



MUSICAM USA

Corporate Computer Systems, Inc. d/b/a MUSICAM USA

LIBERTY™
Users Guide

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LIBERTY Users Guide

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Table of Contents

INTRODUCTION	3
Installation and Usage Tips	4
CONTROLS & CONNECTIONS	5
QUICK START GUIDE for the Beginner	6
Operating the MENU NAVIGATION KNOB.....	6
Setup for Microphone Input.....	6
GETTING STARTED	8
Setting Factory Defaults	8
Dialing a number.....	9
Dialing From An Office or Hotel Room	9
Handset Dialing	9
Memory Dialing from Interstate or International call areas.....	10
How to store a phone number	10
Storing and naming a number and/or editing a stored number.....	11
Quick Function Tips	12
Default Function Keys	12
Function Key Options.....	13
DETAILED CONFIGURATION	14
Menu Tree.....	14
Setup Menu.....	16
Sub Menus of 01 View Configuration.....	16
Sub Menus of 02 Codec Setup	19
Sub Menus of 03 Modem setup.....	19
Sub Menus of 04 Dialing Setup.....	20
Sub Menus of 05 Unit Setup.....	21
Sub Menus of 06 Advanced Setup.....	22
Sub Menus of 07 Reset Functions	23
Sub Menus of 08 Test Modes	24
Sub Menus of 09 Memory Setup.....	24
Sub Menus of 10 Unit Details	24
HOW THE LIBERTY WORKS	24
Intelligent Gain Control (IGC)	25
DSP Based Compressor Limiter.....	25
Modem Negotiation and Line Quality.....	25
MASTER SLAVE OPERATION	25
PEAK LEVEL METER	26
THEORY OF OPERATION	26
Preparing to use the Toolbox application	27
Connecting LIBERTY to the PC	27
Menu Items.....	28
General Configuration	30
POTS Setup.....	30
Local Control	31
Remote Control	32
Line Monitor	32
Chat	33
Functions	35
Software Upgrade	37
Upgrading Software	38
Mic / Line Audio In Connector.....	38
Program Out Connector	38
RS 232 Interface Connector.....	38
Appendix A—One Year Limited Warranty	40
Appendix B— Liberty Technical Specifications	41
INDEX	42

INTRODUCTION

MUSICAM USA the World's Leader in codecs gives you the new LIBERTY "POTS only" codec intended for bi-directional, remote and unattended operation.

With the introduction of the Voyager POTS Codec, MUSICAM USA has demonstrated that stable high bandwidth links with unfailing audio and data is the new reality for broadcasting over an analog telephone line. The new Liberty codec incorporates the same superb DSP algorithm delivering crystal clear 15kHz mono audio in real time at bit rates as low as 24kbps with very short 100ms coding delay and a minimal loss of quality over a standard telephone line.

LIBERTY is the economical model of MUSICAM USA's POTS Line. It offers the same excellent audio quality of the Voyager at a much lower price.

Liberty provides audio-link opportunities previously impossible or simply too expensive. Broadcast journalists and sports casters now have an easy to use, high quality, compact portable field codec. LIBERTY can be transported as carry-on baggage allowing convenient worldwide coverage with minimal equipment.

Using the LIBERTY is as simple as plugging it into a POTS phone line and dialing the destination number. The receiving Liberty automatically answers the call and establishes the link. For POTS connections, a built-in modem negotiates the best possible data rate for high quality low-noise and distortion free, bi-directional audio.

LIBERTY features include:

- High quality audio at very low bit rates (as low as 9600bps)
- Remote control features for remote operation
- Special modem for POTS codec operation
- Automatic link re-connect in the event of line dropouts
- Extensive menu system caters for most individual applications
- Fast and easy configuration via a Windows 9*/ME/2K/XP software application: Toolbox.

Liberty is basically the same as the **MUSICAM USA Voyager**. **EXCEPT**; it has the following differences:

- **One** balanced Microphone/Line input; standard XLR three-pin male, Input 1.
- **One** unbalanced input channel; Input 2 is provided on a pair of RCA connectors. This is summed to a single audio (mono) signal.
- Liberty's Intelligent Gain Control (**I.G.C**) on both inputs.
- DSP Based Compressor Limiter.
- **Two-peak** audio LED's are provided to indicate output has reached +16dBu.
- Three peak audio level bar-graphs are shown on the LCD display; each input separately as well as their summed (DSP) audio stream. Their order is Input 1(top), Sum (middle) then Input 2(bottom).
- A **cell phone** jack (3.5mm) is provided for standard bi-directional phone quality audio.
- One CMOS relay facility is provided via the DB9 connector (pins 1&6) for remote control of equipment.
- **NOTE**: The following options are **NOT** available on the Liberty: ISDN, Rack mounting and Data Software.

The Liberty has the same software upgrade capabilities as the Voyager Codec. Full upgrades are possible using the MUSICAM USA Toolbox software. We are continually updating our manuals and software...Get the latest at www.musicamusa.com.

Installation and Usage Tips

While the MUSICAM USA LIBERTY is a very reliable telecom product, its performance will only be as good as the POTS line that it is operating over. Take precautions to remove these possible interference sources:

- Other telephone handsets
- Fax machines
- Computer modems
- Alarm systems
- Extension bells
- Clandestine devices

Important precaution on the LIBERTY Telco-line: ENSURE THAT CALL WAITING IS DISABLED!

It is preferable to obtain a dedicated phone line from the Telco without going through a PBX or PABX. If this is unavoidable, check that the line works BEFORE you try to do a live program. Some of these systems have poor line characteristics and may make the operation of the LIBERTY unstable.

WARNING: DO NOT CONNECT YOUR LIBERTY TO A DIGITAL PHONE SYSTEM AS PERMANENT DAMAGE MAY OCCUR. If you are unfamiliar with a particular facility, check that the line you are given is NOT a digital line. This is very important because if the unit becomes faulty due to the use of a digital phone system, the Warranty becomes void.

On most good lines, the LIBERTY is normally able to achieve 28,800 bps (Bits Per Second) at a line quality of approximately 70%. If you are not able to achieve this level of operation, try to connect at a lower bit rate for 50% line quality.

CHECK:

- Length of the line from your site to the local Exchange or Central Office
- Presence of stub or party lines on your local loop
- Earth leakage problem on the line
- Equipment problem at the Exchange or Central Office

It is desirable to have a local loop (The line from your office or home to the local Central Office or Exchange.) as short as possible. Optimum performance can be expected for lines up to about two miles in length.

In some countries, it has been the practice to have more than one phone service attached to one line. As more lines have been installed, the services have been separated but the unused lines have remained connected to the local loop. Even though the old line may be unused, if it is still present across your local loop, it may cause problems Selector with your equipment operation.

A good line should have an earth isolation of better than ten meg-ohms. If your line is located in an area where water is a problem, check out the earth leakage

Although there are many factors at the Telco end that can cause problems, a problem that does occasionally occur is if the clock on the interface codec to your line is not synchronized to the network. A drifting clock will cause instability and unreliable LIBERTY performance. If you suspect that this could be the problem then contact your local Telco.

CONTROLS & CONNECTIONS



QUICK START GUIDE for the Beginner

Plug the Liberty in and wait for about 15 seconds for the unit to start up and load the operating software.

Operating the MENU NAVIGATION KNOB

The rotary **MENU NAVIGATION KNOB** (see Controls & Connections on page 7) is used to operate and configure LIBERTY.

- **Rotate** the **MENU NAVIGATION KNOB** to **scroll** up, down or sideways on lists. The lists are viewable on the **LCD screen**.
- **Click** the **MENU NAVIGATION KNOB** downwards to **select** an item in the LCD Screen, which is highlighted in [brackets].

***NOTE** the Keypad key marked **CLEAR** takes you to the previous screen!*

Setup for Microphone Input

Here is an example of how to use the **MENU NAVIGATION KNOB** in conjunction with the LCD screen to set up for a microphone input:

- Attach your Audio inputs to the XLR connector.
- Attach standard Telco cord to RJ11 connector on the rear of your codec.
- Use the MENU NAVIGATION KNOB to change the Input to Microphone as follows;

```
=  
Enter Number: --  
Ctl: Local      IGC: --  
[DIAL] MEMORY MENU
```

Main screen – appears after start up

```
=  
Hit DIAL or ANSWER  
Ctl: Local      IGC: --  
[DIAL] MEMORY MENU
```

Select a Menu item by rotating the **MENU NAVIGATION KNOB**. The selected item is identified by a square bracket: []. In this case you have a choice of DIAL, MEMORY or MENU. Choose **MENU**.

```
Setup Menu  
[05 Unit Setup]  
06-Advanced Setup  
07 Reset Functions
```

Scroll Down and select **Unit Setup**.

Continues on next page...

Unit Setup
[01 Set Input Gain]
02 Intelligent Gain
03 Relay Operation

Select **Set Input Gain**.

Set Input Gain

INP1: [Microphone]

Scroll to Microphone and Select.

Changes Saved...

Continue Setup?
[CONTINUE] EXIT

You can select **Continue** or **Exit**.
You have now changed the Input type.

- Set Input 1 and 2 knobs to 2 ‘o’clock position. This sets the outgoing program level.
- To hear outgoing audio through the headphones (plug into rear socket) set the **Send** knob to 3 ‘o’ clock and **Return** knob to minimum. To hear return audio from the other end - reverse the **Send** and **Receive** knob settings.
- You are now SET to GO!
- Repeat steps 2,4 & 6 for the “Destination” Liberty.
- You can monitor the output using headphones attached to this Liberty. Alternatively, connect the audio program output as desired on the destination Liberty.
 - *Note: the **Return** knob on the destination codec is the headphone volume. It does not adjust the program output level.*
- Using the keypad, enter the telephone number of the destination codec and press the **Enter/Dial** key.

Important: Ensure you have installed your unit correctly as instructed in the **Installation and Usage Tips** section on page 4.

GETTING STARTED

Setting Factory Defaults

Restoring to factory default settings is good practice. It gives your LIBERTY a configuration with a predictable set of options.

FROM THE STARTUP SCREEN HERE'S HOW:

Enter Number:
Ctl: Local IGC: --
[DIAL] MEMORY MENU

- **Enter Number:**
- **Ctl: Local IGC: --**
- **DIAL MEMORY**
[MENU]

Rotate **MENU NAVIGATION KNOB** to select MENU then Click **MENU NAVIGATION KNOB**.

Setup Menu
[01 View Config]
02 Codec Setup
03 Modem Setup

*Scroll using **MENU NAVIGATION KNOB** to [07 Reset Functions]*

[07 Reset Functions]
08 Test Modes
09 Memory Setup

Select *[07 Reset Functions]* Click **MENU NAVIGATION KNOB**.

Reset Functions
[01 Reset DSP]
02 Reset Settings
03 Reset Phone Mem

*Scroll using **MENU NAVIGATION KNOB** to [02 Reset Settings]*

Reset Functions
[02 Reset Settings]
03 Reset Phone Mem
04 reset Funct Mem

Select *[02 Reset Settings]* by clicking **MENU NAVIGATION KNOB**.

Reset Settings
All Current Settings
Will be lost!!!!
[CANCEL] RESET

Scroll right to [RESET] Then select with **MENU NAVIGATION KNOB**

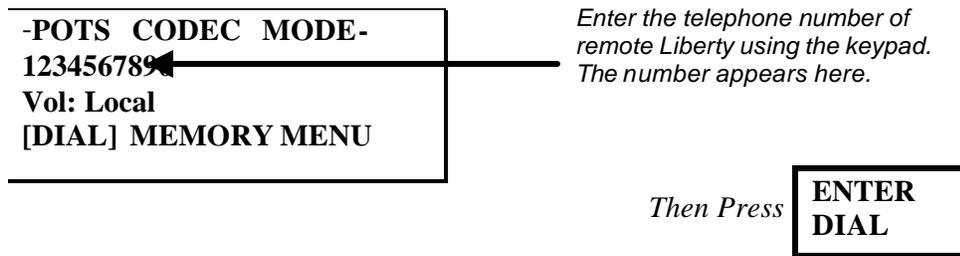
Changes Saved...

Continue Setup?
[CONTINUE] EXIT

Select [CONTINUE] and follow prompts to [04 Reset Function Mem]. This restores default values to the F1 and F2 keys. On the **Reset Funct Mem** screen "All Function Saved will be lost!!!!" warning is given. Scroll using **MENU NAVIGATION KNOB** to select [RESET]. The last display is the same as above. Select by scrolling the **MENU NAVIGATION KNOB** [EXIT] then select by clicking the **MENU NAVIGATION KNOB**.

Dialing a number

Here's how to make a connection from one LIBERTY to another using a standard Plain Old Telephone Service (POTS) telephone line. Connect the telephone line to the modular socket (RJ11) at the rear of the LIBERTY. Switch on and wait for the self-check functions to complete.



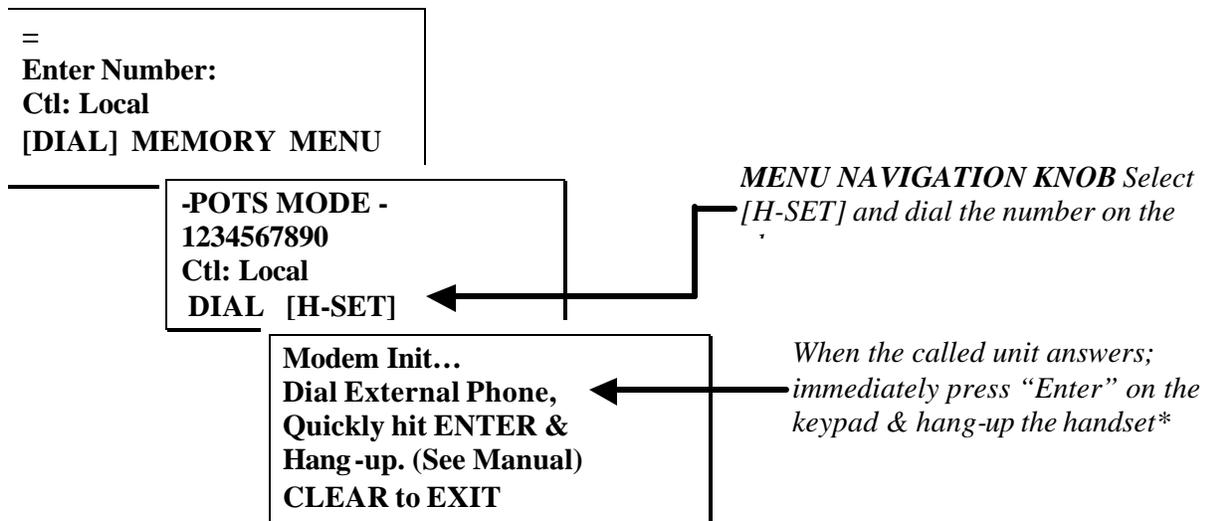
The LIBERTY will dial the number to establish a connection with the remote Liberty at an initial attempt of 19,200 bps bit-rate. The modems measure the characteristics of the telephone line and negotiate the highest possible stable data rate for best sound quality.

Dialing From An Office or Hotel Room

Most hotels and offices require dialing an additional digit(s) followed by a pause to gain access to an outside line. After entering the access number hold the “#” key until a comma (“;”) appears after the access number on the LCD display. Now enter the rest of the telephone number. A two second pause has now been inserted after the access digit to allow time for the outside line to be set up for dialing. The length of this pause can be changed in the “View Config” menu.

Handset Dialing

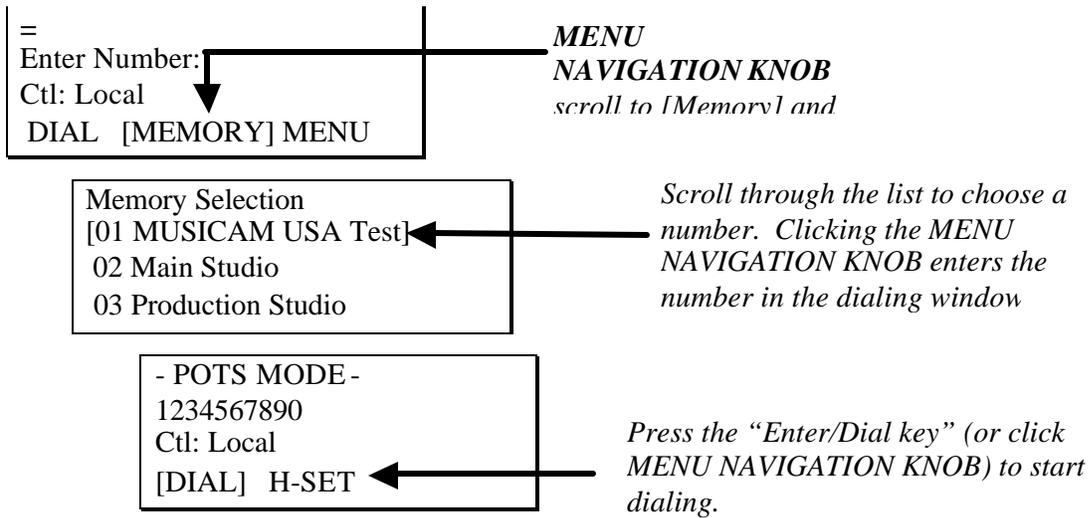
An external telephone handset can be used to dial a number. This may be necessary if unusual telephone system conditions cause problems with the LIBERTY dialer. Connect a telephone to the “Handset” modular connector on the rear panel of the LIBERTY. Using the **MENU NAVIGATION KNOB** scroll to **[DIAL]** then click **MENU NAVIGATION KNOB** to select. Then follow the steps below:



* If the remote LIBERTY used a handset to answer the call, the remote LIBERTY user must press the Answer key in order to connect with the modem.

Dialing: From Phone Book Memory

Commonly called numbers can be stored in LIBERTY'S internal phone book. To dial a number from the phone book follow the sequence shown below:



Memory Dialing from Interstate or International call areas

When dialing from a new area code or country, enter the area code or international access codes into the PREFIX memory location. Enable the "Prefix" option in the "Setup" menu. Using a prefix avoids the need to manually enter these codes each time a phone memory is used. Only one Prefix memory is available (see page 21 under *Prefix Enable* for more details).

How to store a phone number

The LIBERTY can store up to 50 telephone numbers. Set out below is the steps to save a number into memory:

Quick Store

```
=
Enter Number: --
Ctl: Local      IGC: --
[DIAL] MEMORY MENU
```

Main screen – appears after start up

```
=
Hit DIAL or ANSWER
Ctl: Local      IGC: --
[DIAL] MEMORY MENU
```

Select [DIAL].

```
- POTS MODE -
Ctl: Local      IGC: --
[DIAL] H-SET
```

Type in the phone number using the Key Pad and press the **Store** button on the Key Pad.

Memory Store
1234567890
Enter Location:

Enter the memory number (between 1 and 50), putting a zero before a single digit (i.e. 01 or 09).

The above procedure saves the number with the name of **QUICK-STORE**. To edit this name or the telephone numbers refer to the next procedure.

Storing and naming a number and/or editing a stored number

=
Enter Number: --
Ctl: Local IGC: --
[DIAL] MEMORY MENU

Main screen – appears after start up

=
Hit DIAL or ANSWER
Ctl: Local IGC: --
DIAL MEMORY [MENU]

Select [MENU].

Setup Menu
[09 Memory Setup]
10 Unit Details
11 Exit Setup

Select [09 Memory Setup].

Memory Setup
[01 QUICK-STORE]
02 Main
03

Select either a new number or an existing one to make changes to it.

View Config
01: Edit Number
1234567890
[CLR] COPY PASTE OK

If no change is required to the number then select [OK] with the **MENU NAVIGATION KNOB**. To change the number select [CLR] and use the Key Pad to enter the new number. Then select [OK] with the **MENU NAVIGATION KNOB**. **Hint:** Copy or Paste a number from one location to another

View Config
01: Edit Name
QUICK STORE
[EDIT] CLEAR OK

If no change is required to the name select [OK] with the **MENU NAVIGATION KNOB**. To change the name select [EDIT] with the **MENU NAVIGATION KNOB**.

01 [Q]UICK-STORE
1234567890
Press CLEAR to End.

The letter being edited is surrounded by brackets. In the example on the left the [Q] is ready for editing. To change turn the **MENU NAVIGATION KNOB**, select by clicking the **MENU NAVIGATION KNOB**. *Note that a space and other symbols are found at the end of the alphabet, numbers are at the beginning.*

```
01 Head Offic[e]
1234567890
Press CLEAR to End.
```

Press CLEAR on the Key Pad to complete the changes.

```
View Config
01: Edit Name
Head Office
EDIT CLEAR [OK]
```

Select [OK] to save the changes to memory.

Quick Function Tips

CLEAR Key: a general Escape key. Selecting the CLEAR Key takes you back to the previous screen in the particular menu that you are in.

Many LIBERTY menu items can be quickly accessed by pressing either the **F1** or **F2** keys followed by a single number (0~9).

A common set of items are installed as defaults and can also be reinstated through the “Reset Function” in the menu system. [Menu 07] The default key settings provide a useful tool for the operator.

The Keys can be tailored to individual requirements through the [06 Advanced Setup] menu and its sub-menu option [05 Function Setup]. The Toolbox PC application can also set the function keys and save these settings as a data file for later reuse.

Default Function Keys

Function Key	Numeric Key	Function
F2	0	Rem Piezo Alrm
F2	1	Rem Port 1
F2	2	Rem Port 2 not available
F2	3	Reneg up
F2	6	Retrain Current
F2	7	Loopback Mode
F2	9	Reneg Dowl

F2 & KEY: 0 - Rem Piezo Alrm

A piezo-electric “beeper” can be set off at the remote end by pressing F2+ 0 keys. A regular beep sounds until pressing any key or knob resets the alert.

F2 & KEY 1, F2 & KEY 2 Activate remote control Ports 1 & 2 respectively.

F2 & KEY 3 Renegotiate Up

LIBERTY will attempt to renegotiate a higher bit rate for better audio quality. The audio is muted for about 1 second during this process.

F2 & KEY 6 Retrain Current

LIBERTY modems communicate over the line to establish the best possible conditions for data transmission. The modems Selector "train" the line to compensate for variations in frequency response and to cancel out any echo that may be present. Under some circumstances, particularly when line conditions are subject to change, it may be beneficial to manually request the modems to "retrain" the line by using F2 & KEY 6. The audio is muted for about 20 seconds during this process.

F2 & KEY 7 Loopback Mode

Tests all signal processing circuitry within Liberty. (Except for the modem). Input signals can be monitored on the "Line Out" connector and headphones.

F2 & KEY 9 Renegotiate Down

Manually request LIBERTY modems to renegotiate a lower bit rate when current line conditions no longer support the prevailing bit rate. Indicated by audible disturbances such as "popping" noises or distortion. The audio is muted for about 1 second during this process.

Function Key Options

Any of the following actions can be assigned to any Function key.

01	Use for assigning unused
02	Renegotiate up
03	Renegotiate down
04	Retrain Current
05	Retrain up
06	Retrain Down
07	Retrain Auto
08	Reset Modem
09	Reset DSP
10	Lock & Unlock
11~16	Remote Relay Function 1-6
17	Pulse or toggle control Port 1 on remote
18	Pulse or toggle control Port 2 on remote
19	Activate Call Alert Beeper on remote
20	Toggle Input 1 preamplifier gain
21	Toggle CODEC
22	Loopback Mode
23	Pulse or toggle control Port 1 on local
24	Piezo Alarm

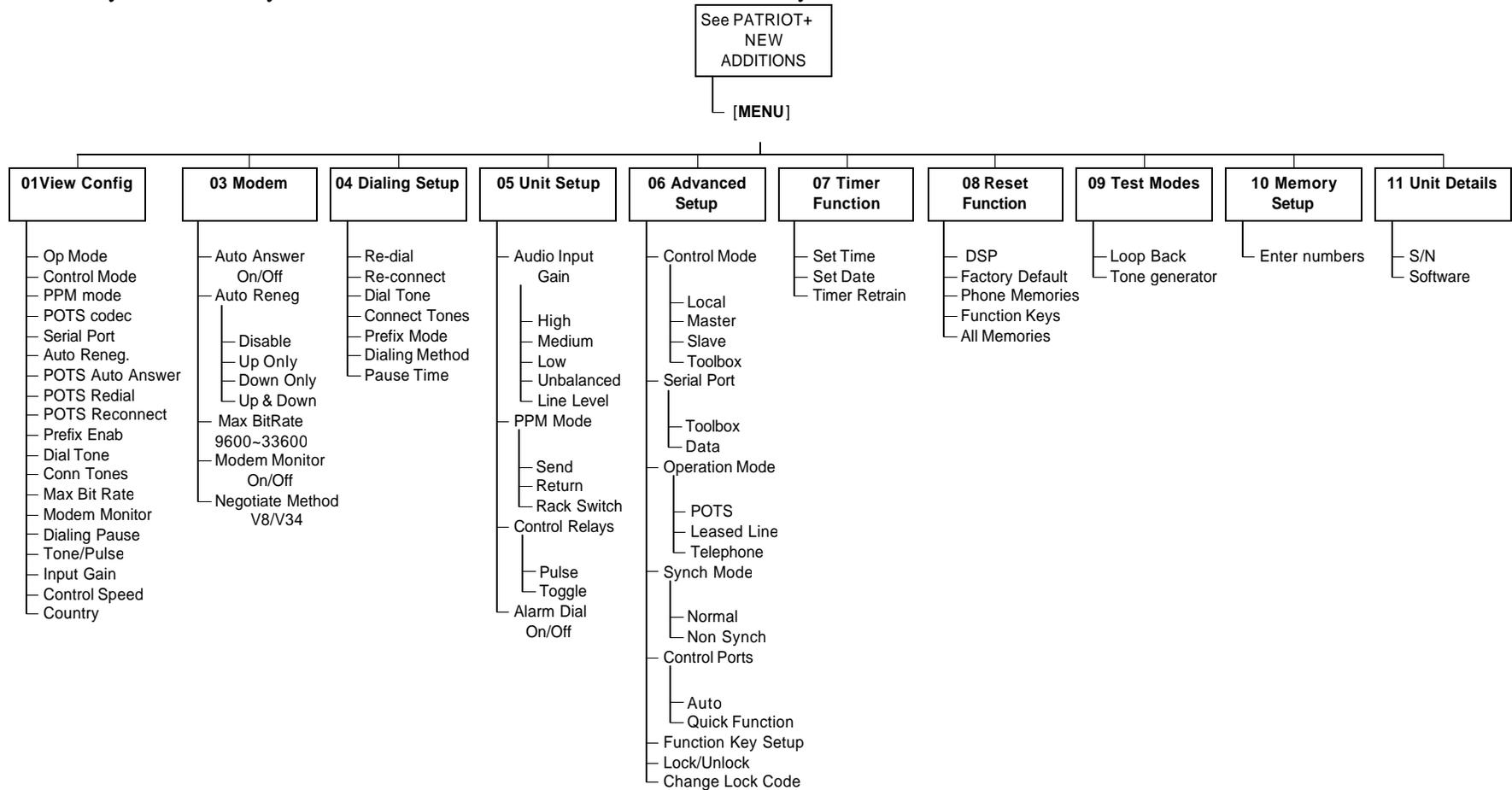
Note: Factory default keys should not be re-assigned unnecessarily as they are common short cuts on most LIBERTYS and are very convenient for operators to use.

DETAILED CONFIGURATION

The LIBERTY operating software has a large number of parameters, which can be changed to meet user requirements. Many settings can be left at the factory set “defaults” however some settings will need changing to meet local conditions.

Menu Tree

This is a summary of the menu system. Some sub menus have been omitted for clarity.



Setup Menu

Choose [MENU] from the initial LCD view showing the choices [DIAL] MEMORY MENU.

“Setup Menu” is displayed at the top; this is the entry point for the menu system.

The screen provides 12 sub-menu selections:

Sub-Menu	Description
01 View Config	A selection of the most commonly used sub menu items, which can be reviewed or changed.
02 Codec Setup	Setup options for Codec algorithms.
03 Modem Setup	Setup selections for the POTS modem. Items include auto answer, maximum bit rate, renegotiation and retraining.
04 Dialing Setup	Telephone dialing options which include number redial, status tones, dialing pause time and prefixes
05 Unit Setup	Settings for audio input sources (rear connectors), Peak program meter, relays and country settings
06 Advanced Setup	Configure local/remote control modes, port operation, quick function setup, and Lock code setup.
07 Reset Functions	Set to factory default, clear memories
08 Test Modes	Loop back test, tone generator
09 Memory Setup	Set up memory dialing. Store numbers & alphanumeric names.
10 Unit Details	Serial number & software versions
11 Exit Setup	Back to START

Sub Menus of 01 View Configuration

The View Configuration menu contains the main control settings and operating modes. Some of the same options are also available from other sub menus and selecting them from the View Configuration menu takes you into the appropriate sub menu. This means that should you select CLEAR from the Key Pad you will go back one screen in whichever menu the View Configuration has taken you to (see page 18 for a diagram of all menus).

NOTE: Default settings in the following submenus are *italicized* and underlined.

Op Mode	<u>POTS</u>	Use this mode to connect via a standard (POTS) telephone line.
	Leased Line Mode	For operation over leased 2 wire bi-directional lines. As the Liberty modem requires a loop voltage source for correct operation, an optional line interface unit is available for use with dedicated 2 wire circuits where the loop voltage is not present.
	Telephone Mode	Use Liberty as an Emergency phone; You will need to plug headphones into the headphone socket and a microphone into the Mic/Line in socket. Dial the phone number on the keypad and when finished press the Enter/Dial key. To finish the call, press the Hang Up key.

	Cell Mode	Use to connect a hands free cable from a cell phone to the cell phone socket.
Control Mode	<u>Local</u>	Gain of both input channels are adjusted by the two front panel controls on the “local” Liberty.
	Master	A pair of Liberty's can be set up to allow the “master” to control the input gain of the “slave.” The remote Liberty has the volume mode set to “slave.” Adjusting the Input controls on the “master” varies the “slave” input gain.
	Slave	Set the remote unit to “slave” for control by the “master” Liberty. Front panel controls are disabled.
	Toolbox	Input gain can be adjusted using the Toolbox application. “Toolbox” mode can be selected on the Liberty or by clicking on the “Setup for T-box” button in the application. Front panel controls are disabled.
IGC Mode	<u>On</u>	Enables the Intelligent Gain Control.
	Off	Disables the Intelligent Gain Control.
POTS Codec	<u>Music</u>	Provides the highest quality when bit rates are 24,000 and above. The codec will operate 9,600- 33,600bps.
	Speech	Used for 16.800bps.
Serial Port	<u>Toolbox</u>	Configures the serial port for use with a Computer using the Toolbox software.
	Data	Use for low speed (200bps) data applications such as remote control or intercom using a TTY terminal.
	Disable	Disables the serial port for use with the Toolbox application.
Auto Reneg	<u>No</u> (Disable)	Setting for live program links. Prevents data renegotiation if line conditions change. <i>Note:</i> Use of auto-renegotiation can cause unexpected program breaks with changes in line conditions.
	Up only	Uses higher bit rate with better line: LQ above 80%.
	Down Only	Lower bit rate used as LQ below 30%. Some Hi.fi loss.
POTS Auto Ans	<u>Yes</u> (Enable)	Liberty automatically answers incoming calls.
	Disable	Liberty will <u>not</u> automatically answers incoming calls.
POTS Redial	<u>No</u> (Disable)	If dialed number is busy, Liberty will <u>not</u> redial.
	Enable	If dialed number is busy, Liberty redials the number for a selectable number of retries.

POTS Reconnect	<u>No</u> (Disable)	If a link fails, Liberty will <u>not</u> hang up and attempt to reconnect with the remote Liberty.
	<u>Enable</u>	If a link fails, Liberty will hang up and attempt to reconnect with the remote Liberty. Use with auto answer.
Prefix Enable	<u>No</u> (Disable)	Liberty will <u>not</u> dial the number stored in the Prefix memory before dialing the number entered via the keypad or from the phone book memory.
	<u>Enable</u>	Liberty dials the number stored in the Prefix memory before dialing a number entered via the keypad or from the phone book memory. <i>Note:</i> The prefix must have been entered in memory for this function to work (Useful for dialing remote and international area codes).
Dial Tone	<u>Detect</u>	Liberty waits until a dial tone is present before dialing.
	<u>Ignore</u>	Liberty will <u>not</u> wait until a dial tone is present before dialing. Use this setting if there is any difficulty detection dial tone.
Con Tones	<u>Ignore</u>	Liberty does <u>not</u> check for a telephone system connection tone at the conclusion of dialing. (e.g. “busy” tone).
	<u>Detect</u>	Liberty checks for a telephone system connection tones at the conclusion of dialing. (e.g. “busy” tone).
Max Bit rate	<u>33600</u> Bit Rate varies with MENU NAVIGATI ON KNOB	Sets the maximum bit rate at which the Liberty will attempt a connection. Reducing this value improves the reliability of the connection on poor quality lines.
Modem Monitor	<u>Yes</u> (Enable)	Enables the modem dialing and connection process to be heard through the headphones.
	<u>Disable</u>	Disables the modem dialing and connection process to be heard through the headphones.
Pause time	<u>2 seconds</u> Seconds vary with MENU NAVIGATI ON KNOB	Determines the length of any dialing pauses, if any are inserted into the telephone number. Made by holding the “#” key until a comma appears after the digit on the LCD display. This feature is useful when dialing through a PBX. Options: 1-10 seconds.
Dial Method	<u>Tone</u>	For tone (DTMF) dialing.
	<u>Pulse</u>	For Pulse dialing.

Input 1*	<u>Line level</u>	Setting for professional audio equipment using +4dBu balanced lines. (Gain ~ 12dB max) * Note – Liberty has a DSP audio limiter.
	Microphone	Up to 70dB gain - use for low sensitivity microphones.
Control speed	<u>Fast:</u>	Determines how the “MENU NAVIGATION KNOB” control responds when it is rotated. Fast is one change per “click.”
	Slow	Slow is a change every second “click.”
Ctry (Country)	<u>U.S.A</u> Select from a list of 34 countries	Sets country specific telephone settings.
EXIT MENU		APPEARS AS THE LAST OPTION ON EACH MENU.

Sub Menus of 02 Codec Setup

01 POTS Codec	<u>Music</u>	Provides highest quality when bit rates are 24,000bps and above. The codec will operate between 33,600bps to 9,600bps.
	Speech	Used for 16.800bps.

02 Exit Setup

Sub Menus of 03 Modem setup

01 POTS AutoAnswer	<u>Yes (Enable)</u>	Liberty automatically answers incoming calls and starts operation. <i>Note:</i> You can use this with Auto redial to maintain a program link over extended periods. Liberty will automatically restore the link in a few seconds if a “dropped call” occurs.
	Disable	Liberty will <u>not</u> automatically answers incoming calls.
02 Auto Reneg	<u>1 Disable</u>	Setting for live program links. Prevents data renegotiation if line conditions change. <i>Note:</i> Use of auto-renegotiation can cause unexpected program breaks with changes in line conditions.
	2 Up Only	Uses higher bit rate with better line: LQ above 80%.
	3 Down Only	Lower bit rate used as LQ below 30%. Some Hi.fi loss.

4 Up & Down Auto renegotiation as line conditions vary.

03 Max B it rate 33600
Bit Rate varies with MENU NAVIGATION KNOB Sets the maximum bit rate at which the Liberty will attempt a connection. Reducing this value improves the reliability of the connection on poor quality lines.

04 Modem Monitor Yes (Enable) Enables the modem dialing and connection process to be heard through the headphones.
Disable Disables the modem dialing and connection process to be heard through the headphones.

05 Negotiate Methd V8 Normally V8(cancel Telco echo suppression). Don't alter!
V34

06 Exit to Setup

Sub Menus of 04 Dialing Setup

01 POTS Redial No
(Disable) If dialed number is busy, Liberty will not redial.
Enable If dialed number is busy, Liberty redials the number for a selectable number of retries.

02 POTS Reconnect No
(Disable) If a link fails, Liberty will not hang up and attempt to reconnect with the remote Liberty.
Enable If a link fails, Liberty will hang up and attempt to reconnect with the remote Liberty. Use with auto answer.

03 Dial Tone Detect Liberty waits until a dial tone is present before dialing.
Ignore Liberty will not wait until a dial tone is present before dialing. Use this setting if there is any difficulty detection dial tone.

04 Connect tones Ignore Liberty does not check for a telephone system connection tone at the conclusion of dialing. (e.g. "busy" tone).
Detect Liberty checks for a telephone system connection tones at the conclusion of dialing. (e.g. "busy" tone).

05 Set Prefix mode Ignore Does not add an extra number (Prefix) when dialing.
Detect Inserts a prefix (such as a 9 or 001) to the dialed number. Useful

when LIBERTY is used in hotels, interstate or in international locations.

06 Dialing method	<u>Tone</u>	For tone (DTMF) dialing.
	Pulse	For Pulse dialing.
07 Set Pause Time	<u>2 seconds</u> Seconds vary with MENU NAVIGATION KNOB	Determines the length of any dialing pauses, if any are inserted into the telephone number. Made by holding the “#” key until a comma appears after the digit on the LCD display. This feature is useful when dialing through a PBX. Options: 1-10 seconds.

08 Exit Menu

Sub Menus of 05 Unit Setup

01 Set Input Gain (Input1)*	<u>Line level</u>	Setting for professional audio equipment using +4dBu balanced lines. (Gain ~ 12dB max) * Note – Liberty has a DSP audio limiter.
	Microphone	Up to 70dB gain - use for low sensitivity microphones.
02 Intelligent Gain (IGC)	<u>On</u>	Enables the intelligent Gain Control.
	Off	Disables the intelligent Gain Control.
03 Relay Operation	<u>Pulse</u>	Determines how the CMOS port relay contact closure operates. Momentary closure. Each activation changes the port state. <i>See “Master Slave Operation” for more information.</i>
	Toggle	
	Disable	
04 Alarm Dial	<u>Disable</u>	No Alarm Dial.
	Enable	Liberty dials the preset alarm number in the internal phone book when a connection is detected between pin 8 (CTS) and pin 7 (RTS) on the DB9 serial data port. The call remains setup while the pins are connected. Useful for security or unattended applications. The alarm number can be any one of the 50 numbers stored in the

Liberty phone book.

05 Control Speed Fast: Determines how the “MENU NAVIGATION KNOB” control responds when it is rotated. Fast is one change per “click.”
Slow Slow is a change every second “click.”

06 Set Country Australia Sets country specific telephone settings.
Select
from a list
of 34
countries

07 Exit Menu

Sub Menus of 06 Advanced Setup

01 Control mode Local Gain of both input channels are adjusted by the two front panel controls on the “local” Liberty.
Master A pair of Liberty's can be set up to allow the “master” to control the input gain of the “slave.” The remote Liberty has the volume mode set to “slave.” Adjusting the Input controls on the “master” varies the “slave” input gain.
Slave Set the remote unit to “slave” for control by the “master” Liberty. Front panel controls are disabled.
Toolbox Input gain can be adjusted using the Toolbox application. “Toolbox” mode can be selected on the Liberty or by clicking on the “Setup for T-box” button in the application. Front panel controls are disabled.

02 Serial Port Toolbox Configures the serial port for use with a Computer using the **Toolbox** software.
Data Use for low speed (200bps) data applications such as remote control or intercom using a TTY terminal.
Disable Disables the serial port for use with the Toolbox application.

03 Operation Mode 1 POTS Mode Use this mode to connect via a standard (POTS) telephone line.
2 Leased Line Mode For operation over leased 2 wire bi-directional lines. As the Liberty modem requires a loop voltage source for correct operation, an optional line interface unit is available for use with dedicated 2 wire circuits where the loop voltage is not present.
3 Telephone Use Liberty as an Emergency phone; You will need to plug

	Mode	headphones into the headphone socket and a microphone into the Mic/Line in socket. Dial the phone number on the keypad and when finished press the Enter/Dial key. To finish the call, press the Hang Up key.
04 Port Mode	<i>Quick Fn</i> Auto	Settings for the control port on the DB9 connector. See Master Slave Operation (page 30).
05 Function Setup	Select F1 or F2 followed by 0 ~9	Select desired function from scroll list. Function will be allocated to combination of F key and keypad digit. See “Function Key Allocations” (page 29).
06 Lock & Unlock	Enter lock code	The default number to lock and unlock Liberty is “1234”
07 Alter lock code	Enter existing lock code	The existing number can be changed in this menu. Enter the existing number and a new 4-digit number. A misplaced lock code number can be read and changed using the Toolbox application.
08 Exit Menu		

Sub Menus of 07 Reset Functions

01 Reset DSP	Restarts DSP operation
02 Reset settings	Restores factory default settings (not memories)
03 Reset phone memories	Clears internal phone list
04 Reset Function memory	Restores function key allocations to factory defaults
05 Reset all Memories	Clears all memories, restores default F key settings
06 Reset MUSICAM USA	Resets everything (all of the above) back to the factory defaults

07 Exit Menu

Sub Menus of 08 Test Modes

01 Loop back mode	Select bit rate (9,600 – 33,600)	Tests all signal processing circuitry within Liberty. (Except modem). Input signals can be monitored on the “Line Out” connector and headphones.
02 400Hz Test Tone	Must be online	Sends a 400Hz tone to the remote Liberty if online and to the unit output if not online. The tone is always +4DBu, which means the LIBERTY can be used for line up, and testing. <i>Note: Tones are generated in the DSP module. The Peak Program meter does not display the level on the originating LIBERTY.</i>

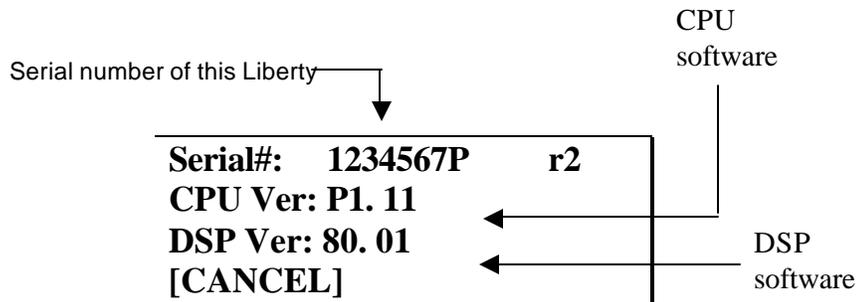
03 Exit Menu

Sub Menus of 09 Memory Setup

The Memory setup is where the stored telephone numbers are accessed from. For full instructions see page 14.

Sub Menus of 10 Unit Details

Provides information on the Liberty:



HOW THE LIBERTY WORKS

Analogue audio inputs (two) are combined and amplitude limited prior to being digitized by a high quality stereo 20-bit analog-to-digital converter. The serial data bit stream is then fed to an extremely fast 32-bit DSP that encodes the audio data using the proprietary digital audio compression algorithm. After compression, the DSP then produces a low bit rate serial data stream that is fed to a V.34 data modem.

At the remote LIBERTY, the reverse process takes place. The audio data is decompressed, fed to a digital-to-analogue converter, then amplified to line level and fed to a balanced output connector for broadcasting.

Intelligent Gain Control (IGC)

The LIBERTY uses an ingenious system to ensure that the signal being broadcast is not too high; the audio signal is passed through a digital volume control (Digi-Pot) and then to an Analogue to Digital converter (ADC). From the ADC the digital audio is fed to the Digital Signal Processor (DSP). The DSP monitors the level of the audio and if this is too high, it sends a control signal to the digi-pot to reduce the input signal level. This ensures that the input level never exceeds the maximum level of the ADC. When the IGC is active, the LCD display shows the IGC with **In1** or **In2** or **In1&2**, depending on which input(s) were too high. When the control knob for the Input is reduced to its correct level, the IGC returns to a null display.

DSP Based Compressor Limiter

When the audio signals for both inputs one and two are summed together in the DSP, the combined level can be too high for the algorithm to encode it. Consequently, a compressor limiter is needed to ensure that the maximum level is never exceeded. It also ensures that momentary peaks on either channel do not exceed the maximum level as well. The response of the Compressor Limiter is extremely fast so it is almost impossible to overload the algorithm.

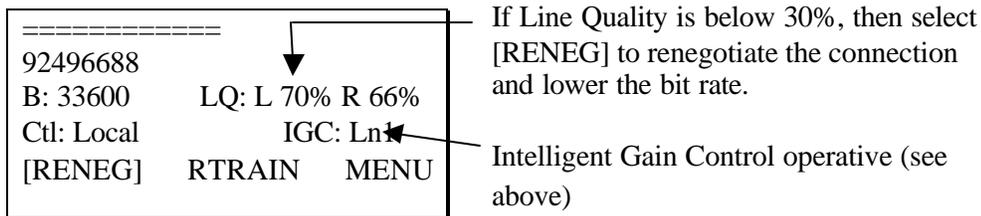
The combination of the LIBERTY IGC and the Compressor Limiter insures that the signal that you are sending always sounds good, even if you don't have the input levels set just right. It prevents splats and distortion due to excessive levels ever spoiling your program.

Modem Negotiation and Line Quality

LIBERTY sends and receives high-speed digital information over a standard telephone line via an internal modem. The modems communicate over the line to establish the best possible conditions for data transmission and the highest reliable data rate. This also corresponds to best possible audio quality.

Initially, the modems “train” themselves to the line to measure and compensate for variations in frequency response and to cancel out any echo that may be present. The modems then establish the highest possible speed for data transfer using a process of “negotiation” with each Data Pump.

When the modems have established the connection, control is passed to the LIBERTY CPU and the LCD will display the Line quality (LQ). Generally, for satisfactory operation, LQ needs to be greater than 30%. LQ of 70% or more is excellent. One of the unique features of the LIBERTY is to show the LQ for both the Local (L) and the Remote (R) units. This valuable information enables the user to manage the link more effectively.



Refer to Menu **03 Modem Setup** in the Detailed Configuration section for more information on retraining and renegotiation the bit rate.

MASTER SLAVE OPERATION

A unique feature of the LIBERTY is the remote control capability of the unit for audio input level control. All LIBERTYS can be set up so that the input level can be controlled from a remote site, such as a studio or control center. This enables the LIBERTY to be used by non-technical people or to be unmanned. All the levels can be monitored and adjusted from the control center by using a master LIBERTY. In most

applications, the LIBERTY located in the studio or control center is set up as the Master unit and the LIBERTY at the remote location is set up as the Slave unit.

The easiest way to do this is with the Quick Function keys F2 - #. By pressing these two keys, one after the other, it will sequence through the different modes of operation. The first sequence sets the LIBERTY in Master mode. Pressing the keys again puts the unit in Slave mode. Pressing the key sequence again sets the unit into Toolbox mode and the final sequence puts the unit back into Local mode. Alternatively, using the MENU NAVIGATION KNOB and selecting the Advanced Setup menu can set up the unit.

When a unit is set up as a Master, the Input gain controls operate the audio gain at the remote LIBERTY. The input level for the local LIBERTY remains at the setting last used when in Local mode. To adjust the local input levels, LIBERTY has to be set back into Local mode.

When a unit is set to Slave mode, the input level is set by the local Input controls until the LIBERTY is connected to a Master unit. When the connection is made, the Slave LIBERTY obtains the gain setting from the Master unit and it then stores the setting in memory. If the Master LIBERTY is then switched to Local, as can be done with the COMMANDER unit, the Slave unit maintains the level last received from the Master unit.

PEAK LEVEL METER

The LCD provided on all LIBERTYS shows the peak audio levels being transmitted.

THEORY OF OPERATION

Coding Algorithms

Over the past two decades, there have been great improvements in the way that digital audio data can be condensed while retaining much of the quality of the original signal. Many different algorithms have been developed, including well-known ones like MPEG layer 2 and 3. These algorithms require a reasonably high bit rate, typically 64kbps or higher, for high quality wide band mono real time operation. Many ISDN codecs use MPEG layer 2 and 3 for mono communications at 64kbps and 128 kbps however the delay can become a problem for real time operation. Some codecs use MPEG-2 layer 2 and 3 to overcome bandwidth limitations at low bit rates.

While the MPEG algorithms may be suitable for ISDN operation, they are quite inadequate for the low bit rates available for POTS operation. Some manufacturers have tried to use MPEG for low bit rate POTS operation but have found the results less than satisfactory. As a typical POTS line will achieve bit rates of 28,800 or less, an algorithm capable of far greater performance than MPEG is required.

Fortunately, significant advances in the development of coding algorithms have made the design of digital audio codecs like the LIBERTY possible. The proprietary coding algorithm used by LIBERTY achieves compression factors of the order of twenty times or more. This enables 15 kHz bandwidth high quality audio to be transported at a bit rate as low as 24,000bps. Reduced quality and bandwidth can be obtained at bit rates down to 9600bps. In addition, low coding delays of 100 milliseconds provide the kind of performance required for real time operation.

TOOLBOX Software

Toolbox is a PC compatible software application that works with the LIBERTY and provides a convenient way to configure, remotely operate and monitor a LIBERTY system using a Personal Computer. The application also provides online “chat” and communication diagnostic tools. Updates can be downloaded from the MUSICAM USA web site: <http://www.musicamusa.com>. Obtain the free, latest version.

Preparing to use the Toolbox application

The Toolbox software is distributed as a compressed file “TieTool.zip”. Extract the program files to the PC hard drive using a program such as WinZip 8. The files are;

- **TieTool.exe** - MUSICAM USA Toolbox application
- **Tietool.hlp** - Toolbox help file

Both of these files should be saved in the same directory or folder.

Connecting LIBERTY to the PC

The LIBERTY serial port connects to any vacant serial (or COM) port on the PC using a standard modem cable. A cable can also be constructed using the following components and connections:

LIBERTY (DB 9 male)	PC (DB 9 female)
Pin 2 (TxD)	Pin 2 (RxD)
Pin 3 (RxD)	Pin 3 (TxD)
Pin 5 (Gnd)	Pin 5 (Gnd)

LIBERTY (DB 9 male)	PC (DB 25 female)
Pin 3 (RxD)	Pin 2 (TxD)
Pin 2 (TxD)	Pin 3 (RxD)
Pin 5 (Gnd)	Pin 7 (Gnd)

When the LIBERTY is connected to the PC, run the Toolbox program and select the Com port to be used for the LIBERTY. The screen display should look like the one on the following page. Then select the CONNECT button to establish the link between LIBERTY and the PC.

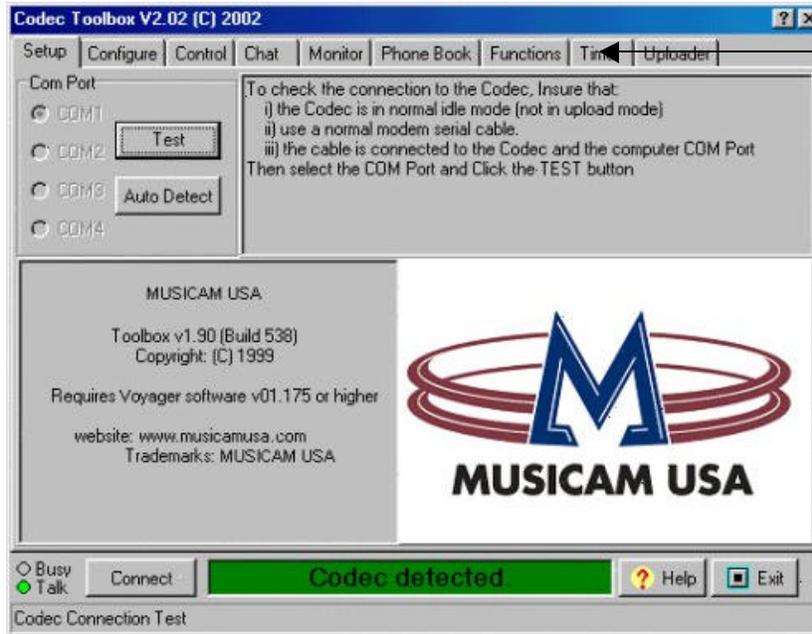
A green display should appear at the bottom of the window showing “LIBERTY detected”. If the message “Unable to detect LIBERTY” appears check:

- LIBERTY has its power on
- A Modem Data cable is connected to the LIBERTY and a spare (unused) COM port on the PC
- The pin connections are as per the above table
- The correct COM port is selected and no other software applications access it.
- Ensure the Properties for your PC Serial COM Port are set as follows;

Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Menu Items

NOTE: The information given below is for #1.037 or higher. Check our website: <http://www.musicamusa.com> for the most up to date operators manual.

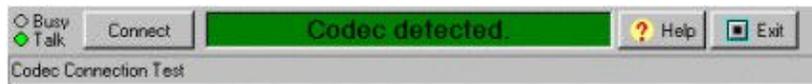


Select the required items by clicking the TAB keys

The Toolbox Main menu screen may appear initially displaying a red message at the bottom of the screen:



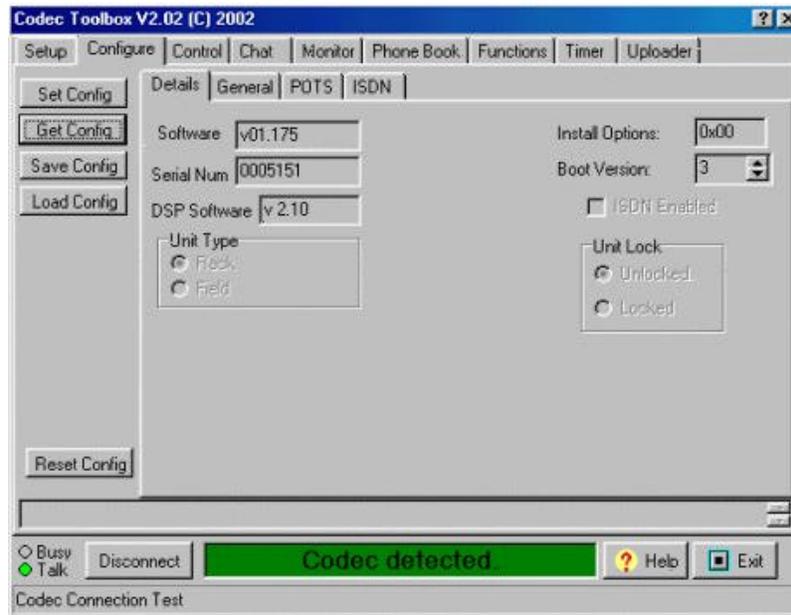
Click “Auto detect” and the program should find the correct “COM” port and establish communication with the LIBERTY. The Message “LIBERTY Detected” appears.



If connection fails - manually select the correct “COM” port and click “TEST”. Check the cable and connections if communication still fails.

Configure Tab:

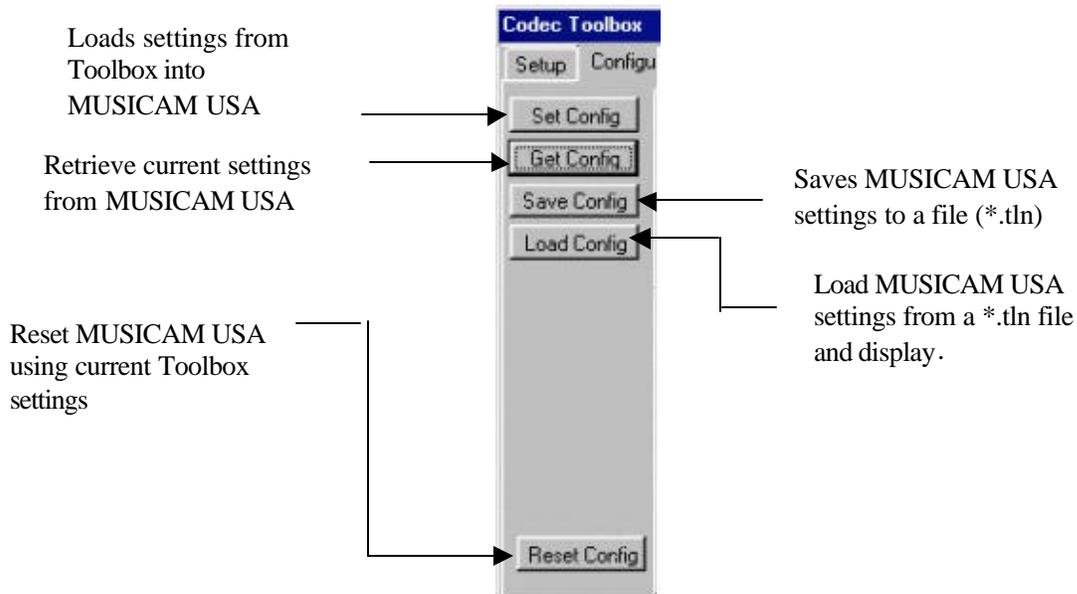
The first tab on the Toolbox is titled Configure. A graphic of the display window is shown below.



There are three sub-tabs that show and control the settings for the following:

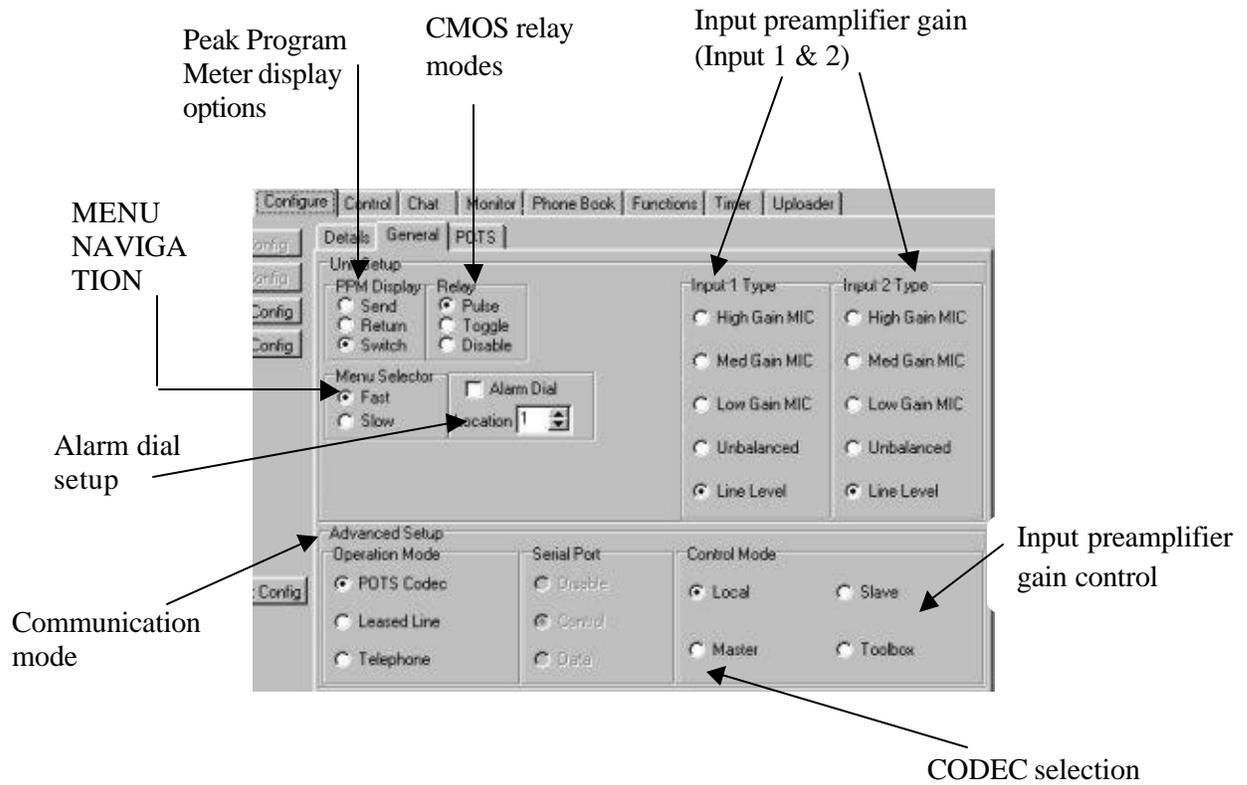
- DETAILS - Provides software version and type information on the LIBERTY
- GENERAL - Configures most settings
- POTS - Sets the telephone modem parameters
- ISDN is not available on the LIBERTY

All setup changes are made or saved through the buttons on the left-hand side of the screen.



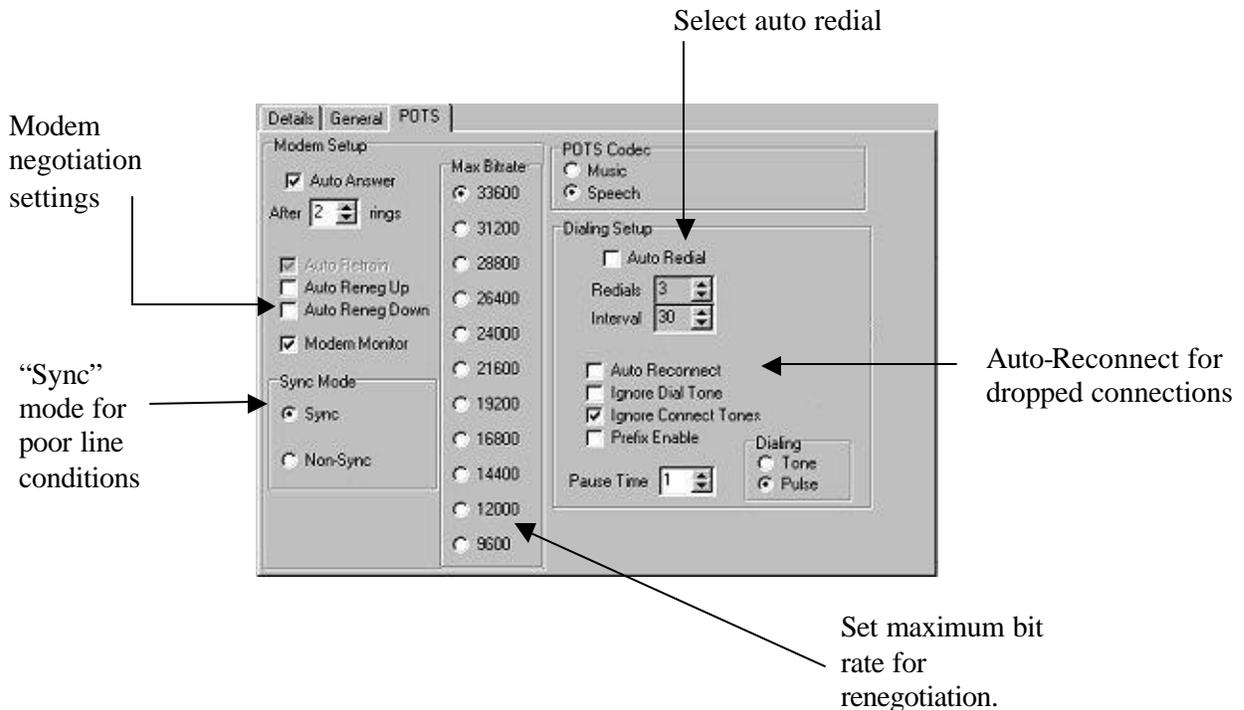
General Configuration

Selected as a sub screen from the “Configure” tab.



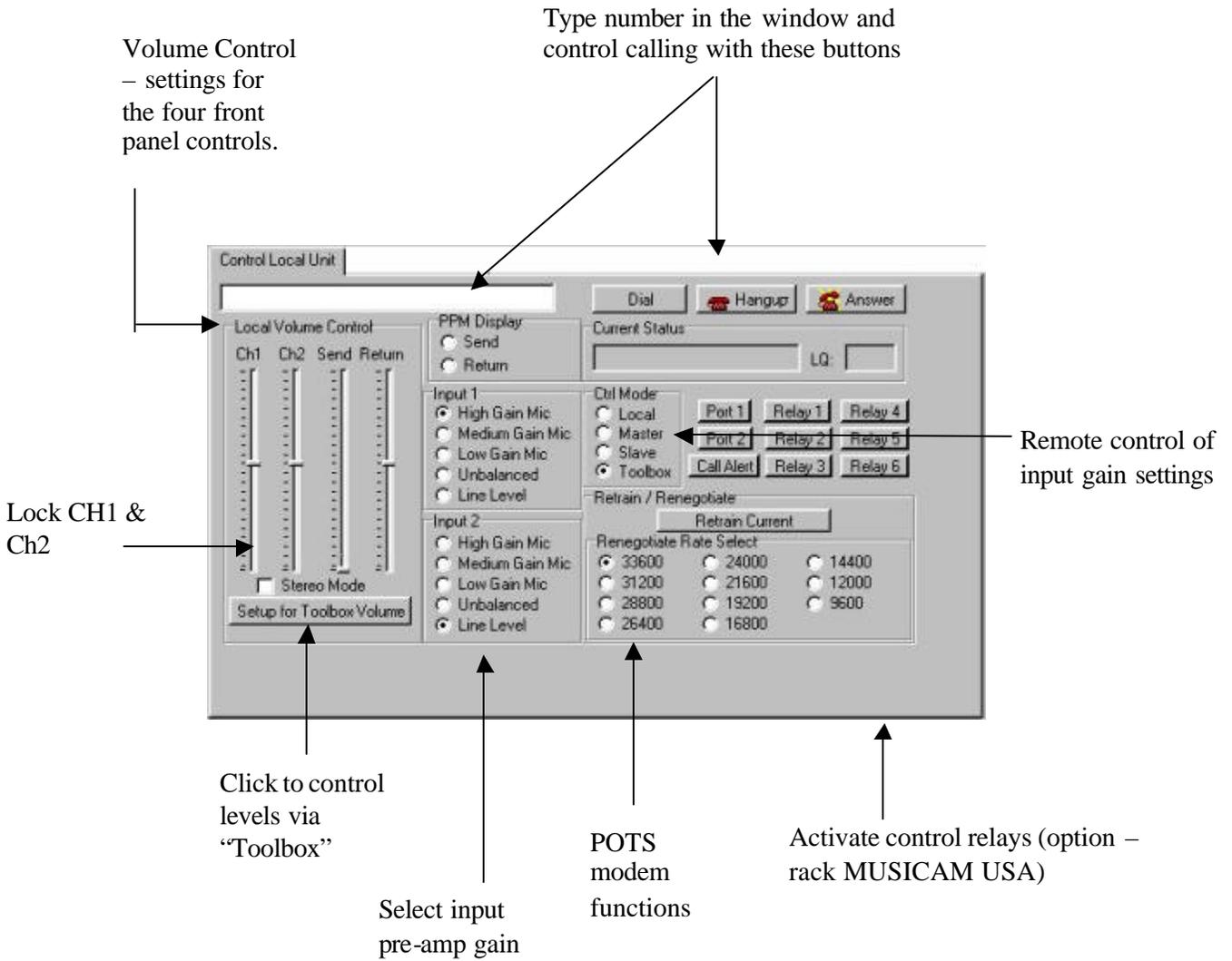
POTS Setup

Selected as a sub screen from the “Configure” tab.



Local Control

This screen is used to operate a LIBERTY connection under computer control. Both local and remote LIBERTYS can be controlled.



Note These settings are NOT stored within the LIBERTY and will be lost when power is removed. Use "Configure" to make permanent changes.

Remote Control

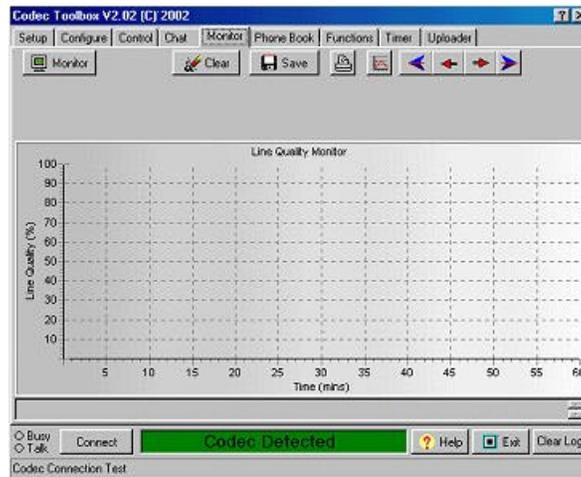
Use this tab to control a remote LIBERTY.



When a link is established with the remote unit, any adjustments to settings on this screen will be enabled at the remote LIBERTY. Functions are identical to the Local Control screen detailed on the previous page.

Line Monitor

This monitor application is useful for detecting telephone line problems and analyzing line performance over a period of time. Test results can be saved for future reference to determine if line performance has changed from previous tests.

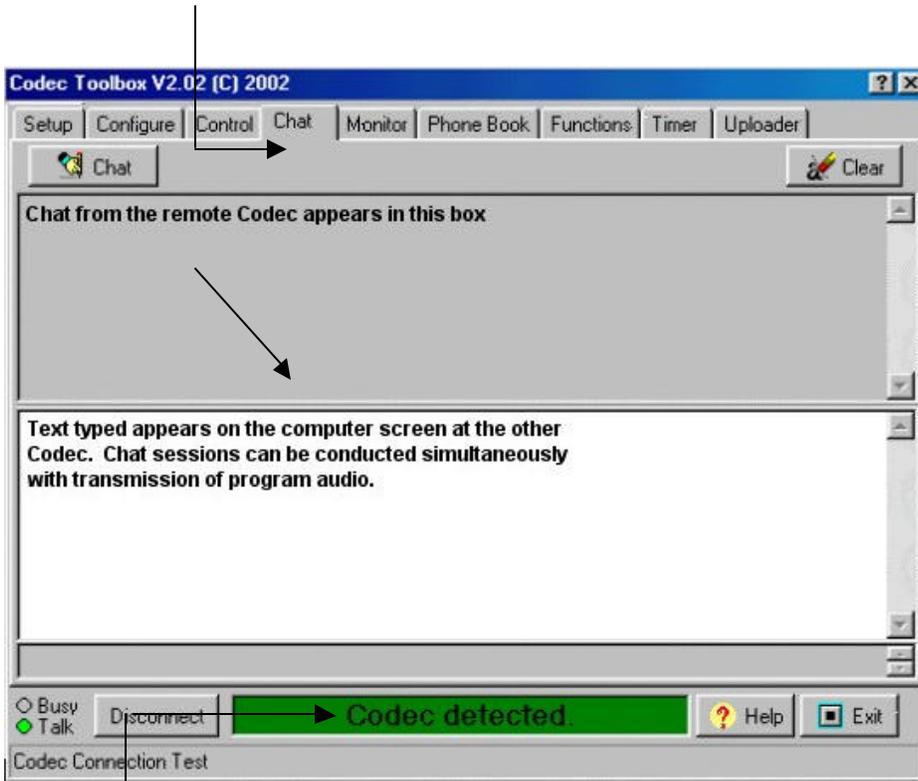


Once a POTS link has been established, the Monitor button is selected to enable a graph of the Line Quality (LQ) to be generated on the screen. Samples of LQ are plotted every 30 seconds and displays are shown in one hour blocks. Use the navigation keys to step through each hour of monitoring.

Chat

This screen provides two-way text communications between two LIBERTYS. Operation is very similar to common Internet chat systems.

Click to here to start a chat



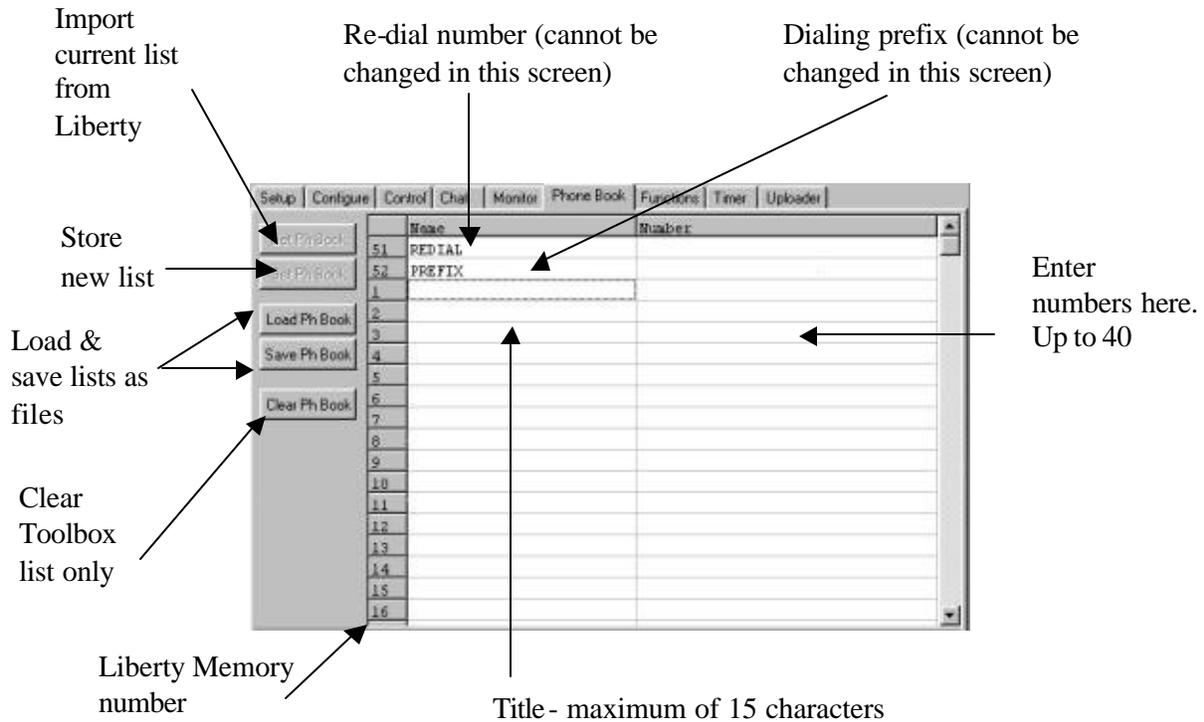
Changes to disconnect when chatting

Phone Book

Although LIBERTY can store up to 50 phone numbers and names, managing this information with the MENU NAVIGATION KNOB can be very involved and time consuming.

Using the Toolbox Phone Book Tab makes managing the stored list of numbers and names very easy.

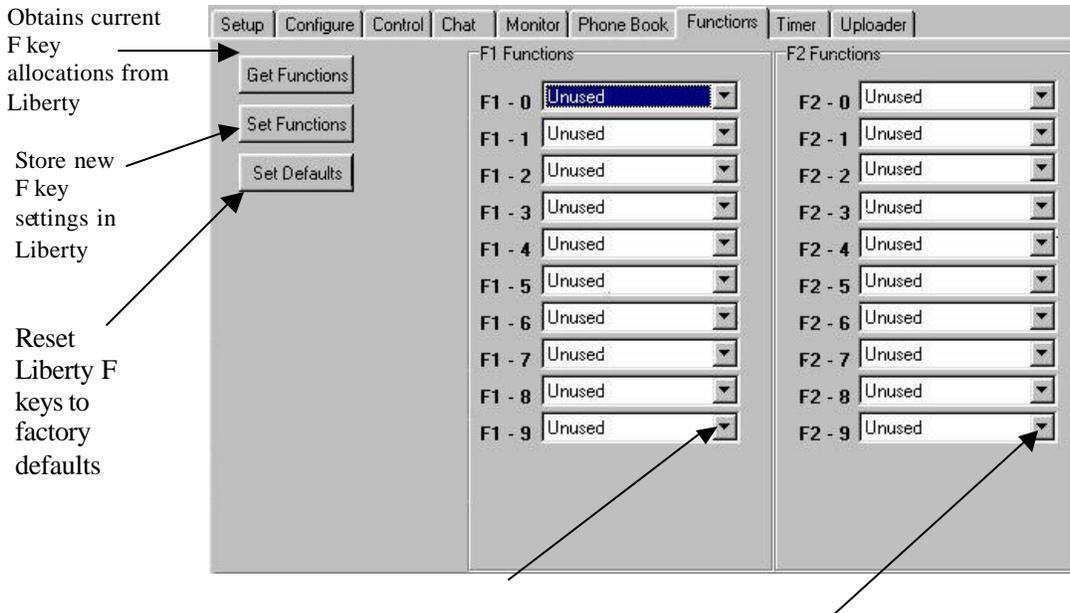
A standard phone book can be stored on a computer and downloaded into all the LIBERTYS held within an organization enabling operators to easily find names and addresses on all LIBERTYS. The screen for the Phone tab is shown below.



The last column contains the phone number for the memory location. The number can be up to 40 digits long and can contain the characters 0-9, (#), (*), and (.). The comma (,) represents a pause. The length of the pause can be changed using the Menu system or Toolbox PC application. Illegal or unrecognized characters appear as pauses (,) in the displayed number.

Functions

The F1 and F2 keys on the LIBERTY front panel are used to provide short cuts to commonly used tasks. The Toolbox Function tab is used to assign functions to either of the F1 or F2 function key short cuts. The screen below shows the default function short cuts for the LIBERTY.



Click these arrows to show & select from a list of available functions

It is highly recommended that the default keys are left unchanged as these provide a standard and convenient way to resolve problems experienced by unfamiliar operators. The following is a list of the assignable functions that can be selected from the pull down menus.

- | | |
|-------|--|
| 01 | Allocated by you |
| 02 | Renegotiate up |
| 03 | Renegotiate down |
| 04 | Retrain Current |
| 05 | Retrain up |
| 06 | Retrain Down |
| 07 | Retrain Auto |
| 08 | Reset Modem |
| 09 | Reset DSP |
| 10 | Lock & Unlock |
| 11~16 | Undefined as yet |
| 17 | Pulse / toggle control Port 1 remote LIBERTY |
| 18 | Pulse/ toggle control Port 2 remote LIBERTY |
| 19 | Activate Call Alert Beeper on remote LIBERTY |
| 20 | Toggle Input 1 preamplifier gain |
| 21 | Und you can choose! |
| 22 | Toggle display mode |
| 23 | Toggle CODEC |

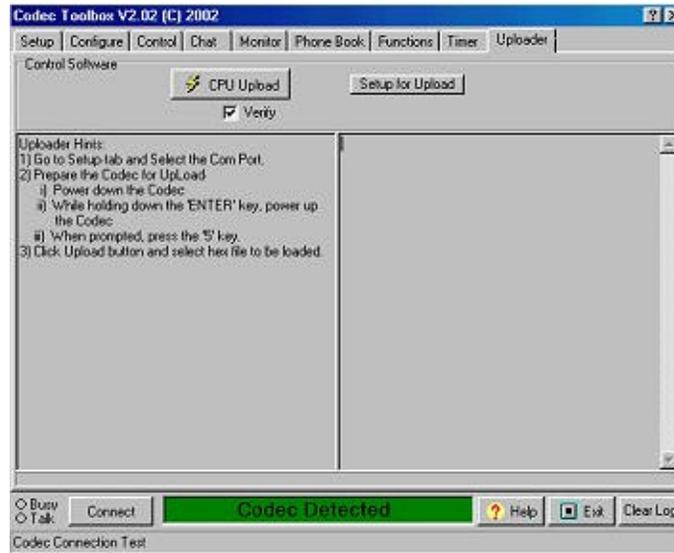
24 Loop back Mode
25~30 Un-funky
31 Pulse / toggle control Port 1 on local LIBERTY
32 ? Winner's choice!

Software Upgrade

LIBERTY operating software is frequently updated as a result of our continuing commitment to product development.

The latest & greatest version is available for download from our website.

Use this screen get the software to be downloaded into the LIBERTY.



Connect LIBERTY to the computer “COM” port with a standard modem cable.
Start Toolbox and establish data communication.

- Select the upload tab on the Toolbox
- Click on the "Setup for Upload" button-a file selection dialogue box should appear
- Turn the LIBERTY off and then turn the power back on
- Select the file to be uploaded and click “CPU Upload”
- Message "Upload successful" should appear at the end of the process

After an upgrade, go to the LIBERTY "Options Menu".

Then select “Reset Functions” and finally select "Reset Settings".

This will delete any settings attached to the old operating system.

NOTE: It may also be necessary to reset the old function list with “Reset Funct Mem”.

On early firmware versions:

- Switch off LIBERTY by disconnecting the power
- Hold down the 'ENTER/DIAL' key on LIBERTY and reconnect the power
- Release the enter/dial key after power is connected
- A message should appear on the LIBERTY requesting a key press (#5) key
- Quickly press the number '5' on the key pad
- The display should display " waiting for upload”
- Proceed with the upload as above

Upgrading Software

Connection Details

There are several connectors on the LIBERTY for connecting audio cables, serial data cables and relay control cables. The following diagrams provide detailed information on the pin connections that should be used when connecting to the LIBERTY.

Mic / Line Audio In Connector



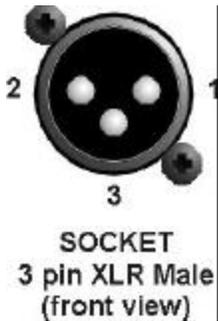
For balanced audio cables, use the following pin connections.

- Pin 1 – Earth or shield connection
- Pin 2 – Audio +ve leg
- Pin 3 – audio –ve legs

For unbalanced cables, use the following pin connections.

- Pin 1 – Earth or shield connection
- Pin 2 – Audio leg
- Pin 3 – No connection or ground

Program Out Connector



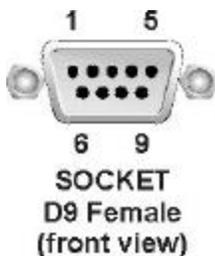
For balanced audio cables, use the following pin connections.

- Pin 1 – Earth or shield connection
- Pin 2 – Audio +vet leg
- Pin 3 – audio –vet legs

For unbalanced cables, use the following pin connections.

- Pin 1 – Earth or shield connection
- Pin 2 – Audio leg
- Pin 3 – No connection

RS 232 Interface Connector



The serial interface connector pin detail is as follows.

- Pin 1 – CMOS Relay
- Pin 2 – TX Data
- Pin 3 – RX Data
- Pin 4 – No Connection
- Pin 5 – Ground
- Pin 6 – CMOS Relay
- Pin 7 – CTS / (Alarm Dial)
- Pin 8 – RTS / (Alarm Dial)
- Pin 9 – No Connection

A standard modem cable will provide the correct connections for a PC to MUSICAM USA connection. Do not use a null modem cable i.e. do not cross wires 2 and 3.

MUSICAM USA POTS Codec Family:

	Voyager	Liberty
<u>Analogue Audio</u>	VERSATILE	ELEGANT
Audio inputs	2xMic/Line Balanced XLR	Mic/Line Bal XLR & 2x RCA
Nominal output Level	+4dBm on XLR	Same
Audio Bandwidth	15 kHz @ 24000 bps+	Same
Headphone output	2 x 6.5mm jack	1 x 6.5mm jack
Saturation Level	+18dBu	Same
Two-way Audio	Yes	Yes
<u>Gain (Maximum)</u>		
Mic	55dB, 65dB, 75 dB	75dB maybe? See next REV!
Unbalanced	35dB	RCA
Line	15dB	15dB
Remote Control CMOS Ports	2 x 3.5 mm jacks	1 on 1 DB9 connector
<u>Call & Modem Control</u>		
Line Connection	RJ11 and RJ45	RJ12
Preset Auto Dial	Yes	Yes
Bi-directional Audio	Yes	Yes
Connect Rate - POTS	9.6kbps -33.6kbps	Yes
Connect Rate - ISDN	56kbps, 64kbps	No
Wireless Interface	Available 3.5mm jacks	Yes 3.5mm jack
<u>Front Panel</u>		
Display Panel	4 x 20 Character LCD Display	4 x 20 Character LCD Display
Keypad	20 soft touch keys	20 soft touch keys
Menu Access	Rotary Encoder	Rotary Encoder
Program Level/Peak Level	Bar Graph Tree: 10 Leds	Three rows within LCD view
<u>Auxiliary Data Port</u>		
Data Channel	User Selectable	No Data Streaming!
Connector	DB9 (RS232)	DB9 (RS232)
Bit Rate Standard	200bps	200bps
USB data port	No	No
<u>Power Supply</u>	Universal Switch mode	Universal Switch mode
Supply Voltage	100VAC to 240VAC	100VAC to 240VAC
Output Voltage	+.5V, +12V, -12V	+.5V, +12V, -12V
<u>VA (Watts)</u>	25	25
<u>Dimensions - Field Unit</u>		
Width	8.25"	8.25"
Depth	8.66"	8.66"
Height	3.15"	3.15"
Weight	2.65 lbs.	2.65 lbs.

Appendix A—One Year Limited Warranty

MUSICAM USA, formerly known as Corporate Computer Systems (CCS) warrants to the original purchaser that each of its hardware products and all components therein contained will be free from defects in materials and/or workmanship for one (1) year from the date of purchase. Any warranty hereunder is extended only to the original purchaser and is not assignable.

In the event of a malfunction or other indication of failure attributable directly to faulty workmanship and/or material, MUSICAM USA will, at its option, repair or replace said device or components, to whatever extent it shall deem necessary to restore said device to proper operating condition.

Before returning a device for repair, the customer must call MUSICAM USA at (732) 739-5600 or e-mail Tech Support at support@musicamusa.com and obtain a return authorization number. This number should be included with the customer's mailing address and telephone number when the product is returned.

Products must be returned to:

MUSICAM USA

670 North Beers St. Building #4

Holmdel, NJ 07733

U.S.A.

Attention: Warranty Repair RMA# _____

During the first year after the date of purchase, all labor and materials will be provided without charge. There shall be no warranty for either parts or labor after the expiration of 1 year from the date of purchase.

Units must be returned postage pre-paid. It is recommended that the unit be insured and securely packed when shipped. Units returned which are out of warranty will be repaired or replaced (at the option of MUSICAM USA) and the customer will be charged for parts and labor at current rates.

Units will be returned to the customer after repair or replacement has been completed by carrier and method chosen by MUSICAM USA to any destination within the United States of America. Should a customer desire some other specific form of conveyance, or be located beyond the US borders, the customer must bear the cost of return shipment.

The customer shall be solely responsible for the failure of any MUSICAM USA hardware computer product, or component thereof, resulting from accident, abuse or misapplication of the product, and MUSICAM USA assumes no liability as a consequence of such events under the terms of this Warranty.

While every effort on the part of MUSICAM USA has been made to provide clear and accurate technical information on the application of its products, MUSICAM USA assumes no liability in any events that may arise from the use of said technical information.

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Appendix B— Liberty Technical Specifications

Frequency Response

24.0 kb/s-33.6 kb/s	15 kHz
14.4 kb/s-21.6 kb/s	7 kHz
12.0 kb/s	6 kHz
9.6 kb/s	5 kHz

Analog Audio

Audio Inputs	2 Mic/Line/Balanced/Unbalanced
Nominal output level	+4 dBm
Connectors	XLR
Headphone output	2 x ¼" phone connectors
Converters	20 Bit A/D and D/A
Saturation Level	+18 dBu
Gain (maximum)	Mic 75 dB unbalanced 35 dB line 15 dB

Call Control

Line connection	RJ11 connector
External Handset input	RJ11 connector
Bi-directional Audio	Yes
Connect Rate	9.6 kb/s-33.6 kb/s

Front Panel

Display Panel	4 x 20 Character LCD Display
Keypad	20 soft touch keys with programmable hot keys
Menu Access	Rotary Encoder

Rear Panel

Auxiliary Data Port	
Data Channel	User selectable
Connector	DB9 (RS232)
Bit Rate	80 bps -200 bps

Power Supply

Universal 100-240 VAC

Dimensions—Portable Unit

Width	8.25" (21 cm)
Depth	8.75" (22.2 cm)
Height	3.25" (8.3 cm)
Net Weight	2.75 lbs. (1.25 kg)

International Compliances

FCC-Part 15,68	Country USA
CE	UK and Europe
CSA	Canada/USA
A and C tick	Australia

INDEX

A	
Alarm Dial.....	22
Appendix A—One Year Limited Warranty..	45
Appendix B— Liberty Technical Specifications	46
Auto Reneg	17
Up, Down.....	20
C	
Chat	38
CLEAR Key	12
Codec.....	19
Con Tones.....	18
Control Mode	
Local.....	17
Control Ports	
setting	23
CONTROLS & CONNECTIONS	5
Country	
Telephone standards	22
D	
Defaults	
Restoring Factory settings.....	8
Dial Method.....	19
Dial Tone	18
ignore,detect.....	20
Dialing	
From An Office or Hotel Room	9
Interstate or International.....	10
Keypad	9
memory	10
Dialling	
handset.....	9
Dialling Pause	
Inserting	18, 21
DSP Based Compressor Limiter	25
E	
Escape Key	12
F	
F Keys	
Allocate functions	23
Function Keys	
Available options for allocation	13
Default key settings.....	12
Loopback Mode	13
Rem Piezo Alm	12
Remote control Ports	12
Renegotiate down	13
Renegotiate Up	12
Retrain current	12
Functions	40
G	
GETTING STARTED	8
I	
Input Gain	
Preamplifier gain.....	19
Settings.....	21
Intelligent Gain Control (IGC).....	25
INTRODUCTION	3
L	
Lock & Unlock	
Alter lock code	23
Default lock code.....	23
Loop back mode.....	24
M	
Max Bitrate	18, 20
Memory Setup	24
MENU NAVIGATION KNOB	
Operation	6
Modem Monitor.....	18, 20
O	
Operation	
POTS	16
Operation Mode	
ISDN	23
Leased Line	23
POTS	23
Telephone.....	23
P	
Pause time.....	18, 21. See Dialing
Phone Book	39
Pots	
line quality.....	25
optimising a connection	25
POTS	3, 17, 18, 19, 20, 32
PPM	21
Prefix mode	21
Q	
Quick Function Tips	12
R	
Relay Operation	21
Reset	
All.....	24
DSP	23
Factory defaults	23
Function memories	24
phone memories.....	24
S	
Serial Port.....	17
Specifications	44
Storing a phone number.....	10

T

Test Modes 24
Tone Generator 24
Toolbox
 COM port 28
 connecting cable 28
 connection problems 28
 F keys 42
 Line monitor 36
 local control..... 34

Phone book39
POTS setup32
Preparing to use28
 saving changes31
 software upload.....42
 starting a session29
Toolbox software28

U

Unit Details24
Upgrading software43