Omnia

USERS MANUAL

20 September, 2000

Version 3

Omnia.sg (Part # 4600-1000)

This Box Contains:

_____ Omnia.sg Processor Unit

_____ Omnia.sg Manual   pt#MAN –OMSG

_____ Warranty Registration   pt#WARR-REGT

_____ Power Cord   pt#CORD-110/220

_____ 5 – 10 x 32 Rack Screws   pt#RACK-SCRW

Packed by: _____

*Inspected by:*_____

*Inspection date:*_____

Customer Service

We support you...

By phone/fax in the USA.

Customer service is available from 9:30 AM to 6:00 PM USA Eastern Time, Monday through Friday at +1 (216) 241-3343. Fax: +1 (216) 241-4103.

By phone/Fax in Europe.

Service is available from Cutting *Edge* Europe in Germany at +49 81 61 42 467.

Fax: +49 81 61 42 402.

By E-Mail.

The address is: support@nogrunge.com.

Via World Wide Web.

The Cutting *Edge* Web site has a variety of information which may be useful for product selection. The URL is: http://www.nogrunge.com.

Feedback

We welcome feedback on any aspect of the Omnia SG ™ or this manual. In the past, many good ideas from users have made their way into software revisions or new products. Please contact us with your comments.

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Updates

The operation of the Omnia SG ™ is partially controlled by software. A continuous program of improvement is underway. Contact us to determine if a newer release is available.

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Warranty

This product is covered by a one year limited warranty, the full text of which is included in the Appendix of this manual.

Service

You must contact Cutting *Edge* before returning any equipment for factory service. Cutting *Edge* will issue a Return Authorization number **which must be written on the exterior of your shipping container.** Please do not return cables or accessories unless specifically requested by Cutting *Edge* technical support. Be sure to adequately insure your shipment for its replacement value. Packages without proper authorization may be refused. USA customers: please contact Cutting *Edge* technical support at +1 (216) 241-3343. All other customers should contact their local dealer to make arrangements for service.

Notices and Cautions

CAUTION:

THE INSTALLATION AND SERVICING INSTRUCTIONS IN THIS MANUAL ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO. REFER ALL SERVICING TO QUALIFIED PERSONNEL.

WARNING:

TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE. DO NOT SHOWER WITH THE UNIT.

THIS SYMBOL, WHEREVER IT APPEARS, ALERTS YOU TO THE PRESENCE OF UNINSULATED, DANGEROUS VOLTAGE INSIDE THE CLOSURE - VOLTAGE WHICH MAY BE SUFFICIENT TO CONSTITUTE A RISK OF SHOCK.

THIS SYMBOL, WHEREVER IT APPEARS, ALERTS YOU TO IMPORTANT OPERATING INSTRUCTIONS.

THIS SYMBOL REFERS TO A HOT TIP. HOT TIPS ARE USEFUL BITS OF INFORMATION THAT WILL HELP YOU GET THE MOST OUT OF YOUR OMNIA SG.

TO PREVENT RISKS OF
ELECTRIC SHOCK,
DISCONNECT POWER
CORD BEFORE SERVICING
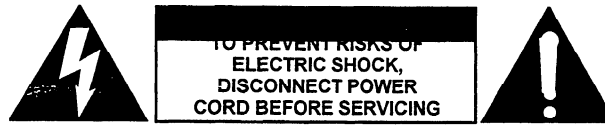
USA CLASS A COMPUTING DEVICE INFORMATION TO USER.

WARNING: This equipment generates, uses, and can radiate radio-frequency energy. If it is not installed and used as directed by this manual, it may cause interference to radio communication. This equipment complies with the limits for a Class A computing device, as specified by FCC Rules, Part 15, Subpart J, which are designed to provide reasonable protection against such interference when this type of equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference. If it does, the user will be required to eliminate the interference at the user's expense. **NOTE:** Objectionable interference to TV or radio reception can occur if other devices are connected to this device without the use of shielded interconnect cables. FCC rules require the use of only shielded cables.

CANADA WARNING: "This digital apparatus does not exceed the Class A limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications." "Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques (de les Class A) prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada."

Table of Contents

1 Introduction

The Omnia SG is a stand-alone digital FM stereo generator which utilizes the advanced digital signal processing techniques pioneered by Cutting Edge in the Omnia Digital Audio Processor. The Omnia SG exhibits unsurpassed audio performance combined with ease-of-use and field software upgrade ability.

The Omnia SG has an impressive list of features including:

- Analog and Digital audio inputs
- Separate level adjustments for analog and digital inputs
- Dual composite outputs with individual level adjustment
- Dual independent SCA inputs
- Pilot reference output
- Silence alarm
- AES/EBU error alarm
- Composite Clipper
- Entirely digital MPX signal generation
- Field software upgrades through the RS-232 interface
- Parallel contact closures for remote operation
- Parallel outputs for remote alarm detection and operation monitoring
- Front panel monitoring of either composite output
- Clear, uncluttered user interface
- Input and output LED level indicators

Omnia, the promise of digital. . . delivered.

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2 Installation
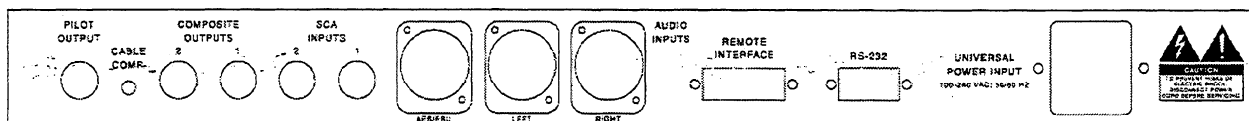
2.1 Power

Install the power cord included with the Omnia SG in the marked AC power connector located in the read of the unit. The internal universal switching supply will accept 115 – 240 VAC input. Turn on the power switch: all of the front panel LED's should light up for 2-3 seconds before the units begins to operate.

2.2 Analog Audio Inputs

Install the left and right analog audio cables in the female XLR connectors marked LEFT and RIGHT on the rear panel. The analog audio section accepts audio input with a peak level of +22dBu. If your level is lower, don't worry – there is an input level adjustment which will be explained in the Level Calibration chapter.

2.3 AES/EBU Digital Audio Input

Insert the AES/EBU cable (110 ohm XLR) in the female XLR connector labeled AES/EBU on the back panel of the Omnia SG. The Omnia expects a peak input level of –3dBFS on the digital audio input.

2.4 Composite Outputs

Attach your BNC cable for the composite signal to the connector labeled COMP-1 on the back panel. Attached a second composite feed cable (if needed) to the connector labeled COMP-2. Both connectors are 75 ohm terminated.

2.5 Pilot Output

Attach the BNC cable for RDS systems 19kHZ reference to the BNC connector labeled PILOT on the rear panel.

2.6 SCA Input

Attach the BNC cable carrying your SCA signal to the connector labeled SCA 1 IN. A second SCA input is supplied should you need it.

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3 The User Interface
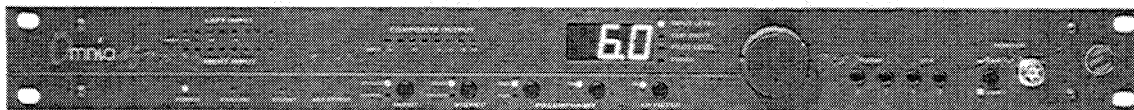
3.1 The Level Meters

The Omnia SG has 3 sets of LED audio level indicators. The two bargraphs on the left indicate input audio level for the left and right input channels. The bargraph to the right indicates the composite output level.

Left/Right Input Level Meters
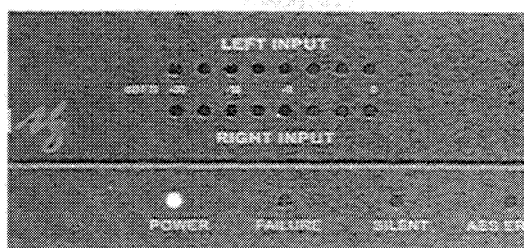
The LED meters for input level have a range of –30dBFS to 0dBFS The input level meters will display the input audio level for both the digital audio inputs, as well as the analog input levels depending on the position of the INPUT selector. The level meters will indicate the audio level AFTER the INPUT GAIN has been applied, so you can monitor the amount of input gain needed.

Composite Level Meter
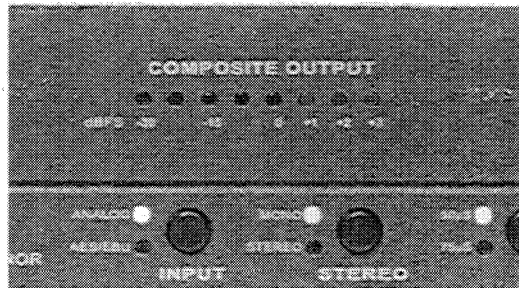
The Composite Level meters indicate the composite level sent to the DA Converter (after the composite clipper has been applied). The red LED's indicate the amount of composite clipping (1dB per LED), so you can monitor the amount of clipping actually being applied to the audio peaks.

> ⚠️
>
> *NOTE THAT THE COMPOSITE LEVEL METER DOES **NOT** REFLECT THE COMPOSITE LEVEL ADJUSTMENTS MADE WITH THE ANALOG TRIM POTS ON THE FRONT PANEL. YOU SHOULD USE A MODULATION MONITOR TO SET THE ANALOG COMPOSITE OUTPUT LEVEL TO THE PROPER MODULATION.*

3.2   The Pushbutton Controls

The Omnia SG has 5 momentary-style pushbuttons on the front panel for On/Off and A/B type parameter adjustments.

Analog-AES/EBU Input Selection

This button switches between the analog and digital audio inputs. The LED's to the left of the button indicate the current setting. Note the audio level indicated on the input level meters will reflect the current input mode setting.

Mono-Stereo Operation

This button selects the mono versus stereo operation of the composite output. Selecting Mono will remove the L-R portion of the composite signal and simply output the sum of the left and right audio inputs. Note that this does NOT turn off the pilot tone in the composite output – you must still do this manually. The LED's to the left of the button indicate the current setting.

50uS-75uS Preemphasis Selector

This button toggles between 50uS and 75uS of preemphasis. The LED's to the left of the button indicate the current preemphasis setting.

Preemphasis On/Off Selector

This button turns the preemphasis on and off. The LED to the left of the button indicates the current state of the preemphasis boost.

Low Pass Filter On/Off Selector

This button enables/disables the 15kHz low pass filter on the composite output. This should normally be set to the ON position because most audio processors will limit the audio spectrum to 15kHz. If your audio processor does not do this or your are unsure, then you should turn this filter ON. The LED to the left of the button indicates the state of the 15kHz low pass filter.

3.3 The Knob/Button and Seven Segment Display
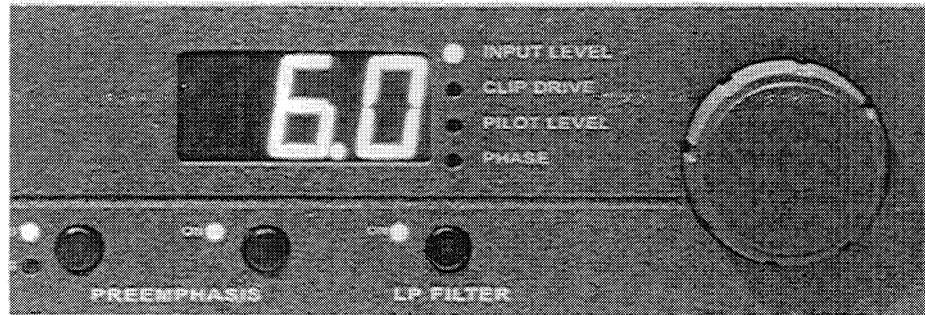
The combination knob and pushbutton are used to control variable parameters which are displayed on the seven segment LED display. Push the knob in momentarily to select among the four different parameters, and rotate the knob to adjust the settings.

Input Level

This setting controls the amount of gain or attenuation applied to the input audio level. The seven segment display will indicate, in dB, the amount of gain or attenuation being applied. The Input Mode selector will choose which input (analog or digital audio) you are currently adjusting. Push the knob until the Input Level LED is illuminated. This will allow you to adjust the RIGHT channel input level. Notice that only the RIGHT audio channel level is being displayed on the LED bargraph. Pushing the knob one more time (notice that the Input Level selector LED is still illuminated, but only the LEFT channel audio level is displayed) will allow you to adjust the left channel input gain. The gain/attenuation setting is applied while you are turning the knob.

Clip Drive

This selection allows you to control the amount of Composite Clip Drive applied to the composite signal. The seven segment display indicates (in dB) the amount of drive (from 0dB to 3dB) applied to the audio signal. Push the knob until the Clip Drive LED is illuminated to view/adjust the Clip Drive setting.

Pilot Level

The Pilot Level selection allows you to adjust the amount of 19kHz pilot tone injected into the composite signal (in percentage). Push the knob until the Pilot Level LED is illuminated to view/adjust the pilot injection level (from 6% to 12%, or OFF).

The seven-segment display will indicate the amount of pilot as a percentage of 100% modulation.

Phase

The Phase selection allows you to adjust the phase relationship between the 19kHz pilot and the 38kHz modulator. This can be used to correct for inconsistencies among different transmitters. This should not be used in place of the cable compensation trim pot on the back of the unit (see Chapter 4 – Calibration for more information).

LOC

Pushing the knob in once after the Phase adjustment setting will lock the user interface ("LOC" will be displayed). This is to prevent accidental adjustment of the user parameters. The knob and the 5 momentary pushbuttons will be frozen. Press the knob in to unlock the front panel. Notice that all status information will still be displayed on the LED's, although you will not be able to change any of the settings.

THE "LOCK" FUNCTION WILL NOT LOCK OUT THE REMOTE CONTROL INTERFACE ON THE BACK PANEL.

3.4 The Front Panel Trim Pots
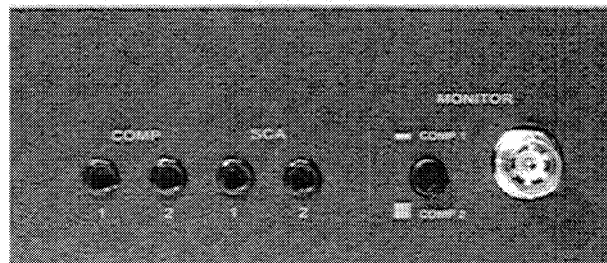
The OmniaSG has 4 trim pots on the front panel for adjusting the SCA input levels and the composite output levels. In addition, a BNC connector is available on the front panel for monitoring either composite output (selected by the button to the right of the connector).

Comp 1 and 2

These two trim pots control the output gain for the two composite outputs. These analog pots allow you to adjust the analog composite output level from 2.5 Vpp to 23.5Vpp when the digital composite signal is at the Composite Clipper Threshold (maximum output). Turn each trim pot clockwise to increase the modulation level.

SCA 1 and 2

These two trim allow you to control the gain / attenuation of the SCA inputs before they are mixed with the composite outputs. The Composite Output trim pots will not affect SCA level. With these trim pots you can add or subtract 8dB of gain from the SCA inputs. Turn each trim pot clockwise to increase SCA input level.

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4   Calibration

With proper calibration the OmniaSG will give you the most accurate results for peak control and modulation. Take the time to go through the steps laid out in this chapter to ensure you get the most out of your OmniaSG.

4.1   Calibrating the Input Levels

This section should be performed for both the analog and digital audio inputs. The OmniaSG will store your level settings for each separately allowing you to switch between analog and AES/EBU inputs without resetting the input level. Note that there are different procedures for calibrating stereo versus analog audio inputs.

> *MAKE SURE YOU HAVE PREEMPHASIS SET TO THE APPROPRIATE POSITION FOR YOUR APPLICATION BEFORE CALIBRATION AS THIS WILL AFFECT THE OUTPUT LEVEL.*

Stereo Audio Calibration

1. Supply a 15kHz tone at your MAXIMUM level (this will ensure proper headroom when using pre-emphasis) to the Omnia.sg analog or AES/EBU inputs.

2. Press the knob/button near the seven segment display until Clip Drive is selected. Set the Clip Drive to **1.0**.

3. Press the knob/button near the seven segment display until you have selected the left channel input level (see the User Interface chapter). Adjust the input level on the seven segment display until the Composite Level Meter displays 2dB of clipping, and then back the level down just enough to leave the first RED LED solidly illuminated—this is 1dB of clipping. Now back the input level down by 1dB (5 clicks on the knob).

4. Press the knob/button one more time to adjust the right channel input level. Unless you need a different setting for right and left channels, set this level to the same level setting on the seven segment display you used for the left channel input.

5. The Composite Level Meter should be solidly illuminating the first RED LED. If this is not the case, repeat steps 2 and 3 until it is. Select Clip Drive by pressing the knob/button once and back the Clip Drive down to 0.0dB on the seven segment display. This will give you the optimum level for the digital composite signal with no composite clipping.

6. Remember to repeat this procedure for both the analog and AES/EBU inputs. Simply select the appropriate mode and the input level settings for that mode will be displayed on the seven segment display.

Mono Audio Calibration

1. Supply a 15kHz tone at your MAXIMUM level (this will ensure proper headroom when using pre-emphasis) to the Omnia.sg analog or AES/EBU inputs.

2. Press the knob/button near the seven segment display until Clip Drive is selected. Set the Clip Drive to **1.0**.

3. Press the knob/button near the seven segment display until you have selected the left channel input level (see the User Interface chapter). Adjust the input level on the seven segment display until the Composite Level Meter displays 2dB of clipping, and then back the level down just enough to leave the first RED LED solidly illuminated—this is 1dB of clipping. Now back the input level down by 2dB (5 clicks on the knob).

4. Press the knob/button one more time to adjust the right channel input level. Unless you need a different setting for right and left channels, set this level to the same level setting on the seven segment display you used for the left channel input.

5. The Composite Level Meter should be solidly illuminating the first RED LED. If this is not the case, repeat steps 2 and 3 until it is. Select Clip Drive by pressing the knob/button once and back the Clip Drive down to 0.0dB on the seven segment display. This will give you the optimum level for the digital composite signal with no composite clipping.

6. Remember to repeat this procedure for both the analog and AES/EBU inputs. Simply select the appropriate mode and the input level settings for that mode will be displayed on the seven segment display.

4.2 Adjusting the Composite Clipper

Once the input levels are calibrated, you may (if you desire) adjust the Composite Clipper Drive. This is done by pressing the knob/button until Clip Drive is selected on the seven segment display. Turn the knob to select the amount of composite clipping you desire. The Composite Level Meter will indicate the amount of clipping applied to the audio. Each RED LED indicates that the audio is 1dB into clipping, up to 3dB.

4.3 Adjusting the Composite Output Level

Once you have calibrated the digital composite signal you can now set the analog level of the composite signal on the BNC connectors. This procedure should be repeated for both the Composite Outputs available on the OmniaSG.

You can use the monitor jack on the front panel for this calibration by pressing the selector button next to the jack to choose which composite output to monitor. The OmniaSG composite outputs are set for a 75ohm load.

Once you have your monitoring equipment set up, adjust the trim pot (COMP 1 or COMP 2 as appropriate) until you reach the desired modulation level on your monitor.

4.4 Adjusting the Cable Compensation

The trim pot on the back panel next to the COMP 2 connector is labeled CABLE COMP. This pot can be used to adjust for differences in cable length and construction which may affect the composite signal. For this test you should use a 100Hz out-of-phase test tone and the "bow-tie" method for examining the phase response of the composite signal. If you need assistance, contact Cutting Edge Customer Support for details.

4.5   Calibrating the SCA Inputs

For this step you should turn off all input audio and monitor the composite output for SCA level only. Attach you SCA input to the appropriate connector (SCA 1 or SCA 2 on the back panel). While monitoring the composite output connector, adjust the trim pots on the front panel to set your SCA level to the desired position.

5 Alarm Indicators
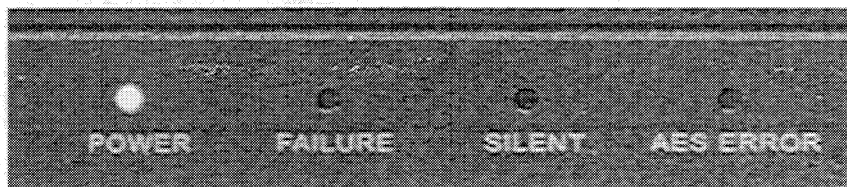
The OmniaSG front panel contains 3 failure alarms (red LED's) and a power indicator (green LED).

5.1 Failure Alarm

This LED will illuminate when there is no digital composite output for at least 10 seconds. This alarm is also indicated on pin 4 of the Remote Control Interface on the back panel. This Failure alarm will clear itself upon return of composite signal. Typically, this alarm will mirror the Silent alarm on the front panel, since this is about the only reason you will lose composite audio output.

5.2 Silent Alarm

The Silent LED will illuminate when the OmniaSG detects no input audio signal for 10 seconds. This applies to whichever Input Mode is selected (Analog or AES/EBU). This alarm is indicated on pins 13 and 14 of the Remote Control Interface and will clear itself immediately upon return of input audio.

5.3 AES Error Alarm

This LED indicates an error in the AES/EBU digital audio bitstream. These errors can be include loss of signal, improper settings on the sending device, and excessive clock jitter on the input. This alarm is independent of the Silent alarm (it is easy to have a valid AES/EBU bitstream with no audio on it). AES Error is indicated on pins 7 and 8 of the read panel Remote Interface. The alarm will be cleared immediately upon correction of the problem.

6 The Remote Control Interface

The OmniaSG is equipped with a contact-closure style remote control interface that mimics many of the operations accessible through the front panel. A DB15 connector on the rear panel is supplied for this purpose. The following table indicates the pinout for this connector.

REMOTE
INTERFACE

PIN 1
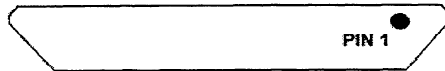
PIN NUMBER	INPUT / OUTPUT	FUNCTION	PIN TYPE NOTE
1	GROUND	GROUND	
2	INPUT	PREEMPHASIS ON/OFF SELECT	1
3	OUTPUT	PREEMPHASIS "ON" INDICATOR	3
4	OUTPUT	FAILURE ALARM INDICATOR	3
5	INPUT	ANALOG – AES/EBU INPUT SELECT	1
6	INPUT	FORCE ANALOG	2
7	OUTPUT	AES/EBU ERROR INDICATOR	4
8	OUTPUT	AES/EBU ERROR INDICATOR	4
9	INPUT	MONO / STEREO MODE SELECT	1
10	OUTPUT	"ANALOG INPUT" INDICATOR	4
11	OUTPUT	"ANALOG INPUT" INDICATOR	4
12	OUTPUT	"MONO OPERATION" INDICATOR	3
13	OUTPUT	SILENCE ALARM	4
14	OUTPUT	SILENCE ALARM	4
15	+5V		

Pin Type Explanations:

1. Momentary close-to-ground type pin. This pin has an internal pullup. Simply close short this pin to ground momentarily (about 0.5 seconds) to switch between modes.

2. The FORCE ANALOG function will force the input mode to ANALOG when held to ground. When released (the pin has an internal pullup) the OmniaSG will return to the previously selected input mode.

3. Open Collector output with internal pullup. These outputs will pull to ground when active. To use as LED indicators, an external current limiting resistor must be provided (at least 330 ohms). Each output can sink up to 200mA.

4. These output pairs are the 2 sides of a relay. The relay will short the two pins when active.

> ⚠ *DO NOT EXCEED 75 VOLTS ACROSS THE DRY RELAY CONTACTS AS THIS MAY DAMAGE THE UNIT. DO NOT EXCEED A CONTINUOUS LOAD CURRENT OF 140mA.*

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7 Using the Field Upgrade Option

Although this will rarely be necessary, the OmniaSG provides the ability to upgrade to upgrade the internal software in the field. Call Cutting Edge Customer Support to find out if a new software version is available and necessary for your application. Instructions on upgrading your OmniaSG software will accompany the new software version sent to your by Cutting Edge.

YOU SHOULD ONLY PERFORM THE FOLLOWING PROCEDURE WITH THE OMNIASG OFF THE AIR AS THIS WILL INTERRUPT THE NORMAL OPERATION OF THE UNIT.

To find out what version of software you are currently running you will need a PC with a 9 pin RS232 cable and a terminal program (such as HyperTerminal™). Turn off the OmniaSG and attach the serial cable to the DB9 connector on the back panel labeled RS-232 and start the terminal program on your PC. Set the connection 19200 baud, 8 bits, no parity, 1 stop bit. Now push and hold the knob/button while you turn on the OmniaSG. After the LED test completes you should see "232" on the seven segment display. Release the knob/button and examine what was printed on the terminal program by the unit. The software version number should be displayed. Reboot the unit to return to normal function.

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8 Drawings
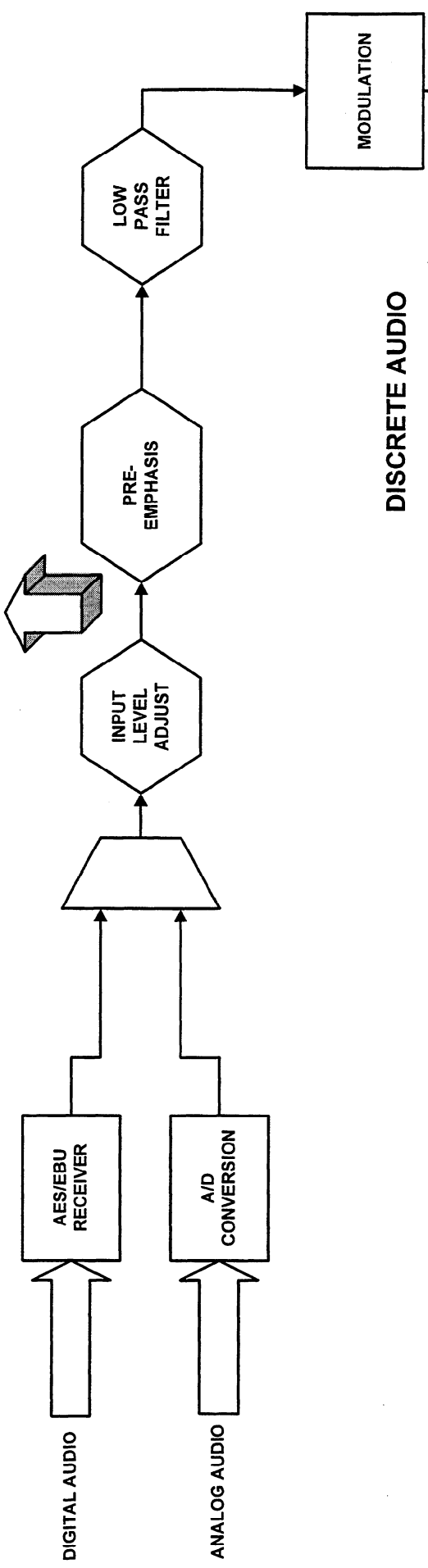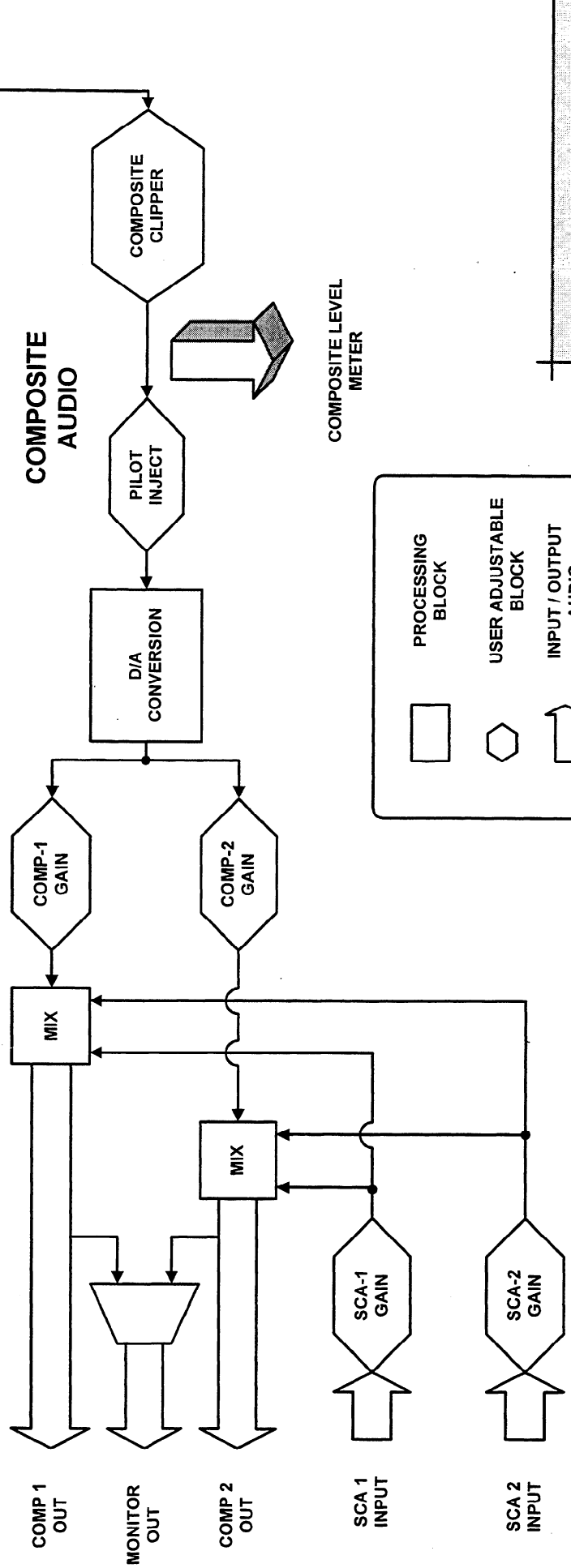
OmniaSG Block Diagram
© Cutting Edge, 2000

Bill Of Materials   September 20,2000   11:29:28

Reference	Part
BR2	HP5082-2818
BR3	HP5082-2810
C1	1/25
C2	1/25
C9	1/25
C10	1/25
C3	0.1uF
C4	0.1uF
C5	0.1uF
C6	0.1uF
C7	0.1uF
C8	0.1uF
C12	0.1uF
C14	0.1uF
C16	0.1uF
C18	0.1uF
C20	0.1uF
C21	0.1uF
C22	0.1uF
C28	0.1uF
C29	0.1uF
C30	0.1uF
C34	0.1uF
C51	0.1uF
C62	0.1uF
C67	0.1uF
C73	0.1uF
C77	0.1uF
C78	0.1uF
C81	0.1uF
C86	0.1uF
C87	0.1uF
C90	0.1uF
C94	0.1uF
C108	0.1uF
C112	0.1uF
C113	0.1uF
C11	0.022uF
C13	1.0uF
C15	1.0uF
C17	1.0uF
C19	1.0uF
C50	1.0uF
C84	1.0uF
C85	1.0uF
C102	1.0uF
C107	1.0uF
C114	1.0uF
C24	0.001uF
C31	0.001uF
C32	0.001uF
C36	0.001uF
C25	47uF
C26	47uF
C27	47uF
C35	47uF
C53	47uF
C54	47uF
C58	47uF
C61	47uF
C66	47uF
C68	47uF
C33	0.47uF
C41	0.47uF
C48	0.47uF
C37	1500pF
C38	10uF
C97	10uF
C39	0.01uF
C40	0.01uF
C72	0.01uF
C106	0.01uF
C42	4.7uF
C43	4.7uF
C45	4.7uF

C46	4.7uF
C44	0.22uF
C47	0.22uF
C69	0.22uF
C49	0.047uF
C52	20pF
C57	20pF
C70	20pF
C71	20pF
C105	20pF
C110	20pF
C111	20pF
C55	5000pF
C56	5000pF
C59	2200pF
C63	2200pF
C88	2200pF
C89	2200pF
C60	330pF
C64	330pF
C65	160pF
C75	160pF
C79	160pF
C80	160pF
C82	160pF
C92	160pF
C96	160pF
C98	160pF
C99	160pF
C91	10pF
C74	10pF
C76	47pF
C83	47pF
C93	47pF
C95	47pF
C100	47pF
C109	47pF
D1	1N4148
D2	1N4148
D3	1N4148
D4	1N4148
D5	1N4148
D6	1N4148
D7	1N4148
D8	1N4148
D9	1N4148
D10	1N4148
D17	1N4148
D18	1N4148
D19	1N4148
D20	1N4148
FB1	BLM-31A-601S
FB2	BLM-31A-601S
FB3	BLM-31A-601S
FB4	BLM-31A-601S
FB5	BLM-31A-601S
FB6	BLM-31A-601S
FB8	BLM-31A-601S
FB9	BLM-31A-601S
FB10	BLM-31A-601S
FB22	BLM-31A-601S
FB23	BLM-31A-601S
FB27	BLM-31A-601S
FB30	BLM-31A-601S
FB31	BLM-31A-601S
FB32	BLM-31A-601S
FB33	BLM-31A-601S
FB34	BLM-31A-601S
FB35	BLM-31A-601S
FB36	BLM-31A-601S
FB11	FAIR-RITE 2944666671
FB16	FAIR-RITE 2944666671
FB17	FAIR-RITE 2944666671
FB19	FAIR-RITE 2944666671
FB20	FAIR-RITE 2944666671
FB21	FAIR-RITE 2944666671
FB12	FERRITE
FB13	FERRITE
FB14	FERRITE
FB15	FERRITE
FB18	FERRITE
FB24	FERRITE

FB25	FERRITE
FB26	FERRITE
FB28	FERRITE
FB29	FERRITE
FB37	FERRITE
FB38	FERRITE
FB39	FERRITE
FB40	FERRITE
FB41	FERRITE
FB42	FERRITE
FB43	FERRITE
FB44	FERRITE
FB45	FERRITE
JP1	JUMPER
JP3	JUMPER
JP4	JUMPER
JP5	JUMPER
JP6	JUMPER
JP7	JUMPER
JP2	4 HEADER
J2	CON10
J1	CON10
J4	CON20A
J5	CON6
J6	CON14A
J7	XLR Female
J11	XLR Female
U18	XLR Female
J10	BNC
J13	BNC
J14	BNC
J16	BNC
J18	BNC
J20	BNC
J12	JUMPER3
J15	JUMPER3
J19	JUMPER3
K2	LH1522
K1	LH1522
L1	PI FILTER
L2	PI FILTER
L3	PI FILTER
L4	PI FILTER
L5	PI FILTER
L6	PI FILTER
L7	PI FILTER
L8	PI FILTER
L9	PI FILTER
P1	FILTERED CONNECTOR DB9F
P2	DB15F FILTERED
P3	10K - 10 Turn
P4	10K - 10 Turn
P5	10K - 10 Turn
P6	10K - 10 Turn
R53	10K - 10 Turn
RP1	SIP-10K
RP2	SIP-10K
RP3	SIP-10K
R1	10K
R2	10K
R3	10K
RP4	10K
RP5	10K
R5	10K
R6	10K
R7	10K
R12	10K
R13	10K
R14	10K
R16	10K
R17	10K
R29	10K
R30	10K
R32	10K
R33	10K
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R37	10K
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R43	10K
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R84	10K
R86	10K
R92	10K
R94	10K
R101	10K
R103	10K
R110	10K
R120	10K
R122	10K
R124	10K
R127	10K
R133	10K
R134	10K
R135	10K
R144	10K
R40	110
R104	110
R105	110
R106	110
R107	110
R117	110
R118	110
R119	110
R137	110
R138	110
Rmod	110
R8	1.0K
R9	1.0K
R10	1.0K
R18	1.0K
R21	1.0K
R22	1.0K
R26	1.0K
R36	1.0K
R81	1.0K
R82	1.0K
R97	1.0K
R98	1.0K
R99	1.0K
R139	1.0K
R141	1.0K
R143	1.0K
R15	600
R28	600
R67	600
R125	600
R19	100K
R20	100K
R23	100K
R25	100K
R24	10
R52	10
R66	10
R130	10
R27	562K
R31	3.3K
R44	500
R45	500
R46	500
R47	500
R48	500
R49	Bourns 3214
R55	75
R69	75
R129	75
R56	10M
R62	1.9K
R121	1.9K
R123	4.75K
R64	4.75K

R68	20K
R126	20K
R72	0
R73	0
R87	0
R88	0
R90	0
R77	150
R85	150
R93	150
R102	150
R79	5.5K
R83	5.5K
R95	5.5K
R100	5.5K
R96	1M
R80	1M
R89	47K
R91	47K
R109	2
R115	3.2K
R116	3.2K
R140	8.66K
R142	8.66K
R145	680
R146	680
R147	680
SW1	ITT SWITCH
S1	SW PUSHBUTTON
T1	TRANSFORMER
U1	LT1081
U2	MAX692A
U3	DSP56303PV
U4	AT29LV010
U10	SRAM256Kx16
U5	SRAM256Kx16
U6	XC9536VQ44
U7	12.288 MHz Clock
U8	DS1489
U12	LM3940
U13	CD4046B
U14	7805
U15	AD1890
U16	CS8412-CS
U17	7905
U19	PCM1702-SOP
U20	AD713SM
U21	AD712
U32	AD712
U36	AD712
U22	LM6321
U24	LM6321
U23	LF353
U30	LF353
U25	OP275
U26	OP275
U28	OP275
U27	CS5334
U31	74HC157
U34	74HCT04
U33	74HCT04
U35	ULN2003A
U39	74LV04

OMNIA STEREO GENERATOR REV. D

TELOS SYSTEMS STEREO GENERATOR PCB
SILKSCREEN LEGEND

HENNICKE ENTERPRISES 990604 23JUN99
TETRAD TE9824
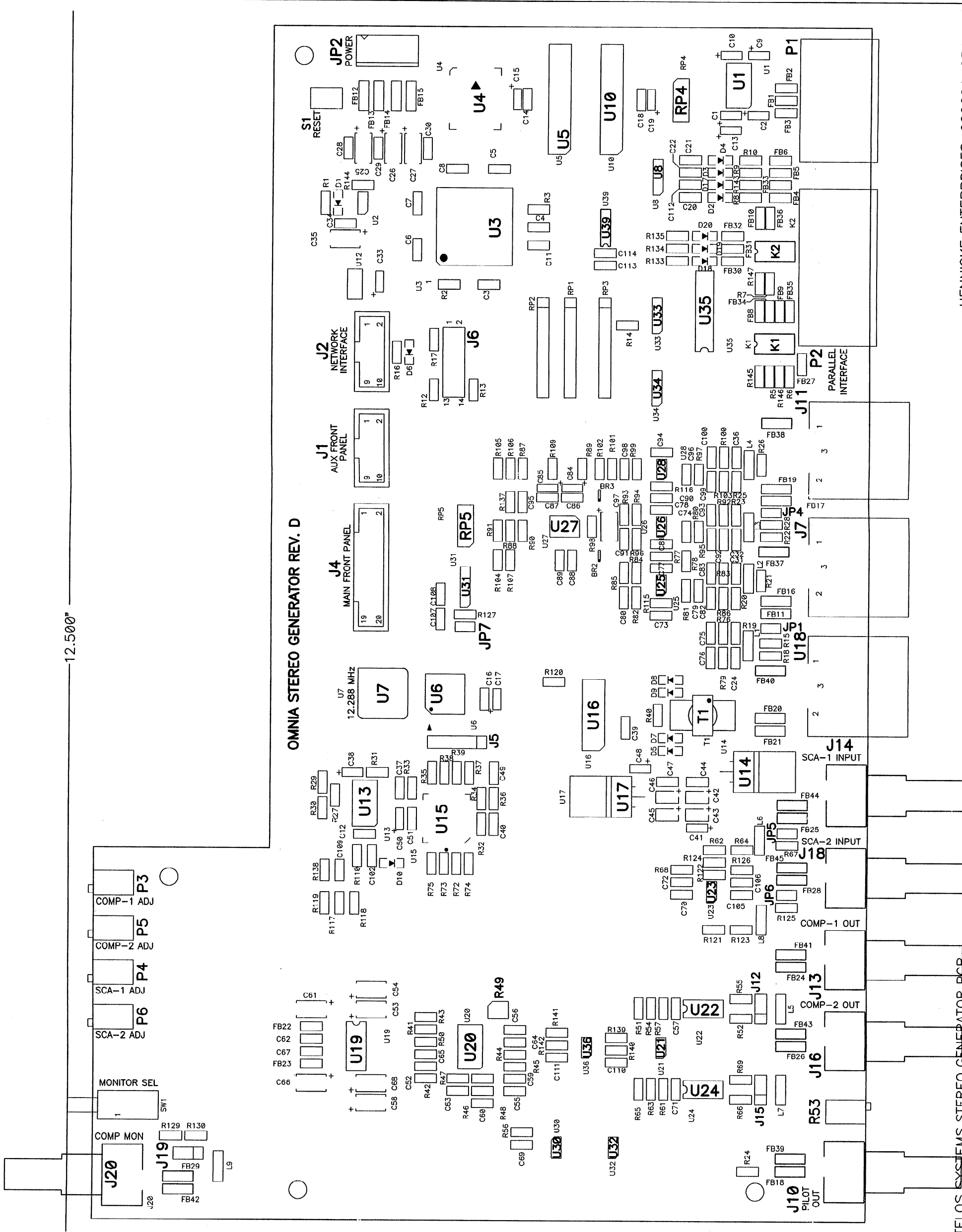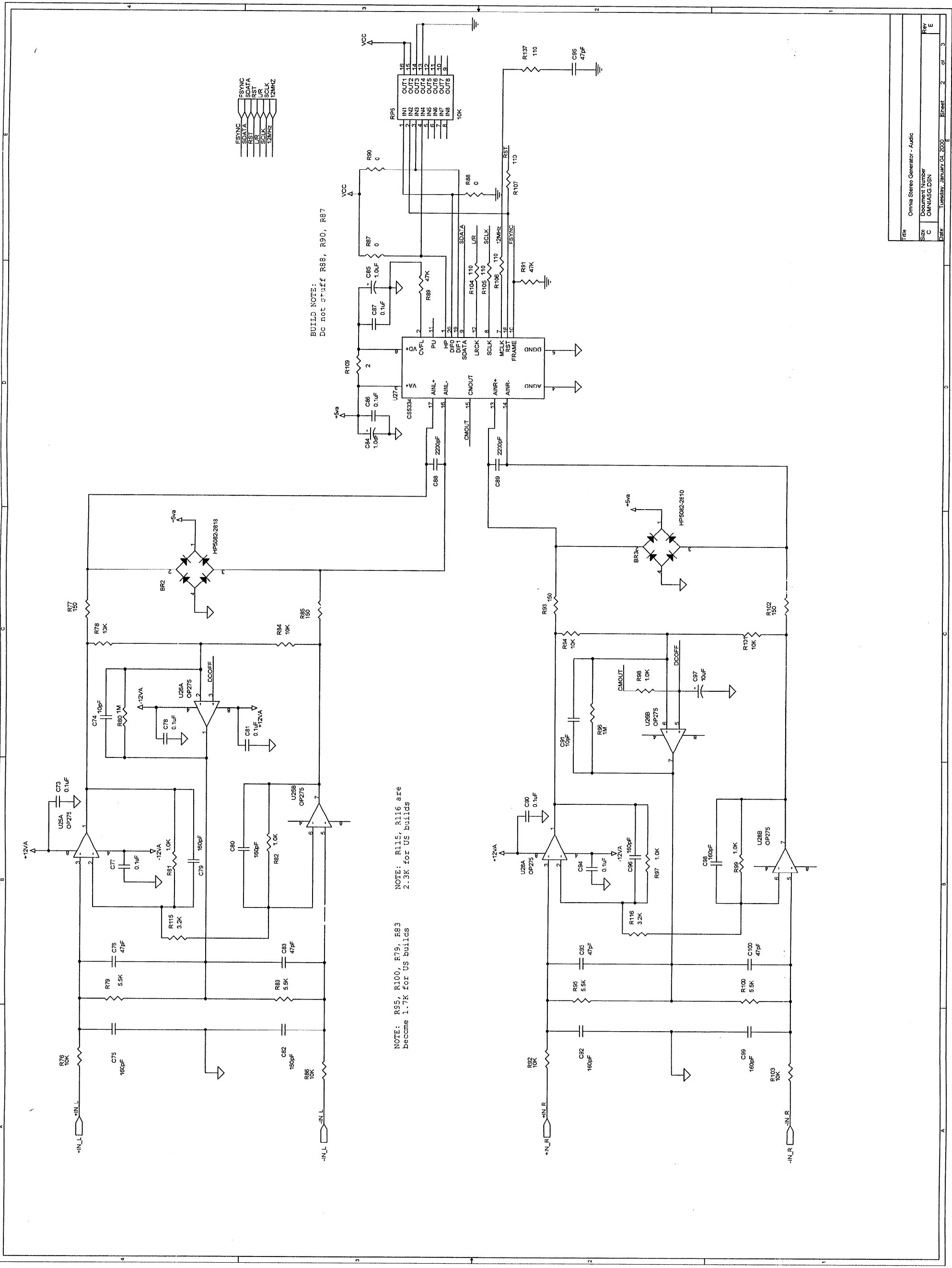
BUILD NOTE:
Do not stuff R88, R90, R87

NOTE: R115, R116 are
2.3K for US builds

NOTE: R95, R100, R79, R83
become 1.7K for US builds

FSYNC
SDATA
RST
I/R
SCLK
12MHZ
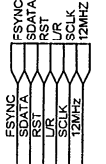
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9 Specifications

PERFORMANCE

all measurements referenced to 100% modulation unless otherwise noted

SNR: > 90dB

Distortion: < 0.02%

Spectrum: 60KHz - 100KHz < -75dB

Crosstalk: < -75dB

Separation: > 60dB, 20Hz - 15KHz

38KHz subcarrier suppression: < -85dB

Pilot accuracy: +/- 0.5Hz

INSTALLATION

Analog Inputs

Left/Right Balanced

XLR (Female) type connectors

10Kohm impedance

AES/EBU Input

XLR (Female) type connector

Sample rate 32KHz - 48KHz, sample rate converted to 48KHz

SCA Inputs

BNC type connector, unbalanced

5Kohm impedance, jumper to 75 ohm

Gain adjust +6dB to +12dB

Composite Baseband Output

Two (2) BNC type, unbalanced

Independent output level control

Source impedance 10/75 ohm selectable

Output level adjustable to 23.5 Vpp

Pilot reference Output

BNC type connector, unbalanced

TTL Level output square wave (0 - +5V)

Front Panel Composite Monitor

BNC type connector, unbalanced

Selectable for COMP 1 or COMP 2 monitoring

Buffered duplicate of back panel signals

ADJUSTMENTS / INDICATORS

Front Panel Adjustments

Lock Mode protects accidental front panel adjustments

Input level: -10dB to +12dB (0.2dB step), software controlled

Composite Clip Drive: +0 to +3.0dB (0.1dB step), software controlled

Pilot Injection Level: OFF, 6% to 12%, software controlled

Phase Adjust: -32 to +32 degrees

Analog / Digital Input select

Mono / Stereo Operation

Preemphasis Off / 50uS / 75uS select

15KHz Low Pass Filter On / Off select

Separate Level Control for Composite Output 1 and 2 (screw pot)

Separate Level Control for SCA Input 1 and 2 (screw pot)

Monitor Selector COMP 1 / COMP 2

Front Panel Indicators

Silence Detect LED, 8 seconds of no input level

Failure LED, 8 seconds of no output level

AES/EBU Error LED, immediately upon loss of valid AES/EBU bitstream

Left / Right Level indicators - 8 segment LED bargraph

Composite Output indicator - 8 segment LED Bargraph, shows depth of composite clipping

Remote Control Interface

DB15 Female shielded connector

3 Momentary close-to-ground Inputs

Analog / Digital Input select

Preemphasis On / Off

Mono / Stereo Operation

1 Static close-to-ground Input

Force Analog mode (unit returns to previously selected input when released)

3 pairs of dry relay status outputs

Silence Detect (same as front panel)

AES/EBU Error Detect (same as front panel)

Analog operation selected

3 open collector status outputs (each requires a separate current limiting resistor when used to power LED indicators).

Failure Detect (same as front panel)

Mono operation selected

Preemphasis On selected

SOFTWARE FIELD UPGRADABLE

RS232 interface on back panel allows software upgrade with terminal program

Shielded DB9 female connector

POWER INTERFACE

110 - 240 VAC 3 terminal plug

Switch-mode power supply

TORQUE

all screws mounted to ASFA specification 76 ft-lb.

EMISSIONS

Outgas < 12ppM, EPA note 11978

NO ANIMALS WERE HARMED IN THE TESTING OF THIS PRODUCT

10 Warranty and Application Caution

OMNIA SG LIMITED WARRANTY

This Warranty covers "the Products," which are defined as the various audio equipment, parts, software and accessories manufactured, sold and/or distributed by TLS Corp.,d/b/a Cutting *Edge* (hereinafter "Cutting *Edge*").

With the exception of software-only items, the Products are warranted to be free from defects in material and workmanship for a period of one year from the date of receipt by the end-user. Software-only items are warranted to be free from defects in material and workmanship for a period of 90 days from the date of receipt by the end-user.

This warranty is void if the Product is subject to Acts of God, including (without limitation) lightning; improper installation or misuse, including (without limitation) the failure to use telephone and power line surge protection devices; accident; neglect or damage.

EXCEPT FOR THE ABOVE-STATED WARRANTY, CUTTING *EDGE* MAKES NO WARRANTIES, EXPRESS OR IMPLIED (INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE).

In no event will Cutting *Edge*, its employees, agents or authorized dealers be liable for incidental or consequential damages, or for loss, damage, or expense directly or indirectly arising from the use of any Product or the inability to use any Product either separately or in combination with other equipment or materials, or from any other cause.

In order to invoke this Warranty, notice of a warranty claim must be received by Cutting *Edge* within the above-stated warranty period and warranty coverage must be authorized by Cutting *Edge*. If Cutting *Edge* authorizes the performance of warranty service, the defective Product must be delivered, shipping prepaid, to: Cutting *Edge*, 2101 Superior Avenue, Cleveland, Ohio 44114.

Cutting *Edge* at its option will either repair or replace the Product and such action shall be the full extent of Cutting *Edge's* obligation under this Warranty. After the Product is repaired or replaced, Cutting *Edge* will return it to the party that sent the Product and Cutting *Edge* will pay for the cost of shipping.

Cutting *Edge's* authorized dealers are not authorized to assume for Cutting *Edge* any additional obligations or liabilities in connection with the dealers' sale of the Products.

Cutting *Edge* products are to be used with registered protective interface devices that satisfy regulatory requirements in their country of use.

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11 CE Declaration of Conformity

Supplementary Information for our European Users

Declaration of Conformity

Application of Council Directives: 93/68/EEC (CE marking); 73/23/EEC (safety-low voltage directive); 89/336/EEC (electromagnetic compatibility).

Standards to which conformity is declared: EN50081-1, EN50082-1.

Manufacturer's Name: Cutting Edge, TLS Corporation

Manufacturer's Address: 2101 Superior Avenue, Cleveland, Ohio, USA

European Office: Cutting Edge Europe
Johannisstrasse 6
85354 Freising
Germany
Telephone: +49.81.61.42.467
Fax: +49.81.61.42.402

Type of Equipment: FM Stereo Generator

Model No.: 4600-1000

Serial No.: _____

Year of Manufacture: 2000

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directives and Standards.

Place: Cleveland, Ohio, USA

Date: 20 September, 2000

Signature:

Full Name: Frank Foti
Position: President

1.0 Introduction

1.1 Scope This record is intended to document Cutting Edge Omnia Stereo Generator conformance with Council Directives: 93/68/EEC (CE marking); 73/23/EEC (safety-low voltage directive); 89/336/EEC (electromagnetic compatibility).

Testing was conducted during the period December 1999 to January 2000.

1.2 Purpose Testing was performed to evaluate safety, emissions, and immunity, conformance to enable CE marking.

1.3 Conclusions The Cutting Edge Omnia Stereo Generator was found to be compliant and CE marking was applied to the product.

2.0 HF Radiated Emissions

2.1 Standards Applied The unit was laboratory evaluated according to standard: EN50081-1 using Measurement Document: EN55022, Class B.

2.2 Testing The unit was tested and evaluated by: Smith Electronics *
2.3 Test Results The unit was found to be in conformance for both radiated and line-conducted emissions.

3.0 Immunity

3.1 Standards Applied

> 3.1.1 ESD Susceptibility Measurement Document: IEC 1000-4-2 (IEC 801-2). Immunity to static electricity.

> 3.1.2 Radiated Susceptibility – HF Electric Field Measurement Document: IEC1000-4-3 (IEC 801-3).

> 3.1.3 Conducted Susceptibility – Power Line Measurement Documents: Burst/Transients: IEC1000-4-4 (IEC 801-4) Surge: IEC1000-4-5 (IEC 801-5) Voltage fluctuations: IEC1000-4-1 (IEC 801-1)

3.2 Testing

> 3.2.1 ESD Immunity The unit was tested and evaluated by: Smith Electronics *

> 3.2.2 Radiated Immunity – RF Electric Field The unit was tested and evaluated by: Smith Electronics *

> 3.2.3 Conducted Immunity – Power Line Testing to IEC801-4 was conducted by: Smith Electronics *

> * Smith Electronics
> 8200 Snowville Rd.
> Cleveland, OH 44141 (USA)

4.0 Low Voltage Directive

4.1 Standards Applied

3.1.1 Low Voltage Directive EN60950

C€ CE Conformance

This device complies with the requirements of EEC Council Directives: 93/68/EEC (CE marking); 73/23/EEC (safety-low voltage directive); 89/336/EEC (electromagnetic compatibility)

Conformity is declared to the following standards: EN50081-1, EN50082-1, IEC/EN60950.

Use of Shielded Cables

In order to conform to the CE requirements for HF radiation, shielded cables should be used for the audio and data connections. For audio connections, the cable shield should be connected to the XLR shell.

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12 Safety Notification

1. **Read All Instructions.** All safety and instructions must be read before operating the product.

2. **Retain All Instructions.** All safety and operating instructions must be maintained for future reference.

3. **Heed All Warnings.** All warnings on the product and those listed in the operating instructions must be adhered to.

4. **Follow All Instructions.** All operating and product usage instructions must be followed.

5. **Heat.** This product must be situated away from any heat sources such as radiators, heat registers, stoves, or other products (including power amplifiers) that produce heat.

6. **Water and Moisture.** Do not use this product near water.

7. **Attachments.** Do not use any attachments not recommended by the product manufacturer as they may cause hazards.

8. **Power Sources.** This product must be operated from the type of power source indicated on the marking label and the installation instructions. If you are not sure of the type of power supplied to your facility, consult your local power company.

9. **Grounding and Polarization.** This product is equipped with a polarized AC plug with integral safety ground pin. Do not defeat the safety ground in any manner.

10. **Power Cord Protection.** Power supply cords must be routed so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to the cords at AC wall plugs and convenience receptacles, and at the point where the cord plugs into the product.

11. **Lightning.** For added protection during a lightning storm, or when the unit is left unattended or unused for long periods of time, unplug the unit from the AC wall outlet. This will prevent damage to the product due to lightning and power surges.

12. **Overloading.** Do not overload AC wall outlets, extension cords, or integral convenience outlets as this can result in a fire or electric shock hazard.

13. **Object and Liquid Entry.** Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

14. **Accessories.** Do not place this product on an unstable cart, stand, tripod, bracket or table. Any mounting of the product needs to follow the manufacturers instructions.

15. **Servicing.** Refer all servicing to qualified service personnel.

16. **Damage Requiring Service.** Unplug this product from the wall AC outlet and refer servicing to qualified service personnel under the following conditions:

    a. When the AC cord or plug is damaged.

    b. If liquid has been spilled or objects have fallen into the product.

    c. If the product does not operate normally (following operating instructions).

    d. If the product has been exposed to rain or water.

    e. If the product has been dropped or damaged in any way.

    f. When the product exhibits a distinct change in performance (outside of normally operating specifications).

17. **Replacement Parts.** When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer. Unauthorized substitutions may result in fire, electric shock, or other hazards.

18. **Safety Check.** Upon completing of any repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.

19. **Cleaning.** Do not use liquid cleaners or aerosol cleaners. Use only a damp cloth for cleaning the exterior of the product.

13 Addenda

Manual History
.1 SS 020999
.2 SS 071100

Omnia SG test procedure   3-23-00

US TEST   (SWEDEN TEST)

1. RS232

    Connect RS232 port to Hyperterminal

    Hold in Knob of SG and power up unit

    Verify all LEDS lit, 232 on 7 seg, and welcome screen on hyperterminal. Verify communication.

    Power down unit and turn off hyperterminal.

2. REMOTE (with audio input – see composite set up)

    Select mono on/off at front panel ,mono light at front panel turns on/off and LED 1 turns on/off on remote connector

    Remove audio input , after 8 seconds LED 2 and 4 should turn on at the remote connector. Also the Failure LED and Silence LED should turn on at the front panel. Connect audio input and all LEDs should turn off.

    Select Preemphasis on/ off at the front panel , Preemphasis light at front panel turns on/off and LED 3 on remote connector turns on/off.

    Select analog input on/off at front panel, both analog light(front panel) and LED 5 (remote connector) should turn on/off.

    Select AES input on/off at front panel, the AES ERROR , AES/EBU (front panel) and LED 6 (remote conn) on/off.

    On Remote connector select
        SW1- mono/stereo
        Sw2 - Preemphasis on/off
        Sw3 - analog/aes on/off
        SW4 - locks analog on

3. COMPOSITE

Select AP SG-US.tst (**SG.SWE.TST**)
AP gen CH. A to CH A input of SG
AP gen CH. B to CH B input of SG
COMP 1 out of SG to AP AUX input
SG setting : Analog, Stereo, Preemphasis on, 75us (**50us**),
     LP filter off.
     Input levels A&B = 0
     Clip Drive = 0
     Pilot = off
     Phase = 0

A. Verify A&B in and Comp out meters are functioning.
B. Adjust Composite 1 trim pot for 0dbr reading on AP @ .1% thd+n.
 (Note: 0dbr = 5.8dbu on US units and 10.3 dbu on Sweden)
 Run Graph F9
 1. Preemphasis on = 75us
 2. Preemphasis on = 50us
 3. Preemphasis off
 4. Preemphasis off/ LP filter on
 See graph chart for acceptable results.
 Retrun unit to original settings in step 3.

C. Remove A input and select mono setting. Comp 1 out= -5.4dbr
 Return A input and select stereo setting.

D. Select SG-USN (**SG – SWEN**) .
 Verify reading is better than –85 dbr , Comp 1 out

E. Move output cable to Comp 2 output and repeat steps A thru D for
 comp 2 .

F. Move output cable to monitor out on front panel. Verify Comp 1
 and 2 = 0 dbr @ .1 % thd+n.

4. Pilot

    A. Turn pilot on and AP output off. Connect O'scope to Composite
    Out and Pilot out. Verify pilot out is a 5vdc 19khz square wave
    That syncs up with composite out.

    Turn Pilot OFF

5. SCA

    A. Select SG-SCA.tst
        Connect coax test cable to AP GEN A output to SCA 1 input (SG)
        Remove JP5 and JP6
        Monitor Comp 1 out
        Adjust SCA 1 so comp 1 = 0 dbr @ .2% thd+n
        Verify this reading at Comp 2 .

    B. Repeat step A for SCA 2

        Reinstall JP5 and JP6

6. Belar

    A. Reconnect AP Gen A&B out to SG A&B in.
        Connect composite 1 of the SG to Belar
        Select SG-USBE (**SG-SWBE**)
        Set pilot to 9.1 % on SG
        Turn off Preemphasis on SG

        On Belar seperation = -55 db / use R49 and R53 for adjustment
        Change input frequency to 1khz, seperation = -60 or better
        pilot level = - 20 db (**-15 db**)

7. AES

    A. Setup:
        DAT digital out to SG digital in
        Audio in to DAT analog inputs
        Set SG to AES in
        Connect SG comp 1 to speaker

        DAT set IEC958=AES/EBU
                Remote/local = local
                Audio input = analog
                SYNC = internal
                Input monitor = on

    B. Listen to audio quality at each Dat sample rate 48khz, 44.1khz and 32khz.. verify DAT synced up i.e FS48 solid and no D1 on or flashing.

    Select CH A in level – adjust, listen for gain – return to 0
    Select CH B in level – adjust, listen for gain – return to 0

8. Close up:

    Setting = analog, stereo, preemphasis on, 75us (**50us**), LP filter off
        Input level = 0, clip drive = 0, pilot = 9.1%, phase = 0

    Place serial number on rear of unit and on motherboard

    Fill out Quality Assurance sheet (include with unit)

    Install lid screws,

NOTICE OF WARRANTY

The Terms and conditions of the Warranty applying to the Product accompanying this Notice of Warranty are found exclusively in this Notice of Warranty. To the extent there is any inconsistency or conflict between the terms and conditions of this Notice of Warranty and the terms and conditions found anywhere else, including the Manual accompanying this Product, the terms and conditions of this Notice of Warranty are superseding and control.

This Warranty covers "the Products," which are defined as the various audio equipment, parts, software and accessories manufactured, sold and/or distributed by TLS Corp., d/b/a Cutting Edge.

With the exception of software-only items, the Products are warranted to be free from defects in material and workmanship for a period of two years from the date of receipt by the end-user. Software-only items are warranted to be free from defects in material and workmanship for a period of 90 days from the date of receipt by the end-user.

The terms and conditions of Cutting Edge's warranty in effect at the time of shipment shall apply.

In order to invoke this Warranty, notice of a warranty claim must be received by Cutting Edge within the above-stated warranty period and warranty coverage must be authorized by Cutting Edge. Notice of a warranty claim may be made orally by telephoning Cutting Edge at +1 (216) 241-3343 or in writing sent by facsimile to +1 (216) 241-4103. If Cutting Edge authorizes the performance of warranty service and if Cutting Edge will be performing the warranty service, the defective Product must be delivered, shipping prepaid, to: Cutting Edge, 2101 Superior Avenue, Cleveland, Ohio 44114 USA. If Cutting Edge authorizes the performance of warranty service and if it authorizes another entity to perform that warranty service, the Product must be delivered, shipping prepaid, to that entity, whose address will be provided by Cutting Edge.

Cutting Edge (or its designee) at its option will either repair or replace the Product and such action shall be the full extent of Cutting Edge's obligation, and buyer's sole remedy, under this Warranty.

After the Product is repaired or replaced, Cutting Edge (or its designee) will return it to the party that sent the Product and Cutting Edge will pay for the cost of shipping.

Cutting Edge will have no responsibility under this Warranty for any Products subject to: Acts of God, including (without limitation) lightning; improper installation or misuse, including (without limitation) the failure to use telephone and power line surge protection devices; accident; neglect or damage.

Cutting Edge's dealers are not authorized to assume for Cutting Edge any additional obligations or liabilities in connection with the dealers' sale of the Products.

EXCEPT FOR THE ABOVE-STATED WARRANTY, CUTTING EDGE MAKES NO WARRANTIES, EXPRESS OR IMPLIED (INCLUDING IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE).

In no event will Cutting Edge, its employees, agents or authorized dealers be liable for incidental or consequential damages, or for loss, damage, or expense directly or indirectly arising from the use of any Product or the inability to use any Product either separately or in combination with the other equipment or materials, or from any other cause.

CUTTING EDGE
TLS Corporation

Omnia. 8/98

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