Service Manual

Model VT130

STEREO POWER AMPLIFIER

audio research
HIGH DEFINITION®

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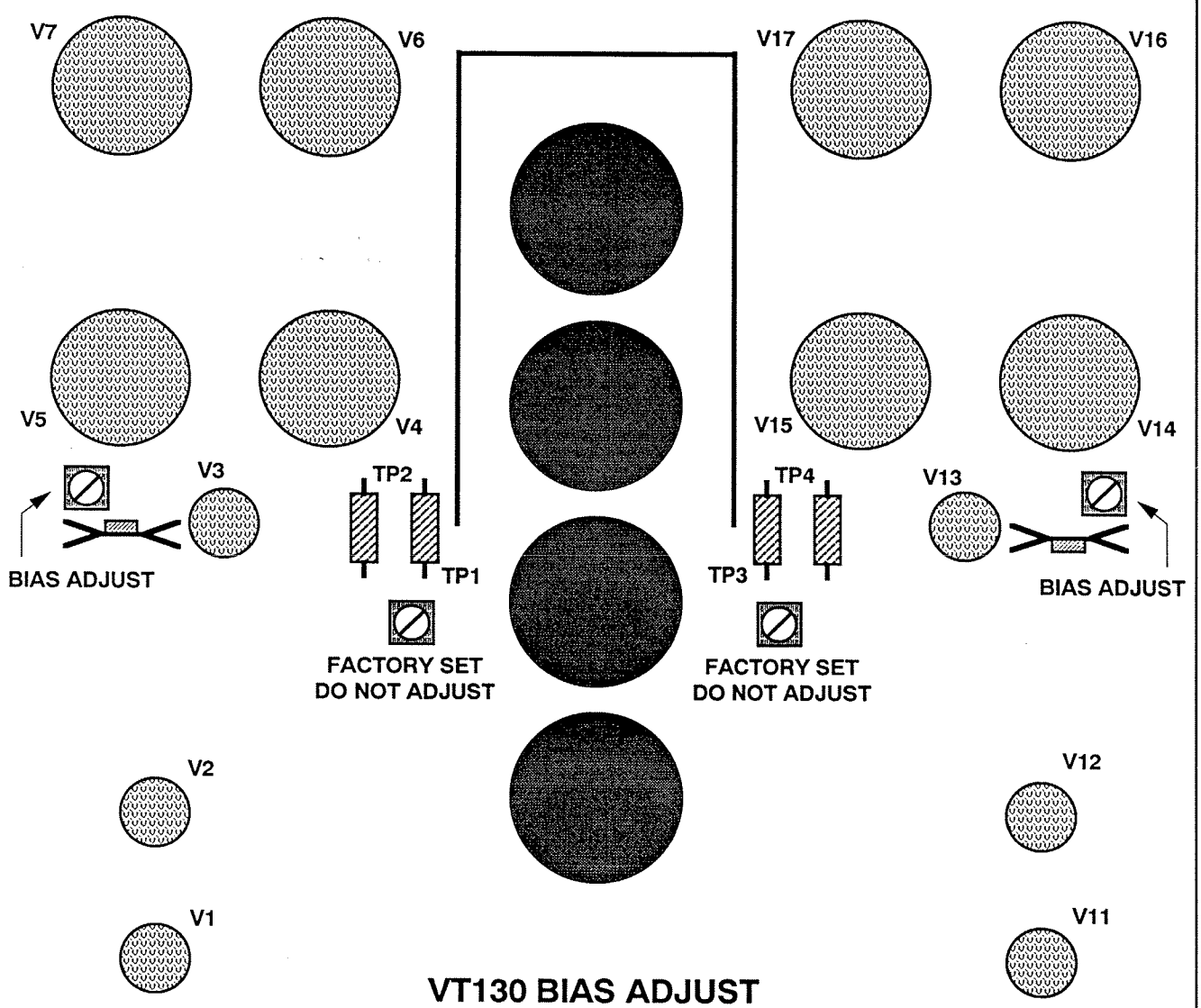
Model VT130



VT130 BIAS ADJUST

AUDIO RESEARCH 12-13-93

Model VT130

Adjustment Procedure.

The VT130 utilizes very high quality, commercial and computer grade components which, together with conservative operation of all components and tubes, will provide long service life, if installed and operated within the parameters outlined in this Manual.

After vacuum tube replacement, it is desireable to readjust the amplifier for optimum performance and tube life.

CAUTION: The following internal procedure should not be attempted by the owner unless he is ***technically qualified.*** There are high voltages and currents within this unit which can be ***lethal*** under certain conditions. All internal adjustments should be accomplished by a qualified individual. It is necessary to remove the top cover from the VT130 for the following adjustment. Unit should be off before removal of cover.

The output tube idle current (bias voltage) requires adjustment anytime one or more output tubes are replaced. Use the plastic alignment tool provided for both of these internal adjustments. A bias adjustment is also required if the 12BH7 driver tube is replaced.

The output stages of the VT130 are partially cathode-coupled "push-pull Class AB_1",utilizing our tightly-coupled output transformers which provide low distortion and sonic accuracy. As shipped from the factory, the output "bias" adjustments are set for a nominal 65mA per tube with a stable power line voltage of 120VAC. (Export models are adjusted for each country's requirements.) Under these idle conditions the tubes are each dissipating approximately 28 watts of their 48 watt rating (42 watt plate, 6 watt screen). This point of operation provides "enriched" Class AB_1, and will satisfy most critical listeners.

Although the main "B+" voltage to the output tubes will vary with line voltage, the "bias" voltage is electronically set. Because of this the change in operating point of the output stage does not vary significantly with reasonable changes in line voltage. It is therefore not normally necessary to readjust "bias" except when changing power output tubes or driver tubes. The output tubes, for example, are operated with electronically regulated "bias". With this voltage regulation the variation in output tube idle current for varying line voltage becomes normally unimportant.

For best results operate and adjust the VT130 at 120VAC line voltage, or at the line voltage that is typical in the final installation. Adjustment must be made under zero-signal conditions after at least 20 minutes of uninterrupted stabilization time.

A digital voltmeter capable of accurate measurements with 0.1mVDC resolution is preferred for accurate adjustment (must have 3 1/2 digit display). Use the plastic alignment tool provided to make the adjustments.

The four test points of the VT130 are accessible from the top side of the main circuit board, and are referred to in the circuit schematic as TP1 & 2, TP3 & 4.

Adjust the output "bias" voltage for 65mVDC (.065 Volt D.C.) between TP1-TP2 and between TP3 & 4 using the trim potentiometer nearest the small finned heat sinks.

If the driver tube has been changed, simply set the "bias" per above.

Servicing

Because of its careful design and exacting standards of manufacture, your VT130 amplifier should normally require only minimal service to maintain its high level of performance.

CAUTION: The VT130 amplifier contains sufficient levels of voltage and current to be ***lethal.*** Do not tamper with a component or part inside the unit. Even with the power turned off, a charge remains in the energy storage capacitors for some time. Refer any needed service to your authorized Audio Research dealer or other qualified technician.

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The vacuum tubes inside the VT130 are high-quality 6550, 12BH7, and 6922 types. Replacement output tubes should be matched for ***best*** sonic performance. Reliable, matched, low gas 6550 tubes – such as those available from Audio Research – are strongly recommended for maximum performance and longevity. Observe the operating and adjustment procedure for adjusting bias when replacing any power output tubes.

Additional questions regarding the operation, maintenance or servicing of your amplifier may be referred to the Customer Service Department of Audio Research Corporation: 612-939-0600. When ordering a service manual from Audio Research or an authorized dealer, be sure to identify the serial number on your amplifier.

Cleaning

To maintain the visual appearance of your amplifier, occasionally wipe the front panel and top cover surfaces with a soft, damp (not wet) cloth to remove dust. A mild, non-alkaline soap solution may be used to remove fingerprints or similar smudges. Cleaners containing abrasives should ***not*** be used as they will damage the "brushed" grain of the panel finish.

Specifications

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POWER OUTPUT: 110 watts per channel continuous at 16 ohms from 20Hz to 20kHz with less than 1.0% total harmonic distortion (typically below .05% at 1 watt).

Approximate actual power available at "clipping" 120 watts (1kHz). (Note that actual power output is dependent upon both line voltage and "condition" i.e.: if power line has high distortion, maximum power will be affected adversely, although from a listening standpoint this is not very critical.)

POWER BANDWIDTH: (-3dB Points) 15Hz to 80kHz.

FREQUENCY RESPONSE: (-3dB Points at 1 watt) 5Hz to 160 kHz.

INPUT SENSITIVITY: 1.2V RMS balanced for rated output.

INPUT IMPEDANCE: 200K ohms balanced.

OUTPUT REGULATION: Approximately 0.5dB 16 ohm load to open circuit (Damping factor approximately 16).

OVERALL NEGATIVE FEEDBACK: 20dB.

SLEW RATE: 17 volts/microsecond.

RISE TIME: 2.0 microseconds.

HUM & NOISE: Less than 0.5mV RMS – 98dB below rated output (IHF weighted, input shorted).

POWER SUPPLY ENERGY STORAGE: Approximately, 280 joules.

POWER REQUIREMENTS: 105-125VAC 60Hz (210-250VAC 50Hz) 620 watts at rated output, 900 watts maximum, 380 watts at "idle".

TUBES REQUIRED: 4 – Matched pair 6550 – Power Output; 2 –12BH7A Driver; 4 – 6922 input.

DIMENSIONS: 14 1/2" (37 cm) W x 12" (30.5cm) H x 22" (56 cm) D. Output connectors extend 1" (2.5 cm) to the rear.

WEIGHT: 69 lbs. (31.4 kg) Net; 95 lbs. (43.2 kg) Shipping.

Specifications subject to change without notice.

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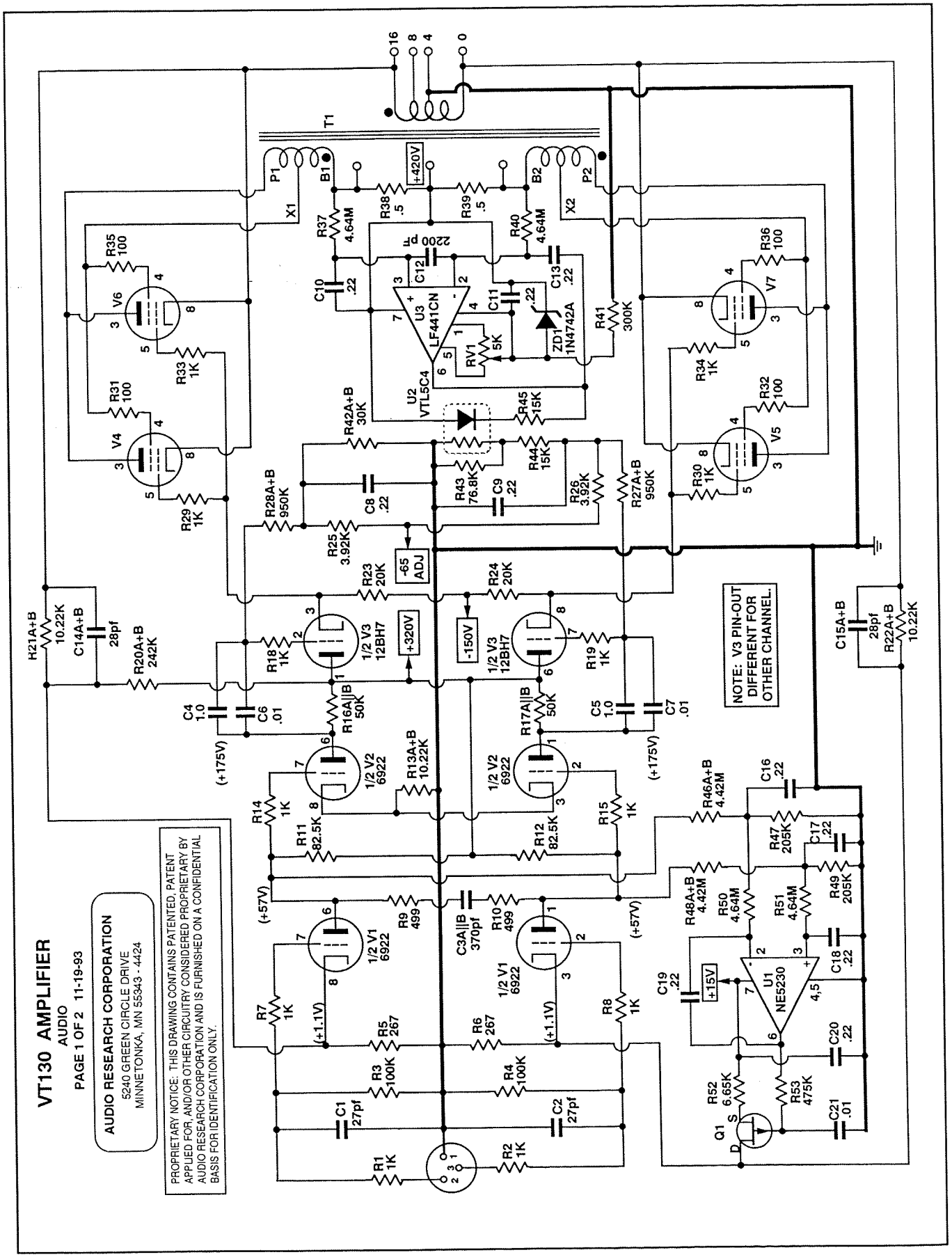
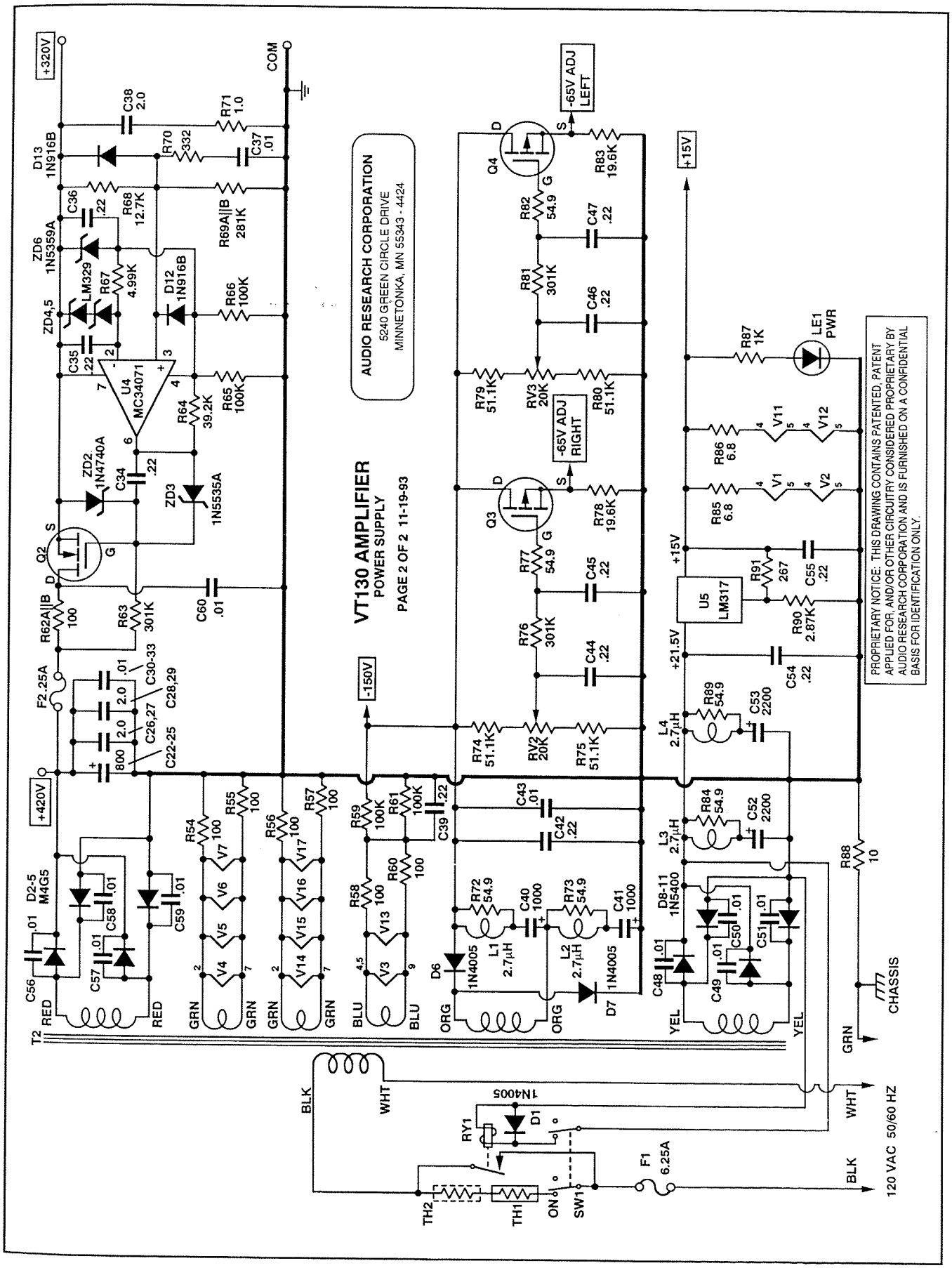
Model VT130 / Schematics



Model VT130 / Schematics



Model VT130 / Parts List

ITEM	SCHEMATIC SYMBOL	DESCRIPTION	QTY	PART NO.
CAPACITORS	C1, 2	CAP. 27PF +/-1PF 630V PNP	4	53270101
	C3A	CAP. 150PF2 1/2% 630V PPN	2	53150202
	C3B	CAP. 220 PF ±2.5% 630V PPN	2	53220201
	C4, 5	CAP. 1UF 400V	4	53100610
	C6, 7, 60	CAP. .01UF 600V	5	53100412
	C8-11, 13, 16-20, 34-36, 39, 42, 44-47, 54, 55	CAP. .22 UF 10% 160V	31	53220507
	C12	CAP. 2200 PF 10% 100VDC	2	53220306
	C14A, 14B, 15A, 15B	CAP. 56 PF +/-2% 630V DPN	8	53560103
	C21, 30-33, 37	CAP. .01 UF+/-10% 630V	7	53100406
	C22-25	CAP. 800 UF 450V GRAY	4	50800801
	C26-29, 38	CAP. 2 UF +/-10% 450V	5	53200602
	C40, 41	CAP. 1000UF 100V	2	50100912
	C43	CAP. .01 UF 400V MKP10	1	53100410
	C48-51	CAP. .01 UF 200V	4	52100400
	C52, 53	CAP. 2200 UF 35V	2	50220903
	C56-59	CAP. .01 UF 250V 20% MPE MALL.	4	53100407
CONNECTORS	J1	XLR CONNECTOR (Female)	2	23201970
	J2-5	D400 CUSTOM BINDING POST	8	10036620
CONTROLS	RV1	5K TRIM POT 10%	2	45500300
	RV2, 3	TRIM POT 20K	2	45200412
DIODES	D1, 6,7	IN4005 GENERAL INSTRUMENT	3	30500400
	D2-5	EDAL #M4G5	4	30503310
	D8-11	MOTOROLA IN5400	4	30501500
	D12, 13	1N916B	2	30500910
FUSES	F1	FUSE, 6-1/4 MDX	1	34501000
	F2	FUSE, 1/4 250V	1	34500102
INDUCTORS	L1-4	CHOKE, 2.7 UH +/- 10%	4	61000160
INTEGRATED CIRCUITS	U1	OP AMP, LOW VOLTAGE	2	31004200
	U2	PHOTO COUPLER TESTED ACCEPT	2	34400121
	U3	LF 441 CN TESTED-ACCEPT	2	31002401
	U4	MC34071P	1	31002200
	U5	ADJ. O.P. VLTG. REG.	1	31004000
PANEL INDICATOR	LE1	L.E.D. COLLAR & RETAINING RING	1	34300102
RELAYS	RY1	RELAY, 24V POWER ON	1	64101200
RESISTORS	R1, 2, 29, 30, 33, 34	RES. 1K 1% MK-5 50PPM	12	42100314
	R3, 4, 59, 61	RES. 100K +/-1% MK-3 50PPM	6	42100503
	R5, 6, 91	RES. 267 OHM 1% MK-3 50PPM	5	42267203
	R7, 8, 14, 15, 18, 19, 87	RES. 1k 1% MK-3 50PPM	13	42100303
	R9, 10	RES. 499 OHM 1% MK-3 50PPM	4	42499203
	R11, 12	RES. 82.5K 1% MK-8 50PPM	4	42825405
	R13A, 13B, 21A, 21B, 22A, 22B	RES. 5.11K, 1% MK-4 50PPM	12	42511313

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ITEM	SCHEMATIC SYMBOL	DESCRIPTION	QTY	PART NO.
RESISTORS	R16A, 16B, 17A, 17B, 65, 66	RES. 100K 1% MK-8 50PPM	10	42100505
	R20A, 20B	RES. 121K 1% MK-350PPM	4	42121503
	R23, 24	RES. 20K 1% MK-5 50PPM	4	42200414
	R25, 26	RES. 3.92K 1% MK-3 50PPM	4	42392303
	R27A, 27B, 28A, 28B, 53	RES. 475K 1% MK-3 50PPM	10	42475503
	R31, 32, 35, 36	RES. 100 OHM 5% 2W	8	43100200
	R37, 40, 50,51	RES. 4.64 MEG. 1% MK-3 50PPM	8	42464603
	R38, 39	RES. 0.5 OHM+/-2% 3W W.W.	4	43050004
	R41	RES. 300K 1% fMK-5 50PPM	2	42300514
	R42A, 42B, 44, 45	RES. 15K 1% MK-3 50PPM	8	42150403
	R43	RES. 76.8K 1% MK-3 50PPM	2	42768403
	R46A, 46B, 48A, 48B	RES. 2.21 MEG 1% MK-3 50PPM	8	42221603
	R47, 49	RES. 205K 1% MK-3 50PPM	4	42205503
	R52	RES. 6.65K 1% MK-3 50PPM	2	42665303
	R54-58, 60	RES. 100 OHM 1% MK-3 50PPM	6	42100203
	R62A, 62B	RES. 200 OHM+F/-1% MK8 50PPM	2	42200205
	R63, 76, 81	RES. 301K 1% MK-3 50PPM	3	42301503
	R64	RES. 39.2K 1% MK-3 50PPM	1	42392403
	R67	RES. 4.99K 1% MK-3 50PPM	1	42499303
	R68	RES. 12.7K 1% MK-3 50PPM	1	42127403
	R69A, 69B	RES. 562K 1% MK-4 50PPM	2	42562513
	R70	RES. 332 OHM 1% MK-3 50PPM	1	42332203
	R71	RES. 1 OHM 2W 5% W.W.	1	43100002
	R72, 73, 77, 82, 84, 89	RES. 54.9 OHM 1% LMK-3 50PPM	6	42549103
	R74, 75, 79, 80	RES. 51.1K 1% NK-3 50ppm	4	42511403
	R78, 83	RES. 19.6K 1% MK-3 50PPM	2	42196403
	R85, 86	RES. 6.8 OHM 2W 5% SPH	2	43680000
	R88	RES. 10 OHM 1% MK-3 50PPM	1	42100103
	R90	RES. 2.87K 1% MK-3 50PPM	1	42287303
SWITCHES	SW1	SWITCH, ROCKER DPST	1	24102300
THERMISTORS	TH1	THERMISTOR 30 OHM +/-20% CL60	1	47000300
TRANSFORMERS	T1	VT130 OUTPUT TRANSFORMER	2	60011020
	T2	XFR., VT130 120V.	1	60011100
TRANSISTORS	Q1	FET, GRAY YELLOW	2	30006424
	Q2	FET, GREEN BLUE	1	30006836
	Q3, 4	MTP 2P45	2	30006200
VACUUM TUBES	V1, 2	VAC. TUBE, 6922 RUSSIAN	4	32001150
	V3	VAC. TUBE, 12BH7A	2	32001200
	V4, 5, 6, 7	VAC. TUBE, RUSSIAN 6550-TESTED	8	32000551
ZENER DIODES	ZD1	IN4742A	2	30502700
	ZD2	IN4740A	1	30500300
	ZD3	IN5535A (KNOX ONLY)	1	30504210
	ZD4, 5	LM329DZ GREEN	2	31000705
	ZD6	IN5359B	1	30503500