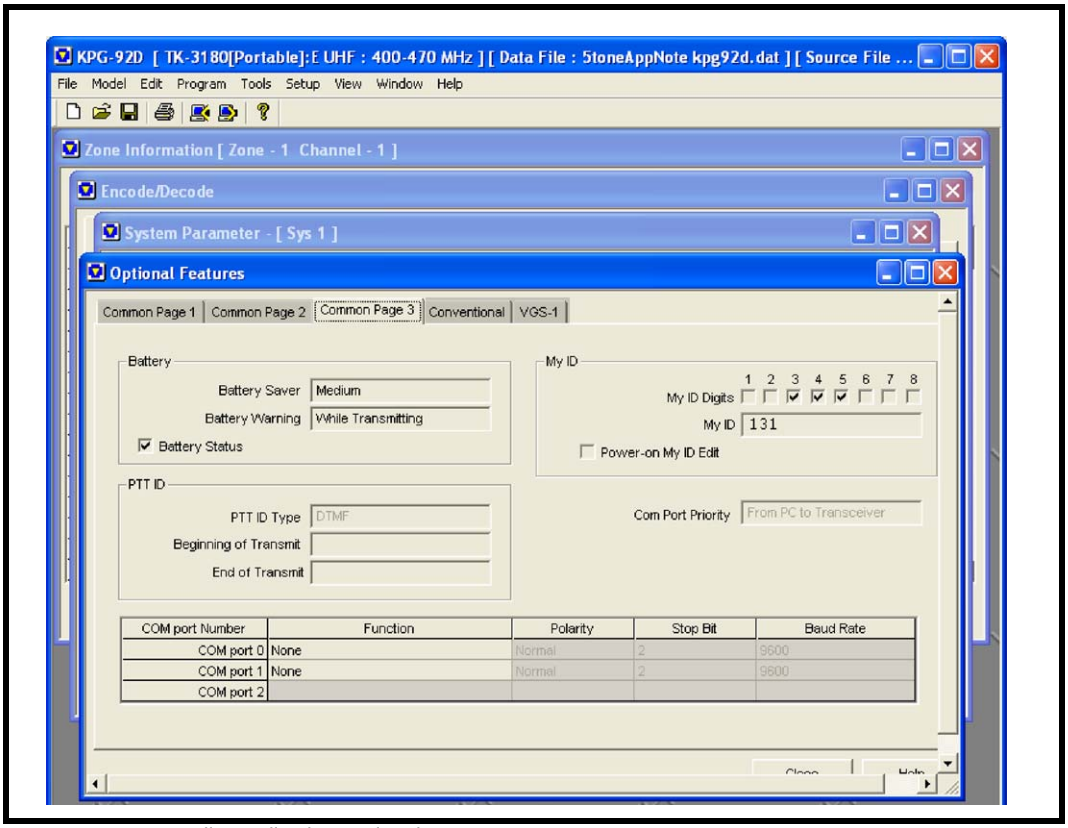

FIGURE 13. Radio Application Optional Features—Common Page 3

Selectable Selcall digits are also held in positions 3, 4, and 5 of a code block, while selectable status digits are in positions 4 and 5. See Figure 14. The unit expects to receive five (5) digits per block.

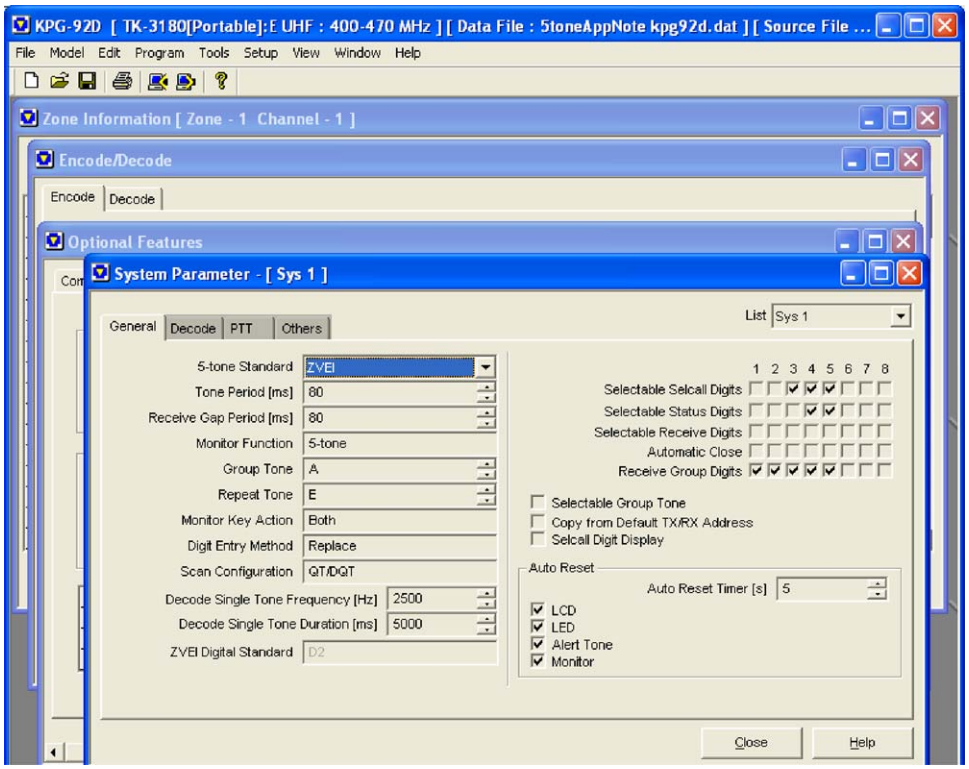

FIGURE 14. Radio Application System Parameters—General Page

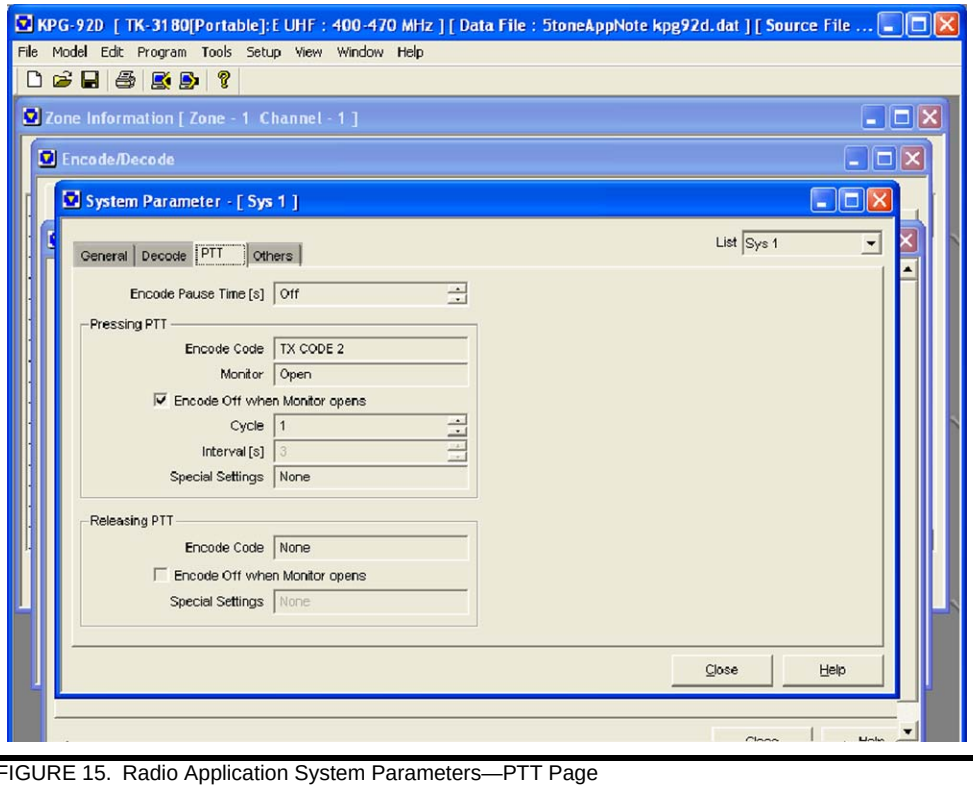

FIGURE 15. Radio Application System Parameters—PTT Page

When the unit PTT button is pressed, TX code-2 is transmitted prior to the mic opening for a voice call. See Figure 15. The contents of TX code-2 directs the voice call to an individual or a group, as loaded by the user before making the call.

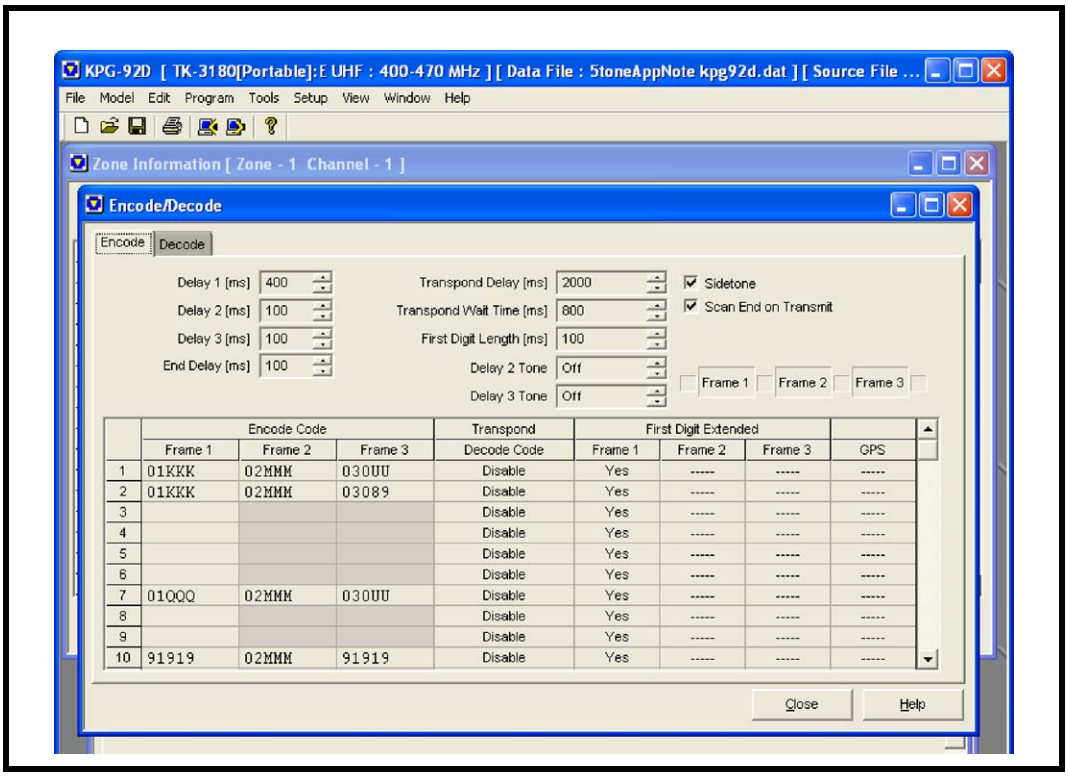

FIGURE 16. Radio Application—Encode Page

The TX code-2 is formatted 01KKKP02MMMP03089, see Figure 16. In compliance with the C-Soft/IP-223 format, TX code-2 block-1 starts with two (2) fixed digits (01), followed by three variables which hold the recipients ID. The recipients ID is loaded by the radio operator prior to making the call. Generally, this is the group ID, of the group the radio belongs to. Block-2 has two (2) fixed digits (02), followed by the radio's own ID. Block-3 contains all fixed digits. The preamble for a general status message is 030. The final digits (89) designate the status as a voice call. Such calls are logged by the C-Soft as voice calls.

TX code-1 is sent by pressing whichever button is defined as send status. The recipient ID (KKK) and the status (UU) are both loaded by the operator prior to sending the call.

TX code-10 is the emergency message, sent by pressing the emergency button, and requires no further explanation at this point.

TX code-7 is sent in response to a particular receive code. Here QQQ is loaded with the ID of the originator of that code. MMM is the ID of the radio unit and SS represents whatever status the radio is currently set to.

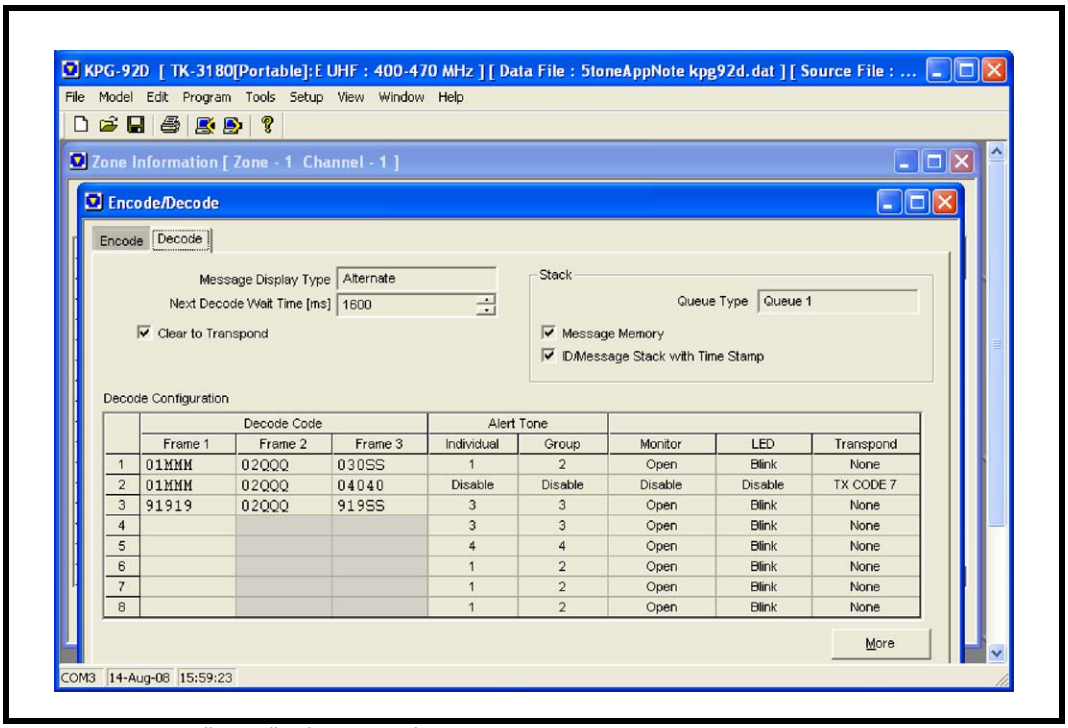

FIGURE 17. Radio Application—Decode Page

The decode structures, shown in Figure 17, indicate the unit accepts calls headed with a tone string structured as in decode 1. Two (2) digits, (01), followed by its own three (3) digit ID. Then two (2) fixed digits (02) followed by the callers ID (QQQ), and finally three (3) fixed digits (030) followed by two (2) status digits (SS).

Exceptions to this are emergency, decode 3, and the status query, decode 2. On receipt of the status block 04040, the radio transponds TX code-7. On receipt of 9191902III9191SS the radio activates an emergency and do whatever it has been programmed to do.

9.0 Dispatch in Action

Example calls are discussed in order to further explore the Selcall code structure and dispatch console features. The characteristics of a particular radio handset and actions of the user are necessary to provide context.

9.1 Status Messaging

The user of radio 131 sets the recipient's ID to that of the dispatch group, then sets the radio status to 56. User 131 clicks the send status button configured for the. The radio transmits the tone string code 0180AP02131P03056.

NOTE: The group code is 80A.

The IP-223 accepts the tone string as a valid group call. Audio is routed to the consoles accompanied by the status message. The consoles translate the ID blocks and status block. From the User ID List, the console translates 131 to Radio E1. From the Group ID List, see Figure 8, it translates 805 as *Disp Gp*, and from the Status ID List Figure 10, it translates 56 as *Status 56*. The console displays the message in the Call History window, with date, time, frequency/channel information, and an appropriate color highlight. Se the Call History window line 2 shown in Figure 12.

9.2 Voice Calls

The user of radio 125—alias Radio K5—sets the recipients ID to that of the dispatch group, PTT, and after the tone string (01E80AP02125P03089) has cleared, makes a voice call to the dispatchers. The call is accepted by ANI call format-3, as a group call, so the IP-223 routes the message to both dispatch consoles. At the consoles the call is logged in the Call History window, and then 131's audio can be heard. A dispatcher uses the line PTT to reply, and a short conversation ensues. See the call logged at Figure 12, Per Line Call History window line 10.

An individual voice call would follow the same pattern, but the recipients ID would be set to that of an individual user or dispatcher—805 for dispatcher 5. If the consoles are not set to display all calls, see Figure 5, then the call would only be logged in the recipient dispatcher's Call History window. Figure 12, Call History window line 7, shows a call made from Radio K2—ID 152—to Dispatcher 5.

9.3 Status Messaging

Before beginning a task, user 131 sets the status field of the radio unit to status 34, which has relevance to the work groups in our example. Dispatch 5 wants to know the status of user 131. The dispatcher opens the Call List and selects Radio E1—alias 131. The dispatcher then clicks the Int Stat Auto button, which results in the transmission of the code string 01E31P02805P04040. Code string 01E31P02805P04040 is accepted by 131's decode 2.Then, 131 responds by sending TX code 7.

The code string sent as TX code 7 is 01805P02131P03034. This code string is accepted by the IP-223 ANI call format-2, as an individual call, and the message is routed to Dispatch 5—ID 805. A status message is logged in dispatch-5's Call History window indicating that Radio E1 is currently at status 34, see line 6 in the Call History window, see Figure 12.

10.0 Emergency Management

User 131 activates an emergency by pressing and holding, the emergency button on the radio unit. The handset sends out the tone string 91919P02131P91919. All radios, in all groups receive and decode the tone string as an emergency message. The radios respond in accordance with their programming, possibly with visual and/or audible alarms.

The IP-223 accepts the tone string as an emergency message, in compliance with ANI call format 1. The IP-223 routes the message to all consoles, packetized accordingly. At the consoles, Active Emergency windows pop up. The emergency is logged in the Call History window and the Active Emergency window, see Figure 18. The console gives audible and visible alarms.

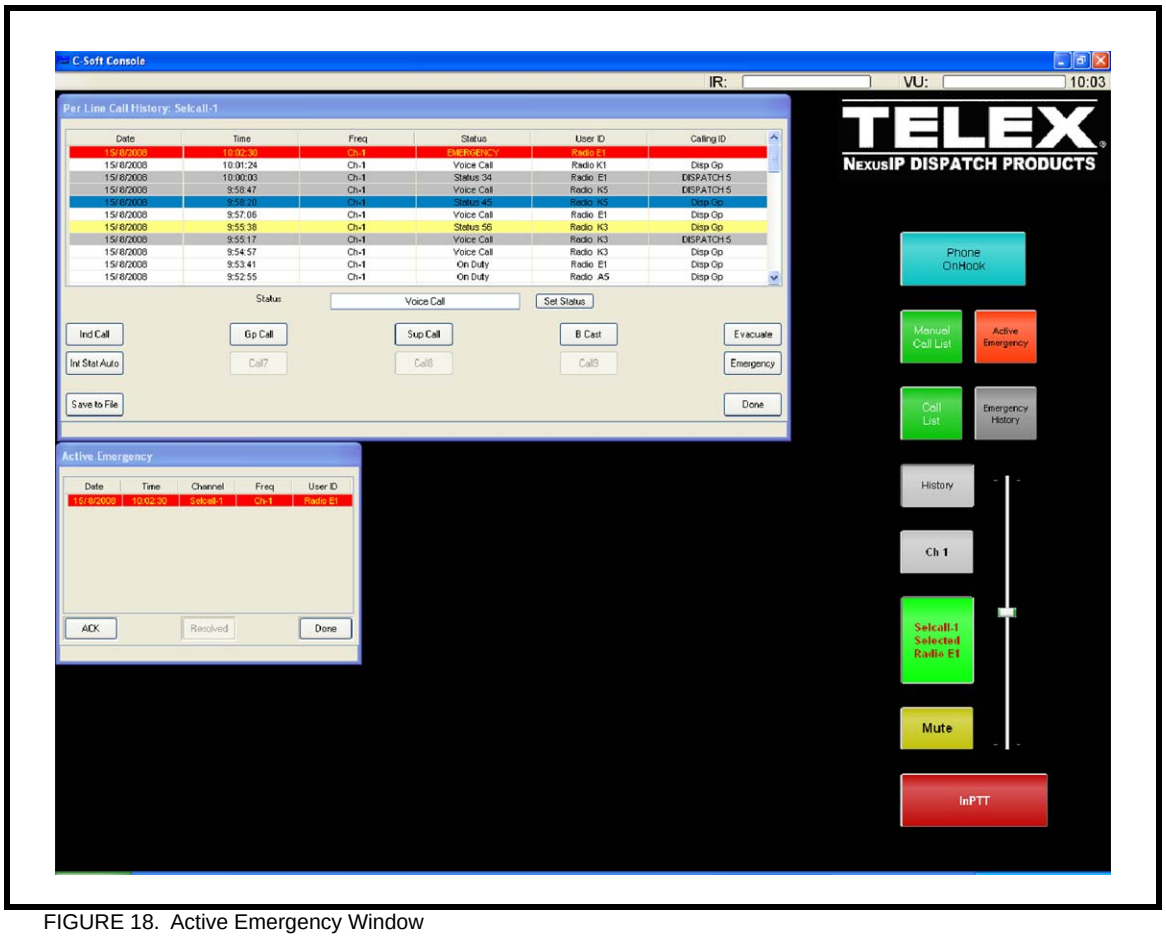

FIGURE 18. Active Emergency Window

A dispatcher accepts the emergency by clicking an ACK button in the Active Emergency window. Acknowledgment is logged in the Call History window, and the audible alarm is silenced on all consoles. When the incident is under control a dispatcher selects the emergency event in the Active Emergency window, and clicks the Resolved button. Visual alarms cease, on all consoles, and the resolution is logged in the Call History window. See Figure 19.

NOTE:

- The Call History window line 4, shows the emergency activated at 10:02:30 was acknowledged at 10:04:11.
- The time is given in HH:MM:SS format, while the Call History window currently shows the date in DD/MM/YYYY format. The date format can be changed to MM/DD/YYYY format within the Global Call Parameters window, see Figure 21.

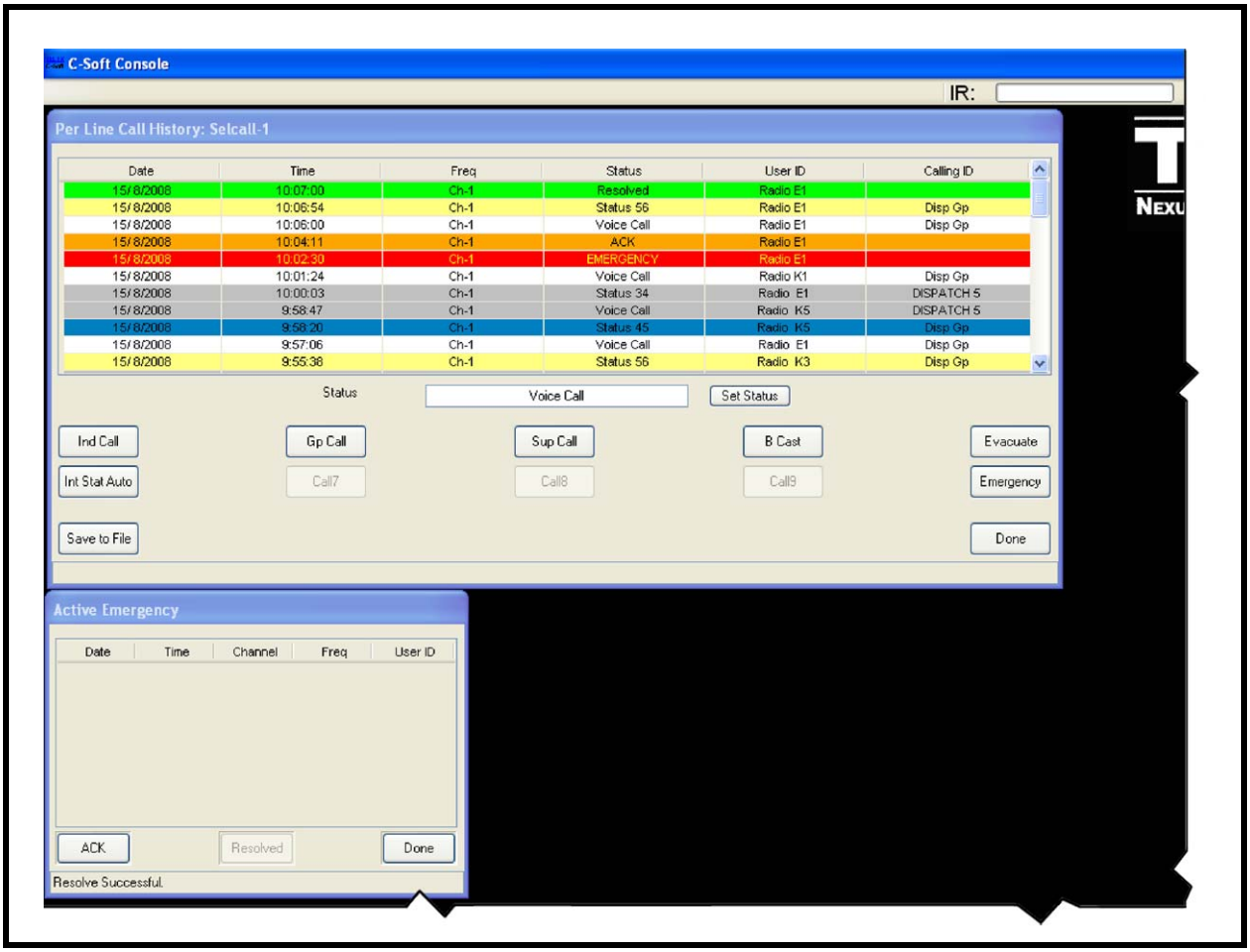

FIGURE 19. Call History Window

A log of all emergency events such as emergency, acknowledgment, and resolution, are permanently held in the Emergency History window Figure 20.

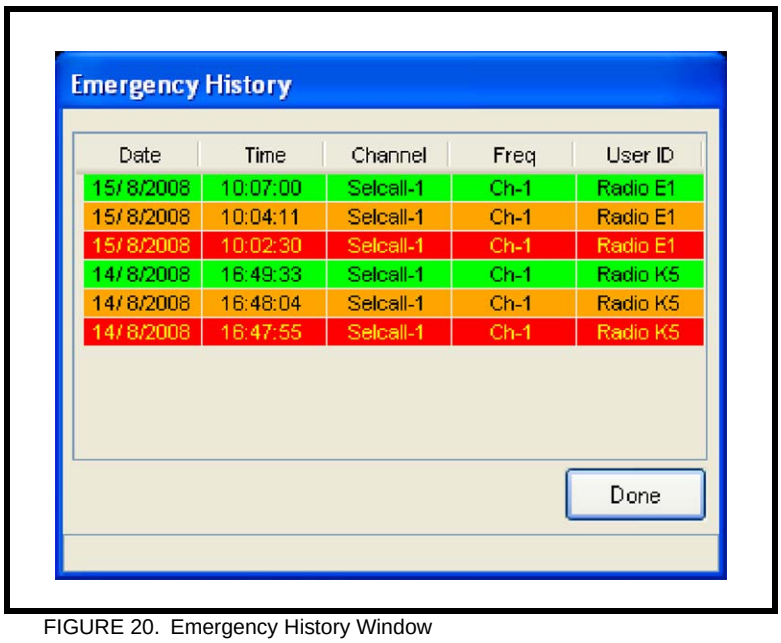

FIGURE 20. Emergency History Window

The Call History windows, are allocated per line. The Active Emergency and Emergency History windows are applied globally, reporting all lines. Thus, they feature the C-Soft line (channel) that the emergency is received on as well as the frequency which is the associated radio's channel setting at the time of the report.

The title bars of windows such as Call History, Active Emergency, and Emergency History, the labels for buttons, as well as log parameters, row size and column headings, are defined within the Global Call Parameters window (Figure-21). Any text and language, supported by the Windows platform, can be used to format variable titles, labels and headers.

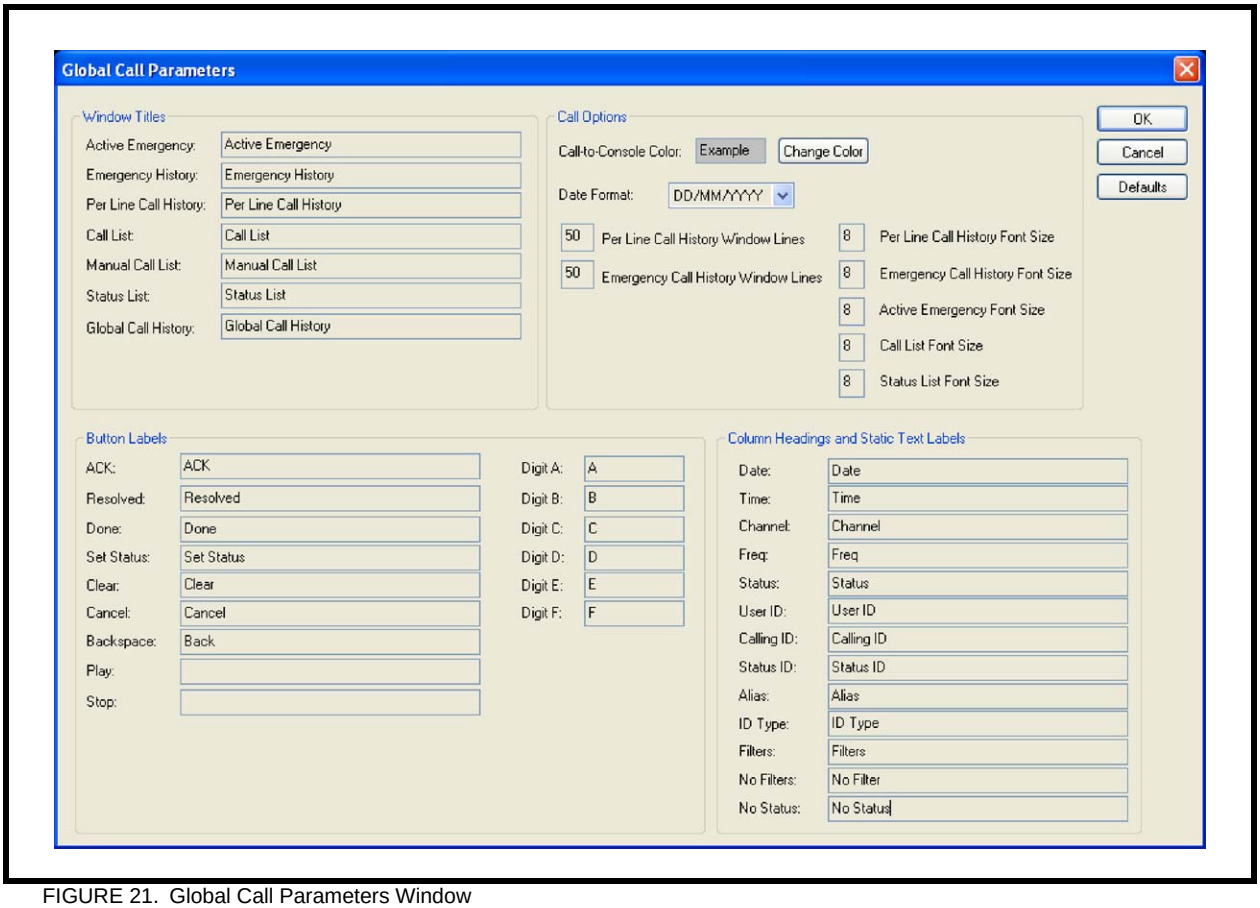

FIGURE 21. Global Call Parameters Window

REFERENCE: Refer to the C-Soft user manual for a detailed explanation of the Global Call Parameters window, and all the other features covered in this document.

NOTE: The example cited in this application note is completely fictional. Similarity to any working networks implementation, past or present, is coincidental.

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Revision	**Change Description**	**Date**
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B	Update brand, format and new document number.	31-MAR-2010

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