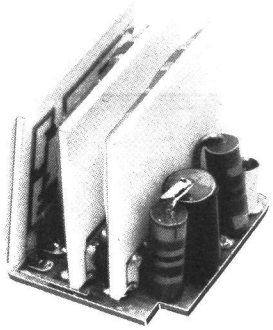
MOBILE RADIO

MASTR® Personal Series

PROGRESS LINE

PE MODELS

CARRIER CONTROL TIMER 19B226333G1



SPECIFICATIONS *

TIMING CYCLE	90 Seconds ± 30 Seconds
INPUT	7.5 Volts @ 50 mA Maximum
AUDIO OUTPUT	1000 Hz
INTEGRATED CIRCUITS	3

*These specifications are intended primarily for the use of the serviceman. Refer to the appropriate Specification Sheet for the complete specifications.

GENERAL ELECTRIC

CARRIER CONTROL TIMER 19B226333G1

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ILLUSTRATIONS

WARNING

No one should be permitted to handle any portion of the equipment that is supplied with voltage or RF power; or to connect any external apparatus to the units while the units are supplied with power. KEEP AWAY FROM LIVE CIRCUITS.

DESCRIPTION

Carrier Control Timer 19B226333G1 automatically interrupts the transmission of a PE transmitter by deactivating the system relay after a 90 second ±30 seconds timing cycle. The timer also alerts the operator that the transmitter is off with a 1000 Hertz alarm tone from the speaker as long as the push-to-talk switch is pressed. Transmission can be resumed by releasing the push-to-talk switch and re-keying the transmitter.

The Carrier Control Timer mounts on the system board and can be used with all PE transmitters. The outline diagram contains the necessary information to install a timer. See the Table of Contents.

CIRCUIT ANALYSIS

The Carrier Control Timer consists of thick film hybrid IC's A1, A2 and A3, diode CR1, capacitors C1 and C2 and RF coils L1 and L2. A simplified circuit diagram is shown in Figure 1. Voltage for the timer is supplied from H32 on the system board.

PTT IC A1

Pressing the push-to-talk switch connects A1-2 to ground causing transistor Q1 to saturate. The voltage on the collector of Q1 causes transistor Q2 to conduct. Q2 conducting causes Q4 to saturate activating system relay K1. Activating K1 keys the transmitter.

Transistor Q3 will not conduct until a positive voltage is applied to A1-3. When Q3 does conduct K1 will deactivate.

The voltage on the emitter of Q2 applied to A1-6 is connected to Timer IC A2-1.

TIMER IC A2

The voltage on A2-1 causes free running multivibrator transistors Q1 and Q2 to oscillate. The 1000 Hz alert tone output of Q1 and Q2 is connected to R707-3 (volume HI) on the case assembly and through a voltage divider to the base of transistor Q3. The alert tone causes Q3 to conduct in pulses. The pulsed current flow charges timing capacitor C2.

When the push-to-talk switch is pressed Q4 will not conduct because A2-6 is grounded. When the push-to-talk switch is released Q4 will conduct and discharge timing capacitor C2, resetting the timer.

THRESHOLD DETECTOR A3

The emitter of transistor Q1 of Threshold Detector A3 is biased so that when timing capacitor C2 charges to a level Veb, Q1 and transistor Q2 will conduct. When Q1 conducts transistor Q3 will also conduct and a voltage will be available at A3-7.

A3-7 is connected to A1-3. The voltage on A1-3 causes Q3 on A1 to conduct. Q3 of A1 conducting causes the system relay to deactivate and the receiver to come on. With the receiver on and the push-to-talk switch still pressed, the alert tone will be heard from the speaker.

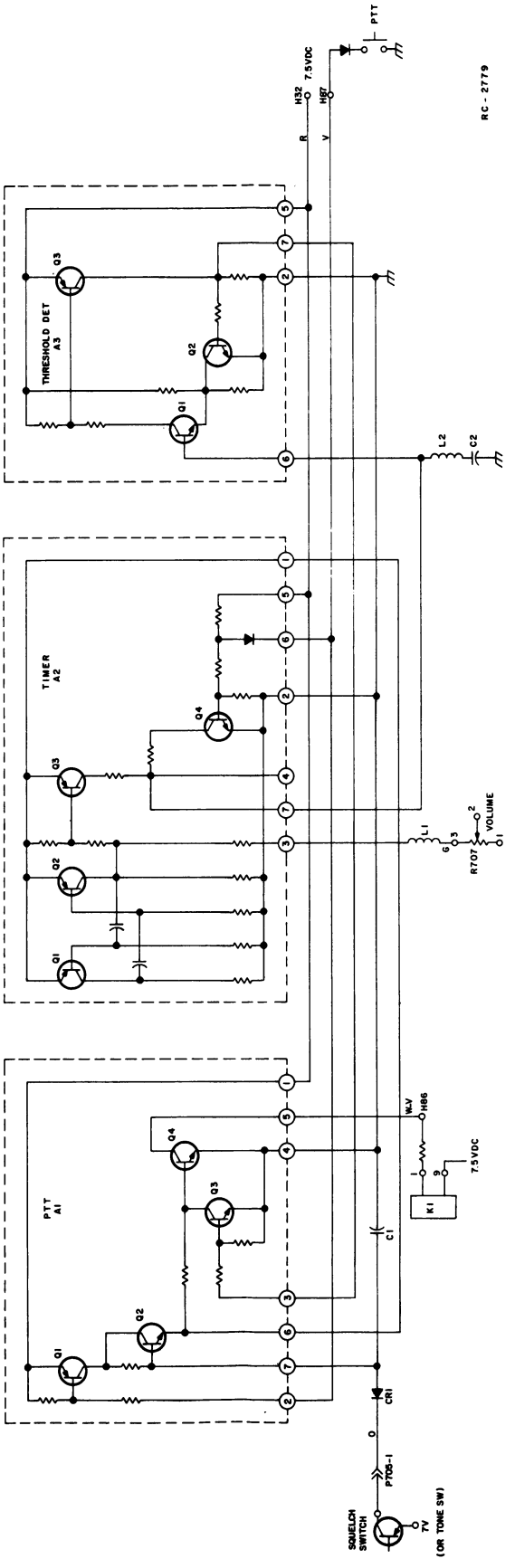
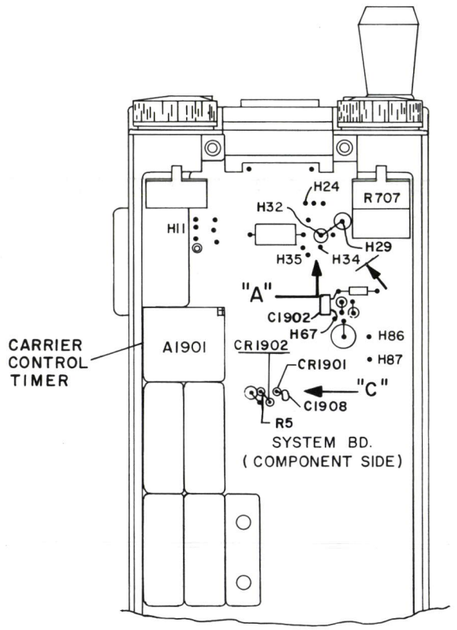
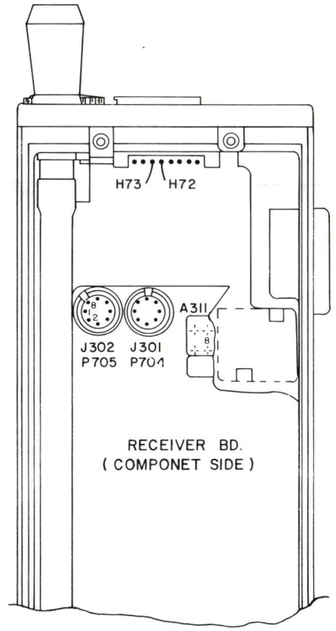


Figure 1 - Carrier Control Timer Simplified Diagram



FRONT VIEW



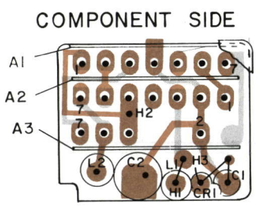
REAR VIEW

CONNECTION CHART CARRIER CONTROL TIMER							
FROM	TO	WIRE	REMARK	FROM	TO	WIRE	REMARK
H86	H87	PW	CUT	A311-4	GRD	C1901	RECEIVER
A1901	R707-3	G	*	A311-4	A311-5	C1902	RECEIVER
A1901	C1905(+)	R	VIEW "B"	A311-9	GRD	C1903	RECEIVER
A1901	H86	W-V		H67	ANODE CR6	C1904	SYSTEM BD
A1901	H87	V					
A1901		O	CUT				

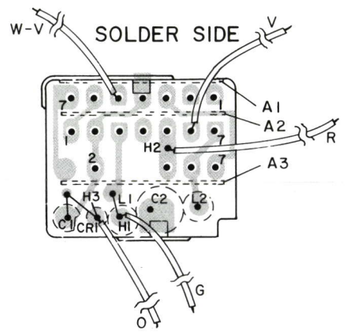
* ROUTE GREEN WIRE OF A1901 HIGH AND TO THE FRONT OF CASE.

CONNECTION CHART CARRIER CONTROL TIMER USED WITH CHANNEL GUARD ENCODE/DECODE			
FROM	TO	WIRE	REMARK
H86	H87	PW	CUT
A1901	R707-3	G	
A1901	C1905 (+)	R	SEE VIEW "B"
A1901	H86	W-V	
A1901	H87	V	
A1901	P705-1	O	
J302-1	P.A.,PIN 9	PW	RECEIVER BOARD CUT
J302-1	SQUELCH MOD PIN 9	DM	RECEIVER BOARD SLEEVE WITH 40388593P4
P.A.,PIN 4	GRD	C1901**	RECEIVER BOARD
P.A.,PIN 4	P.A.,PIN 5	C1902**	RECEIVER BOARD
P.A.,PIN 9	GRD	C1903**	RECEIVER BOARD
H67	ANODE CR6	C1904	SYSTEM BD
H26 SYS BD	P705-7	O	DISCONNECT AT P705-7***

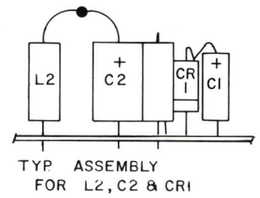
* ROUTE GREEN WIRE OF A1901 HIGH AND TO THE FRONT OF CASE.
** SEE NOTE 9.
*** PERFORM THIS STEP ONLY WHEN RADIO CONTAINS TWO TONE ENCODE ONLY (7TH DIGIT R) CHANNEL GUARD. SLEEVE CUT END OF WIRE TO PREVENT SHORTS.



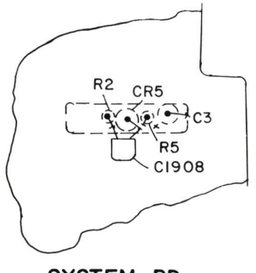
(19C320974, Sh. 2, Rev. 1)
(19C320974, Sh. 3, Rev. 1)



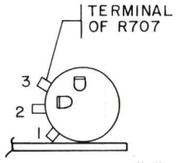
(19C320974, Sh. 2, Rev. 1)



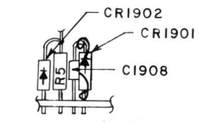
TYP ASSEMBLY FOR L2, C2 & CR1



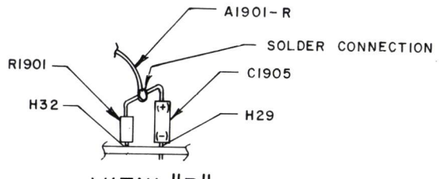
SYSTEM BD.
(SOLDER SIDE)



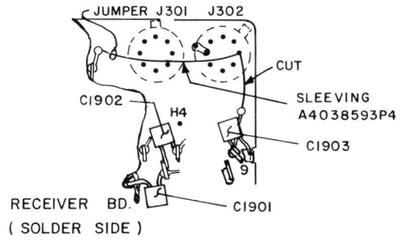
VIEW AT "A"
(PARTIAL)



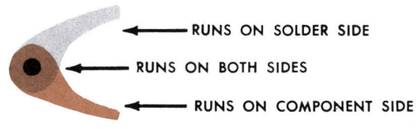
VIEW "C"



VIEW "B"
ROTATED CW

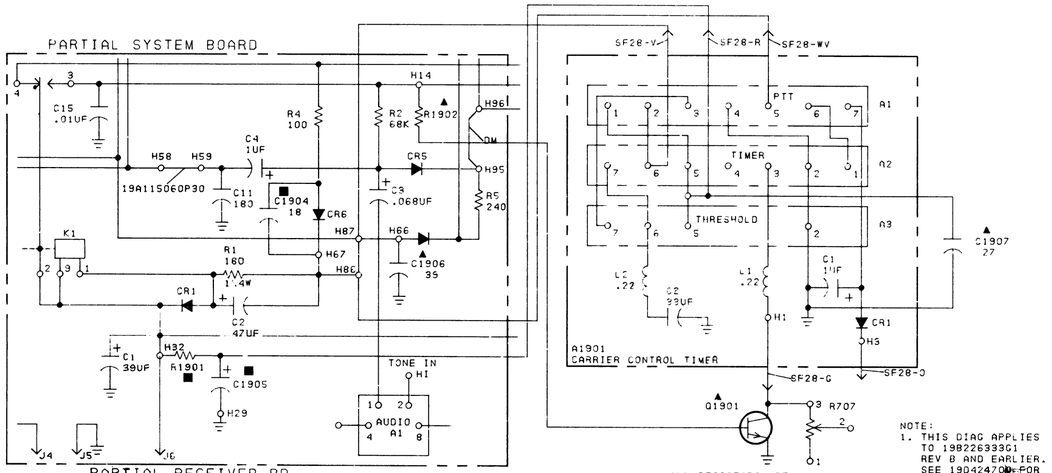


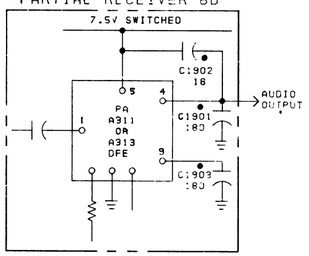
(19D423460, Rev. 2)



OUTLINE DIAGRAM

CARRIER CONTROL TIMER 19B226333G1





NOTE:
1. THIS DIAG APPLIES TO 19B226333G1 REV.B AND EARLIER. SEE 19D424700 FOR LATER REVISIONS.

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT. FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.	
MODEL NO	REV LETTER
PL19B226333G1	B

ALL RESISTORS ARE 1/8 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS.INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

▲ C1901,R1902,C1906,&C1907 USED ONLY WHEN TIMER INSTALLED IN UHF PE RADIO.
● C1901,C1902,C1903 INSTALLED ON RECEIVER BOARD IN ALL PE'S CONTAINING CCT.
■ C1904,C1905,R1901 INSTALLED ON SYSTEM BOARD ON ALL PE SYSTEMS CONTAINING CCT.

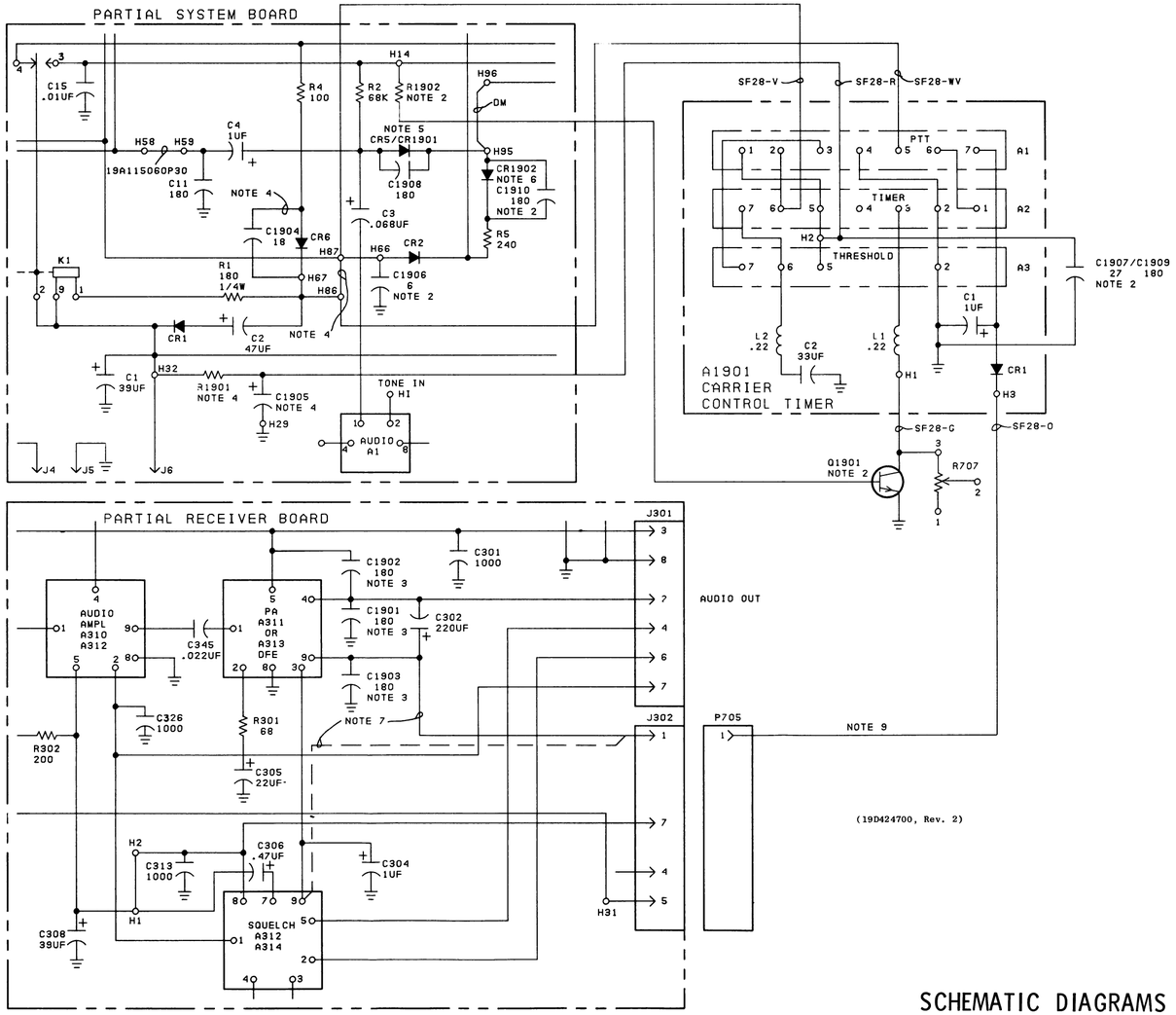
(19C327625, Rev. 5)

MODEL NO	REV LETTER
PL19B226333G1	E

ALL RESISTORS ARE 1/8 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS.INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

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.

NOTES:
1. INTERCONNECTION DIAG FOR 19B226333G1 REV.B AND EARLIER IS 19C327625.
2. Q1901,R1902,ARE USED IN BOTH HI BAND AND UHF APPLICATIONS. C1906,C1907 ARE USED IN UHF APPLICATIONS. C1909 AND C1910 ARE USED IN HI BAND APPLICATIONS.
3. C1901,C1902,C1903 INSTALLED ON RECEIVER BOARD IN ALL PE'S CONTAINING CCT.
4. C1904,C1905,R1901 INSTALLED ON SYSTEM BOARD AND PW RUN BETWEEN H86 AND H87 IS CUT ON ALL PE SYSTEMS CONTAINING CCT.
5. CR1901 USED IN HB LOCAL/REMOTE APPLICATIONS.
6. CR1902 USED IN LOCAL/REMOTE SYSTEMS(ALL BANDS).
7. PRINTED WIRING RUN BETWEEN J302-1 AND C302 CUT AT POINT INDICATED AND JUMPER ADDED FROM J302-1 AND SQUELCH MODULE PIN 9 WHEN RADIO CONTAINS CC.
8. NOMENCLATURE FOR PA IS A311 FOR TWO AND EIGHT FREQUENCY UNITS AND A313 FOR DUAL FRONT END UNITS. NOMENCLATURE FOR SQUELCH MODULE IS A312 FOR TWO AND EIGHT FRENQUENCY UNITS AND A314 FOR DUAL FRONT END UNITS. NOMENCLATURE FOR AUDIO AMP IS A310 FOR TWO AND EIGHT FREQUENCY UNITS AND A312 FOR DUAL FRONT END UNITS.
9. WIRE NOT PRESENT IN NON CHANNEL GUARD UNITS.
10. C1908 USED IN HI BAND AND UHF LOCAL/REMOTE APPLICATIONS.



SCHEMATIC DIAGRAMS

CARRIER CONTROL TIMER 19B226333G1

PARTS LIST

LBI-4950A

CARRIER CONTROL TIMER KIT
19B226333G1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1901 thru C1904	19A116114P10073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -3300 PPM.
C1905	5491674P37	Tantalum: 10 µf ±20%, 10 VDCW; sim to Sprague Type 162D.
C1906*	19A116114P50	Ceramic: 39 pf ±5%, 100 VDCW; temp coef 0 PPM. Added by REV A.
C1907*	19A116114P2044	Ceramic: 27 pf ±5%, 100 VDCW; temp coef -80 PPM. Added by REV B.
C1908*	19A116114P10073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -3300 PPM. Added by REV C.
C1909* and C1910*	19A116114P10073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -3300 PPM. Added by REV E.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1901*	5494922P1	Silicon; sim to Type 1N456. Added by REV C.
CR1902*	19A115100P1	Silicon; sim to Type 1N458A. Added by REV C.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1901*	19A115910P1	Silicon, NPN; sim to Type 2N3904. Added by REV A.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1901	3R152P510J	Composition: 51 ohms ±5%, 1/4 w.
R1902*	3R152P203J	Composition: 20,000 ohms ±5%, 1/4 w. Added by REV A.
		CARRIER CONTROL TIMER BOARD 19B226333G2
A1	19C320997G1	PTT Module.
A2	19C320981G1	Timer Module.
A3	19C320984G1	Threshold Detector.
		- - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C2	19C307102P20	Tantalum: 33 µf +5%, 4 VDCW.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A115250P1	Silicon.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1 and L2	19B209420P105	Coil, RF: 0.22 µh ±10%, 0.14 ohms DC res max; sim to Jeffers 4416-5.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A130238G1	Can.
	4035306P62	Washer, fiber. (Used at A2-2 and A2-6).

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 - To improve transmitted audio when CCT is used.
Added C1906, R1901 and Q1901.

REV. B - To improve RF filtering.
Added C1907.

REV. C - To improve operation.
Added C1908, CR1901, and CR1902.

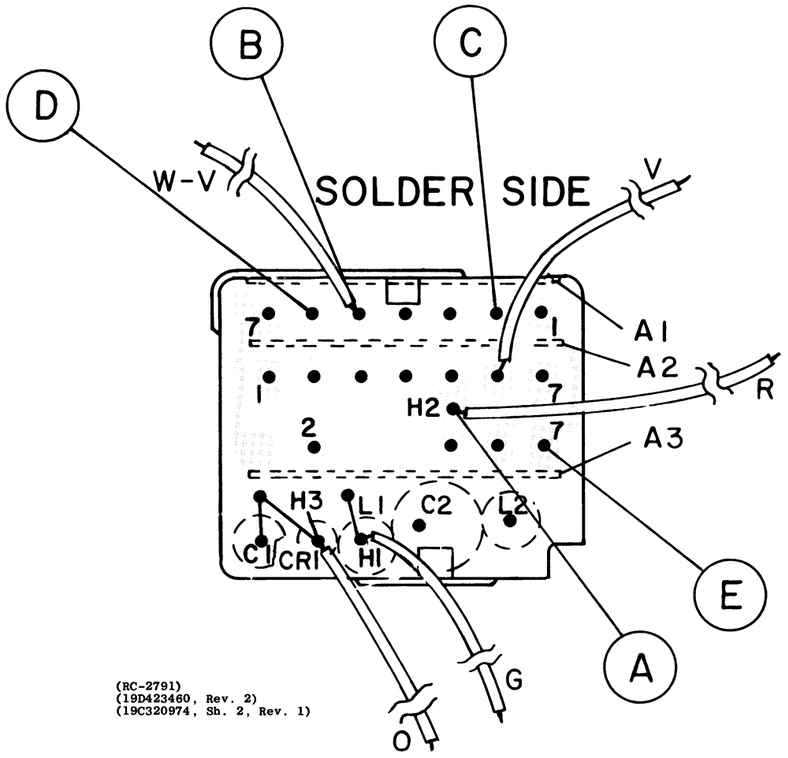
REV. D - To reduce tone feed thru during transmit.
Deleted "C1908" from note 5. Added note 10:
"C1908 used in Hi Band and UHF local/remote applications."

REV. E - To further reduce tone feed thru.
Added C1909 and C1910.

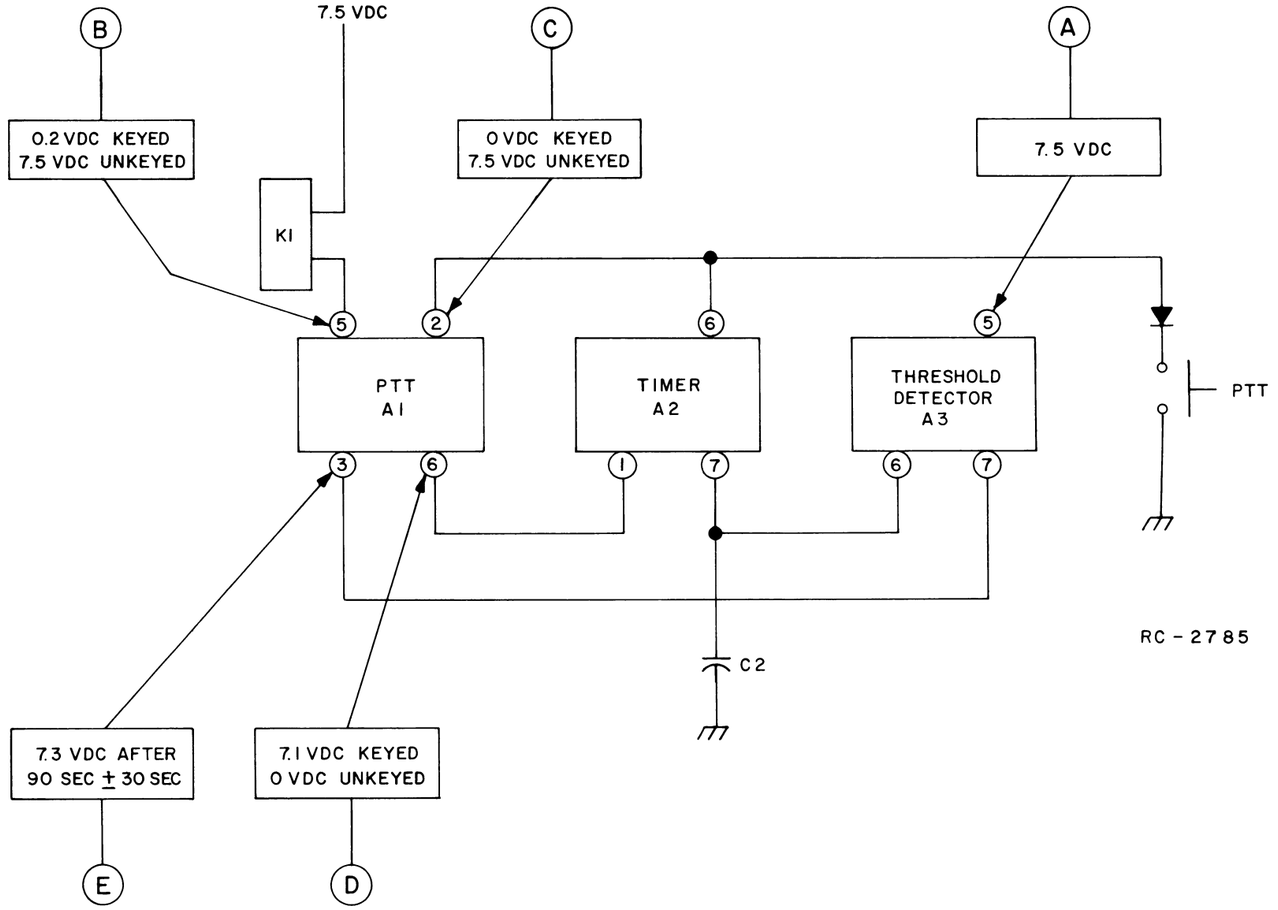
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

TROUBLESHOOTING PROCEDURE

SYMPTOM	STEP	TEST POINT	ACTION
Transmitter will not key	1	(A)	Check for 7.5 VDC.
	2	(B)	Check for 7.5 VDC unkeyed and 0.2 VDC keyed.
	3	(C)	Check for 7.5 VDC unkeyed and zero VDC keyed.
	4	(D)	Check for zero VDC unkeyed and 7.1 VDC keyed.
Timer will not time out	1	(A)	Check for 7.5 VDC.
	2	(E)	Check for 7.3 VDC 90 seconds ±30 seconds after keyed.
	3	---	Check timing capacitor C2.



(RC-2791)
(19D423460, Rev. 2)
(19C320974, Sh. 2, Rev. 1)



RC-2785