LINEAR ACOUSTIC

AERO.mobile

Mobile Audio/Loudness Manager

User Guide

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This product may optionally contain Dolby Pulse (HE AAC) encoding and is manufactured under license from Dolby Laboratories, Inc. The encoder contains confidential unpublished works and is protected by US and foreign patents and is copyright 2007 Dolby Laboratories, Inc.

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Chapter 1: Introduction

The Linear Acoustic AERO.mobile™ is a compact audio pre-processing system for use in mobile and hand-help broadcast applications. Much more than just a typical processor, the AERO.mobile brings new psychoacoustic techniques that protect and project audio quality through even the smallest portable and hand held devices.

AERO.mobile has the following features:

- Dual processing for two separate program channels
- Linear Acoustic Mobilizer™ technology transforms normal station audio into mobile-ready audio with increased consistency and dialogue intelligibility.
- AEROMAX® 2-channel loudness and DRC engines
- Integrated LtRt or LoRo90 stereo downmixer allowing any type of stereo or surround audio to be applied
- HD/SD-SDI I/O standard with relay bypass for fail-safe operation
- Optional Dual redundant power supplies
- Optional dual stereo Dolby Pulse (HE AAC) encoder

1.1 Principles of Operation

The AERO.mobile is built on the foundation of the AERO.one and provides the same integrating long-term loudness controller, multiband short-term loudness controllers, LtRt or LoRo downmix, metadata input for channel and processing control, plus GPI control of switching functions. However, new Mobilizer technology has been added to provide a psychoacoustic boost to specific audio characteristics critical for intelligibility under adverse listening conditions such as small speakers and/or noisy environments.

Specific processing presets and adjustments are discussed in Chapter 5.

Figure 1-1 shows the internal audio path of the AERO.mobile. It should be noted that this diagram is a general representation of signal flow and shows the optional Dolby Pulse (HE AAC) encoder. Please consult the appropriate section of this manual for specific functionality.

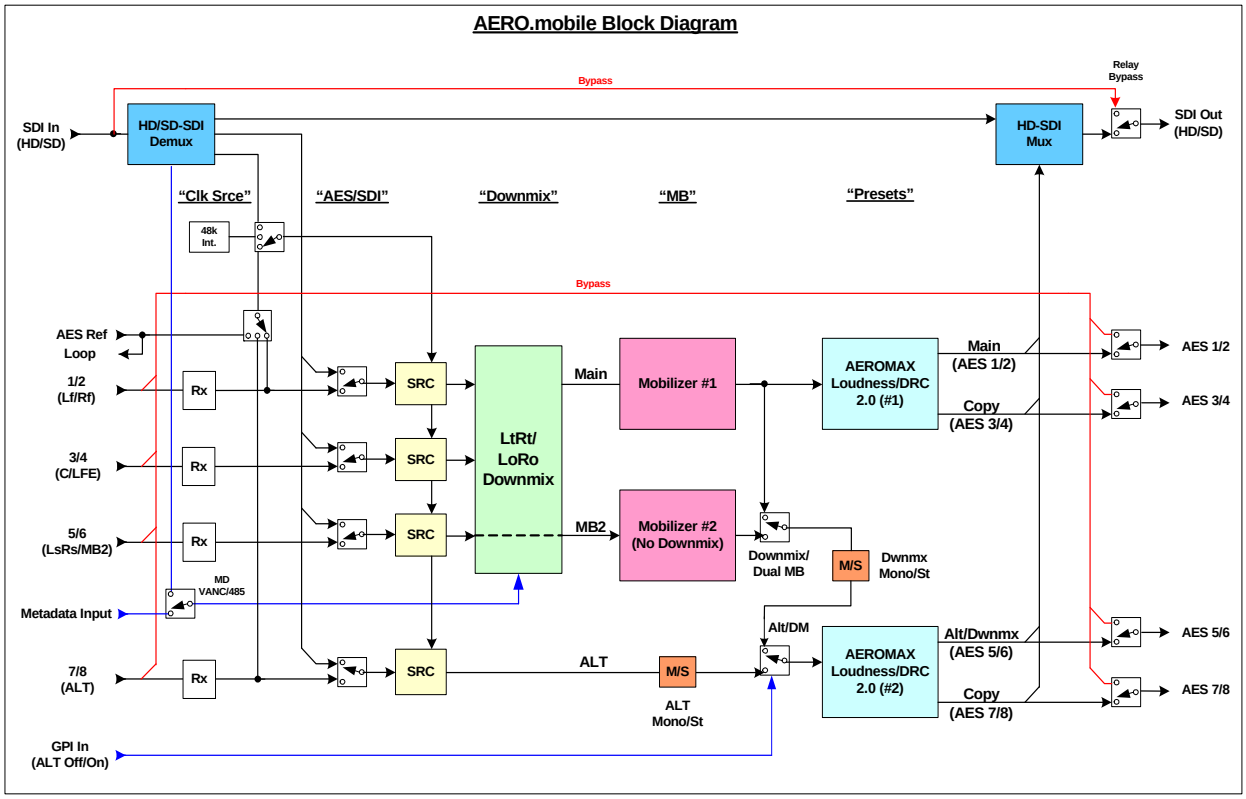

Figure 1-1 Basic Audio Block Diagram

1.2 Location of AERO.mobile

Mobile DTV operates slightly differently than standard DTV. It uses different video and audio coding, but it also connects to the multiplexer via an IP connection over Ethernet. Theoretically, this means that Mobile DTV encoding can be located just about anywhere, but likely will be at the station for connection to baseband audio and video sources. Since AERO.mobile accepts baseband audio and outputs a signal for encoding, a good installation point would be very close to the Mobile DTV encoder as shown below in Figure 1-2.

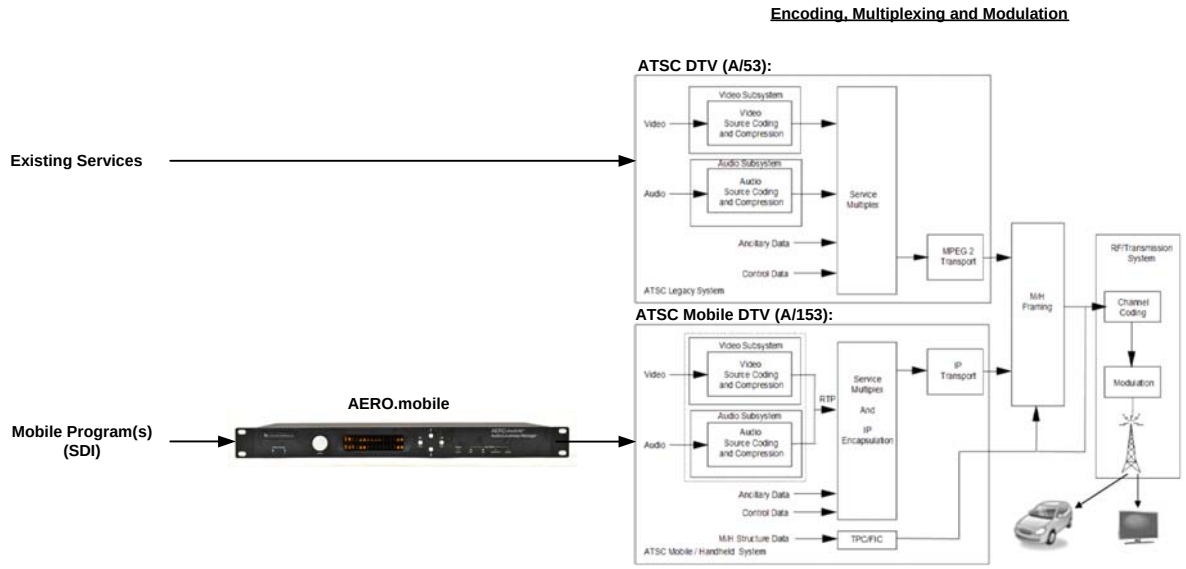

Figure 1-2 Installation of AERO.mobile for Mobile DTV programming

If the station already has a Linear Acoustic AERO.air or AERO.mobile as shown below in Figure 1-3, it can be installed near this unit.

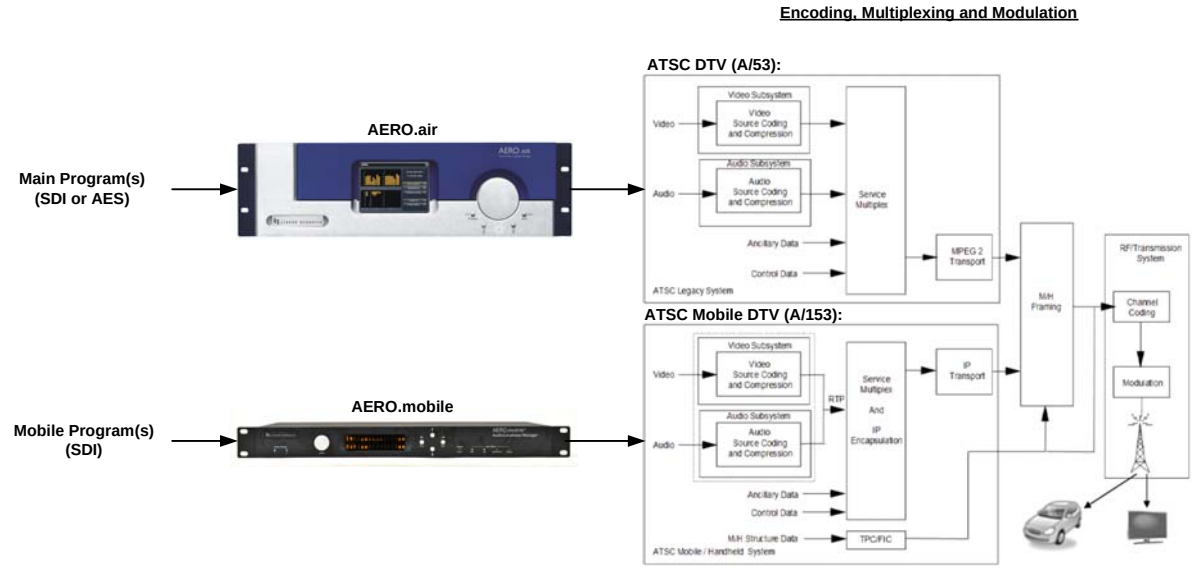

Figure 1-3 Installation of AERO.mobile for Mobile DTV and AERO.air for main DTV programming.

1.3 Reference Levels

The AERO.mobile is designed to support a standard reference level of -20dBFS. Other levels can be supported as the slow-moving Input AGC will easily compensate for any level differences.

Please see Chapter 4 for detailed information.

1.4 Reset and Upgrades

Hard reset of the unit can be accomplished by simultaneously and briefly pressing the Left, Up, and Right buttons. This will cause a quick audio disruption while the bypass relays engage, and another when the unit is finished re-booting.

Upgrades are accomplished via an Ethernet connection and a software upgrade package supplied by the factory.

WARNING: Do not connect any devices to the USB connector without specific instructions from the factory!

1.5 Warranty and Feedback

Please take a moment to fill out the postage-paid warranty card included with the unit and drop it in the mail. This will enable us to contact you if there are any software or documentation issues. Also, we are very interested in your feedback. This unit was designed based on input gathered from many broadcast engineers and it will evolve further thanks to ongoing suggestions and comments from users. We look forward to hearing from you.

Chapter 2: Connections and Quick Setup

This chapter covers all required connections for the AERO.mobile.

2.1 Unpacking and Inspection

Before unpacking the unit, inspect the outer carton for shipping damage. If the carton shows damage, inspect the unit in those areas. Please save the carefully designed shipping carton and packing materials. In the unlikely event that the unit needs to be returned to the factory, alternate cartons or packing materials may not be adequate and can cause damage not covered by warranty.

The following essential items are provided with the unit:

- Bag containing:
    - Quick-start sheet to get you up and running
    - IEC power cord(s) (style matches country of order);
    - this manual, and a handy black pen.
- Warranty information: Please fill out and return the warranty card to Linear Acoustic to ensure your software and documentation are kept up to date.

2.2 Installation

AERO.mobile installation requires:

- One standard rack space unit with ADEQUATE VENTILATION (the unit relies on convection cooling from side-panel vents);
- standard 75-Ohm BNC cables for digital signal connections;

  To connect to digital equipment with 110-Ohm XLR connectors, use impedance-matching transformers (available from Canare, Neutrik and other manufacturers).
- Proper reference. The unit can be synchronized to AES Input 1, AES Input 4, SDI, or Internal 48kHz. All inputs have SRCs but a master reference is required. Proper reference signal selection and application is imperative for an artifact-free installation. Clicks or pops can usually be traced back to improper reference configuration.

2.3 Rear Panel

The rear panel of the AERO.mobile contains its electrical I/O.

2.3.1 Connection Ports

All of the connections for AERO.mobile are on the rear panel and are described in detail below. See Chapter 5: *Specifications* for specific pinouts.

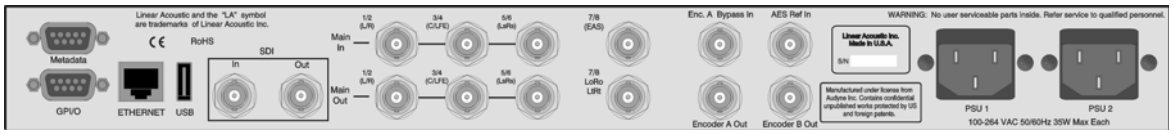

Figure 2-1 Rear Panel

- **Metadata I/O:** RS-485 connection accepts the metadata output of any Dolby equipment (DP572, DP570, etc...) or any Dolby-compatible metadata source. Not required for mobile DTV applications.

- **SDI Input/SDI Output:** Main I/O for de-embedding and re-embedding any of the 16 available channels in an applied HD or SD-SDI signal. VANC metadata extraction per SMPTE 2020 methods A and B is also supported.

- **GPI/O:** Connect dry contact closures here to control upmixing and EAS on/off. Note that GPI functions require held closures for the duration of the desired function. Status of upmixing will be reflected on the corresponding GPO pin.

- **ETHERNET:** Used for firmware upgrades.

***NOTE:** Appropriate reference must be selected for proper operation.*

- **PSU:** Dual power supply IEC inputs, 100-264 VAC, 50/60Hz. Note that these power supplies run in parallel and while only one is required for proper operation, both should be connected to separate power feeds for redundancy. A UPS is not required but clean reliable AC power is.

- **Main Audio Input**: Connect the 48kHz PCM signals to these inputs. The input channels are arranged as follows:

    - 1/2 = Left front/Right front downmixer input

    - 3/4 = Center/LFE downmixer input

- 5/6 = Left surround/Right surround downmixer input (OR input to MB2 when MB Type = MB1&MB2 Stereo)
- 7/8 = ALT input

NOTE: *MB Type = MB1&MB2 Stereo, the downmixer is bypassed and Channel 1/2 is the input for Mobilizer 1, Channel 5/6 is the input for Mobilizer 2, and 7/8 remains the ALT input.*

- **Bypass/Encoder Inputs:** OPTION - Bypass input for Dolby Digital (AC-3) encoder. Accepts output of external encoder for fail-safe operation.

NOTE: *Appropriate reference should be applied and selected for proper operation.*

- **Main Audio Outputs:** Main 48kHz processed digital audio outputs:
  - 1/2 = Main LoRo or LtRt output
  - 3/4 = utility duplicate of 1/2
  - 5/6 = Secondary CC2 program or downmixed main program output
  - 7/8 = utility duplicate of 5/6.

2.4 Quick Setup Notes

The Linear Acoustic AERO.mobile is configured at the factory and is ready to go on the air after making the proper input and output connections and determining if upmixing is desired. By default, the unit is set to accept 5.1 channel input and downmix it, apply a single Mobilizer (MB) engine, and have a second ALT input available for use.

- Apply audio to Main Input 1/2 or 1-6 if a 5.1 channel source is present
- Set Clock Reference = AES 1
- The front panel Reference indicator should be green.
- The main menu will default to showing input and output meters, and there should be activity on the first two meters.
- Processed audio will be available on the main outputs 1/2 with a duplicate on 3/4.
- If audio has been applied to 7/8 and the Ch 7/8 Output Source menu is set to ALT,

it will be processed and output from 7/8 with a duplicate on 5/6.

- When MB Type = None or MB1 (single MB engine) and the Ch 7/8 Output Source menu is set to Downmix, then the main program on 1/2 and 53/4 will also be output from 5/6 and 7/8.

- When MB Type = MB1&MB2 Stereo, the second MB engine gets its input from 5/6 and outputs to 5/6 with a duplicate on 7/8.

Flexibility sometimes comes at the price of complexity, so please refer to Chapter 4 and the Block Diagram for more information. We know this can get confusing, so call us if you get stuck, we will be happy to step you through it.

The best way to learn the processor is to explore the different settings with audio applied and monitored. There are several factory presets to support many different tastes. Some presets may not sound much different at first, but will perform very differently depending on program content. Modern broadcast television offers the ability to process less, and even the heaviest presets in the AERO.one are moderate by comparison to what might be found in traditional analog television audio processors.

NOTE: *For best audio quality, the AERO.one should be the only processor in line with station audio. Please make sure to remove any legacy processing that might have been installed for analog operation as it will impair the performance capabilities of the AERO.one. We suggest checking drawings and physical installations to make sure that this old gear is removed.*

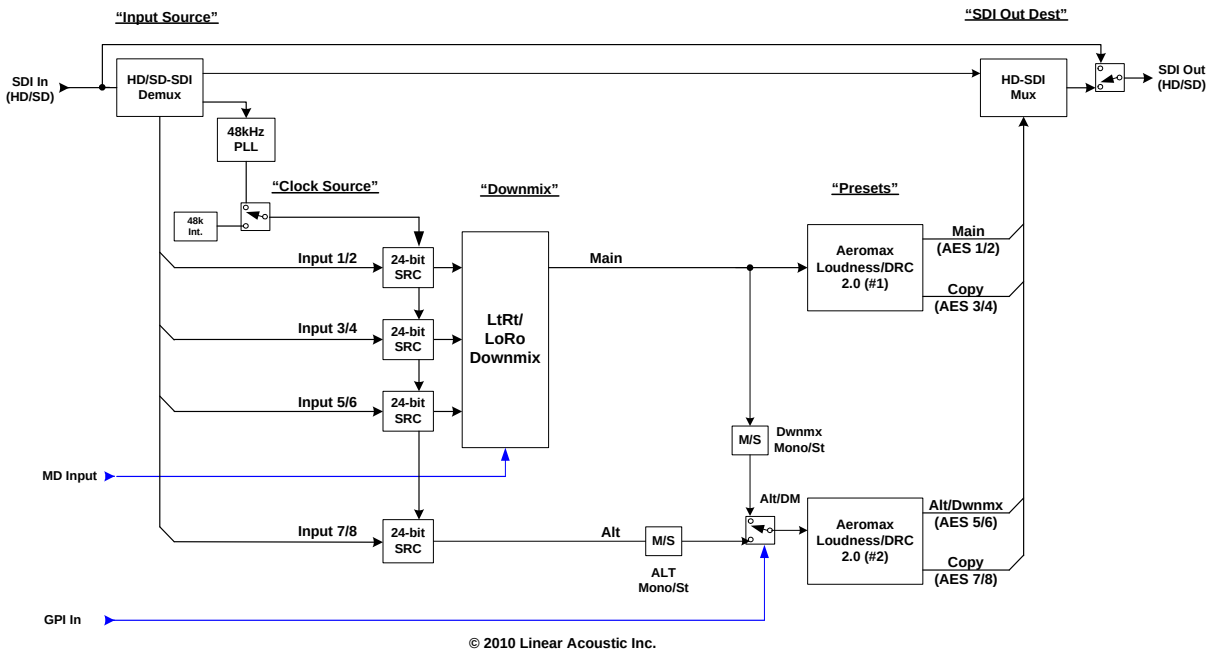

Figure 2-2 MB Type set to Downmix (no Mobilizer)

Downmix (No MB) is essentially a "Mobilizer Bypass" mode useful for checking the effects of the MB process.

With Mobilizer Type set to MB1 (Fig. 2-3):

- Input 1/2: Left Front/Right Front (LfRf) Input to MB1
- Input 3/4: Center/LFE Input to MB1
- Input 5/6: Left surround/Right surround (LsRs) Input to MB1
- Input 7/8: Alternate Input (EAS)

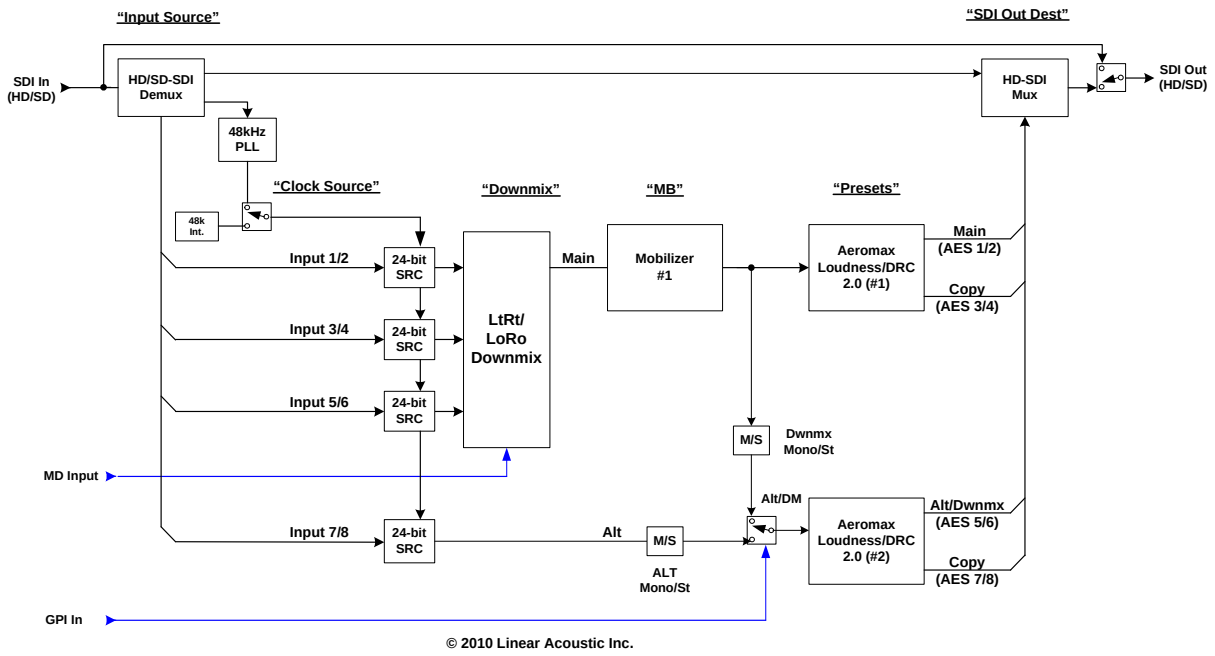

Figure 2-3 MB Type set to MB1 (one Mobilizer engine)

MB1 enables a 5.1 channel program to be input, downmixed, Mobilized then output, while providing a secondary non-Mobilized path for an alternate program.

With Mobilizer Type set to MB1&MB2 Stereo (no dowmix):

- Input 1/2: Primary MB1 Input
- Input 3/4: Not used
- Input 5/6: Secondary MB2 Input
- Input 7/8: Alternate Input (EAS)

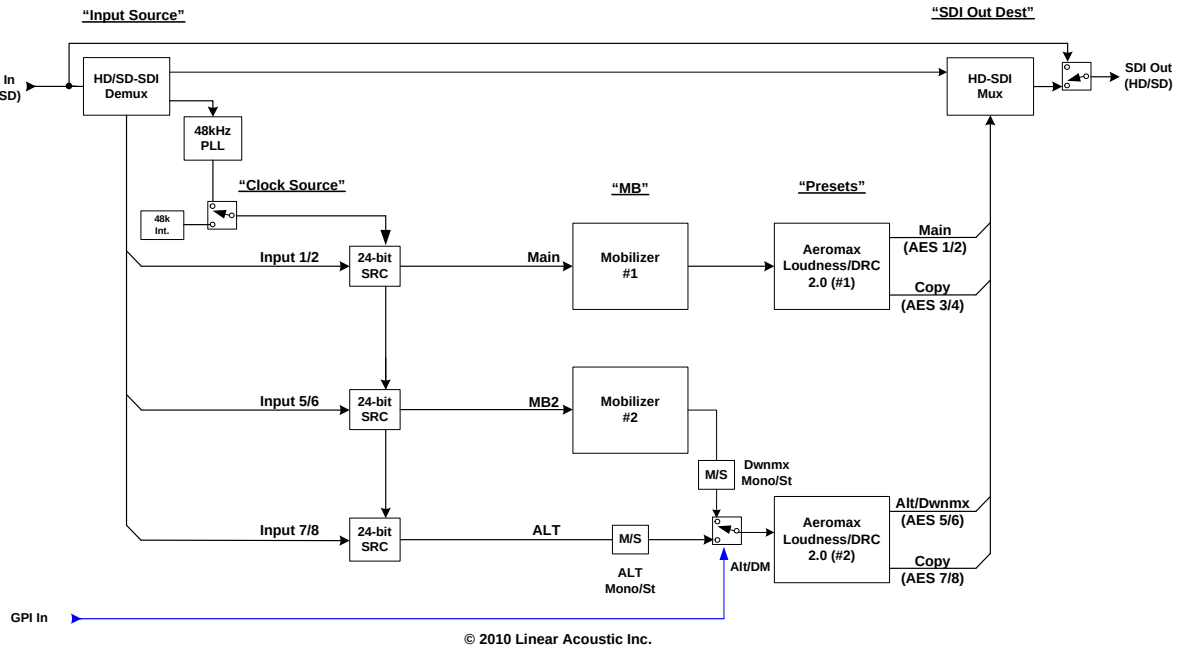

Figure 2-4 MB Type set to MB1&MB2 (Stereo)

MB1&MB2 mode provides two separate Mobilizer and AEROMAX engines for processing two independent programs.

- Audio outputs will be available as follows:
    - AES 1/2 = Primary Program (Engine 1)
    - AES 3/4 = Copy of Primary Program (Engine 1)
    - AES 5/6 = Secondary Program (Engine 2)
    - AES 7/8 = Copy of Secondary Program (Engine 2)

Once the Input and Output settings are correct, the main menu will default to showing input and output meters, and assuming audio is present in the applied SDI signal, there should be activity on at least the first two meters.

The best way to learn the processor is to explore the different settings with audio applied and monitored. There are several factory presets to support many different tastes. Some presets may not sound much different at first, but will perform very differently depending on program content. The constraints of mobile listening environments require processing that is by its very nature different than traditional processing.

NOTE: *For best audio quality, the AERO.mobile should be the only processor in line with station audio. Please make sure to remove any legacy processing that might have been installed as it will impair the performance capabilities of the AERO.mobile. We suggest checking drawings and physical installations to make sure that this old gear is removed.*

It may seem counter intuitive, but overprocessing does not allow more audio to fit in a smaller space, or be reproduced more clearly from smaller speakers. Traditional heavy processing removes critical audio cues that normally enable the human auditory system to extract important information from background noise. The AERO.mobile and its presets have been carefully designed to accentuate these cues.

Chapter 3: Applications

The AERO.mobile is intended to be used in an emission (transmission) environment. This chapter discusses several common applications for the unit. General block diagrams are provided to give the user a sense of some of what can be accomplished with the AERO.mobile unit but are by no means the only uses for the device.

Figure 3-1 below is a very high-level view of the last stages of a typical broadcast plant supporting both legacy analog transmission in addition to digital transmission. It can be seen that the AERO.mobile is being used to process a main and an alternate program, producing smooth and consistent audio appropriate for transmission to all consumers.

The AERO.mobile is also fed with a contact closure from master control and the station automation system to signify when alternate audio programming (ALT) such as EAS is present and when it is missing. This controls the ALT functionality to provide a seamless crossfade between alternate and main audio so this secondary path always has audio present. This feature saves the cost and complexity of several additional external units that would be required to perform this function.

It should be noted that the AERO.mobile can also accept and utilize metadata to control processing as well as automatically mute unused input channels. This is useful when Main In 3-6 might be presented with audio that would otherwise be ignored by downstream encoders controlled by metadata.

Metadata can be applied either via serial RS485 connection or it can be extracted from the vertical ancillary space of an applied HD-SDI signal.

Finally, note that setting clock source to SDI is required if the unit is used in an installation where the AERO.mobile is re-embedding audio.

NOTE: *When using SDI re-embedding, clock source will be forced to SDI.*

3.1 Mobile DTV Only Application

Figure 3-1 shows how an AERO.mobile can be installed to process a mobile-specific program stream. Note that up to two separate audio programs can be accommodated by the AERO.mobile.

The primary processor in the AERO.mobile can accept stereo or a full 5.1 channel program which it will downmix to stereo before processing.

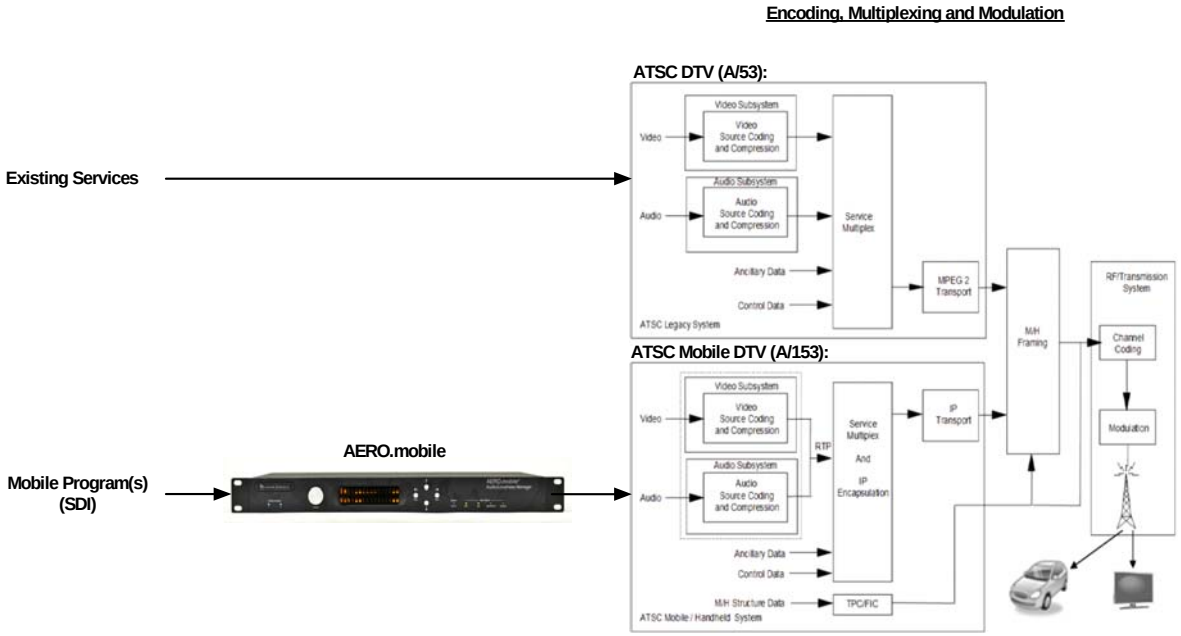

Figure 3-1 AERO.mobile general application

The second processor in AERO.mobile has the ability to accept stereo, dual channel mono, or single channel mono. It can also turn a stereo program into mono. This can be helpful for dialogue only programs by allowing the mobile audio encoder to be run at a lower bitrate. The second processor can also be commanded to switch the main program in place of the secondary program.

3.2 Standard plus Mobile Application

Figure 3-2 shows how an AERO.mobile can be installed alongside a new or existing AERO.air or AERO.one main channel audio processor. Since it is likely that the video encoders for both the mobile and the standard DTV channels will be located near each other, this is a likely scenario.

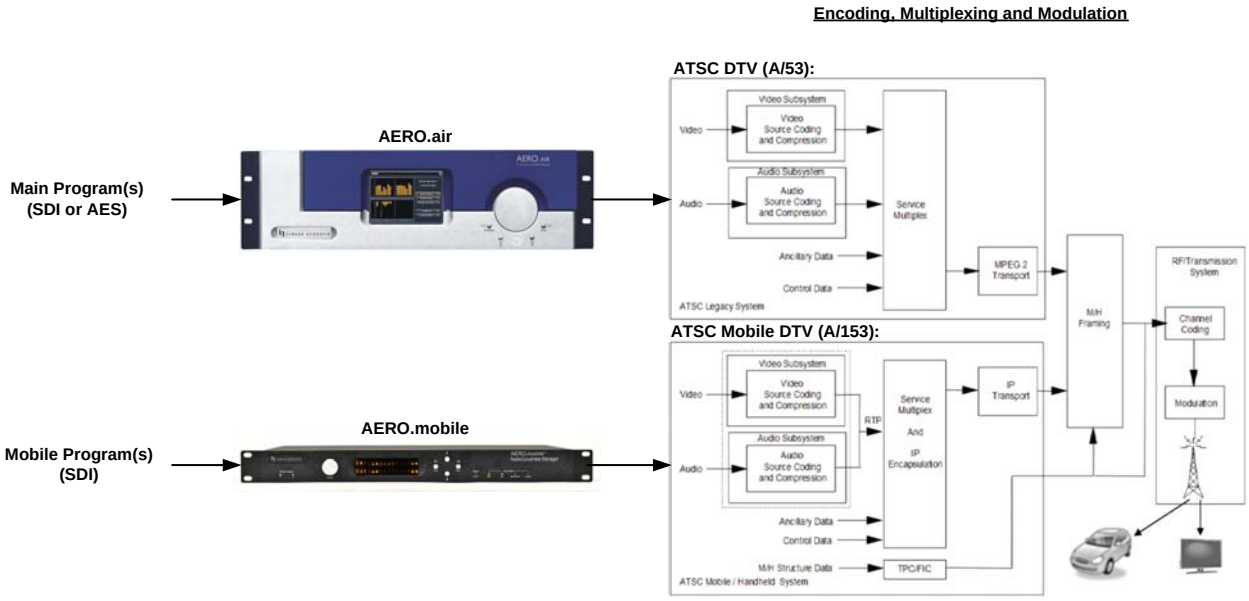

Figure 3-2 AERO.mobile for mobile DTV and AERO.air for standard DTV.

Note that it is possible to consider feeding both sources from an SDI distribution amplifier and the AERO.air will provide 5.1 channel audio and Dolby Digital encoding for the primary DTV services, while the AERO.mobile will take the same source audio and create a version appropriate for Mobile DTV transmission.

It is also possible to use the second output to create a specially tailored version for web streaming as the pre-processing that AERO.mobile performs is appropriate for web audio encoders.

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Chapter 4: Detailed Operation

This chapter discusses in detail the structure of the Linear Acoustic AERO.mobile, how to use the front panel interface to access the menus, accessing and saving factory and user processing presets, and GPI and Metadata setup.

Most of it is rather obvious, and a bit of experimentation will quickly make you comfortable navigating through the submenus. If in doubt, use the Left Arrow to back out towards the Main menu. The menus and submenus are structured to access more complex functionality as you go deeper into the hierarchy. See the page the end of this chapter for a menu tree.

4.1 Main Menu (Signal Status Meters)

Audio I/O Meters

Shows the main audio I/O for the unit, plus the status of ALT (alternate program) functionality. Signal presence meters for each audio channel applied to the processing engines are followed by outputs from the processing and downmix engines. The left display shows audio present on the 1/2, 3./4, and 5/6 inputs with corresponding downmixed output on 1/2 and 7/8. The right display shows ALT mode active where audio present on Input 7/8 is processed as the second program and is output on 7/8.

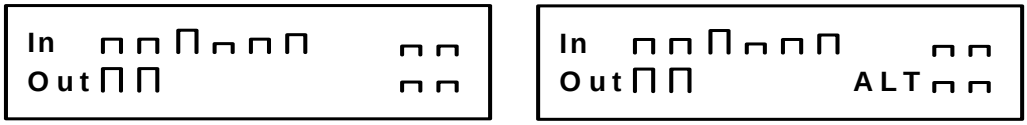


Figure 4-1 Main Audio I/O Meters

NOTE: *The AERO.mobile can operate as two independent processors (ALT Active) or can replace the secondary output with primary audio (ALT not active). This is useful to maintain continuity when alternate program audio is not present.*

Audio Input and Output Meters

The next two menus show output and ALT status with channel labels. Note that for AERO.mobile, the 5.1 channel input (L,R,C,S,Ls,Rs) is the input to the downmixer and is only active when the Mobilizer type is Downmix (No MB) or MB1 and is not active in MB1&MB2 (stereo).

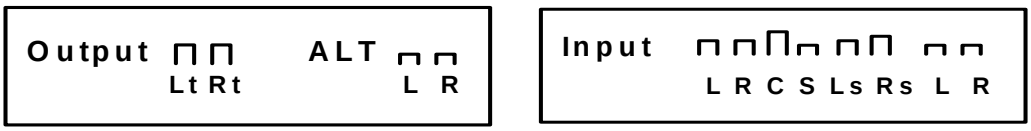


Figure 4-2 Audio signal presence and upmix indication

AGC Meters

Show the gain reduction status of the Input AGC and the Multiband AGC. More downward meter excursion indicates lower gain (more gain reduction). The center dot in each of the AGC bands shows 0dB at the center of the AGC range.

Figure 4-3 AGC Gain Reduction metering

GPI Status Display

Shows the current status of each of the four GP Inputs, plus the active preset. The screen below shows GPI 1 set for ALT, GPI 2 set for Coding Mode 2/0 (i.e. Mute inputs 3-6), GPI 3 set to select Secondary Preset, and GPI 4 set to select Primary Preset. Lower case indicates that the GPI function is set but the GPI is not active.

Figure 4-4 GPI Status Screen

Metadata Status (Pgm 1-8)

Shows the status of applied metadata signal (485 or VANC). The Program Config is shown along with the audio coding mode (acmod) and dialnorm for each of the possible eight programs.

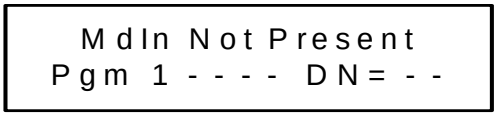


Figure 4-5 Metadata Status Screen

4.2 Statistics Menu

Provides details about software, firmware and DSP versions, DSP communications status, as well as listing any installed options. This menu also shows the presence for each of the AES pairs, 1-8.

- **Firmware Version:** 5100.03.05 (or later)
- **Device Options:** None
- **App Uptime:** Shows time running in d:hh:mm:ss
- **Ref Chg:** Counts the number of times the system reference has changed since reboot or reset
- **DSP 1 Version:** V1.7.0
- **DSP 1 TX Errors:** Shows transmission errors between micro and DSP1.
- **DSP 1 Rx Errors:** Shows receive errors between micro and DSP
- **DSP 2 Version:** V2.2.0
- **DSP 2 TX Errors:** Shows transmission errors between micro and DSP1.
- **DSP 2 Rx Errors:** Shows receive errors between micro and DSP.

4.3 Setup Menu

Entering the Setup menu gives access to **Presets/Processing adjustment**, **I/O settings**, **Communication** settings and **System** settings. With the exception of the Presets/Processing menu and the Mobilizer Menu, which are described in detail in Chapter 5, all other settings will be described below.

4.4 I/O Menu

The I/O menu is where the input and output audio, control, and metadata signals are selected to interface with the loudness control and upmixing engines.

4.4.1 Master Bypass

Enabled de-energizes the SDI and metadata relays for a hard bypass. This will of course create a momentary interruption in these signals but is useful for troubleshooting.

4.4.2 GPI Control (Flashing "g")

When enabled the unit is under GPI control and most changes are not allowed. This will be indicated in the menus by a lower-case flashing "g" in the left corner of the display.

4.4.3 GPI Function (GPI 1-4)

Selects the function of each GPI input. Selections are:

- **None:** No function for this GPI (as the name would lead you to believe)
- **Pri Preset:** GPI selects the preset defined below for the Primary processor.
- **Sec Preset:** GPI selects the preset defined below for the Secondary processor.
- **ALT Off/On:** Selects ALT (alternate audio program) audio present on input 7/8 and can be commanded to replace audio present there from downmix or the secondary Mobilizer engine in 2+2 mode. This is useful for EAS.
- **ALT On/Off:** Inverted version of above.
- **Mode 2/0 Off/On:** When active, mutes Inputs 3-6. This is done if the source audio is definitely 2 channels and prevents extraneous signals that might be present on Inputs 3-6 from being added to the downmix. Useful if the Main Input is being fed from a 4 channel source where 1/2 are the main program and 3/4 are Natural Sound or tones.

4.4.4 GPI Preset (GPI 1-4)

Defines which of the stored presets a GPI will recall. Any of the sixteen stored presets are available for selection.

4.4.5 Downmix Setup:

- **Type: LtRt/LoRo** - The AERO.mobile is able to create an LoRo or LtRt output from an applied 5.1 channel signal for output on 1/2. Note that due to the required phase encoding, selection of LtRt will increase the latency of the 7/8 output to 21 milliseconds. For mobile applications, LoRo is the recommended default.
- **Downmx Ctr Level -** Allows adjustment of Center from 0dB to -6dB for LoRo mode only, default is -3dB.
- **Downmx LFE Level -** Allows adjustment of LFE from 0dB to OFF for LoRo mode only, default is -10dB.

- **Downmx Ls/Rs Level -** Allows adjustment of Ls or Rs from 0dB to OFF for LoRo mode only, default is -3dB.

4.4.6 Clock Source (Output Reference)

AES 1, AES 4, AES Reference, SDI or Internal 48kHz can be selected as the clock reference for the outputs. Note that if a selection is made for a source that is not applied, the front panel Ref LED will be red, and the AERO.mobile will revert to internal 48kHz to maintain audio. All inputs have sample rate converters so asynchronous audio can be accepted as long as the reference is set correctly.

4.4.7 Input Sources (Channels 1-8)

Selects audio source for each of the four input pairs to the processing engines. Each corresponding AES pair (i.e. AES 1/2 for Input 1/2) or any de-embedded pair from SDI can be selected. Default is corresponding AES inputs for each pair.

4.4.8 SDI Embed

Selects whether to enable audio re-embedding or pass the SDI signal through the AERO.mobile untouched. Note this does not affect de-embedding which is active at all times.

WARNING: If SDI Embed is enabled, Clock Source should be set to SDI.

4.4.9 SDI Out Destination (Channels 1-16)

Selects source of audio for re-embedding into an applied SDI signal. Choices are Mute, AES (i.e. the processor output pair), and any of the SDI pairs. This menu can also be used as a router or pair shuffler within SDI. Default is AES Out 1/2 for SDI Out 1/2, AES 3/4 for SDI Out 3/4, AES Out 5/6 for SDI Out 5/6, and AES Out 7/8 for SDI Out 7/8. Remaining SDI outputs are source from their corresponding inputs (i.e. pass through).

4.4.10 Metadata Setup

The AERO.mobile has been designed to take best advantage of metadata. The incoming Dolby or Dolby-compatible metadata stream is parsed on a program-by-program basis, and the dialog loudness and audio coding mode (channel count) parameters are used to scale processing and control upmixing respectively. Setup of metadata can be accomplished in the AERO Setup -> I/O menu.

AERO.mobile Metadata Setup Procedure:

- **Source: RS485/VANC**- Selects between the RS-485 serial metadata input and meta-

data extracted from the Vertical Ancillary (VANC) of an applied HD-SDI signal. For VANC metadata there are several other settings:

- **VANC MD is Async:** Disabled for standard VANC metadata, Enabled for CBS-style VANC metadata. Default is Disabled.
- **VANC MD DID/SDID:** Selects the Data ID and Secondary Data ID of the metadata signal in hex. SMPTE RP2020 recommends DID be set to 0x45 and SDID be set to 0x01 and these are the defaults.
- **VANC MD Line:** Selects the video line to extract VANC metadata from. SMPTE RP2020 recommends that metadata be inserted on Line 9, but we have seen a great deal of variation, thus the default is Auto.

- **MD = 2/0 Pgm Sel:** Describes which consumer metadata program will be used to control the processing. Default and most common is Pgm 1 and this is the default.
- **MD = 2/0 Function:** Describes what will be controlled when the selected metadata program has an audio coding mode (acmod) of 2/0. Selections include:
  - **Chan Mode 2/0:** Mutes Inputs 3-6 as described above, or **None**.
- **Pri/Sec Dialnorm:** Specifies the "fallback" dialnorm value which will be used if metadata is not applied or if it fails. Separate values for Primary and Secondary programs. Default is 24.
- **Apply Dialnorm: Yes/N**o - If set to yes, then the incoming dialnorm parameter is applied to the incoming audio to scale it prior to processing. If dialnorm was set correctly upstream, then the processing will be minimal. If dialnorm does not match the audio, the AERO.mobile will realign it in real time. Default is Do Not Apply.

4.4.11 Ch 7/8 Out Src

Selects the function of each GPI input. Selections are:

- **ALT:** Allows selection of external audio present on the 7/8 input.
- **Downmix:** Allows channel 7/8 output to come from secondary processing core in MB1+MB2 mode, or the downmix of the Primary program. This is the default.

NOTE: *Ch 7/8 Out Src will be inactive if GPI is active and GPI will control this mode.*

4.4.12 ALT Mode

Selects mode of the Main In 7/8 between stereo and three mono modes. Selections are:

- **Stereo:** Channel 7/8 are passed without modification
- **Mono:** Channel 7 and 8 are summed and passed as dual mono
- **Mono Ch 7:** Channel 7 input is used for dual mono
- **Mono Ch 8:** Channel 8 input is used for dual mono

4.4.13 Downmix Ch Mode

Selects the mode of Primary Program sent to the Secondary signal processing path and eventually outputs 5/6 and 7/8 (please see the block diagram in Chapter 1):

- **Stereo:** Passes downmixed input signals directly through to 5/6 and 7/8
- **Mono:** Sums outputs 1/2 and presents them as dual mono
- **Mono Lo:** Sends Lo output of downmix as dual mono
- **Mono Ro:** Sends Ro output of downmix as dual mono

NOTE: *Downmix Ch Mode does not affect the Main Outputs 1/2 or 3/4*

4.5 SDI Status Menu

Pressing the left arrow key when at the top menu will display the status of an applied SDI signal. The SDI input is auto-sensing between SD and HD, and although it is not recommended to hard switch input streams between SD and HD if a clean switch is desired, the unit will automatically track the change. HD or SD, frame rate and frequency are displayed.

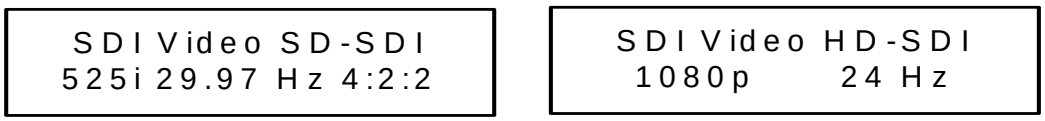
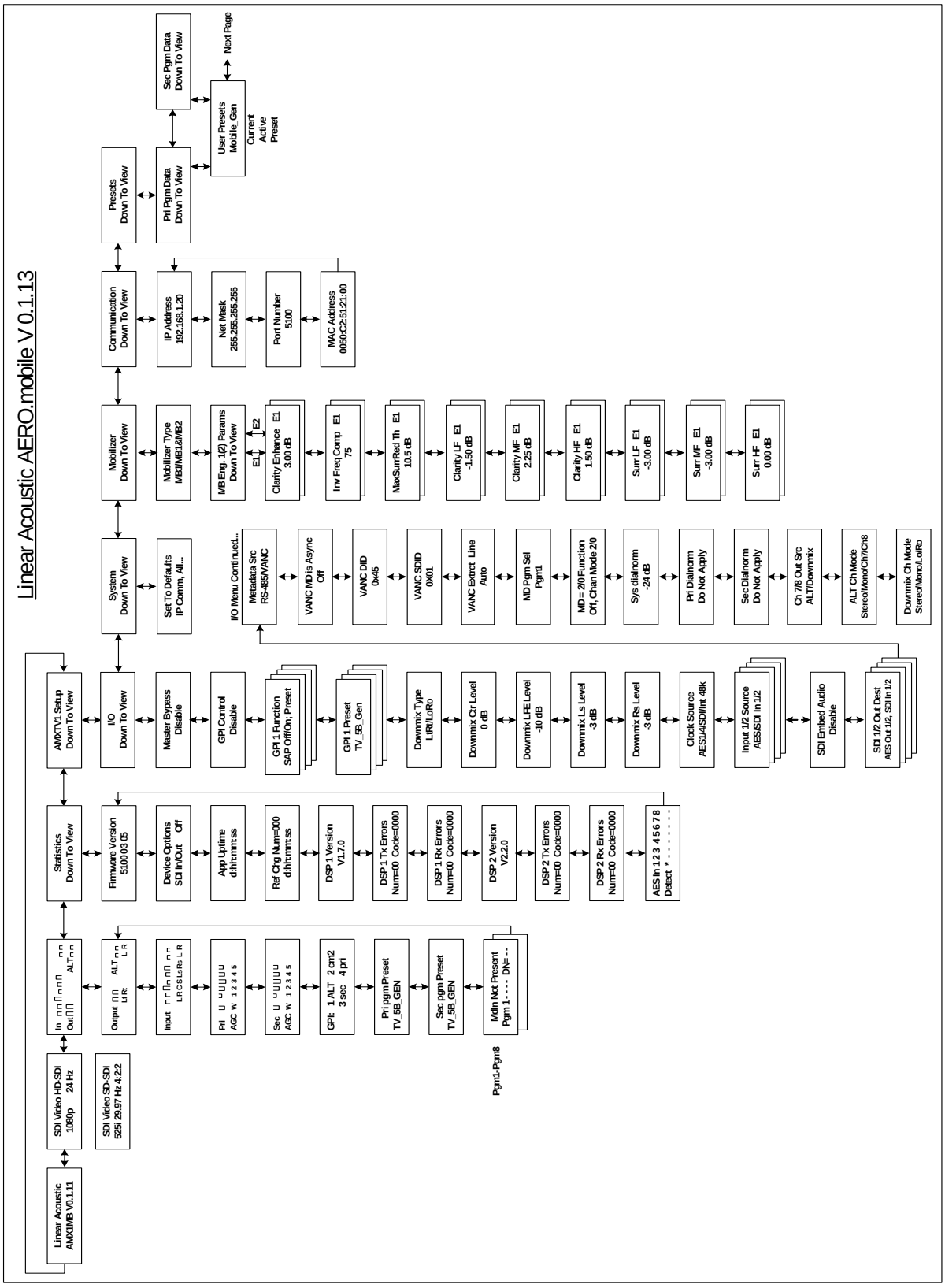
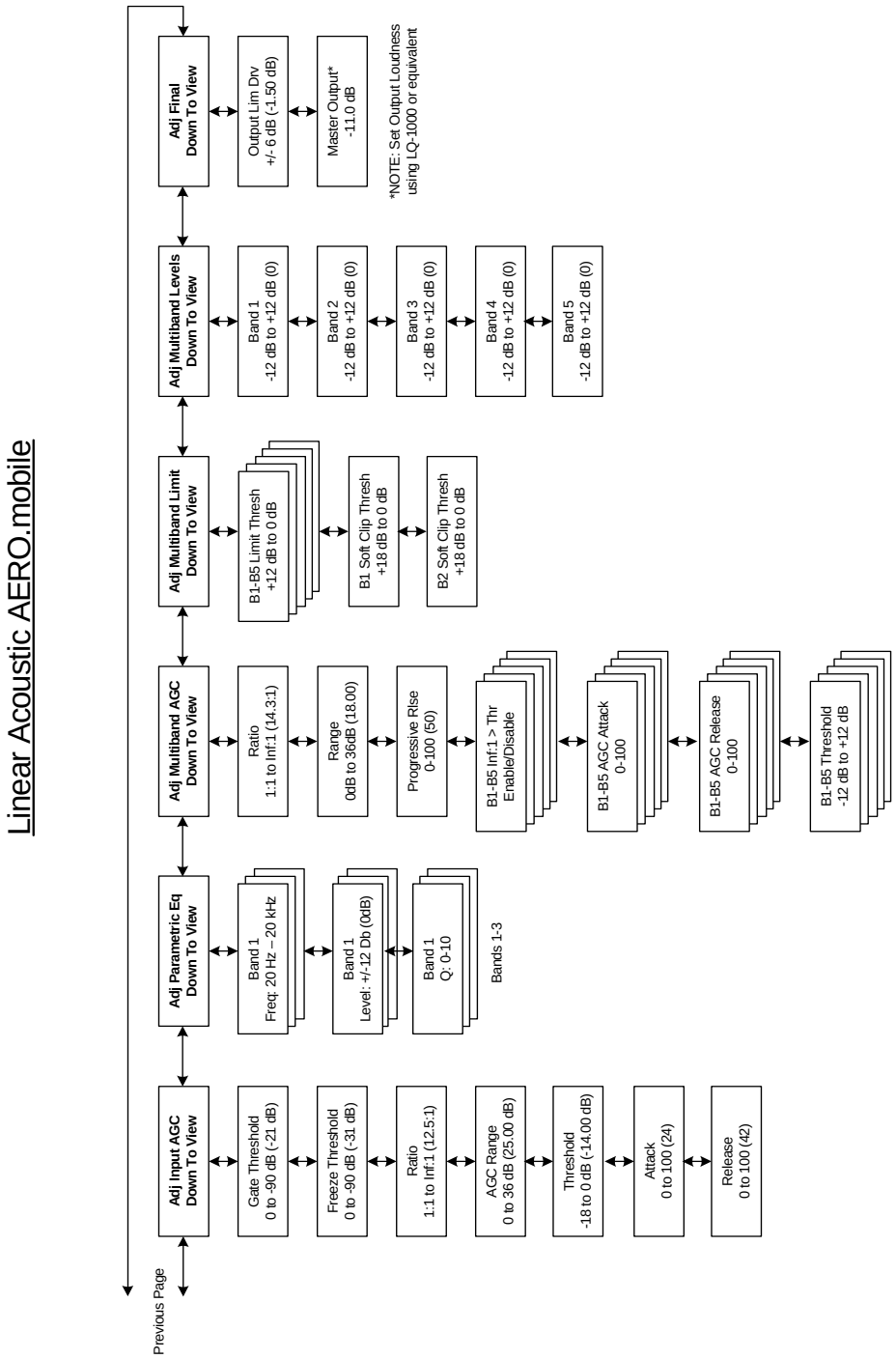


Figure 4-6 SDI Status Screens

- NOTES -


Linear Acoustic AERO.mobile V 0.1.13
Linear Acoustic AMX1MB V0.1.11
SDI Video HD-SDI 1080p 24 Hz
SDI Video SD-SDI 525i 29.97 Hz 4:2:2
In Out
Output LR
Input LR
Pri AGC w 1 2 3 4 5
Sec AGC w 1 2 3 4 5
GPI: 1 ALT 2 cm2 3 sec 4 pri
Pri pgm Preset TV_5B_GEN
Sec pgm Preset TV_5B_GEN
Mdin Not Present Pgm 1 - - - - DNE - -
Pgm1-Pgm8
Statistics Down To View
Firmware Version 5100 03 05
Device Options SDI In/Out Off
App Uptime d:hh:mm:ss
Ref Chg Num=000 d:hh:mm:ss
DSP 1 Version V1.7.0
DSP 1 Tx Errors Num=00 Code=0000
DSP 1 Rx Errors Num=00 Code=0000
DSP 2 Version V2.2.0
DSP 2 Tx Errors Num=00 Code=0000
DSP 2 Rx Errors Num=00 Code=0000
AES In 1 2 3 4 5 6 7 8 Detect * - - - - - - -
AMXTV1 Setup Down To View
I/O Down To View
Master Bypass Disable
GPI Control Disable
GPI 1 Function SAP Off/On; Preset
GPI 1 Preset TV_5B_Gen
Downmix Type LtRt/LoRo
Downmix Ctr Level 0 dB
Downmix LFE Level -10 dB
Downmix Ls Level -3 dB
Downmix Rs Level -3 dB
Clock Source AES1/4/SDI/Intrn 48k
Input 1/2 Source AES/SDI In 1/2
SDI Embed Audio Disable
SD 1/2 Out Dest AES Out 1/2, SDI In 1/2
System Down To View
Set To Defaults IP Comm, All...
I/O Menu Continued...
Metadata Src RS-485/VANC
VANC MD is Async Off
VANC DID 0x45
VANC SDID 0X01
VANC Extrct Line Auto
MD Pgm Sel Pgm1
MD= 2/0 Function Off, Chan Mode 2/0
Sys dialnorm -24 dB
Pri Dialnorm Do Not Apply
Sec Dialnorm Do Not Apply
Ch 7/8 Out Src ALT/Downmix
ALT Ch Mode Stereo/Mono/Ch7/Ch8
Downmix Ch Mode Stereo/MonoLo/Ro
Mobilizer Down To View
Mobilizer Type MB3/MB1&8/MB2
MB Eng. 1(2) Params Down To View
E1 E2
Clarity Enhance E1 3.00 dB
Inv Freq Comp E1 75
MaxSurrRed Th E1 10.5 dB
Clarity LF E1 -1.50 dB
Clarity MF E1 2.25 dB
Clarity HF E1 1.50 dB
Surr LF E1 -3.00 dB
Surr MF E1 -3.00 dB
Surr HF E1 0.00 dB
Communication Down To View
IP Address 192.168.1.20
Net Mask 255.255.255.255
Port Number 5100
MAC Address 0050:C2:51:21:00
Presets Down To View
Pri Pgm Data Down To View
User Presets Mobile_Gen
Current Active Preset
Sec Pgm Data Down To View
Next Page


Linear Acoustic AERO.mobile
Previous Page
Adj Input AGC Down To View
Gate Threshold 0 to -90 dB (-21 dB)
Freeze Threshold 0 to -90 dB (-31 dB)
Ratio 1:1 to Inf:1 (12.5:1)
AGC Range 0 to 36 dB (25.00 dB)
Threshold -18 to 0 dB (-14.00 dB)
Attack 0 to 100 (24)
Release 0 to 100 (42)
Adj Parametric Eq Down To View
Band 1 Freq: 20 Hz – 20 kHz
Band 1 Level: +/-12 Db (0dB)
Band 1 Q: 0-10
Bands 1-3
Adj Multiband AGC Down To View
Ratio 1:1 to Inf:1 (14.3:1)
Range 0dB to 36dB (18.00)
Progressive Rise 0-100 (50)
B1-B5 Inf:1 > Thr Enable/Disable
B1-B5 AGC Attack 0-100
B1-B5 AGC Release 0-100
B1-B5 Threshold -12 dB to +12 dB
Adj Multiband Limit Down To View
B1-B5 Limit Thresh +12 dB to 0 dB
B1 Soft Clip Thresh +18 dB to 0 dB
B2 Soft Clip Thresh +18 dB to 0 dB
Adj Multiband Levels Down To View
Band 1 -12 dB to +12 dB (0)
Band 2 -12 dB to +12 dB (0)
Band 3 -12 dB to +12 dB (0)
Band 4 -12 dB to +12 dB (0)
Band 5 -12 dB to +12 dB (0)
Adj Final Down To View
Output Lim Drv +/- 6 dB (-1.50 dB)
Master Output* -11.0 dB
*NOTE: Set Output Loudness using LQ-1000 or equivalent

Chapter 5: Presets and Processing

The Linear Acoustic AERO.mobile contains multiple factory-programmed processing presets that have been developed after many hours of listening and experimenting, using hundreds of program sources across all genres for tuning. Preset creation is an ongoing process, and we regularly implement new presets based on customer feedback.

Of course, all processing controls are accessible and users can custom design special presets that might be even more appropriate for a given situation. We strongly recommend starting with the factory preset that is closest to the desired objective, then fine tuning it to reach the desired goal. This will minimize the troubles that will likely be encountered as many adjustments interact.

5.1 Description of Factory Presets & Adjustments

Each unit ships with a number of presets that are useful for most situations. A brief description of each is given below. Following the description of presets, a description of each control available for use by all presets is given. Note that not all presets use every feature. Please note, factory presets CAN be over-written. Default values are given at the end of this chapter.

- MOBI 5B GEN - This is the default preset for the AERO.mobile. It provides a moderate degree of dynamic range processing, and is appropriate for all types of content. Use of this preset is highly recommended as a starting point as it has been tuned to work with the preceding Mobilizer stage (see below).

- MOBI 5B LIGHT - Similar to MOBI 5B GEN, however the Multiband AGC ratio and Range have been reduced for a more gentle action.

- MOBI 5B HVY - Similar to MOBI 5B GEN, however the Multiband AGC ratio and range have been increased for a more dense and less dynamic sound.

- MOBI 5B SPORTS - Multiband attack and release times modified for a smooth and consistent result with typical network sports programming. Less range for both the Input AGC and Multiband AGC.

- ITU LOUD LMT - Uses wideband AGC to set average loudness, while multiband and final look-ahead limiters protect against radical overload. Useful for pre-corrected or content that has been previously processed.

- PROTECTION LMT - Bypasses all processing except for the final output limiter which is set only to prevent overload.

5.1.1 Processing Structure

Before choosing to jump into shark infested waters, we *STRONGLY* recommend starting with a factory preset and modifying from there. Preset creation starting from scratch is an incredibly time consuming process requiring large amounts of time and huge amounts of content spanning all genres including music of every type, films of every type, television dramas and sitcoms of every type, and talking-head programs of every type. We have already done much of the heavy lifting, and provide presets based on our own listening and feedback from customers over the past few years. Certain parameters such as crossover frequencies and channel coupling are not adjustable and are hard-coded to the most appropriate values. That being said, access to all adjustable parameters is provided. Be careful with this power as most all settings interact with each other, sometimes in ways that might not be immediately audible.

Below is a drawing showing the general signal flow of the processing core to indicate what part of the chain is being adjusted by each parameter. Note that this signal flow is also captured in the "Adjust Processing" menu, with the top of the list being the input, and the bottom of the list being the output.

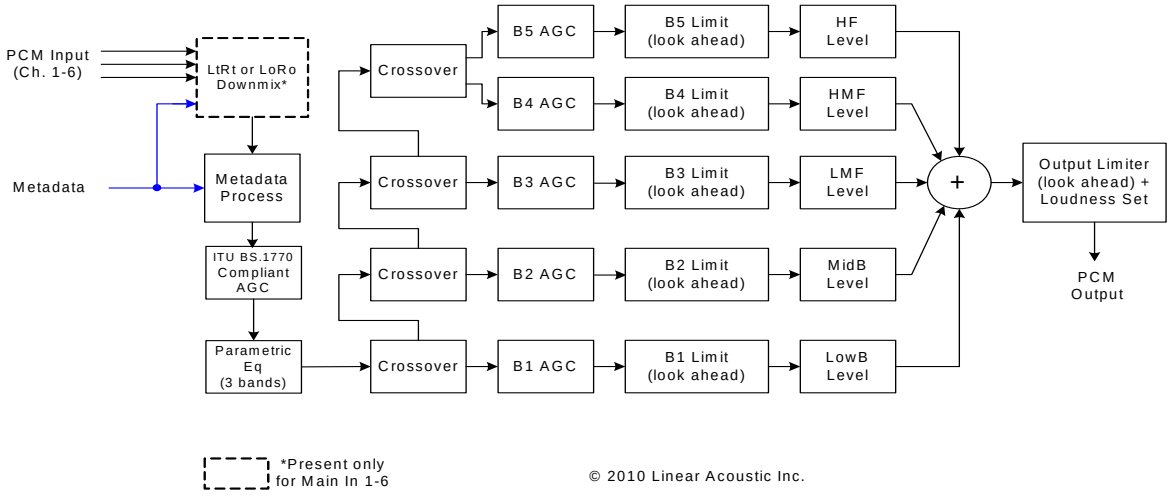


Figure 5-1 General signal flow of the AERO.mobile processing core

5.1.2 Adjusting Processing

Following is a description of all adjustable core processing parameters.

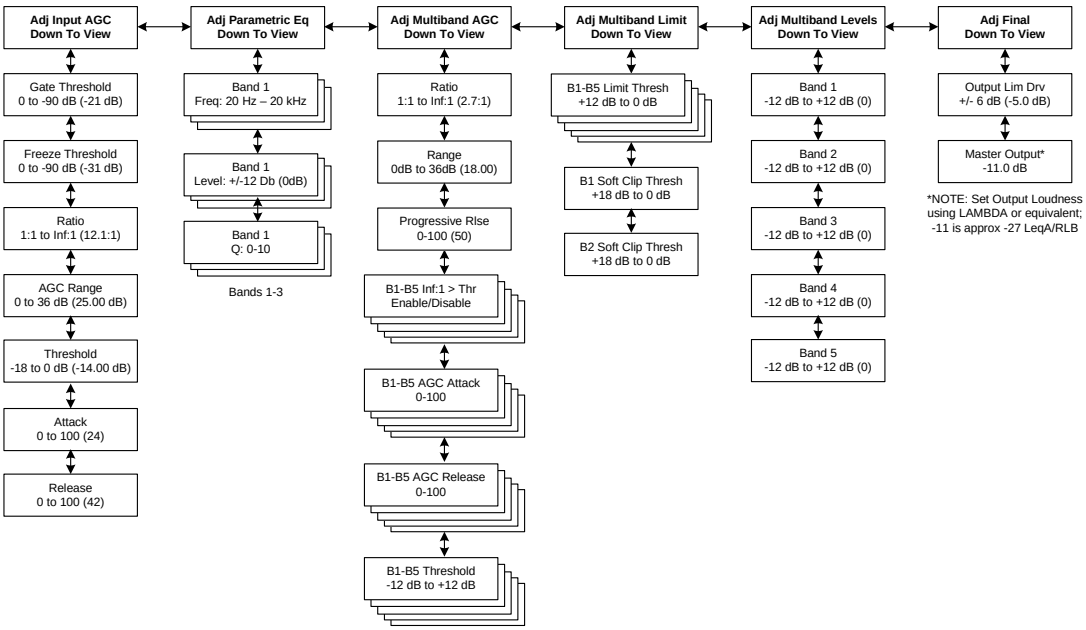


Figure 5-2 Adjust Processing Menus

But first... A Word on Our Crossovers

The multiband crossovers in the AERO.mobile consist of second order Linkwitz Reilly style filters that are hard coded to specific frequencies. As the processing required for television applications is not as aggressive as other mediums, little advantage can be gained from changing these values, and the remainder of the processing relies on these characteristics remaining constant.

For reference, the crossover frequencies are:

- Band 1 (Low Bass): 20 Hz - 60 Hz
- Band 2 (Mid Bass): 30 Hz - 200 Hz
- Band 3 (Low Mid): 170 Hz - 1.15 kHz
- Band 4 (High Mid): 950 Hz - 6.1 kHz
- Band 5 (Brilliance): 5.2 kHz - 24 kHz

Parametric Eq(ualization)

Three bands of parametric equalization are provided for fine tuning if necessary. None of the factory-supplied presets use the parametric equalizers, but they are provided to create notch filters or other effects if necessary. Each filter has a gain control with a +/-12dB range, a center frequency control that varies from 20 Hz to 22.050 kHz, and a bandwidth or "Q" control that varies between 0 and 10. Normal default settings for all bands are Gain = 0dB, in other words bypassed.

Input AGC

The input AGC is a very slow acting front-end gain control with a 36dB gain range whose only purpose is to make sure that the following processing stages are fed with the correct average audio levels. It is basically the automatic equivalent of an operator slowly riding a gain control on a console to keep the audio close to reference level. Wideband in nature, the AGC is not meant to perform rapid gain reduction or expansion as its actions will be more audible, as with all wideband gain processors. As a slow gain rider, its actions are nearly inaudible thanks to the multiband processing that follows it. The AGC has two stages of gating where the gain expansion is slowed or stopped to prevent background noise increasing.

Adjustable parameters are:

- Gating Thresh(old): 0dBFS to -90 dBFS

-Gating sets the point at which the AGC release time is made extremely slow to prevent increasing background noise and allow the AGC to return to unity gain.

- Freeze Thresh(old): 0dBFS to -90dBFS

-Freeze stops all gain change (i.e. when the audio drops to silence), and remains frozen at its current gain value until the threshold is exceeded.

NOTE: *Adjust Gate and Freeze to match plant practices. Very quiet audio (such as a golf match) benefits from having processing frozen when input audio drops below a given level to prevent "boosting the cricket" sounds.*

- Ratio: 1:1 to Inf:1

- Range: 0dB - 36 dB

-Range sets how much gain expansion above unity is performed, and this amount is subtracted from the total AGC gain range of 36dB, so the default value allows for 24dB of expansion and 12dB of compression. This adjustment

is reflected in real time by changing the AGC meter scale.

- Threshold: -18dBFS - 0dBFS

- Attack: 0 - 150, slowest - fastest

- Release: 0 - 150, slowest - fastest

- Progressive Release: 0 - 100, slowest - fastest

-Sets the speed at which the release time is increased faster at very low gain values. This feature approximates a logarithmic release to help recovery from dramatic gain reduction more quickly.

Multiband AGC

This section is the heart of the dynamics processing engine. A multiband AGC (i.e. compressor) that allows for medium ratio (3:1 is default) adjustment of audio band. Adjustable parameters are:

- Ratio: 1.0:1 - Inf:1 (default: 3.0:1)

- B1-B5 Inf:1 Above Thresh: Enabled / Disabled

-AGC automatically increases ratio to Infinity:1 once a signal exceeds the threshold (set below), allowing for expansion below the threshold and limiting above the threshold. Useful for bass frequency control.

- Range: 0dB - 24dB

-Range sets how much gain expansion above unity is able to be performed. This adjustment is reflected in real time by changing the AGC meter scale.

- Progressive Release: 0 - 100, slowest - fastest

-Sets the speed at which the release time is increased faster at very low gain values. This feature approximates a logarithmic release to help recovery from dramatic gain reduction more quickly.

- B1 - B5 AGC Attack: 0 - 150, slowest - fastest

-How fast an input signal is acted upon once is crosses the set threshold

- B1 - B5 AGC Release: 0 - 150, slowest - fastest

-How fast an input signal recovers from a gain change once that signal falls below the set threshold.

- B1 - B5 AGC Thresh(old): -12.00dB - +12.00dB

-The reference point for the attack and release parameters to act on the audio signal present in that band.

Multiband Limiters

Performs multiband limiting of the signals coming from the multiband compressor.

- B1 - B5 Lim(it) Thresh(old): +12.00dB - 0.00dB

-The point above which limiting action takes place at an Infinity:1 ratio.

- B1 Soft Clip Thresh(old): +12.00dB - 0.00dB

- B2 Soft Clip Thresh(old): +12.00dB - 0.00dB

-The point above which band one (low bass) is very quickly limited, acting more like a clipper without the artifacts. This helps maintain a "tight" bass sound.

Multiband EQ

This is the section where each of the processing bands is summed and where overall frequency response can be tailored.

- B1 - B5 Out(put) Mix: -12dB - + 12dB

-Sets the mix level for each band summing all bands back together. These controls are prior to the final look ahead limiter and increasing gain may cause more final limiting (possibly more than desired)

Final Stage

This final section of the processor is where the final look ahead peak limiter and bass soft clipper are adjusted. The look ahead limiters are wideband, limited to 6dB of gain reduction, are extremely fast, and due to their look-ahead nature are virtually transparent even at full gain reduction. Their purpose is to control peaks that make it through the multiband section. Adjustable parameters are:

- Final Limiter Drive: -6dB - +6dB

-Sets the level at which the wideband sum of all bands is fed to the final limiter.

- Output Level: -36dB - 0dB

-Sets the output level for the current preset. Can be used to match the measured loudness of one preset to another. This is useful as more aggressive presets will measure differently from less aggressive versions.

NOTE: *With MOBI 5B GEN selected and normal dialog-based programming applied, loudness will measure approximately -24dBLKFS using a Linear Acoustic LAMBDA audio monitor or LQ-1000 Loudness Quality Meter.*

	Mobi 5B Gen	Mobi 5B Light	Mobi 5B Heavy	Mobi 5B Sports	ITU_Loud_Limit	Protection_Limt
Input AGC						
Gate Threshold	-21 dB	-21 dB	-21 dB	-11 dB	-15 dB	-21 dB
Freeze Thresh	-31 dB	-31 dB	-31 dB	-21 dB	-42 dB	-31 dB
Ratio	12.5:1	9.1:1	12.5:1	9.1:1	12.5:1	**1.0:1**
AGC Range	25.00 dB	25.00 dB	25.00 dB	21.00 dB	25.00 dB	24.00 dB
Threshold	-14.00 dB	-14.00 dB	-14.00 dB	-12.00 dB	-14.00 dB	-16.00 dB
Attack	24	24	24	21	10	24
Release	42	42	42	40	29	42
Parametric EQ						
B1 Frequency	57 Hz	57 Hz	57 Hz	23 Hz	57 Hz	57 Hz
B1 Gain	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB
B1 Q (Octaves)	1.5	1.5	1.5	1.5	1.5	1.5
B2 Frequency	2.89 kHz	2.89 kHz	2.89 kHz	2.89 kHz	2.89 kHz	2.89 kHz
B2 Gain	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB
B2 Q (Octaves)	2.0	2.0	2.0	2.0	2.0	2.0
B3 Frequency	15.53 kHz	15.53 kHz	15.53 kHz	15.53 kHz	15.53 kHz	15.53 kHz
B3 Gain	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB
B3 Q (Octaves)	1.0	1.0	1.0	1.0	1.0	1.0
Multiband AGC						
Ratio	6.3:1	2.0:1	14.3:1	2.4:1	**1.0:1**	**1.0:1**
Range	12.00 dB	9.00 dB	18.00 dB	12.00 dB	24.00 dB	24.00 dB
Progressive Rel	50	50	50	35	50	50
Ratio Above Threshold:						
B1 Inf:1	Disable	Disable	Disable	Disable	Disable	Disable
B2 Inf:1	Enable	Enable	Enable	Enable	Disable	Disable
B3 Inf:1	Enable	Enable	Enable	Enable	Disable	Disable
B4 Inf:1	Disable	Disable	Disable	Disable	Disable	Disable
B5 Inf:1	Disable	Disable	Disable	Disable	Disable	Disable
B1 AGC Attack	22	22	25	22	46	46
B2 AGC Attack	32	32	40	43	88	88
B3 AGC Attack	42	42	42	43	88	88
B4 AGC Attack	62	62	62	55	88	88
B5 AGC Attack	75	75	75	60	92	92
B1 AGC Release	56	56	56	20	50	50
B2 AGC Release	67	67	67	32	60	60
B3 AGC Release	68	68	68	40	86	86
B4 AGC Release	74	74	74	38	88	88
B5 AGC Release	84	84	84	36	92	92
B1 AGC Thresh	0.00 dB	0.00 dB	0.00 dB	3.00 dB	0.00 dB	0.00 dB
B2 AGC Thresh	0.00 dB	0.00 dB	0.00 dB	3.00 dB	0.00 dB	0.00 dB
B3 AGC Thresh	0.00 dB	0.00 dB	0.00 dB	3.00 dB	0.00 dB	0.00 dB
B4 AGC Thresh	0.00 dB	0.00 dB	0.00 dB	3.00 dB	0.00 dB	0.00 dB
B5 AGC Thresh	0.00 dB	0.00 dB	0.00 dB	3.00 dB	0.00 dB	0.00 dB
Multiband Limiters						
B1 Lim Thresh	5.75 dB	5.75 dB	4.25 dB	6.00 dB	4.25 dB	18.00 dB
B2 Lim Thresh	8.00 dB	8.00 dB	4.25 dB	6.00 dB	7.00 dB	18.00 dB
B3 Lim Thresh	8.50 dB	8.50 dB	6.50 dB	7.50 dB	7.50 dB	18.00 dB
B4 Lim Thresh	10.25 dB	10.25 dB	9.00 dB	7.25 dB	9.25 dB	18.00 dB
B5 Lim Thresh	10.50 dB	10.50 dB	9.00 dB	6.75 dB	9.25 dB	18.00 dB
B1 Soft Clip Thr	6.00 dB	6.00 dB	6.00 dB	3.00 dB	6.00 dB	18.00 dB
B2 Soft Clip Thr	6.00 dB	6.00 dB	6.00 dB	3.00 dB	6.00 dB	18.00 dB
Multiband Levels						
B1 Out Mix	0.00 dB	0.00 dB	0.00 dB	-3.00 dB	0.00 dB	0.00 dB
B2 Out Mix	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB
B3 Out Mix	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB
B4 Out Mix	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB
B5 Out Mix	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB
Final Stage						
Output Lim Drv	-1.50 dB	-1.50 dB	-1.50 dB	-2.50 dB	0.00 dB	-3.00 dB
Master Output	-15.0 dB	-14.0 dB	-15.0 dB	-11 dB	-9.0 dB	0.0 dB

Figure 5-3 AERO.mobile factory presets

5.1.3 Linear Acoustic Mobilizer Settings

Linear Acoustic CrowdControl technology isolates and protects important dialogue information and pre-corrects for downstream phase and equalization "enhancements" offered by default on many television sets. Used by the leading sports broadcast networks and local stations, CrowdControl enables broadcasters to protect their valuable assets against so-called "hyper-surround" systems that provide interesting albeit uncontrolled effects with some content but dialogue intelligibility problems with other content.

Mobile DTV standards are very new, but research into the devices that would eventually reproduce the audio and video content was well underway. So too was a modern understanding of how human auditory perception performs in noisy environments. Just like chocolate and peanut butter, or spaghetti and meatballs, the two were naturally destined to compliment each other.

The work done to create CrowdControl auspiciously provides a stable foundation for what is necessary with mobile audio. While aggressive traditional processing does allow more audio fit into a smaller box, it is all the wrong audio. Think about the common situation of having a conversation in a noisy environment- the last thing you want to do is to turn down the loudest parts and turn up the softest parts of everything. Then you end up with foreground and background noise at the same level and the intelligibility of your conversation decreases. This is exactly what traditional wideband, single band or multiband audio processors do. In fact, it is also what the processing section of other Linear Acoustic AERO processors do.

What is necessary then is the ability to only affect the important foreground material and do so in a way that enhances intelligibility. Mobilizer does just this. Controls are named in a way that makes simples sense, and many will have an immediate audible result, however some are controlling aspects of the processing that may only become active under certain conditions.

These controls will be described below. They are applied prior to the processing presets, but work in tandem with the factory settings.

MB Type

Described in detail in Chapter 2, this simply selects the signal routing for the two possible Mobilizer processing engines.

Clarity Enhance

As in CrowdControl, Clarity Enhance adjust the level of the audio that is coherent in level and phase between the two input channels. Increasing this essentially boosts level of dialogue. **Default Setting: 3.00 dB**

Inverse Frequency Compensation

This control provides equalization to help audio stand out from mobile devices. **Default Setting: 75**

Max Surr Reduction Threshold

Sets the threshold for a limiter that constrains the amount of non-phase coherent audio (like crowd swells) from overwhelming the phase coherent sounds (like dialogue). **Default Setting: 10.50 dB**

Clarity LF, MF, HF

Provides control over three bands of the phase coherent audio. **Default Settings: LF = -1.50 dB, MF = 2.25 dB, HF = 1.50 dB**

Surr LF, MF, HF

Provides control over three bands of the non-phase coherent audio. **Default Settings: LF = -3.00 dB, MF = -3.00 dB, HF = 0.00 dB**

Chapter 6: Troubleshooting

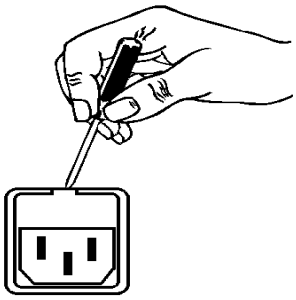
The Linear Acoustic AERO.mobile is a very stable and reliable unit, and most problems can be traced back to mis-wiring causing incorrect signals to be applied to the unit, or more than likely mis-configuration. As simple as the unit is to use once installed, it is very flexible and thus a necessarily complex processor. In an effort to speed troubleshooting, some common problems and solutions are described below.

6.1 Problems and Possible Causes

One of the best troubleshooting features of the AERO.mobile is the hard-bypass of the audio and SDI signals. This is useful because it allows instant removal of the unit from the signal path. Hard-bypass can be accomplished two ways, the simplest being to remove AC power from the unit by turning the power switch off. A less dramatic way to accomplish the same result is to access the I/O menu and enable Master Bypass. If you are unsure of what is happening in a particular system, simplifying the signal path is a good start and will help isolate problems quickly.

6.1.1 Unit won't power on

First check the obvious and make sure that the power cord or cords are plugged into live AC outlets (it happens). Next, see if either or both of the blue front panel PSU lights is illuminated. If not, check the power supply fuses by removing the power cords and using a small flat-blade screwdriver to remove the fuse holder from the IEC inlet module. The holder carries a spare fuse and extras were included in the packing kit with the unit. If the fuse is bad and continues to blow, please contact the factory.



6.1.2 The Ref LED is red

Check to make sure that an AES reference signal is connected to the unit and that the correct reference is selected. Note that this signal can be either AES black (i.e. an AES signal with silent audio), or an AES signal with audio. Reference can be derived from Main Input 1, Input 4, SDI, or Internal within the I/O Options menu (see Chapter 4).

6.1.3 Output Audio Clicks and Pops

This could indicate that the AES Reference is missing or at the wrong sample rate (the unit expects to be locked to 48kHz). If improper reference is chosen, the Ref LED will be red and the unit will revert to internal 48kHz reference allowing the audio to continue, but due to the sample rate converters present on each input pair, the outputs will be asynchronous with the inputs. The solution is to make sure that the reference is connected.

It could also mean that audio applied to the unit is not properly referenced, or that the equipment that the AERO.mobile is feeding is not properly referenced. Using the master bypass function of the unit is a helpful way to troubleshoot this issue.

6.1.4 Received Audio Has Dropouts

The primary cause of this is the Dolby Digital AC-3 encoder not being properly referenced with respect to the DTV video encoder/multiplexer. This is normally accomplished very simply by having all gear referenced to the local plant.

In some cases, such as with certain equipment from Tandberg, a special reference signal is generated in the multiplexer and it needs to be connected back to the Dolby Digital (AC-3) encoder and used as its reference (i.e. set the encoder to "REF IN/SRC On mode). Consult your DTV encoder reference manual for more details.

6.1.5 Audio Pumps and Breathes

Sometimes audible in less sophisticated processors or when attack and release times are not adjusted properly. The factory presets included with the AERO.mobile will not cause pumping or breathing, but if it sounds like this is happening, here are some suggestions:

- Ensure that station audio is not being inadvertently pre-processed by legacy gear. The AERO.mobile performs best when it receives unprocessed audio.

- Make sure Gate and Freeze thresholds are set appropriately for facility audio. These are explained in greater detail in Chapter 5, but essentially they set the thresholds below which the processing will gate release time to a very slow speed, or freeze release time completely. Set correctly, this will prevent background noise being increased unnecessarily during quiet scenes.

6.1.6 Problems with EAS decoding

It is important to locate EAS encoding equipment after any audio processing, including AERO.mobile. It is critical that processing be minimized for use with current EAS systems.

Chapter 7: Specifications

Table 7-1 Electrical Specifications

Sampling Rate	48 kHz (±0.1%)
Processing Delay	16 msec minimum
Processing Algorithms	Linear Acoustic Mobilizer audio processing plus AEROMAX loudness and DRC engine and ITU LoRo and LtRt downmix
Audio Word Length	24-bit performance, processing in bypass
Metadata Input/Output	RS-485, 9-pin female D-connector on rear panel
GPIO Port	TTL level, 25-pin female D-connector
Ethernet Port	RJ-45 female jack connector
SDI I/O	
HD/SD-SDI I/O	Audio can be de-embedded (demuxed) from any of the four groups and re-embedded (muxed) into any of four the groups. Signals per SMPTE 299M-2004/292M-2004. Metadata can be extracted from VANC per SMPTE RP 2020 A or B.

Table 7-2 Mechanical Specifications

Dimensions	1.75 × 19 × 24 in (44.4 × 48.3 × 61 cm)
Net Weight	6 lbs (2.72 kg) approx.
Shipping Weight	8 lbs (3.63 kg) approx.
Power Requirements	90-2 50–60 Hz
Power Consumption	40 W maximum

Table 7-3 Environmental Specifications

Operating Temperature	0°C to 50°C
Non Operating Temperature (Storage)	–20°C to +70°C
Humidity	Up to 98% relative humidity, non-condensing
EMC Radiation Limits	FCC Part 15 Class A, ICES-003

Metadata Input Port

9-pin female D-connector with full-duplex RS-485 protocol running at 115 kbps. Pinout is compatible with SMPTE 207M. Pin-for-pin compatible with Dolby metadata sources (i.e. straight-through cable should be used.

Table 7-4 Metadata I/O Port Pinout

Pin	Connection
1	Shield
2	TX A asynchronous data out –
3	RX B asynchronous data in +
4	Ground
5	NC
6	Ground
7	TX B asynchronous data out +
8	RX A asynchronous data in –
9	Shield

Ethernet Port

Standard RJ-45 female connector that supports 10 or 100BASE-T.

GPI/O Parallel Control Port

TTL level controls, active Low. The 5-V output for external GPO indicators is limited by a self-resetting fuse.

Table 7-5 GPI/O Port Pinout

Pin	Connection
1	GPI 1
2	GPI 2
3	GPI 3
4	GPI 4
5	Ground/Common
6	GPO 1
7	GPO 2
8	GPO 3
9	GPO 4

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