

Section 3 Operation

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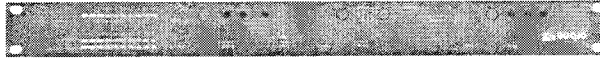
3-2	8218 Controls and Meters
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Caution

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 service personnel.

8218 Controls and Meters



Screwdriver-Adjustable Controls

Orban supplies a special green-handled flat-blade screwdriver (Xcelite R3323) to adjust the stereo encoder controls. Note that the Orban tweaker tool supplied with the analog OPTIMODs cannot be used with the 8200.

Output Levels are analog multi-turn controls that determine the peak-to-peak output level appearing at the composite outputs. Range is 0.4 to 8V p-p.

Comp 1 control sets the output level of COMPOSITE OUTPUT 1.

Comp 2 control sets the output level of COMPOSITE OUTPUT 2.

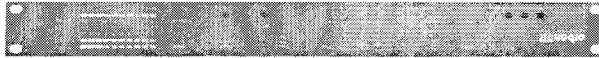
Pilot control adjusts the level of the 19kHz stereo pilot tone. You can measure the injection of the pilot tone, in percent modulation, by switching the Meter switch to Pilot.

Drive controls determine the sensitivity of signals appearing at the 8218 inputs.

Left control determines the sensitivity of the encoder to signals appearing at the LEFT INPUT. When Left is advanced fully counter-clockwise, +15 dBu produces 100% modulation at 100Hz. When Left is advanced fully clockwise, 0 dBu (0.775V rms) produces 100% modulation at 100Hz.

Right control determines the sensitivity of the encoder to signals appearing at the RIGHT INPUT. When Right is advanced fully counter-clockwise, +15 dBu produces 100% modulation at 100Hz. When Right is advanced fully clockwise, 0 dBu produces 100% modulation at 100Hz.

Digital control determines the sensitivity of the encoder to digital signals appearing at the AES/EBU INPUT. When Digital is advanced fully clockwise, digital input at 6dB below full scale produces 100% modulation at 100Hz. When Digital is advanced fully counterclockwise, digital input at full scale produces 100% modulation at 100Hz. The sensitivity can be increased in three ranges of 5, 10, and 15dB by setting combinations of the 5dB and 10dB DIP switches on the rear panel.



Input button determines whether the analog or digital AES/EBU INPUT drives the stereo encoder. If no valid digital signal is present at the digital input, the function defaults to analog, the Analog lamp is lit, and the Digital lamp blinks two times per second. If there is a parity error, a bi-phase coding violation, a receiver PLL not locked condition, or if the transmitter set the validity bit, the lamp blinks 4 times per second and the AES/EBU alarm output on the rear-panel DB-25 remote connector is set to +15V. Upon receiving a valid digital input, the input switches to digital immediately, the Digital lamp lights, and the Analog lamp goes off.

Stereo Mono button determines whether the main operating mode of the stereo encoder is stereo or mono:

Stereo: The encoder produces the standard stereo baseband. Pre-emphasis is applied according to the state of the emphasis logic. The state of the Cross Talk Test switch determines whether the stereo main channel and subchannel are produced according to their standard definitions, or if special test modes are present. (See the discussion of the Cross Talk Test switch, below, for a definition of these test modes.) The state of the Pilot switch determines whether the stereo pilot tone is present. When entering Stereo mode from Mono L or Mono R, the state of Pilot is set to that used in the most recent occasion of Stereo mode.

mono L: The encoder produces a monophonic signal from the LEFT INPUT. Pre-emphasis is applied according to the state of the emphasis logic. The stereo pilot tone is not present, regardless of the state of the Pilot O/Off switch. Both the Pilot On and Pilot Off LEDs are not lit. The stereo subchannel is not present. (Operationally, this function requires the 8218 to increase the gain of the left channel to the output by 6.84dB by comparison to its gain in Stereo so that a signal of a given level at the input produces the same peak level at the 8218's composite output in Mono mode as it does in Stereo mode, assuming 9% pilot injection.)

mono R: Same as Mono L, but accepts audio from the RIGHT INPUT.

Pilot button determines whether the pilot tone is present when the operating mode is Stereo, and regardless of the setting of the Cross Talk Test switch. In Mono L or Mono R modes the button is locked out and both associated LEDs are Off. The Pilot status is linked with Stereo mode so that returning from Mono L or Mono R to Stereo mode restores the Pilot to the state it was in when last in Stereo mode.

Cross Talk Test button determines if the stereo encoder operates normally, or if it produces special test functions. Whenever one of the two crosstalk tests is selected (Main>Sub or Sub>Main) the system first saves the current operational state for Stereo/Mono and Pilot. This operational state is restored when Operate is selected.

Operate: Stereo encoder operates normally.

Main>Sub: Produces a pure main-channel signal from the left channel audio. Operating this function forces the encoder into Stereo mode if it is not already in that mode, and any local and remote Stereo/Mono switching is locked out. The stereo subchannel is turned off. Pre-emphasis is applied according to the state of the emphasis logic. Pilot status is determined by the Pilot switch. The left channel input at 100% modulation level produces 91% modulation at the composite output with the pilot Off, and 100% modulation at the composite output with the pilot On (when pilot level set for 9% injection). This implies increasing the gain of the left channel to the composite output by 6.02dB by comparison to normal Stereo Operate mode.

Sub>Main: Produces a pure stereo subchannel channel signal from the left channel audio. Operating this function forces the encoder into Stereo mode if it is not already in that mode, and any local and remote Stereo/Mono switching is locked out. The main channel is turned off, and only the output of the subchannel modulator is applied to the composite output. Pre-emphasis is applied according to the state of the emphasis logic. Pilot status is determined by the Pilot switch. The left channel input at 100% modulation level produces 91% modulation at the composite output with the pilot Off, and 100% modulation at the composite output with the pilot On (when pilot level set for 9% injection). This implies increasing the gain of the left channel to the subchannel modulator by 6.02dB by comparison to normal Stereo Operate mode.

Meter display determines whether the bottom meter displays the composite level in percent modulation, or if it displays the pilot injection, in percent modulation. When Pilot is displayed, the display is dark unless the 8218 is in Stereo mode and the Pilot is On.

AES Determines Pre-Emph & 50, 75, J.17 De-Emph LEDs, show an actual status of the 8218: Whether it is applying 50 μ s or 75 μ s pre-emphasis to the input audio, whether it is applying J.17 de-emphasis to the audio, and whether this pre-emphasis is determined by DIP switches on the rear panel or by status bits received in the AES bitstream. The AES Determines Pre-Emph and J.17 De-Emph LEDs should only be On when the rear-panel AES DETERMINES EMPH is set to YES and a valid AES signal is present at the digital input.

Specifications

Performance

Frequency Response : Follows standard 50 μ s or 75 μ s pre-emphasis curve \pm 0.20dB, 5Hz-15kHz.

Channel Separation (L-R Crosstalk): >70dB, 20Hz-15kHz.

Noise (75 μ s, de-emphasized, 100% modulation): <-90dB.

Total System Distortion : 0.02% THD, 0.035% SMPTE IMD 20Hz-15kHz.

Input Peak Level: \leq +6dB, referenced to 100% modulation.

Overshoot Control (Overshoot Control Limiter active): <-0.5dB.

Spectral Protection: 61-100kHz (3dB or less overshoot peak reduction): Overshoot compensator-induced spectral splatter <-80dB.

Crosstalk (Main>Sub or Sub>Main) — Linear (referenced to 100% modulation): <-85dB.

Crosstalk (Main>Sub or Sub>Main) — Non-Linear (referenced to 100% modulation): <-85dB.

38kHz Subcarrier Suppression (referenced to 100% modulation): <-70dB.

76kHz Subcarrier Sideband (referenced to 100% modulation): <-85dB.

Installation

Analog Audio Input

Configuration: Left and right.

Impedance: 100k Ω , electronically balanced. Termination resistor can be installed.

Common Mode Rejection: >60dB.

Sensitivity: Adjustable, 0 to +15dBu to produce 100% modulation.

Maximum Input Level: +18dBu.

Connector: XLR-type, female, EMI-suppressed. Pin 1 Chassis Ground, Pins 2 and 3 electronically balanced.

Digital Input

Configuration: Two-channel AES/EBU-standard.

Sampling rate: Variable, 32kHz to 48kHz, automatically selected.

Sensitivity: -21dBFS to 0dBFS to produce 100% modulation, in four ranges.

Connector: XLR-type, female, EMI-suppressed. Pin 1 Chassis Ground, Pins 2 and 3 transformer balanced and floating.

SCA Subcarrier Inputs

Configuration: Two inputs that sum into composite baseband outputs.

Input Impedance: 600 Ω .

Sensitivity: 0.8Vp-p for 10%, 1.0Vp-p for 12.5% modulation of main carrier.

Maximum Input Level: +18dBu, single-ended.

Connector: BNC, floating over chassis ground. EMI-suppressed.

Composite Baseband Outputs

Configuration: Two BNC outputs, each with independent output level control, output amplifier and connector.

Source Impedance: 0 Ω voltage source or 75 Ω (jumper-selectable), single-ended.

Load Impedance: 37 Ω or greater. Termination not required.

Level (0 Ω Source Impedance, 75 Ω or higher Load Impedance): Adjustable, 0Vp-p to 0-8.8Vp-p (100% modulation) with output level control.

Connector: BNC, floating over chassis ground. EMI-suppressed.

Pilot Reference Output

Configuration: Buffered square-wave reference for RDS or other subcarrier services.

Source: TTL level output, 0 to +5V peak.

Connector: On Remote Control Interface.

AES/EBU Error Alarm

Source: \pm 15V (On), W0U-15V (Off), 10mA maximum.

Connector: On Remote Control Interface.

Remote Computer Interface

Configuration: Seven inputs — select between Analog/Digital Input, Pre-Emphasis On/Off, Operation Mode (Stereo, Mono From Left or Mono from Right).

Voltage: 5-12VAC or DC, momentary or continuous, optically-isolated. Current-Limited 9VDC provided to facilitate use of contact closure.

Connector : DB-25, male, EMI-suppressed.

Physical

Switches: Input (Analog, Digital), Stereo/Mono (Stereo, Mono L, Mono R), Pilot On/Off, Crosstalk Test (Operate, Main>Sub, Sub>Main), Meter (Composite, Pilot).

Screwdriver-Adjustable Controls: Drive (Left, Right and Digital) and Output Levels (Pilot, Comp 1, Comp 2).

Metering: Two ten-segment LED bargraph displays show peak level of Left and Right inputs. One 10-segment display shows Composite or Pilot output level.

Rear Panel DIP Switch: Selects Pre-Emphasis In/Out, Pre-Emphasis type (50 μ s or 75 μ s), J.17 de-emphasis In/Out, whether or not pre-emphasis and J.17 de-emphasis respond to AES/EBU status bits, digital input range (four 6dB ranges), and overshoot compensator on/off.

Requirements: Switch-selectable on the rear panel, 98-132VAC or 196-264VAC; 50-60Hz.

Connector: IEC; detachable 3-wire power cord supplied. AC is EMI-suppressed.

Fuse: 1/2-amp 3AG 250V Slow-Blow for 115V operation; 1/4-amp "T"-Type (250mA) Slow-Blow for 230V operation.

Safety Standards: NRTL-tested to UL Standard 1419, IEC65 and EN50082.

Dimensions (WxHxD): 19in/48.3cm wide, 10.25in/26.1cm deep, 1.75in/4.5cm high. 1 rack unit.

Operating Temperature Range: 32-122°F/0-50°C

Humidity: 0-95% RH, non-condensing.

Circuit Characteristics

Analog-To-Digital Converter

(A/D Converter subject to change as technology improves.)

Device: Crystal CS5390.

Performance: 20-bit.

Digital Signal Processing

Device: Motorola DSP56009.

Performance: 24-bit processing. 144dB internal dynamic range.

Digital-To-Analog Converter

Device: Analog Devices AD1890.

Performance: 18-bit.

Pilot

Frequency: 19kHz.

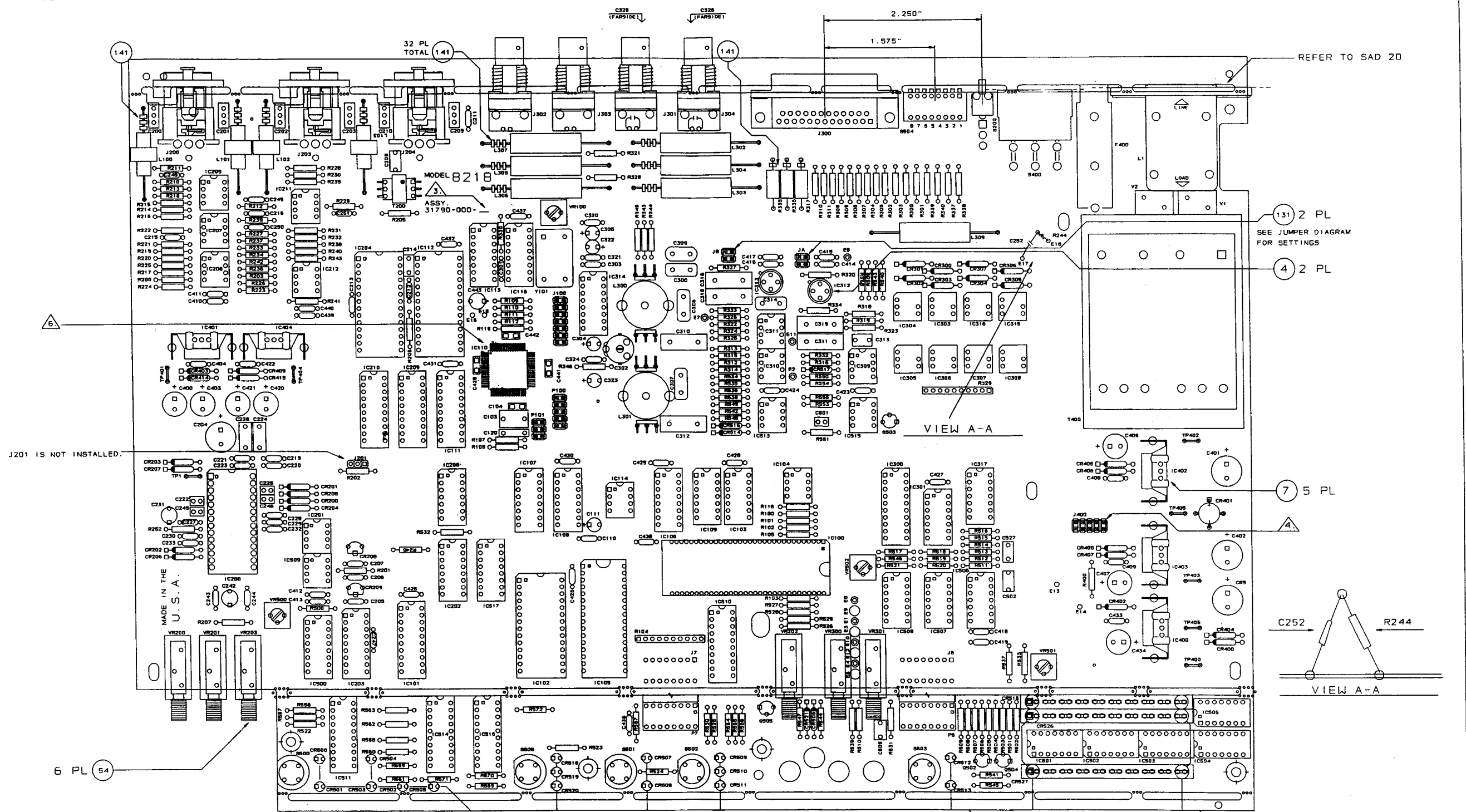
Accuracy: ± 0.5 Hz.

Injection: Adjustable, 7%-11%.

Warranty

One Year, Parts and Labor: Subject to the limitations set forth in Orban's Standard Warranty Agreement.

Specifications subject to change without notice.



J201 IS NOT INSTALLED.

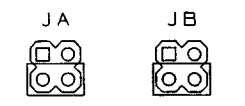
6 PL 54

COMPONENT SIDE

6 PL 16

6 PL 5

JUMPER DIAGRAM



PLACE JUMPER RECEPTILES IN SECOND POSITION

- △ MOUNT HEAT SINK #16017.000.01 TO IC110 DSP USING LOCKTITE #383 THERMAL ADHESIVE AND #7387 ACTIVATOR.
- 5. CHECK TO INSURE PROPER LEAD TRIM ALONG CABLE ROUTING PATH.
- ▲ CLIP PIN 10 OF J400
- ▲ MARK ASSEMBLY REVISION LEVEL IN SPACE PROVIDED
- 2. REFERENCE SCHEMATIC DRAWING NO. 61168-000
- 1. SQUARE PADS INDICATE PIN 1 OF CONNECTORS, CATHODE OF DIODES POS. SIDE OF CAPS., PIN 1 OF IC'S

NOTES: (UNLESS OTHERWISE SPECIFIED)

2658	4/99	15	BOM CHANGE	CF	JT
2706	10/98	14	MOVE W1-4 TO COMP SIDE	CF	JT
2562	1/98	13	ADDED NOTE 5	CF	BD
2542	10/97	12	ADDED CAP C502	CF	BD
2513	8/97	11	UPDATE & REVISE	CF	CP
2491	7/97	10	BOM CHANGE ONLY	CF	CP
2471	6/97	09	BOM CHANGE ONLY	CF	CP
2408	5/97	08	ADD HEATSINKS	CF	JT

2402	3/97	07	UPDATE & REVISE	CF	JT
2281	8/96	06	BOM CHANGE	CF	CP
2180	9/95	05	PARTS LIST CHANGE	CF	CP
2179	9/95	05	ADD NOTE #5	CF	CP
2177	8/95	04	IMPROVE PERFORMANCE	CF	CP
2168	7/95	04	RELEASE TO PRODUCTION	CF	CP
2164	7/95	04	REPLACE L1/STK W/CABLE SUB-ASSY	CP	CP
2153	5/95	03	IMPROVE PERFORMANCE	DB	CP
2107	4/95	02	IMPROVE PERFORMANCE	DB	CP
2049	11/94	01	RELEASE TO PRODUCTION	DB	CP
ECO NO.	DATE	REV	DESCRIPTION	BY	CKD

REVISIONS	
MODEL NO.	8218
TITLE	PCB ASSEMBLY
APPROVALS	DATE
DJN BORBA	8/15/94
CKD	CP 12/94
APVR	CP 12/94
SIZE	D
DWG NO.	31790
VER	000
REV	15
SHEET	1 OF 2

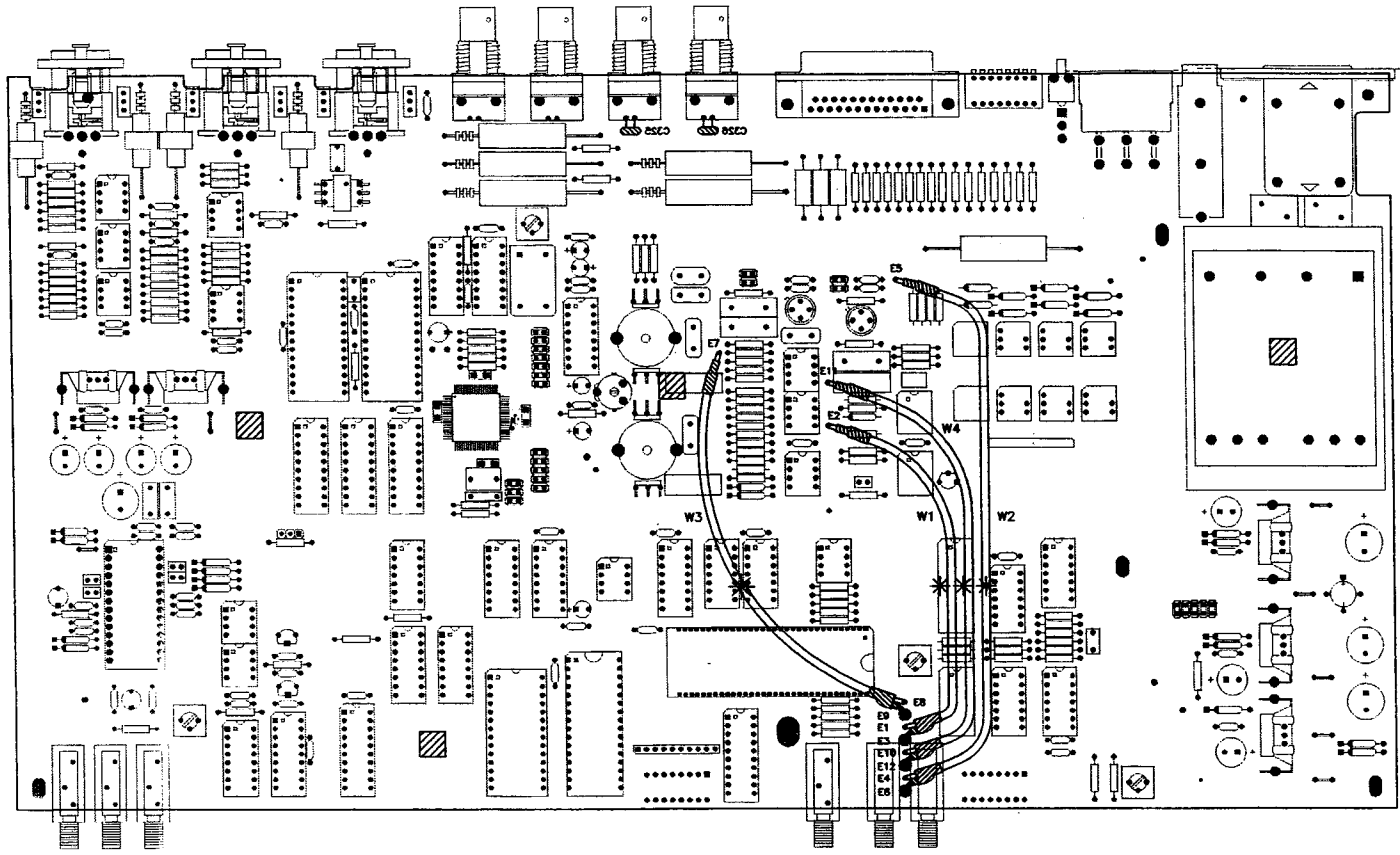
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8 7 6 5 4 3 2 1

ECO NO.	DATE	REV.	DESCRIPTION	BY	CHK

- NOTES: (UNLESS OTHERWISE SPECIFIED)
1. USE "TAK-PAK" TO TIE DOWN COAXIAL CABLE TO THE BOTTOM OF THE BOARD, AS INDICATED BY * (4 PLACES).
 2. CHECK TO ENSURE THAT COAXIAL CABLES DO NOT REST UPON SHARP COMPONENT LEADS.

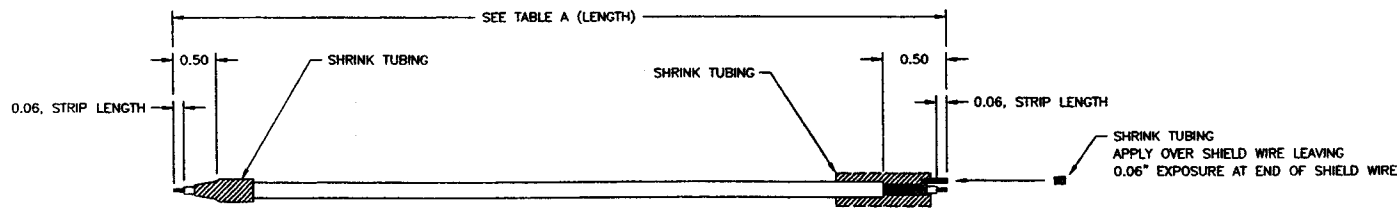
COMPONENT SIDE SHOWN



▨ LOCATION OF BUMPERS # 15209.000.01 4 PCS. ON UNDERSIDE OF PCB.

TABLE A

REF	LENGTH	FROM	TO
W1	4.50"	E1 (E3, GND)	E2
W2	6.50"	E4 (E6, GND)	E5
W3	5.50"	E8 (E9, GND)	E7
W4	5.50"	E10 (E12, GND)	E11



COAXIAL CABLE
NATIONAL, 24AWG
MIL-SPEC-W-16878

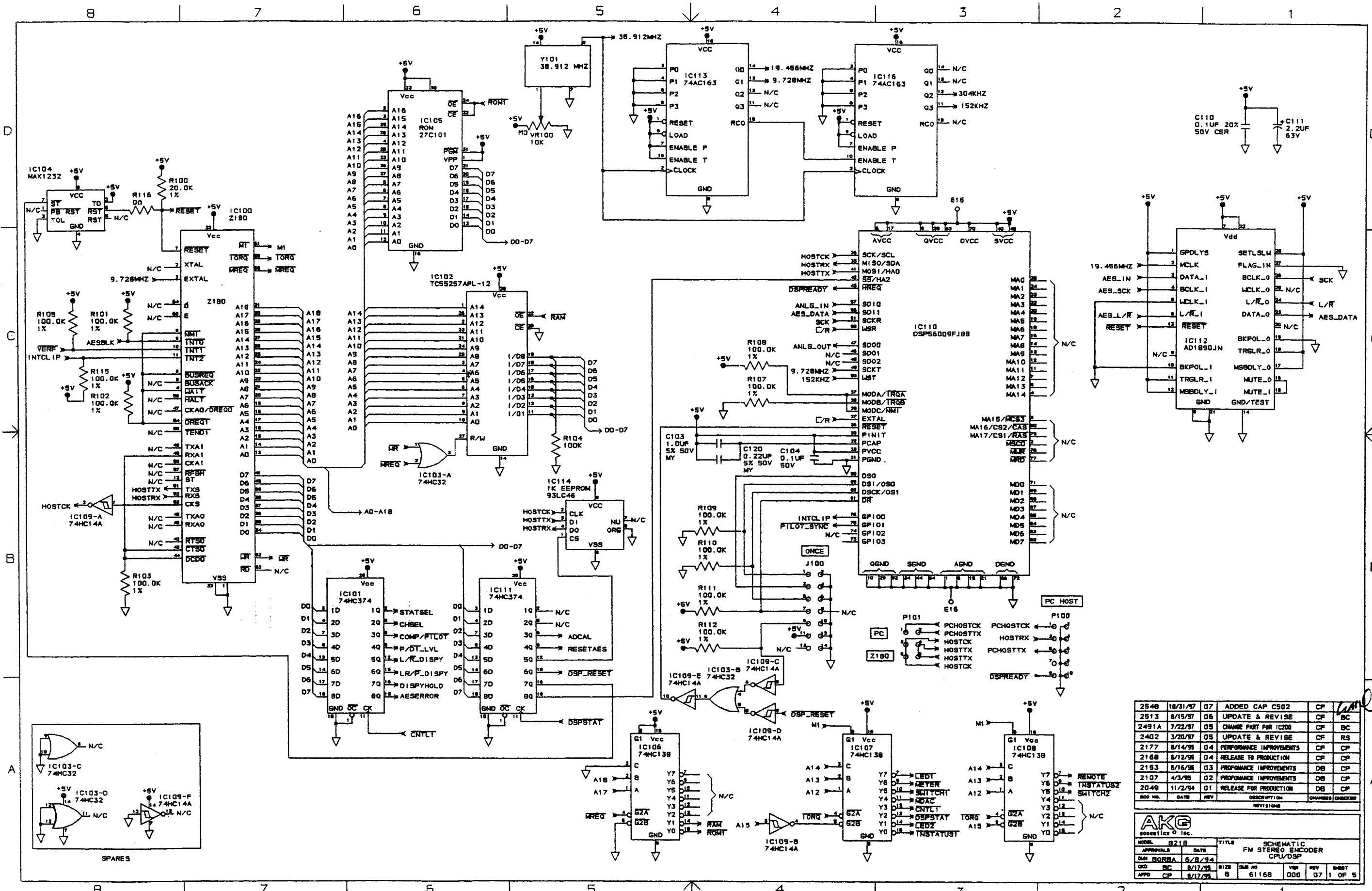
CABLE DETAIL
SCALE: 2X

SEE SHEET 1 OF 2 FOR REVISION RECORD AND HISTORY

ITEM	QTY	PART NUMBER	BILL OF MATERIAL	DESCRIPTION
SIGNATURES		DATE	UNLESS OTHERWISE NOTED: DIMENSIONS ARE IN INCHES TOLERANCES	orban 1530 Alameda Street San Leandro, CA 94577 (510) 351-3000 TITLE: PCB ASSEMBLY, 8218
DRAWN			.X ± .020 .XX ± .010 HOLES ± .005 ANGLES ± .030°	
CHECKED			SIZE: D	SCALE: 1:1
PROJ. ENGR.			DRAWING NO. 31790	REV. 000
ISSUED			MODEL	FILE NUMBER
DO NOT SCALE				SHEET: 2 of 2

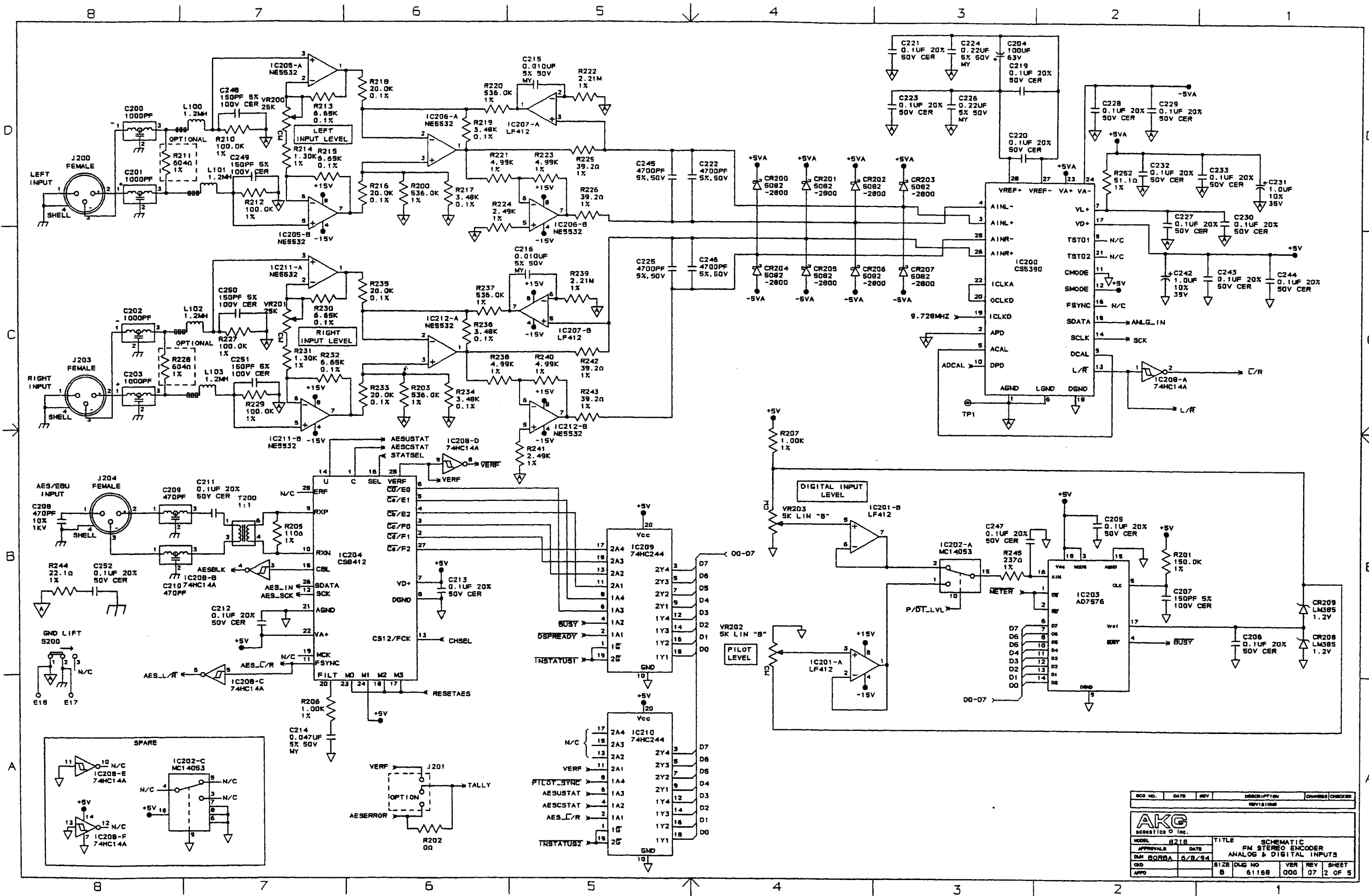
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8 7 6 5 4 3 2 1



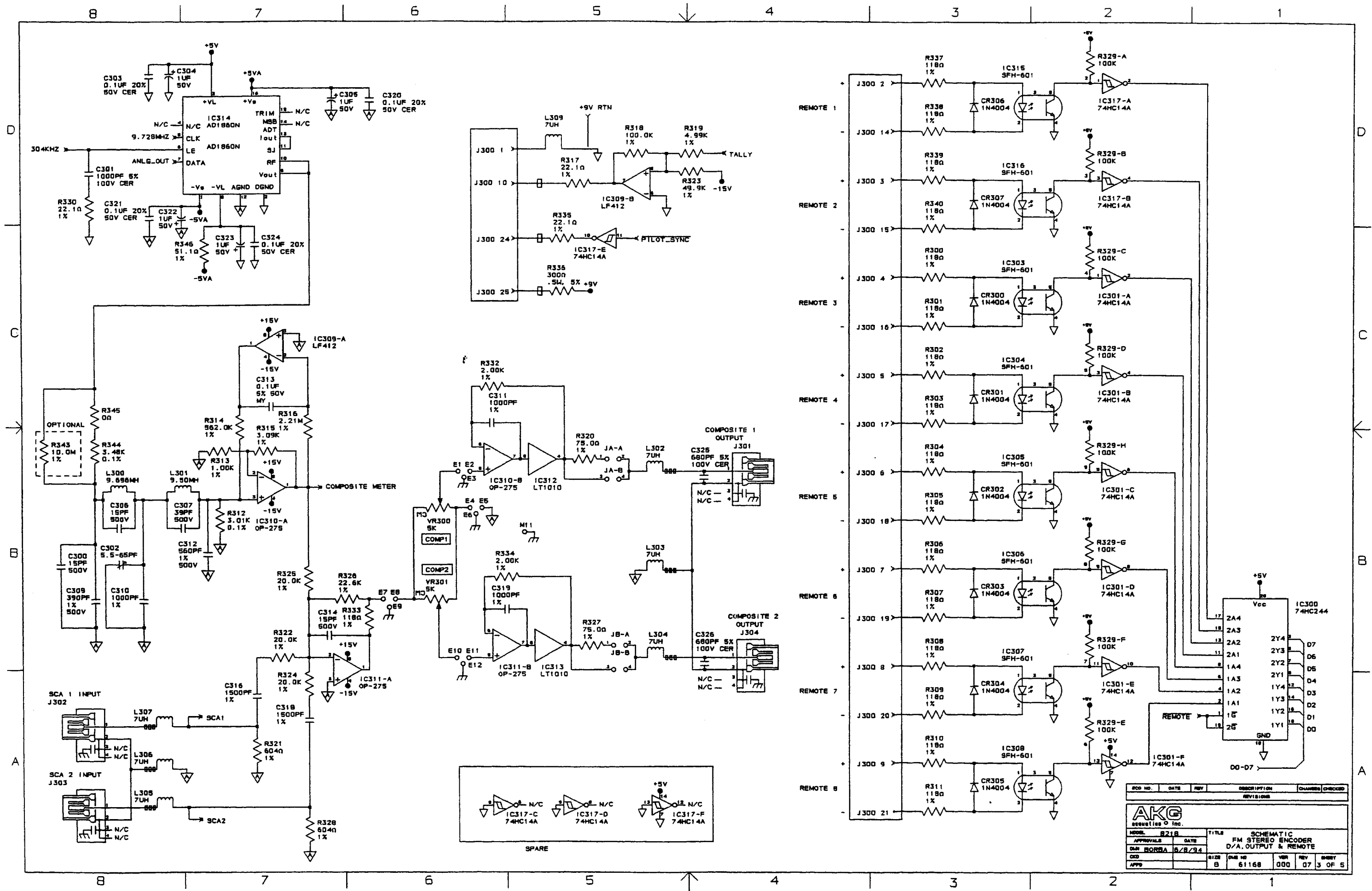
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2513	8/15/97	06	UPDATE & REVISE	CF	BC
2491A	7/22/97	05	CHANGE PART FOR IC200	CP	BC
2402	3/20/97	05	UPDATE & REVISE	CF	RS
2177	8/14/96	04	PERFORMANCE IMPROVEMENTS	CF	CP
2168	6/12/96	04	RELEASE TO PRODUCTION	CF	CP
2153	6/16/96	03	PERFORMANCE IMPROVEMENTS	DB	CP
2107	4/3/95	02	PERFORMANCE IMPROVEMENTS	DB	CP
2049	11/2/94	01	RELEASE FOR PRODUCTION	DB	CP
REV NO.	DATE	REV	DESCRIPTION	CHANGES	CHECKED

		TITLE SCHEMATIC FM STEREO ENCODER CPU/DSP	
APPROVALS BY: BORGIA DATE: 6/8/94 QCD: RC APPD: CP	DATE 6/8/94 8/17/95	SIZE B	QTY 61168
REV 000	REV 07	SHEET 1	OF 5



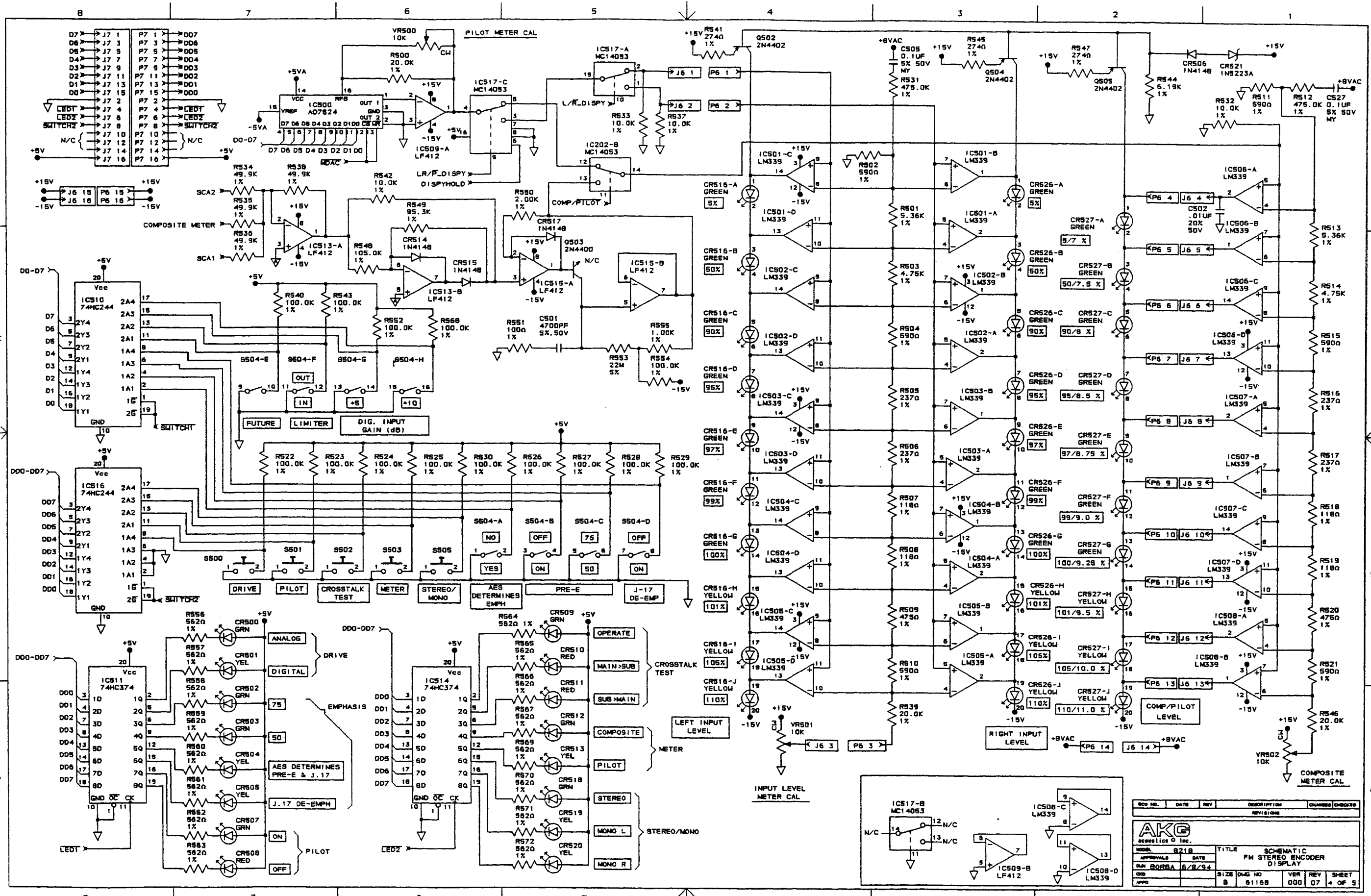
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AKG acoustics inc.		TITLE SCHEMATIC FM STEREO ENCODER ANALOG & DIGITAL INPUTS		
MODEL B21B	DATE 6/8/94	SIZE B	DLG NO 61168	VER 000
APPD B	REV 07	SHEET 2	OF 5	



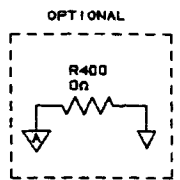
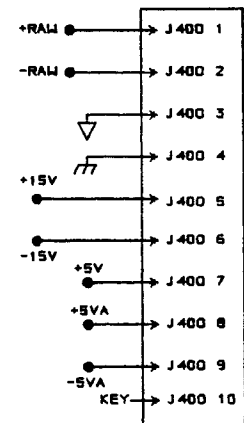
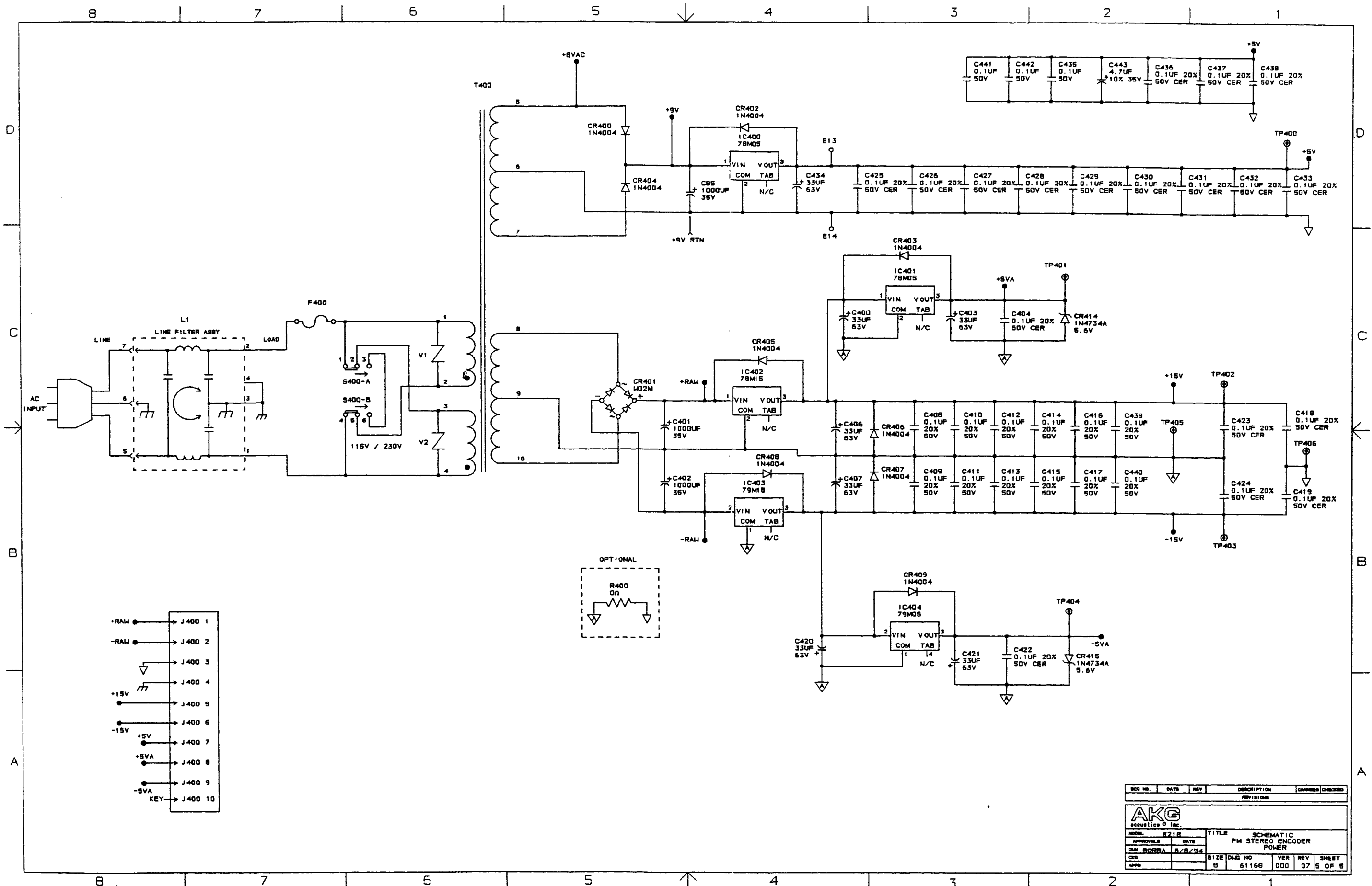
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1			REVISED		

AKG Stereos Inc.		TITLE SCHEMATIC	
MODEL 821B	DATE 8/8/94	DESCRIPTION FM STEREO ENCODER D/A OUTPUT & REMOTE	
APPROVALS	DATE	REV	ISSUE
DAW BORSA	8/8/94	B	61168 000 07 3 OF 5



REV. NO.	DATE	REV.	DESCRIPTION	CHANGED	BY
1					

AKG	
RESEARCH & INC.	
MODEL: 8218	TITLE: FM STEREO ENCODER DISPLAY
APPROVALS: [Signature]	DATE: 6/8/94
DESIGNER: BORBA	SIZE: 4x6 NO.
APPD:	8 61168 000 07 4 OF 5



REV	DATE	BY	DESCRIPTION	CHANGES	CHECKED
REVISIONS					

AKG Acoustics Inc.		TITLE SCHEMATIC FM STEREO ENCODER POWER			
MODEL	R21R	DATE			
APPROVALS					
DESIGNER	ROBBA	A/B/94	SIZE	DWG NO	VER
CHKD			B	61168	000
APPD			8	07	5 OF 5

Warranty

United States Warranty

Limited Warranty

Valid only in the United States. We warrant Orban products against defects in material or workmanship for a period of one year from the date of original purchase for use, and agree to repair or, at our option, replace any defective item without charge for either parts or labor.

Important: This warranty does not cover damage resulting from accident, misuse or abuse, lack of reasonable care, the affixing of any attachment not provided with the product, loss of parts, or connecting the product to any but the specified receptacles. This warranty is void unless service or repairs are performed by an authorized service center. No responsibility is assumed for any special, incidental or consequential damages. However, the limitation of any right or remedy shall not be effective where such is prohibited or restricted by law.

Simply take or ship your Orban product prepaid to our service department. Be sure to include your sales slip as proof of purchase date. (We will not repair transit damage under the no-charge terms of this warranty). Orban will pay return shipping.

Note: No other warranty, written or oral is authorized for Orban products.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow the exclusion of limitations of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above exclusion and limitations may not apply to you.

International Warranty

Bedingungen

Orban gewährt 1 Jahr Garantie ab Verkaufsdatum auf nachweisbare Material- und Fabrikationsfehler. Der Garantieanspruch erlischt bei unsachgemäßer Handhabung, elektrischer oder mechanischer Beschädigung durch mißbräuchliche Anwendung sowie bei unsachgemäßer Reparatur durch nichtautorisierte Werkstätten. Voraussetzung für die Garantieleistung ist die Vorlage der ordnungsgemäß durch den Fachhändler ausgefüllten Garantiekarte sowie der Kaufrechnung. Transport- und Portospesen, welche aus der Einsendung des Gerätes zur Garantiereparatur erwachsen, können von Orban nicht übernommen werden, das Risiko der Zusendung trägt der Kunde. Die Garantie wird ausschließlich für den ursprünglichen Käufer geleistet.

Warranty Conditions

Orban warrants Orban products against evident defects in material and workmanship for a period of one year from the date of original purchase for use. This warranty does not cover damage resulting from misuse or abuse, or lack of reasonable care, and inadequate repairs performed by unauthorized service centers. Performance of repairs or replacements under this warranty is subject to submission of this Warranty/Registration Card, completed and signed by the dealer on the day of purchase, and the sales slip. Shipment of the defective item for repair under this warranty will be at the customer's own risk and expense. This warranty is valid for the original purchaser only.

Conditions de garantie

Pour toute mise en œuvre de garantie ou de service après-vente, vous devez vous adresser à votre revendeur. Notre société assure au revendeur le remplacement gratuit des pièces détachées nécessaires à la réparation pendant un an, à partir de la date de votre facture, sauf en cas de non respect des prescriptions d'utilisation ou lorsqu'une cause étrangère à l'appareil est responsable de la défaillance. Les dispositions stipulées ci-dessus ne sont pas exclusives du bénéfice au profit de l'acheteur de la garantie légale pour défaut et vice cachés qui s'applique, en tout état de cause, dans les conditions des articles 1641 et suivants du Code Civil.

Condizioni di garanzia

L'Orban presta garanzia per un anno dalla data della vendita per difetti di materiale e fabbricazione che possono essere provati. Il diritto di garanzia cessa in caso di manipolazione impropria, danneggiamento elettrico o meccanico attraverso l'uso non appropriato e riparazione inesatta eseguita da officine non autorizzate. E' indispensabile, per la prestazione della garanzia, presentare la carta di garanzia debitamente riempita dal rivenditore autorizzato e la fattura di vendita. Spese di trasporto che risultano dall'invio dell'impianto per la riparazione in garanzia, non possono essere assunte dall'Orban l'invio e a rischio e pericolo del cliente. La garanzia verrà data solo al primo acquirente.

Condiciones de garantía

Orban concede 1 año de garantía por defectos comprobables de material o de fabricación a partir de la fecha de venta. El derecho de garantía caduca en caso de procederse a una manipulación inadecuada en caso de producirse daño eléctrico o mecánico por uso indebido, así como también en caso de reparaciones inadecuadas por parte de talleres no autorizados. La prestación de la garantía está sujeta a la presentación de la Tarjeta de Garantía rellena correctamente por el vendedor autorizado, y de la factura de compra. Orban no asume ningún gasto de transporte o correo incurrido por el envío del aparato defectuoso para la reparación bajo garantía; el riesgo del envío ha de ser asumido por el cliente. La garantía se concede única y exclusivamente al comprador original.