

NOTES

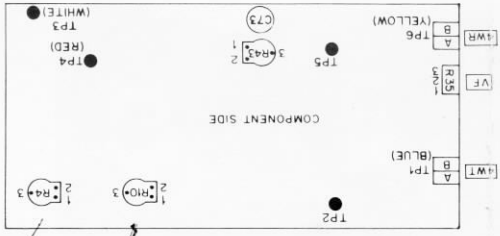
- 1 ALL MEASUREMENTS IN DBM(SVM) UNLESS OTHERWISE SPECIFIED
- 2 ALL MEASUREMENTS IN DBM(SVM) UNLESS OTHERWISE SPECIFIED
- 3 VARIABLE INDUCTIVE LOADS FOR SIGNALS FROM TRANSMITTER
- 4 POTENTIOMETER FOR CARRIER LEVEL ADJUSTMENT
- 5 POTENTIOMETER FOR TEST TONE LEVEL ADJUSTMENT
- 6 POTENTIOMETER FOR TEST TONE LEVEL ADJUSTMENT
- 7 VARIABLE CAPACITOR FOR FREQUENCY ADJUSTMENT
- 8 RANGE SWITCH FOR FREQUENCY SELECTION
- 9 POTENTIOMETER FOR DETECTOR GAIN ADJUSTMENT
- 10 ALL LEVELS ARE RECEIVING STATION

CIRCUIT	U15	U15	U15	U17	U17
U15					
U15					
U15					
U17					
U17					

PULSE TABLE NOTES

- 1 ALL PULSES ARE 100 NS
- 2 THESE CONDITIONS ARE FOR MAINTENANCE ONLY

MLN6287A Channel Modem
Block and AC Level Diagram
Motorola No. EPPS-27854-0
10/1/79-PHI

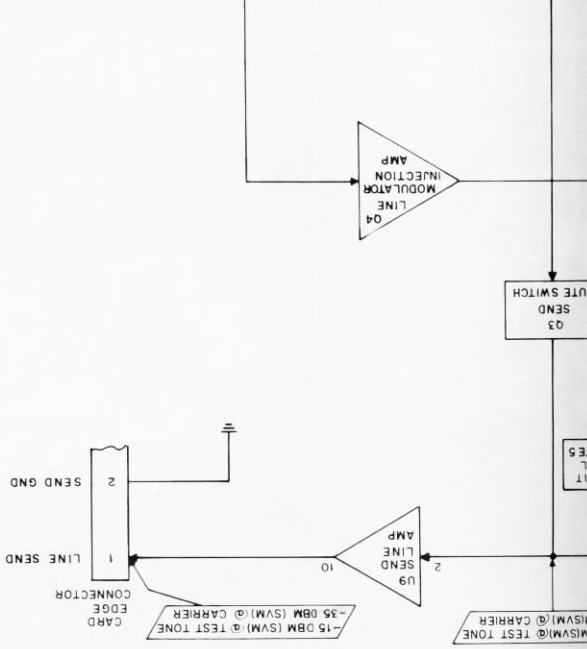
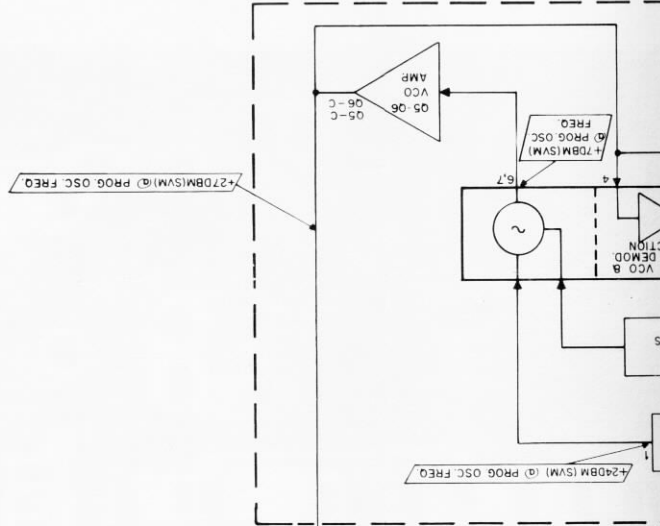
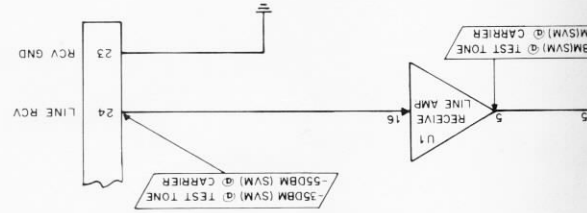


- 1 ALL PULSES ARE APPROXIMATELY 15 VOLTS PEAK TO PEAK
- 2 THESE CONDITIONS REPRESENT NORMAL PROGRAMMABLE OSCILLATOR OPERATION IF CONDITIONS OTHER THAN THESE ARE OBSERVED REFER TO MAINTENANCE SECTION

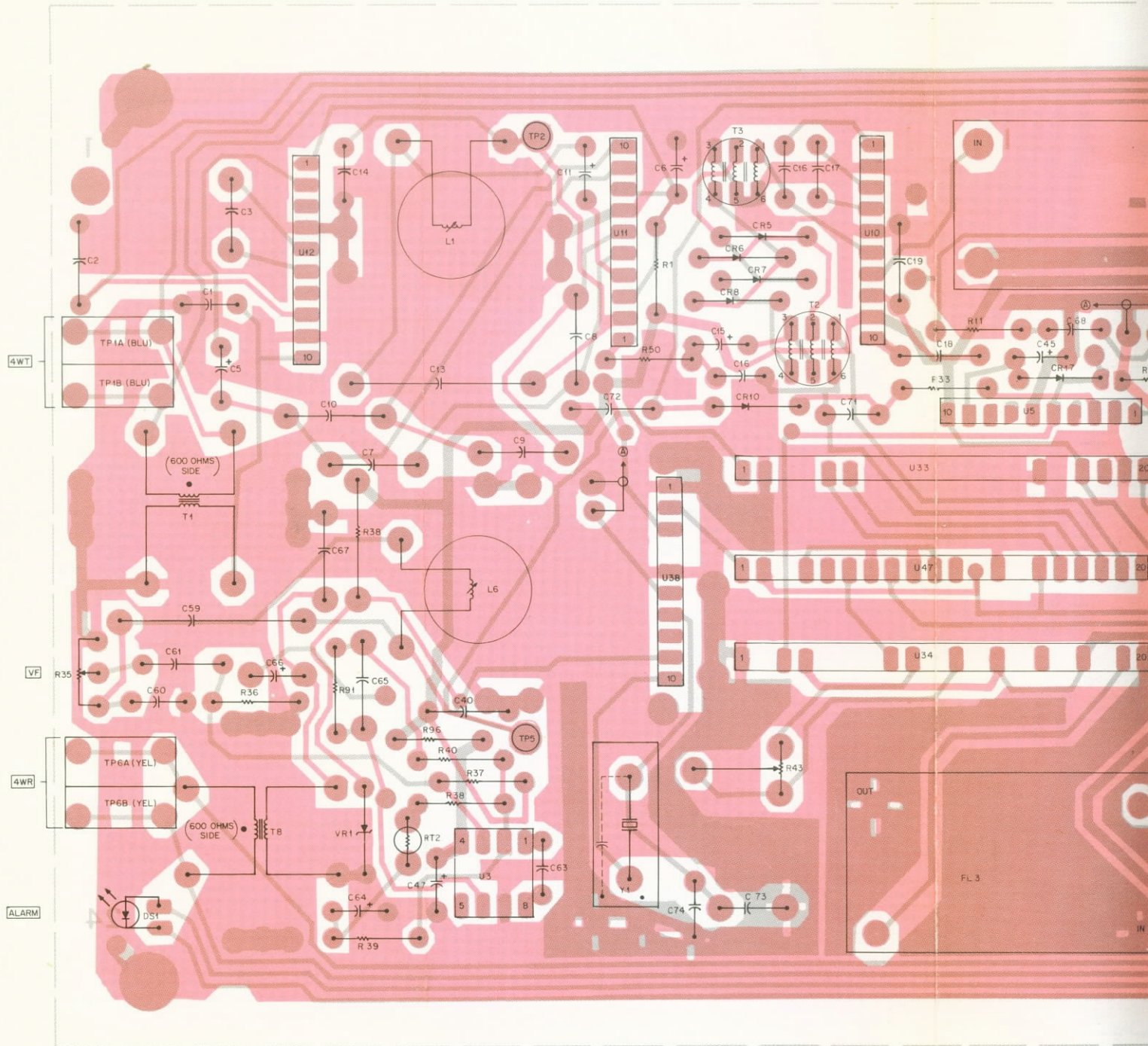
TABLE OF PULSES

CIRCUIT	PIN	DURATION (US)	PERIOD (US)	SHAPE
U15	1	0.75	19.2	TT
U15	2,3	0.75	250	TT
U15	14	0.10	250	TT
U17	6	REPEATING PULSE PATTERN THAT DEPENDS ON PROG. OSC. FREQ.		
U17	12	25 TO 50 DEPENDS ON PROG. OSC. FREQ.	250	
U17	15	125	250	

- 1 ALL MEASUREMENTS MARKED (WBVM) ARE MADE WITH A BRIDGING WIDEBAND AC VOLTMETER WITH A DB SCALE CALIBRATED FOR DBM INTO 600 OHMS (MOTOROLA S1053C OR EQUIVALENT).
- 2 ALL MEASUREMENTS MARKED (SVM) ARE MADE WITH A BRIDGING FREQUENCY SELECTIVE VOLTMETER WITH A DB SCALE CALIBRATED FOR DBM INTO 75 OHMS (CUSHMAN 211A PROBE WITH CE21A SELECTIVE VOLTMETER OR EQUIVALENT).
- 3 VARIABLE INDICATORS 1 & 2 ARE ADJUSTED TO NOTCH OUT 4 KHZ FROM THE VFSIGNALS FOR DETAILS REFER TO THE CHANNEL MODEM SECTION.
- 4 POTENTIOMETER R40 IS USED TO SET THE LEVEL OF THE REINSERTED CARRIER FOR FURTHER DETAILS REFER TO THE SYSTEM ADJUSTMENTS SECTION.
- 5 POTENTIOMETER R4 IS USED TO SET THE LINE SEND LEVEL FOR FURTHER DETAILS REFER TO THE SYSTEM ADJUSTMENTS SECTION.
- 6 POTENTIOMETER R35 IS USED TO SET THE VFS RECEIVE LEVEL FOR FURTHER DETAILS REFER TO THE SYSTEM ADJUSTMENTS SECTION.
- 7 VARIABLE CAPACITOR C73 IS USED TO SET THE FREQUENCY OF THE 5.2 MHZ OSCILLATOR FOR FURTHER DETAILS REFER TO THE CHANNEL MODEM SECTION.
- 8 RANGE SWITCHES ARE USED TO ADJUST THE FREQUENCY RANGE OF THE VCO FOR FURTHER DETAILS REFER TO THE SYSTEM ADJUSTMENTS SECTION.
- 9 POTENTIOMETER R43 IS USED TO SET THE SENSITIVITY LEVEL OF THE LEAD DETECTOR FOR FURTHER DETAILS REFER TO THE SYSTEM ADJUSTMENTS SECTION.
- 10 ALL LEVELS ARE NOMINAL AND ASSUME THAT THE MODEM IS SENDING AND RECEIVING STANDARD TEST TONE AND SIGNALING CARRIER LEVELS.



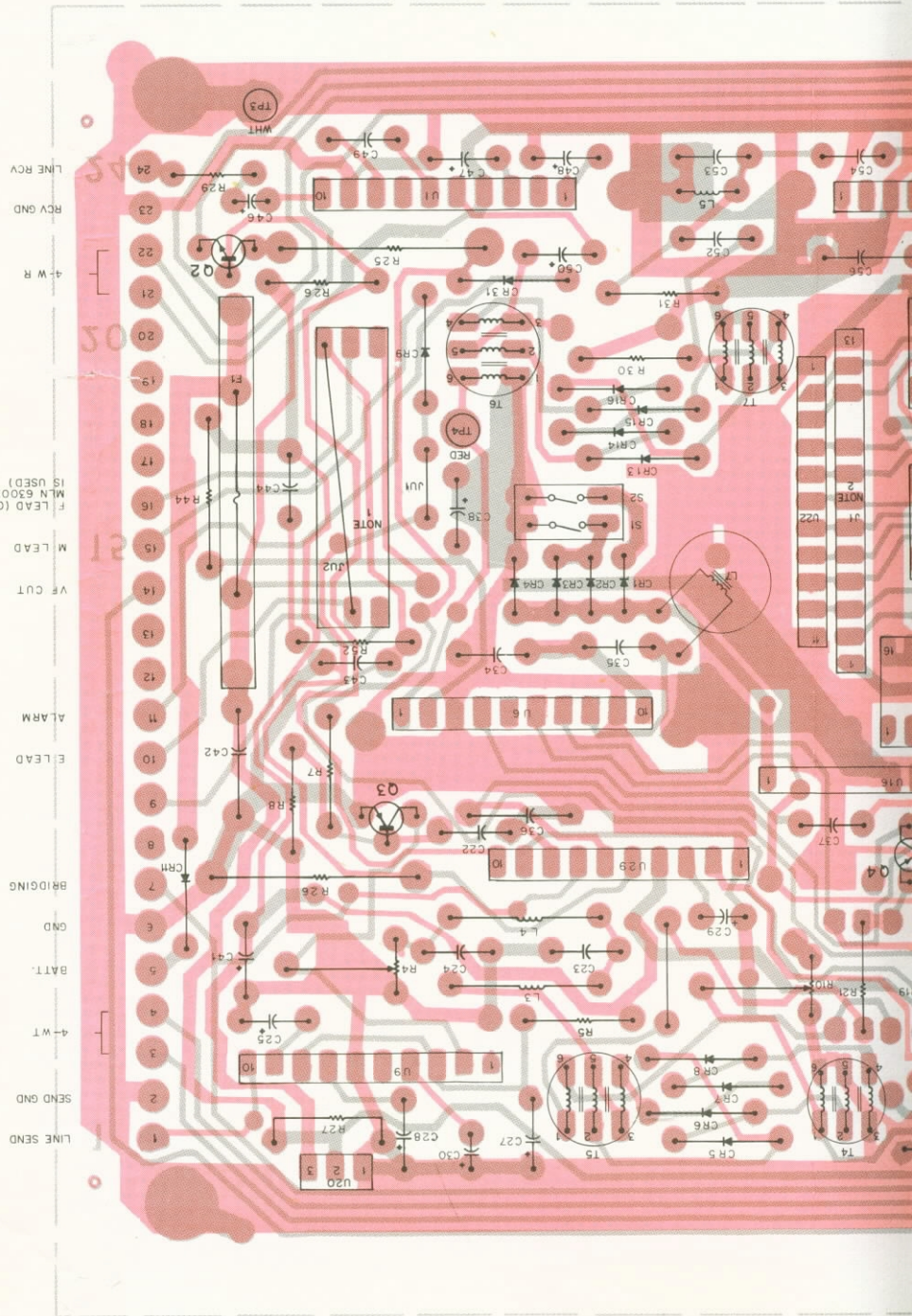
EPPS-27854-0



SHOWN FROM COMPONENT SIDE

MLN6287A Channel Modem
 Circuit Board Detail, Schematic
 Diagram, and Parts List
 (Sheet 1 of 3)
 Motorola No. PEPS-27859-0
 10/1/79-PHI

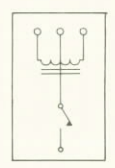
SOLDER SIDE ● BD-EFPS-27855-0
 COMPONENT SIDE ● BD-EFPS-27856-0
 OL-EFPS-27857-0



LOCATION DETAIL FOR
 STAMPING POINTS
 (COMPONENT SIDE)

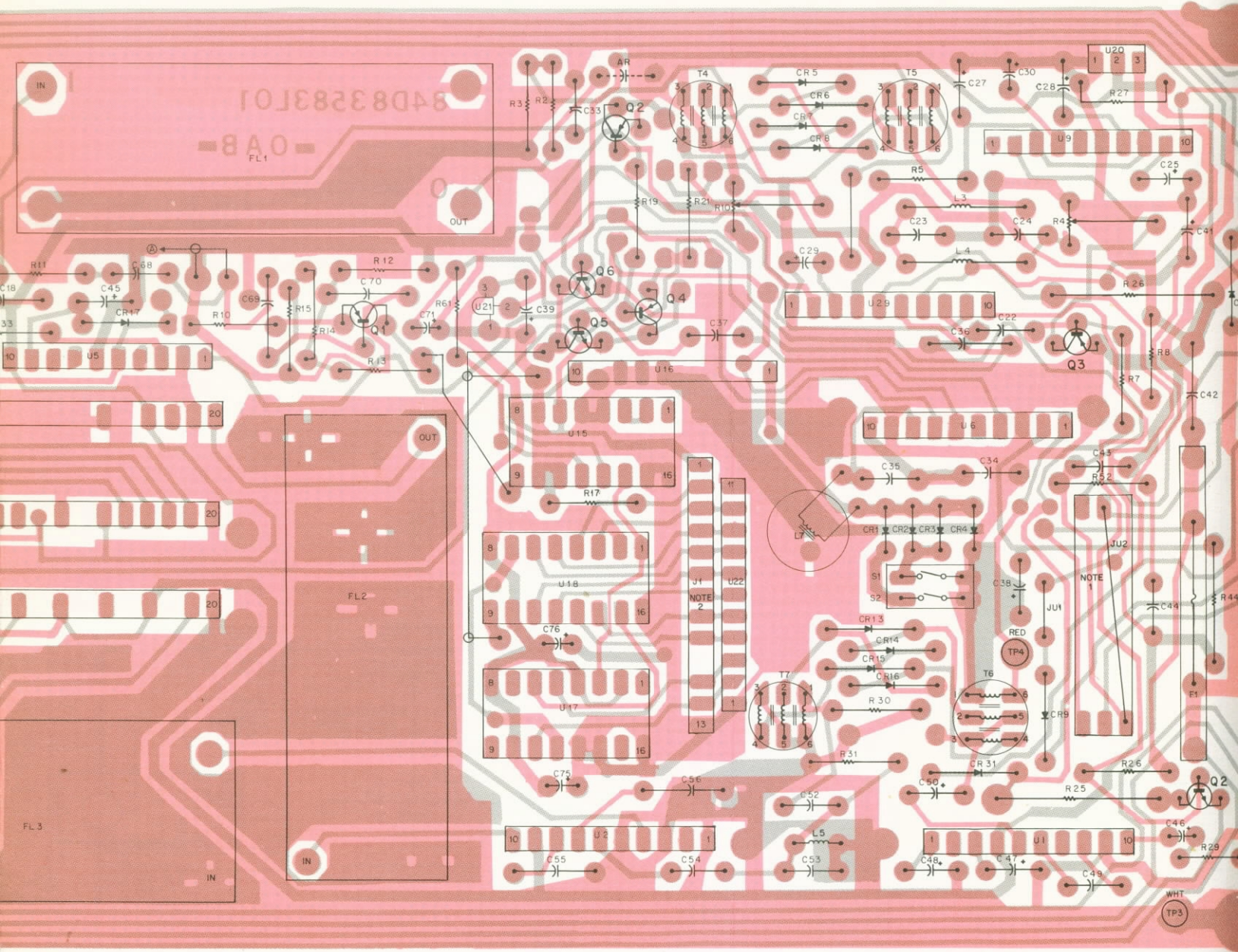
F LEAD (ONLY WHEN
 MLN 6300A RELAY OPTION
 IS USED)

2. A PROGRAMMED MLN6300A CODE PLUG IS INSERTED
 INTO JACK J1.

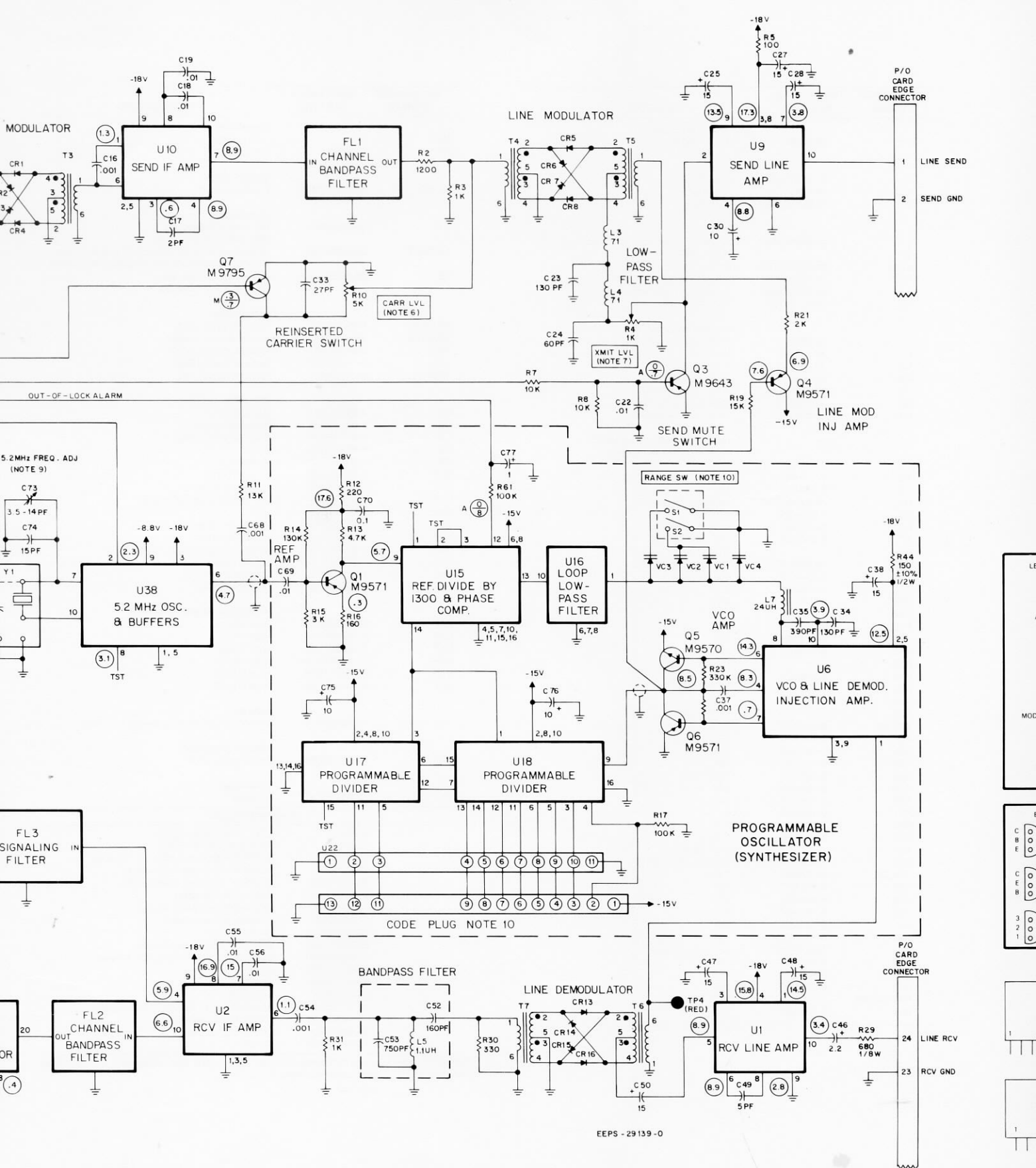


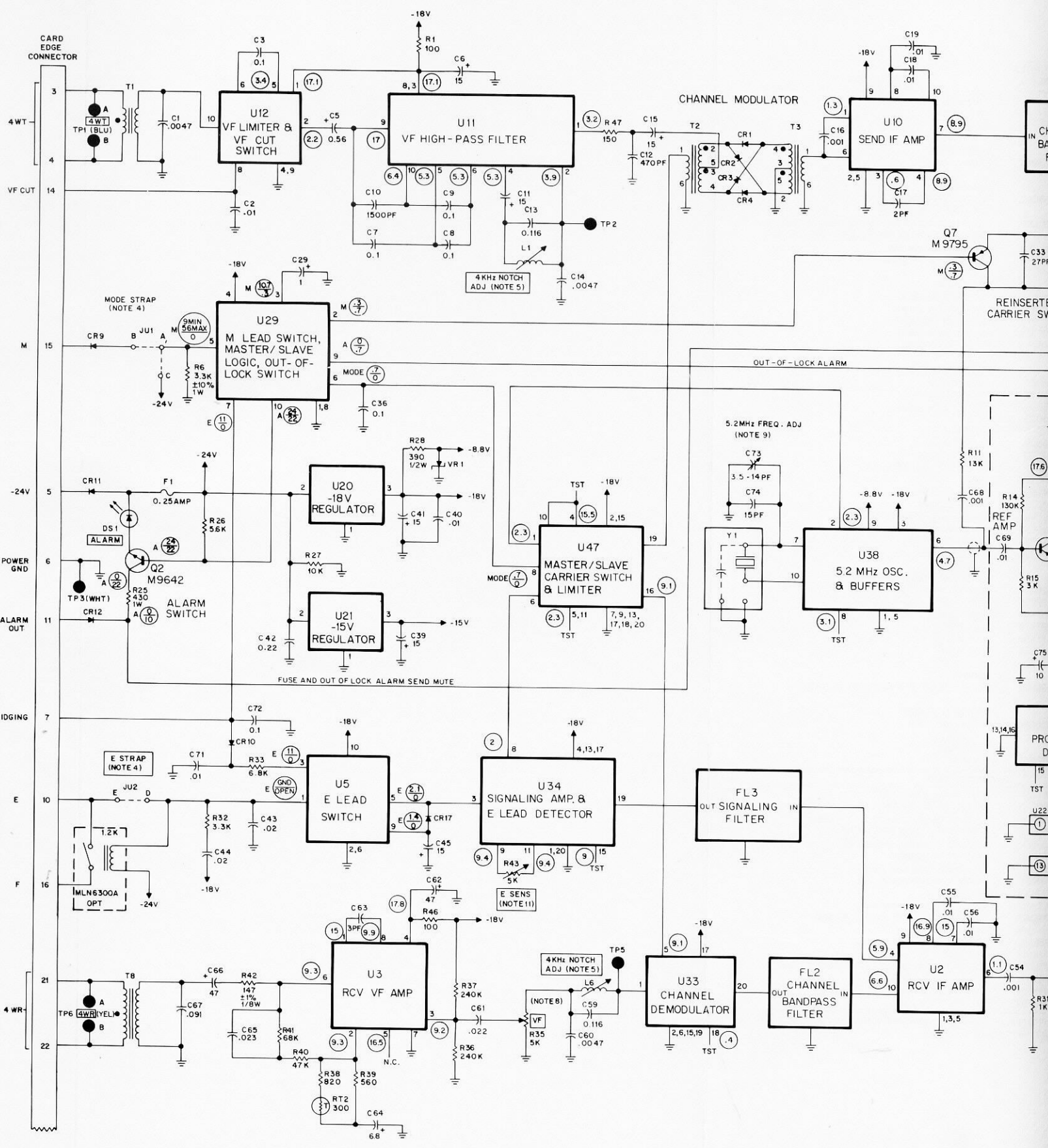
NOTES:
 1. WHEN THE OPTIONAL MLN6300A RELAY IS USED,
 JUMPER WIRE J12 SHOULD BE DISCONNECTED.

LINE SEND
 SEND GND
 4-WT
 BATT.
 GND
 BRIDGING
 E LEAD
 ALARM
 V F CUT
 M LEAD
 F LEAD
 4-W R
 RCV GND
 LINE RCV



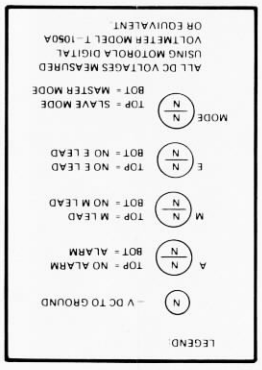
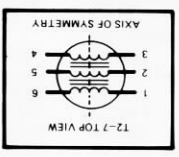
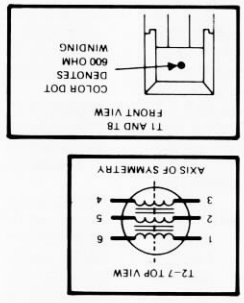
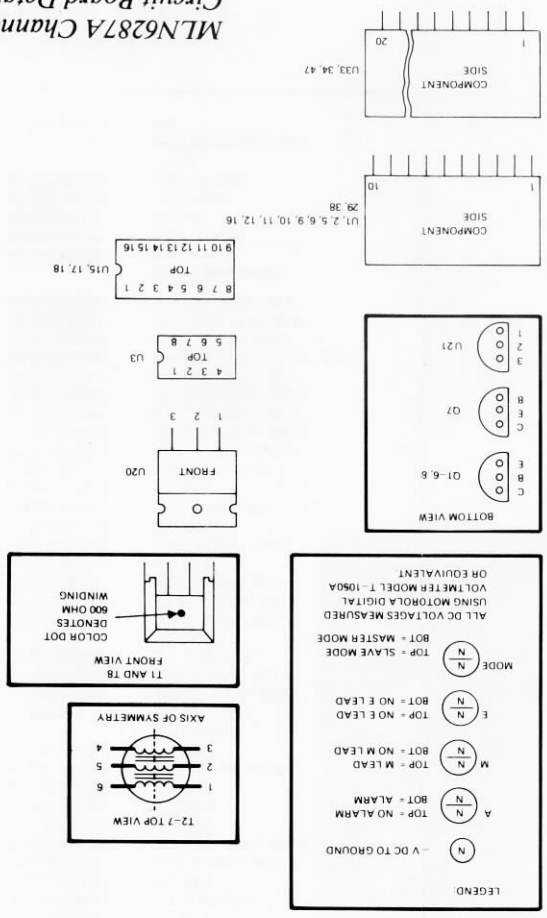
SOLDER SIDE ● BD-EEPS-27855-0
 COMPONENT SIDE ● BD-EEPS-27856-0
 OL-EEPS-27857-0





MLN6287A Channel Modem
 Circuit Board Detail, Schematic
 Diagram, and Parts List
 (Sheet 2 of 3)
 Motorola No. PEPS-27859-0
 10/1/79-PHI

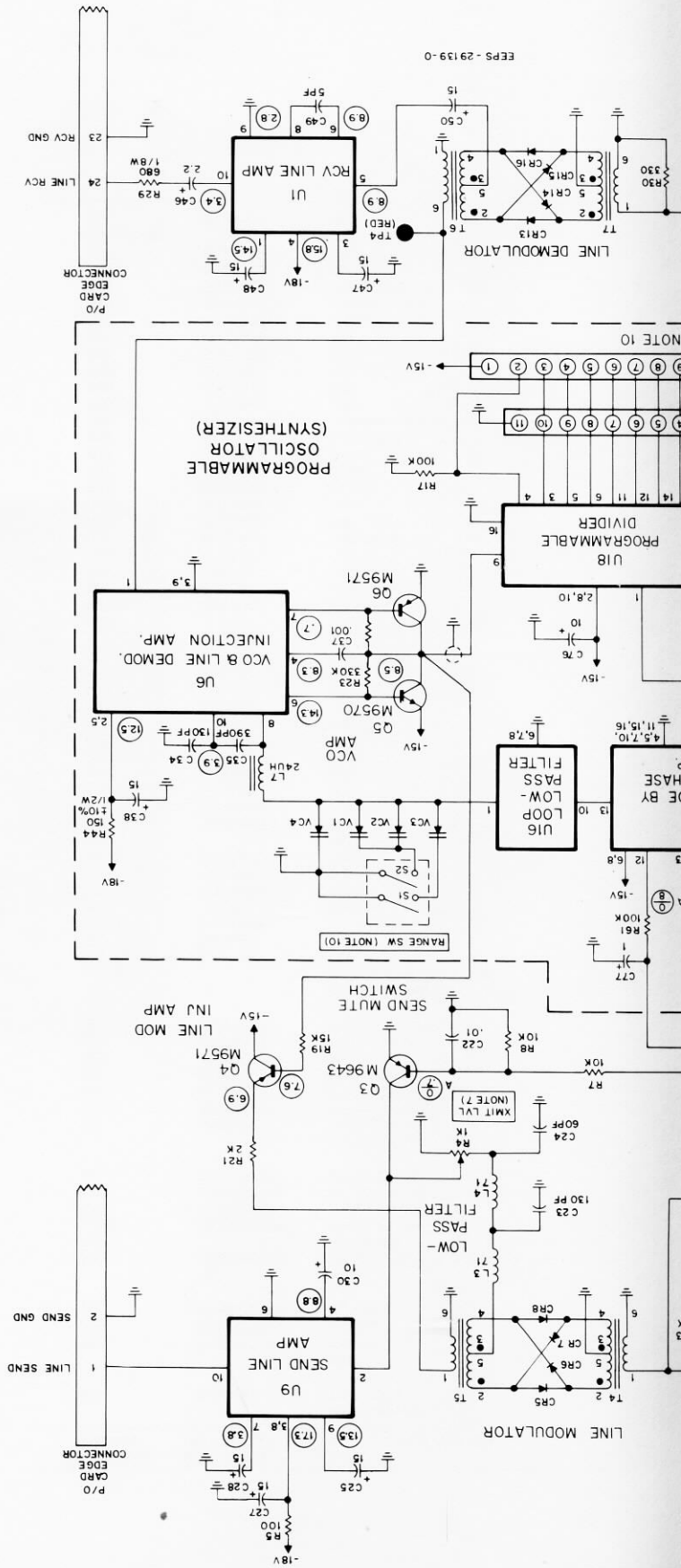
CHANNEL MODEM



NOTES:
 1. UNLESS OTHERWISE INDICATED, RESISTOR VALUES ARE IN OHMS, CAPACITOR VALUES IN MICROFARADS, AND INDUCTOR VALUES IN MILLIHENRIES.
 2. INTEGRATED CIRCUITS ON THIS BOARD ARE CMOS DEVICES.
 3. IC TYPES AND CONNECTIONS FOR THIS BOARD ARE AS FOLLOWS:

REFERENCE	DESCRIPTION	TYPE	MFG'S.
U3	OPERATIONAL AMPLIFIER	M2064	7
U15	PHASE COMPARATOR & PROGRAMMABLE COUNTER	14568	16
U17	DIVIDE BY N COUNTER	14526	16
U18	BCD BINARY COUNTER	14569	16

JUMPER	STRAPPING	FUNCTION
U1	A-B	AUTOMATIC MODE
	A-C	MASTER OF OPERATION
	D-E	SOLID STATE E-LEAD
U2	NO JUMPER	ONLY WHEN MLN6300A ALARM RELAY OPTION IS USED



4. VARIABLE INDUCTORS L1 & L6 ARE ADJUSTED TO NOTCH OUT 4 KHZ FROM THE VF SIGNALS. FOR DETAILS REFER TO THE CHANNEL MODEM SECTION.
 5. POTENTIOMETER RH10 IS USED TO SET THE LEVEL OF THE REINTEGRATED SIGNALING CARRIER. FOR FURTHER DETAILS REFER TO THE SYSTEM ADJUSTMENTS SECTION.
 6. POTENTIOMETER RH3 IS USED TO SET THE VF RECEIVE LEVEL. FOR FURTHER DETAILS REFER TO THE SYSTEM ADJUSTMENTS SECTION.
 7. POTENTIOMETER RH4 IS USED TO SET THE LINE SEND LEVEL. FOR FURTHER DETAILS REFER TO THE SYSTEM ADJUSTMENTS SECTION.
 8. POTENTIOMETER RH5 IS USED TO SET THE FREQUENCY OF THE VARIABLE CAPACITOR C73 TO SET THE FREQUENCY OF THE CHANNEL MODEM SECTION.
 9. RANGE SWITCHES ARE USED TO ADJUST THE FREQUENCY RANGE OF THE VCO. FOR FURTHER DETAILS REFER TO THE SYSTEM ADJUSTMENTS SECTION.
 10. POTENTIOMETER RH43 IS USED TO FURTHER DETAILS REFER TO THE SYSTEM ADJUSTMENTS SECTION.
 11. THE LEAD DETECTOR FOR FURTHER DETAILS REFER TO THE SYSTEM ADJUSTMENTS SECTION.

parts list

MLN6287A Channel Modem

PL-6720-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		capacitor, fixed; uF ± 20%; 500 V: unless otherwise stated
C1	21-82428B27	.0047 ± 10%; 100 V
C2	21-82428B35	.01 + 80 -20%; 500 V
C3	21-82372C01	0.1 + 80 -20%; 25 V
C4		NOT USED
C5	23-84538G24	0.56 ± 10%; 35 V
C6	23-84538G04	15; 20 V
C7, 8, 9	8-83813H06	0.1 ± 10%; 100 V
C10	21-863291	1500 pF ± 2%
C11	23-84538G04	15; 20 V
C12	21-82187B39	470 pF ± 10%
C13	8-85531C18	0.116 ± 2%; 50 V
C14	21-82428B27	.0047 ± 10%; 100 V
C15	23-84538G04	15; 20 V
C16	21-82187B29	.001 ± 10%; 100 V
C17	21-82133G37	2 pF ± .25 pF; NPO
C18, 19	21-82428B35	.01 + 80 -20%
C20		NOT USED
C21		AS REQUIRED
C22	21-82428B35	.01 + 80 -20%
C23	21-861601	130 pF ± 3%; 300 V
C24	21-82537B19	60 pF ± 5%; 100 V
C25	23-84538G04	15; 20 V
C26		NOT USED
C27, 28	23-84538G04	15; 20 V
C29	23-84538G01	1; 35 V
C30	23-84665F01	10 + 100 -10%; 25 V
C31, 32		NOT USED
C33	21-82133G06	27 pF ± 5%; NPO
C34	21-861601	130 pF ± 3%; 300 V
C35	21-82537B34	390 pF ± 5%; 100 V
C36	21-82372C01	0.1 + 80 -20%; 25 V
C37	21-82187B29	.001 ± 10%; 100 V
C38, 39	23-84538G04	15; 20 V
C40	21-82428B35	.01 + 80 -20%
C41	23-84538G04	15; 20 V
C42	8-82905G32	0.22 ± 10%; 50 V
C43, 44	21-82428B26	.02 + 80 -20%; 200 V
C45	23-84538G04	15; 20 V
C46	23-84538G08	2.2; 20 V
C47, 48	23-84538G04	15; 20 V
C49	21-82133G53	5 pF ± 5 pF; NPO
C50	23-84538G04	15; 20 V
C51		NOT USED
C52	21-865442	160 pF ± 3%
C53	21-84534B08	750 pF ± 2%; 300 V
C54	21-82187B29	.001 ± 10%; 100 V
C55, 56	21-82428B35	.01 + 80 -20%
C57, 58		NOT USED
C59	8-85531C18	0.116 ± 2%; 50 V
C60	21-82428B27	.0047 ± 10%; 100 V
C61	8-82905G02	.022 ± 10%; 50 V
C62	23-84538G06	47; 20 V
C63	21-82133G45	3 pF ± .5 pF; NPO
C64	23-84538G09	6.8; 20 V
C65	8-82905G39	.023 ± 5%; 50 V
C66	23-84538G06	47; 20 V
C67	8-83813H17	.091 ± 5%; 50 V
C68	21-82187B29	.001 ± 10%; 100 V
C69	21-82428B59	.01 + 80 -20%; 200 V
C70	21-82372C01	0.1 + 80 -20%; 25 V
C71	21-82428B59	.01 + 80 -20%; 200 V
C72	21-82372C01	0.1 + 80 -20%; 25 V
C73	20-84978A02	variable: 3.5 to 14 pF; 200 V
C74	21-82133G19	15 pF ± 5%; NPO
C75, 76	23-84665F01	10 + 100 -10%; 25 V
C77	23-84665F04	1 + 150 -10%; 50 V
		diode: (see note)
CR1-4	48-84616A09	hot carrier
CR5 thru 8	48-86850C65	type 1N4454
CR9 thru 12	48-82466H13	silicon
CR13-16	48-84616A09	hot carrier
CR17	48-86850C65	type 1N4454
		light emitting diode:
DS1	48-88245C01	red

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		fuse, cartridge:
F1	65-20987	1/4 A; 250 V
		filter:
FL1	91-84471L01	channel
FL2	91-84471L02	channel
FL3	91-82933M01	signaling
		coil:
L1	24-82290M01	variable; 12.94-14.85 mH; res. 1.3
L2		NOT USED
L3, 4	24-82835G26	choke; 71 uH
L5	24-82835G42	choke; 1.1 uH
L6	24-82290M01	variable; 12.94-14.85 mH; res. 1.3
L7	24-82927K07	choke; 24 uH
		transistor: (see note)
Q1	48-869571	PNP; type M9571
Q2	48-869642	NPN; type M9642
Q3	48-869643	PNP; type M9643
Q4	48-869571	PNP; type M9571
Q5	48-869570	NPN; type M9570
Q6	48-869571	PNP; type M9571
Q7	48-869795	PNP; type M9795
		resistor, fixed; ± 5%; 1/4 W: unless otherwise stated
R1	6-124A25	100
R2	6-124A51	1.2k
R3	6-124A49	1k
R4	18-84944C10	variable: 1k ± 20%
R5	6-124A25	100
R6	6-126C61	3.3k ± 10%; 1 W
R7, 8	6-124A73	10k
R9		NOT USED
R10	18-83452F11	variable: 5k ± 20%
R11	6-124A76	13k
R12	6-124A33	220
R13	6-124A65	4.7k
R14	6-124B01	130k
R15	6-124A60	3k
R16	6-124A30	160
R17	6-124A97	100k
R18		NOT USED
R19	6-124A77	15k
R20		NOT USED
R21	6-124A56	2k
R22		NOT USED
R23, 24	6-124B10	330k
R25	6-126A40	430; 1 W
R26	6-124A67	5.6k
R27	6-124A73	10k
R28	6-125A39	390; 1/2 W
R29	6-185A45	680; 1/8 W
R30	6-124A37	330
R31	6-124A49	1k
R32	6-124A61	3.3k
R33	6-124A69	6.8k
R34		NOT USED
R35	18-84944C12	variable: 5k ± 20%
R36, 37	6-124B07	240k
R38	6-124A47	820
R39	6-124A43	560
R40	6-124A89	47k
R41	6-124A93	68k
R42	6-10621B14	147 ± 1%; 1/8 W
R43	18-84944C12	variable: 5k ± 20%
R44	6-125A29	150 ± 10%; 1/2 W
R46	6-124A25	100
R47	6-124A29	150
R48 thru 60		NOT USED
R61	6-124A97	100k

MLN6287A Channel Modem
Circuit Board Detail, Schematic
Diagram, and Parts List
(Sheet 3 of 3)
Motorola No. PEPS-27859-O
10/1/79-PHI

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
RT1		thermistor: NOT USED
RT2	6-865641	300 ohms
S1, S2	40-83022M02	switch: slide 2 station spst
T1	25-85255C02	transformer: Pri: lead 1 & 2 res. 60 Sec: lead 3 & 5 res. 340
T2 thru 7	24-84805L01	Start: Terminal #1 natural, #2 green, #3 red Finish: Terminal #4 red, #5 green, #6 natural
T8	25-85255C03	Pri: lead 1 & 2 res. 60 Sec: lead 3 & 5 res. 25
TP1A, B	9-84554E07	test points: female; coded BLU
TP2, TP5	29-10271A15	terminal, pin; 2 used
TP3	9-84260F01	female; coded WHT
TP4	9-84260F02	female; coded RED
TP6A, B	9-84554E05	female; coded YEL
U1	1-80703D31	thick-film circuit: Receive amp
U2	1-80703D32	Receive i-f amp
U5	1-80703D34	Signaling Detector
U6	1-80703D35	VCO
U9	1-80720D95	Send amp
U10	1-80703D39	Send i-f amp
U11	1-80703D40	High-pass filter
U12	1-80703D41	VF limiter/driver/VF mute
U16	1-80713D16	LPF
U22	51-82142K02	Resistive network
U29	1-80713D17	Carrier switch
U33	1-80703D42	Amp/second demodulator
U34	1-80703D33	Signal receiver
U38	1-80703D37	5.2 MHz osc/amp
U47	1-80703D36	CXR SW/limiter
U3	51-84320A64	integrated circuit: (see note) type M2064
U15	51-84887K55	type 14568
U17	51-84887K49	type 14526
U18	51-84887K78	type 14569
U20	51-84621K59	type M2159
U21	51-84621K56	type M2156
VC1 thru 4	48-82190H32	varicap: silicon; 29 pF; 30 V dc coded YEL-RED
VR1	48-82256C56	voltage regulator: Zener type, 8.8 V
Y1	48-84116F01	resonator: 5.2 MHz
mechanical parts		
	2-9627	NUT, 4-40 x 3/16 x 3/32"
	2-121841	NUT, 6-32 x 5/16 x 7/64"
	3-134169	SCREW, tapping; 4-40 x 1/4"; 4 used
	3-490773	SCREW, machine; 6-32 x 9/16"
	3-82227A03	SCREW, machine; 4-40 x 5/16"
	4-10057A13	WASHER, insulator
	4-84850A01	WASHER, shoulder; 2 used
	7-82082M01	FRAME, circuit board
	26-82076C01	SHIELD, coil
	26-83470M01	SHIELD, integrated circuit
	39-82208M01	CONTACT, modem ground; 4 used
	42-82654G04	CLIP, fuse; 2 used
	55-82209M01	HANDLE
	9-82071K01	SOCKET
	9-84671L01	RECEPTACLE, female; 12 contact; 2 used
	14-84268A01	INSULATOR, transistor
	15-83918F01	COVER, 2"; 2 used
	15-83918F02	COVER, 1"; 2 used

note: For optimum performance, diodes, transistors, and integrated circuits must be ordered by Motorola part number.

TION

5 mH; res. 1.3

5 mH; res. 1.3

)

6; 1/4 W:
ated