REPEATER CONTROL
RCL - 54 B
Sub - Assembly No.14.0571

Glenayre electronics

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RCL-54B REPEATER CONTROL, SUB ASSEMBLY 14.0571

1 SPECIFICATIONS

POWER REQUIREMENTS	13 VDC at 5 mA.nominal
DROP-OUT DELAY RANGE	0.15 to 5 seconds, nominal
TIME LIMIT	4 min.
P.C.EDGE CONNECTOR	22 pin, 3.96 mm spacing
DIMENSIONS LXWXH	154 mm x 20 mm x 107 mm

2 DESCRIPTION

The RCL-54B Repeater Control is an electronic interface to operate a radio transmitter and receiver in a radio-repeater configuration. The circuit board plugs into a 22 pin P.C. edge connector. A labelled front panel allows easy access to the adjustment controls and a folded metal card-holder allows quick removal of the plug-in assembly for service or testing. An on-board front-panel switch is provided for disabling the repeater transmit function during tests.

3 FUNCTIONAL CONNECTIONS (BY PIN NUMBER)

1	GND	Common ground.
2	RX AF IN LO	Receiver low-level audio input.
3	RX AF IN HI	Receiver high-level audio input.
6	+13V IN	+13 volt supply input.
8	+8V OUT	+8 volt supply output. Used to power 8 volt accessory circuits.
9	$\overline{\text{RPT DIS}}$	Application of ground to this pin disables the repeater.
10	MOD	Leveled output of the audio coupler for voice-modulation input to the transmitter.
11	AF OUT	An amplified version of receiver audio input. Used for driving the inputs of tone decoders or accessory circuits.

12	AF IN	Input to the AF Switch. This input is normally connected to AF OUT at pin 11.
13	$\overline{\text{RPT EN}}$	Application of ground to this pin enables the audio coupler and PTT circuits to function according to the state of COS IN. This pin is used as a control gate for tone-operated squelch systems and must be grounded externally for carrier-squelch systems.
14	COS IN	Carrier-operated switch input. This circuit is connected to the receiver squelch circuit and will detect an input carrier as being present for more than about 3 volts input.
15	COS OUT	Carrier-operated switch output. This output is buffered for loads up to 15 mA.
16	$\overline{\text{COS OUT DIS}}$	COS OUT is disabled when this pin is grounded.
17	$\overline{\text{TRANSMIT IN}}$	Grounding this pin will ground the PTT, provided S1 is in REPEAT position and the COS-driven limit timer permits.
18	PTT	An internal open-collector NPN switch grounds this pin to key the transmitter. It will connect to the transmitter's PTT input.
19	$\overline{\text{LIMIT DIS}}$	The limit timer is disabled when this pin is grounded.
20	$\overline{\text{SW MUTE}}$ IN	A low applied to this pin will mute the AF switch.
21	TRANSMIT OUT	This output is high (+8V CMOS) when the transmitter is keyed via pin 18 (PTT).
22	GND	Common ground.

4 CIRCUIT DESCRIPTION

The carrier-operated switch (COS) comprises Q1 as a threshold detector and U1C to form a fast-acting switch with hysteresis. U1D and Q3 provide a buffered COS OUT that will source up to 15 mA. If a low is applied to COS OUT DIS then COS OUT will be disabled. The COS signal output from U1C is ANDED with a repeater enable signal from U1A to provide an enabled COS at U1B output. This COS signal is enabled when RPT EN input is low. The COS signal is fed to the delay timer, limit timer and pre-emphasizing switch.

The delay timer U2D will provide a high at its output if either COS is low or if TRANSMIT IN is low. In the case that COS is low and TRANSMIT IN is high (or no connection) the output of U2D will remain high after COS goes high (loss of a carrier at the receiver) for the time set using the DELAY control R3. This will cause the transmitter to be active for a drop-out delay time after the loss of received signal (adjustable 0.15 to 5 seconds). For test purposes U2C allows switch S1 to disable manually the electronic keying of the transmitter PTT through this card. $\overline{\text{RPT DIS}}$ permits external disabling at this point.

The limit timer uses a stable 2 kHz oscillator and a delay counter U4 to provide a limit of 4 minutes on COS being low before the output at U3B disables keying of the transmitter PTT through gate U3A. The time can be changed in octaves from 1 to 64 minutes by cutting the PC trace provided and placing a wire to an appropriate pin as shown on the schematic diagram. The limit timer can be disabled by applying a low to $\overline{\text{LIMIT DIS}}$. Q2 is the PTT keying switch. The logic drive is available at TRANSMIT OUT.

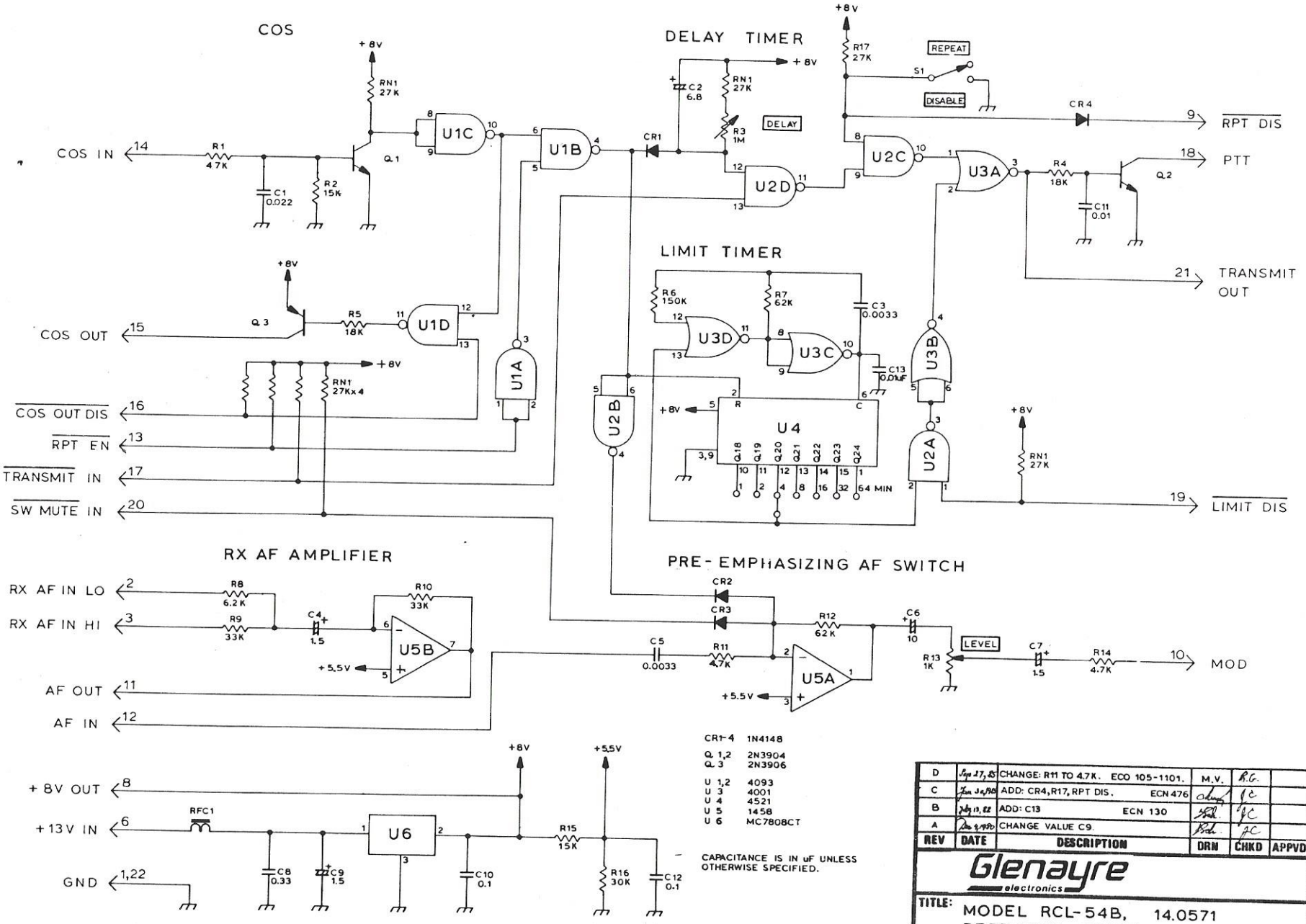
COS is inverted with U2B and applied to CR2 to gate open the pre-emphasizing switch when COS is low (a signal is received and the card is enabled). CR3 allows an external device to mute this switch when $\overline{\text{SW MUTE}}$ IN is low. U5B accepts both standard low level and high level RX AF inputs and produces a buffered output at AF OUT. This output can be connected directly, or through an external filter, to AF IN which is the input to the pre-emphasizing switch U5A. The LEVEL control, R13, is used to adjust the repeater audio gain.

U6 provides a regulated +8 volts DC supply for the on-board electronics and up to 100 mA of external load.

5 ADJUSTMENTS

DELAY — Sets transmitter drop-out delay. Front-panel, single-turn pot., (slot-driver) adjustable from 0.15 to 5 s nominal.

LEVEL — Sets repeater deviation ratio. Normally set for one to one at 2 kHz deviation for 1000 Hz tone.



CR1-4 1N4148

Q 1,2 2N3904
Q 3 2N3906

U 1,2 4093
U 3 4001
U 4 4521
U 5 1458
U 6 MC7808CT

CAPACITANCE IS IN uF UNLESS OTHERWISE SPECIFIED.

REV	DATE	DESCRIPTION	DRN	CHKD	APPVD
D	Aug 27, 85	CHANGE: R11 TO 4.7K. ECO 105-1101.	M.V.	R.C.	
C	Jan 30, 80	ADD: CR4, R17, RPT DIS. ECN 476		JC	
B	July 13, 82	ADD: C13 ECN 130		JC	
A	Jan 9, 80	CHANGE VALUE C9.		JC	

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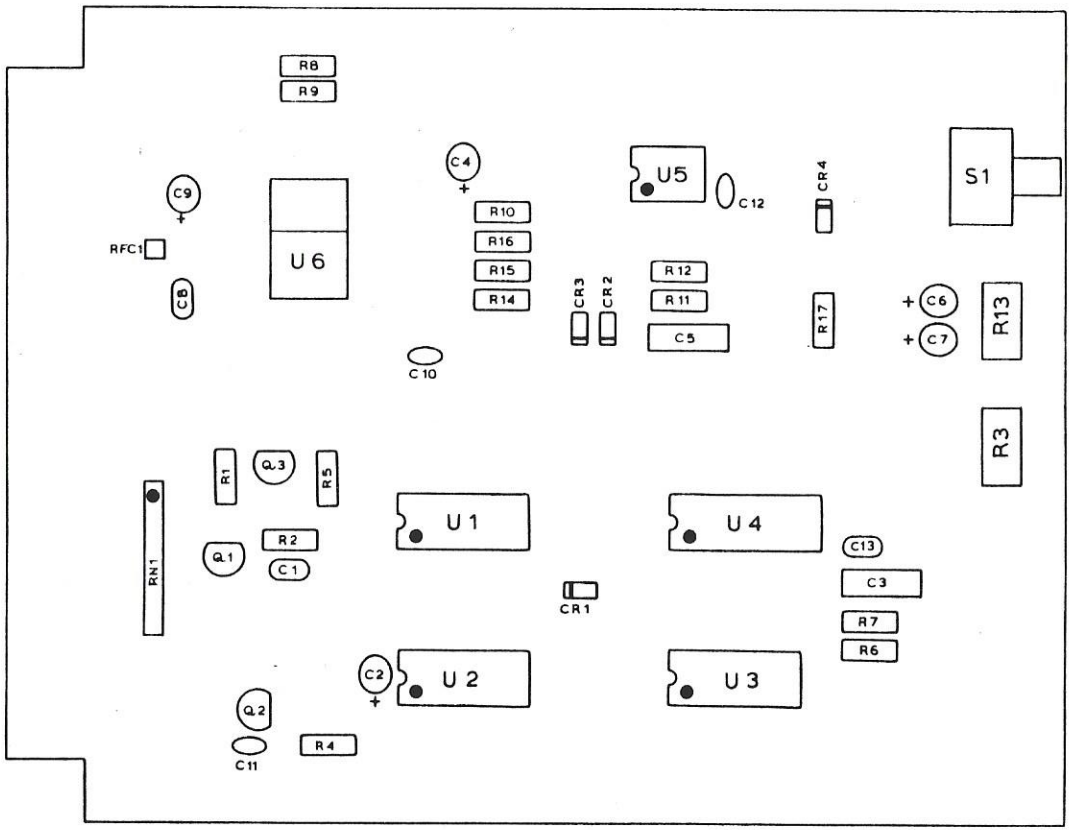
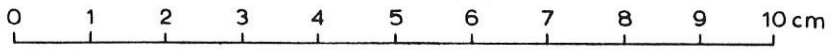
TITLE: MODEL RCL-54B, 14.0571
REPEATER CONTROL
SCHEMATIC DIAGRAM

DRAWN	DATE MAY 23, 1980.	DRAWING NUMBER
CHECKED JC	SCALE	9-4
APPROVED	PCB C9-2	

VIEW FROM COMPONENT SIDE





REV	DATE	DESCRIPTION	DRN	CHKD	APPVD
D	Jan 31, 1985	ADD: CR4, R17. ECN 476			
C	July 13, 83	ADD: C13 ECN 130			
B	June 9/81	CR1 POLARITY CORR.			
A	Dec 4, 1980	CHANGE OF TYPE C9			

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TITLE: MODEL RCL-54B, 14.0571
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P.C. ASSEMBLY

DRAWN	DATE JUN. 5, 1980.	DRAWING NUMBER
CHECKED	SCALE	9-5
APPROVED		

C1	0.022 uF ceramic	Kemet	C330C223M1R5CA	24.4050	1	
C2	6.8 uF tant. 25V	Elna	25SC-6.8	26.1022	1	
C3	0.0033 uF polystyrene	Phil.	279AHC 3K3	25.0008	1	
C4	1.5 uF tant., 35V	Hitachi	TD155M35	26.1032	1	
C5	0.0033 uF polystyrene	Phil.	279AHC 3K3	25.0008	1	
C6	10 uF tant., 25V	Hitachi	TD100M25	26.1023	1	
C7	1.5 uF tant., 35V	Hitachi	TD155M35	26.1032	1	
C8	0.33 uF ceramic	Kemet	C330C334M5U1CA	24.4051	1	
C9	1.5 uF tant.	Hitachi	TD155M35	26.1032	1	
C10	0.1 uF ceramic	"	C320C104M5R5CA	24.4045	1	
C11	0.01 uF "	"	C320C103M5R5CA	24.4044	1	
C12	0.1 uF "	"	C320C104M5R5CA	24.4045	1	
C13	0.01 uF "	"	C320C103M5R5CA	24.4044	1	
CR1-4	Si	Uniz	1N4148	37.0600	4	
Q1	NPN trans.	MOTO	2N3904	64.0120	1	
Q2	NPN "	MOTO	2N3904	64.0120	1	
Q3	PNP "	NEC	2N3906	64.0122	1	
R1	47K ¼W 5% tol.	Rohm	R25J	55.2473	1	
R2	15K "	"	"	55.2153	1	
R3	1M pot. single-turn P.C.	Spect.	63 X 105	54.5202	1	
R4	18K ¼W 5% tol.	Rohm	R25J	55.2183	1	
R5	18K "	"	"	55.2183	1	
R6	150K "	"	"	55.2154	1	
R7	62K "	"	"	55.2623	1	
R8	6.2K "	"	"	55.2622	1	
R9	33K "	"	"	55.2333	1	
Ref	**Description**	**Mfr**	**Mfr Part No**	**WR Part No**	**Qty**	**Item**

REV	APP	DATE	ITEM	CHANGE TO	WR PART NO.
C	JC	Sep 26/85		ECO 105-1101	
B	JC	Jan 30/85	CR4	ECN 476	37.0600
A	JC	Dec 2,80	C9	change type/value	

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PARTS LIST

DATE : May 27, 1980 | MODEL : RCL-54B

APPROVED : JC | ASSY. NO. 14.0571

SHEET 1 OF 2

Ref	Description	Mfr	Mfr Part No	WR Part No	Qty	Item
R10	33K ¼W 5% tol.	Rohm	R25J	55.2333	1	
R11	4.7K ¼W 5% tol.	Sann	R25J	55.2472	1	
R12	62K "	"	"	55.2623	1	
R13	1K pot. single-turn P.C.	Spect.	63 X 102	54.5200	1	
R14	4.7K ¼W 5% tol.	Rohm	R25J	55.2472	1	
R15	15K "	"	"	55.2153	1	
R16	30K "	"	"	55.2303	1	
R17	27K	"	"	55.2273	1	
RFC1	1 - ½ turn #24 on bead			31.1065	1	
RN1	res. network 7 pos. 27K	Beck.	764-1R27K	56.0201	1	
S1	SPDT toggle	C&K	7101A	61.0601	1	
U1	CMOS quad Schmitt NAND	Mot.	MC14093BCP	41.1796	1	
U2	CMOS quad Schmitt NAND	"	MC14093BCP	41.1796	1	
U3	CMOS quad NOR	"	MC14001BCP	41.1700	1	
U4	CMOS 24-bit count.	"	MC14521BCP	41.1909	1	
U5	dual Op. Amp.	"	MC1458CP1	41.1403	1	
U6	3-term. reg. 8V	"	MC7808CT	41.1603	1	
	PCB			51.0571	1	
	Card Handle			23.1070	1	
	Card Holder			23.1083	1	
	Heatsink	Therm.	TH#10E-14	23.2151	1	
	IC Socket 8-pin	TI	C8408-02	33.1175	1	
	" " 14-pin	"	C8414-02	33.1176	3	
	" " 16-pin	"	C8416-02	33.1177	1	
	Regular Split Lockwasher 18-8	Pacifl	No.6	40.1151	2	

REV	APP	DATE	ITEM	CHANGE TO	WR PART NO.
A	JC	Jan 30/80	R17	ECN 476	55.2273

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PARTS LIST

DATE : May 27,1980

MODEL : RCL-54B

APPROVED : JC

ASSY. NO. 14.0571

SHEET 2 OF 2