1. Theory of Operation

The transmitter uses microstrip design with ceramic substrate board. All the transmitter stages consist of 50–ohm blocks with Class C amplifier circuitry. The transmitter has two major sections; the low level amplifier (LLA), and the power amplifier (PA).

The frequency synthesizer generates an RF output of 150 mW at the required transmit carrier frequency. The RF signal goes to the controlled stage of the LLA. The gain of the controlled stage and the output power of the radio change with variations in the control voltage. The controlled stage drives the LLA output stage (Q802). The IPA module has a rated output power of 2.2 watts.

The RF signal passes from the LLA to the final power amplifier via a coaxial cable. The signal then goes to amplifier stage Q803 and to stage Q804. These two stages, which are mounted on separate microstrip assemblies, can output 14W and 45W respectively.

For the 30W radio, Q803 functions as the driver stage and Q804 functions as the final amplifier. For the 78W and 100W radios, Q803 is the predriver stage and Q804 is the driver stage. The 78W and 100W final amplifiers contain three power transistors (Q805, Q806, and Q807) that operate in parallel.

The transmitter has temperature–sensing circuitry that protects the final power amplifier against high temperatures. This circuitry works in conjunction with the power control circuits to reduce the radio output power whenever the transistor temperature exceeds 80°C. The voltage drop across R801 in the power control circuitry measures the current in the final PA stage. The RF drive to the PA is reduced whenever it exceeds a safe level.

The RF power output from the final amplifier module goes to the harmonic filter, then to the directional coupler. The directional coupler measures both the forward and reflected power. Information related to the forward and reflected power is relayed to the power control circuitry on the common circuits board. The power control circuits react to any change in power by changing the RF drive to restore the RF power output to its original level.

When the reflected power at the radio output connector reaches a level that can damage the final power transistors, the power control circuitry reacts by reducing the RF power output to a safe level. The reflected power should always be less than 40% of rated output power. The directional coupler RF output goes to the antenna via a harmonic filter and the antenna switch.

2. Transmitter Tests

Note

See the Synthesizer section of the manual for information on transmit frequency, audio deviation, and modulation troubleshooting.

2.1 PRELIMINARY TEST

Connect the radio to a proper wattmeter, dummy load, and 13.4V supply.

CAUTION

Key the transmitter only while making adjustments. Make adjustments from the bottom of the radio and through the common circuits board.

2.2 CONTROL AND PROTECTION TESTS

2.2.1 Current Limiting

(1) Set POWER SET fully clockwise.

(2) Set CURRENT LIMIT fully counterclockwise.

(3) Key the transmitter and observe the radio current drain. Drain should be less than 5 uA. Rotate CURRENT LIMIT clockwise. The current drain should increase to a maximum reading of less than 30 uA before you reach the maximum clockwise position.

2.2.2 Power Set

(1) Set CURRENT LIMIT fully clockwise.

(2) Set POWER SET fully counterclockwise.

(3) Key the transmitter and observe the wattmeter. Rotate POWER SET clockwise to set the maximum power output level. See Table 1 for correct meter readings.

Table 1. Power Set Levels

RATED OUTPUT	SET OUTPUT TO:
100 watts	120 watts
78 watts	94 watts
30 watts	36 watts

2.2.3 Thermal Protection

(1) Set CURRENT LIMIT fully clockwise.

(2) Rotate POWER SET until the power reading is approximately 87.5% of the maximum. See Table 2.

Table 2. Output Levels for Thermal Protection

MAXIMUM OUTPUT	SET OUTPUT TO:
120 watts	105 watts
94 watts	82 watts
36 watts	32 watts

(3) Touch a soldering iron the RT801 (near the flange of the last final device). The power output should decrease as RT801 heats up.

2.2.4 Reflected Power Protection

(1) Set CURRENT LIMIT fully clockwise.

(2) Key the transmitter and adjust POWER SET for normal power.

CAUTION

Since the following test requires transmission without a dummy load, the transmitter should be keyed only long enough to allow verification of proper operation of the equipment.

(3) Remove the 50–ohm load from the radio. Briefly key the transmitter and verify the output power indicates less than 50%.

2.3 RF AMPLIFICATION TESTS

2.3.1 Injection

(1) Disconnect the RF drive signal to the exciter from the synthesizer (J700).

(2) Connect a 50–ohm terminated RF milli–voltmeter to the synthesizer's transmitter injection plug (P700). Residual RF drive to the exciter in the receive mode should be less than –5 dBm. Transmitter injection in the transmit mode should be greater than +22 dBm.

2.3.2 Low Level Amplifier

(1) Disconnect the LLA from the PA and re–connect it to a wattmeter and dummy load.

(2) Set POWER SET and CURRENT LIMIT to mid–rotation.

(3) Key the transmitter. The minimum output power should be greater than 2.2 watts.

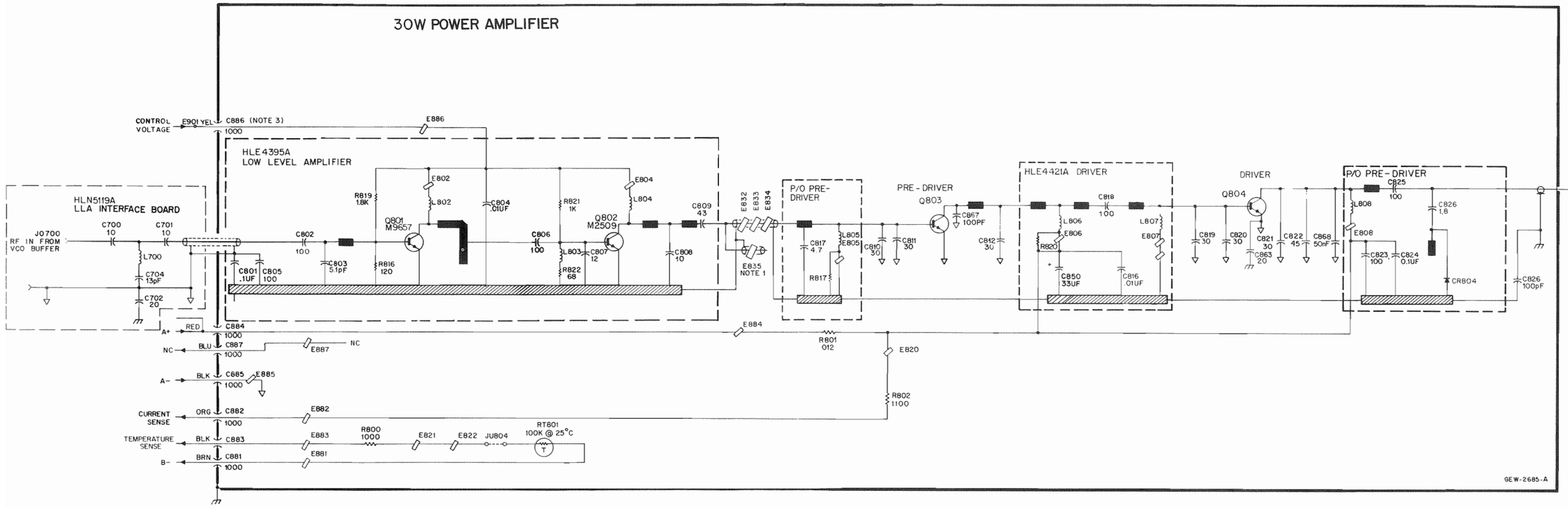
Table 3. Transmitter Troubleshooting Procedures

STEP	SYMPTOM	PROCEDURE	NORMAL INDICATION	NOT NORMAL	ACTION
1	Suspected Transmitter Failure.	Measure RF output at antenna connector.	Rated power.	Transmitter operational.	High power– perform transmitter Control & Protection Circuit Troubleshooting. No power– Go to 2. Low power– Go to 3.
2	No Output Power.	a. Set CURRENT LIMIT & POWER SET fully clockwise. Check Meter 5.	> 5 uA.	Go to b.	Go to 3.
		b. Measure DC voltage across antenna relay coil during TX.	5VDC.	Go to c.	Check coil continuity (DC resistance = 160 ohms); If good, troubleshoot relay drive circuitry.
		c. Check reed switch continuity.	Continuous during TX.	Go to d.	Replace switch.
		d. Check harmonic filter and output cable for shorts and discontinuities.	See schematic.	Go to 3.	Repair defect.
3	Low Output Power.	a. Measure DC level at collector of Q802.	> 11VDC	Go to b.	Perform Transmitter Power Control & Protection Circuit Troubleshooting Procedure
		b. Measure RF signal level at VCO buffer output.	±22dBm minimum.	Perform Power Amplifier Troubleshooting Procedure.	Perform Synthesizer Troubleshooting Procedure.

Table 4. Transmitter Control and Protection Circuitry Troubleshooting Procedures

STEP	SYMPTOM	PROCEDURE	NORMAL INDICATION	NOT NORMAL	ACTION
1	Little or No power; (POWER SET & CURRENT LIMIT) fully clockwise.	a. Disconnect LLA from controls synthesizer at J700. Check for keyed at U900–4.	9.5 VDC.	Go to step 1b.	a. Check PA ENABLE at J300–5. b. Check for synthesizer lock. c. Check PA ENABLE switch (Q902).
		b. Measure output voltage of U900D–1.	> 5 VDC.	Repair control voltage amplifiers Q900 & Q901.	Go to step 1c.
		c. Measure voltages to input of U900D–2 & –3.	pin 3 > pin 2	U900 defective.	Check for shorts or opens in resistive feed circuits of J950–2 & 3.
2	All controls inoperative.	a. Disconnect LLA from synthesizer at J700.	3V to 120V.	Go to step 3b.	Repair control voltage amplifiers Q900 & Q901.
		b. Set all controls clockwise. Measure U900B–9 & –10 in TX mode.	pin 10 > pin 9.	U900 defective.	Perform VSWR shutback Troubleshooting.
3	Current Limit inoperative.	Disconnect exciter from synthesizer at J700. Unsolder CURRENT SENSE (orange) from C887. Check drain current.	10 A.	Check for short on A+ of current sense line.	Check for fault in current limit circuit U900C and repair.

STEP	SYMPTOM	PROCEDURE
4	Reflected power (VSWR) protection inoperative.	Check and repair defect in reflected power detector components U900B, CR902, etc.
5	Thermal protection inoperative.	Check and repair defect in thermal protection components U900A, CR903, RT801, etc.
6	Power set inoperative.	Check and repair defect in forward power detector components R902, CR902, etc.



HLN4465B PA Hardware Kit — MXW–2438–A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±10%, 100V (unless otherwise stated)		
C703	21–82428B36	.002 uF, 200V
C861,862	21–82187B44	.0016 uF
C863	21–83406D81	20, ±5%, 500V
C864	21–82187B44	.0016 uF
C865	21–83406D75	1.5, ±.25%, 500V
C866	21–82187B44	.0016 uF
C880	21–84873H66	4.7, ±.5%
C881	21–82187B44	.0016 uF
resistor, fixed, ohm, ±5%, 1/4 watt (unless otherwise stated)		
R818	06–11045A25	100, 1/2W
	mechanical parts	
	14–80142A02	power distribution
	26–80254A01	heat sink low level amp
	76–83466K01	ferrite core
	29–80218D01	grounding lug
	76–84069B04	ferrite core bead (7 used)
	29–80218D01	grounding lug
	29–80218D01	grounding lug
	32–80084A02	stud device gasket
	07–80078A01	thermistor mounting bracket
	32–80074B01	harmonic filter gasket (2 used)
	32–80084A02	stud device gasket (2 used)
	42–10283A19	cable clip
	15–84827M01	cover
	32–83896M01	gasket
	03–10911A11	machine screw M3X0.5X8
	29–84093M01	solder lug (3 used)
	37–00132057	heat shrink tubing
	42–84510M04	PA strap
	42–80137A02	substrate clip

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HLN4046A Feedthru Plate — MXW–4502–A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, 500V (unless otherwise stated)		
C881–887	21–82812H03	100, +100, –0%
	mechanical parts	
	64–80005A01	feedthru plate
	04–83755H01	solder washer, 7 used

5/9/88

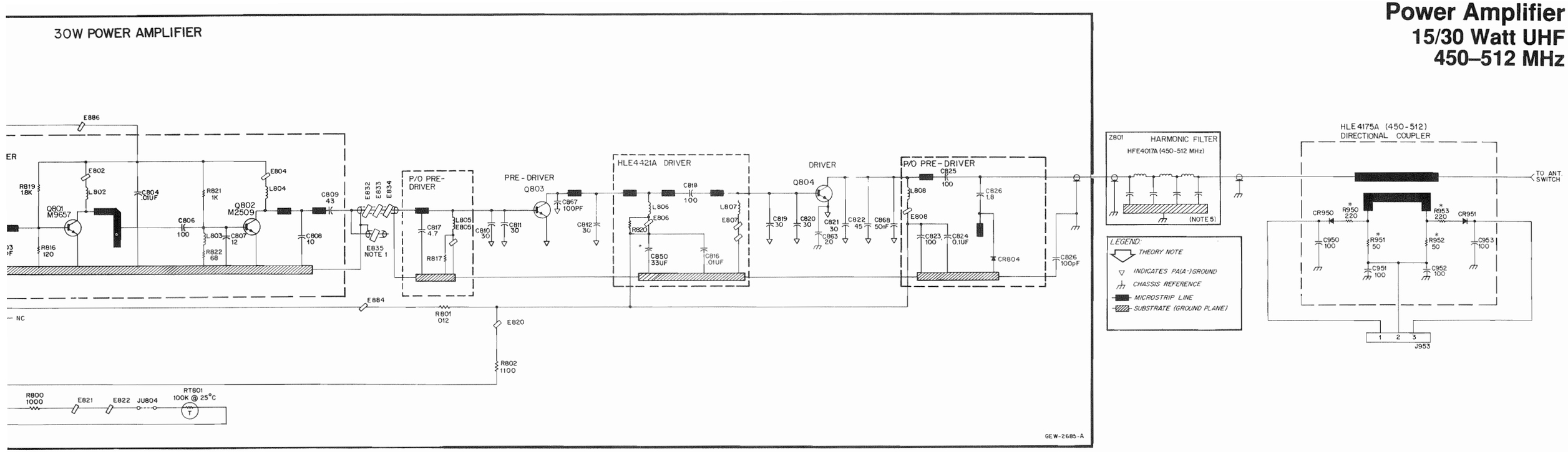
parts list

Associated Parts for 15/30 W Power Amplifier — MXW-2688-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed, µF ±20%, 25V unless otherwise stated
C867	21-82187B44	.001 (used in Range 2 only)
	or 21-82372C08	.02 +80, –20% (used in Range 5 only)
C868	21-82372C10	.05 µF (used in Range 1 only)
		ferrite bead
E832–834	76-80164C01	core
E835	76-83466K01	core (used in Range 2 only)
E881–887	76-84069B04	core
	mechanical parts	
	42-10283A19	nylon cable clip (Range 2 only)
	75-80054F01	compression pad
	14-80142A02	power distribution board insulator
	26-80254A01	low-level amp heatsink
	07-80078A01	thermistor bracket
	32-80074B01	harmonic filter gasket
	32-80084A01	stud device gasket, 2 used
	15-84827M01	harmonic filter cover
	32-83896M01	RF gasket
	32-80211F01	harmonic filter cover gasket
	42-80137A02	substrate clip
	42-84510M02	PA strap, 4 used
	03-10943M15	tapping screw (TT3.5 × 0.6 × 8), 8 used
	01-80244H01	PA shield
	03-10911A11	machine screw (M3 × 0.5 × 8), 5 used
	15-80001G01	directional coupler cover form
	55-84300B04	handle
	03-10943M16	tapping screw (TT3.5 × 0.6 × 10), 5 used
	14-80135H01	PA hybrid insulator, 2 used

4/01/86

Power Amplifier
15/30 Watt UHF
450–512 MHz



HLN4465B PA Hardware Kit — MXW–2438–A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±10%, 100V (unless otherwise stated)		
C703	21–82428B36	.002 uF, 200V
C861,862	21–82187B44	.0016 uF
C863	21–83406D81	20, ±5%, 500V
C864	21–82187B44	.0016 uF
C865	21–83406D75	1.5, ±.25%, 500V
C866	21–82187B44	.0016 uF
C880	21–84873H66	4.7, ±.5%
C881	21–82187B44	.0016 uF
resistor, fixed, ohm, ±5%, 1/4 watt (unless otherwise stated)		
R818	06–11045A25	100, 1/2W
mechanical parts		
	14–80142A02	power distribution
	26–80254A01	heat sink low level amp
	76–83466K01	ferrite core
	29–80218D01	grounding lug
	76–84069B04	ferrite core bead (7 used)
	29–80218D01	grounding lug
	29–80218D01	grounding lug
	32–80084A02	stud device gasket
	07–80078A01	thermistor mounting bracket
	32–80074B01	harmonic filter gasket (2 used)
	32–80084A02	stud device gasket (2 used)
	42–10283A19	cable clip
	15–84827M01	cover
	32–83896M01	gasket
	03–10911A11	machine screw M3X0.5X8
	29–84093M01	solder lug (3 used)
	37–00132057	heat shrink tubing
	42–84510M04	PA strap
	42–80137A02	substrate clip

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HLN4046A Feedthru Plate — MXW–4502–A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, 500V (unless otherwise stated)		
C881–887	21–82812H03	100, +100, –0%
mechanical parts		
	64–80005A01	feedthru plate
	04–83755H01	solder washer, 7 used

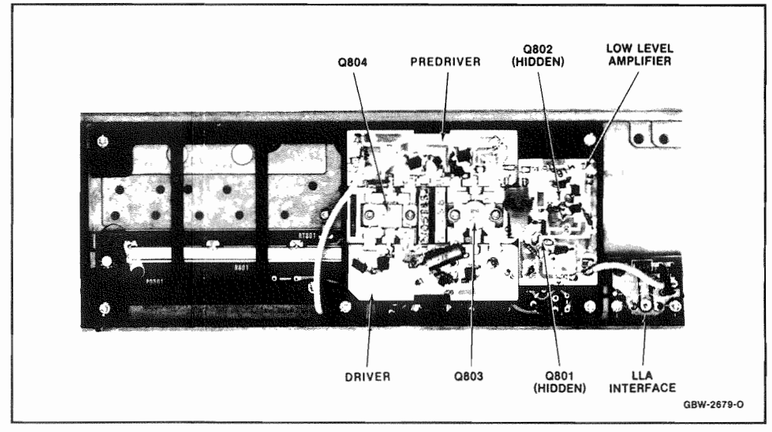
5/9/88

parts list

Associated Parts for 15/30 W Power Amplifier — MXW-2688-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed, µF ±20%, 25V unless otherwise stated
C867	21-82187B44	.001 (used in Range 2 only)
	or 21-82372C08	.02 +80, –20% (used in Range 5 only)
C868	21-82372C10	.05 µF (used in Range 1 only)
		ferrite bead
E832–834	76-80164C01	core
E835	76-83466K01	core (used in Range 2 only)
E881–887	76-84069B04	core
mechanical parts		
	42-10283A19	nylon cable clip (Range 2 only)
	75-80054F01	compression pad
	14-80142A02	power distribution board insulator
	26-80254A01	low-level amp heatsink
	07-80078A01	thermistor bracket
	32-80074B01	harmonic filter gasket
	32-80084A01	stud device gasket, 2 used
	15-84827M01	harmonic filter cover
	32-83896M01	RF gasket
	32-80211F01	harmonic filter cover gasket
	42-80137A02	substrate clip
	42-84510M02	PA strap, 4 used
	03-10943M15	tapping screw (TT3.5 × 0.6 × 8), 8 used
	01-80244H01	PA shield
	03-10911A11	machine screw (M3 × 0.5 × 8), 5 used
	15-80001G01	directional coupler cover form
	55-84300B04	handle
	03-10943M16	tapping screw (TT3.5 × 0.6 × 10), 5 used
	14-80135H01	PA hybrid insulator, 2 used

4/01/86

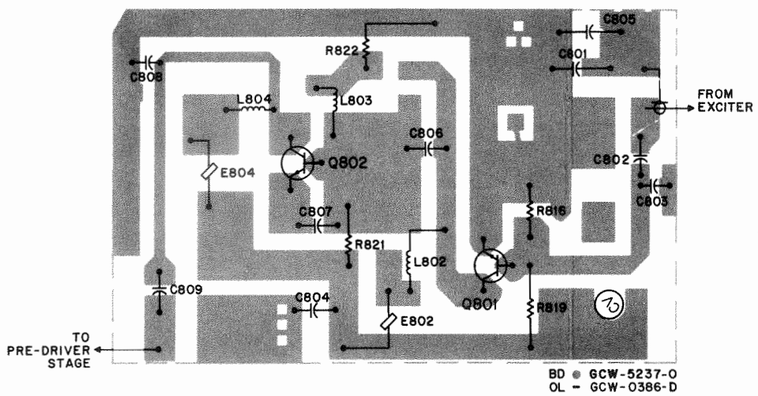


GBW-2679-O

Schematic, Circuit Board Diagrams, and Parts Lists for 15/30 Watt Power Amplifier
PW–2675–C
(Sheet 1 of 2)
8/30/88

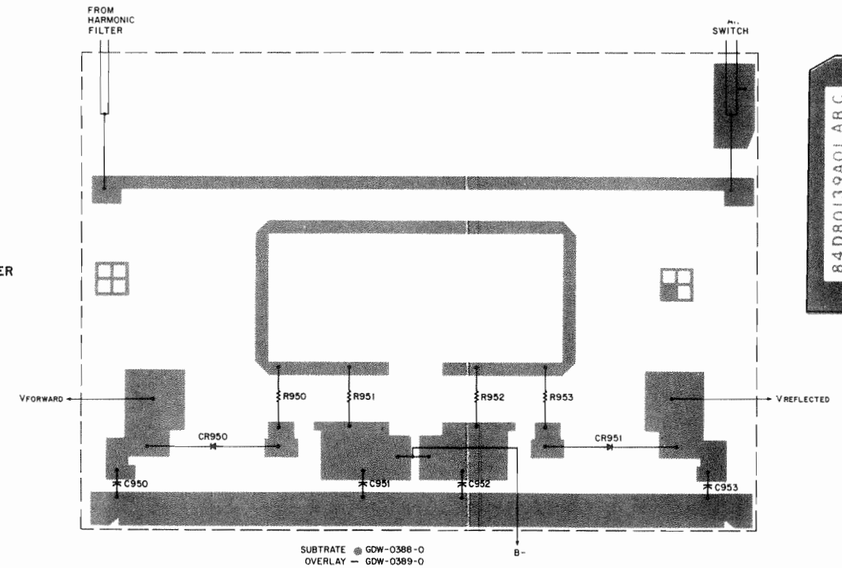
Power Amplifier
15/30 Watt UHF
450–512 MHz

HLE4395A LOW LEVEL AMPLIFIER (LLA)



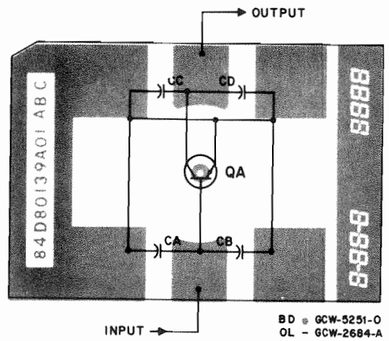
BD ● GCW-5237-O
OL – GCW-0386-D

HLE4175A DIRECTIONAL COUPLER



SUBTRATE ● GDW-0388-O
OVERLAY – GDW-0389-O

TRANSISTOR SUBSTRATE



BD ● GCW-5251-O
OL – GCW-2684-A

RANGE 1 (406–420 MHz)

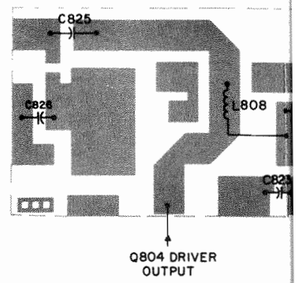
QA	CA	CB	CC	CD	CF
Q803	C810	C811	N.U.	C812	C867
Q804	C819	C820	C821	C822	C868
Q805	C829	C830	C835	C836	C872
Q806	C831	C832	C837	C838	C873
Q807	C833	C834	C839	C840	C874

RANGE 2–5 (450 – 512 MHz)

QA	CA	CB	CC	CD	CE*
Q803	C810	C811	N.U.	C812	N.U.
Q804	C819	C820	C821	C822	N.U.
Q805	C829	C830	C835	C836	C851
Q806	C831	C832	C837	C838	C852
Q807	C833	C834	C839	C840	C853

* CE IS PART OF HLN4040A CAPACITOR KIT.

HL



parts list

HLE4395A Low Level Amplifier — MXW–2692–B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±10%, 100V (unless otherwise stated)		
C801	21–13741C17	.1, 20%, 25V
C802	21–13740A55	100 ±20
C803	21–84873H21	5.1, ±5%
C804	21–84547A05	.1, ±20%, 50V
C805	21–11078B42	100, ±5%
C806	21–13740A55	100, ±20
C807	21–84873H36	12
C808	21–84873H76	10, ±5%, 50V
C809	21–05157A86	43, ± 2%, 50V
coil, rf		
L802	24–80092G60	airwound
L803,804	24–80090G02	airwound
transistor (see note)		
Q801	48–00869657	NPN, type M9657
Q802	48–80225C09	NPN, type M25C09
resistor, fixed, ohm, ±5%, 1/4 watt (unless otherwise stated)		
R816	06–11009C27	120
R819	06–11009C55	1.8k
R821	06–11009C49	1k
R822	06–11009C21	68
mechanical parts		
	76–83960B01	ferrite core (2 used)

8/15/88

note: For best performance, order diodes, transistors, and integrated–circuit devices by Motorola part number.

HLE4175A Directional Coupler — MXW–0396–D

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±20%, 100V (unless otherwise stated)		
C950–953	21–13740A55	100
connector plug		
P952	15–84301K01	3–contact
mechanical parts		
	07–80168F01	directional coupler frame
	29–83208M01	solder lugs (3 used)
	64–83403M01	substrate
	39–82717M01	receptacle contact
	42–10217A02	tie strap .091X3.62

8/15/88

HLE4445A Transistor Kit 14W
HLE4447A Transistor Kit 50W, Range 2 & 3
HLE4448A Transistor Kit 50W, Ranges 2, 3, 4, & 5 — MXW–5488–O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±10%, 100V (unless otherwise stated)		
C810,811	21–84366F04	30, ±5%, 250V (HLE4445A only)
C812	21–11078B27	30, ±5% (HLE4445A only)
C890–892	21–84366F04	30, ±5%, 250V
C893	21–84366F06	45, ±5%, 250V
transistor (see note)		
Q803	48–84411L36	NPN, type M1136 (HLE4445A only)
Q890	48–80225C02	NPN (HLE4447A only)
Q890	48–84411L29	NPN, type M1129 (HLE4448A only)
mechanical parts		
	07–80195B01	frame lead (2 used) (HLE4445A Only)
	07–80195B02	frame lead (2 used)
	04–80141B02	solder preform (2 used)

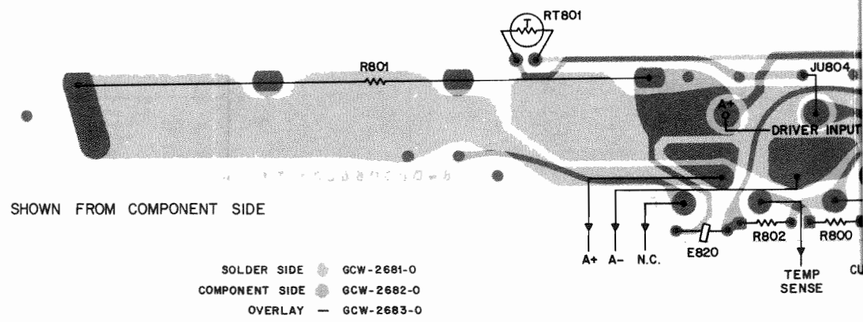
5/9/88

note: For best performance, order diodes, transistors, and integrated circuit devices by Motorola part number.

HLE4409A Pre–Driver

REFERENCE SYMBOL	MOTO PART
capacitor, fixed, pF, ±5%, 10	
C817	21–11
C823	21–13
C824	21–84
C825	21–11
coil, rf	
L805	24–80
L808	24–80
resistor, fixed, ohm, ±5%, 1/	
R817	06–11
	76–83

HLE4405A POWER DISTRIBUTION BOARD



SOLDER SIDE ● GCW-2681-O
COMPONENT SIDE ● GCW-2682-O
OVERLAY – GCW-2683-O

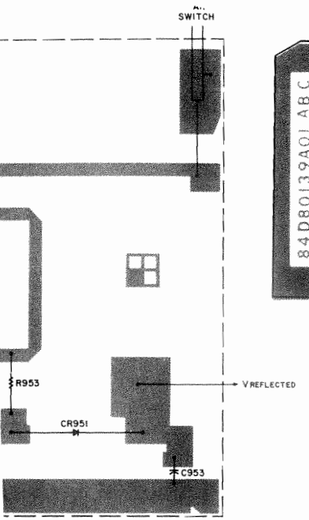
HLE4405A Power Distribution Board — MXW–2694–A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
connector plug		
P804–807	09–80155A02	flat wafer connector (6 used)
resistor, fixed, ohm, ±5%, 1/4 watt (unless otherwise stated)		
R800	06–11009C49	1k
R801	17–82155M01	.012 shunt
R802	06–11009C50	1.1k
thermistor		
RT801	06–83600K09	100K green
mechanical parts		
	24–80036A02	1/2 turn ferrite choke (3 used)

5/9/88

Schematic, Circuit Board Diagrams, and Parts Lists for 15/30 Watt Power Amplifier
PW–2675–C
(Sheet 2 of 2)
8/30/88

PLER

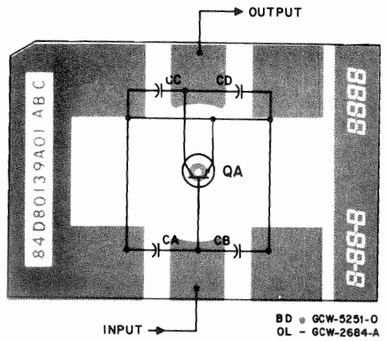


MXW–0396–D

frame
d)

8/15/88

TRANSISTOR SUBSTRATE



RANGE 1 (406–420 MHz)

QA	CA	CB	CC	CD	CF
Q803	C810	C811	N.U.	C812	C867
Q804	C819	C820	C821	C822	C866
Q805	C829	C830	C835	C836	C872
Q806	C831	C832	C837	C838	C873
Q807	C833	C834	C839	C840	C874

RANGE 2–5 (450 – 512 MHz)

QA	CA	CB	CC	CD	CE*
Q803	C810	C811	N.U.	C812	N.U.
Q804	C819	C820	C821	C822	N.U.
Q805	C829	C830	C835	C836	C851
Q806	C831	C832	C837	C838	C852
Q807	C833	C834	C839	C840	C853

* CE IS PART OF HLN4040A CAPACITOR KIT.

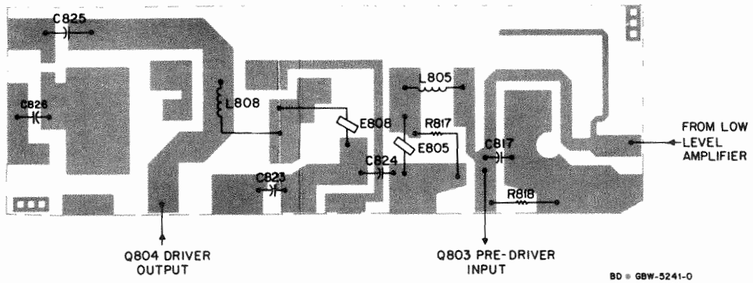
HLE4445A Transistor Kit 14W
HLE4447A Transistor Kit 50W, Range 2 & 3
HLE4448A Transistor Kit 50W, Ranges 2, 3, 4, & 5 MXW–5488–O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±10%, 100V (unless otherwise stated)		
C810,811	21–84366F04	30, ±5%, 250V (HLE4445A only)
C812	21–11078B27	30, ±5% (HLE4445A only)
C890–892	21–84366F04	30, ±5%, 250V
C893	21–84366F06	45, ±5%, 250V
transistor (see note)		
Q803	48–84411L36	NPN, type M1136 (HLE4445A only)
Q890	48–80225C02	NPN (HLE4447A only)
Q890	48–84411L29	NPN, type M1129 (HLE4448A only)
mechanical parts		
	07–80195B01	frame lead (2 used) (HLE4445A Only)
	07–80195B02	frame lead (2 used)
	04–80141B02	solder preform (2 used)

5/9/88

note: For best performance, order diodes, transistors, and integrated circuit devices by Motorola part number.

HLE4409A PREDRIVER

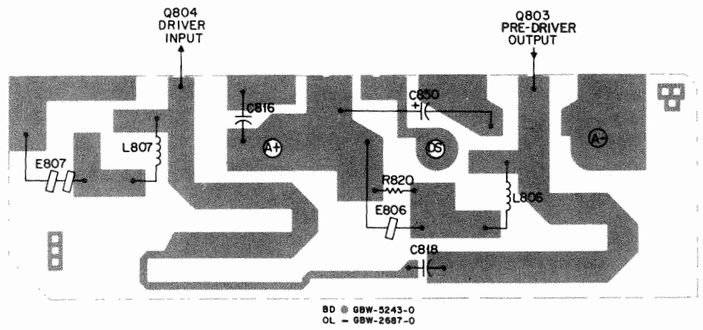


HLE4409A Pre–Driver MXW–2691–B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±5%, 100V (unless otherwise stated)		
C817	21–11078B05	4.7, ±.25 pF
C823	21–13740A55	100, 50V
C824	21–84547A13	10 uF, ±10%, 50V
C825	21–11078B42	100
coil, rf		
L805	24–80090G01	airwound
L808	24–80090G01	airwound
resistor, fixed, ohm, ±5%, 1/4 watt (unless otherwise stated)		
R817	06–11009C03	12
mechanical parts		
	76–82960B01	ferrite core

8/15/88

HLE4421A DRIVER

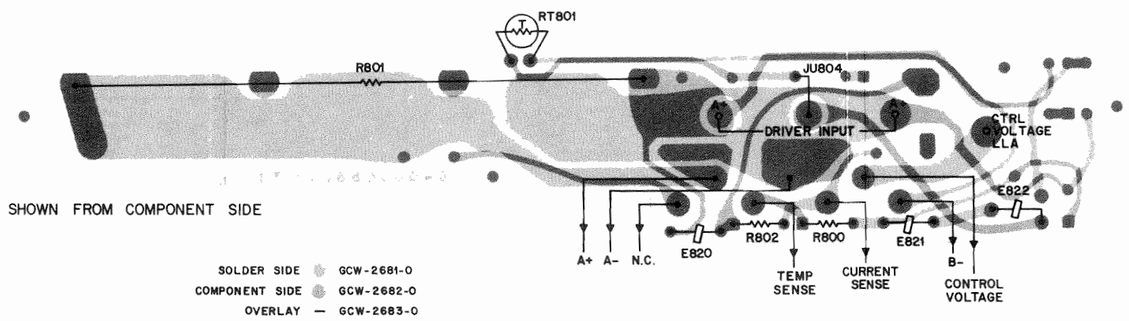


HLE4421A Driver MXW–2689–A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF ± 20%, 50V (unless otherwise stated)		
C816	21–13740A55	.01 uF
C818	21–05157A07	100
C850	23–82783B07	33 uF, 25V
coil, RF		
L806,807	24–80090G01	air wound
resistor, fixed, ohm, ±5%, 1/4 W (unless otherwise stated)		
R820	06–11009C18	51
mechanical parts		
E806	76–83960B01	ferrite core
E807	76–80178D02	ferrite core, 2 used

8/30/88

HLE4405A POWER DISTRIBUTION BOARD

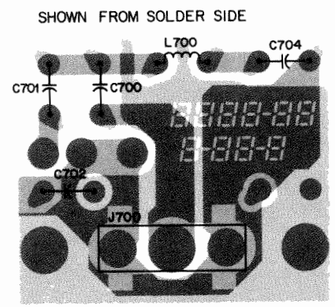


HLE4405A Power Distribution Board MXW–2694–A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
connector plug		
P804–807	09–80155A02	flat wafer connector (6 used)
resistor, fixed, ohm, ±5%, 1/4 watt (unless otherwise stated)		
R800	06–11009C49	1k
R801	17–82155M01	.012 shunt
R802	06–11009C50	1.1k
thermistor		
RT801	06–83600K09	100K green
mechanical parts		
	24–80036A02	1/2 turn ferrite choke (3 used)

5/9/88

HLN5119A LLA INTERFACE



HLN5119A Low Level Amplifier Interface Board MXW-2690-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed, pF ±5%, 100V unless otherwise stated
C700, C701	21-11014H25	10 ±.5 pF
C702	21-11014H32	20
C704	21-11014H28	13
		connector receptacle
J700	09-80001F01	phono jack
		coil, rf
L700	24-11030D02	coded orange
mechanical parts		
	29-80014A01	coaxial terminal clip

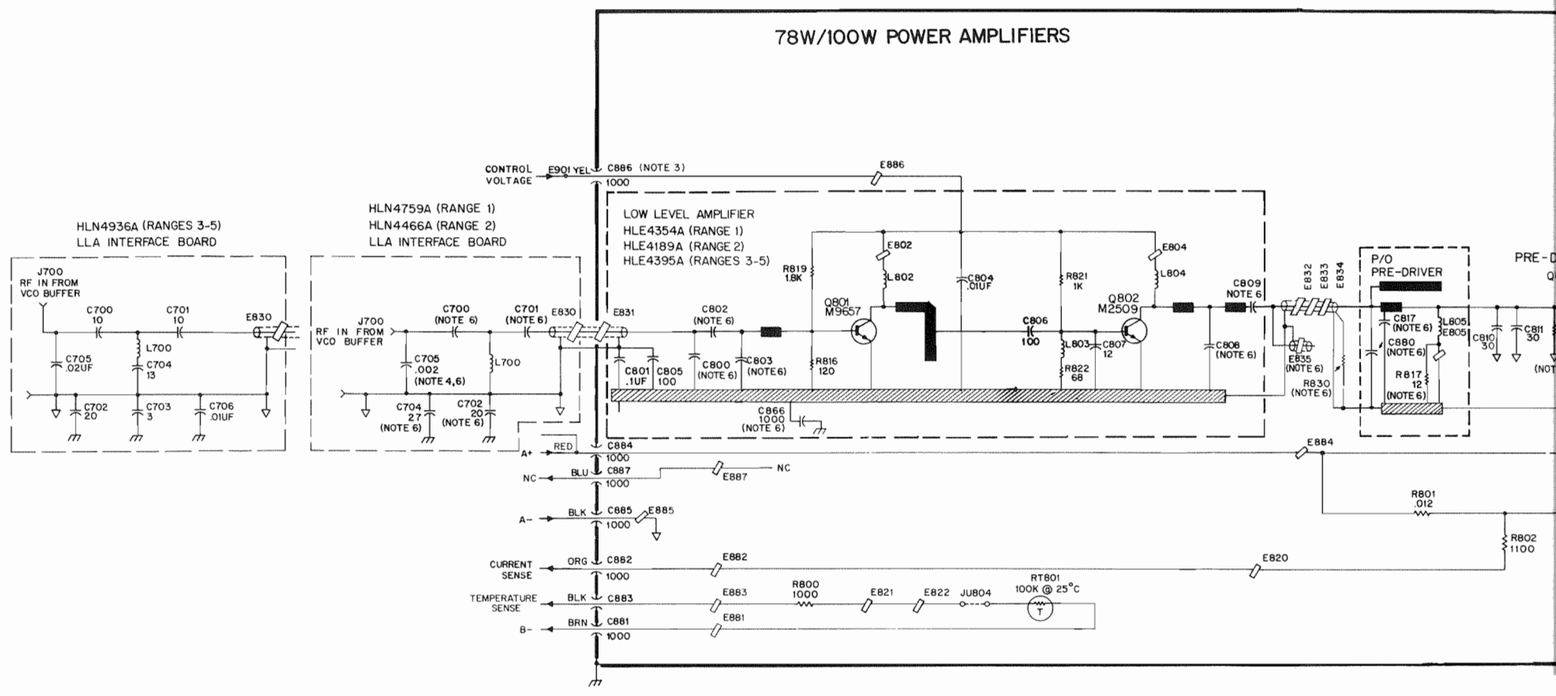
parts list

Associated Parts for 78/100 Power Amplifiers — MXW–0394–F

RANGE 1	2	3	4	5	REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
					capacitor, fixed, pF, ±10%, 100V (unless otherwise stated)		
				●	C705	21–82372C08	.02 uF, +80, –20%, 25V
				●	C706	21–83596E37	.01 uF, +70, –30%
●		●		●	C861	21–83596E13	.001 uF, 500V
	●				C861	21–82187B44	.001 uF
●	●				C862	21–82187B44	.001 uF
●	●				C863	21–83406D81	20, ±5%, 500V
●	●				C864	21–82187B44	.001 uF
				●	C864	21–13740A55	.01 uF
●					C865A	23–82783B08	1 uF, ±20%, 35V, tantalum
●	●				C865B	21–83460D75	1.5, ±.25 pF, 500V
●	●				C866	21–82187B44	.001 uF
●					C867	21–83596E10	220, ±20%, 500V
●				●	C867	21–11015B01	100
●		●			C868	21–82187B44	.001 uF
●		●			C869–871	23–82783B08	1 uF, ±20%, 35V
		●			C871	21–83596E18	.0015 uF, 500V
	●				C872–874	21–83406D69	30
				●	C875	21–82187B44	.001 uF
	●				C880	21–84873H66	4.7, ±.5 pF, 50V
	●				C881	21–82187B44	.001 uF
					ferrite bead		
●	●				E830–831	76–83466K01	core
●	●	●	●	●	E832–834	76–80164C01	core
●	●				E835	76–83466K01	core
●	●	●	●	●	E881–887	76–84069B04	core
					resistor, fixed, ohm, ±5%, 1/2 watt (unless otherwise stated)		
	●				R818	06–11045A25	100
			●		R818	06–11009C29	150, 1/4W
●					R818	06–00125A33	220
	●	●			R830	06–11045A09	22
	●				R860	06–80036611	2.7, 1/4W
					mechanical parts		
●	●	●	●	●		01–80244H01	PA shield assembly
●	●	●	●	●		03–10911A11	machine screw (M3 x .5 x 8), 10 used
●	●					03–10943M15	tapping screw (TT3.5 x .6 x 8), 5 used
●	●	●				03–10943M15	tapping screw (TT3.5 x .6 x 8), 8 used
●						03–10943M16	tapping screw (TT3.5 x .6 x 10), 3 used
	●	●	●	●		03–10943M16	tapping screw (TT3.5 x .6 x 10), 5 used
		●	●	●		03–80254F01	tapping screw (3.5 x 1.27 x 8)
●	●	●	●	●		07–80078A01	thermistor bracket
●	●	●	●	●		14–80135H01	insulator, PA hybrids, 2 used
●	●	●	●	●		14–80142A02	insulator, power distribution board
●	●	●	●	●		15–80001G01	directional coupler cover form
●	●	●	●	●		15–84827M01	harmonic filter cover
●	●	●	●	●		26–80254A01	low level amplifier heatsink
●						29–00005227	solder lug
●						29–00005294	solder lug, 2 used
●	●			●		29–80218D01	grounding lug, 2 used
			●			29–00005261	solder lug
	●					29–80218D01	grounding lug, 3 used
●	●					29–84093M01	solder lug, 3 used
				●		29–84093M01	solder lug, 1 used
●	●	●	●	●		32–80074B01	harmonic filter cover gasket
●	●	●	●	●		32–80084A01	stud device gasket, 3 used
●	●	●	●	●		32–80211F01	harmonic filter cover gasket
●	●	●	●	●		32–83896M01	RF gasket
●	●					42–10283A19	nylon cable clip
●	●	●	●	●		42–80137A02	substrate clip
●	●	●	●	●		42–84510M02	PA strap, 4 used
●	●	●	●	●		55–84300B04	handle
●	●	●	●	●		55–84300B05	directional coupler cover handle

8/25/88

note: For best performance, order diodes, transistors, and integrated circuit devices by Motorola part number.



HLN5145A Stability Kit — MXW–2936–B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±10%, 100V (unless otherwise stated)		
C8721	21–11015A07	.01 uF, +80, –20%
coil, rf		
L830	24–82723H44	.039 uH
resistor, fixed, ohm, ±5%, 1/2 watt (unless otherwise stated)		
R831	06–00125A18	51

5/9/88

HLN4040A Capacitor Kit (Range 2 Only) — MXW–5490–O

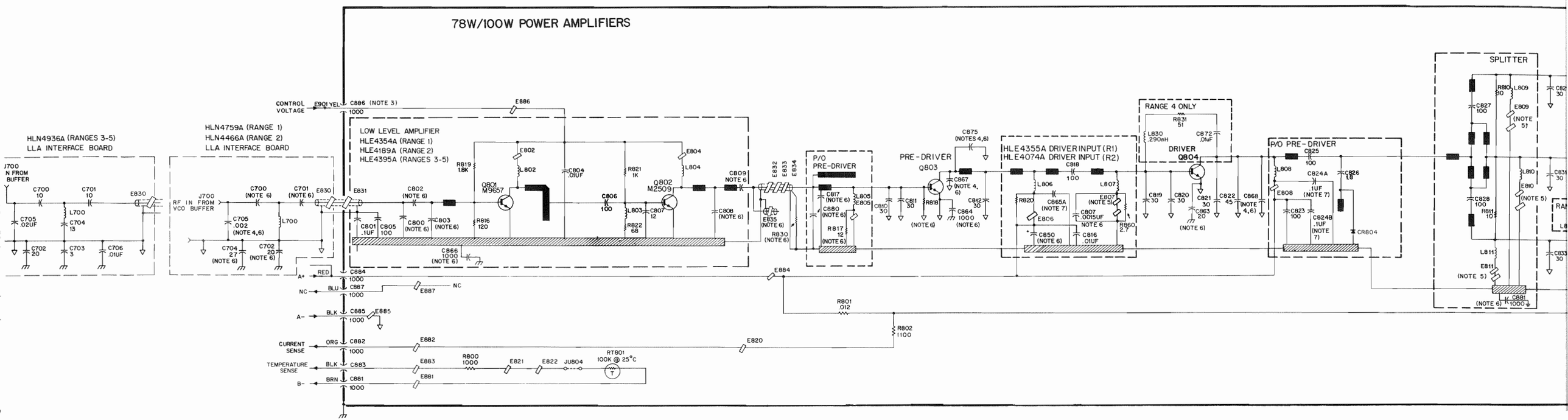
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±5%, 200V (unless otherwise stated)		
C851–853	21–84493B31	57

5/9/88

HLN4046A Feedthru Plate — MXW–4502–A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, 500V (unless otherwise stated)		
C881–887	21–82812H03	100, +100, –0%
	mechanical parts	
	64–80005A01	feedthru plate
	04–83755H01	solder washer, 7 used

5/9/88



LN5145A Stability Kit — MXW–2936–B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
apacitor, fixed, pF, ±10%, 100V (unless otherwise stated)		
8721	21–11015A07	.01 uF, +80, –20%
oil, rf		
830	24–82723H44	.039 uH
esistor, fixed, ohm, ±5%, 1/2 watt (unless otherwise stated)		
831	06–00125A18	51

5/9/88

LN4040A Capacitor Kit (Range 2 Only) — MXW–5490–O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
apacitor, fixed, pF, ±5%, 200V (unless otherwise stated)		
851–853	21–84493B31	57

5/9/88

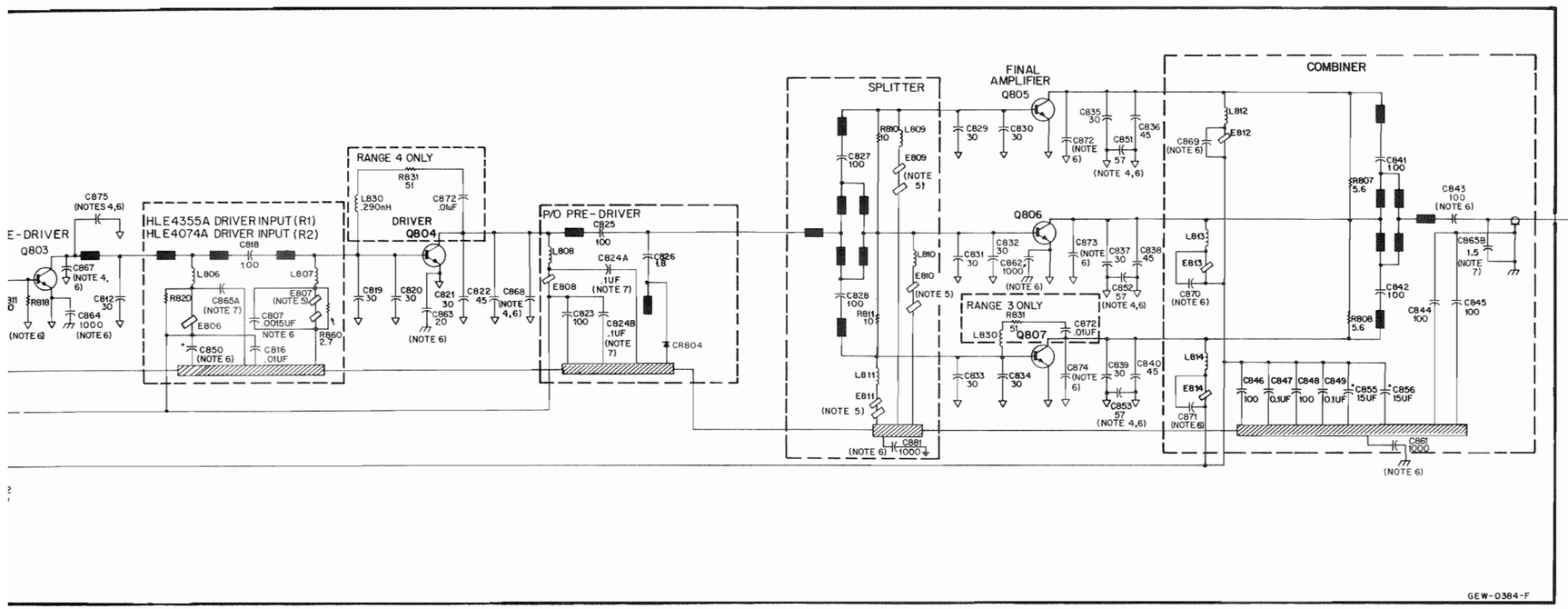
LN4046A Feedthru Plate — MXW–4502–A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
apacitor, fixed, pF, 500V (unless otherwise stated)		
881–887	21–82812H03	100, +100, –0%
	mechanical parts	
	64–80005A01	feedthru plate
	04–83755H01	solder washer, 7 used

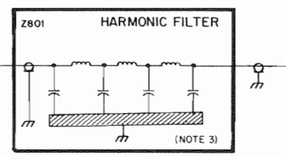
5/9/88

Power Amplifier

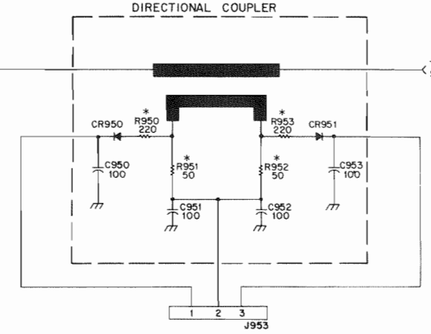
100 Watt: Range 1 (406–420 MHz)
Range 2 (450–470 MHz)
78 Watt: Range 3 (470–488 MHz)
Range 4 (482–500 MHz)
Range 5 (494–512 MHz)

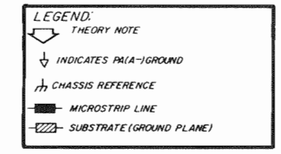


HFE4015A (RANGE 1)
HFE4013A (RANGES 2-4)
HFE4016A (RANGE 5)

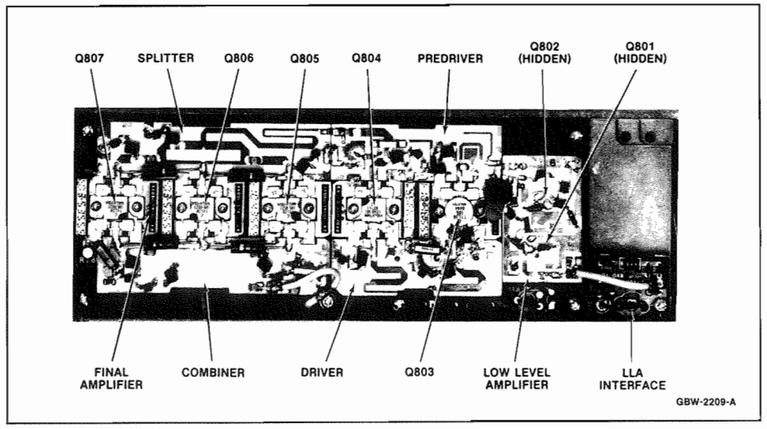


HLE4175A
DIRECTIONAL COUPLER





NOTES:
1. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR VALUES ARE IN OHMS, AND ALL CAPACITOR VALUES ARE IN PICOFARADS.
2. COMPONENTS MARKED WITH AN ASTERISK ARE SCREENED DIRECTLY UPON THE SUBSTRATE AND ARE NOT FIELD REPLACEABLE.
3. SEVEN FEEDTHRU CAPACITORS (C881–C887) AND ONE HARMONIC FILTER ARE UNDERNEATH THE CIRCUIT BOARD, AND CAN BE REACHED ONLY FROM THE BOTTOM OF THE RADIO.
4. IF CAPACITORS C705, C706, C851–853, C867, AC868, OR C875 HAVE TO BE REPLACED, MAKE CERTAIN THAT THE LEADS OF THE REPLACEMENT CAPACITOR ARE THE SAME LENGTH AS THOSE OF THE CAPACITOR BEING REPLACED.
5. E807 THROUGH E811 ARE FERRITE BEADS. RANGE 1 USES TWO (MOTOROLA PART NO. 76–80178D02) AND RANGES 2–5 USE ONLY ONE (MOTOROLA PART NO. 76–83960B01).
6. COMPONENT VALUE IS RANGE SENSITIVE AND MAY NOT BE USED IN EVERY RANGE. SEE THE PARTS LIST.
7. COMPONENT LOCATION IS RANGE DEPENDENT. SUFFIX A IS FOR RANGE 1 ONLY AND SUFFIX B IS FOR RANGE 2 ONLY.



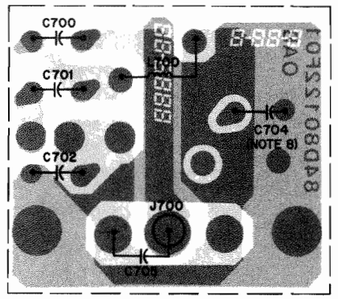
Schematic, Circuit Board Diagrams, and
Parts Lists for 78/100 Watt Power Amplifier
PW–0871–G
(Sheet 1 of 2)
8/30/88

Power Amplifier

100 Watt: Range 1 (406–420 MHz)
Range 2 (450–470 MHz)
78 Watt: Range 3 (470–488 MHz)
Range 4 (482–500 MHz)
Range 5 (494–512 MHz)

LLA INTERFACE
HLN4759A (RANGE 1)
HLN4466A (RANGE 2)
HLN4936A (RANGES 3-5)

SHOWN FROM SOLDER SIDE



SOLDER SIDE — GBW-0429-O
COMPONENT SIDE — GBW-0430-O
OVERLAY — GBW-0431-C

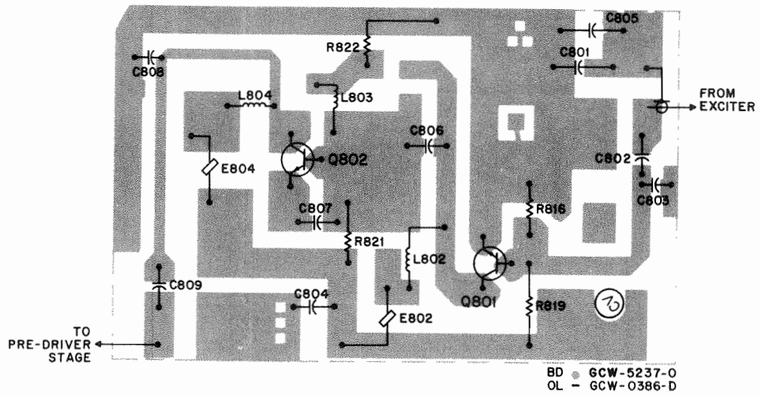
HLN4759A Low-Level Amplifier Interface Board (Range 1)
HLN4466A Low-Level Amplifier Interface Board (Range 2, 100W)
HLN4936A Low-Level Amplifier Interface Board (Ranges 3-5, 78W) MXW-0395-D

RANGE 1	2	3	4	5	REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
							capacitor, fixed, pF ±0.25 pF, 100V unless otherwise specified
●	–	–	–	–	C700	21-11014H15	3.9
–	●	–	–	–	C700	21-11014H16	4.3
–	–	●	●	●	C700	21-11014H25	10 ±0.5 pF
●	–	–	–	–	C701	21-11014H12	3.0
–	●	–	–	–	C701	21-11014H16	4.3
–	–	●	●	●	C701	21-11014H25	10 ±0.5 pF
–	●	●	●	●	C702	21-11014H32	20
–	–	●	●	●	C703	21-11014H12	3
●	–	–	–	–	C704	21-11014H35	27
–	–	●	●	●	C704	21-11014H28	13
–	–	●	●	●	C705	21-82428B36	.002 µF ±10%, 200V
–	●	–	–	–	C705	21-82372C08	.02 µF +80, –20%, 25V
–	–	●	●	●	C706	21-83596E37	.01 µF +70, –30%
							connector reeptacle
●	●	●	●	●	J700	09-80001F01	phono jack
							coil, RF
●	–	–	–	–	L700	24-83884G07	choke
–	●	–	–	–	L700	24-83884G03	choke
–	–	●	●	●	L700	24-11030D02	coded orange
							mechanical part
						29-80014A01	coaxial terminal clip

8/19/86

note: For best performance, order diodes, transistors, and integrated circuits by Motorola part number.

LOW LEVEL AMPLIFIER
HLE4354A (RANGE 1)
HLE4189A (RANGE 2)
HLE4395A (RANGE 3-5)



BD — GCW-5237-O
OL — GCW-0386-D

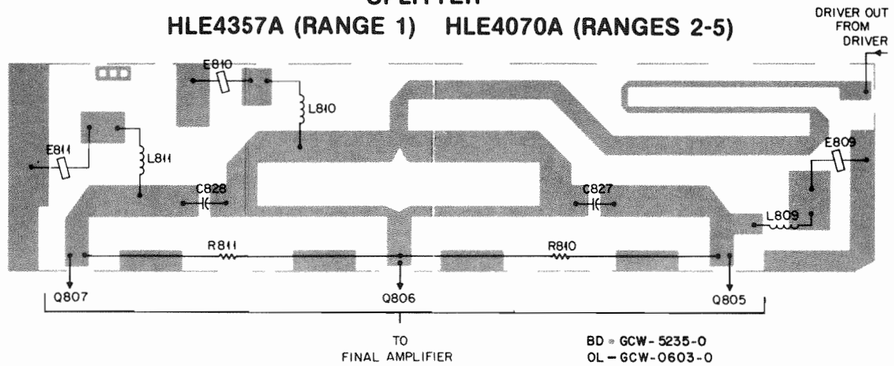
HLE4354A Low Level Amplifier (Range 1)
HLE4189A Low Level Amplifier (Range 2, 100W)
HLE4395A Low Level Amplifier (Ranges 3–5, 78W) MXW-0390-D

RANGE 1	2	3	4	5	REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
							capacitor, fixed, pF ±5%, 50V (unless otherwise stated)
●					C800	21–84873H75	7, ±.25 pF
●	●	●	●	●	C801	21–84547A24	0.1uF, ±20%, 25V
●					C802	21–13740A64	240
	●	●	●	●	C802	21–13740A55	100
●					C803	21–84873H75	7, ±.25 pF
	●				C803	21–05632D37	240, 25V
		●	●	●	C803	21–84873h21	5.1
●	●	●	●	●	C804	21–84547A05	0.01 uF, ±20%
●	●	●	●	●	C805	21–11078B42	100, 100V
●	●	●	●	●	C806	21–13740A55	100, ±20%
●	●	●	●	●	C807	21–13740A31	12, ± 10%
		●	●	●	C808	21–05632D37	7.7, .25, 25V
●	●				C809	21–13740A55	100
		●	●	●	C809	21–05157A86	43
	●				C893	23–84762H04	2.2uF, +20%, 25V, tantalum
							coil, RF
●	●	●	●	●	L802	24–80092G60	airwound
●	●	●	●	●	L803–804	24–80090G02	airwound
							transistor (see note)
●	●	●	●	●	Q801	48–00869657	NPN, type M9657
●	●	●	●	●	Q802	48–80225C09	NPN, type M25C09
							resistor, fixed, Ω ±5%, 1/4 watt (unless otherwise stated)
●	●	●	●	●	R816	06–11009C27	120
●	●	●	●	●	R819	06–11009C55	1.8k
●	●	●	●	●	R821	06–11009C49	1k
●	●	●	●	●	R822	06–11009C21	68
							mechanical parts
●	●	●	●	●		76–83960B01	ferrite bead, 2–used

8/30/88

note: For best performance, order diodes, transistors, and integrated circuits by Motorola part number.

SPLITTER
HLE4357A (RANGE 1) HLE4070A (RANGES 2-5)



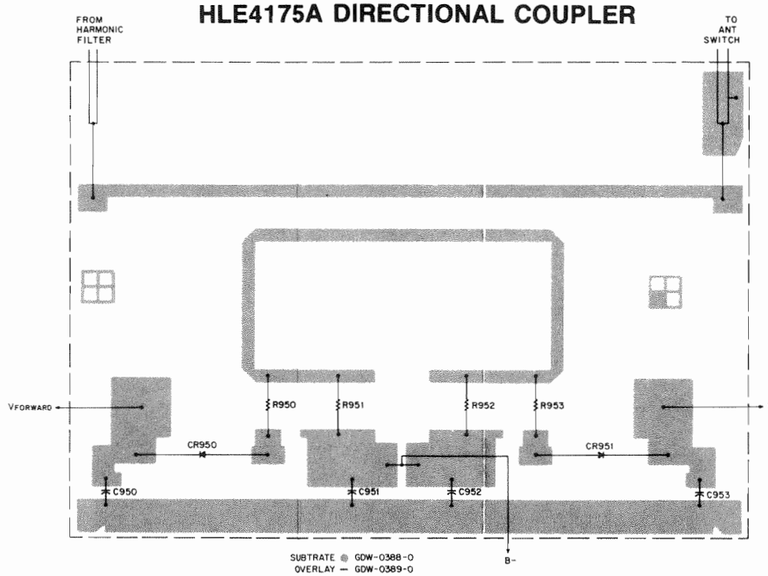
BD = GCW-5235-O
OL = GCW-0603-O

HLE4357A Splitter Substrate (Ranges 2, 3, 4, & 5) MXW-0892-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±5%, 100V (unless otherwise stated)		
C827–828	21–11078B42	100
coil, rf		
L809–811	24–80090G01	airwound
resistor, fixed, ohm, ±10%, 1 watt (unless otherwise stated)		
R811	06–00126C01	10 (Range 2, 3, 4, 5)
mechanical parts		
E809–E811	76–83960B01	ferrite core (Ranges 2, 3, 4, & 5)
	76–80187D02	ferrite core (Range 1)

5/12/88

HLE4175A DIRECTIONAL COUPLER

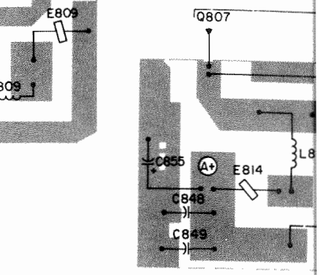


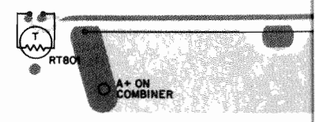
SUBTRATE — GDW-0388-O
OVERLAY — GDW-0389-O

HLE4175A Directional Coupler MXW-0396-D

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±20%, 100V (unless otherwise stated)		
C950–953	21–13740A55	100
connector plug		
P952	15–84301K01	3–contact
mechanical parts		
	07–80168F01	directional coupler frame
	29–83208M01	solder lugs (3 used)
	64–83403M01	substrate
	39–82717M01	receptacle contact
	42–10217A02	tie strap .091X3.62

8/15/88



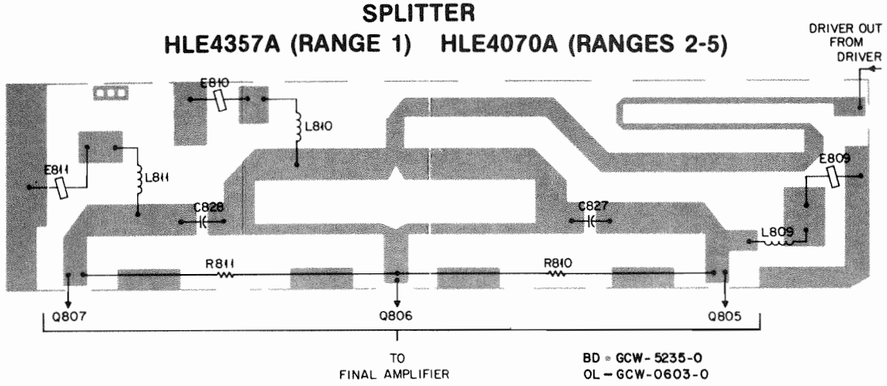


SHOWN FRO

SOLDER SIDE — GCW-5238-A
COMPONENT SIDE — GCW-5236-A
OVERLAY — GCW-0383-A

Schematic, Circuit Board Diagrams, and
Parts Lists for 78/100 Watt Power Amplifier
PW–0871–G
(Sheet 2 of 2)
8/30/88

SPLITTER
HLE4357A (RANGE 1) HLE4070A (RANGES 2-5)

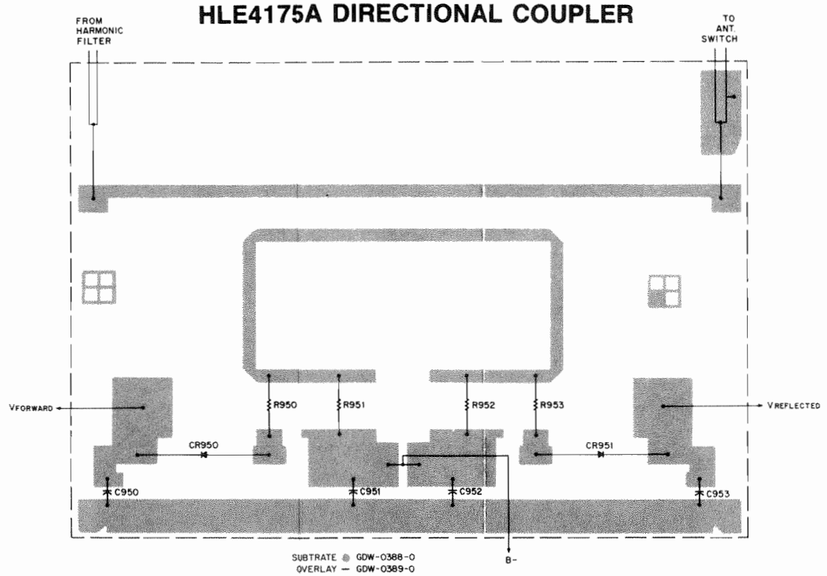


HLE4357A Splitter Substrate (Ranges 2, 3, 4, & 5) MXW–0892–C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±5%, 100V (unless otherwise stated)		
C827–828	21–11078B42	100
coil, rf		
L809–811	24–80090G01	airwound
resistor, fixed, ohm, ±10%, 1 watt (unless otherwise stated)		
R811	06–00126C01	10 (Range 2, 3, 4, 5)
mechanical parts		
E809–E811	76–83960B01	ferrite core (Ranges 2, 3, 4, & 5)
	76–80187D02	ferrite core (Range 1)

5/12/88

HLE4175A DIRECTIONAL COUPLER

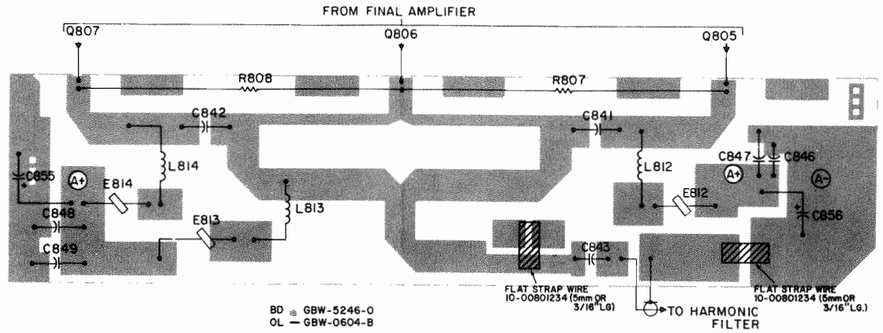


HLE4175A Directional Coupler MXW–0396–D

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±20%, 100V (unless otherwise stated)		
C950–953	21–13740A55	100
connector plug		
P952	15–84301K01	3–contact
mechanical parts		
	07–80168F01	directional coupler frame
	29–83208M01	solder lugs (3 used)
	64–83403M01	substrate
	39–82717M01	receptacle contact
	42–10217A02	tie strap .091X3.62

8/15/88

COMBINER
HLE4155A (RANGE 1)
HLE4065A (RANGES 2 AND 3)
HLE4066A (RANGES 4 AND 5)



HLE4155A Combiner Substrate (Range 1)
HLE4065A Combiner Substrate (Ranges 2, & 3)
HLE4066A Combiner Substrate (Ranges 4, & 5) MXW–0391–E

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±5%, 100V (unless otherwise stated)		
C841–842	21–11078B42	100
C843	21–11078B36	56 (HLE4155A only)
C843	21–11078B42	100 (HLE4065A & HLE4066A only)
C844–845	21–11078B42	100
C846	21–13740A55	100, 50V
C847	21–84547A13	.1 uF, 10% 50V
C848	21–13740A55	100, 50V
C849	21–84547A13	.1 uF, 10% 50V
C855–856	23–82783B24	15 uF, ±10%, 25V, tantalum
resistor, fixed, ohm, ±10%, 1 watt (unless otherwise stated)		
R807–808	06–00126D63	5.6 (HLE4066A & HLE4155A only)
coil, rf		
L812–814	24–80090G01	airwound
mechanical parts		
	76–83960B01	ferrite core (3 used)

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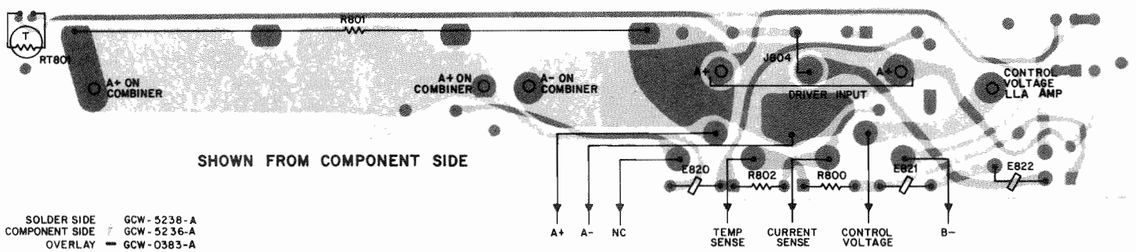
HLE4345A POWER DISTRIBUTION BOARD

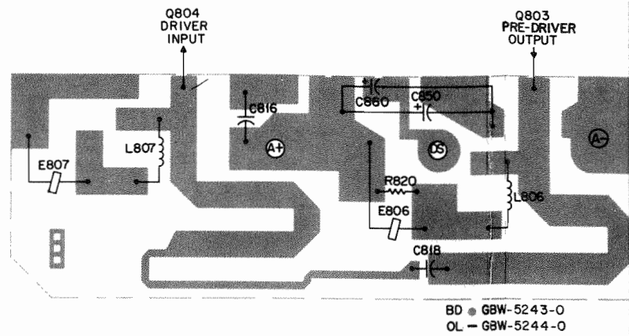


HLE4345A Power Distribution Board MXW–0869–C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
connector plug		
P801–807	09–80155A02	flat wafer
resistor, fixed, ohm, ±5%, 1/4 watt (unless otherwise stated)		
R800	06–11009C49	1k
R801	17–82155M01	shunt, .012
R802	06–11009C50	1.1k
thermistor		
RT801	06–83600K09	100k, ±15%
mechanical parts		
	24–80036A02	1/2 turn ferrite choke (3 used)
	75–80054F01	compression pad

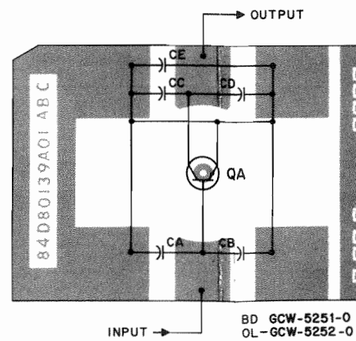
5/9/88

DRIVER INPUT
HLE4355A (RANGE 1)
HLE4074A (RANGES 2,3,5)
HLE4421A (RANGE 4)

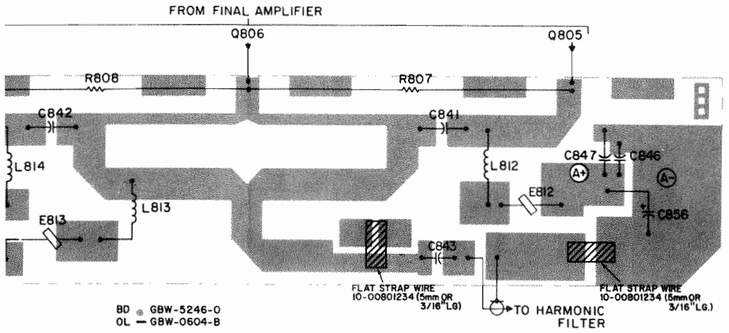


HLE4074A Driver Input Substrate (Ranges 2, 3, & 5)
HLE4355A Driver Input Substrate (Range 1)
HLE4421A Driver Input Substrate (Range 4) MXW–5

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±20%, 50V (unless otherwise stated)		
C816	21–84547A05	.01 uF
C818	21–13740A55	100
C850	23–82783B24	15 uF, ±10%, 25V, tantalum (HLE4
C850	23–82783B07	33 uF, ±20%, 25V, tantalum (HLE4355A/4421A)
C860	23–82783B24	15 uF, ±10%, 25V, tantalum (HLE4
C865	23–82783B08	1 uF, 35V, tantalum (HLE4355A)
coil, rf		
L806–807	24–80090G01	airwound
resistor, fixed, ohm, ±5%, 1/4 watt (unless otherwise stated)		
R820	06–11009C18	51 (HLE4421A)
mechanical parts		
E806	76–83960B01	ferrite core
E807	76–83960B01	ferrite core (HLE4074A)
E807	76–80178D02	ferrite core (HLE4355A/4421A)



COMBINER
HLE4155A (RANGE 1)
HLE4065A (RANGES 2 AND 3)
HLE4066A (RANGES 4 AND 5)



HLE4155A Combiner Substrate (Range 1)
HLE4065A Combiner Substrate (Ranges 2, & 3)
HLE4066A Combiner Substrate (Ranges 4, & 5) MXW–0391–E

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±5%, 100V (unless otherwise stated)		
C841–842	21–11078B42	100
C843	21–11078B36	56 (HLE4155A only)
C843	21–11078B42	100 (HLE4065A & HLE4066A only)
C844–845	21–11078B42	100
C846	21–13740A55	100, 50V
C847	21–84547A13	.1 uF, 10% 50V
C848	21–13740A55	100, 50V
C849	21–84547A13	.1 uF, 10% 50V
C855–856	23–82783B24	15 uF, ±10%, 25V, tantalum
resistor, fixed, ohm, ±10%, 1 watt (unless otherwise stated)		
R807–808	06–00126D63	5.6 (HLE4066A & HLE4155A only)
coil, rf		
L812–814	24–80090G01	airwound
mechanical parts		
	76–83960B01	ferrite core (3 used)

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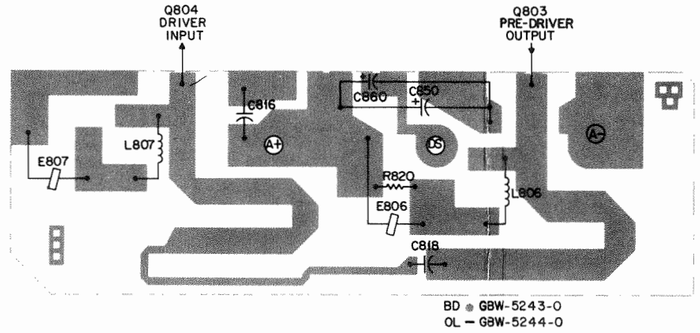
DRIVER INPUT
HLE4355A (RANGE 1)
HLE4074A (RANGES 2,3,5)
HLE4421A (RANGE 4)



HLE4074A Driver Input Substrate (Ranges 2, 3, & 5)
HLE4355A Driver Input Substrate (Range 1)
HLE4421A Driver Input Substrate (Range 4) MXW–5489–A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±20%, 50V (unless otherwise stated)		
C816	21–84547A05	.01 uF
C818	21–13740A55	100
C850	23–82783B24	15 uF, ±10%, 25V, tantalum (HLE4074A)
C850	23–82783B07	33 uF, ±20%, 25V, tantalum (HLE4355A/4421A)
C860	23–82783B24	15 uF, ±10%, 25V, tantalum (HLE4074A)
C865	23–82783B08	1 uF, 35V, tantalum (HLE4355A)
coil, rf		
L806–807	24–80090G01	airwound
resistor, fixed, ohm, ±5%, 1/4 watt (unless otherwise stated)		
R820	06–11009C18	51 (HLE4421A)
mechanical parts		
E806	76–83960B01	ferrite core
E807	76–83960B01	ferrite core (HLE4074A)
E807	76–80178D02	ferrite core (HLE4355A/4421A)

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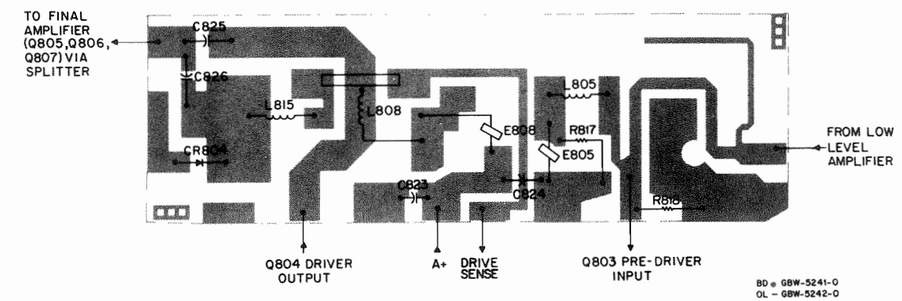
PREDRIVER
HLE4356A (RANGE 1)
HLE4079A (RANGES 2,3,5)
HLE4422A (RANGE 4)



HLE4356A Pre–Driver Substrate (Range 1)
HLE4422A Pre–Driver Substrate (Range 4)
HLE4079A Pre–Driver Substrate (Ranges 2, 3, & 5) MXW–0393–F

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±5%, 50V (unless otherwise stated)		
C817	21–11078B05	4.7, ±.25 pF, 100V
C817	21–11078B15	12, 100V (Range 1 only)
C823	21–13740A55	100
C824	21–84547A13	.1 uF, 10%
C825	21–11078B42	100, 100V
C825	21–11078B10	7.5, ±.25 pF, 100V (Range 1 only)
C826	21–05632D43	1.8, ±.25 pF
diode (see note)		
CR804	48–84616A11	hot carrier (Range 1 only)
coil, rf		
L805,808	24–80090G01	airwound
mechanical parts		
	76–83960B01	ferrite core (Ranges 2,3,5 only)
	76–80178D02	ferrite core (Range 1 & 4 only)
	76–83960B01	ferrite core
	55–80065B01	driver/limiter strap

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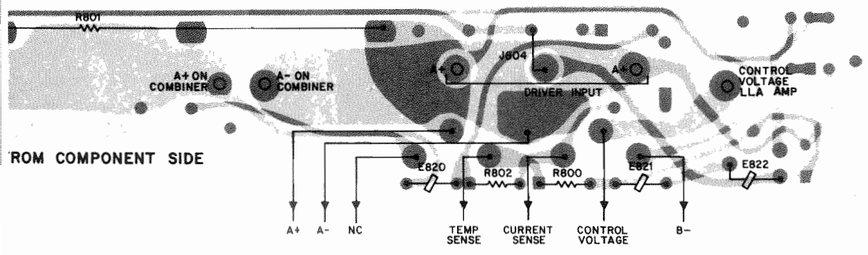
note: For best performance, order diodes, transistors, and integrated circuit devices by Motorola part number.

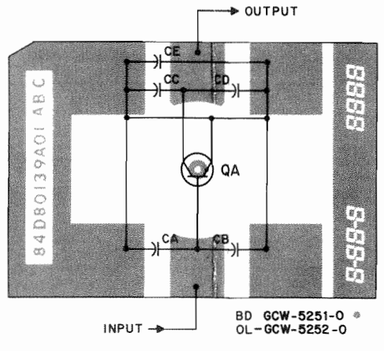
HLE4345A POWER DISTRIBUTION BOARD



HLE4345A Power Distribution Board MXW–0869–C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
connector plug		
P801–807	09–80155A02	flat wafer
resistor, fixed, ohm, ±5%, 1/4 watt (unless otherwise stated)		
R800	06–11009C49	1k
R801	17–82155M01	shunt, .012
R802	06–11009C50	1.1k
thermistor		
RT801	06–83600K09	100k, ±15%
mechanical parts		
	24–80036A02	1/2 turn ferrite choke (3 used)
	75–80054F01	compression pad

5/9/88



HLE4452A

QA	CA	CB	CC	CD	CE
Q803	C810	C811	N.U.	C812	N.U.
Q804	C819	C820	C821	C822	N.U.
Q805	C829	C830	C835	C836	C851
Q806	C831	C832	C837	C838	C852
Q807	C833	C834	C839	C840	C853

TRANSISTOR SUBSTRATE

HLE4446A Power Transistor Kit 50W (Range 1)
HLE4447A Power Transistor Kit 50W (Ranges 2 &3)
HLE4448A Power Transistor Kit 50W (Ranges 2, 3, 4, & 5) MXW–5063–O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±5%, 250V (unless otherwise stated)		
C890–892	21–84366F04	30
C893	21–84366F06	45
transistor (see note)		
Q890	48–80225C01	NPN (HLE4446A)
Q890	48–80225C02	NPN (HLE4447A)
Q890	48–84411L29	NPN, type M1129 (HLE4448A)
mechanical parts		
	07–80195B02	lead frame (2 used)
	04–80141B02	solder preform (2 used)

5/9/88

note: For best performance, order diodes, transistors, and integrated circuit devices by Motorola part number.