Mods for Ranger RCI-2950

Modification voor Ranger RCI-2950

The only difference between the old and new versions of the RCI2950 is the new CPU board. They require slightly different modifications.

Old Version

The old version of this radio can be expanded from 26 Mhz to 32 Mhz. Although the use of the 30 -32 Mhz range may need realignment.

First find the PC board with the jumpers on (behind the front panel).Then find 'J2',there is a jumper on pins P3 and P4.If this is jumper is removed you will get coverage from 26 Mhz to 29.7 Mhz.

If this jumper is then place on P1 and P2 coverage will be from 26 Mhz to 32 Mhz(re tuning may be needed to operate in 30-32 Mhz range).

The CPU now needs to be reset by pressing the button located below 'J2'

New Version

As the CPU board has changed the modification is different. On the CPU board there is only one jumper with two positions available. In one position it covers 28 Mhz to 30 Mhz, In the other it covers 26 Mhz to 30 Mhz. But if you jump all three pins together you'll get 26 Mhz to 30 Mhz.(If this is incorrect PLEASE tell me)

Problem.....Clarifier Mod (open) for the Mirage/Ranger RCI-2950

The Fix:

First I must assume that you have the "proper" equipment for this modification.

Locate R-197
Unsolder the wire lead side of this resistor that goes to the black wire of plug
Make sure that the "hole" is cleaned out good from where R-197 was removed
Solder a piece of wire from this hole to Pin #3 of IC6 (about 6 inches)
Remove D-59

Let your radio "cook" for a couple of hours to get "used" to the new modification.

Full Time "Talk Back"

To fix: Remove D - 78

RCI - 2950 & 2970 Other Tips

1. Receiver Temporarily Shuts Down

To fix: This is an AGC overload. Locate R49, a look resistor and replace with a 470K resistor.

2. Very "Noisy" Receiver

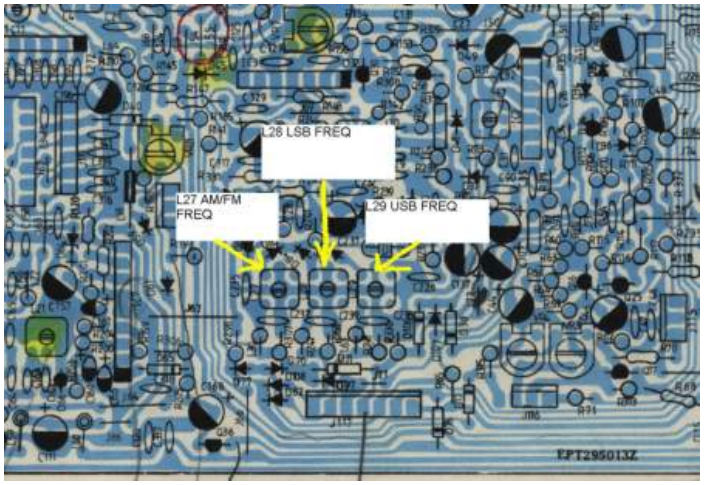
To fix: Locate R78, a 2.2 K resistor and replace with a 6.8 K resistor.

Improved receive gain

Quieting of AM reception and improving gain of incoming signals is a common request from radio operators. In the first stages of the HF input 2SC1674 transistor can be found. This transistor is responsible for the amplification of a small detected signals. A problems exist if the transistor itself is noisy as is such the case of the 2SC1674 when compared to other low noise packages. Along with the amplification of the incoming signals is transistor noise. Replacement of this transistor with a higher gain, lower noise transistor greatly improves the signal to noise ratio of your receiver.
We will use an 2SC2999 transistor that has higher gain lower noise characteristic. Replace the 2SC1674 (Q18) with an 2SC2999 (or similar low noise and high gain transistor) to achieve this improved signal to noise ratio.
Re-Adjust L8 and L9
The gain will improved with more than 6dB with the same signal to noise ratio.

Adjustment points of RCI-2950 series

Frequency adjustment points of RCI-2950 series.



Click on the image to see a bigger view of the main board.

RCI-2950dx 18.9251 - 36.1049 freq mod

Do you want to go down to 20mhz on that dx radio??

After you have the module installed, you can trick it into going to any frequency between 18.9251-36.1049mhz! This involves a little math but you can do it!!

You first program the split function...for our example we will use 6.965mhz..

After this is programmed leave the spit function at -split..

Next press manual to get to the ch display and have it on ch 1

Next press manual to get to the co display and have it on ch 1..

Press the mic key momentairly and notice the buzzz from the radio, it's because the spit function is still active..

Press Man again.. and Bingo "(UNQUOTE) .....

I have tried this without the module (i don't even know what module is being mentioned) and would you beleive i can actualy transmit and receive on these frequency's.... In order for it to be a 100% right i will hafe to re-align the radio again..... Kind of sounds like the AR3500 in a small way... My self i can't wait til the future when the rest of this radio's secrets are reveiled.

RCI-2950dx 15 meter conversion

1- Radio must have the module connected to rx/tx from 32.000 - 24.000 mhz.

2- Open radio on the speaker side.

3- Face the back side of radio towards you. leaving the front panel away from you.

4- Looking where the module is plugged in on the back side of the front panel there will be 2 sets of pins right above the module plug in. connect the 2 right pins together.

5- Reassemble the radio.

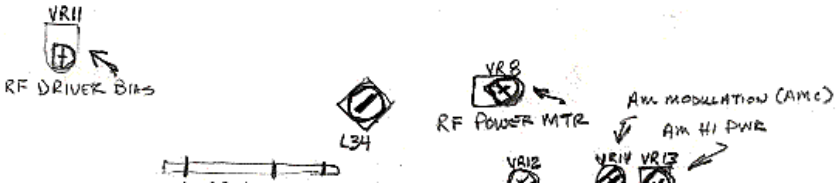
6- Turn radio on and radio should start at 21.000.

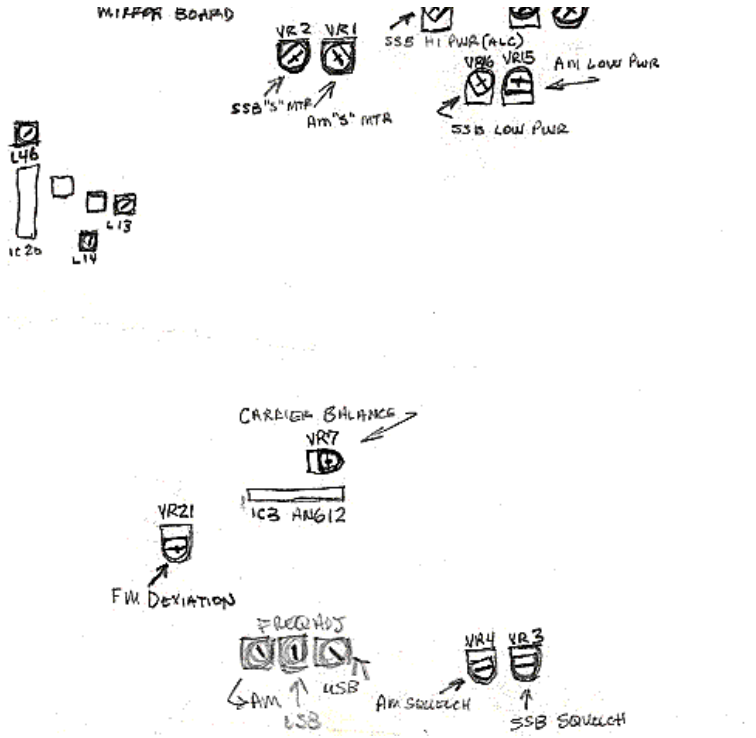
I have done this modification but have not TX on an antenna. It does TX RF but not sure how well the RX is. Please don't do this modification if you are unsure or uncomfortable with this mod. I take no responsibility on the outcome.

RCI 2950-2970 alignment

Reference the accompanying pictorial sketch (below) for component location during your alignment process. The pictorial component layouts are adjusted to the factory settings for my radio and yours may differ. All alignments are done at your own risk and you assume any and all liabilities for your own mistakes. The forgoing has been performed on many of the RCI 29xx series amateur radios. Why they call this an amateur radio is beyond me. The RCI 29xx series radio has horrible grounding problems and the frequency drifts after warm-up. It is my assumption, and that of most, that this is RCI's attempt at selling mass quantities of "Hybrid CB" Radios - and boy have they!

RCI-2950 - 2970 Elignment





Adjust VR14 (AM Modulation AMC) for maximum forward modulation. I personally don't recommend removing Q32 (Modulation Limiter) for more modulation - the radio will splatter enough without its removal.

Set your desired operating frequency or choose a frequency that is in "middle" of the band that you prefer to operate. With a Watt Meter connected and a properly adjusted antenna; adjust L34, L13, L14, L46, and L10 in AM Mode for maximum forward output.

VR11 (RF Driver Bias) should be adjusted for maximum forward RF output in AM Mode. After adjustment repeat the adjustments of L34, L13, L14, and L10.

Disconnect your antenna and install a wattmeter and a dummy load to the output of the radio. On the front of the radio; rotate the RF PWR control to its maximum - full clockwise position and adjust VR13 (AM High Power) for 12-Watts "dead key - no audio" output. Rotate the RF PWR control to its minimum - full counter clockwise position and adjust VR15 (AM Low Power) for 2-Watts "dead key - no audio" output. With a watt meter and antenna hooked up, and no modulation injected, you should see about 15 watts minimum to 30 watts maximum RF output.

Disconnect your antenna and install a wattmeter and a dummy load to the output of the radio. On the front of the radio; rotate the RF PWR control to its maximum - full clockwise position and adjust VR12 (SSB High Power ALC) for a maximum PEP on SSB. Rotate the RF PWR control to its minimum - full counter clockwise position and adjust VR16 (SSB Low Power ALC) for a minimum 6 Watts PEP on SSB. With a watt meter and antenna hooked up, and speaking normally into the microphone, you should see about 40 watts maximum RF output.

With the antenna disconnected, and a wattmeter and dummy load installed, set the RF PWR control to minimum - full counter clockwise position. Adjust VR8 (RF Power Meter) to reflect the actual "minimum" output of the radio.

RCI 2950 New Model, Extended RX/TX

Remove the bottom cover and with the rear panel nearest to you, observe a pair of jumper posts in the cutout of the aluminum bracket behind the front panel looking like " : : ". Jumper the right pair.

Replace the bottom cover and you now have continuous coverage from 24-32 Mhz (but output may be reduced over 30 Mhz).

Press the "MAN" button and the display changes to the CB mode with channels 1-40 available.

Press again to restore VFO display. Be advised that this rig is NOT FCC type accepted for CB use despite

Press again to restore VFO display. Be advised that this rig is NOT FCC type accepted for CB use despite the manufacturer's provision of a CB channel display.

Amateur Ops, do not jeopardize your priveledges by transmitting on out-of-band frequencies or on the chicken band.

The best use of this mod is as a driver for a 10M to 2M transverter such as the Ten-Tec 1210, providing all modes and full coverage of the 2 meter ham band using 28 to 32 Mhz.

Frequency Modification for Ranger RCI-2950

1- Remove the case. I *think* you can remove either the top cover or the bottom cover to get to the PC board with the jumpers. It will be a small PC board immediately behind the front panel.

2- Locate "J2". There will be a jumper on pins P3 and P4.
3- Remove this jumper to expand coverage to 26 MHz - 29.7 MHz.
4- Move the jumper from P3-P4 to P1-P2 to expand coverage to 26 MHz - 32 MHz.
5- After moving (or removing) the jumper, press the CPU reset button (located below J2).

NOTE:
Operation between 30-32MHz may require retuning the VCO.

CB Channel Readout Modification

1- Locate J1. There will be a jumper on pins P1-P2.
2- Remove jumper and place on P2-P3.
3- Press the LOCK button on the front panel. The readout will now display the CB channel number 1-40 -- also will display "A" channels.
3-Press LOCK again to return to VFO mode.

NOTE:
The SHF button will not operate while in CB mode.
This modification will disable the frequency lock function.

CB Channel 9 Select Modification

1- Locate J3. There is a jumper between P1-P2.
2- Remove the jumper and place it on P2-P3.
3- Press the "roger beep" button to go directly to CB Channel 9.

NOTE:
Doing this modification makes it impossible to turn off the roger beep feature (unless, *possibly* you make sure the roger beep is turned off before moving the jumper. I'm not sure).

Tune-up Modifications

Adjust VR14 (AMC) for maximum forward modification. Mod limiter Q32 can be removed for more modulation, but it also disables VR12 (SSB ALC) and disables variable power for SSB. I do not recommend removing Q32; you'll have plenty of modulation as is.

Tune L34, L13, L14, L46 and L10 in AM mode for maximum forward swing, using a peak-reading wattmeter. Try to balance for even power from top to bottom of frequency range.
NOTE: You'll have a LOT of trouble identifying these cans. Sorry, I don't know for sure where they are either.

Adjust VR13 (AM High Power) for 12 watts dead key with the front panel RF power control at maximum.
Adjust VR15 (AM Low Power) for 2 watts dead key with front panel RF power control at minimum.
>From the 12-watt dead key you should see a forward swing of 30-40 watts.
>From the 2-watt dead key you should see a forward swing of 18-20 watts.

Adjust VR12 (SSB High Power ALC) for maximum PEP on SSB, then back off just a little, with front panel RF power control at maximum.
Adjust VR16 (SSB Low Power ALC) for 5-6 watts PEP on SSB with front panel RF power control at minimum. You should see 40-50 watts PEP on SSB with front panel RF power control at maximum.

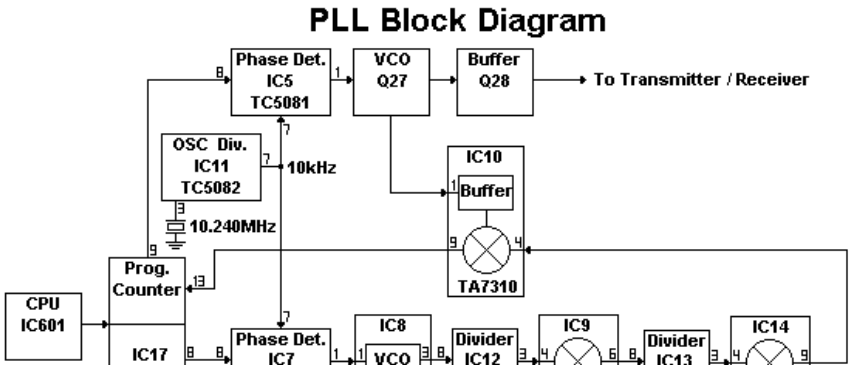
Microphone wiring diagram

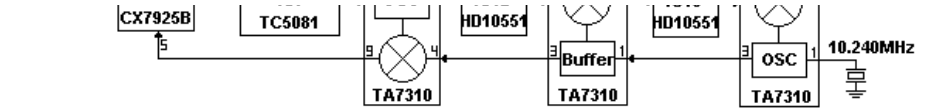
Pin 1 -- shield

Pin 2 -- Audio
Pin 3 -- Transmit
Pin 4 -- Receive
Pin 5 -- Frequency select up These might be reversed.
Pin 6 -- Frequency select down /

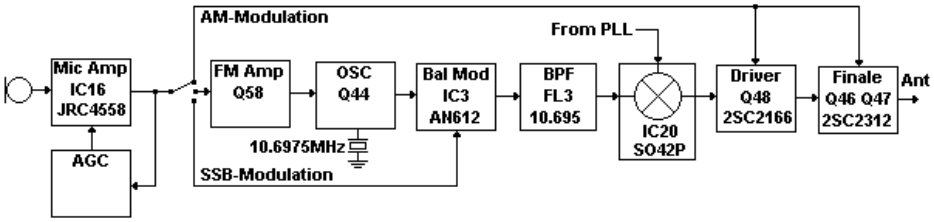
Disclaimer:
The preceding message is posted for information only. I do not condone the modification of amateur transceivers for use outside the amateur band. It is *possible* that performing the tune-up modifications will shorten the life of the radio's components due to driving them too close to their design tolerances. I accept no responsibility for possible damage to any radio that is modified in this way. I cannot personally vouch for any of these modifications; they were given to me by a technically-inclined friend.

Block Diagram

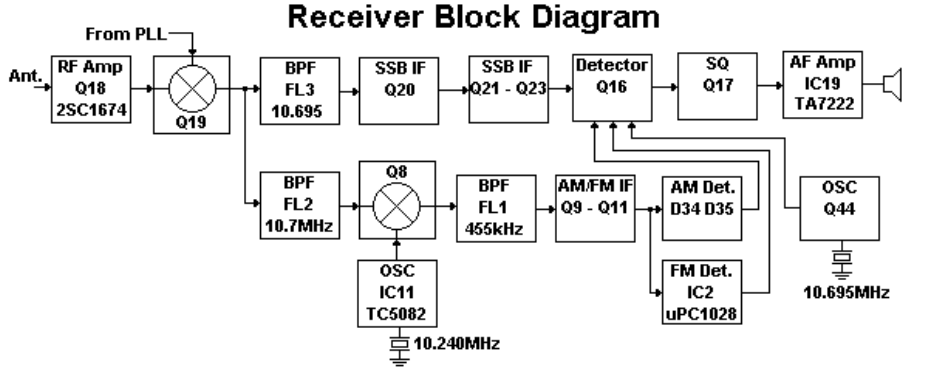


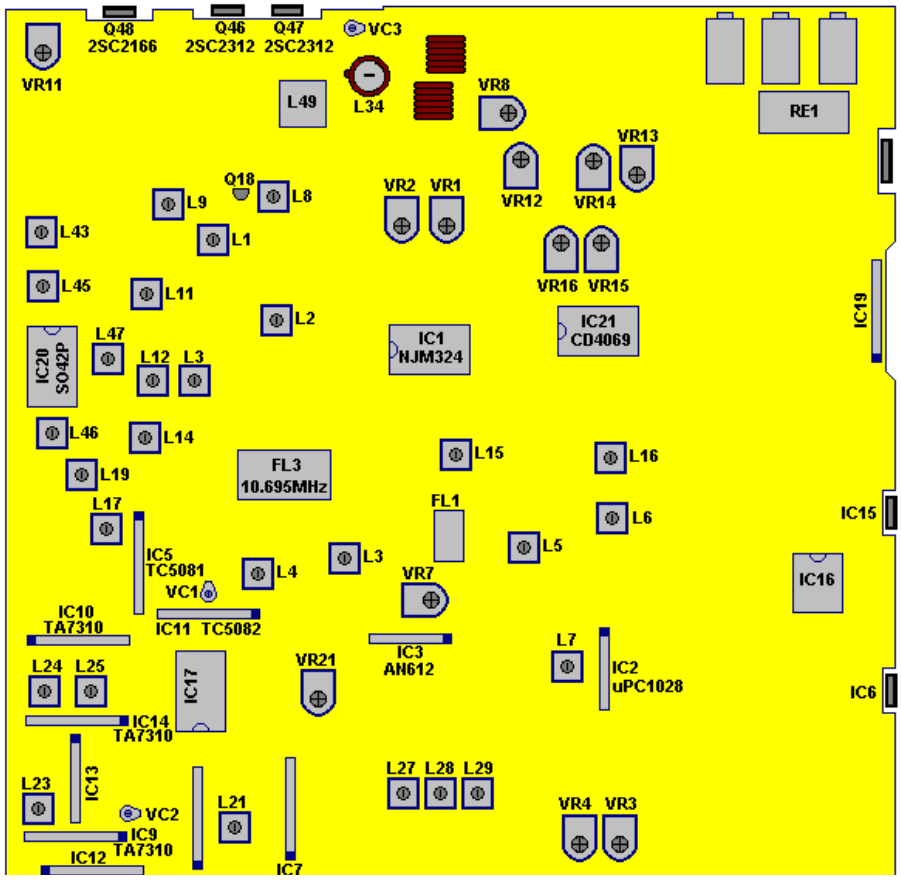


Transmitter Block Diagram



Receiver Block Diagram





Reading Point	Adjustment	Description	Value
OSCILLATOR / PLL			
J13	L17	VCO-Voltage	2,2 Volt
IC7 Pin 3	L21		1,2 Volt
L61	VC1	RX AM	10.240MHz
IC14 Pin 3	VR21	TX AM	10.240MHz
D45	L27	TX AM	10.6950MHz
D45	L29	TX USB	10.6925MHz
D45	L28	TX LSB	10.6975MHz
IC17 Pin 13	Check	RX AM	5.930MHz
IC17 Pin 12	L23		Maximum on Oscilloscope
IC17 Pin 13	L24 L25		Maximum on Oscilloscope
D116	L19		Maximum on Oscilloscope
RECEIVER			
	L8 L9 L11	RF Input	
	L12 L13 L14	1st IF	
	L3 L4 L5 L6	AM/FM IF	
	L7	FM Discriminator (Demodulator)	
	L15 L16	SSB IF	
TP1	L1 L2	NB/ANL IF	
	VR3	AM Squelch threshold	
	VR4	SSB Squelch threshold	
S-Meter	VR2	RX SSB	
S-Meter	VR1	RX AM	
TRANSMITTER			
	VR11	Bias Driver	10mA
	VC3	Bias Finale	
	L47	TX Mixer input (10.695MHz carrier)	
	L48	TX Mixer input (From PLL)	
	L45	TX Mixer output	
	L43	Pre-Driver input	
	L34	Harmonic output	
	VR7	SSB Modulator Balance	
	VR16	SSB Low Power	5 Watt (ALC)
	VR12	SSB High Power	40 Watt (ALC)
	VR15	AM Low Power	4 Watt
	VR13	AM High Power	30 Watt
	VR14	90% AM-Modulation	AMC
Power Meter	VR8	TX AM	

ATTENTION

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The KB2LJJ takes no responsibility for any damage during the modification or for any wrong information made on this modification.