

**CTCSS TONE CONTROL**  
**RTC -54 B**  
**Sub -Assembly No.14.0601**

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RTC-54B CTCSS TONE AND FILTER CONTROL, SUB-ASSEMBLY 14.0601

1 SPECIFICATIONS

POWER REQUIREMENTS	8 VDC at 15 mA nominal
LPF CUT OFF	250 Hz
HPF CUT OFF	350 Hz
FILTER PASSBAND RIPPLE	1 dB nominal
FILTER STOPBAND REJ.	30 dB nominal
CLOCK FREQUENCY STABILITY	0.01%, -30 to +60 deg.C
P.C. EDGE CONNECTOR	22 pin, 3.96 mm spacing
DIMENSIONS L X W X H	154 mm x 20 mm x 107 mm

2 DESCRIPTION

The RTC-54B is a band-splitting filter and clock generator suitable for CTCSS applications. The low pass filter passes only the CTCSS band and rejects the voice band. The high pass filter passes the voice band and rejects the CTCSS band. The filters provide separate outputs for CTCSS decoders and voice transmission respectively.

An on-board 200 kHz clock can be used externally for synthesized tone circuitry.

A labelled front-panel and folded metal card-holder permit quick removal of the plug-in assembly for service and testing.

3 FUNCTIONAL CONNECTIONS (BY PIN NUMBER)

1	GND	Common ground
2	HPF OUT	High pass filter output
4	FILTER IN	Filter input
8	+8V IN	+8 volt supply input
11	LPF OUT	Low pass filter output
13	TOS BUS	Output to TOS bus
21	200 kHz CLOCK OUT	Output of 200 kHz clock generator
22	GND	Common ground

## RTC-54B CTCSS TONE AND FILTER CONTROL, SUB-ASSEMBLY 14.0601

## 4 CIRCUIT DESCRIPTION

## 4.1 BAND-SPLITTING FILTER

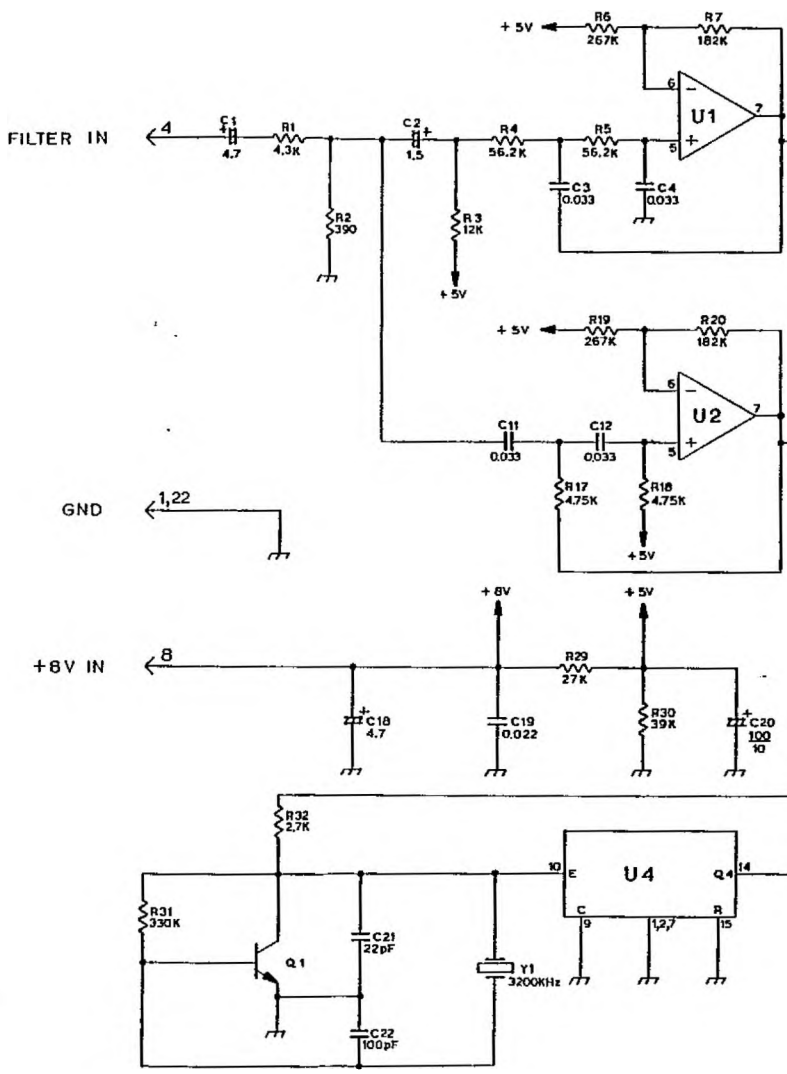
The filter is made up with sixth order Chebyshev filters and an input attenuator R1, R2 to give unity gain. The low pass section is designed to pass 50 to 250 Hz and reject 350 to 3000 Hz. The high pass section rejects 50 to 250 Hz and passes 350 to 3000 Hz.

## 4.2 200 KHZ CLOCK

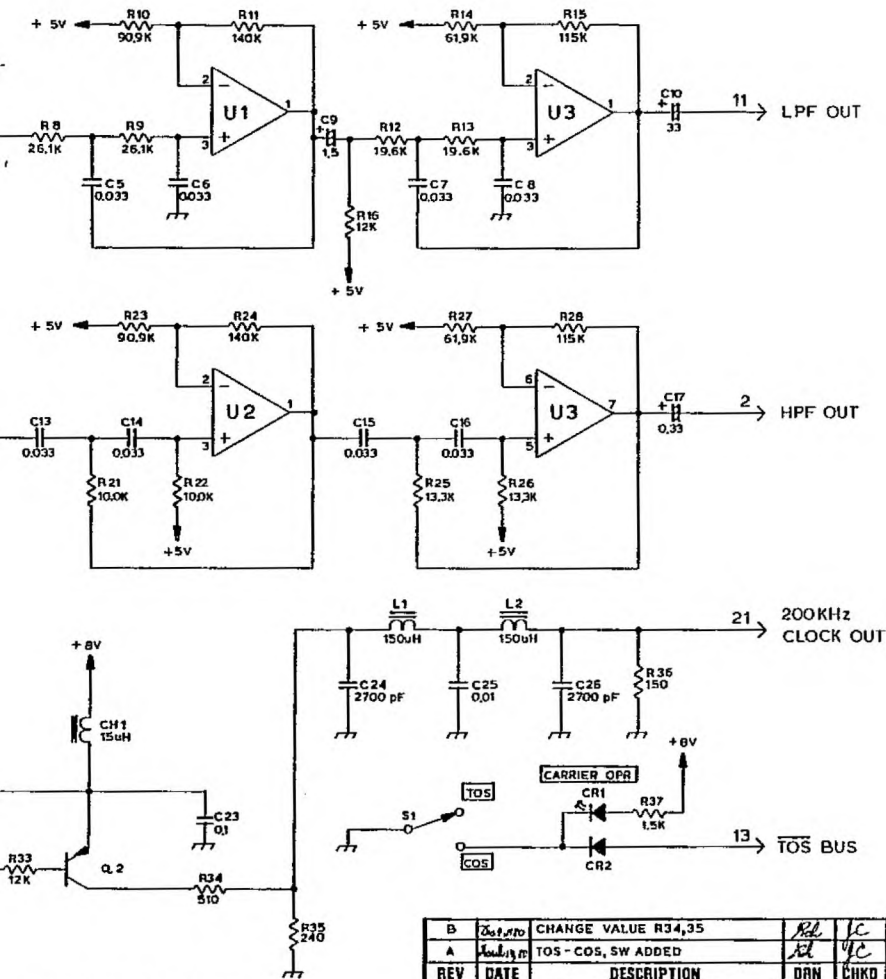
Q1 is a 3200 kHz crystal oscillator, using Y1, that drives a divide by 16 circuit made up with a 4 bit counter, U4. The 200 kHz output is buffered by Q2 and attenuated with R34 and R35. The output of the fifth order low pass filter C24, 25, 26 and L1, 2 is a 1 volt peak to peak sine wave suitable for distribution to external circuitry.

## 4.3 TEST SWITCH

The front panel toggle switch S1 will permit the simulated reception of a tone signal and enable repeater systems to be carrier-operated while S1 is in the COS position. At the same time the front panel LED warns that the system is not in normal tone operation. If S2 is in the TOS position, the tone controlled operation is unaffected and the LED is not lit. This switch is not installed on early models.



REV. 1994C-W R.1.1



CAPACITANCE IS IN pF UNLESS OTHERWISE SPECIFIED

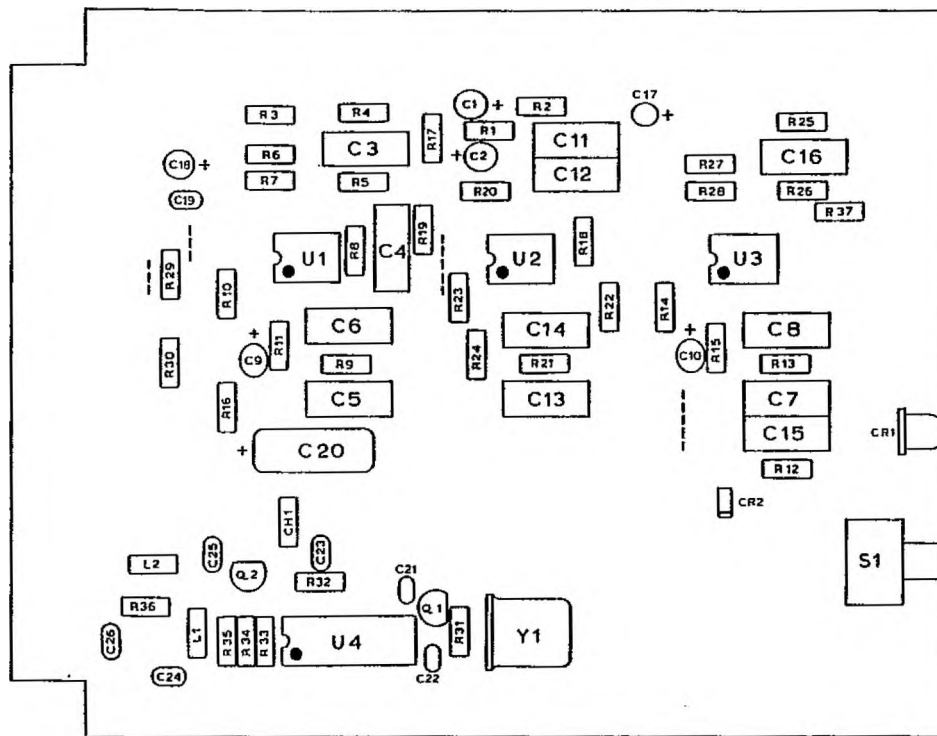
- Q.1 2N3904
- Q.2 2N3906
- U1-3 1458
- U.4 4520
- CR1 MV5753
- CR2 1N4148

B	2081/770	CHANGE VALUE R34,35	AL	IC	
A	10/11/77	TOS - COS, SW ADDED	AL	YC	
REV	DATE	DESCRIPTION	DRN	CHKD	APPVD

**WR** WESTERN RADIO SERVICES LTD.  
VANCOUVER B.C., CANADA

TITLE: MODEL RTC-54B, 14.0601  
CTCSS TONE CONTROL  
SCHEMATIC DIAGRAM

DRAWN <i>W.R.</i>	DATE AUGUST 7, 1979.	DRAWING NUMBER
CHECKED <i>IC</i>	SCALE	12 - 1
APPROVED		




VIEW FROM COMPONENT SIDE



A	Edwin	COS-105, 5W ADDED	Ed	JC
REV	DATE	DESCRIPTION	DRN	CHKD
			APPRD	
<b>WR</b>		<b>WESTERN RADIO SERVICES LTD.</b>		
		VANCOUVER B.C., CANADA		
TITLE: MODEL RTC-54B, 14.0601				
CTCSS TONE CONTROL				
P.C. ASSEMBLY				
DRAWN	Edwin	DATE	AUG. 9, 1979.	DRAWING NUMBER
CHECKED	JC	SCALE		12-2
APPROVED				

C1	4.7 uF tant., 25V			26.1021		
C2	1.5 uF tant., 35V	Kemet	T362B155M035AS	26.1002		
C3	0.033 uF parylene	"	F320B3302G050	25.0500		
C4	0.033 uF "	"	"	"		
C5	0.033 uF "	"	"	"		
C6	0.033 uF "	"	"	"		
C7	0.033 uF "	"	"	"		
C8	0.033 uF "	"	"	"		
C9	1.5 uF tant., 35V			26.1032		
C10	33 uF tant., 10V			26.1010		
C11	0.033 uF parylene	Kemet	F320B3302G050	25.0500		
C12	0.033 uF "	"	"	"		
C13	0.033 uF "	"	"	"		
C14	0.033 uF "	"	"	"		
C15	0.033 uF "	"	"	"		
C16	0.033 uF "	"	"	"		
C17	0.33 uF tant., 35V	Kemet	T362A334M035AS	26.1000		
C18	4.7 uF tant., 25V			26.1021		
C19	0.022 uF ceramic	Kemet	C330C223M1R5CA	24.4050		
C20	100 uF elect., 10V	Siem.	81000	27.1002		
C21	22 pF ceramic	Kemet	C315C220K2G5CA	24.4049		
C22	100 pF "	"	C312C101M2G5CA	24.4040		
C23	0.1 uF "	"	C320C104M5R5CA	24.4045		
C24	2700 pF "	"	C320C272K1R5CA	24.4048		
C25	0.01 uF "	"	C320C103M1R5CA	24.4044		
C26	2700 pF "	"	C320C272K1R5CA	24.4048		
CH1	15 uH	Del.	1025-48	31.1006		
CR1	LED, red	GI	MV5753	58.0021		
CR2	Si	Fair.	1N4148	37.0600		
Ref	Description	Mfr	Mfr Part No	WR Part No	Qty	Item
			<b>UR communications ltd.</b> vancouver, b.c., canada.			
			<b>PARTS LIST</b>			
			DATE : May 29, 1980	MODEL : RTC-54B		
			APPROVED : <i>kc</i>	ASSY. NO 14.0601		
REV	APP	DATE	ITEM	CHANGE TO	WR PART NO.	SHEET 1 OF 3



L1	150 uH	Del.	1025-72	31.1007		
L2	150 uH	Del.	1025-72	31.1007		
Q1	NPN	Mot.	2N3904	64.0120		
Q2	PNP	Mot.	2N3906	64.0122		
R1	4.3K ½W 5% tol.	Rohm	R25J	55.2432		
R2	390 "	"	"	55.2391		
R3	12K "	"	"	55.2123		
R4	56.2K ½W 1% tol.	IRC	T055	56.0113		
R5	56.2K "	"	"	56.0113		
R6	267K "	"	"	56.0119		
R7	182K "	"	"	56.0118		
R8	26.1K "	"	"	56.0112		
R9	26.1K "	"	"	56.0112		
R10	90.9K "	"	"	56.0115		
R11	140K "	"	"	56.0117		
R12	19.6K "	"	"	56.0110		
R13	19.6K "	"	"	56.0110		
R14	61.9K "	"	"	56.0114		
R15	115K "	"	"	56.0116		
R16	12K ½W 5% tol.	Rohm	R25J	55.2123		
R17	4.75K ½W 1% tol.	IRC	T055	56.0121		
R18	4.75K "	"	"	56.0121		
R19	267K "	"	"	56.0119		
R20	182K "	"	"	56.0118		
R21	10.0K "	"	"	56.0109		
R22	10.0K "	"	"	56.0109		
R23	90.9K "	"	"	56.0115		
R24	140K "	"	"	56.0117		
Ref	Description	Mfr	Mfr Part No	WR Part No	Qty	Item
			 <b>UR communications ltd.</b> vancouver, b.c., canada. <b>PARTS LIST</b>			
			DATE: May 29, 1980	MODEL: RTC-54B		
			APPROVED: <i>jc</i>	ASSY. NO. 14.0601		
REV	APP	DATE	ITEM	CHANGE TO	WR PART NO.	
					SHEET 2 OF 3	

R25	13.3K ¼W 1% tol.	IRC	T055	56.0111		
R26	13.3K "	"	"	56.0111		
R27	61.9K "	"	"	56.0114		
R28	115K "	"	"	56.0116		
R29	27K ¼W 5% tol.	Rohm	R25J	55.2273		
R30	39K "	"	"	55.2393		
R31	330K "	"	"	55.2334		
R32	2.7K "	"	"	55.2272		
R33	12K "	"	"	55.2123		
R34	510 "	"	"	55.2511		
R35	240 "	"	"	55.2241		
R36	150 "	"	"	55.2151		
R37	1.5K "	"	"	55.2152		
U1	dual Op. Amp.	Mot.	MC1458CP1	41.1403		
U2	"	"	"	"		
U3	"	"	"	"		
U4	dual 4-bit count.	"	MC14520BCP	41.1908		
S1	SPDT toggle	C&K	7101A	61.0601		
Y1	3200 KHz			34.1005		
	PCB			51.0601		
	Card Handle			23.1070		
	Card Holder RTC-54B			23.1084A		
	IC Socket	TI	C8408-02	33.1175	3	
	" "	TI	C8416-02	33.1177		
Ref	Description	Mfr	Mfr Part No	WR Part No	Qty	Item

**WR communications Ltd.**  
vancouver, b.c., canada.

**PARTS LIST**

DATE: May 29, 1980

MODEL: RTC-54B

APPROVED: *fc*

ASSY. NO. 14.0601

*A/K* Dec 1.80 R34.35 change value

REV	APP	DATE	ITEM	CHANGE TO	WR PART NO.

SHEET 3 OF 3