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AIR/GROUND COMMUNICATIONS
ACB-560

Voice Switch Simulator (VSS)
Module Manual

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Job	Approvals	Date	
Originator:	J CHEN	05/29/2003	CIE ENGINEERING INC. 6001 Woodlake Lane, Alexandria, VA 22310 (703) 922-7061
Approved:			
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1.0 INTRODUCTION

This Module Manual provides detailed information about the Voice Switch Simulator (VSS).

The Voice Switch Simulator is designed to act as a VSCS simulator for the RPDE-GNI. The intended purpose of the VSS is to assist FAA NEXCOM contractors in developing their GNI systems.

The VCM has been developed for the **NEXCOM Group (ACB-560)** of the Federal Aviation Administration's William J. Hughes Technical Center. The NEXCOM Group supports the following NEXCOM programs:

- Next Generation A/G Communications System (NEXCOM)
- Rapid Prototype Development Effort (RPDE)
- NEXCOM System Demonstrations

1.1 PURPOSE

The purpose of this document is to present Voice Switch Simulator (VSS) installation and operation instructions.

The VSS and associated documentation are intended solely to facilitate development of NEXCOM RPDE. The VSS and associated documentation neither implies nor imposes functional, performance, design or other requirements, nor in any way alters the existing industry agreements.

1.2 DOCUMENT CONVENTIONS

N/A.

1.3 INTENDED AUDIENCE AND READING SUGGESTIONS

This document is intended for NEXCOM contractors.

1.4 REFERENCES

Reference documentation includes:

- Federal Aviation Administration document FAA-E-2885

1.5 REVISION HISTORY

Date	Revision	Description of Changes
05/29/2003	1.0	Initial Release

2.0 GENERAL DESCRIPTION

2.1 OVERVIEW

The VSS consists of two individual Voice Channel Modules (VCM) mounted in a single chassis (see Figure 1). The modules are identical to each other. Each module will be responsible for all the control and monitoring functions for a single controller position. This document will describe the operation of a single module but is applicable to any VCM module in a VSS system.

Figure 1. VSS Interface Panel

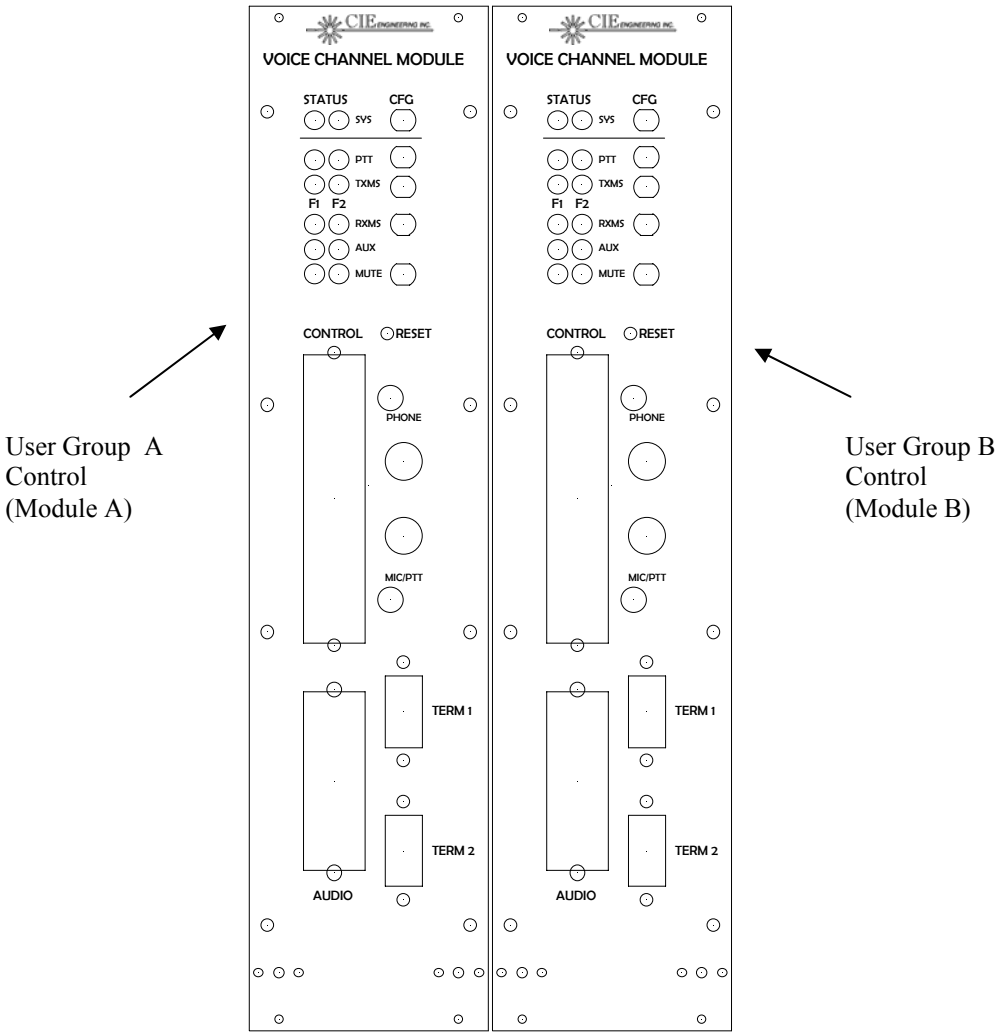
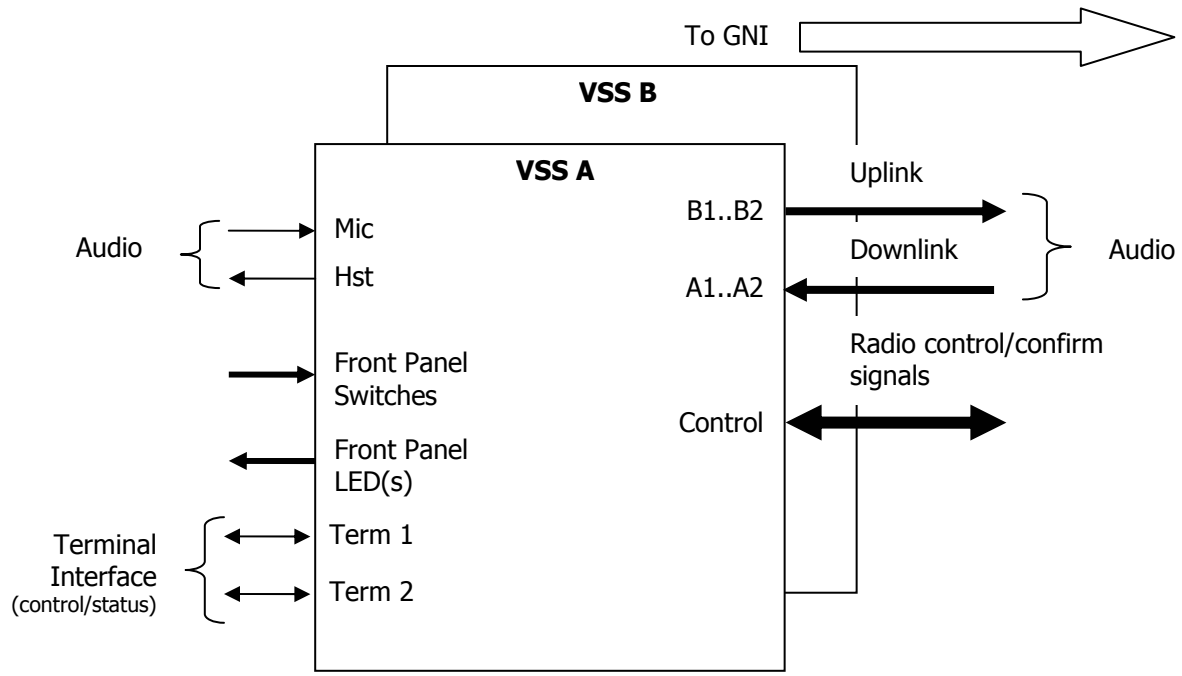


Figure 2 provides an interface diagram for a single module of the Voice Switch Simulator (VSS).

Figure 2. Voice Switch Simulator (VSS) Block Diagram



2.2 FEATURES

The Voice Switch Simulator (VSS) provides the following features:

- Power On Self Test (POST)
- Ability to generate uplink audio
- Ability to monitor downlink audio
- Ability to control radio control signals
- Ability to operate in 'B' or 'C' mode for radio control signals
- Ability to time assertion of radio control signal and reception of confirm signal to within 1ms of accuracy
- Ability to display state changes of radio control, confirm signals on terminal along with time stamp
- Non-volatile audio level adjustments
- Test tone generation
- Visual indication of audio levels
- Terminal-based software upgrades (via XMODEM protocol).

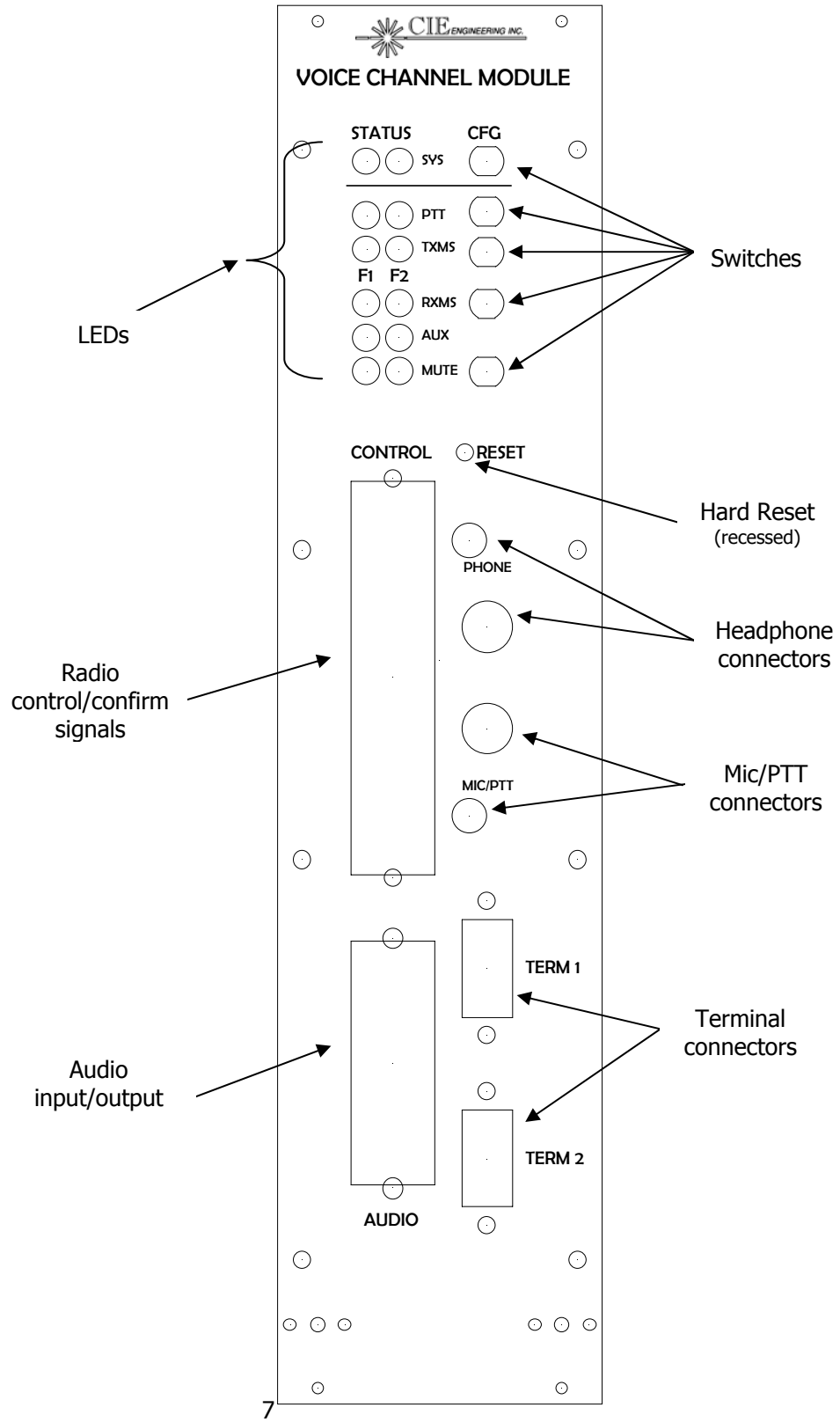
3.0 CONNECTORS, CONTROLS & INDICATORS

The VSS includes the following connectors, controls and LED displays:

- Control Interface (x1) – interface for radio control and confirmation signals
- Terminal Interface (x2) – terminal command interface for unit configuration
- Audio Interfaces (x4) – audio for uplink and downlink
- Headset Interface (x2) – audio monitoring
- Microphone Interface (x2) – audio generation
- Switches (x5) – interface for modification of radio control signals
- LED Indicators (x12) –unit mode and status information

Figure 1 contains illustrations of the VSS interface panels showing the location of connectors and LEDs.

Figure 3. VSS Interface Panel



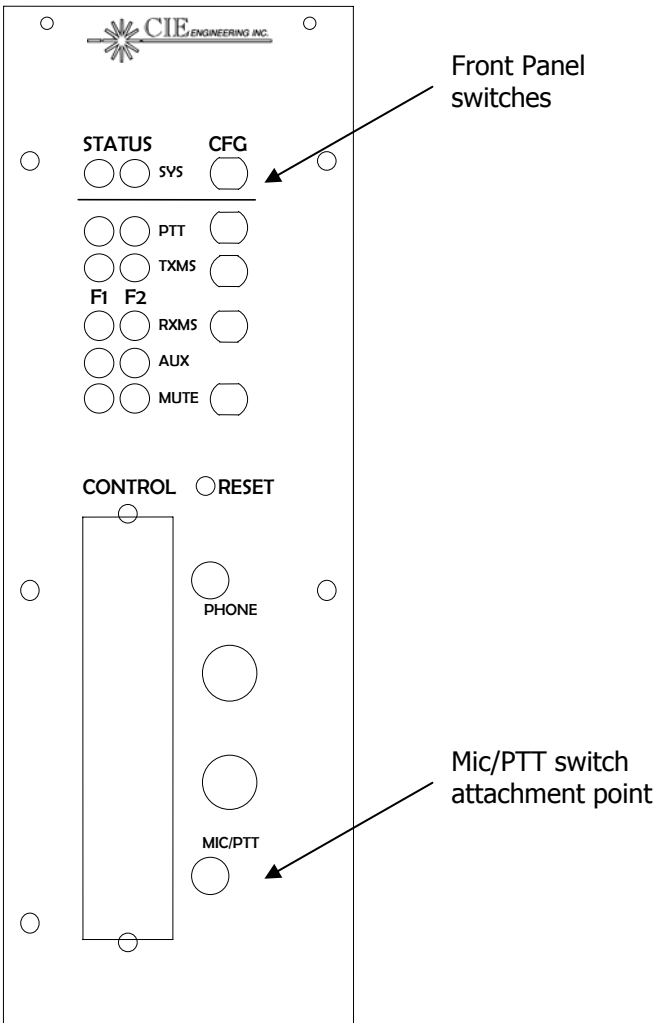
3.1 FRONT PANEL SWITCHES

The VSS contains 5 three 3 position front panel switches and 1 push to talk switch attachment point. The front panel switches will be the primary interface the user has for PTT assertion and standby and main radio selection.

3.1.1 Switch Locations

The switches are designated SYS, PTT, TXMS, RXMS, MUTE see Figure 4.

Figure 4. VSS Switch Designations



3.1.2 Switch Functionality

The SYS switch is a front panel control switch. When placed in the left or center position the front panel control the F1 radio control signals.

The switches function according to the table below.

Table 1. Switch Functions

Switch	Position		
	Left	**Middle**	**Right**
SYS	F1 control	F1 Control	Unused
PTT	Assert push to talk	No Override	Push to talk not asserted
TXMS	Select TX Main Radio	No Override	Select TX Standby Radio
RXMS	Select RX Main Radio	No Override	Select RX Standby Radio
MUTE	Mute Selected	No Override	No Mute Selected

Switch	Position	
	Pressed	**Released**
MIC/PTT	Assert push to talk	push to talk not asserted

Note: To enable the MIC/PTT, insure the PTT switch is placed in the RIGHT position.

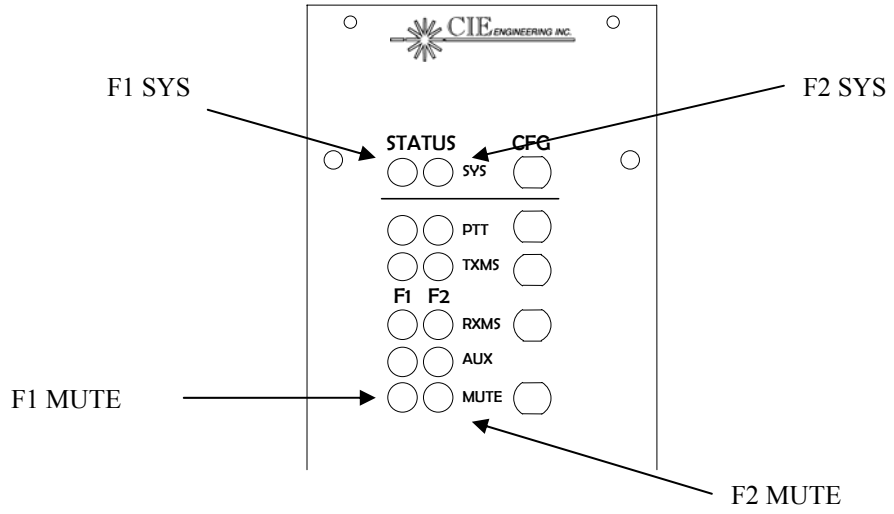
3.2 FRONT PANEL LEDS

The module contains 12 bi-color (off, red, green)

3.2.1 LED Locations

The front panel LEDs are designated by its column followed by its row see Figure 5.

Figure 5. VSS LED Designations



3.2.2 LED Functionality

The LEDs will be used to display the current PTT and main/standby radio selections along with the associated confirmation signals. See Table 2.

Table 2. LED Functions

LED	Led States				
	Off	**Green**	**Blink Green**	**Red**	**Blink Red**
F1 SYS	Unused	Unused	System operating normally	System error detected	Unused
F1 PTT	No PTT asserted	PTT Main selected and confirm signal received	PTT confirm does not match PTT Main selection	PTT Standby selected and confirm signal received	PTT Standby confirm does not match PTT standby selection
F1 TXMS	Unused	TX main selected and confirmed	TX main confirm does not match TX main selection	TX standby selected and confirmed	TX standby confirm does not match TX standby selection
F1 RXMS	Unused	RX main selected and confirmed	RX main confirm does not match RX main selection	RX standby selected and confirmed	RX standby confirm does not match RX standby selection
F1 AUX	Unused	Normal Audio	Unused	Unused	Peak audio detected
F1 MUTE	No mute selected	Mute selected and confirmed	Mute confirm does not match mute selection	Unused	Unused

3.3 RADIO CONTROL/CONFIRM SIGNALS

The VSS provides monitoring and control of all the signals according to Table 4 and Table 5 as required by the document FAA-E-2885 in both 'B' and 'C' modes of operation. The B mode of operation uses voltage signals (+12V/GND). The C mode of operation uses contact closure signals (OPEN/CLOSED). All signals are available on the front panel CONTROL connector.

3.3.1 Control/Confirm Signals

Table 3 denotes the radio control / confirm signals present in each mode of operation.

Table 3. Control / Confirm Signals present each mode

	Mode	
Signal	**B**	**C**
F1 PTTM	X	X
F1 PTTS	-	X
F1TXMS	X	X
F1 RXMS	X	X
F1 MUTE	X	-
F2 PTTM	X	X
F2 PTTS	-	X
F2TXMS	X	X
F2 RXMS	X	X
F2 MUTE	X	-
F1 PTT Confirm	X	X
F1 TXMS Confirm	X	X
F1 RXMS Confirm	X	X
F1 Mute Confirm	X	-
F2 PTT Confirm	X	X
F2 TXMS Confirm	X	X
F2 RXMS Confirm	X	X
F2 Mute Confirm	X	-

X	Signal is present in mode
-	Signal is not present in mode

3.3.2 'B' Mode Characteristics

The VSS will send +12 VDC to actuate control signals.

Table 4. 'B' Mode Signals

Symbol	Pin	Source	Symbol Function
Out00+	1	VSS	F1 PTT PTT,+12 VDC PTT Release, 0 VDC
Out02+	3	VSS	F1 Transmitter M/S Select Select Standby, +12 VDC Select Main, 0 VDC
Out03+	4	VSS	F1 Receiver M/S Select Select Standby, +12 VDC Select Main, 0 VDC
Out04+	5	VSS	F1 Receiver Mute/Unmute Receiver Mute, +12 VDC Receiver not muted (Unmute), 0 VDC
DIN0	16	GNI	F1 PTT Confirm PTT Confirmation, +12 VDC PTT Release Confirmation, 0 VDC
DIN2	18	GNI	F1 Transmitter M/S Confirm Standby Transmitter Selected, +12 VDC Main Transmitter Selected, 0 VDC
DIN3	19	GNI	F1 Receiver M/S Confirm Standby Transmitter Selected, +12 VDC Main Transmitter Selected, 0 VDC
DIN4	20	GNI	F1 Mute Confirm Receiver is muted, +12 VDC Receiver not muted, 0 VDC
DIN9	49	GNI	Mute Confirm Receiver is muted, +12 VDC Receiver not muted, 0 VDC
GND	25, 50		Ground
Unused	2, 6, 8-15, 17, 21, 22-48		These signals are unused. They **must** be left unconnected.

3.3.3 'C' Mode Characteristics

The VSS provides the required contact closure interface.

Table 5. 'C' Mode Signals

Symbol	Pin	Source	Symbol Function
Out00+	1	VSS	F1 PTT Main PTT, Contact closure between Out00+, Out00- PTT Release, open
Out00-	26		
Out01+	2	VSS	F1 Push to talk standby PTT, Contact closure between Out01+, Out01- PTT Release, open
Out01-	27		
Out02+	3	VSS	F1 Transmitter M/S Select Select Standby, Contact closure between Out02+, Out02- Select Main, open
Out02-	28		
Out03+	4	VSS	F1 Receiver M/S Select Select Standby, Contact closure between Out03+, Out03- Select Main, open
Out03-	29		
DIN0	16	GNI	F1 PTT Confirm PTT Confirmation, Contact closure between DIN0 to ground PTT Release Confirmation, open
DIN2	18	GNI	F1 Transmitter M/S Confirm Standby Transmitter Selected, Contact closure between DIN2 to ground Main Transmitter Selected, open
DIN3	19	GNI	F1 Receiver M/S Confirm Standby Transmitter Selected, Contact closure between DIN3 to ground Main Transmitter Selected, open
GND	25, 50		Ground
Unused	5-15, 17, 21-24 30-49		These signals are unused. They **must** be left unconnected.

Note: The VSS includes a pull-up resistor on DINx signals to insure an inactive state when the signal is not connected.

3.4 AUDIO INPUT OUPUT

3.4.1 Audio Connector

The 24 pin audio input output connector provides the interface for transferring audio to the VSS module. Table 6 provides connector pin and signal information.

Table 6. Analog Audio Input Output Signal Description

Symbol	Pin	Pin Type	Name/Function
A1-	24	Input	F1RXM – Frequency 1 main receive
A1+	12		
A2-	23	Input	F1RXS – Frequency 1 standby receive
A2+	11		
A3-	21	Input	Unused
A3+	10		
A4-	21	Input	Unused
A4+	9		
A5-	20	Input	Unused
A5+	8		
A6-	19	Input	Unused
A6+	7		
B1-	6	Output	F1TXM – Frequency 1 main transmit
B1+	18		
B2-	5	Output	F1TXS – Frequency 1 standby transmit
B2+	17		
B3-	4	Output	Unused
B3+	16		
B4-	3	Output	Unused
B4+	15		
B5-	2	Output	Unused
B5+	14		
B6-	1	Output	Unused
B6+	13		

3.4.2 PHONE Connector

The VSS provides both a 3.5mm and .250" standard monaural headset jacks. The connector signals are internally wired together, so use only one jack at a time. The large jack is compatible with Sigtronics Model S-20 Headset.

Table 7. PHONE Connector Pin Out		
Pin	**LARGE Jack**	**SMALL Jack**
Tip	Headphone (positive)	Headphone (negative)
Ring	Not Appliable	Not connected
Sleeve	Headphone (negative)/GND	Headphone (positive)

3.4.3 MIC/PTT Connector

The VSS provides both a 3.5mm and .206" standard microphone/PTT connectors. The connector signals are internally wired together, so use only one jack at a time. The large jack is compatible with Sigtronics Model S-20 Headset with separate PTT adapter.

Table 8. MIC/PTT Connector Pin Out		
Pin	**LARGE Jack**	**SMALL Jack**
Tip	Microphone	Push To Talk
Ring	Push To Talk	Microphone
Sleeve	Ground	Ground

3.5 TERMINAL (TERM) INTERFACE

The VSS provides two standard computer RS-232 serial ports for communicating with the system. The terminal interface is used for configuration of the system and status retrieval.

The VSS terminal connectors are a standard DB-9F (socket type pins). Both TERM interfaces use the standard asynchronous ASCII communication protocol with the following communication parameters:

- 115200 bps, 8 data bits, 1 stop bit, no parity, hardware handshaking.

3.6 POWER ON SELF TEST (POST)

During POST the external LEDs are used to indicate POST status. This was done such that there would be a means of retrieving POST status if there were a debug port failure. If a POST test should fail the LEDs will not transition to runtime behavior but will instead hold the last POST status state. The LEDs in the following discussion will be referred to according to Table 9.

Table 9. External LED labels		
F1	**F2**	**Label**
11	10	Status
9	8	PTT
7	6	TXM/S
5	4	RXM/S
3	2	MUTE
1	0	SQBRK

Led Meaning:
LED's 2-5 will be used to indicate the numeric identification of the VSS module

	LED State			
VCM id	**LED 8**	**9**	**6**	**7**
0	Green	Off	Off	Off
1	Off	Green	Off	Off
2	Off	Off	Green	Off
3	Off	Off	Off	Green

LED's 6-7 will be used to indicate the clocking of the sport 0 bus

	LED State	
Sport 0 Clocking	**LED 4**	**5**
Local	Green	Off
Remote	Off	Green
Incorrect Rate	Red	Red

LED 0 will be used to indicate the status of the A/D

	Led State
A/D State	**LED 10**
Good	Green
Bad	Red

4.0 INSTALLATION

4.1 BASIC INSTALLATION

The VSS is connected to the RPDE-GNI via appropriate cabling through the front panel control and audio connectors. See Table 4 and Table 5 for the pin outs for the control connector. See Table 6 for the pin outs for the audio connector.

The VSS requires the use of a front panel headset (not supplied). The recommended headset is Sigtronics Model S-20 with PTT switch adapter.

5.0 OPERATION

5.1 RADIO CONTROL SIGNALS

There are two methods for manipulating the radio control / confirm signals (RCC) via the front panel switches or the terminal command "rcsig". Terminal control of the RCC signal is only enabled when the front panel switch that controls that signal is set to the center position.

The PTT signal has one additional method of operation, via a push button switch connected to the MIC/PTT connector. The PTT signal is active when the button is depressed. Push button control of the PTT signal is only active when the PTT front panel switch is in the right most position.

The state of the PTT signal affects side tone. If PTT is active side tone (audio from microphone to headphone) is present. If PTT is not active there is no side tone.

The state of the TXMS signal does not affect audio in the system. Uplink audio is always provided on the B1 and B2 connectors. The VSS expects the GNI to pick the correct audio uplink source based on the state of the TXMS RCC signal.

In addition to driving the RXMS RCC signal the RXMS front panel switch also selects the audio port that the headset is monitoring. If main is selected the headset monitors audio from the A1 connector, if standby is selected the headset monitor audio from the A2 connector.

The state of the mute signal does not affect audio in the system. The VSS expects the GNI to mute the audio according to the mute RCC signal.

5.2 UPGRADING VSS SOFTWARE

The Firmware program contained in the VSS is field upgradeable via the serial port on TERM1. Please contact CIE Engineering regarding the availability of upgrade programs.

The procedure to upgrade the software is as follows:

1. Connect a terminal to TERM1. Make sure that the terminal has hardware handshaking disable for this procedure.
2. Apply power to the module or perform a software reset with the recessed button on the front panel.
3. "Booting …" and a spinning cursor will appear on the terminal for a few seconds
4. Press the escape key during the spinning cursor, before the startup sequence begins printing to the screen.
5. This will stop the boot sequence and provide a DSP Debugger prompt, which is a "!".
6. Type "DL" and then <ENTER> on the terminal.
7. The flash memory will be erased and the user will be asked to pick a file.
8. Select "Transfer File" from the terminal program. In HyperTerminal go to the "Transfer" menu and click on "Send File"
9. Select the s-record file that has been supplied for upgrade and use the Xmodem transfer protocol.
10. Send the file.
11. The file will be transferred and validated. It may take several minutes to transfer the file, do not remove power or reset during the transfer.
12. Cycle power or perform a reset. The new software version will be displayed at startup or with the **VERSION** command.

6.0 FUNCTIONAL DESCRIPTION

6.1 TIMING

The VSS supports event time stamping via two separate counters: an epoch counter and a frame counter. The epoch counter increments for each 6-second NEXCOM epoch. The frame counter increments for each 125 us period (the duration of a T1 frame). There are 48000 frame counts in an epoch.

6.1.1 System Timing

To ensure that the logs of both VSS modules and the VPA are synchronized. The VPA will send the system frame count to the VSS module over the chassis backplane.

If the VPA is not available the VSS module will generate it's own system timing. The counter will start at 0 and will be incremented by one every 125us and wrap at 47999 the same as the system frame count.

6.1.2 Epoch Counter

The VSS will also provide a epoch counter. This is a free running non-signed 32-bit counter that is incremented (by one) once every time the new frame counter is less than the previous, e.g. during frame counter rollover. Once the epoch counter reaches its maximum value of FFFFFFFFh it will rollover to 0.

The epoch counter will roll over once every

6s * 0x100000000 == 25.77 x 10 ^ 9 seconds (~819 years)

6.2 RADIO CONTROL / CONFIRM SIGNALS

There are two methods for manipulating the radio control / confirm signals (RCC) via the front panel switches or the terminal command "rcsig". Terminal control of the RCC signal is only enabled when the front panel switch that controls that signal is set to the center position.

6.2.1 Radio Control/Confirm Signal Timing

The VSS is capable of measuring the time elapsed between the assertion of a radio control signal and the confirmation of the signal. See RCSIG command in the Terminal Command Reference. The VSS is capable of better than 1ms accuracy in measuring the response time of the radio control signals. When control signal timing is enabled the VSS will display the time elapsed between the assertion of the radio control signal and its confirmation. The VSS expects a confirmation signal to be received within 1 second of its assertion. If the confirm signal timing exceeds 1 second, the VSS will time out and stop measuring the signal response time.

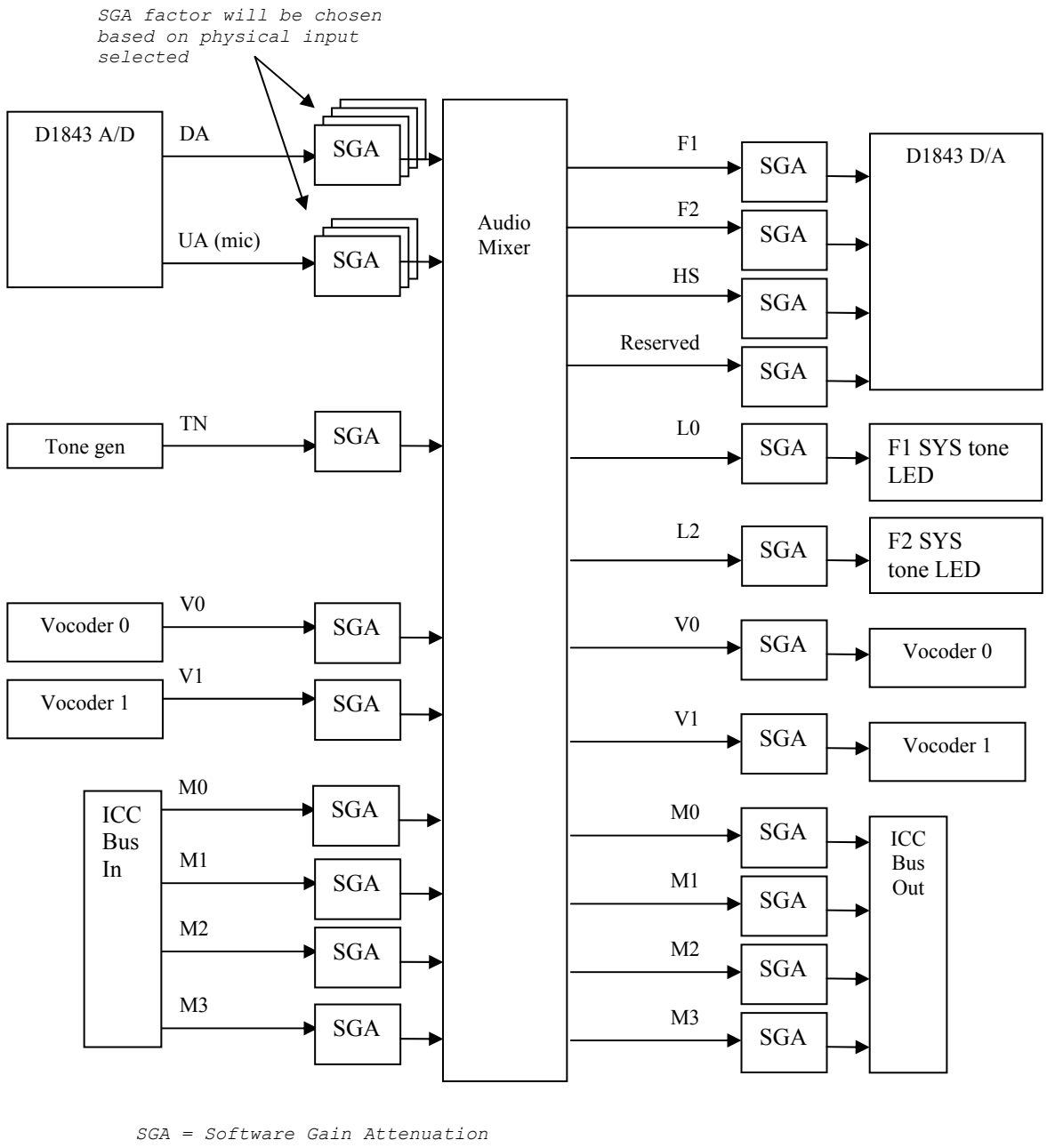
6.2.2 Radio Control/Confirm Signal Logging

The VSS provides the ability to generate a log of assertion, release and reception of radio control and confirmation signals. Each log will be stamped with the epoch count and frame count.

6.3 AUDIO

Figure 1 details the flow of audio through the system.

Figure 6. Audio Flow in System



Note: The figure above includes references to future signal flows that are reserved for future use, e.g. the vocoder and ICC bus signals.

6.3.1 Analog to Digital, Digital to Analog Converter

An Analog Devices AD1843 codec provides A/D and D/A functionality for the VSS module. The codec contains two analog to digital converters, four digital to analog converters, several audio multiplexers and gain and attenuation control for each D/A, A/D converter.

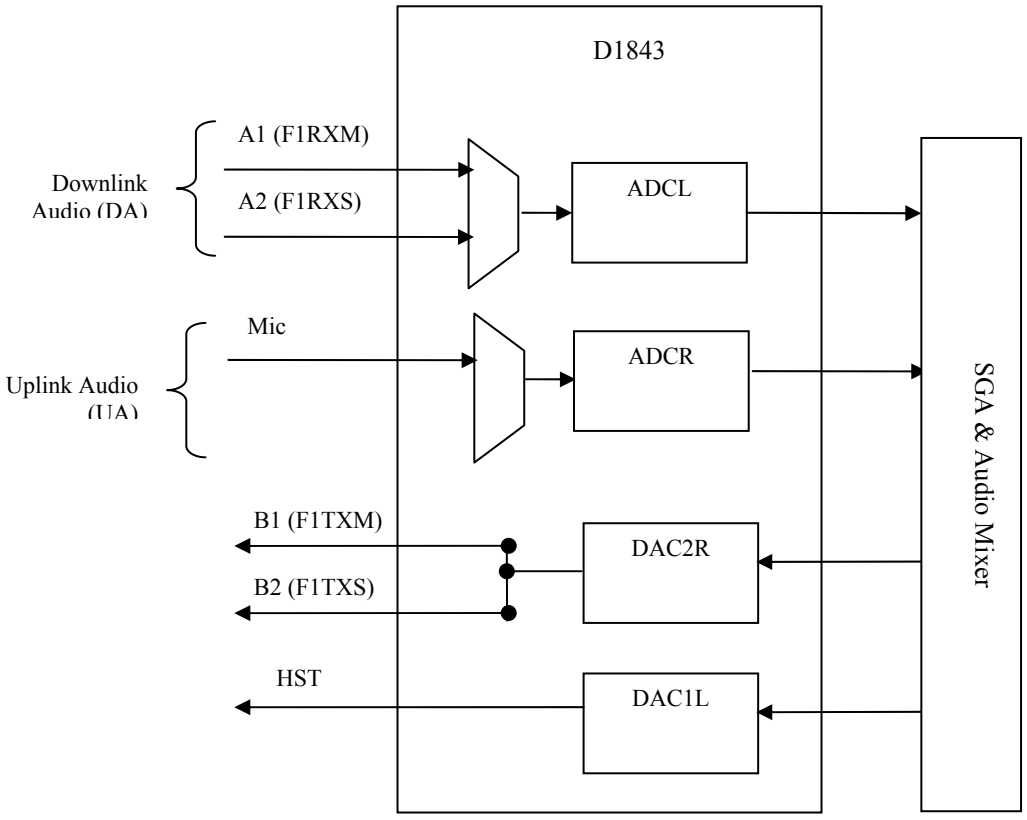
The codec is configured to sample the audio at an 8 KHz rate. The codec outputs 16-bit signed values.

The A/D channels are labeled ADCL, ADCR. The analog audio (A1 – A6) input passes through a selector before being passed through to the A/D this provides the ability to have more audio input channels than A/D converters. The VSS software controls the ADCL audio selector based on the state of the F1 RXMS request signal. When the main receiver is requested, the VSS receives audio on the A1 signal interface. When the standby receiver is requested, the VSS receives audio on the A2 signal interface.

The D/A channels are labeled DAC2R, DAC2L, DAC1R and DAC1L. The output for each D/A converter is driven on all of its outputs simultaneously. For example the same audio is heard on outputs B1 – B2.

Figure 7 is a logical diagram of the codec as configured by the VSS.

Figure 7. Analog Audio Connecters



6.3.2 Linear Audio Mixer

The mixer provides basic audio mixing and routing capability for linear audio inputs and outputs. The mixer can combine any number of inputs on a single output. If the summed inputs were to exceed a signed 16-bit value the result would saturate.

6.3.3 Software Gain Attenuation (Volume Control)

Individual volume controls are provided for each input (A1 – A6, microphone, VOC 0, VOC 1, test tone, ICC 0, ICC 1, ICC 2, ICC 3, ICC 4) and output (B1 – B6, headphone, VOC 0, VOC 1, ICC 0, ICC 1, ICC 2, ICC 3. The volume adjustment is implemented as a multiplier with a range of 0 to 63.998 in .00195 step increments. The SGA blocks are controlled with the VOL command (see Terminal Command Reference). A value of 0200 (hex) corresponds to a gain of 1.

The VSS supports multiple SGA blocks for the ADCL and ADCR signals. An SGA value is available for each multiplexed input. The VSS software selects the ADCL SGA block based on the state of the F1 RXMS request signal. When the main receiver is requested, the VSS uses the A1 signal SGA block. When the standby receiver is requested, the VSS uses the A2 SGA block. While a selection of SGA blocks is also shown for UA (MIC) in Figure 6, only the MIC SGA block is presently applicable

6.3.4 Audio Activity / Level Indication

The F1, F2 Aux LEDs are used as an audio activity / level indicator. The LED is off if no audio is detected, blink green if audio is detected and blink red if peak audio is detected. If there is a constant stream of audio or peak audio the LED will not blink but will be solid green or solid. The F1 Aux LED is currently used to monitor both downlink and uplink audio.

6.3.5 Test Tone

The VSS is capable of generating a test tone with a frequency range of 300-3400Hz.

6.3.6 Side Tone

The VSS provide a side tone (microphone to headphone) when PTT is active.

6.3.7 Vocoder

The VSS provides the ability to accommodate two ATC-10B voice encoder modules for compressing or decompressing linear audio. This feature is not currently being used.

6.3.8 ICC Bus

The VSS has the ability to send and receive up to 4 channels of linear voice data in a chassis. This feature is not currently being used.

7.0 TERMINAL COMMAND REFERENCE

The VSS provides a simple command line interface. The command line interface is not case sensitive. The command syntax is described below.

In the sections below, optional parameters are denoted with square brackets. In general, the optional parameters are used to change values. When the optional parameter is not supplied, the current configuration is displayed at the terminal interface.

7.1 TIMING RELATED COMMANDS

7.1.1 EPOCH

Command:	EPOCH
Description:	Displays/modifies the current epoch counter. The current frame count is also displayed.
Syntax	EPOCH [NEWVAL]
Parameters:	If NEWVAL not present displays the current epoch counter and frame count NEWVAL – The new value for the epoch counter (enter as hex value).
Notes:	

Examples:	`DBG: EPOCH`
	`Frame Count: 40000`
	`Epoch Count: 5001`
	`DBG: EPOCH 3000 {epoch counter set to 3000}`
	`OK`

Related Commands:	
Non-Volatile:	No

7.2 RADIO CONTROL/CONFIRM RELATED COMMANDS

7.2.1 RCMODE

Command:	RCMODE
Description:	Displays or modifies radio control/confirm signaling mode
Syntax	RCMODE [MODE]
Parameters:	If parameter MODE is not present displays the current radio control / confirm signaling mode MODE – The new mode that the radio control/confirm signals should operate in B – radio control confirms signals in B mode operation C – radio control confirms signals in C mode operation
Notes:	

Examples:	`DBG: RCMODE`
	`C {radio control/confirm signals in C mode}`
	`DBG: RCMODE B {change radio control/confirm signals to B mode}`
	`OK`

Related Commands:	
Non-Volatile:	Yes.

7.2.2 RCSIG

Command:	RCSIG
Description:	Show radio control override. Used to override the front panel control of radio control signals.
Syntax	RCSIG [SIGNAL] [STATE]
Parameters:	If SIGNAL, STATE not present displays state of all lines If STATE not present displays state of LINE SIGNAL–Indicates the control line that should be modified P1 – F1 PTT main T1 – F1 TX main/standby R1 – F1 RX main/standby M1 – F1 mute STATE – Is a value that indicates the state the control line should be set to If the LINE is PTTM, PTTS, MUTE 0 – de-asserts 1 – asserts If the LINE is TXMS, RXMS 0 – Selects main 1 – Selects standby
Notes:	The associated front panel switch must be in the NO OVERRIDE position to enable terminal control.

Examples:	`DBG: RCSIG P1 1 {F1 PTTM is set to asserted state}`
	`OK`
	`DBG: RCSIG P1`
	`1 1 {column 1 is current state of signal, column 2 is confirm, both asserted}`
	`DBG: RCSIG`
	`control | cfrm`
	`P Q T R M | P T R M`
	`F1 0 N 0 1 1 | 0 0 0 1 {PTT Main not asserted, PTT Standby not present, TX main selected, RX standby selected, mute asserted, PTT not confirmed, TX main confirmed, RX main confirmed, mute confirmed}`

Related Commands:	
Non-Volatile:	N/A

7.2.3 EVTTIME

Command:	EVTTIME
Description:	Enables printing of radio control signal timing measurements to the selected terminal interface. The current software release supports printing to a single port. When the command is issued for a terminal port, any prior printing to a different port will be automatically disabled.
Syntax	EVTTIME PORT [ENABLE]
Parameters:	If ENABLE is not present displays if RCC timing is enabled or not for port PORT – Port timing information should be displayed on. 1 for term 1, 2 for term 2 ENABLE – Enables or disables RCC timing E – Enables RCC timing D – Disables RCC timing

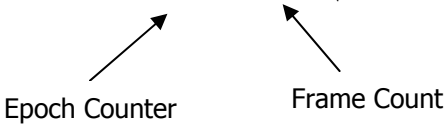
Notes:	Sample timing output when RCC timing is enabled
	`EVT: P1T 0 00000000 0000 0000`
	`EVT: T1T 0 timeout`
	`EVT: P1T 1 00000000 0623 00c4`
	Time difference between signal assertion and confirmation reception. Left number of frame counts, right number of ms.

Examples:	`DBG: EVTTIME 1`
	`d` *{RCC timing is currently disabled}*
	`DBG: EVTTIME 1 e` *{RCC timing is enabled on term 1}*
	`OK`

Related Commands:	
Non-Volatile:	Yes

7.2.4 EVTLOG

Command:	EVTLOG
Description:	Enables printing of radio control signal state changes to the selected terminal interface. The current software release supports printing to a single port. When the command is issued for a terminal port, any prior printing to a different port will be automatically disabled.
Syntax	EVTLOG PORT [ENABLE]
Parameters:	If ENABLE is not present displays if RCC logging is enabled or not or port PORT – Port timing information should be displayed on. 1 for term 1, 2 for term 2 ENABLE – Enables or disables RCC logging E – Enables RCC logging D – Disables RCC logging

Notes:	Sample output when RCC logging is enabled:
	`EVT: P1R 1 00000001 1000 (PTT Main output asserted)`
	`EVT: Q1R 0 00000001 3020 (PTT Standby output de-asserted)`
	`EVT: PTC 0 00000002 0000 (PTT confirm de-asserted)`
	`EVT: P1C 1 00000002 1000 (PTT confirm asserted)`
	`EVT: T1R 0 00000002 2690 (TXMS output main selected)`
	`EVT: R1C 1 00000002 5069 (RXMS confirm standby received)`
	 
	Epoch Counter Frame Count

Examples:	`DBG: evtlog 1`
	`1 e {event logging is currently enabled on term 1}`
	`DBG: evtlog 2 e {event logging is enabled for term 2}`
	`2 e`

Related Commands:	
Non-Volatile:	Yes

7.3 AUDIO RELATED COMMANDS

7.3.1 VOL

Command:	VOL
Description:	Displays the current volume for selected input/output or sets a new volume for selected input/output. The VOL values are entered in hexadecimal 7.9 format where the 7-bit field is the integer multiplier and the 9-bit field is the fractional multiplier. A value of 0200h corresponds to a gain of 1.
Syntax	VOL CHAN [GAVOL]
Parameters:	If VOL is not present displays the current volume for CHAN CHAN – The audio input/output that we wish to view or modify A1 A2 MC - Mic B1 – Also changes B2 B2 – Also changes B1 HP – Headphone P0 – Peak detector LED 0 P1 – Peak detector LED 1 GAVOL – The volume for the channel 0x7fff for max, 0 for min, use 0200 for gain=1.
Notes:	
Examples:	
Related Commands:	
Non-Volatile:	Yes

7.3.2 MVOL

Command:	MVOL
Description:	Display or controls the mixer control table
Syntax	MVOL [PCMOUT] [PCMIN] [VALUE]
Parameters:	If PCMIN, PCMOUT, VALUE not present displays the whole table If PCMIN, VALUE not present displays all inputs for PCMOUT If VALUE not present PCMOUT, PCMIN value displayed PCMOUT – Output for mixer F1 – F1 transmit audio F2 – F2 transmit audio HS – Headset L0 – Audio level monitor LED 0 L1 – Audio level monitor LED 1 V0 – To vocoder 0 encoder V1 – To vocoder 1 encoder M0 – ICC back plane monitor 0 M1 – ICC back plane monitor 1 M2 – ICC back plane monitor 2 M3 – ICC back plane monitor 3 PCMIN – Input for mixer DA – F1, F2 downlink audio UA – Uplink audio TN – Tone generator V0 – Vocoder 0 decoder V1 – Vocoder 1 decoder M0 – ICC back plane monitor 0 M1 – ICC back plane monitor 1 M2 – ICC back plane monitor 2 M3 – ICC back plane monitor 3 VALUE – The percent amount that PCMIN should contribute to PCMOUT audio level 0 – 0% 7fffh – 100%
Notes:	

Examples:	DBG: mvol {*display entire table*} da ua v0 v1 tn m0 m1 m2 m3 {*row is output*} hs 7fff 0000 0000 0000 0000 0000 0000 0000 0000 {*column is input*} f2 0000 0000 0000 0000 0000 0000 0000 0000 0000 f1 0000 7fff 0000 0000 0000 0000 0000 0000 0000 v0 0000 0000 0000 0000 0000 0000 0000 0000 0000 v1 0000 0000 0000 0000 0000 0000 0000 0000 0000 l0 7fff 7fff 0000 0000 0000 0000 0000 0000 0000 l1 0000 0000 0000 0000 0000 0000 0000 0000 0000 m0 0000 0000 0000 0000 0000 0000 0000 0000 0000 m1 0000 0000 0000 0000 0000 0000 0000 0000 0000 m2 0000 0000 0000 0000 0000 0000 0000 0000 0000 m3 0000 0000 0000 0000 0000 0000 0000 0000 0000 DBG: mvol hs {*display single output*} da ua v0 v1 tn m0 m1 m2 m3 hs 7fff 3fff 0000 0000 0000 0000 0000 0000 0000 {headset has 100% downlink audio routed to it, 50% uplink audio} DBG: mvol hs da {*display output input*} 7fff
Related Commands:	
Non-Volatile:	Yes

7.3.3 MTSEL

Command:	MTSEL
Description:	Selects the mixer control table
Syntax	MTSEL [TABLE]
Parameters:	If TABLE not present displays the currently selected table TABLE – The number for the mixer control table to be used
Notes:	
Examples:	
Related Commands:	
Non-Volatile:	Yes

7.3.4 STVOL

Command:	STVOL
Description:	Display / modify the side tone audio level. Sidetone is enabled only when PTT is asserted.
Syntax	STVOL [VALUE]
Parameters:	If value not present displays the current side tone VALUE – The level the side tone should be 0 – off 7fffh – Max
Notes:	
Examples:	
Related Commands:	
Non-Volatile:	Yes

7.3.5 AUDIOLED

Command:	AUDIOLED
Description:	Display or modifies the thresholds used by the audio activity LED.
Syntax	AUDIOLED LED [ACTIVE] [PEAK]
Parameters:	If ACTIVE, PEAK are not present displays the current threshold LED 1 – F1 Aux LED 2 – F2 Aux LED ACTIVE The threshold that should be used to determine if there is audio activity in the system. Ranges from 0 (very low level) to 0x7FFF max level PEAK The threshold that should be used to determine if there is audio activity in the system. Ranges from 0 (very low level) to 0x7FFF max level
Notes:	In general the ACTIVE threshold should be set below the PEAK threshold. The default ACTIVE and PEAK thresholds are 0100h and 7FF0h, respectively.
Examples:	
Related Commands:	
Non-Volatile:	Yes

7.3.6 TESTTONE

Command:	TESTTONE
Description:	Display or modifies the current settings of the tone generator
Syntax	TESTTONE [FREQ]
Parameters:	If FREQ not present displays the current test tone frequency and level FREQ – The desired frequency of the tone 300 to 3400 decimal
Notes:	
Related Commands:	
Non-Volatile:	Yes

7.4 MISCELLANEOUS

7.4.1 SAVECFG

Command:	SAVECFG
Description:	Store non-volatile configuration settings to flash
Syntax	SAVECFG
Parameters:	none
Notes:	
Examples:	
Non-Volatile:	N/A

7.4.2 DEFAULTCFG

Command:	DEFAULTCFG
Description:	Restores factory default values for all non-volatile parameters
Syntax	DEFAULTCFG
Parameters:	none
Notes:	Not all factory default values will take affect immediately. It is recommended that the system be power cycled to ensure consistency in the state of the system.
Examples:	
Non-Volatile:	N/A

7.4.3 CECHO

Command:	CECHO
Description:	Display / modifies state of command echo
Syntax	CECHO PORT [STATE]
Parameters:	PORT – Terminal to be displayed/modified 1 – term 1 2 – term 2 STATE – New state for port E – Enable D – Disable
Notes:	
Examples:	
Non-Volatile:	Yes

7.4.4 CPROMPT

Command:	CPROMPT
Description:	Display / modifies state of command prompt
Syntax	CPROMPT PORT [STATE]
Parameters:	PORT – Terminal to be displayed/modified 1 – term 1 2 – term 2 STATE – New state for port E – Enable D – Disable
Notes:	
Examples:	
Non-Volatile:	Yes

7.4.5 VERSION

Command:	VERSION
Description:	Displays software version
Syntax	VERSION
Parameters:	None
Notes:	
Examples:	
Non-Volatile:	N/A