

27MHz CB to 50 MHz Amateur Use Conversion

This page details (in brief) the component changes to modify a Cybernet series 27MHz CB transceiver to 50MHz.

Please note that these details are meant for the experienced radio builder/repairer rather than the beginner.

I don't transmit on it much but it uses very little power on receive and the squelch makes it a lot more pleasant than listening to band noise all day.

The photo at left shows the modified transceiver plus a 100 watt CB linear also modified for 50 MHz - a "pidgeon pair" if you will. The combination will produce about 60-70W PEP on 6m SSB and with the internal RF receive preamp on, a much more sensitive receive setup. There is no intention to detail the modifications to the linear amp as each and every CB amplifier will be different and thus require individual changes.



The setup is connected to the J-Pole antenna via a short run of foam-dielectric RG58-sized coax so is great for all-round monitoring.

Even though this article was originally written back in 2002, the same radio + linear are being used here on a daily basis (circa 2009). The common 12V DC power supply runs off a 24 hour timer that switches them on at about 7AM and off at about 9.30PM each and every day, 7 days a week, 52 weeks a year. With the receiver lightly squelched, anything worthwhile that happens on 50.110 USB "emanates" from the radio shack, be it CW or SSB. If I am in earshot, I either listen to this radio or turn on the main station equipment - an Icom IC-7400 which has the advantage of a 6 element yagi to boost signals.

There are probably more of these transceivers around in junkboxes now that 27MHz CB has largely died off and this article might extend their useful lifetimes...

This conversion applies only to the Cybernet series of 27MHz CBs using the PLL-02 synthesiser chip. The 40 channel version is preferred but it can be done on the Australian 18 channel with less frequency coverage available. These were marketed as Super Panther, Super Bengal, HMV Roadhound TX77 but many other brands had exactly the same PCB inside.

The modifications require removing coils, capacitors, a new injection crystal and a lot of patience. Do not attempt it unless you are competent enough to be able to make it work. You don't need a lot of test equipment other than a RF power meter, multimeter and a source of signals at 50 Mhz to tune up the receiver. A frequency counter makes it easier but is not mandatory. I do not guarantee that these modifications will work but they have been used to change a few 27MHz CBs to 50MHz so they SHOULD work for you too. Read the instructions fully so that you understand which parts you will need to complete the modification and the new parts required.

BEFORE YOU START EVEN UNSCREWING THE COVERS, MAKE SURE THE TRANSCEIVER IS WORKING NORMALLY ON BOTH TRANSMIT AND RECEIVE.

The following instructions are in 'brief mode' - it does not say unsolder the can to be able to remove the ferrite ring inside. For instance, "add 12pF externally" means either solder it across the coil base under the PCB or in holes as available. Many things are not detailed precisely. It is up to you to follow the trend of the instructions.

The original instructions were supplied by Gary VK4AR and he apparently used some ideas from modifications done by VK4FXX/VK4ZGF on the same series radios back in about 1980 or 1981. The original modifications required changing capacitors but also stripping turns off coils. The modifications detailed here are simpler and require capacitor changes rather than coil changes.

Receiver Modifications: Changes tuning to 50Mhz for the receiver RF amp and mixer inputs.

1. T7 - Remove the green ferrite ring inside the can. Change C100 from 33pF to 15pF
2. T8 - Remove the internal capacitor and add 12pF externally
3. T9 - Remove the pink ferrite pot core and internal capacitor. Add external 22pF across the PCB and remove C107.
4. Change X1 crystal from 10.0525MHz to 10.14575Mhz (see notes below re other crystals)
5. Ground Pins 4&8 and take Pin 7 of the PLL02 to +5V (changes to 5KHz channel spacing)
6. Reverse the purple & brown wires to the mode switch as USB and LSB are now reversed (mixer now has low side injection rather than high side injection as in normal CB mode)
7. Retune T3 with voltmeter at TP3 then adjust the VCO. Tune T7, T8, T9, T1 and T2 for best receiver sensitivity

Note re Crystal calculations : If you have a crystal close to 10.15Mhz (eg 10.1 and higher), you may be able to use it but not start at 50.0 for channel 1. Use the formula below in reverse to see if it is usable without the need of purchasing a new one. In fact I suggest you use it and make sure the total modification works BEFORE you order one for an exact frequency.

5KHz mode :- $X1 = ((Ft - 10.692) + 1.275)/4$

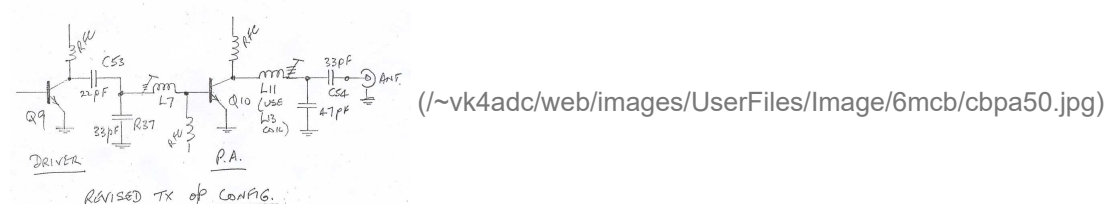
10KHz mode :- $X1 = ((Ft - 10.692) + 2.55)/4$

Clarifier modifications: Changes to T/R clarifier and widens range.

1. Remove D4, D5 and R23 (33k)
2. Move the wire from the moving contact arm of the clarifier pot from R24 to the former junction point of D4,D5 & R23.
3. Connect a wire from the unterminated end of the clarifier control to the regulated 9.4V lug on S2 (mode switch).

Note : The tuning of the clarifier is now non-linear but alignment of CT1 will allow the pot to be centred on either a 5 or 10KHz point (as set by the PLL channelling - as noted above).

Transmitter modifications : Retunes to 50MHz and removes some of the low pass filtering at the transmitter output.



Click to see revised PA circuit larger

1. T4 - Remove the internal capacitor and add 22pF externally.
2. T5 - Remove black ferrite ring inside the can & the internal capacitor. Add 15pf externally.
3. Replace C47 (47pF) with 15pF
4. Remove C52, C37, R37, L11, L12, C54, C55, C57, R40, C184, L201 & C201 at the antenna socket.
5. Cut the PCB track at the earthy end of L7. When fully isolated, join by a short strap to the Base of Q10.
6. Install 22pF in place of C53 and 33pF in place of R37
7. Replace L11 with coil from L13 position, C54 with 33pF, solder 47pF under the PCB from the junction of L11 & C54 to PCB ground. Connect a short wire from the outgoing connection of C54 to the antenna connector.
8. Bypass the SWR PCB if fitted.

Tuning notes : Tune T4 at the to end of the range ie Ch40, tune T5 at the low end ie Ch1. Tune T6 at the centre eg CH20. Tune L7 and L11 for maximum output. At least 4W AM and 4 to 6W on SSB should be realised.

It is possible to optimise the output power by replacing the fixed capacitors in the C53, R37, C54 positions and the 47pF across the output with physically small 60pF trimmers. Changing the driver and PA transistors to 2SC1306 and 2SC1307 respectively should allow power outputs close to 10W on 50MHz.

If it seems these details are brief, they certainly are - and are meant to be. If they do not make sense to you then do not attempt to modify the CB to put it on 50MHz !

GOOD LUCK !

POSTSCRIPT :

After putting together the brief instructions above (on 10 Mar 2002) based on work actually done here in my workshop, I found a reference on the <http://www.6mt.com> site (now gone) for CB conversions up to 50MHz. Most of the items were just JPG graphics but there was one descriptive text by Shawn Baris ZR1EV which I had not seen before. I have made it available for download from this site as an additional source of info regarding these conversions. The file is CBCONV.TXT (/~vk4adc/web/images/UserFiles/File/CBconv.txt) (42KB) and I suggest you download it from here and read it later.