

TELEPHONE REMOTE
SECOND FUNCTION KIT
FOR CU-10A CONTROL UNIT AND RA-10A REMOTE CONTROL ADAPTER

CU-10A FACTORY INSTALLED: HAMMARLUND PART NO. PL 53293-G1
CU-10A FIELD INSTALLATION: HAMMARLUND PART NO. PL 53293-G2

RA-10A FACTORY INSTALLED: HAMMARLUND PART NO. PL 53295-G1
RA-10A FIELD INSTALLATION: HAMMARLUND PART NO. PL 53295-G2

INSTALLATION INSTRUCTIONS

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INTRODUCTION

The Second Function Kit may be used for a variety of special system applications. Basically this kit permits the control of a relay at the base station site from the remote control site with both in a stand-by condition (receive). This second function relay may also be energized during transmit for other applications such as two frequency.

As the most popular use of this kit is for tone squelch over-ride, this application has been referenced in the "Theory of Operation" section.

INSTALLATION

Install parts as indicated by heavy lines. Use drawings T53291-1 and M53297 for CU10A units with serial numbers below 500, and drawing P53292-1 for the RA10A. The heavy lines indicate added circuitry or components. Dotted wiring or components are to be removed.

If a transistorized desk mike incorporating an over-ride switch is used, be sure the SP-DT switch section which operates in the QT or "up" position is wired to open in that position.

THEORY OF OPERATION

A negative voltage is developed across a resistor added between the center tap of the power transformer and ground. The resultant loss of B+ voltage is made up by the substitution of silicon rectifiers in a "plug-in" module for the vacuum tube type previously employed. This voltage is fed through a resistor and an inductance to the center of the line transformer T101. Another choke connected to the other side of the line serves to maintain line balance to ground while maintaining the high impedance input feature which allows several units to be used in parallel without excessive loading of the line. The second choke is returned to the over-ride keying source through a blocking capacitor so that any hum on the keying voltage is balanced with respect to ground and does not appear in the output.

The over-ride relay in the remote control adapter is connected from one line to ground. The over-ride circuit is connected so that the relay must be energized to put the QT in operation. This provides the greatest degree of fail safe operation since any failure will allow the relay to drop out restoring the system to non coded squelch operation.

The over-ride is controlled by shorting the junction of the 8.2k resistor and the inductance to ground, thus removing the voltage from the line from all control units. IT IS IMPORTANT TO ALERT THE OPERATORS TO THE FACT THAT UNATTENDED CONTROL UNITS MUST BE LEFT IN THE "NORMAL" POSITION (QT OPERATING) SO THAT CONTROL FROM OTHER UNITS IS POSSIBLE.

ADJUSTMENT

The only additional adjustment is that of the hum balance pot on the top of the CU10A chassis. There may be some interaction between units so it is advisable to set all units to mid-position and then adjust each in turn for minimum hum in its own speaker. Somewhat less than full volume should be used when making this adjustment so the hum null point is not masked by line noise.

CAUTION

Since the keying and the over-ride operation are carried on from one side of the telephone line or the other to ground respectively, it is necessary that the line be properly polarized when connected to the control unit. The over-ride relay has a coil resistance of 6000 ohms, and the keying relay has a coil resistance of 8000 ohms. It is possible to determine which relay is connected to a particular side of the telephone line by means of an ohmmeter. With the RA10A connected to the far end of the telephone line and terminal #4 grounded, connect an ohmmeter between ground and each side of the telephone line in turn. The lead showing the lowest resistance to ground would be connected to terminal #7 of the CU10A (over-ride). The higher resistance side should be connected to terminal #1. (keying)

It may be found that occasionally the telephone company in servicing or checking a line may reverse same, thereby causing improper operation of this system. If this should occur it will be necessary to reverse the line at either the remote control units or the remote control adapter at the base station.

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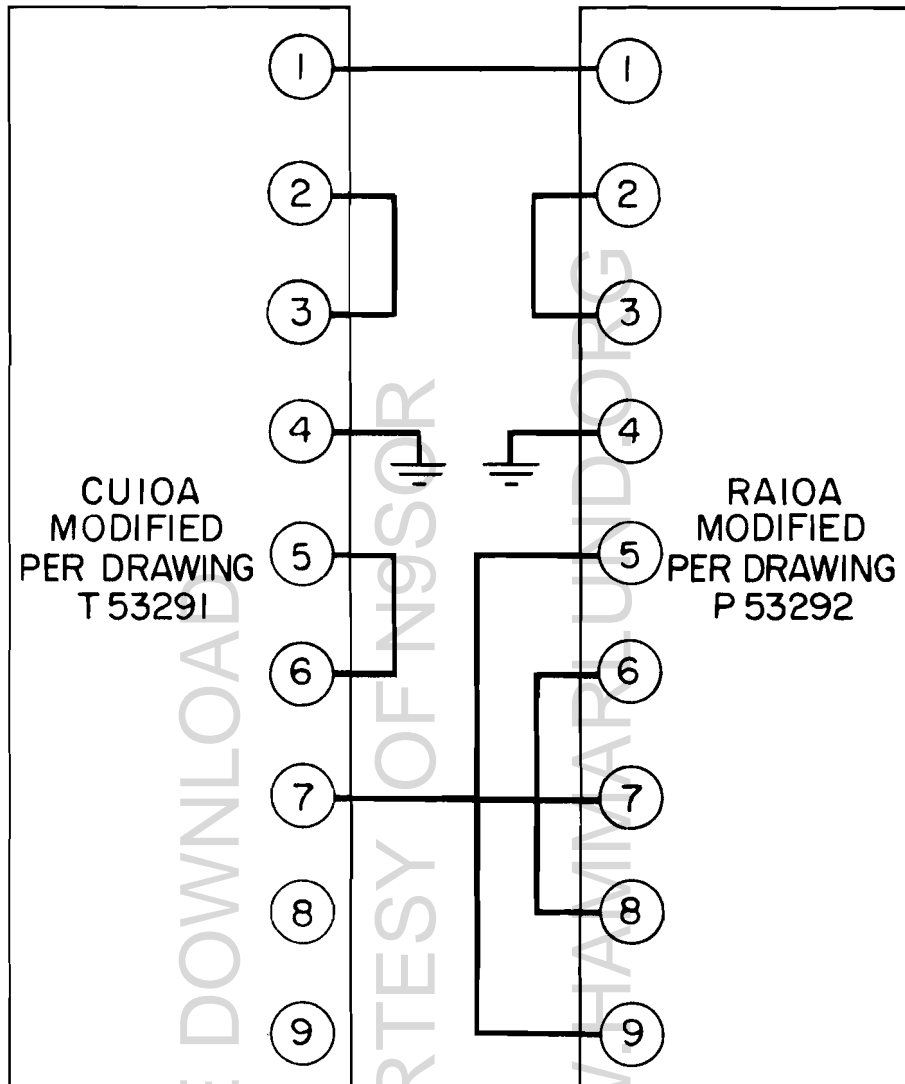
CU-10A
SECOND FUNCTION KIT
(FIELD INSTALLATION)
PARTS LIST

SCHEMATIC DESIGNATION	DESCRIPTION	HAMMARLUND PART NO.	QTY.
C115, C116	Capacitor, mylar .47 mfd, 400v	K23927-5	2
C201, C202	Capacitor, electrolytic 20 mfd, 150v	K23073-77	2
C203, C204	Capacitor, metalized paper 1.0 mfd, 200v	K23035-7	2
L201, L202	Filter reactor 1.5 hy	K26693-1	2
R201	Resistor, fixed 2k $\pm 10\%$, 10w	K19337-5	1
R202	Resistor, fixed 1k $\pm 10\%$, 1w	K19310-49	1
R203	Resistor, fixed 8.2k $\pm 10\%$, 2w	K19304-40	1
S201	Switch, toggle (SP-DT)	K52018-1	1
Z201	Rectifier, plug-in assembly	K39143-G1	1
MISCELLANEOUS PARTS			
	Plate marking	M53117-3	1
	Terminal strip, (3 lug)	M16650-56	1
	Terminal strip, (2 lug)	M16650-66	1
	Screw, #6-32 x 3/8 lg. binding hd.	K10020-58	4
	Nut, hex #6-32, x 1/4 a.f.	K10012-24	4
	Lockwasher, #6 ext.	K10054-1	4

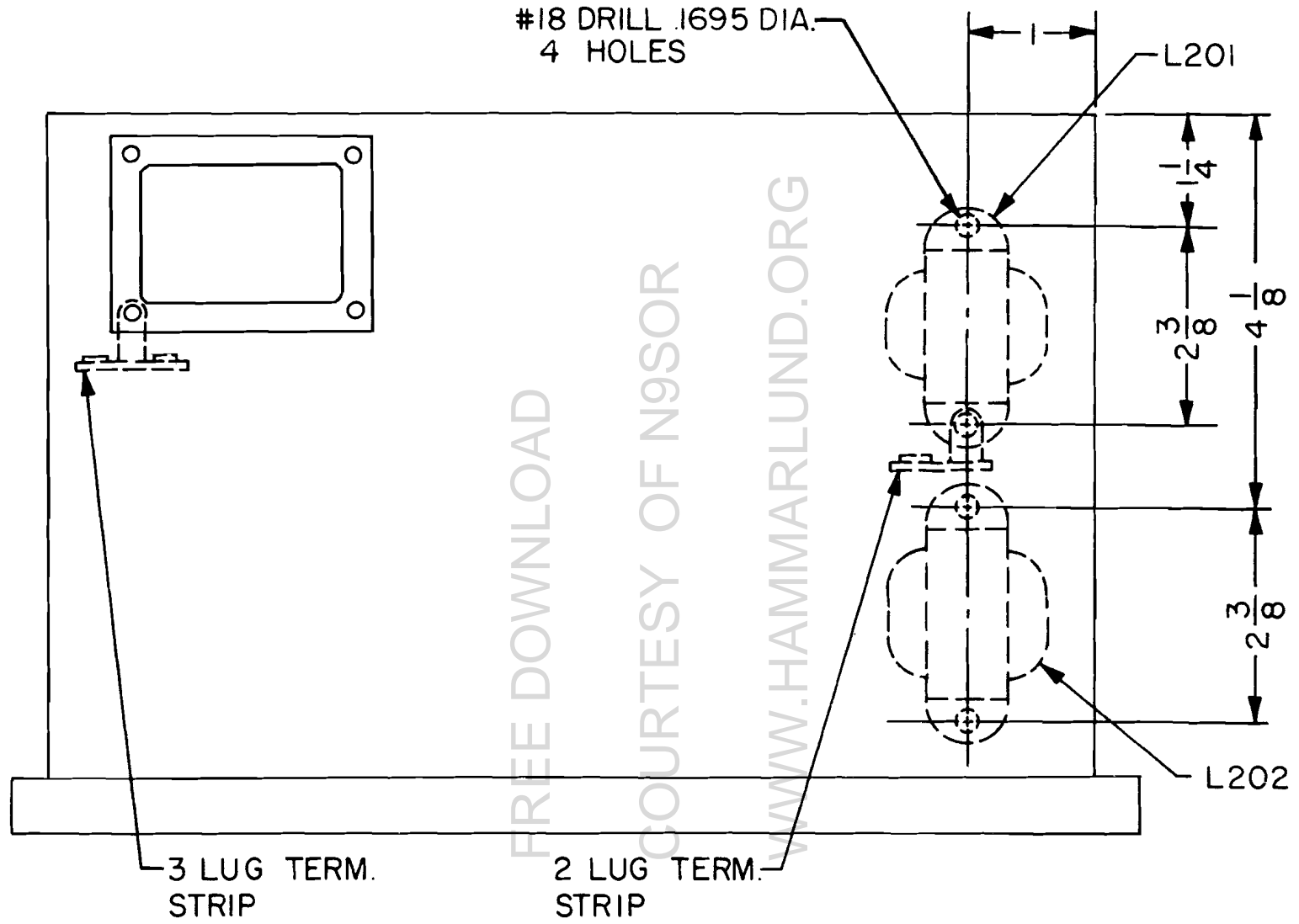
RA-10A
SECOND FUNCTION KIT
(FIELD INSTALLATION)
PARTS LIST

K201	Relay	K40412-1	1
R201	Resistor, variable 20k $\pm 20\%$, 1/2w	K26218-11	1
MISCELLANEOUS PARTS			
	Screw #8-32 x 3/16" lg. binding hd.	K10021-26	2
	Lockwasher #8 ext.	K10054-2	2
	Turbo saturated sleeving (1/2" lg.)	K16513-12BK	2
	Self locking nut #3/8-32 x 1/2 a.f.	K11886-2	1
	Lead wire #22 awg blk 8" lg.	K16645-0	1

SYSTEM CONNECTIONS



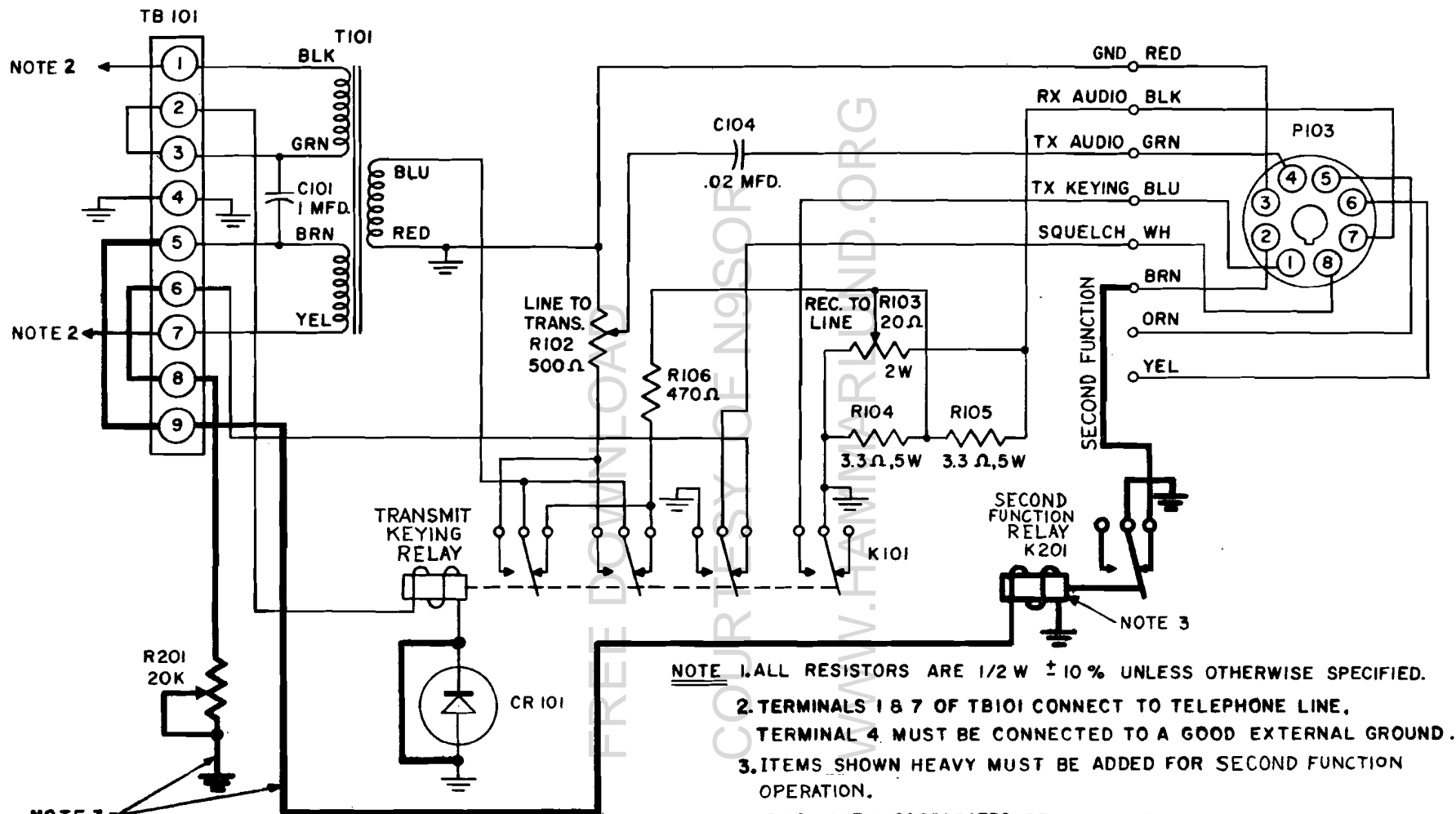
- NOTES:
1. SLAVE UNITS MAY BE CONNECTED ACROSS CUIOA BY WIRING SAME AS ABOVE AND OBSERVING TELEPHONE LINE POLARITY.
 2. REMOTE SQUELCH IS NOT NORMALLY USED WITH THIS SYSTEM.



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 CHASSIS MODIFICATION
 (SECOND FUNCTION KIT)

No. 53297 | M



- NOTE 1.** ALL RESISTORS ARE 1/2 W ± 10% UNLESS OTHERWISE SPECIFIED.
- 2.** TERMINALS 1 & 7 OF TB101 CONNECT TO TELEPHONE LINE, TERMINAL 4 MUST BE CONNECTED TO A GOOD EXTERNAL GROUND.
- 3.** ITEMS SHOWN HEAVY MUST BE ADDED FOR SECOND FUNCTION OPERATION.
- 4.** THIS UNIT INCORPORATES REV. 1 THRU 3 OF SCHEMATIC P53057-1.

MODIFIED FOR MULTIPLE CONTROL WITH QT OVERRIDE
 USE WITH CU10A'S MODIFIED PER DWG T53291-1 ONLY