

MAINTENANCE MANUAL 851-870 MHz, 35 WATT POWER AMPLIFIER ASSEMBLY 19D430488G1, 2 LB130857E (df3174)

- TABLE OF CONTENTS -

	Page
DESCRIPTION	1
CIRCUIT ANALYSIS	1
OUTLINE DIAGRAM	3 - 4
SCHEMATIC DIAGRAM	5
PARTS LIST AND PRODUCTION CHANGES	6

DESCRIPTION

The power amplifier assembly for $MASTR^{\odot}$ II uses six RF power transistors to provide a maximum of 35 Watts output power, R24 located on the PA module, is used to ad just the output power to any level from 7 Watts to rated RF power output. The power control circuit consists of R24, Q207, Power Control IC (U1), and a directional coupler.

SUPPLY VOLTAGE AND METERING

Supply voltage is connected through power leads from the system board to feedthrough capacitor C219. C219 prevents RF from getting on the power leads.

Centralized metering jack J205 is provided for use with GE Test Model 4EX3A11 or Test Kit 4EX8K12. The test set meters the AMPL-1 DRIVE (exciter output), the POWER CONTROL voltage, and the DRIVER AND PA CURRENT.

CIRCUIT ANALYSIS

PA ASSEMBLY

The exciter output is coupled through a 50 ohm RF cable to the PA input connector P101. The RF input is coupled through a matching network composed of C2, C3, L1 + L2 and L3 to the base of power amplifier Q201.

Part of the RF input is rectified by CR1 and metered at J205--4 through resistor R21. The rectified RF is also applied to the power control IC (L1).

Collector voltage to Q201 is applied from the power controller through collector stabilizing network L5 and R4 and collector feed network L4 and C201.

The output of Q201 is coupled to the base of the second power amplifier Q202 $\,$

through coupling capacitor CS, and a matching network consisting of C6, C7 L6 and L7.

Collector voltage to Q202 is controlled by power control IC (U1), and Q207 and is applied through a collector stabilizing network L11 and R7 and collector feed network C202 and L10.

The output of Q202 is coupled to the base of power amplifier Q203 through C9 and the matching network of C203, C204, CIO, L13, L14 and L15.

The collector voltage to Q203 is coupled directly from the supply voltage through collector stabilizing network L17 and R9 and collector feed network L16 and C11.

The output of Q203 is coupled through an impedance matching network (C206, C13, C207, C208, L18, L19, L20 and L21) and a 50 ohm microstrip W4 that matches the output impedance of Q203 to the input impedance of driver Q204.

The collector voltage of Q204 is coupled through R26 from the supply voltage, through collector stabilizing network L23 and R11 through collector feed network L22 and C15.

Collector current for Q204 is metered across tapped manganin resistor R26. The reading, taken in position "F" on the 10 Volt scale of the Test Set with the High Sensitivity button pressed, should be approximately 2.1 Amperes.

—— WARNING —

The RF Power Transistors used in the transmitter contain Beryllium Oxide, a TOXIC substance. If the ceramic, or other encapsulation is opened, crushed, broken or abraded, the dust may be hazardous if inhaled. Be extremely careful to avoid damaging transistors when working with the PA assembly.



The output of Q204 is coupled through an impedance matching network (C209, C210, C36 and L24) and a 50 ohm microstrip, W5, to a power splitter consisting of micro strip transmission line W6-W9 and R12.

RF output power from Q204 (approximately 12 Watts) is split evenly between two identical class C power amplifiers Q205 and Q206 via their respective identical impedance matching networks. The impedance matching networks consist of C19, C211, C213, L27, L25 and C20, C212, C214, L26 and L28.

Collector voltage for Q205 and Q206 is supplied from the A+ line at C219-1 through identical collector stabilizing networks consisting of R13, L31, C23 and L32, R14 and C24 respectively.

Collector current for Q205 and Q206 is metered across tapped manganin resistor R27. The reading taken in position G on the 10 volt scale with the HIGH SENS button on the test set pressed. The meter reading should be 7.9 Amperes.

The output of Q205 and Q206 is coupled through identical impedance matching and RF power combining networks. The W over combine consists of micro strip transistion

lines W12 and W13 and resistor 15. The combiner adds the outputs of Q205 and Q206 and

applies the combined RF output to the low pass filter through 50 ohm micro strip W14. The RF power output is applied to antenna connector J202 through 50 ohm micro strip W1 in the low pass filter, to the antenna relay or to J202.

— CAUTION -

The placement of monolithic capacitors on the PA board is very critical; therefore, it is not recommended that the PA board be serviced in the field.

POWER CONTROL CIRCUIT

The Power Control Circuit, consists of CR1, U1, Q207 and the directional coupler (C30, C31, CR3, R16 and W15).

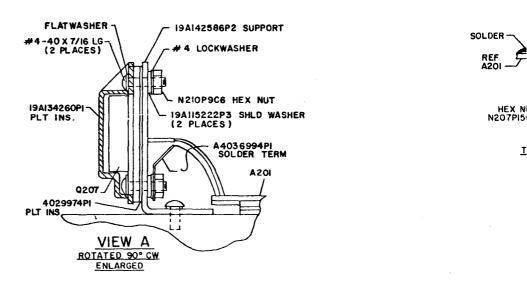
When the transmitter is keyed, rectified RF from CR1 is applied to a transistorized switch in the Power Control IC (U1), turning on the switch. The switch operates a voltage regulator. The directional coupler senses the forward power at the output of the power amplifier and feeds voltage back to the Power Control IC, resulting in feedback control of the voltage regulator output. A constant voltage is fed via pin 4 of U1 to Power Adjust potentiometer R24. The setting of R24 determines the voltage fed to the base and collector of Q201 and the collector of 0202. Reducing the supply voltage to these stages reduces the drive to the remaining stages of the power amplifier, thereby reducing the power output of the PA.

Overvoltage sensing of the supply voltage via pin 11 of U1 shuts down the driver when this condition occurs, thus protecting the driver and PA stages. The feedback power control performs the function of power leveling of the amplifier output over a range of varying input conditions such as drive level, DC voltage and load variations.

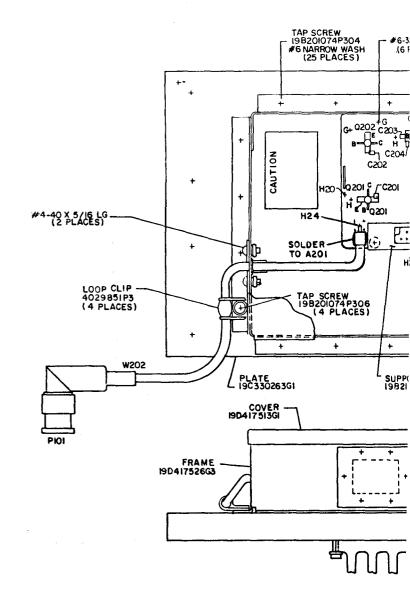
R29 is provided to limit the maximum power delivered to the antenna to prevent the probability of PA burn up due to misadjustment for excessive power. R29 is set to provide RF output 1 dB greater than rated power.

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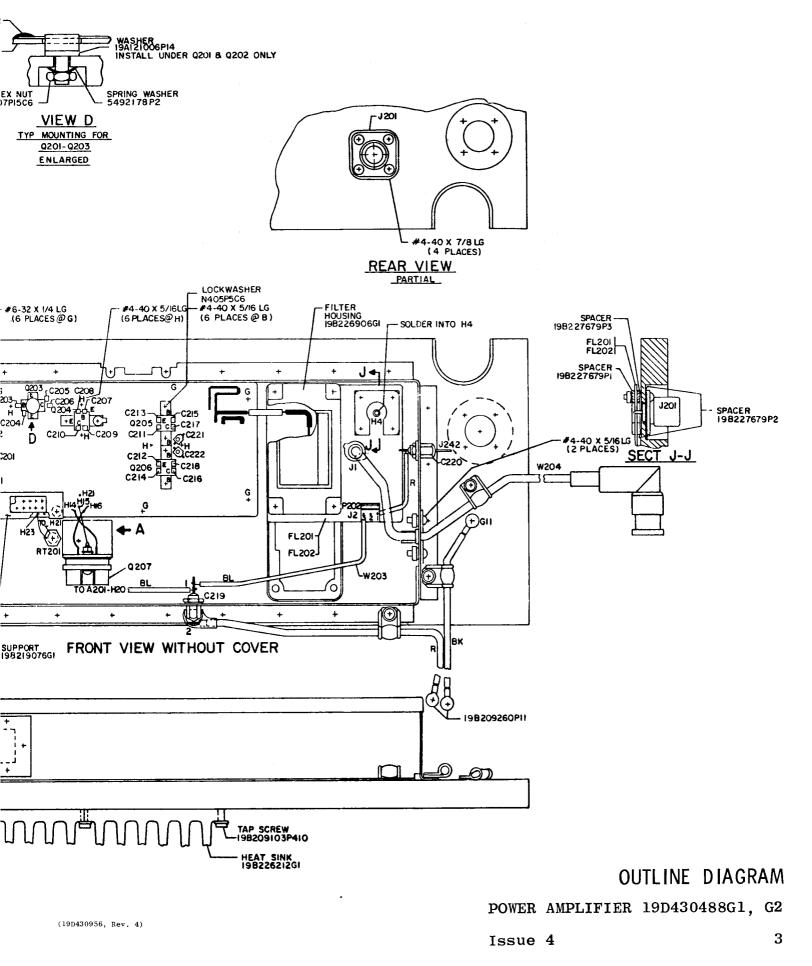




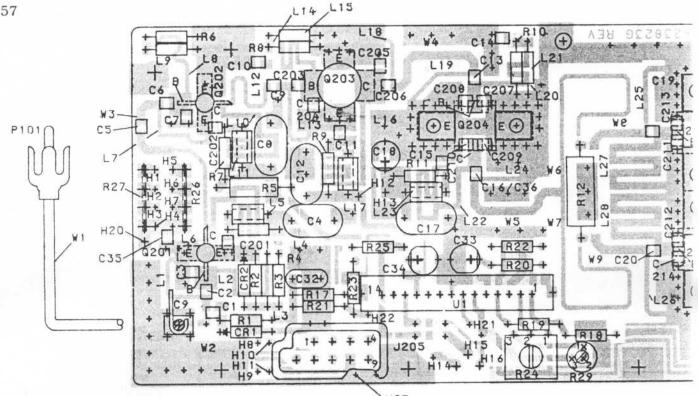
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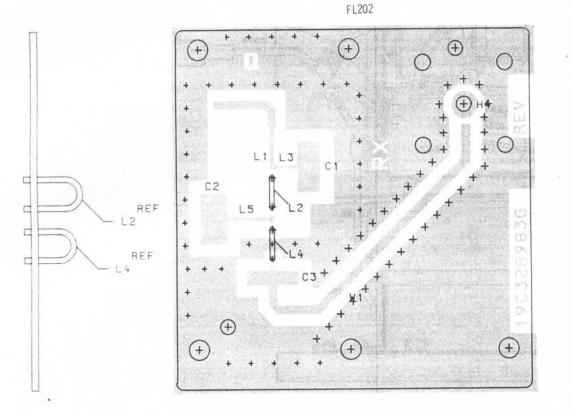
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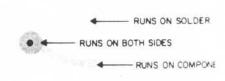
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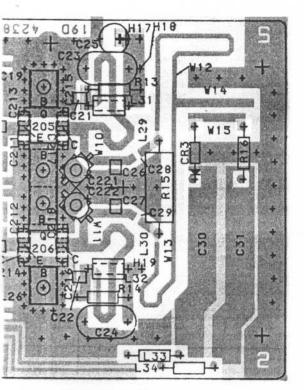


H23



OUTLINE DIAGRAM PA BOARD AND ASSEMBLIES (19C328984, Rev. 0) (19A138346, St. 1, Rev. 0) (19A138346, St. 2, Rev. 0)

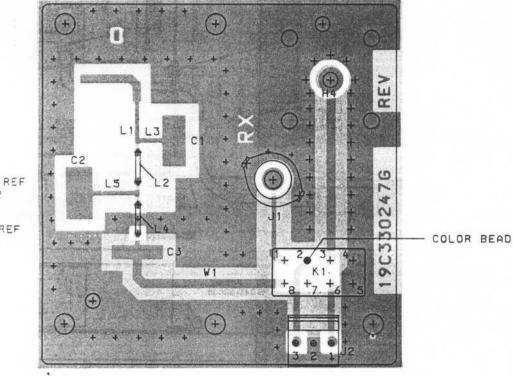




CONNI	ECTIONS	CHART
FROM	TO	USING
H1	H17	W18
H2	H9	ST22-BR
НЗ	HØ	ST22-R
H4	H12	W17
H5	H13	W20
H6	H10	ST22-0
H7	H11	ST22-W
H18	H19	W19

(19D424590, Rev. 6) (19B227301, Sh. 1, Rev. 2) (19B227301, Sh. 2, Rev. 2)

FL201



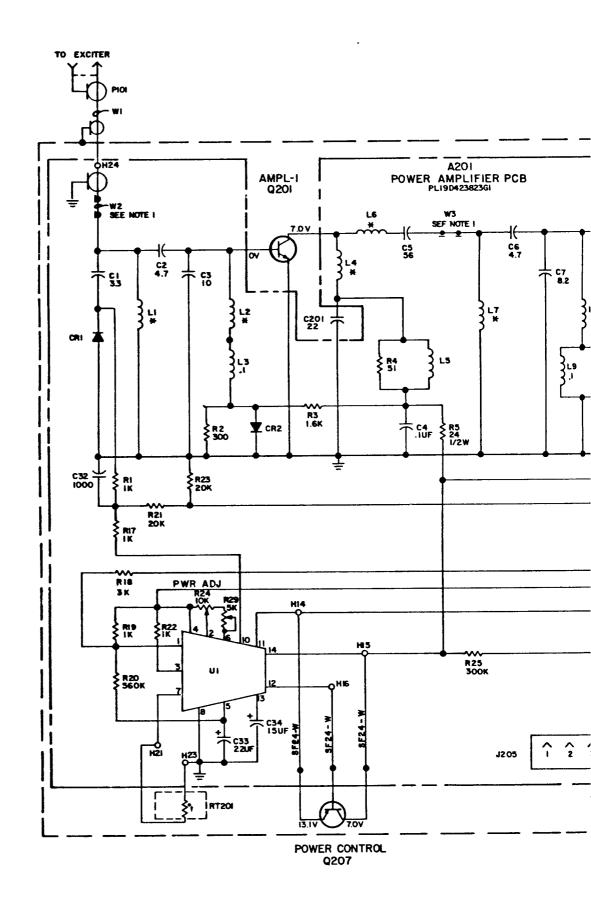
(19C330249, Rev. 0) (19A142581, Sh. 1, Rev. 0) (19A142581, Sh. 2, Rev. 0)

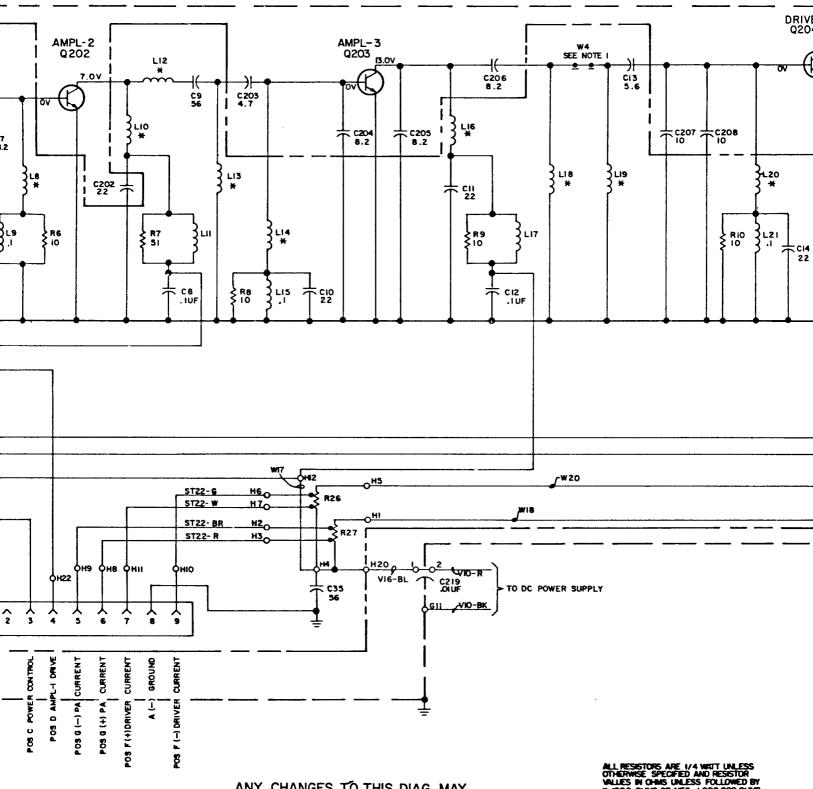
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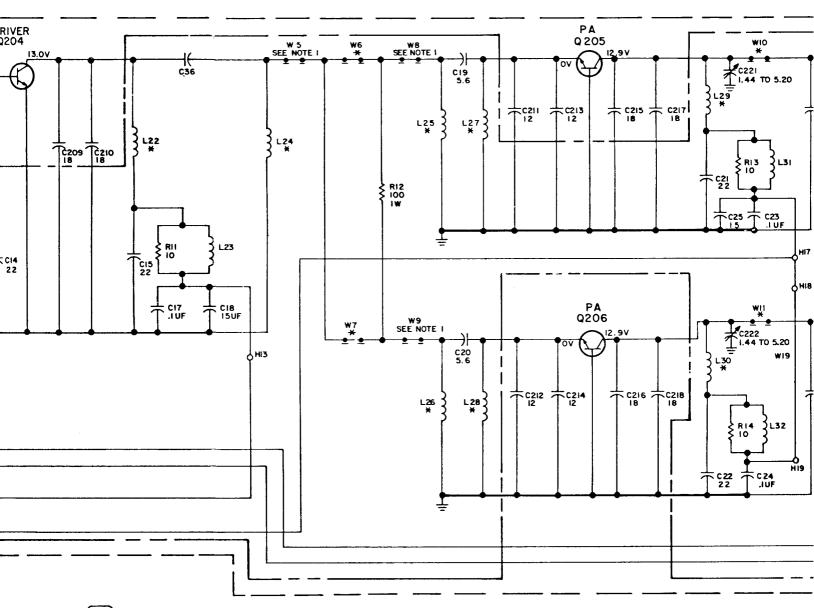
MPONENT SIDE

LOER SIDE





ANY CHANGES TO THIS DIAG. MAY AFFECT 19R622245, 19R622312 OR 19R622262 ALL RESISTORS ARE 1/4 WRTT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHNIS UNLESS FOLLOWED BY K-1000 OHNIS OR MEG = 1,000,000 OHNIS -CAPROTIOR VALUES IN PROFARADS (EDUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF- MICROFARADS, INULCTINCE VALUES IN MICROFIEMADS, INULCTINCE VALUES IN MICROFIEMADS, INULCTINCE VALUES IN MICROFIEMADS, INULCTING BY MH- MILLINEIMITYS OR IH-HEMITYS.





VOLTAGE READINGS

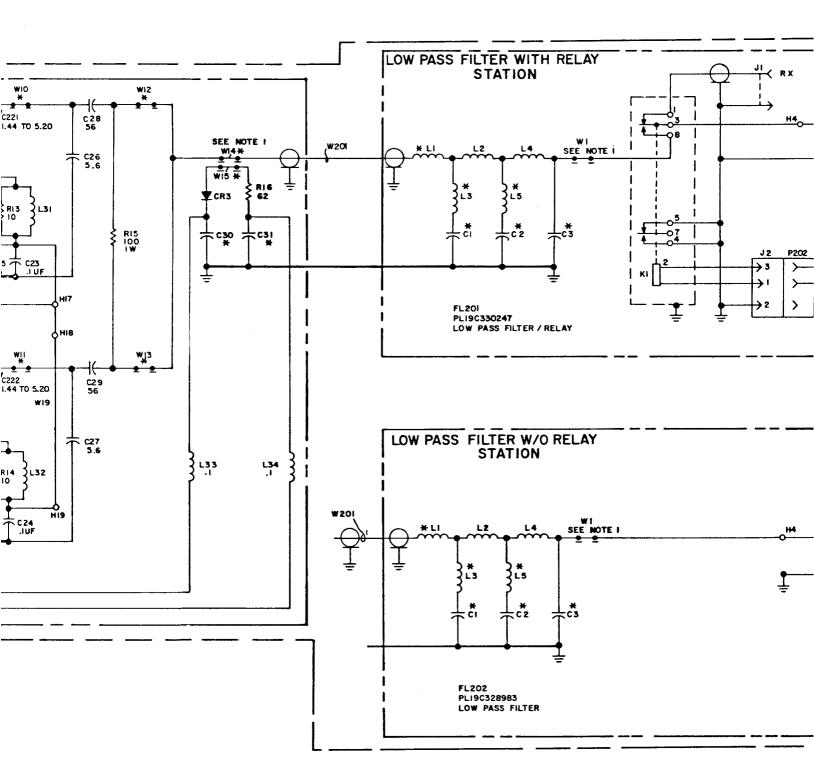
VOLTAGE READINGS ARE TYPICAL READINGS MADE WITH TRANSMITTER KEYED, AND MEAS, RED WITH A 20,000 OHMS FREN-VOLT METER AN RE COKE (25:50 MICROHENRYS) IS USED IN THE HOT METER LEAD TO AVOID DETUNING REFCROLITS. NOTE: READINGS AT 0201, 0202 COLLECTOR AND IN THE READINGS AT 0201, 0202 COLLECTOR AND IN THE TRANSMITTER ADJUSTED FOR 35 WATTS OUTPUT THESE READINGS WILL VARY DEPENDING ON THE SETTING OF POWER ADJUST CONTROL R24.

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

	POWER AMPLIFIER	REV		REV		REV
W/RELAY	PL190430488GI	D	PL190423823G3	•	PLI9C330247GI	
W/O RELAT	PL19D430488G2	D	PL190423823G3		PL-19C328983GI	

NOTES: 1.50 2.PAF 3.Q2 M/ S/ IN

(19R622411, Rev. 4)



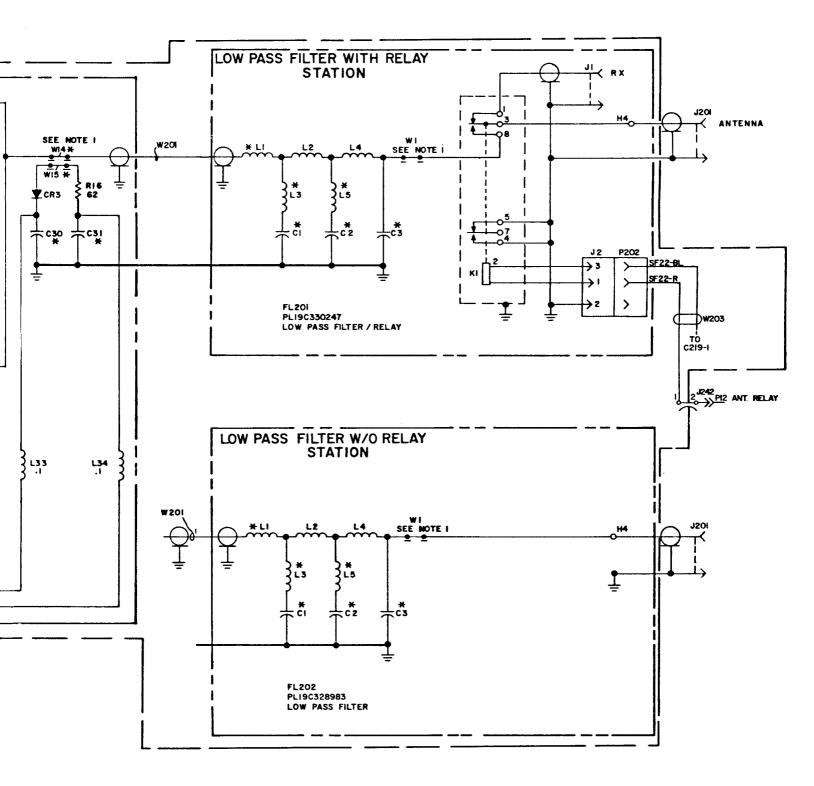
NOTES:

- 1.50 OHM MICROSTRIP (PART OF PWB). 2. PARTS INDICATED BY + ARE PART OF PCB. 3. 0205 & 0206 ARE PART OF A PASE -MATCHED PAIR AND MUST BE OF THE SAME GROUP NUMBER. GROUP INDENTIFIES INTERCHANGEABLE PARTS.

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POWER AMPLIFIER

Issue 3



SCHEMATIC DIAGRAM

POWER AMPLIFIER 19D430488G1, G2

TOF PWB). ARE PART OF PCB. TOF A PASE -ST BE OF THE GROUP INDENTIFIES ITS.

PARTS LIST

851-870 MHZ, 35 WATT TRANSMITTER POWER AMPLIFIER 19D430488G1 W RELAY - REV D 19D430488G2 W/O RELAY - REV D ISSUE 3

SYMBOL	GE PART NO.	DESCRIPTION
A201		POWER AMPLIFIER BOARD 19D423823G3
		CAPACITORS
C1	19A134419P1	Ceramic: 3.3 pF ±.25 pF, 50 VDCW, temp coef 0 ±120 PPM.
C2	19A134419P5	Ceramic: 4.7 pF \pm .25 pF, 50 VDCW, temp coef 0 \pm 60 PPM.
C3	19A134419P13	Ceramic: 10 pF $\pm 5\%$, 50 VDCW, temp coef 0 ± 60 PPM
C4	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.
C5	19A134419P31	Ceramic: 56 pF \pm 5%, 50 VDCW, temp coef 0 \pm 30 PPM
C6	19A134419P5	Ceramic: 4.7 pF <u>+</u> .25 pF, 50 VDCW, temp coef 0 <u>+</u> 60 PPM.
C7	19A134419P11	Ceramic: 8.2 pF $\pm 5\%$, 50 VDCW, temp coef 0 ± 60 PPM.
C8	19A116080P107	Polyester: 0.1 uF $\pm 10\%$, 50 VDCW.
C9	19A134419P31	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM
C10 and C11	19A134419P21	Ceramic: 22 pF $\pm 5\%$, 50 VDCW, temp coef 0 ± 30 PPM
C12	19A116080P107	Polyester: 0.1 uF $\pm 10\%$, 50 VDCW.
C13	19A134419P7	Ceramic: 5.6 pF \pm 5%, 50 VDCW, temp coef 0 \pm 60 PPM.
C14 and C15	19A134419P21	- Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM
C17	19A116080P107	Polyester: 0.1 uF +10%, 50 VDCW.
C18	19A134202P8	Tantalum: 15 uF $\pm 20\%$, 20 VDCW.
C19 and C20	19A134419P7	- Ceramic: 5.6 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 60 PPM.
C21 and C22	19A134418P21	Ceramic: 22 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM
C23 and C24	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.
C25	19A134202P8	Tantalum: 15 uF +20%, 20 VDCW.
C26 and C27	19A134418P7	Ceramic: 5.6 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM.
C28 and C29	19A134418P31	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM
C30 and C31		(Part of 19D423824P1 printed board).
C32	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C33	19A134202P6	Tantalum: 22 uF \pm 20%, 15 VDCW.
C34	19A134202P8	Tantalum: 15 uF $\pm 20\%$, 20 VDCW.
C35	19A134419P31	Ceramic: 56 pF \pm 5%, 50 VDCW, temp coef 0 \pm 30 PPM
C36	19A134418P9	Ceramic: 6.8 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM.
0.0.1	10111005051	DIODES AND RECTIFIERS
CR1	19A116052P1 19A115775P1	Silicon, hot carrier: Fwd drop .350 volts max.
CR2 CR3	19A115775P1 19A116052P2	Silicon, fast recovery, 225 mA, 50 PIV. Silicon, fast recovery; sim to Hewlett Packard 5082-2811.
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SYMBOL	GE PART NO.	DESCRIPTION
J205	19B219374G1	JACKS AND RECEPTACLES
L1 and L2		(Part of 19D423824P1 printed board).
L3	19B209420P101	Coil, RF: .10 uH ±10%, 0.8 ohms DC res max; sim to Jeffers 4416-1K.
L4		(Part of 19D423824P1 printed board).
L5	19A701091G1	Coil.
L6 thru L8		(Part of 19D423824P1 printed board).
L9	19B209420P101	Coil, RF: .10 uH $\pm 10\%$, 0.8 ohms DC res max; sim to Jeffers 4416-1K.
L10		(Part of 19D423824P1 printed board).
L11	19A701091G1	Coil.
L12 thru L14	-	(Part of 19D423824Pl printed board).
L15	19B209420P101	Coil, RF: .10 uH ±10%, 0.8 ohms DC res max; sim to Jeffers 4416-1K.
L16		(Part of 19D423824P1 printed board).
L17 L18	19A701091G1	Coil. (Part of 19D423824P1 printed board).
thru L20		(Part of 19942-824F1 printed board).
L21	19B209420P101	Coil, RF: .10 uH ±10%, 0.8 ohms DC res max; sim to Jeffers 4416-1K.
L22		(Part of 19D423824P1 printed board).
L23 L24	19A701091G1	Coil.
thru L30		(Part of 19D423824P1 printed board).
L31 and L32	19A701091G1	Coil.
L33 and L34	19B209420P101	Coil, RF: .10 uH ±10%, 0.8 ohms DC res max; sim to Jeffers 4416-1K.
		RESISTORS
R1 R2	19A700106P63 3R152P301J	Composition: 1K ohms $\pm 5\%$, 1/4 w. Composition: 300 ohms $\pm 5\%$, 1/4 w.
R3	3R152P162J	Composition: 1.6K ohms $\pm 5\%$, 1/4 w.
R4	19A700106P32	Composition: 51 ohms <u>+</u> 5%, 1/4 w.
R5	3R77P240J	Composition: 24 ohms ±5%, 1/2 w.
R6	19A700106P15	Composition: 10 ohms <u>+</u> 5%, 1/4 w.
R7	19A700106P32	Composition: 51 ohms $\pm 5\%$, 1/4 w.
R8 thru R11	19A700106P15	Composition: 10 ohms <u>+</u> 5%, 1/4 w.
R12	19A700112P39	Composition: 100 ohms ±5%, 1 w.
R13 and R14	19A700106P15	Composition: 10 ohms <u>+</u> 5%, 1/4 w.
R15	194700112939	Composition: 100 ohms ±5%, 1 w.
R16	3R152P620J	Composition: 62 ohms $\pm 5\%$, 1/4 w.
R17 R18	19A700106P63 3R152P302J	Composition: 1K ohms $\pm 5\%$, 1/4 w. Composition: 3K ohms $\pm 5\%$, 1/4 w.
R19	19A700106P63	Composition: 1K ohms $\pm 5\%$, 1/4 w.
R20	3R152P564J	Composition: 560K ohms $\pm 5\%$, 1/4 w.
R21	3R152P203J	Composition: 20K ohms $\pm 5\%$, 1/4 w.
R22	19A700106P63	Composition: 1K ohms $\pm 5\%$, 1/4 w.
R23	3R152P203J	Composition: 20K ohms $\pm 5\%$, 1/4 w.
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325 B77 1047001400 72.2.0000, cornet: 3.7K alum (107, 1/2 w.	R25	3RI52P304J		P101		(Part of W201).
377000000000100000000010000000001000000000000000000000000000000000000		19C850605P2	Shunt resistor.			TRANSISTORS
10 10012070024 10012040070 5011000, 300, 300, 300, 300, 300, 300, 30				Q201	19A134430P1	Silicon, NPN.
Joseff District Construction Construntion Construction Constructi	. R29	19A700016P3	Variable, cermet: 4.7K ohms $\pm 10\%$, 1/2 w.	Q202	19A134430P2	Silicon, NPN.
1 136427034 NewF endTail (see surfact mat. 			INTEGRATED CIRCUITS	Q203	19A134431P1	
VI The second seco	U 1	19D429709G4	Power control, low current out.			
H 158.13855801 Cable. (fact ubic file). 0077 19.1167287 Silicot, 700. H7 108.0276307 Jappe. Jappe. Jappe. H7 108.0276307 Jappe. Jappe. H9 108.0276307 Jappe. 10.1082700 Jappe. H9 108.0276307 Jappe. 10.1082700 Jappe. H9 108.0276307 Jappe. 101.028700 Cable. (for the SIT. of the SIT.				and	19A134433P1	Silicon, NPN.
Nome Name All (rest of 10065380/pt printed board). Imperiate Second Second Sec	W 1	19A136858G1			194116758P1	Silicon PNP.
NT.7 Lamber. Attor. Attor. NT.7 Lamber. Anger. Attor. The Value 2005, color ode white; sin to Color 200, color ode white; sin to Color 200, c				4201	10111010011	
417 1002276007 Junger. 1002276007 Junger. Junger. 100227607 Junger. Junger. 100227607 Junger. Junger. 10013441897 Coreance: 3.2 pf 155. 50 FDCK, temp coef 0 100 PM Junger. 100134418971 Coreance: 1.6 pf 155. 50 FDCK, temp coef 0 100 PM Junger. 100134418973 Coreance: 1.6 pf 155. 50 FDCK, temp coef 0 100 PM Junger. 100134418973 Coreance: 1.6 of ur - o coef. 0.00 PM Junger. 10134418973 Coreance: 1.6 of ur - o coef. 0.00 PM Junger. 10134418973 Coreance: 1.8 pf 155. 50 FDCK, temp coef 0 100 PM Junger. 10134418973 Coreance: 1.8 pf 155. 50 FDCK, temp coef 0 100 PM Junger. Junger.						
19 1982/16601 Jamper. 200 1982/16602 Jamper. 201 1982/16602 Coll. () Coll. () 201 1981/268021 Coll. () Coll. () Coll. () Coll. () 2020 1981/268021 Coll. () Coll. () Coll. () Coll. () Coll. () 2031 1981/268021 Coll. () Coll. () Space () Coll. () Coll. () 2031 1981/268021 Contact () D () Coll. () Space () Coll. () Coll. () Coll. () Coll. () Coll. () 2031 1981/268021 Contact () D () Coll. () Space () Coll. () <thcoll. ()<="" th=""> <thcoll. ()<="" td=""><td>W17</td><td>19B227659P4</td><td>Jumper.</td><td>RT201</td><td>19A129379G1</td><td></td></thcoll.></thcoll.>	W17	19B227659P4	Jumper.	RT201	19A129379G1	
NTD 1822705801 Jumper. Calle, NT. N20 1982276502 Jumper. Calle, NT. C201 1982276502 Calle, NT. C201 19812640001 Calle, NT. C201 19812640001 Calle, NT. C203 198126410921 Cornic: 4.7 pf 1.25 pf, 50 VDCK, temp coef 0 200 H C204 198126410911 Cornic: 4.7 pf 1.25 pf, 50 VDCK, temp coef 0 19822707991 Spacer. (Used with FLODI and FLOD). C207 198136410913 Cornact: 1.8 J pf 155, 50 VDCK, temp coef 0 120 VDK 19822612004CR Tag acros. Philip PO2DRUVE. So. 0-32 t 1/4. C208 198136410913 Cornact: 1.8 J f 155, 50 VDCK, temp coef 0 120 VDK 1982763004CR Tag acros. Philip PO2DRUVE. So. 0-32 t 1/4. C209 198136410913 Cornact: 1.8 J f 155, 50 VDCK, temp coef 0 120 VDK 1981263004CR Tag acros. Philip PO2DRUVE. So. 0-32 t 1/4. C200 198136410913 Cornact: 1.8 J f 155, 50 VDCK, temp coef 0 120 VDK Tag acros. Philip PO2DRUVE. So. 0-32 t 1/4. C201 198136410913 Cornact: 1.8 J f 155, 50 VDCK, temp coef 0 120 VDK Tag acros. Philip PO2DRUVE. So. 0-32 t 1/4. C201 198136410913 Cornact: 1.8 J f 155, 50 VDCK, temp coef 0 120 VDK T	W18	19B227659P2	Jumper.			CADLES
K50 1092776091 Jamper. C10 1912708031 Call: approx 3 feet long. C11 19313419721 Ceranic: 22 pr 55, 30 YDCW, tonp coef 0 100 PPB 9202 19314200711 Call: approx 3 feet long. C201 19313419721 Ceranic: 14.7 pf 1.50 p7, 50 YDCW, tonp coef 0 19314200711 Cable: approx 3 feet long. C202 19313419713 Ceranic: 10 pf 1.55, 50 YDCW, tonp coef 0 19822077921 Spacer. (Used with F201 and F7202). C203 130134189713 Ceranic: 10 pf 155, 50 YDCW, tonp coef 0 150 PPB 713880873 Nut, hox, hraz: No. 1/4-28. (Secures (218 k Call) C203 130134189713 Ceranic: 12 pf 155, 50 YDCW, tonp coef 0 150 PPB 713887873 Nut, hox, hraz: No. 1/4-28. (Secures (218 k Call) C214 19313418973 Ceranic: 12 pf 155, 50 YDCW, tonp coef 0 150 PPB 193142039271 Issultor, phate. Used with (207). 13313418913 Ceranic: 12 pf 155, 50 YDCW, tonp coef 0 150 PPB 54921792 Support. (See with (207). 1341205091 Osange: size to ter 2075050788887 Support. (See with (207). Support. (See with (207). 13413418913 Ceranic: 12 pf 155, 50 YDCW, tonp coef 0 150 PPB Support. (See with (207).	W19	19B227659P1	Jumper.	W201	19413685961	
C201 19.134.410/01 Cernnic: 20 pr 055, 50 YDCW, top conf 0 100 PM W203 19.41480001 Calle: uprox 2 feet Dng. C203 19.4134.410/01 Cernnic: 20 pr 155, 50 YDCW, temp coef 0 19.414200701 Calle: uprox 2 feet Dng. C204 19.4134.410/01 Cernnic: 3.0 pr 1.55, 50 YDCW, temp coef 0 19.414200701 Calle: uprox 2 feet Dng. C204 19.4134.410/01 Cernnic: 3.0 pr 1.55, 50 YDCW, temp coef 0 19.0122767991 Spacer. (Used with FLODI and FLOD). C206 19.4134.410/01 Cernnic: 10 pr 155, 50 YDCW, temp coef 0 100 PM 71.3000380 Nat, hex, hexas: No. 1/4-38. (Secures C210 A C206 19.4134.419015 Cernnic: 12 pr 155, 50 YDCW, temp coef 0 100 PM 71.3000380 Nat, hex, hexas: No. 1/4-38. (Secures C210 A C206 19.4134.18019 Cernnic: 12 pr 155, 50 YDCW, temp coef 0 100 PM 71.3000380 Nat, hex, hexas: No. 1/4-38. (Secures C210 A C216 19.4134.18019 Cernnic: 12 pr 155, 50 YDCW, temp coef 0 100 PM 19.41525293 Insulator, bashist. (Mod with Q207). C211 19.4134.18019 Cernnic: 12 pr 155, 50 YDCW, temp coef 0 100 PM 19.41525293 Insulator, bashist. (Mod with Q207). C211 19.4134.18019	W20	19822765993	Jumper.			
and CR02 Image: Second Se			CAPACITORS	i		
C202 19431341976 Coratic: 1.7 pf 1.2 gf 1.5 0 VDCV, temp coef 0 C204 194313419713 Coratic: 1.7 pf 1.2 gf 1.5 0 VDCV, temp coef 0 19822767871 Spacer. (Used with FL201 and FL202). C205 194313419713 Curanic: 10 pf 155, 50 VDCV, temp coef 0 100 PM 19822767871 Spacer. (Used with FL201 and FL202). C206 194313419713 Curanic: 10 pf 155, 50 VDCV, temp coef 0 100 PM 13822261261 Heat wink. C207 194313419713 Curanic: 10 pf 155, 50 VDCV, temp coef 0 100 PM 733989873 Nit, her, brass: No. 1/4-28. (Secures CIB & Carabic: Alumina, Cised with C207). C208 194313419715 Ceranic: 12 pf 155, 50 VDCV, temp coef 0 100 PM 73989873 Nit, her, brass: No. 1/4-28. (Secures CIB & Carabic: Alumina, Cised with C207). C216 194313419715 Ceranic: 18 pf 155, 50 VDCV, temp coef 0 100 FM 1941105210 Nat, her, brass: No. 1/4-28. (Secures CIB & Carabic: Cised with C207). C213 194313419719 Ceranic: 18 pf 155, 50 VDCV, temp coef 0 100 FM 1941060871 Nat, her, brass: No. 1/4-28. (Secures CIB & Carabic: Alumina, Sim Cised with C207). C213 194136419719 Ceranic: 18 pf 157, 50 VDCV, temp coef 0 10 FM 1941060714 Nat, her, brass: No. 1.4-28. (Secures Cised with C207). C214 1941107081 Ceranic: No. 8-12 S		19A134419P21	Ceramic: 22 pF $\pm 5\%$, 50 VDCW, temp coef 0 ± 30 PPM	W204	19A142607G1	Cable: approx 2 feet long.
C203 194.154.1975 Corrant:: 4.7 pf ±.25 pf, 50 VDCW, temp coof 0 190.27673p1 Spacer. (Used with FL201 and FL202). C204 194.154.19911 Corrant:: 8.2 pf 15%, 50 VDCW, temp coof 0 190.27673p1 Spacer. (Used with FL201 and FL202). C205 194.154.19913 Corrant:: 10 pf 15%, 50 VDCW, temp coof 0 190.27673p1 Spacer. (Used with FL201 and FL202). C205 194.154.19913 Corrant:: 10 pf 15%, 50 VDCW, temp coof 0 190.0767 No.1/4-28. (Secures C218 & C220). C205 194.154.19910 Corrant:: 12 pf 15%, 50 VDCW, temp coof 0 190.0767 190.1159 VD21081V*: No. 6-32 x 1/4. C205 194.154.19910 Corrant:: 12 pf 15%, 50 VDCW, temp coof 0 190.0767 190.1159 VD21081V*: No. 6-32 x 1/4. C215 194.154.19910 Corrant:: 18 pf 15%, 50 VDCW, temp coof 0 190.0767 Support. (Gad with Q207). C215 194.154.18919 Corrant:: 0.0 WDCW, temp coof 0 190.01300405 Support. (Gad with Q207). C215 194.154.18919 Corrant:: 0.0 WDCW, temp coof 0 190.0130164 Support. (Gad with Q207). C216 194.1670891 Corrant:: 18 pf 15%. 50 VDCW, temp coof 0 190.0130164 Support. (Gad with Q207). C216 194.10600947 Cora						
COD bray COD Construct Construct 8.2 pf 255, 50 VDCW, temp coef 0 1982707992 Spacer. (Used with FL201 and FL202). COD COD Code 19A134419913 Ceramic: 10 pf 255, 50 VDCW, temp coef 0 100 PW Code 713889873 Nut, her, heras: No. 1/4-28. (Secures C219 & Cocy, herastic, building, herastic, buildin	C203	19A134419P5			10000767001	
trop trop <thtre< th=""> <thtrop< th=""> trop tr</thtrop<></thtre<>	C204	194134419011				
CD7 C00 C00 C00 C00 C01 C01 C01 C01 C01 C01	thru					
C200 19.4134418019 Ceramic: 18 pf 15%, 50 VDCW, temp coef 0 30 PFM N80P1300405 Tap screw_Philips PO2IDRIVE: No. 6-32 x 1/4. C211 19.4134418019 Ceramic: 12 pf 15%, 50 VDCW, temp coef 0 30 PFM 19.4134418019 Used with Q207). C215 19.4134418019 Ceramic: 12 pf 15%, 50 VDCW, temp coef 0 30 PFM 19.412425802 Support. (Used with Q207). C216 19.4134418019 Ceramic: 10 pf 15%, 50 VDCW, temp coef 0 30 PFM 54.0217862 Support. (Used with Q207). C218 19.413670801 Ceramic: 0.01 uF -0 +1005, 500 VDCW, rated 19.4121006914 Washer. (Used with Q201, Q203). C222 19.470301882 Variale: 1.44 to 5.20 pF, 126 VDCW; sin to EF 19.470378225 Nut, her, brass: No. 8-32. (Used with Q201, Q202). FL201 R00 MHz FILTER/RELY ASSCMMLY 19.23331501 Filter Web. (W RELAY). 19.413680975 Consector, printed vining: 3 contacts rated at 3 samp; sits to Mains of 05-51-031. Nachine screw, phillips head: No. 6-32 x 3/4. 19.4120000171 Hermetic scaled: US to 341 ohms coll rese, WF4-501586, or Potter-Purefield KCM0160. 19.421006744 12 19.413680371 Coil. Support. (Used with Q201, Cable of 19.0029. 12 19.4136	C207 and	19A134419P13	Ceramic: 10 pF $\pm 5\%$, 50 VDCW, temp coef 0 ± 60 PPM			Nut, hex, brass: No. 1/4-28. (Secures C219 &
C211 19A134419P15 Ceramic: 12 pF ±5%, 50 VDCW, temp coof 0 ±30 PPW 4029974P1 Insulator, plate: aluminu. (Used with Q207). C215 19A134418P19 Ceramic: 18 pF ±5%, 50 VDCW, temp coof 0 ±30 PPW 5375-20. (Used with Q207). C219 19A116708P1 Ceramic: 0.01 uF -0 ±100%, 500 VDCW, rated 20 anps; sim to Erie 327050X9W0103P. C221 19A116708P1 Ceramic: 1.44 to 5.20 pF, 125 VDCW; sim to EF 19A12006P14 Washer. (Used with Q201 & Q202). C222 19A700049P2 Variable: 1.44 to 5.20 pF, 125 VDCW; sim to EF 19041751361 PA Cover. J1 19A700049P2 Scometor, preceptacle: 500 VDCW maximum; sim to 19041751361 PA Cover. J2 19A116689P55 Connector, printed wiring: 3 contacts rated at 5 amps; sim to box 03-65-1031. 198201074P312 Tap acrew, phillips POZIDRIVE: No. 6-32 x 3/4. (Secures 2020). K1 19A700061P1 Hermetic sealed: 180 to 311 ohms coll ree, #+16.3 VDC; sim to GE 38AV1700A2, CP Chare, HF=101556, or Potter-Brunfield HCM6160. 19A1066914 Washer. (Used with W202, W204). L2 19A136863P1 Coll. Coll. 19A12006P14 Washer. (Used with W202, W204). L2 19A136863P1 Coll. Coll. 19A121006P14 Washer. (Used with W202, W204).	C209 and	19A134418P19	Ceramic: 18 pF <u>+</u> 5%, 50 VDCW, temp coef 0 <u>+</u> 30 PPM.			(Secures A201).
thru C214ISA123686P2Support. (Used with Q207).(215 (217)19A134418P19 (218)Ceramic: 18 pF ±5%, 50 VDCW, temp coef 0 ±30 PFW (219)Support. (Used with Q2017).(219) (211) (221)19A116708P1 (220)Ceramic: 0.01 uF -0 ±100%, 500 VDCW, rated 20 amps; sim to Erie 327050X8V0103P.Support. (Used with Q201-4203).(221) (221) (221) (221)19A116708P1 (220)Ceramic: 1.44 to 5.20 pF, 125 VDCW; sim to EF Johnson 186-0607-175.19A12306871 (19A702782P5)Nut, her, brass: No. 8-32. (Used with Q201-203).(222) (221) (222)19A703518P2 Johnson 186-0607-175.Nut, her, brass: No. 8-32. (Used with Q201-203).Nut, her, brass: No. 8-32. (Used with Q201-203).(222) (222)19A703518P2 Johnson 186-0607-175.Nut, her, brass: No. 8-32. (Used with Q201-203).Pilter Web. (W RELAY).(222) (222)19A703048P2 (1923034761)Somector, receptacle: 500 VDCW maximum; sim to NTF-1058.19D417513G1 (19D4125793)Pilter Web. (W/O RELAY).(1) (1) (223047471)19A700049P2 (1923047471)Connector, printed wiring: 3 contacts rated at S amps; sim to Molex 09-65-1031.19B201074P312 (19B200103P41)Tap screw, hex head: No. 8-32 x 5/8. (Secures Hat sink).(1) (1) (220)19A700061P1Hermetic sested: 150 to 324 ohms coll res, WFF-1201558, or Potter-Brumfleid HCM6160.19A7087661 (19A708639P1Support. (1205).(1) (2) (2) (2)19A136863P1 (2)Coll.19B201074P366 (2) (2)Tap screw, hex head: No. 8-32 x 5/8. (Secures (Secures cable cilp loops).(1) 		194124419015	Companies 10 pF 45 ⁶ 50 UDCW town cost 0 420 DDU			
C215 thru C21819A13418P19Ceramic: 18 pF ±5%, 50 VDCW, temp coef 0 ±0 PPW C378549217802Washer, spring tension: sim to Wallace Barnes 275-20. (Used with Q201-Q203).C219 c219 c219 c22019A116708P1 c221 and c220Ceramic: 0.01 uF -0 ±100%, 500 VDCW, rated 20 amps; sim to Eris 20750XXW0305.19A121006P14 Variable: 1.44 to 5.20 pF, 125 VDCW; sim to EF Johnson 186-0607-175.19A121006P14 19A702782P5Washer, spring tension: sim to Wallace Barnes 275-20. (Used with Q201 & Q202).FL201R00 NHz FILTER/RELAY ASSUMBLY 19G330247G1 19G330247G119A1700049P2Connector, receptacle: 500 VDCW maximum; sim to NTF-1058.19B210315G2Filter Web. (W/O RELAY).J119A700049P2 2 Connector, printed wiring: 3 contacts rated at 5 amps; sim to Eriol Seiter 500 VDCW maximum; sim to NTF-1058.19B210074P312Tap screw, phillips PozIDRIV*: No. 6-32 x 3/4. (Secures 2005).K119A700061P1Hermetic scaled: 180 to 341 ohms coll res, 8-16.3 VDC; sim to GE 38A1780A2, CP Clare HFF-121568, or Potter-Purmicid HCW6100.19A21006014 19A21006014Washer. (Used with W202, W204).L219A136863P1 104.1Coll.Coll.Coll.19B201074P306 18P201074P306Tap screw, Phillips POZIDRIV*: No. 6-32 x 3/8. (Secures achel clip loops).L219A136863P1 104.1Coll.Coll.19B201074P306 18P200268P113Tap screw, Phillips POZIDRIV*: No. 6-32 x 3/8. (Secures achel clip loops).L219A136863P1 104.1Coll.Loopass filter, 	thru	194194419519	Ceramic: 12 pr ±5%, 50 VDCW, temp coer 0 ±30 PPM			
C219 and C22019A116708P1 and C220Ceramic: 0.01 uF -0 +100%, 500 VDCW, rated 20 amps; sim to Eric 327050X5W0103P.19A121006P14Washer. (Used with Q201 & Q202).C221 and C22219A703518F2Variable: 1.44 to 5.20 pF, 125 VDCW; sim to EF johnson 186-0607-175.19A1051361PA Cover.FL201800 MHz FILTEF/RELAY ASSEMBLY 19C302476119A2331561Filter Web. (W RELAY).J119A700049F2Connector, receptacle: 500 VDCW maximum; sim to NTF-1058.Son tasc of the screek, phillips head: No. 6-32 x 1. (Secures J205).J219A116659P55Connector, printed wiring: 3 contacts rated at S amps; sim to Molex 09-65-1031.19B21076401Support. (J205).K119A700061P1Hermetic scaled: 180 to 341 ohms coil res, HWF-10558, or Potter-Drukited action for the screek, phillips POZIDRIVE: No. 6-32 x 3/4. (Secures J205).19A136863P1L219A136863P1Coil.IBA1368663P1Coil.L219A136863P1Coil.IBS209268P113Terminal; sim to AMP 2-34835-4. (Located at C219).L219A136863P1Coil.IBS209260P11Solderless terminal. (Located or red & black power leads).FL20219C32888301Lowpass filter.19B209268P113Solderless terminal. (Located or red & black power leads).	C215 thru	19A134418P19	Ceramic: 18 pF $\pm 5\%$, 50 VDCW, temp coef 0 ± 30 PFM			Washer, spring tension: sim to Wallace Barnes
and C22020 amps; sim to Erie 327050X5W0103P.194702782P5Nut, hex, brass: No. 8-32. (Uaed with Q20203).C221 and 		19411670801	Companie: 0.01 NR -0.11005 500 VDCW metod		19A121006P14	Washer. (Used with Q201 & Q202).
and C222Johnson 186-0607-175.19FL201Sobmson 186-0607-175.19823331501FL201800 MH# FILTER/RELAY ASSEMBLY 19C3302470119823331501J119A700049P2Connector, receptacle: 500 VDCW maximum; sim to NTTF-1058.N80P13016C6J219A116659P55Connector, printed wiring: 3 contacts rated at 5 amps; sim to Molex 09-65-1031.198203034701J219A700061P1Hermetic sealed: 180 to 341 ohms coll res, 8-16.3 VDC; sim to GE 35AV1760A2, CP Clare HFW-1201558, or Potter-Brumfield HCM6160.19820913P410L219A136863P1Coil.19B201074P362L219A136863P1Coil.Coil.L419A136863P1Coil.Lowpass filter.L219C328983G1Lowpass filter.L219C328983G1Lowpass filter.L219C328983G1Lowpass filter.L319A134260P1Insulator, cover. (Used with Q207).	and C220		20 amps; sim to Erie 327050X5W0103P.		19470278295	Nut, hex, brass: No. 8-32. (Used with Q201-Q203).
FL201800 MH# FILTER/RELAY ASSEMBLY 19C330347G119B23315G2Filter Web. (W/O RELAY).J119A700049P2Connector, receptacle: 500 VDCW maximum; sim to NTTF-1058.N80P13016C6Machine screw, phillips head: No. 6-32 x 1. (Secures 19B220906G1 filter housing).J219A116659P55Connector, printed wiring: 3 contacts rated at 	and	19A703518P2	Variable: 1.44 to 5.20 pF, 125 VDCW; sim to EF Johnson 186-0607-175.			
FL201800 MH2 FILTER/RELAY ASSEMBLY 19C330247G119D416275P3Filter casting.J119A700049P2Connector, receptacle: 500 VDCW maximum; sim to NTTF-1058.N80P13016C6Machine screw, phillips head: No. 6-32 x 1. (Secures 19B226906G1 filter housing).J219A116659P55Connector, printed wiring: 3 contacts rated at 	C222					
J119A700049P2Nachine screw, phillips head: No. 6-32 x 1. (Secures 19B266906G1 filter housing).J219A116659P55Connector, printed wiring: 3 contacts rated at 5 amps; sim to Molex 09-65-1031.19B201074P312Tap screw, Phillips POZIDRIV®: No. 6-32 x 3/4. (Secures J205).K119A700061P1Hermetic sealed: 180 to 341 ohms coil res, 8-16.3 VDC; sim to GE 33AV1760A2, CP Clare HFW-1201558, or Potter-Brumfield HCM6160.19A12006P14Washer. (Used with Q201 & Q202).L219A136863P1Coil.Coil.19B201074P366Tap screw, Phillips POZIDRIV®: No. 6-32 x 3/8. (Secures J205).L219A136863P1Coil.Coil.19B201074P366Tap screw, Phillips POZIDRIV®: No. 6-32 x 3/8. (Located at Q204).FL20219C32898361Lowpass filter. Lowpass filter.19B209260P11Solderless: sim to AMP 2-34835-4. (Located on red & black power leads).FL20219C32898361Lowpass filter. Lowpass filter.19B209260P11Solderless terminal. (Located on red & black power leads).	FL201					
J119A700049P2Connector, receptacle: 500 VDCW maximum; sim to NTTF-1058.19B201074P312Tap screw, Phillips POZIDRIV*: No. 6-32 x 3/4. (Secures J0205).J219A116659P55Connector, printed wiring: 3 contacts rated at 5 amps; sim to Molex 09-65-1031.19B201074P312Tap screw, Phillips POZIDRIV*: No. 6-32 x 3/4. (Secures J0205).K119A700061P1Hermetic sealed: 180 to 341 ohns coll res, R=16.3 VDC; sim to GE 35AV1760A2, CP Clare HFW-1201556, or Potter-Brumfield HCM6160.19A121006P14Washer. (Used with Q201 & Q202).L219A136863P1Coil19D201074P306Tap screw, Phillips POZIDRIV*: No. 6-32 x 3/8. (Secures cable clip. (Used with W202, W204).L219A136863P1Coil19D20TORS19B209268P13Tar screw, Phillips POZIDRIV*: No. 6-32 x 3/8. (Secures cable clip. loops).L219A136863P1Coil.19E209268P13Terminal, solderless: sim to AMP 2-34835-4. (Located at C219).FL20219C32898301Lowpass filter. 			1903024761			
J2IPA116659P55Connector, printed wiring: 3 contacts rated at 5 amps; sim to Molex 09-65-1031.IPB21907661Support. (J205).K119A700061P1Hermetic sealed: 180 to 341 ohms coil res, 8-16.3 VDC; sim to GE 3SAV1760A2, CP Clare HFW-1201558, or Potter-Brumfield HCM6160.19A121006P14Washer. (Used with Q201 & Q202).L219A136863P1CoilINDUCTORS19B201074P306Cable clip. (Used with W202, W204).L219A136863P1Coil.19B209268P113Terminal, solderless: sim to AMP 2-34835-4. (Located on red & black power leads).FL20219C328983G1Lowpass filter.19B209260P11Solderless terminal. (Located on red & black power leads).			JACKS AND RECEPTACLES		N80P13016C6	(Secures 19B226906G1 filter housing).
K119A700061P1Farmetic sealed: 180 to 341 ohms coil res, R=16.3 VDC; sim to GE 38V176042; CP Clare HFW=1201558, or Potter-Brumfield HCM6160.19B209103P410Tap screw, hex head: No. 8-32 x 5/8. (Secures heat sink).L219A136863P1Coil.19A136863P1Coil.19B209268P113Cable clip. (Used with W202, W204).FL20219C328983G1Lowpass filter.19G209268P113Terminal, solderless: sim to AMP 2-34835-4. (Located on red & black power leads).FL20219C328983G1Lowpass filter.19B209260P11Solderless terminal. (Located on red & black power leads).	J1	19A700049P2			19B201074P312	Tap screw, Phillips POZIDRIV®: No. 6-32 x 3/4. (Secures J205).
K119A700061P1Hermetic sealed: 180 to 341 ohms coll res, 8-16.3 VDC; sim to GE 3SAV1760A2, CP Clare HFW-1201558, or Potter-Brumfield HCM6160.19A121006P14Washer. (Used with Q201 & Q202).L219A136863P1INDUCTORS Coil.19A101863P13Cable clip. (Used with W202, W204).L419A136863P1Coil.19B201074P306Tap screw, Phillips P0ZIDRIV*: No. 6-32 x 3/8. 	J2	19A116659P55				
K119A700061P1Hermetic sealed: 180 to 341 ohms coll res, 8-16.3 VDC; sim to GE 3SAV1760A2, CP Clare HFW-1201558, or Potter-Brumfield HCM6160.19A121006P14Washer. (Used with Q201 & Q202).L219A136863P1 INDUCTORS Coil.19A201074P306Tap screw, Phillips P0ZIDRIV*: No. 6-32 x 3/8. (Secures cable clip loops).L419A136863P1Coil.19B201074P306Terminal, solderless: sim to AMP 2-34835-4. (Located at C219).FL20219C328983G1Lowpass filter.19B209260P11Solderless terminal. (Located on red & black power leads)					198209103P410	
L2 19A136863P1 Coil. L4 19A136863P1 Coil. FL202 19C328983G1 Lowpass filter. JACKS AND RECEPTACLES 19A134260P1 L2 19A134260P1 L2 19A134260P1 L2 19A134260P1 L2 19A134260P1 L3 19A134260P1 L4 19A134260P1 L5 19A134260P1 L4 19A134260P1 L5 19A134260P1 L5 19A134260P1 L5 19A134260P1 L5 19A134260P1	К1	19A700061P1			19A121006P14	Washer. (Used with Q201 & Q202).
L219A136863P1INDUCTORS19B201074P306Tap screw, Phillips POZIDRIV*: No. 6-32 x 3/8. (Secures cable clip loops).L419A136863P1Coil.19B209268P113Terminal, solderless: sim to AMP 2-34835-4. (Located at C219).FL20219C328983G1Lowpass filter.19B209260P11Solderless terminal. (Located on red & black power leads)			8-16.3 VDC; sim to GE 3SAV1760A2, CP Clare			
L2 19A136863P1 Coil. Solderless: sim to AMP 2-34835-4. L4 19A136863P1 Coil. Solderless: sim to AMP 2-34835-4. FL202 19C328983G1 Lowpass filter. 19B209260P11 Solderless terminal. (Located on red & black power leads). Solderless terminal. (Used with Q207).						
L4 19A136863P1 Coil. 19B209268P113 Terminal, solderless: sim to AMP 2-34835-4. (Located at C219). FL202 19C328983G1 Lowpass filter. 19B209260P11 Solderless terminal. (Located on red & black power leads). JACKS AND RECEPTACLES 19A134260P1 Insulator, cover. (Used with Q207).	1.0	10412686201			19B201074P306	Tap screw, Phillips POZIDRIV®: No. 6-32 x 3/8. (Secures cable clip loops).
FL202 19C328983G1 Lowpass filter. 19B209260P11 Solderless terminal. (Located on red & black power leads). JACKS AND RECEPTACLES 19A134260P1 Insulator, cover. (Used with Q207).					19B209268P113	Terminal, solderless: sim to AMP 2-34835-4.
power leads). JACKS AND RECEPTACLES 19A134260P1 Insulator, cover. (Used with Q207).					19B209260P11	
					1000000114	
J201 7777145P5 Receptacle: sim to Amphenol 82-97. (STATION)					19A134260P1	Insulator, cover. (Used with Q207).
	J201	7777145P5	Receptacle: sim to Amphenol 82-97. (STATION)			
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PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter," which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

- REV. A 19D430488G1 & G2 800 Mhz Power Amplifier Assembly To improve reliability. Changed Q207 from 19A116375P' to 19A116758P1.
- REV. A 19D423823G3 800 MHz Power Amplifier Board To reduce the probablity of P.A. Burnout due to misadjustmenu for excessive power. Added R29.