



# A-VBI*ENC*

## Audio-in-VBI Encoder

### USER'S MANUAL

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## **WARRANTY**

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## **IMPORTANT**

This instrument is an AC mains-operated electrical apparatus. Maintenance, repairs, and adjustments must be carried out only by qualified personnel. Do not operate the unit without the covers in place.

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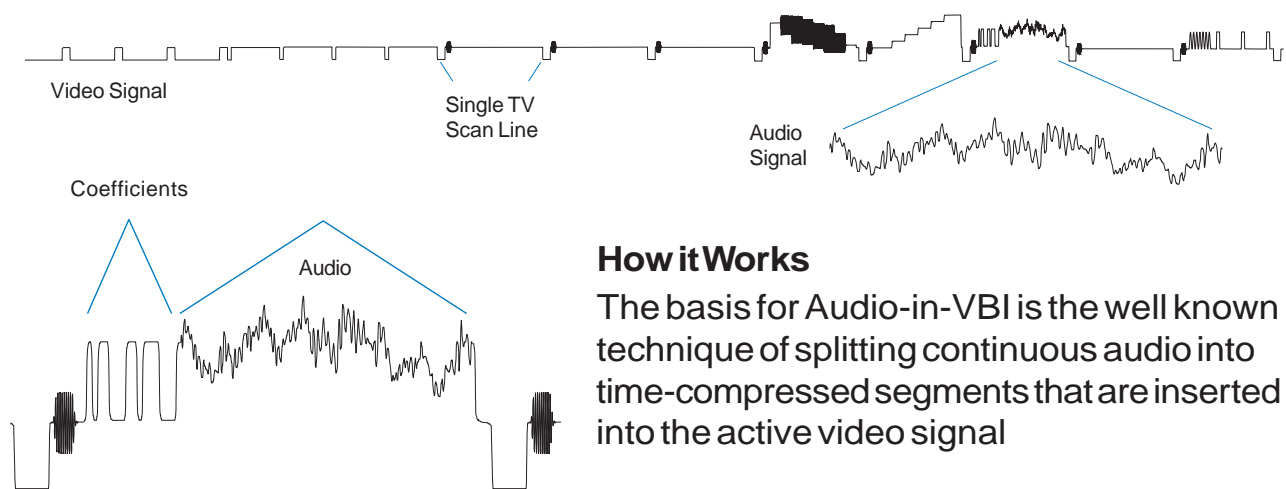
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# 1. General Information

## 1.1 Introduction

Thank you for purchasing *A-VBIENC*, an exciting new technology from Mixed Signals that allows you to embed a continuous audio channel in a single TV video line. The resulting video with embedded audio may be broadcast, uplinked, or recorded on standard VHS tape.



### How it Works

The basis for Audio-in-VBI is the well known technique of splitting continuous audio into time-compressed segments that are inserted into the active video signal

What's new, however, is the addition of signal processing "coefficients" that enhance the encoded signal. The coefficients are encoded in digital form and accompany the audio on the same scan line. The coefficients control frequency response, dynamic gain, muting, addressing, encryption, and other parameters in the decoder.

*A-VBIENC* encodes a 5.2 KHz audio signal in a single TV scan line. Incoming audio is digitized, processed, time-compressed, and split into segments that are inserted into a video scan line. You can select any TV scan line from 10-25. Plus, you can assign the encoded audio to one of eight addresses. Audio-in-VBI decoders set to a different VBI line or address hear nothing. Audio sent to address zero overrides decoder address settings—the audio is heard unconditionally by all decoders. Addresses may be selected remotely with switch contacts via a rear panel connector.

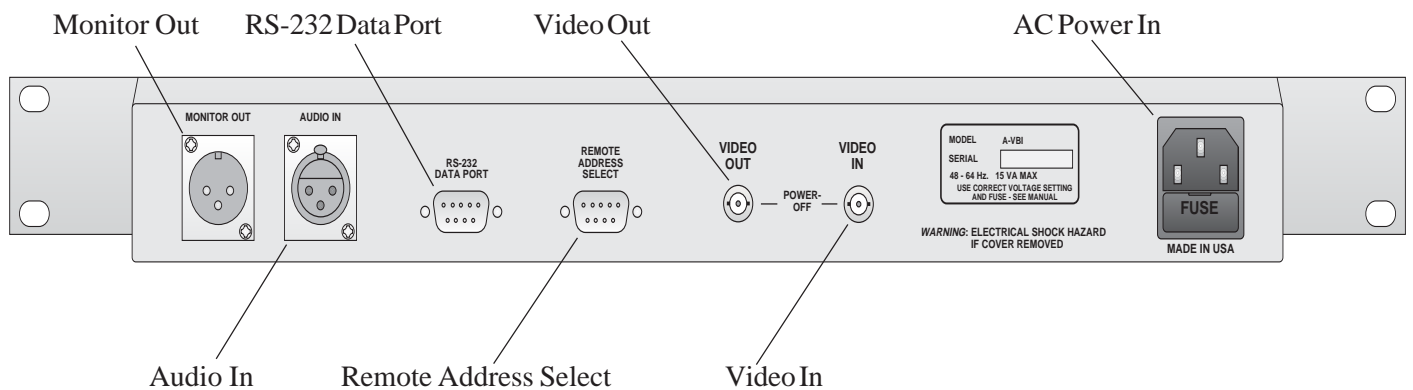
*A-VBIENC* offers three levels of scrambling using a front panel encryption key setting. You can adjust an "auto mute" threshold from the front panel. When the incoming audio drops below the mute threshold, the encoder sends a mute command to the Audio-in-VBI decoder.



## 2. Installation

### 2.1 How to connect

1. Apply NTSC program video to the VIDEO IN BNC connector. Source must be standard composite video. AVBlenc terminates the source video with 75 ohms.
2. Take the program video with encoded audio signal from VIDEO OUT.
3. Apply the audio signal to be encoded to the AUDIO IN XLR connector. This is a line level balanced audio input.
4. Optionally, connect switch contacts to the REMOTE ADDRESS SELECT connector to allow remote addressing.
5. Apply AC line power to the unit via the detachable three wire cord.



### Grounding (earthing)

The AVBI encoder must be connected to a protective earth conductor via the three wire AC line (mains) cord. The AC power plug shall be inserted only into a receptacle outlet that has a protective earth contact. The ground wire must not be defeated by use of a two wire extension cord.



**WARNING:** Any interruption of the power line ground circuit inside or outside the AVBI Encoder, or removal of the AC receptacle ground wire, will create a potential shock hazard.



## 3. Operating Instructions

### 3.1 Front panel controls, indicators

- 1 Auto Mute LED. Indicates that AVBlenc is sending a signal for AVBI *decoders* to mute their audio outputs. See Auto Mute threshold setting below.

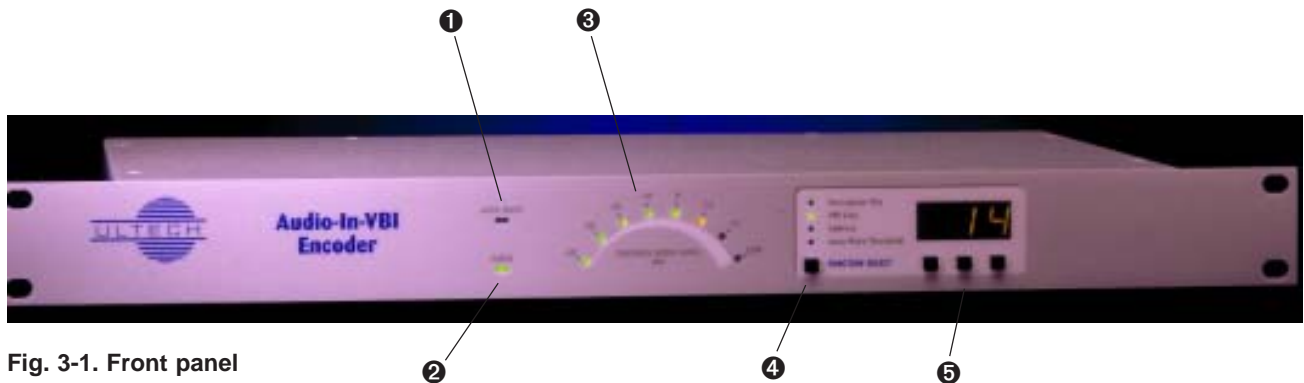


Fig. 3-1. Front panel

- 2 Program Video LED. Illuminates when AVBlenc detects proper incoming video.
- 3 Encoded Audio Level LEDs. Indicates encoded audio level. Although the Clip LED indicates hard clipping, you may find the audio more intelligible if the incoming level is adjusted slightly high than to avoid ever reaching the clipping level.
- 4 Function select button. All front panel settings are remembered even when the AC power is cycled. Press this button to select between the following functions:

#### Encryption Key

A setting of "000" results in no encryption. A setting of "001" to "FFF" causes the encoded audio to be encrypted. A decoder must be set to the same setting in order to unscramble the audio. Encrypting the audio adds to the audio delay time. With encryption, the *encoder in* to *decoder out* delay is about 333 mS. Without encryption, the audio is delayed about 90 mS.

**VBI Line**

Determines which scan line will carry the encoded audio signal. The choices range from line 10 to 25. Audio information is always encoded in both fields. When changing the VBI line, please note that there is a delay of a few seconds before the data “moves” to the new line. This lets you set the VBI line without corrupting the intervening lines.

**Address**

The audio encoder can “steer” audio to 1 of 8 addresses. Address “0” is the “all call” address—decoders will receive audio regardless of their address settings. Addresses 1-7 steer the audio to specific decoders. The addresses are set from the rear panel remote address connector; you cannot set the address from the front panel. But selecting the Address function from the front panel will let you see the remote address on the LED display.

**Auto Mute Threshold**

Some receivers provide automatic muting of audio if the audio drops below a certain level (“squelching”). But the Audio-in-VBI system provides a much better mechanism for muting audio at the decoder. If the audio at the input of the *encoder* drops below a certain threshold, the encoder will transmit a binary code that tells the decoder to mute its audio (the mute feature can be disabled on the front panel of the decoder). The mute threshold ranges from 0 to 39. When the mute threshold is reached, the auto mute LED lights.

- 5 Digit set buttons. Lets you adjust the units, tens, and hundreds settings individually.

## 3.2 Remote Address switching

· **Remote Address Select 9 pin male D.** Allows for the selection of an address by external equipment. Addressing is disabled when no connection is made with this connector (default). Up to 7 different addresses can be selected numbering 1 through 7. Pin 1 of the connector corresponds to address 1 and pin 7 corresponds to address 7. Pins 8 and 9 are ground returns. These inputs can be driven by either 5 volt logic or can be connected to dry contact switches or relays. Grounding an address input causes selection of that address. Multiple conflicting address selections cause the highest number selected address to be encoded. (Higher numbers have priority over lower numbers.)

### Address select lines for Audio-in-VBI Encoder

Remote address select connector, 9 pin male D-Sub mini connector on rear panel of encoder.

<u>Pin</u>	<u>Function</u>
1	Address 7
2	Address 6
3	Address 5
4	Address 4
5	Address 3
6	Address 2
7	Address 1
8	Ground (thru 10 ohm resistor)
9	Ground (thru 10 ohm resistor)

To select an address, connect the appropriate address pin to ground via a switch. You can only select one address at a time. No address pins connected to ground selects address 01—the “all call” channel.

## 3.3 RS-232 Interface

## 4.0 Audio-in-VBI Decoder

### 4.1 Introduction:

The A-VBIDEC (decoder) decodes audio from an analog video channel which has been encoded by an A-VBIENC (encoder). The decoder may also be used directly from off air through use of the built in tuner. Any off air channel from 1 through 63 can be selected. Audio outputs are separately provided for both the decoded audio and the off air main tuner audio. Any Vertical Blanking Interval (VBI) line can be selected from line 11 through 22 for decoding. The decoder may also be assigned a unique address allowing the common VBI line to be used with multiple decoders selectively.

### 5.0 Rear Panel Connections:

- **Power Inlet.** Power is applied to the decoder through the supplied AC line cord to the standard IEC power connector. The decoder is operable from 90VAC to 260VAC over a frequency range of 48 to 64Hz.
- **Video In BNC.** For applications requiring decode from an NTSC composite analog video source.
- **Video Out BNC.** Duplicates and buffers the video in source. Also provide NTSC composite analog output of the selected tuner channel when the tuner is in use.
- **Tuner Audio Out male XLR.** Provides a +4dbu balanced output of the main audio channel of the selected tuner channel.
- **VBI decoded Audio Out male XLR.** Provides a +4dbu balanced output of the decoded audio.
- **Tuner In "F" connector.** For connection to an antenna or RF channel source.

### 6.0 Front Panel Indicators and Buttons:

- **Data LED.** Illuminates when valid encoded audio is detected.
- **Video LED.** Illuminates when proper NTSC composite video is detected.
- **Decoded Audio Level dbu.** 8 colored LED display arranged as a VU meter. Displays the instantaneous encoded and decoder output level. The red "clip" LED is calibrated to illuminate at +4.4dbu.
- **Function Select and LEDs.** Four LEDs which indicate whether "Decryption Key", "VBI line", "Address", or "Off-Air Channel" is selected. Depressing the "Function Select" button allows rotation through, and selection of, the desired function.

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## 6.0 Front Panel Indicators and Buttons (Con't)

- **Three Digit Display.** Displays the parametric values programmed for the currently selected function. A pushbutton beneath each digit allows for setting of the respective digit.
- **Auto Mute.** A button and LED which alternately controls and displays the status of the Auto Mute feature. When enabled, causes the output to be muted when the decoded audio level is near inaudibility.
- **Fine Tune.** Two buttons which allow the fine tuning of the selected tuner channel.
- **Filter.** A button and LED which alternately controls and displays the status of a low pass filter. Useful in noisy environments.

## 7.0 Operating Instructions:

The decoder is operated by selecting functions and setting parameters on the three-digit display.

### **Decryption Key:**

The Decryption Key function is not currently implemented. The value "000" must be set for proper operation of the decoder.

### **VBI Line:**

The VBI Line function permits the selection of a VBI line to be decoded. The line number selected must agree with the line number programmed at the encoder.

### **Address:**

The address function is useful for multiple remote situations. A single studio encoder can target a specific decoder by address for audio transmission.

The address must be coordinated with the studio or director as IFB assigned. Setting the address of the decoder to zero permits all addressable channels to be heard (all call) or if addressing is not desired.

### **Off-Air Channel:**

Selects the RF channel to be received and decoded. Fine Tune buttons can be used to fine tune to the desired channel. Setting the channel number to zeros causes selection of the NTSC composite video input for decoding.



