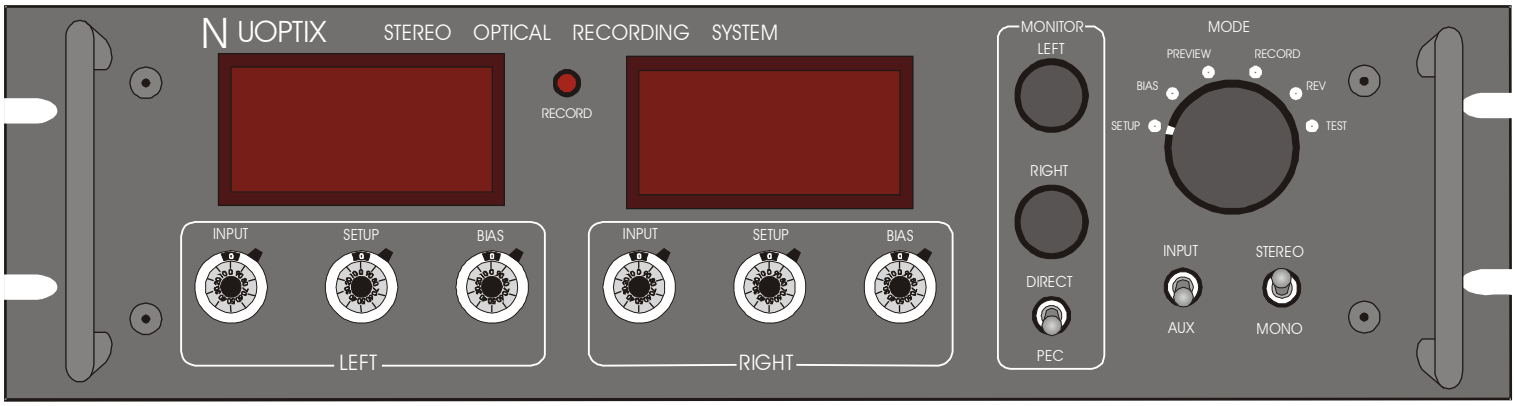
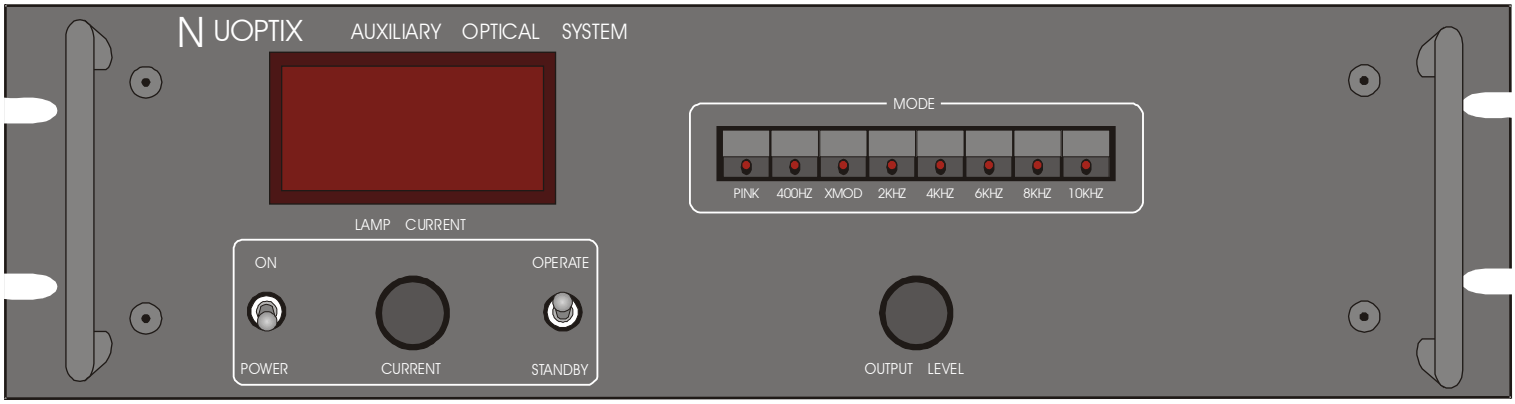
STEREO OPTICAL RECORDING SYSTEM





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SPECIFICATIONS

STEREO OPTICAL RECORDING SYSTEM (SORS)

Electrical Characteristics:

Input Impedance:	20K ohms - Balanced differential amplifier
Input Level:	-10dbm to +16dbm (for 50% track)
Preamp Input:	SORS provides ±15VDC to and accepts monitor signals from photocell preamplifier
Output:	Drives Nuoptix modified 5 contact Westrex type light valves
Frequency Response:	20Hz to 14kHz
S/N Ratio:	Greater than 80 db
Distortion:	Less than 0.05% THD (400hz at 100%)
Power Requirements:	Powered by Auxiliary Optical System

Physical Characteristics:

Dimensions:	19.0 inches (48.2 cm) wide 5.2 inches (13.3 cm) tall 14.4 inches (36.8 cm) deep
Weight:	12.6 lbs (5.7 Kg)

SPECIFICATIONS

AUXILIARY OPTICAL SYSTEM (AOS)

Electrical Characteristics

Lamp Output:	4.25 to 8.50 amps
Digital Meter:	Displays lamp current in amps
Signal Output:	Minus infinity to +13dbm Auto-controlled from SORS
Frequency Tolerance:	±0.005%
Distortion:	Less than 0.15% THD (400hz at +10dbm)
Output Frequencies:	400Hz Tone, 8kHz X-MOD, 1kHz, 2kHz, 6kHz 8kHz, 10kHz Tone
Pink Tone:	30 components 1/3 octave spacing Equal amplitude
Pink Tone Freqs:	24, 32, 40, 48, 64, 80, 96, 128, 160, 192, 256, 320, 384, 512, 640, 768, 1024, 1280, 1536, 2048, 2560, 3072, 4096, 5120, 6144, 8192, 10240, 12288, 16384, 20480 Hertz
Power Output:	±15VDC at 3 amps +5VDC at 3 amps
Power Requirements:	115 VAC or 230 VAC at 60 Hz or 50Hz
Power Consumption:	Approximately 225 watts

Physical Characteristics:

Dimensions:	19.0 inches (48.2 cm) wide 5.2 inches (13.3 cm) tall 14.5 inches (36.8 cm) deep
Weight:	30.5 lbs (13.9 Kg)

GENERAL DESCRIPTION

The Stereo Optical Recording System (SORS) and Auxiliary Optical System (AOS) together comprise a complete photographic sound track recording package for making both monaural and Stereo Optical sound track negatives on a Westrex type recorder. The system uses a specially modified five contact light valve and electro-optical monitoring system. The SORS provides direct independent electronic control of each of the four "ribbons" in the five contact light valve. This allows electronic track placement and spacing so that a single valve can be used for both mono and stereo recording. The SORS monitors the light passing through the light valve to the film and uses this information to display on digital meters a direct readout of optical track size which means extremely accurate dimensions can be maintained. The SORS uses a 16 bit digital delay to delay the audio signal while the noise reduction signal is being configured. This results in the lowest possible noise and eliminates the transient distortion and muted sound quality of older generation optical sound tracks. The direct electronic control of the light valve modulator provides for frequency response from 20Hz to 14kHz. The system provides for selected print loss equalization and exact level setup by use of digital peak signal monitoring. The SORS will accept input signal bus levels from -10dbm to +16dbm. It has a separate monaural input which is automatically selected when the system is switched to the MONO mode. The system provides line level monitor outputs capable of driving 600 ohm loads.

The AOS auxiliary system provides a unique set of digitally generated test signals which can be instantly selected and injected into a recorded track. The digitally generated test signals frequencies and levels are extremely accurately defined. This assures that crossmodulation test tracks made on the machine are extremely accurate. A unique new Pink Tone signal is also selectable. This signal is also digitally generated and provides a flat spectrum on 1/3 octave spectrum analyzers whose 1/3 octave filter frequencies are accurately set.

INSTALLATION INSTRUCTIONS

The SORS may be rack mounted in a standard 19 inch rack directly above the AOS unit. The AOS must have at least one inch clearance below to allow adequate air flow into the slots in its bottom panel. The case of the AOS is connected to the power cord third wire common. The case of AOS is connected to the case of the SORS through the aux power interconnect cable. Signal ground is isolated from the case in both units. It is recommended that all audio signals be carried on shielded cables and that the recorder and the SORS and the AOS be tied to a common chassis ground. All interconnect cables and connectors are supplied in the factory installation of the system.

Bright light falling directly onto the optical recorder visual observation window should be avoided as it can result in erroneous SETUP readings.

The pin outs of all connections on both units is given on last page of this manual as well as being indicated on the system schematics.

OPERATION

Before turning the system on or off, the front panel mode switch should be set to the SETUP position. This electrically disconnects the light valve from the electronics and thereby protects it from electrical transients. The system is turned on by the power switch on the front of the AOS. To record an optical track, first set the record lamp current and select MONO or STEREO mode with the SORS front panel toggle switch. (Note that the lamp current may be reduced when not recording by toggling the lamp standby switch to the standby position. The reduced lamp current prolongs lamp life.) With the mode switch in the SETUP position adjust the SETUP pot controls on the front panel to read the slack light valve ribbon spacing (in mils) for the particular light valve in use. Rotate the mode switch to the BIAS position and adjust the two 10 turn controls labeled BIAS to provide the desired size bias lines as indicated on the digital meters. One and a half mil bias lines for stereo recording and a two mil bias lines for monaural recording are recommended. Note that different BIAS settings will be required for stereo and mono recording. Rotate the mode switch to the PREVIEW position and adjust the input bus level signal to read 50% using the INPUT level controls. In this mode the light valves are not connected and the meter displays the signal level prior to the overload clipper and anti alias filters. The SORS will accept input bus levels from -10 dbm to +16 dbm. Rotate the mode to the RECORD position. In the record mode the light valve is connected and the meter displays the signal level after the overload clipper and anti-alias filters. At any time during recording, any of the test signals from the AUXILIARY

ELECTRONICS may be recorded by switching the input select switch from INPUT to AUX. The 8K XMOD test signal may be used to verify crossmodulation distortion cancellation on the print or for recording standard crossmodulation distortion tests. The PINK TONE test signal is a digitally generated signal which appears as a spectrally flat signal on a 1/3 octave spectrum analyzer whose 1/3 octave filter's center frequencies are properly set. Following the recording, the mode switch may be switched to the REVERSE position for density check or to the TEST position which alternates reverse bias and bias line. Following the recording, the mode switch should be returned to the SETUP position to protect the light valve.

CAUTION: OPERATION OF THE RECORDING SYSTEM WITH CONSTANT FREQUENCY ABOVE 8kHz AND 80% MAY CAUSE PERMANENT DAMAGE TO THE LIGHT VALVE.

MONITORING

The monitor controls on the front panel of the SORS adjust the output monitor level but have no effect on the recording itself. The P.E.C./DIRECT toggle switch selects the monitor signal from the input or from the photocell monitor. The SORS is designed so that the adjustment of the SETUP controls assures that the P.E.C. and DIRECT monitor levels match. The internal PEC trimpot (R56) is set to match P.E.C. to direct monitor level (see P.E.C. amplifier adjustments).

EXPLANATION OF CONTROL

The INPUT controls adjust the input signal levels. The SETUP controls adjust the gains of the photocell monitor amplifiers which are DC coupled. The SETUP gain is set so that when the SORS unit is in the SETUP mode, the front panel digital meters read the standby or "slack" ribbon spacing, in mils, of the two standby tracks exposed on the film negative. These standby track spacings may be verified by developing a strip of the exposed negative with the SORS in the SETUP position and measuring, with a toolmakers microscope, the track dimensions.

The BIAS control adjusts the gain of the output drive amplifier of the SORS whose output is the composite of the audio and noise reduction signals. In the BIAS mode the input audio signal is disconnected, and the ten turn BIAS controls are adjusted to provide the desired size bias lines read directly in mils (to the nearest tenth of a mil) on the digital meters.

The MONO/STEREO toggle switch does two things. It selects the audio input to the SORS from either the two stereo inputs or the monaural input and sets the light valve ribbons for proper track placement for the two different recording modes. Remember that different BIAS settings will be required for stereo and mono recordings.

CALIBRATION AND NECESSARY EQUIPMENT

The SORS is factory calibrated and use of the following procedures is not required in daily operation. An audio signal source and a digital voltmeter are required to calibrate the Stereo Optical Recorder. All measurements made during the calibration of the unit are made between the stated test point and the system common. A convenient ground is provided as a loop of bare wire between pin 18 and pin V of J2 (stereo digital delay board connector) on the mother board

INPUT LEVEL AND CLIPPER CALIBRATION

Unplug the light valve connector from the SORS unit rear panel. Rotate both BIAS controls on the front panel fully counter-clockwise. Remove the film loss EQ by setting the dip switches labeled PRE-EMP and DE-EMP to the OPEN position. Turn the power on. Apply a 100% signal at 400Hz (i.e. 6db over buss level) to the MONAURAL input connector on the SORS back panel. Toggle the Mono/Stereo switch to the MONO position and set the mode switch to PREVIEW. Set the input controls on the front panel to 5.00. Adjust the trimpot labeled GAIN (R15) for a reading of 100 on the panel meter. Rotate the mode switch to RECORD and adjust trimpot labeled DEL (R89) so panel meters read 100. This calibrates the Digital Delay for unity gain. Adjust the trimpot labeled CLIP (R43) for +4.00 volts at TP1. This sets the clipper at 130% Repeat this procedure for both left and right channels.

NOISE REDUCTION CALIBRATION

Once again the noise reduction should not require adjustment once factory set but the following procedure can be used if alignment is necessary. Rotate the mode switch to the BIAS position. Adjust comparator COMP (R99) so that the voltage at TP3 just switches from -15 to +15 volts. This allows the NR circuit to follow signals that are at extremely low levels. Return the mode switch to RECORD and select a 400Hz input signal at 100% as shown on the panel meters. Adjust NR (R115) for -50mV DC at TP4. This adjusts the NR gain or margin. Adjust AUDIO (R54) for a +10dbm signal at TP5. This sets the required amount of audio signal to be summed to the DC noise reduction signal. (Note: The adjustment of R54 should be verified by photographic development tests of tracks as described in the TRACK PLACEMENT AND SIZE ADJUSTMENT section. The final setup requires that the modulated amplitudes on the track be those given on page 13 for a given meter % modulation reading in the RECORD position. R54 should be adjusted finally for that result.)

TRACK PLACEMENT

This section will require a series of darkroom development tests. On the PC board layout diagram you will notice four trimpots labeled S1, S2, M1 and M2. Trimpots S1 and S2 displace the light valve ribbons while the unit is in the Stereo mode. Trimpots M1 and M2 displace the light valve ribbons while in the Mono mode. Trimpots S1 and M1 move the ribbons that are closest to the picture area of the film while S2 and M2 move the ribbons that are closest to the sprocket holes. Ribbon positions can be quickly and accurately set using the front panel meters to measure how far a ribbon is displaced. With the front panel 10 turn BIAS controls reduced to zero and the rotary mode switch set to BIAS, the meters will accurately read the ribbon spacing if the SETUP pots on the front panel have been properly adjusted to slack spacing reading (See Operating Instructions). Now the meter will accurately reflect any movements of the individual ribbons made by the ribbon placement trimpots. One must first determine how much and in which direction each ribbon needs to be moved using a film development test. The appropriate internal placement trimpots can be adjusted, while observing the front panel meters, to gauge the resultant displacements. This will provide rapid and accurate positioning of the track edges. Track placement should be verified by a final photographic development test. Remember that 1 mil of movement will equal 1 mil of the meter reading; i.e., if you need to move 2 mils and the slack reading is 18.0, you should adjust to read either 16.0 or 20.0 depending on the direction you need to move the ribbon.

SIZE ADJUSTMENT

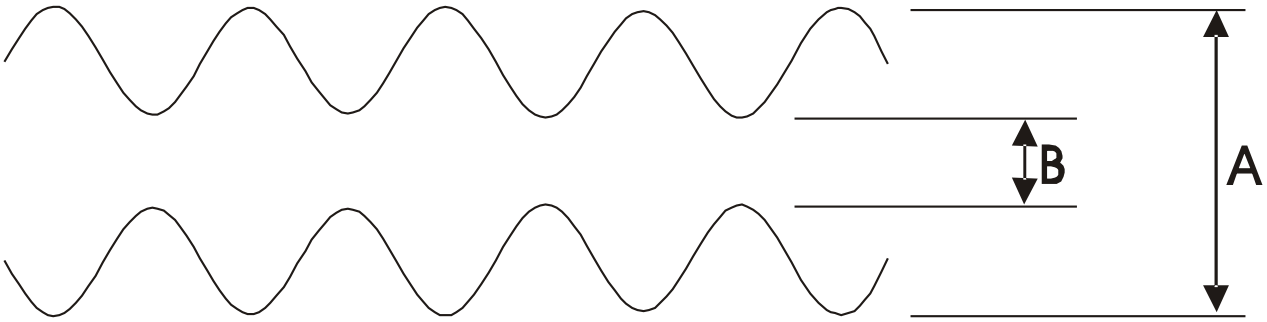
Apply an 80% signal at 400Hz and verify the total recorded modulation as determined using the formula on the page titled “How to Measure % Modulation”. R54 should be adjusted (by reading the level at TP5 on the D202 Board) so that the modulation measured on the film corresponds exactly to the meter reading in the RECORD position. To figure out how much to adjust, after measuring the amount of modulation according to the formula on the page “How to Measure % Modulation”, divide 80 by the % of modulation, then use the following formula:

DB=20*Log(80/%mod)

An example:

Using the same result in the page titled “How to Measure % Modulation” which is 77.8%, 20*Log(80/77.8)=+.242207799, so you would raise the level .24 DB again as read on TP5 D202 Board.

HOW TO MEASURE % MODULATION
ON 35mm DUAL BILATERAL OPTICAL TRACKS



$$\%MOD = \frac{A-B}{38} \times 100 \qquad \text{MONO TRACK}$$

$$\%MOD = \frac{A-B}{33} \times 100 \qquad \text{STEREO TRACK}$$

EXAMPLE: % MODULATION OF ONE TRACK OF A STEREO TRACK

A = 31.5 MILS

B = 5.8 MILS

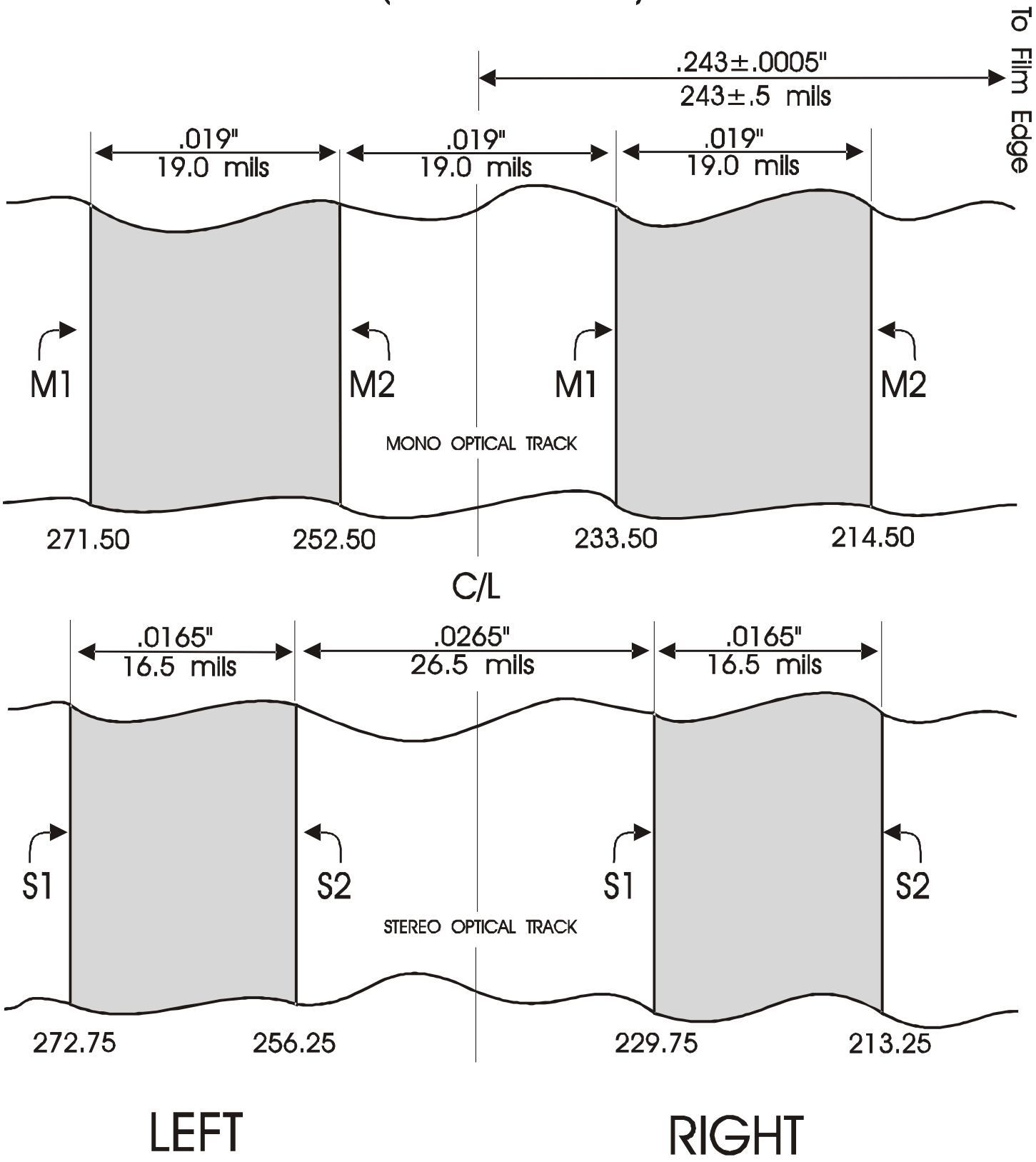
(A-B) = 25.7 MILS

$\frac{(A-B)}{33} \times 100 = 77.8\%$ MODULATION

MUST MEASURE BOTH TRACKS OF DUAL BILATERAL TRACK AND AVERAGE

OPTICAL TRACK DIMENSIONS AND PLACEMENT

(WITH ZERO BIAS)



LIGHT VALVE EQUALIZATION

Check to see that film loss EQ dip switches labeled PRE-EMP and DE-EMP are set to OPEN (i.e. flat or no equalization). Toggle the recording lamp to OPERATE and set to nominal current. Rotate the mode switch to the SETUP position and adjust the SETUP controls for slack spacing meter reading. Advance the mode switch to the BIAS position and increase the BIAS controls on the front panel for an 8 mil bias line as indicated on the front panel meter. Advance the mode switch to the RECORD position and apply a 50% signal at 400Hz. With the DIRECT/P.E.C. toggle switch in the P.E.C. position, increase the MONITOR control for a 0 dBm level on the monitor output. Carefully sweep the input frequency, making sure that the input level remains constant, and adjust the light valve equalization internal trimpots to achieve a flat response as monitored on the P.E.C. monitor output. The reduced signal and bias levels are used to assure that the light valve does not clash during the equalization procedure. The 2KHZ, 4KHZ and 6KHZ are boost and cut filters with midrange being flat. The 8KHZ (R58) is a cut only filter. The 8KHZ filter has a frequency trim control F8 (R59) with midrange being around 8.5 KHZ. The Q of this filter is similar to that of the light valve. Setting the notch frequency of the 8KHZ filter to just above the light valve resonance frequency, say 9KHZ, results in the most accurate equalization. The 10KHZ (R78) is a boost only filter.

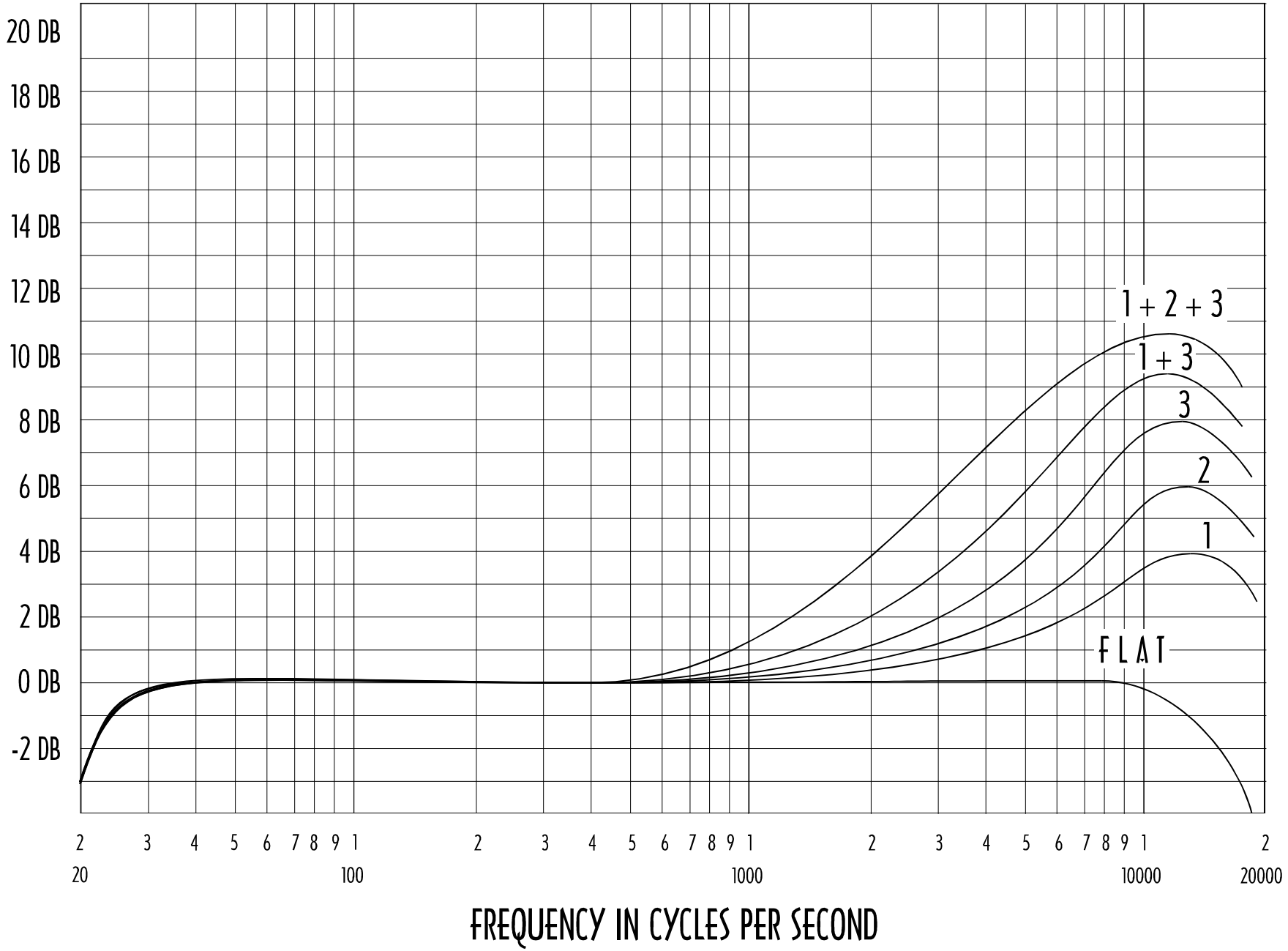
LAMP BALANCE

Optical sound track negatives must be properly exposed to assure cross-modulation distortion cancellation. This is accomplished by preparing cross-modulation tests for each laboratory at which sound track negatives are to be made. In addition, the two tracks of a Stereo Optical or dual bilateral optical sound track must be of equal density. Hand development test at the recording studio may be used to assure this balance of density. The photoelectric monitoring system on the SORS is very helpful in achieving lamp balance, which is changed by moving the record lamp horizontally. You will note that with the SORS in the SETUP position the meters read the amount of light exposing the two tracks. As the lamp is moved horizontally the displayed numbers will change. You will note that there is a simple relationship between the meter readings and the densities measured on the exposed negative and that this may be used to balance the lamps by monitoring the meters while moving the lamp. You can set the “SETUP” pots to read exactly what your density readings are, making sure you put the picture side density reading on the “Left” meter. the simply adjust until they read the same. This is explained also in the Camera manual.

FILM LOSS EQUALIZATION

After all the calibration procedures are complete, film loss EQ dip switches labeled PRE-EMP and DE-EMP should be set. PRE-EMP is for recording pre-emphasis and DE-EMP is for monitor deemphasis. Both are complimentary to each other and should therefore always be set in the same condition. Refer to the SORS PRINT LOSS EQUALIZATION curves to select the appropriate position. Position 1 or 2 with the 680pf capacitor is recommended for 35mm recording.

SORS PRINT LOSS EQUALIZATION



P.E.C. AMPLIFIER ADJUSTMENTS

Unplug the recording lamp from the back panel of the SORS. Rotate the mode switch to the SETUP position and rotate the SETUP pot on the front panel fully clockwise. Adjust the OFFSET pot (R53) so that the front panel meters read zero. (Caution: The PEC offset can be effected if bright light is allowed to fall on the visual track window. The window size has been reduced to minimize the problem but care should still be exercised.) Reconnect the recording lamp and set to the nominal recording lamp current. Adjust the SETUP controls for the proper slack ribbon spacing readings. Rotate the mode switch to BIAS and adjust for a 1.5 mil bias line. Change to RECORD mode and adjust the input to 80% at 400 Hz. With the DIRECT/P.E.C. in the DIRECT position, adjust the MONITOR level control on the front panel for +10 dBm at TP8. Now toggle the switch to the P.E.C. position and adjust the PEC trimpots (R51) for +10 dBm. This adjustment matches the direct and P.E.C. levels. Connect the input to the LEFT channel only. Adjust CROSS (R52) for minimum signal appearing at TP8 of the right channel board. Connect the input to the RIGHT channel only and adjust CROSS (R52) for minimum signal appearing at TP8 of the left channel board. This adjustment cancels any crosstalk that may have accumulated in the optical system.

PIN OUT CONNECTS FOR THE SORS AND THE AOS

1. Left, Right & Mono Signal Inputs - 3 pin female XLR
   - Pin 1 - Analog Common
   - Pin 2 - High
   - Pin 3 - Low

2. Left & Right Channel Monitor Outputs - 3 pin male XLR
   - Pin 1 - No Connect
   - Pin 2 - High
   - Pin 3 - Analog Common

3. Optical Preamplifier - 5 pin male XLR on chassis

	PREAMP
Pin 1 - Right Input	- E8
Pin 2 - +15 V Supply	- E5
Pin 3 - Analog Common	- E6
Pin 4 - -15 V Supply	- E7
Pin 5 - Left Input	- E9

4. Light Valve Output - 5 pin female XLR on chassis

	LV TERMINALS
Pin 1 - Left - (Sprocket Side)	- 1
Pin 2 - Left + (Picture Side)	- 2
Pin 3 - Analog Common	- 3
Pin 4 - Right - (Sprocket Side)	- 4
Pin 5 - Right + (Picture Side)	- 5

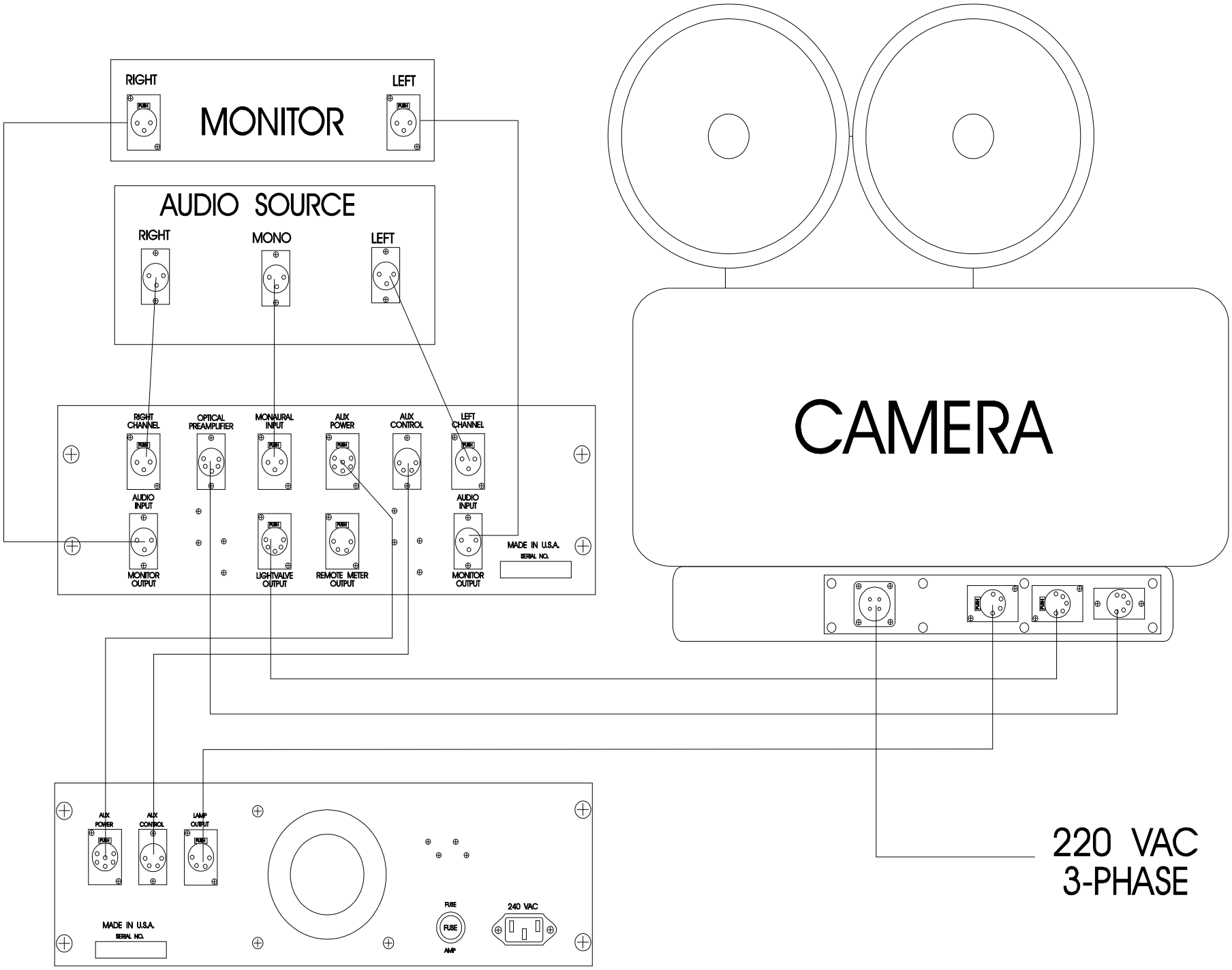
5. Remote Meter Output - 4 pin female XLR on chassis
   - Pin 1 - Left + Output
   - Pin 2 - Analog Common
   - Pin 3 - Analog Common
   - Pin 4 - Right + Output

6. Aux Power - 6 pin female XLR on chassis

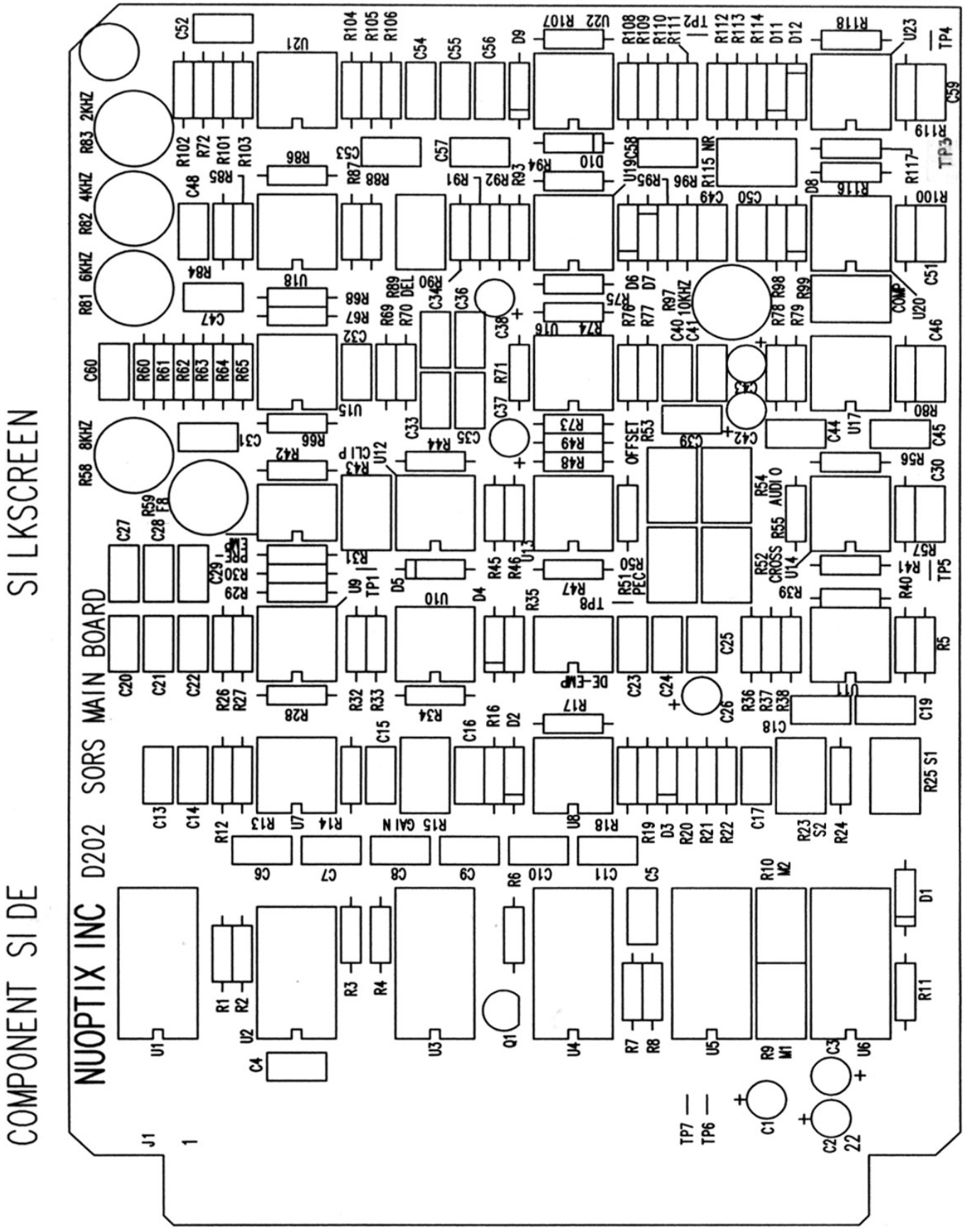
(SORS Input)	(AOS Output)
Pin 1	Pin 1 - + 15V Supply
Pin 2	Pin 2 - - 15V Supply
Pin 3	Pin 3 - Audio Common
Pin 4	Pin 4 - Digital Ground
Pin 5	Pin 5 - +5 Volts

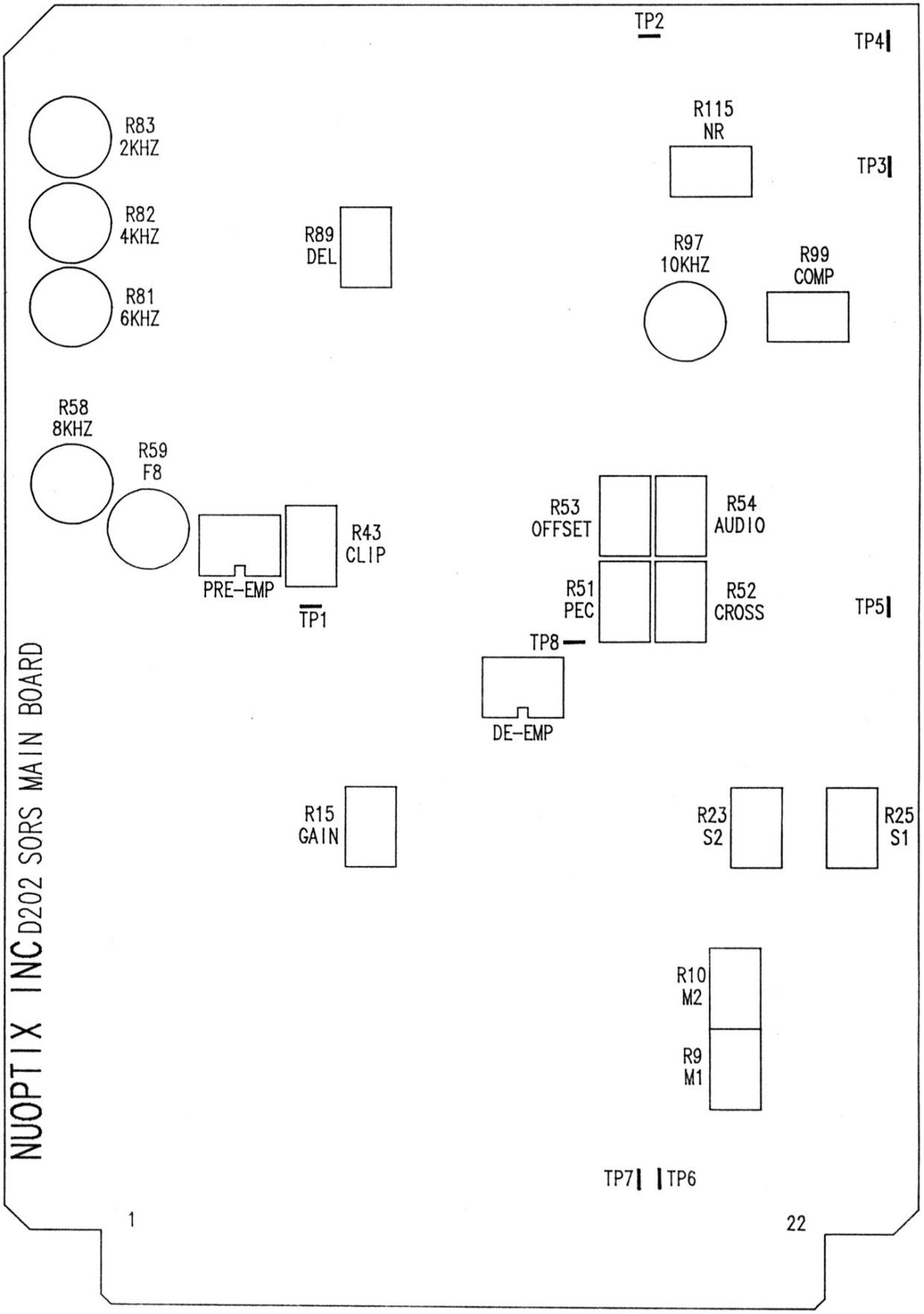
7. Aux Control - 4 pin male XLR on chassis
   - Pin 1 - Aux Signal Generator Audio
   - Pin 2 - Aux Signal Generator On/Off

8. Lamp Output - 4 pin female XLR on chassis
   - Pin 1 - Low Side
   - Pin 2 - Low Side
   - Pin 3 - High Side
   - Pin 4 - High Side


RIGHT
LEFT
MONITOR
AUDIO SOURCE
RIGHT
MONO
LEFT
CAMERA
RIGHT CHANNEL
OPTICAL PREAMPLIFIER
MONAURAL INPUT
AUX POWER
AUX CONTROL
LEFT CHANNEL
AUDIO INPUT
AUDIO INPUT
MONITOR OUTPUT
LIGHTVALVE OUTPUT
REMOTE METER OUTPUT
MONITOR OUTPUT
MADE IN U.S.A.
SERIAL NO.
AUX POWER
AUX CONTROL
LAMP OUTPUT
MADE IN U.S.A.
SERIAL NO.
FUSE
FUSE
AMP
240 VAC
220 VAC
3-PHASE

SCHEMATICS


COMPONENT SIDE
SILKSCREEN
NUOPTIX INC D202 SORS MAIN BOARD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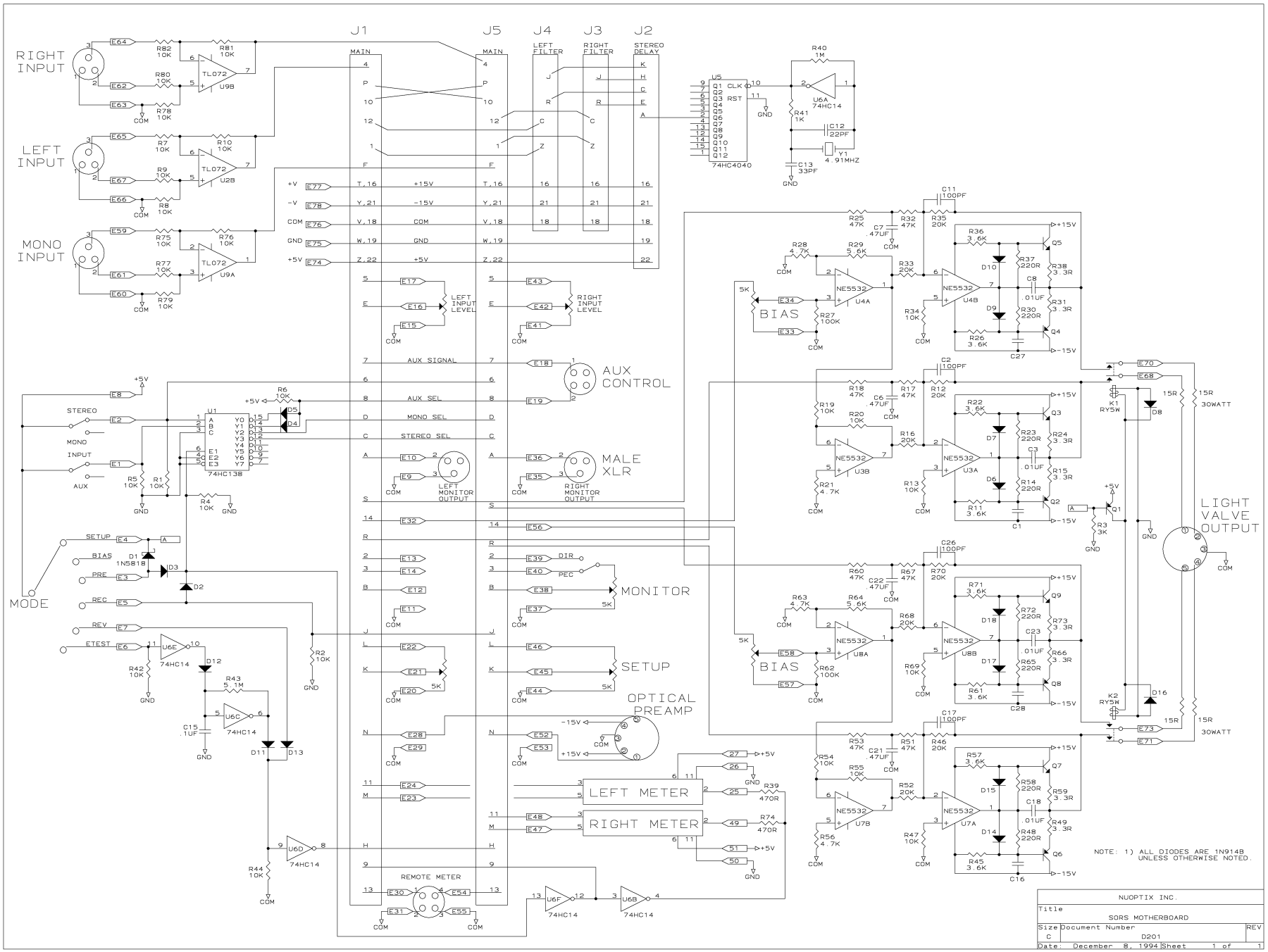
TP4
R83
2KHZ
R82
4KHZ
R81
6KHZ
R89
DEL
R115
NR
TP3
R97
10KHZ
R99
COMP
R58
8KHZ
R59
F8
PRE-EMP
R43
CLIP
TP1
R53
OFFSET
R54
AUDIO
R51
PEC
R52
CROSS
TP5
TP8
DE-EMP
R15
GAIN
R23
S2
R25
S1
R10
M2
R9
M1
TP7
TP6
NUOPTIX INC D202 SORS MAIN BOARD
1
22


J1
J5
J4
LEFT FILTER
J3
RIGHT FILTER
J2
STEREO DELAY
MAIN
RIGHT INPUT
LEFT INPUT
MONO INPUT
TL072
U9B
U2B
U9A
74HC4040
74HC14
+15V
-15V
+5V
COM
GND
LEFT INPUT LEVEL
RIGHT INPUT LEVEL
AUX SIGNAL
AUX SEL
MONO SEL
STEREO SEL
AUX CONTROL
MALE XLR
LEFT MONITOR OUTPUT
RIGHT MONITOR OUTPUT
MONITOR
SETUP
OPTICAL PREAMP
LEFT METER
RIGHT METER
REMOTE METER
STEREO
MONO
INPUT
AUX
MODE
SETUP
BIAS
PRE
REC
REV
ETEST
DIR
PEC
74HC138
NE5532
BIAS
LIGHT VALVE OUTPUT
30WATT
NOTE: 1) ALL DIODES ARE 1N914B UNLESS OTHERWISE NOTED.
NUOPTIX INC.
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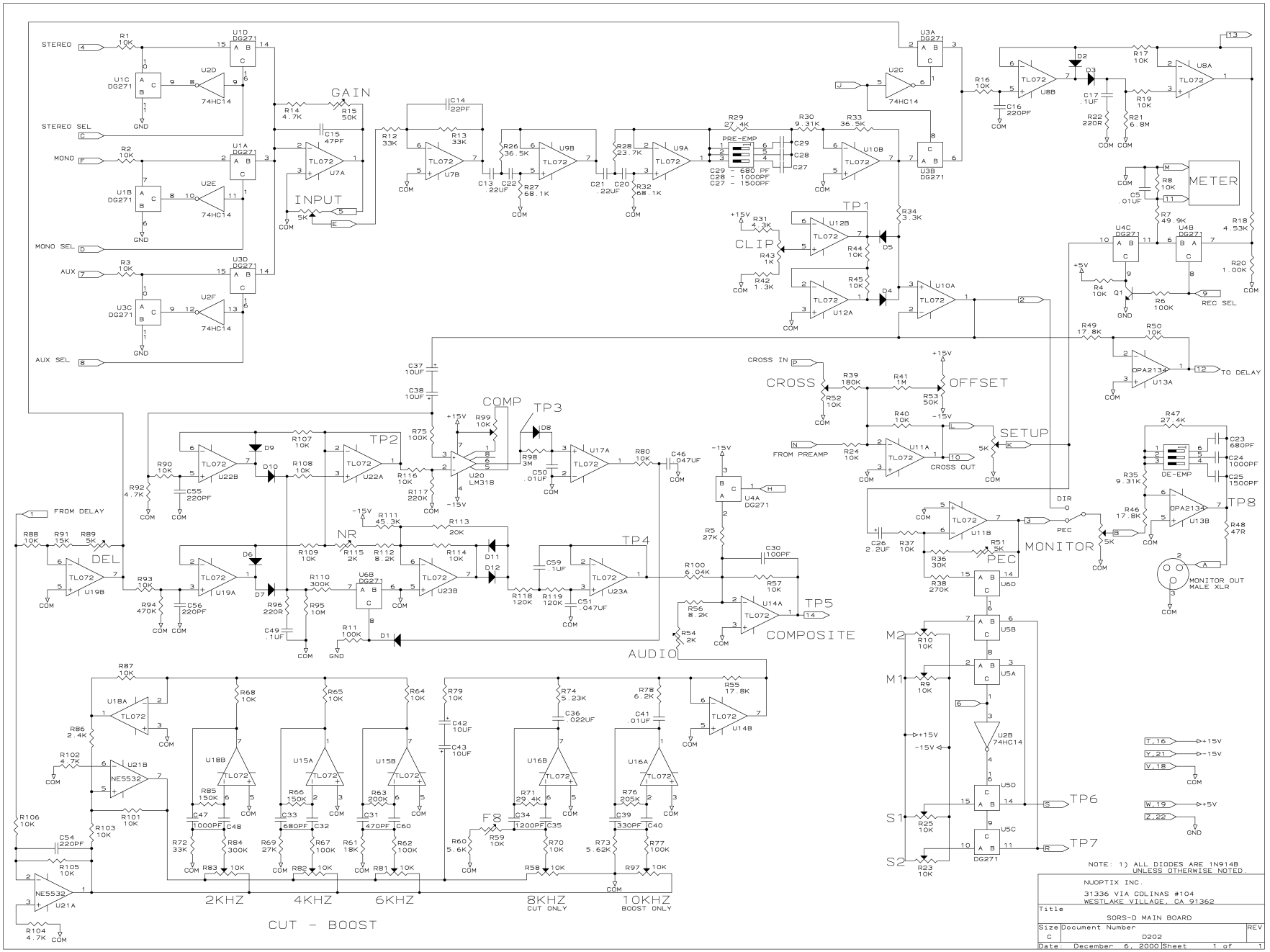
Size C
Document Number D201
REV
Date: December 8, 1994
Sheet 1 of 1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MONO
MONO SEL
AUX
AUX SEL
GAIN
INPUT
CLIP
METER
REC SEL
CROSS IN
CROSS
OFFSET
SETUP
CROSS OUT
FROM PREAMP
TO DELAY
FROM DELAY
DEL
NR
COMP
DE-EMP
PRE-EMP
DIR
PEC
MONITOR
MONITOR OUT
MALE XLR
AUDIO
COMPOSITE
2KHZ
4KHZ
6KHZ
8KHZ
CUT ONLY
10KHZ
BOOST ONLY
CUT - BOOST
NOTE: 1) ALL DIODES ARE 1N914B
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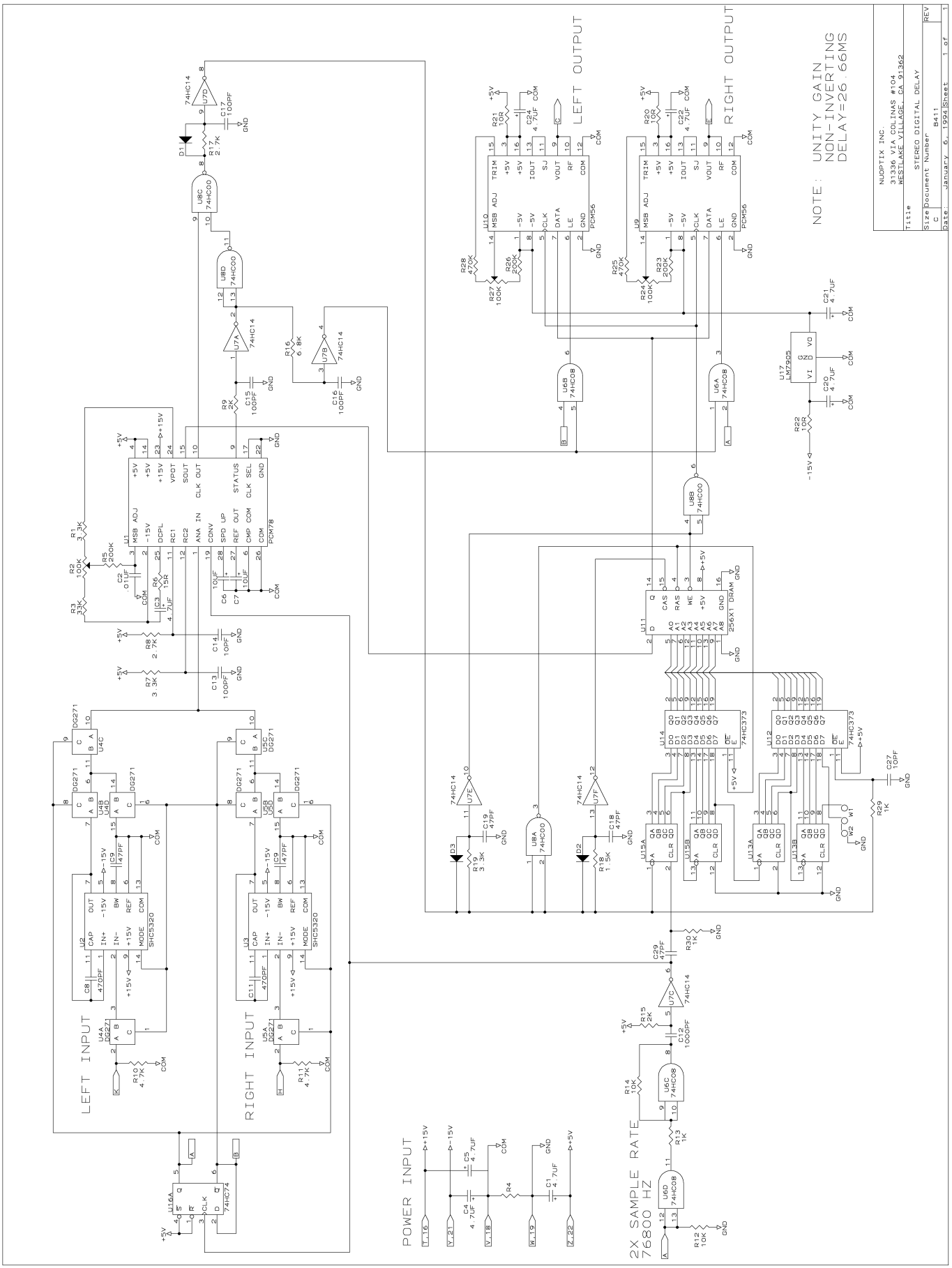
Sheet 1 of 1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Size
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Document Number
B411
REV
Date: January 6, 1994
Sheet 1 of 1
NOTE: UNITY GAIN
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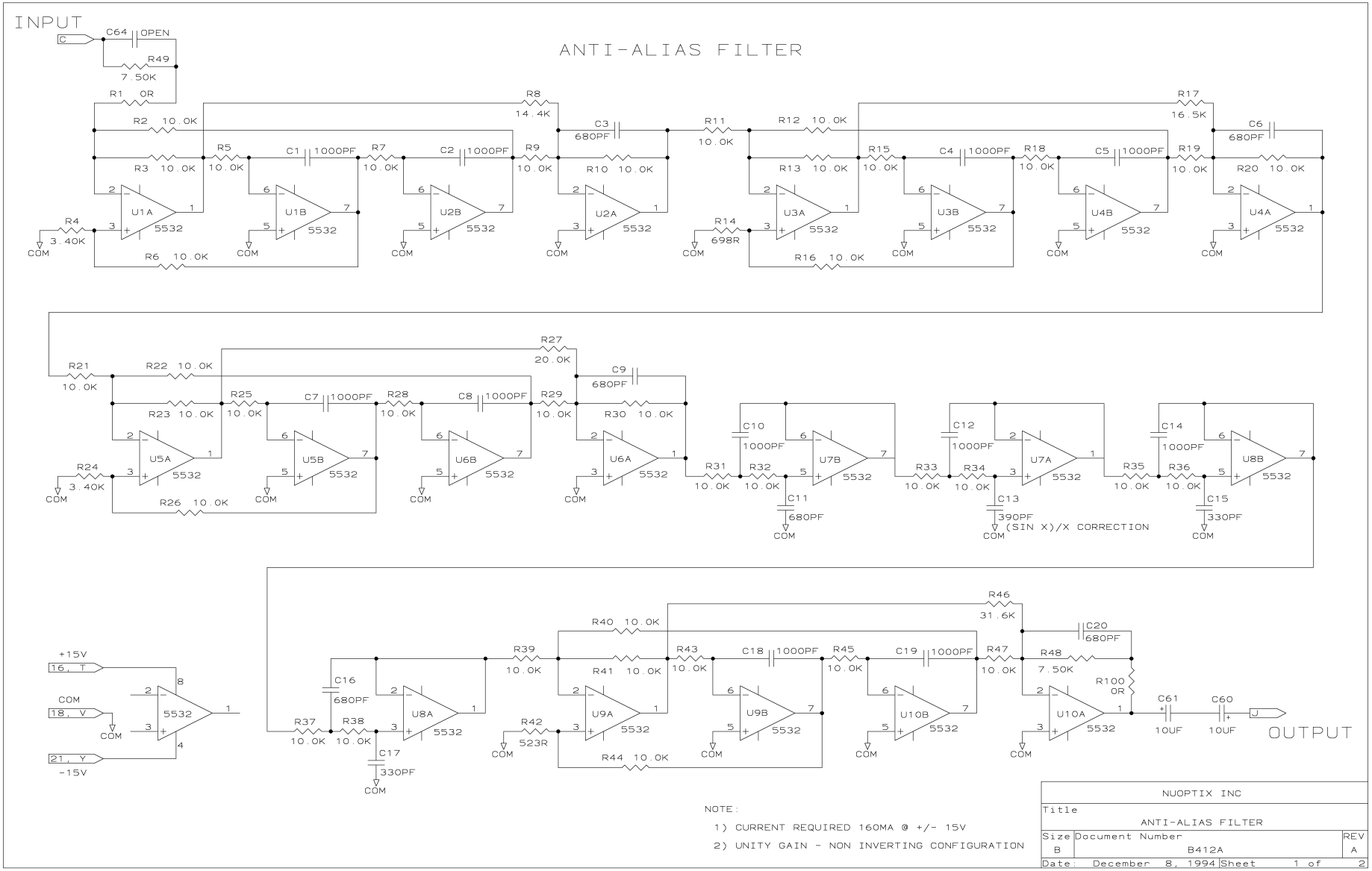
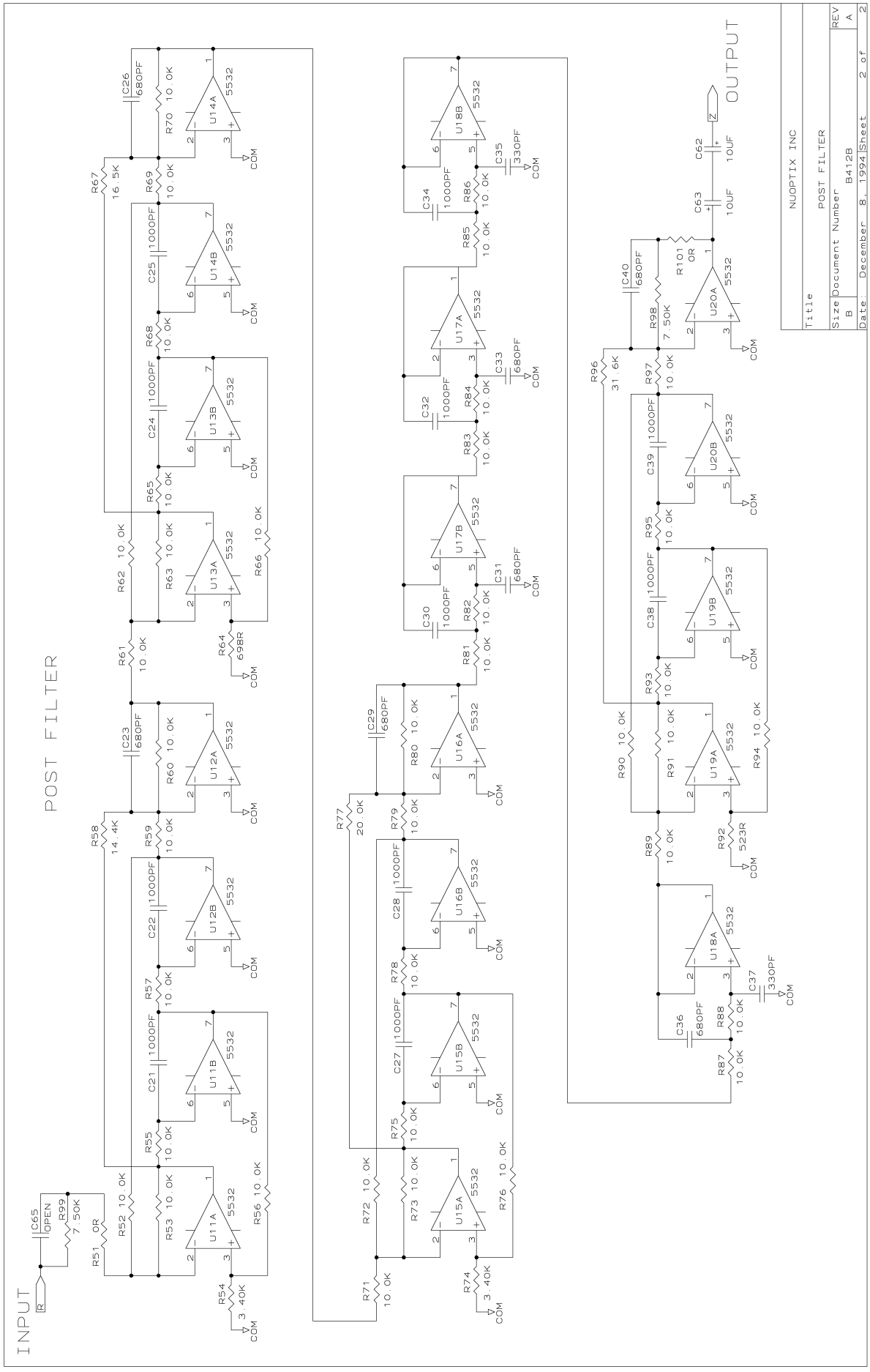
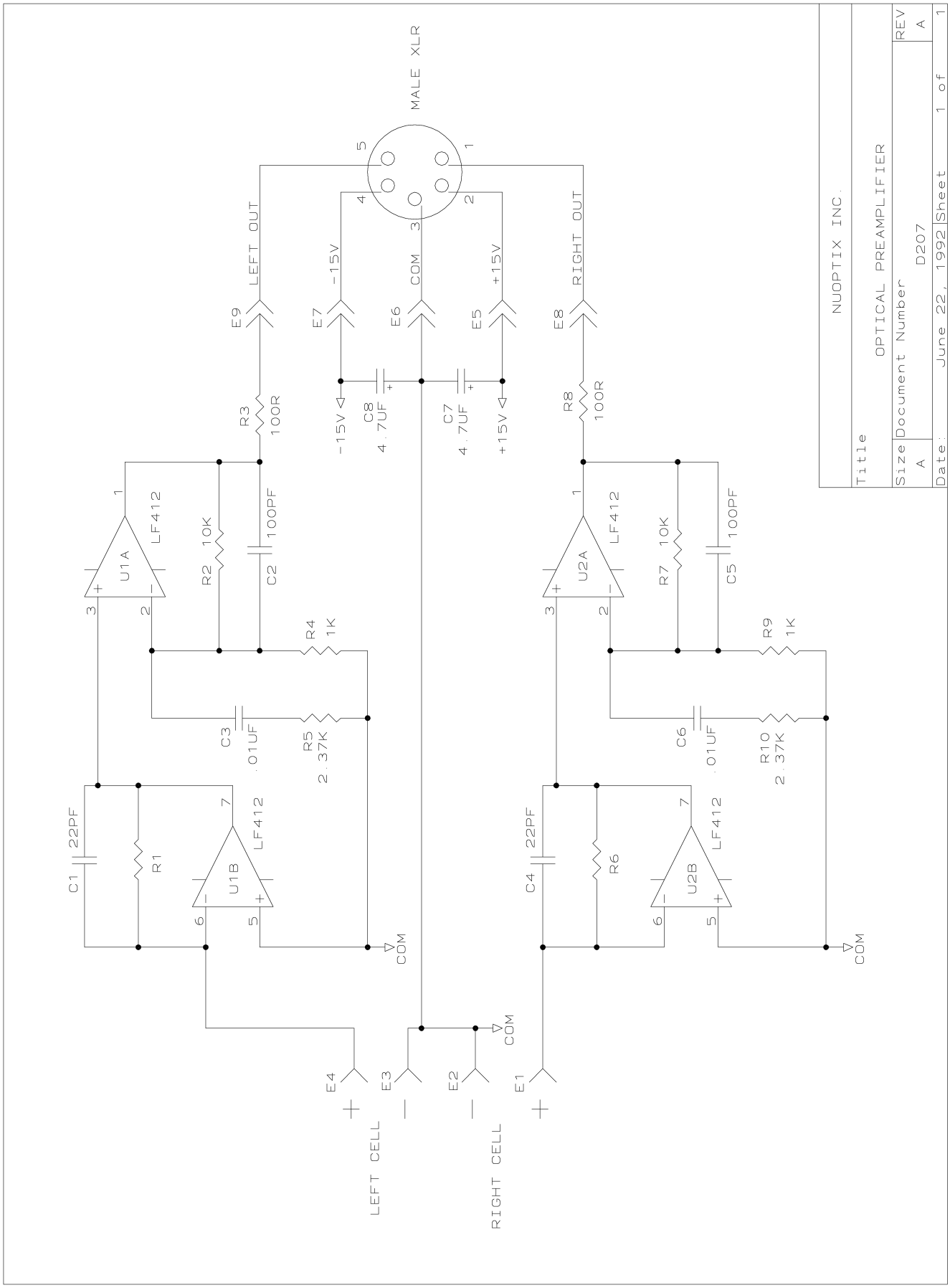
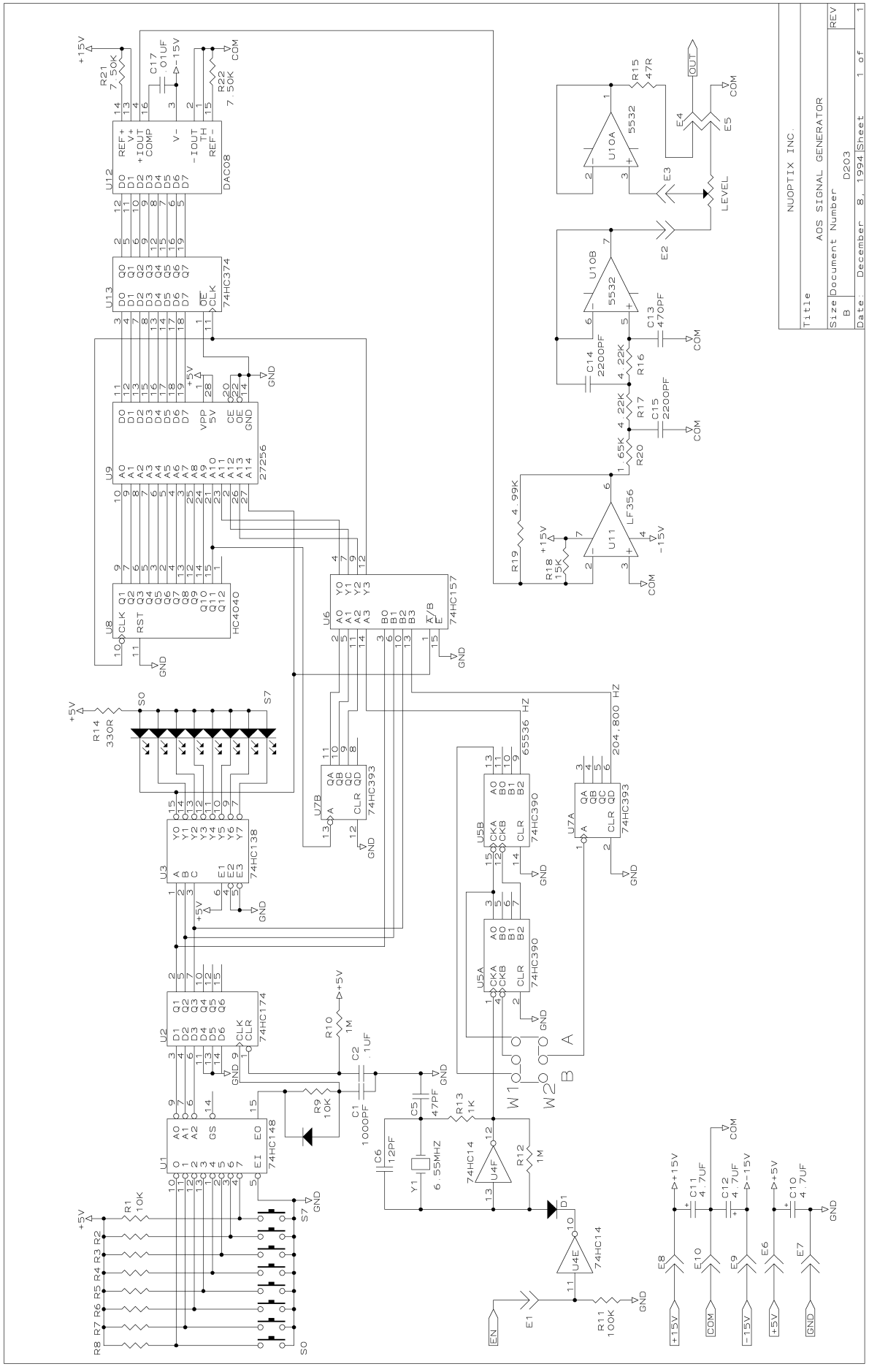
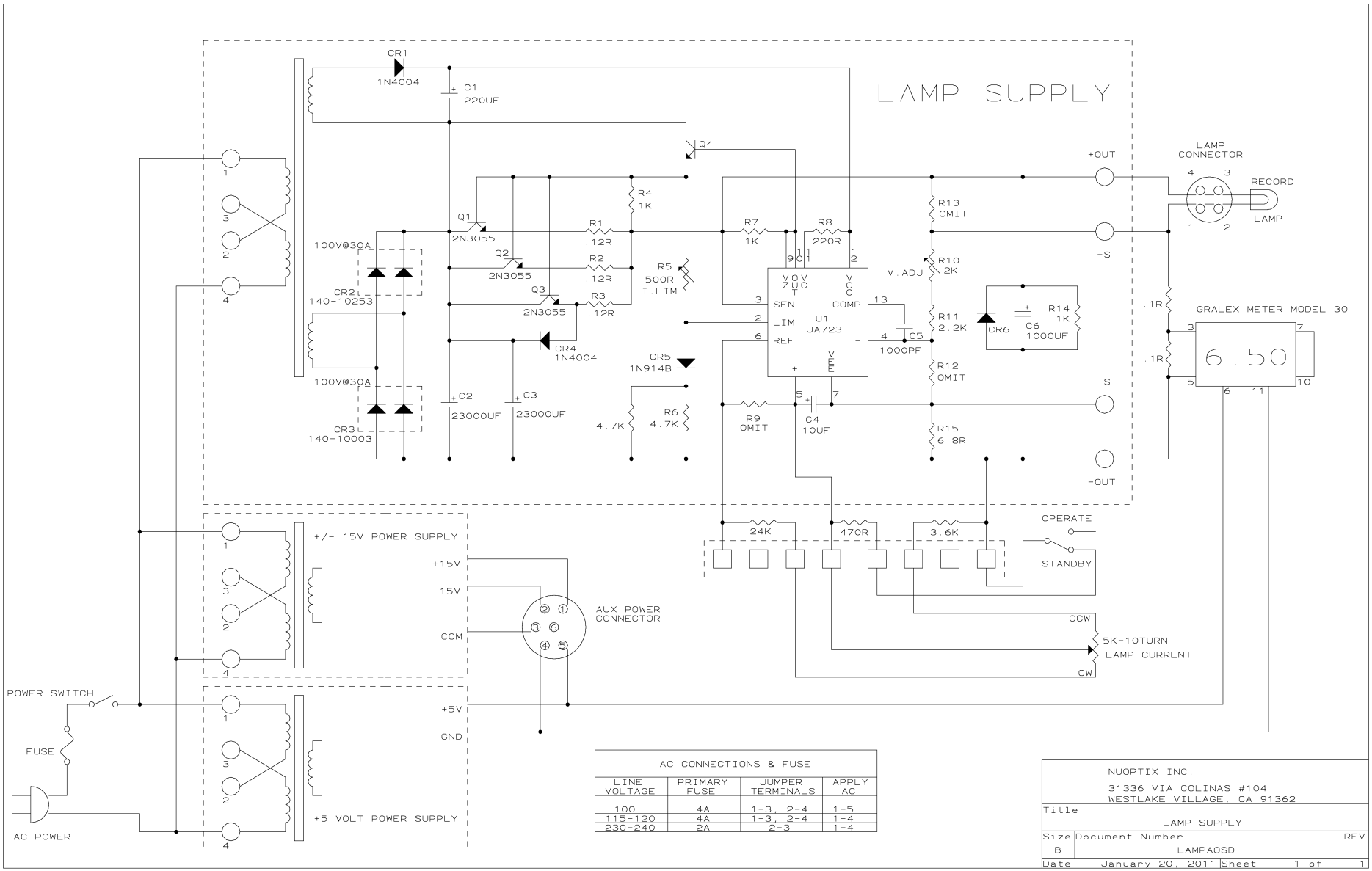
LEFT OUTPUT
RIGHT OUTPUT
LEFT INPUT
RIGHT INPUT
POWER INPUT
2X SAMPLE RATE
76800 HZ


INPUT
ANTI-ALIAS FILTER
C64 OPEN
R49 7.50K
R1 0R
R2 10.0K
R3 10.0K
R4 3.40K
R5 10.0K
R6 10.0K
C1 1000PF
R7 10.0K
C2 1000PF
R8 14.4K
R9 10.0K
C3 680PF
R10 10.0K
R11 10.0K
R12 10.0K
R13 10.0K
R14 698R
R15 10.0K
R16 10.0K
C4 1000PF
R17 16.5K
R18 10.0K
C5 1000PF
R19 10.0K
C6 680PF
R20 10.0K
U1A 5532
U1B 5532
U2A 5532
U2B 5532
U3A 5532
U3B 5532
U4A 5532
U4B 5532
COM
R21 10.0K
R22 10.0K
R23 10.0K
R24 3.40K
R25 10.0K
R26 10.0K
C7 1000PF
R27 20.0K
R28 10.0K
C8 1000PF
R29 10.0K
R30 10.0K
C9 680PF
U5A 5532
U5B 5532
U6A 5532
U6B 5532
C10 1000PF
R31 10.0K
R32 10.0K
C11 680PF
U7B 5532
C12 1000PF
R33 10.0K
R34 10.0K
C13 390PF
U7A 5532
(SIN X)/X CORRECTION
C14 1000PF
R35 10.0K
R36 10.0K
C15 330PF
U8B 5532
+15V
16, T
COM
18, V
21, Y
-15V
5532
R37 10.0K
R38 10.0K
C16 680PF
C17 330PF
U8A 5532
R39 10.0K
R40 10.0K
R41 10.0K
R42 523R
R43 10.0K
R44 10.0K
C18 1000PF
U9A 5532
U9B 5532
R45 10.0K
C19 1000PF
U10B 5532
R46 31.6K
R47 10.0K
C20 680PF
R48 7.50K
R100 0R
U10A 5532
C61 10UF
C60 10UF
J
OUTPUT
NOTE:
1) CURRENT REQUIRED 160MA @ +/- 15V
2) UNITY GAIN - NON INVERTING CONFIGURATION
NUOPTIX INC
Title
ANTI-ALIAS FILTER
Size B
Document Number B412A
REV A
Date: December 8, 1994
Sheet 1 of 2


POST FILTER
INPUT
OUTPUT
NUOPTIX INC
Title
POST FILTER
Size B
Document Number B412B
REV A
Date: December 8, 1994 Sheet 2 of 2


NUOPTIX INC.
Title
OPTICAL PREAMPLIFIER
Size A
Document Number D207
REV A
Date: June 22, 1992
Sheet 1 of 1
MALE XLR
LEFT OUT
-15V
COM
+15V
RIGHT OUT
R3 100R
R8 100R
C8 4.7UF
C7 4.7UF
U1A LF412
U2A LF412
U1B LF412
U2B LF412
R2 10K
R7 10K
C2 100PF
C5 100PF
R4 1K
R9 1K
C3 .01UF
C6 .01UF
R5 2.37K
R10 2.37K
C1 22PF
C4 22PF
R1
R6
COM
LEFT CELL
RIGHT CELL


NUOPTIX INC.
Title
AOS SIGNAL GENERATOR
Size B
Document Number D203
REV
Date: December 8, 1994 Sheet 1 of 1
U1 74HC148
U2 74HC174
U3 74HC138
U4 74HC14
U5 74HC390
U6 74HC157
U7 74HC393
U8 HC4040
U9 27256
U10 5532
U11 LF356
U12 DAC08
U13 74HC374
Y1 6.55MHZ
LEVEL
OUT
COM
EN
65536 HZ
204.800 HZ



AC CONNECTIONS & FUSE			
LINE VOLTAGE	PRIMARY FUSE	JUMPER TERMINALS	APPLY AC
100	4A	1-3, 2-4	1-5
115-120	4A	1-3, 2-4	1-4
230-240	2A	2-3	1-4

NUOPTIX INC.
31336 VIA COLINAS #104
WESTLAKE VILLAGE, CA 91362

Title: LAMP SUPPLY

Size: B | Document Number: LAMPAOSD | REV:

Date: January 20, 2011 | Sheet 1 of 1