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NOTES ONLY

BY KEVIN WHITE FORBES

FREQUENCY MODIFICATIONS AND POWER CONTROLS FOR THE PHILIPS FM 320

UHF CB TRANSCEIVER

**Transmitting on non C.R.S. (Citizens Radio Service) frequencies is not permitted.
Reception of non C.R.S. (UHF C.B.) is permitted. (you are allowed to listen).
This information record is provided for technical and educational purposes only.**

INSTALLING EXTRA CHANNELS

If you are highly superstitious, you probably won't want to continue after I tell you that you have to cut a track that joins two I.C.'s and it runs between pin 13 on both of them. (Humour)

You will need a double pole single throw (dpst) toggle switch.

Thin hookup wire.

A soldering iron and solder.

A little bit of nouse, but not too much.

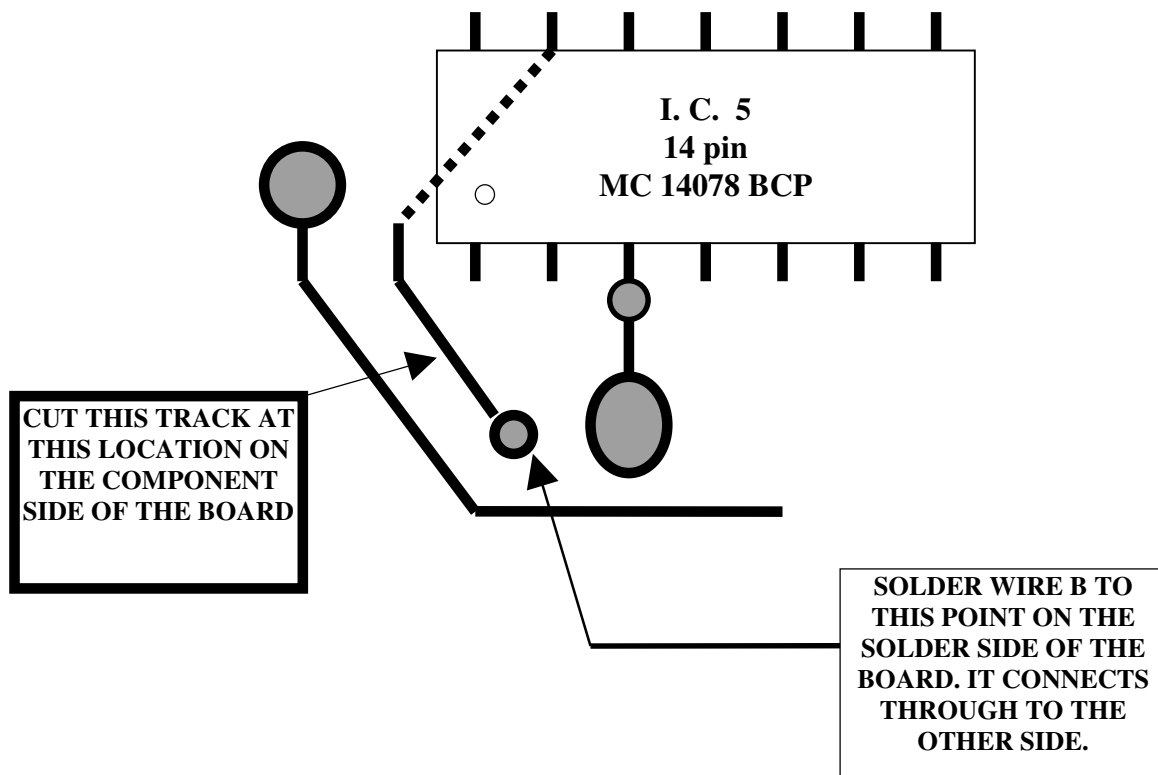
Let's start our doctoring by removing the top and bottom covers of the radio.

You won't have to take off the front panel cover even if you want to personally adjust the high or carrier mute (VR 19) and or the low or noise mute (VR 20) settings.

See "Components Layout" page. There are small holes in the circuit board for adjustments.

Prepare the toggle switch for installation by soldering on to its three terminals predetermined lengths of end stripped and tinned hookup wire. We shall refer to these wires as A, B, and C. Wire B is the centre wire on the switch or the common.

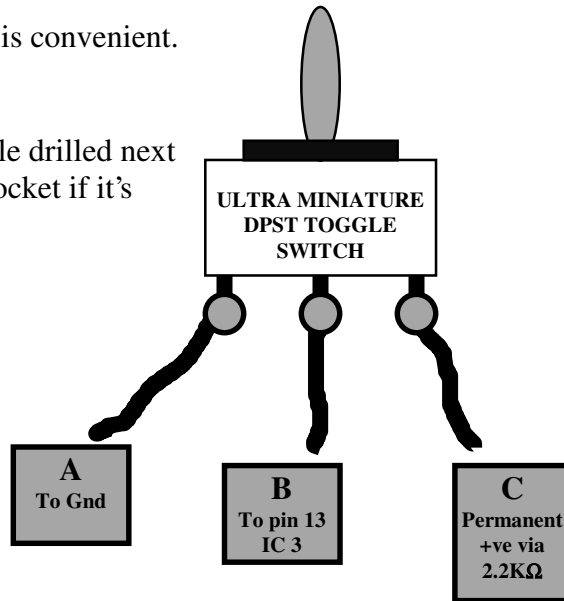
Let's cut the track that joins pin 13 on IC 3 with pin 13 on IC 5 at the location marked. The idea is to disable the output from IC 5 from the rest of the circuit, it prevents the counter going above 40. This track is also connected to the front panel display chips.



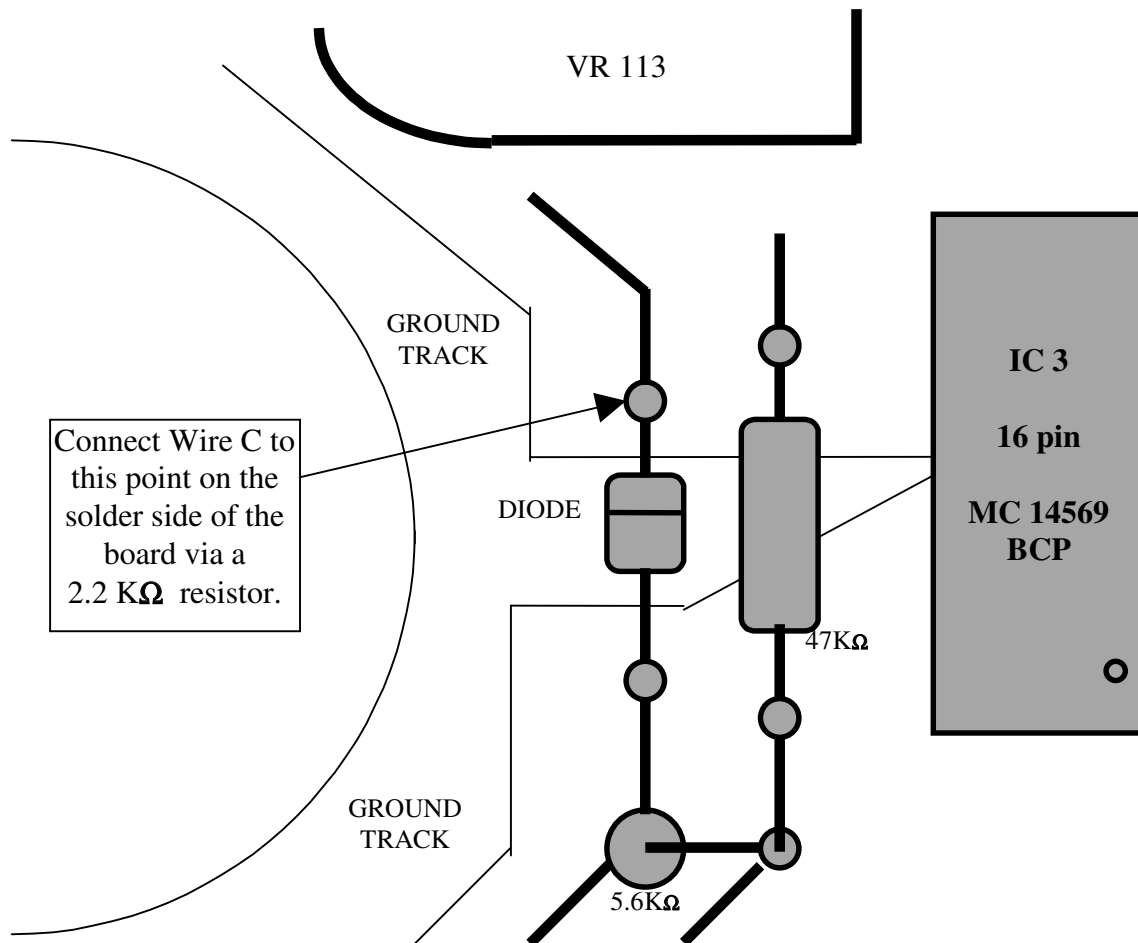
INSTALLING EXTRA CHANNELS

Solder wire A to Ground somewhere that is convenient.

The toggle switch could be placed in a hole drilled next to the EXT SPKR socket or remove the socket if it's not used and place the toggle in there.



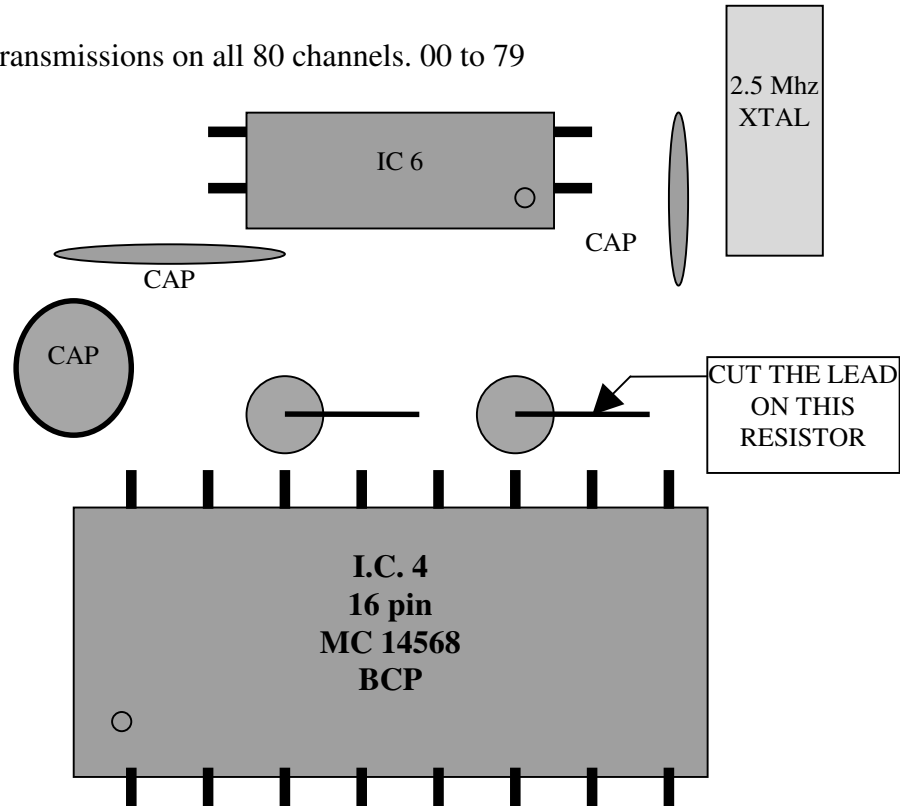
Wire C must have a resistor on the end of it. Say 1kΩ to 3.3 kΩ should do and the resistor should be soldered to a permanent positive voltage such as the one shown. The resistor may be placed on the switch or on the board, just so long as it's in between the board and the switch.



INSTALLING EXTRA CHANNELS

Disable the “Transmit Inhibit Circuit” which prohibits transmissions above channel 65 or something by cutting the lead on resistor **R 287 22K**.

This will enable transmissions on all 80 channels. 00 to 79



Well that's that bit over, now for a bit of twiddling.

Time to adjust the HF VCO. See the “Components Layout” page for “L9”. The ferrite slug in the middle will have to be wound out to the full extent of its travel and perhaps a little bit further as mine had to be.

Keep checking that you have transmit and receive on channels 00 low band and 79 high band.

This VCO is right on its limit providing 2 Mhz of coverage. I had to put a small piece of rolled up paper inside the coil and push the ferrite slug slowly down into it, checking my channels for TX & RX at the same time, until it was just right, applying some araldite to secure it in place for ever.

You may have to adjust also VR 113 and C 111 single turn trimmer cap UHF VCO.

Make notes of the original positions of these controls BEFORE you start adjusting them.

Rightyo then.

Yo Ho Ho and a bottle of Rum. Let's turn the power up. Oh what fun!

Just in case it is not putting out its full allowable 5 watts.

AUDIO & POWER ADJUSTMENTS.

When adjusting ferrite slugs in coils, use a plastic tip or a copper tip, copper is a little more forgiving than hard steel tips on brittle ferrite. **REMEMBER.** Breaking the slug could throw the radio completely off frequency.

VR 11 is the deviation control, turning it fully clockwise produces the narrowest deviation and the best modulation, turning it fully counter clockwise kills audio modulation completely.

Peak the Audio by carefully adjusting **L49** while watching the signal strength meter and receiving a constant strong signal such as a local repeater first. Then **L48** and then **L45**.

If you are having a hard time understanding weak stations through bad audio. Try this. Stick a bit of wire in the antenna socket just long enough to pick up the signals on low mute. With a plastic tip, (inserting a metal tip may change the freq.), **VERY** carefully adjust **C 13** RX Freq. Adj. until the clearest most intelligible signal is heard.

POWER ADJUSTMENTS:

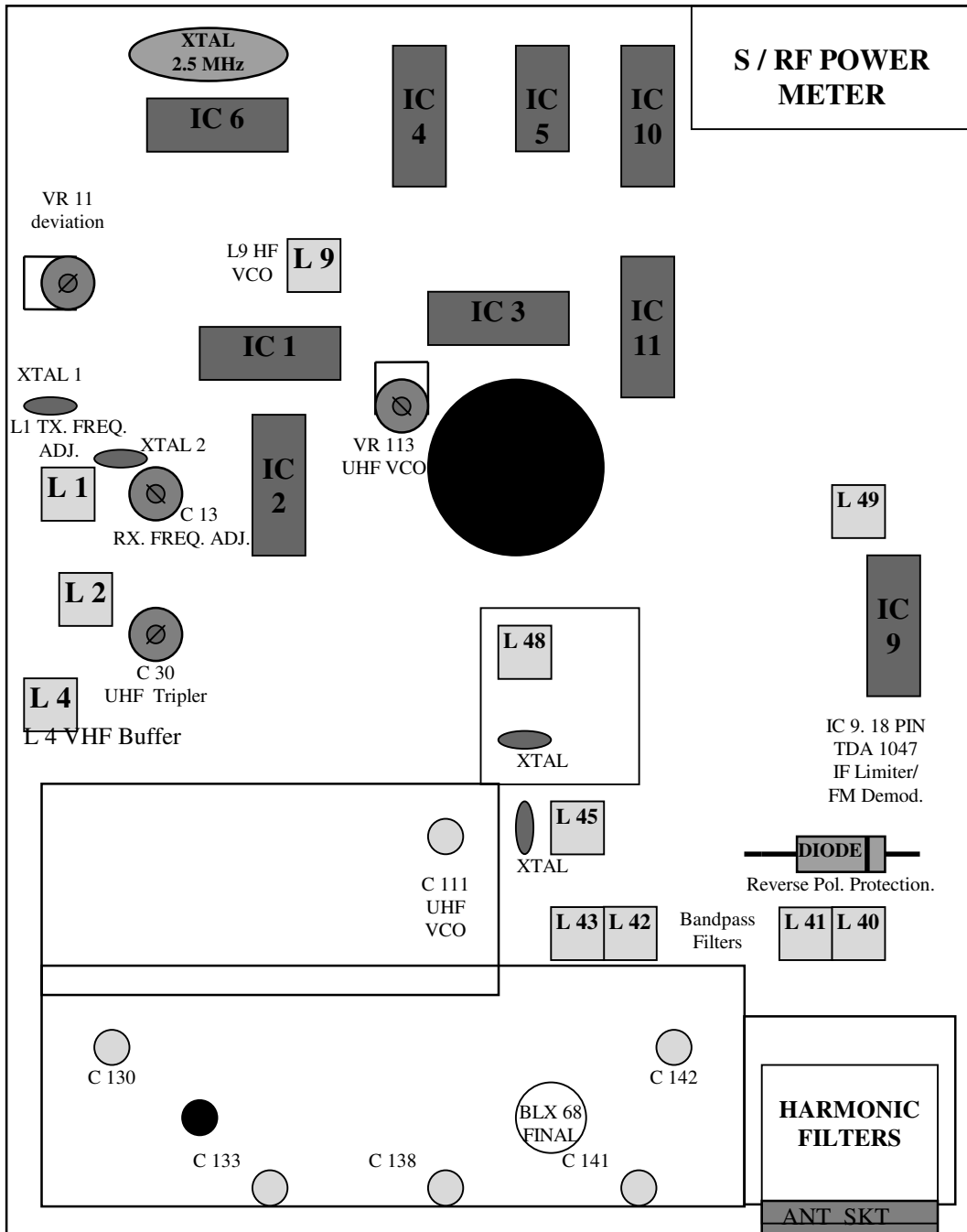
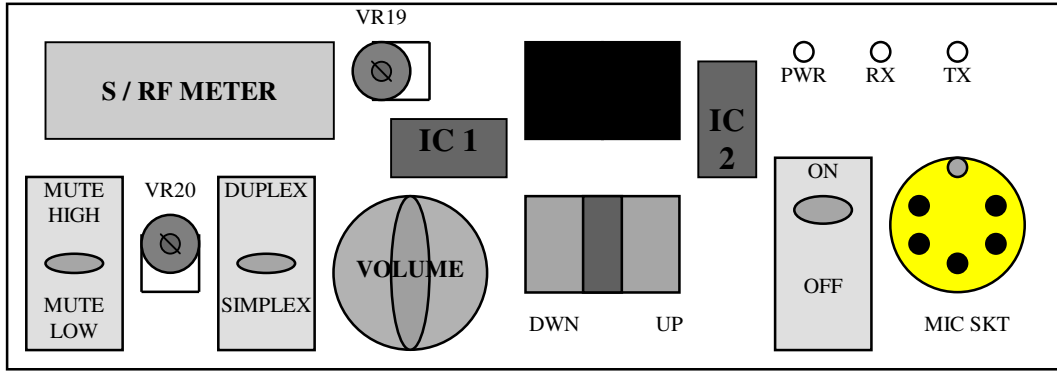
You need, one SWR/Power meter capable of operating at 477 Mhz connected inline for these adjustments to be made properly. If not, use the radios S/RF Meter.

These should be made with a 50 ohm dummy load flatlined or at the very least an antenna with a SWR lower than 1:1.5 Go to a quiet unused channel. push the transmit button and with a plastic tip, (inserting a metal tip **WILL** change the freq. and **KILL** the transmitter.), adjust in this order and very slowly and carefully, **C130, C133, C138, C141** and **C 142**.

You will not get much more than 5 watts out of this radio. My radio had an output power of less than 1 watt when I put on the power meter, not enough to set the calibration on the SWR meter. I watched happily as the needle climbed to 5 watts as I adjusted the controls.

The FM 320 is notorious for not working after getting a bump, it has no chassis to protect it, only its plastic covers. Suspect the solder connections between the front panel and the main circuit board. If this is not the problem try prodding and poking the main board and observe what happens. You may have to re-solder all the joins on the board to find it.

COMPONENTS LAYOUT FM 320. FRONT PANEL & MAIN BOARD.



PHILIPS FM 320

UHF TRANSCEIVER.

476.400 MHz To 478.375 MHz.

CHANNEL	FREQ.	CHANNEL	FREQ.	CHANNEL	FREQ.	CHANNEL	FREQ.
00	476.400	20	476.900	40	477.400	60	477.900
01	476.425	21	476.925	41	477.425	61	477.925
02	476.450	22	476.950	42	477.450	62	477.950
03	476.475	23	476.975	43	477.475	63	477.975
04	476.500	24	477.000	44	477.500	64	478.000
05	476.525	25	477.025	45	477.525	65	478.025
06	476.550	26	477.050	46	477.550	66	478.050
07	476.575	27	477.075	47	477.575	67	478.075
08	476.600	28	477.100	48	477.600	68	478.100
09	476.625	29	477.125	49	477.625	69	478.125
10	476.650	30	477.150	50	477.650	70	478.150
11	476.675	31	477.175	51	477.675	71	478.175
12	476.700	32	477.200	52	477.700	72	478.200
13	476.725	33	477.225	53	477.725	73	478.225
14	476.750	34	477.250	54	477.750	74	478.250
15	476.775	35	477.275	55	477.775	75	478.275
16	476.800	36	477.300	56	477.800	76	478.300
17	476.825	37	477.325	57	477.825	77	478.325
18	476.850	38	477.350	58	477.850	78	478.350
19	476.875	39	477.375	59	477.875	79	478.375