PRESIDENT LINCOLN

(HR2510, HR2600, Uniden 2830 & Realistic HTX-100)

COOKBOOK

CONTENTS

2 Two Stage Power Level

2.1 F/QRO and QRP/QRO Versions

I personally said that it was a shame that all versions of the Uniden HR2510 and HR2600 had so many features, but no power level control. The Lincoln export had a carrier control that allowed the operator to vary the AM/FM power levels, but not the SSB/CW levels. Only half a fix I'd say, since one may wish to drive a simple amplifier beyond the 25 or so watt limit of the radios for DXing. Hence the idea for the two-stage power level switch for these rigs.

The "Mic Gain" control does cut the power a bit on SSB, but not enough for QRP levels that some wish, but can be used in conjunction with the switch to lessen power even more, if one wishes...

The switch simply inserts a given resistance in series with internal pots to provide the desired effect; to cut power (or carrier) on AM/FM modes, and to increase power on SSB/CW.

Let me further explain about the F/QRO and QRP/QRO versions. F/QRP simply means F = Factory power levels on the low setting, QRO = maximum allowable power of the radio on the high setting. The same with QRP/QRO, but at much lower levels on the QRP setting, for use as a battery-powered portable rig for Field Day, or to drive any of the various low-input linear amplifiers one can build or obtain at various flea-markets and ham fests.

First build the switch for the version you desire: 2.2k/3.3k resistors for the F/QRO version, or 5.6k resistors for the QRP/QRO version. See the following diagram; it is on the rear of the switch, and is labeled "A" and "B" poles for simplicity.

Next, remove both covers of the radio; connect to a 13.8 volt DC power supply of at least 10 amps; connect the output of the radio through an accurate watt meter and a dummy load. Now, tune the carrier level up to 20 watts using VR107 in the HR2510, VR8 for the HR2600. Then, with a 1kc tone, key the rig and adjust the ALC down to 12-15 watts using VR104 in the HR2510, VR5 in the HR2600. Now turn the radio off, and disconnect from the power supply.

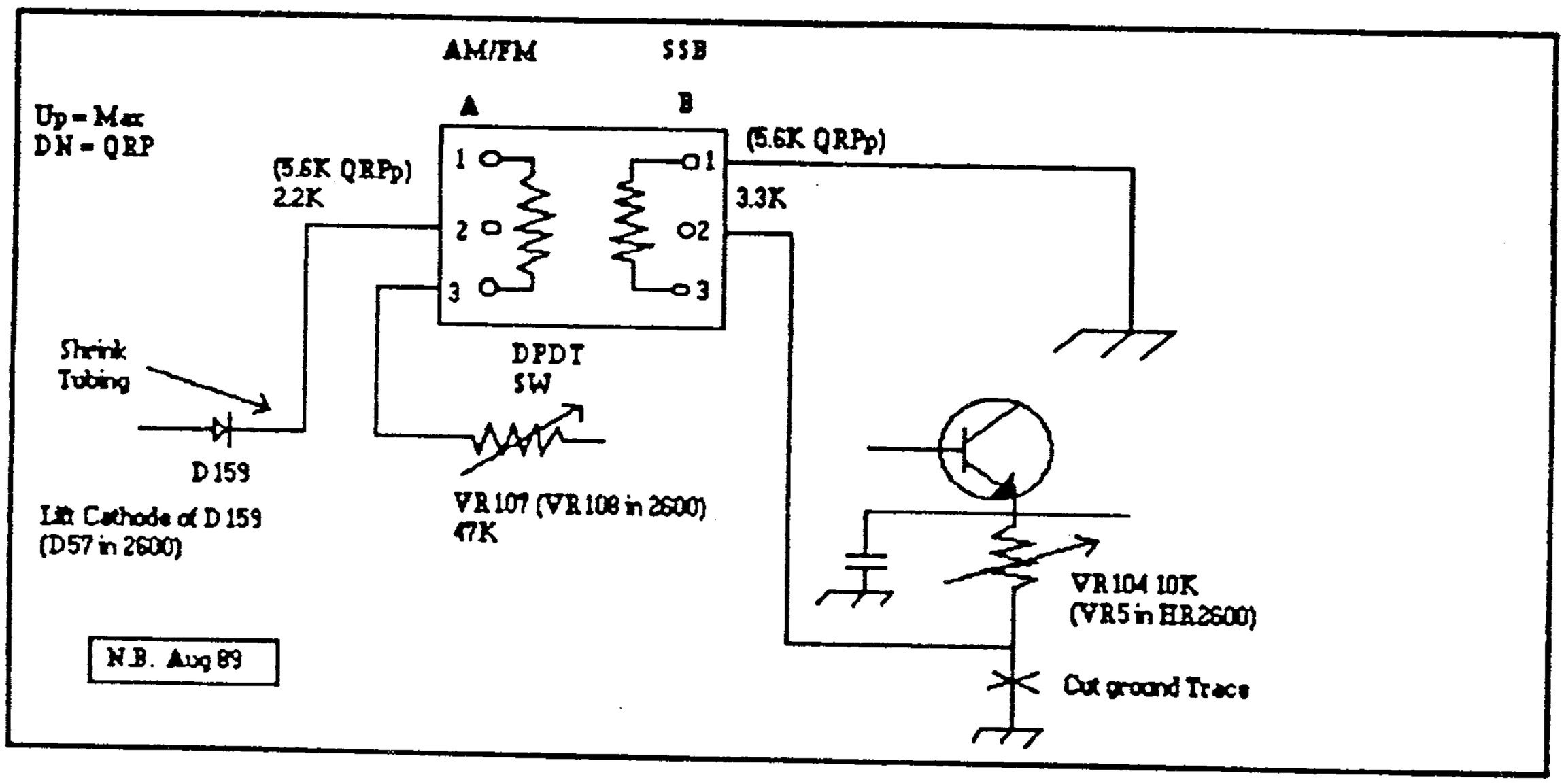
Turn the radio over, and remove the four screws holding the entire microprocessor PCB and frame, and carefully swing it out of the way to expose the bottom of the main PCB in the front of the radio. In this area, you'll find the solder connections for VR107 and D159 for the HR2510, or VR8 and D57 for the HR2600. Install the "A" side of the switch; this controls the AM/FM carrier/CW power levels.

The wiring of the "B" portion of the switch can be installed in one of two ways. After isolating the ground pad of VR104 (HR2510) or VR5 (HR2600), be sure to check your work with a good VOM for total isolation. Now, the first method; route the wires to the bottom of the board and solder in place to the appropriate pads. The second method is more professional and sturdier; using a small PCB drill, bore holes in the appropriate pads and install the switch wiring from the top, and secure same with the main wiring bundle with wire ties. Be sure to check all connections!

Next, carefully swing the microprocessor frame and PCB back into place taking care **not to pinch any of the wires!** Re-install the screws, turn the rig over, connect back to the power supply and power meter and dummy load. With the switch in "HI", check for maximum PEP and 20 watts carrier power. Switch to "LOW", and check the outputs. With the F/QRO version, the powers should be approximately halved, and for the QRP/QRO version, carrier power should be 4-6 watts, and 8-12 watts on SSB/CW. Slight adjustment can be done, with little effect on the high power setting, to fine tune the low powers.

Mount the switch in a comfortable position, with the right front side of the rig, the most open for location. Please note here that the Lincoln already has a variable carrier control, so the "B" portion of the switch can be used to govern the SSB/CW power levels.

2.2 Diagram for Two-stage power Level



Note: Schematic diagram does not follow physical layout of the PCB.

For SSB.

Tune ALC down to 20 watts PEP (5-8 watts QRP version). Isolate VR104 (VR5 in HR2600) from ground **completely!** Connect B1 wire to PCB ground, and B2 wiring to isolated pad of VR104 (VR5 in HR2600). A further reduction in PEP can be obtained by activating the Mic Gain switch on the front panel.

For Carrier (AM/FM).

Tune carrier to 20 watts. Lift cathode of D159 (D57 in the HR2600) and connect to wire A2, covering diode and solder connection with heat shrink tubing. Connect A3 wiring to hole vacated by diode at the variable resistor.

Note: The President Lincoln, a European version of the HR2510/HR2600, already has an outboard control for AM/FM carrier power, so the "A" portion of the above switch is not needed, only the "B" portion.

2.3 Table of parts regarding Two-Stage Power Level

	HR2510	HR2600
Carrier Control	VR107	VR8
SSB ALC Control	VR104	VR5
Diode involved with mods	D159	D57

2.4 Variable Power Controls

Any of the above controls could be paralleled or replaced with an outboard control for total control over the range of the power outputs. Personally, if an operator uses an amplifier, the two-stage power control should be used to avoid dialing a variable control too high (although one could leave the switch in "HI" position, couldn't he?).

3 The Mystery of the 9-Pin Molex Plug

If your like me, did you say to yourself, "Why the heck did they put those things on the rear of these radios, when simple jacks would do?"? At least Radio Shack had their HTX-100 built with something sensible!

The HR2510/HR2600/Lincoln all use this awkward 9-pin plug on the rear heat sink for internal/external speakers, CW key, PA Speaker, with two pins (3 and 6) not connected.

Personally, I think the internal/external speaker wiring can be put on a jack, as well as the CW wiring. PA... Who cares? If nothing else, the 9-pin plug could be used to wire in some useful accessories, such as relay keying of an amplifier, possible transverter inputs/outputs, test points to externally monitor internal workings, like an old tyme (sic) S/RF meter or AGC metering during antenna tests (see elsewhere in text).

These are just a few thoughts; use your own imagination!

4 Better Noise Blanker Performance

This consists of replacing a couple of 1N60 diodes with better-performing Schottky barrier types, ECG584 or equivalent:

-in the HTX-100, the Noise Blanker diodes are D1 and D2, located next to L1.

-in the HR2510/HR2600/Lincoln, these are D201 and D202, located on the sub-board PB117AA.

If need be, L1 in the HTX-100, and L203 in the HR2510/HR2600/Lincoln can be peaked at the noise frequency.

5 "OOPS!" Found in Manuals

On page 12 of the HTX-100 manual, concerning the alignment of the transmitter, the first two procedures deal with the adjustment of the final and driver transistor bias. Under "Remarks", the first procedure reads "...adjust VR11", change to read "VR12"; the second procedure reads "... adjust VR12; change to read "VR11". Whoever did the proof-reading didn't make sure the procedure matched the adjustments in column two!

Also on page 59 of the HTX-100 manual, a supposed diagram of TDA1905 is shown, but the chip is actually the pin-out of the PLL0305A! This also happened on page 16 of the HR2600 manual, but on page 14 of the HR2510 manual, they somehow got it right! The TDA1905 audio chip is a 16-pin device, while the PLL0305A is an 18-pin device.

6 A 12 Meter Uniden Radio?

Yep, 'tis so! Donated by an unknown source was the following information;

"In those HR2510 radios that were modified for 26-29.999 Mhz operation, a crystal **could** be changed to allow 12 meter operation. X302, the 22.0 Mhz crystal on the synthesizer board can be changed for a 10.240 Mhz crystal to gain operation from 24.475 to 28.475 Mhz. Since this doesn't effect the freq readout, a channel chart would have to be made to coincide with the readout."

Curious... I robbed a 10.240 Mhz crystal from a junked-out CB, and tried it. The range I obtained was 24.482 to 28.482 Mhz... most likely due to the cut of the crystal. 12 meters (24.890 to 24.990) fell on the 26.410 to 26.510 readout. Power output seemed very well, and the receiver was functional, although I didn't take the time to hook up the signal generator! (It was 1:45 AM!) Surely, for optimum performance, the radio should be peaked for this new range.

As for the HR2600, this radio supposedly **can't** be tricked for the extended range, doing this change would only net approximately 26.475 to 28.175 Mhz; not acceptable! Note: For this range, try a 6 Mhz crystal.

For the hardy experimenter, a small diode-switching board could be made, and switching between the 22 Mhz and 10.240 Mhz crystals could be done, with a total re-tuning to cover the entire range; it looks as if this rig can do it!

7 Audio Capacitor Update

In earlier versions of the Uniden boards, there have been some (more or less) sub-standard capacitors installed, which have created failures over a few years usage. Mostly, these were in some of the so-called "Export" CBs that many hams bought up and converted for 10 meters, such as the Jackson.

In the HR2510/HR2600/Lincoln and HTX-100, not much has changed, in that the manufacturer still insists on using the same value electrolytic capacitors; these capacitors are available at almost any local electronic store, and are common values. The caps installed in the radios are all mostly 10 volts rated, and should be changed to **at least** 16 volt-rated caps. 25 to 35 volts being better. In the HR2510/HR2600, these caps are C95 and C97. For C130, change to a 50 volt rating. In the HTX-100, change C102, and check C103 for a range of 16 volts or better; C130 has been omitted.

While changing the voltage ratings of these caps, keep the microfarad (mf) values the same.

8 Better AM Receive Audio

This is similar to the noise Blanker update, in that you'll replace the AM detector diodes D111 and D112 for the better Schottky barrier diodes (ECG583 or equivalent); be careful when soldering! None in the HTX-100... No AM!

9 A Simple Power Boost

From WA2IVN: by paralleling C127 with a 680 pf cap, several more watts output will be realized. These parts are the same in the HR2510/HR2600; in the HTX-100, the cap to parallel will be C131, but do this with a 330 pf cap.

10 A Simple Rit Modification

This is a quick 'n' easy RIT mod for those who wish to have variable control of TX/RX at the same time:

1. Remove D150 from the main PCB. (Right front corner).

2. Locate the 4-wire molex plug on the top main PCB, just left of the center; remove the Orange wire, pull it from the wire bundle and route it to the microprocessor board; solder the end to the +7 volt pin of IC311.

3. Center the Rit control, Adjust L315 on the Microprocessor board for "Center Slot" (on frequency operation).

11 A Different Light On Things

Have you gotten tired of the same orange glow from the meter/freq display? ***Change it!*** All you need do is go to your local electronic store and ask for a 12 volt wheat bulb and a different color hood to cover it. Be sure the new hood will fit in the same slot as the old, orange hood -- just snip the leads of the old bulb and remove the hood 'n' all, solder the new bulb in place, being sure to sleeve the soldered wires with heat shrink tubing, to prevent shorting and fasten the new hood in place with just a dab of clear bathroom caulk.

The military uses red-backlit dials for nighttime use, since it is much easier on the eyes -- some folks have expressed satisfaction with this, while others like a light blue. Choose the best for you!

12 A Simple Talk-Back Removal

Locate Q117, a 2SC945 transistor; remove C137 (10v 22uf) capacitor and R199 (1k ohm) resistor from the base of the transistor. You might notice a slight "POP" when un-keying, but this should remove any feedback problems.

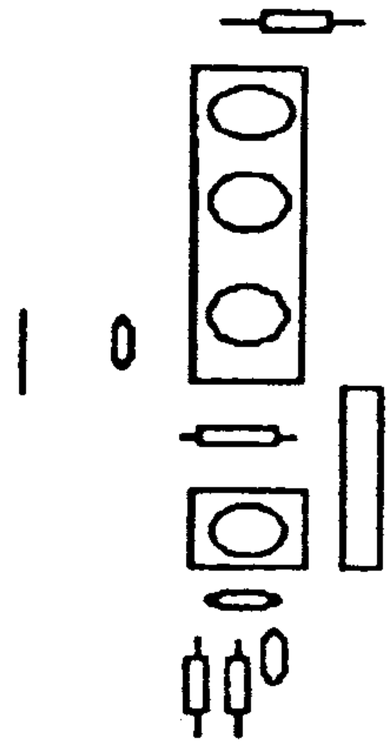
13 Quickie Transmitter Tune-Up

If the power seems to be down at the band edges in either stock or beefed-up versions of the Uniden/Realistics, try this procedure:

FT4	HR2600
FT104	HR2510/Lincoln
FT3	HTX-100
L25	HR2600
L111	HR2510/Lincoln
L26	HTX-100

FT4= HR2600
FT104= HR2510 & Lincoln
FT3= HTX-100

L25 = HR2600
L111 = HR2510 & Lincoln
L26 = HTX-100



In the respective radios, insert a 1Khz tone at the mike input and tune forward coil Lxx for peak output, being very careful, at the center band. Next peak the center coil of FTxx for center band, the rear coil for low end of the band, and the forward coil for the high end of the band. This should get everything back up to spec, and gain a few watts, too!

14 Mic Wiring

For those of you who wish to put your favorite power or noise canceling mike on the HR2510/HR2600, here is the 5 pin plug scheme from the original mike:

Pin 1.....Audio
Pin 2.....Ground
Pin 3.....Transmitt
Pin 4.....Scan Up
Pin 5.....Scan Down

Pins 4 and 5 are grounded to achieve their functions, and do not have to be used when changing to another Mic. In case you happen to use your HR2510/HR2600 as a base radio, a D104 or Turner with a couple of extra wires and a DPDT Center off Momentary switch can be added to the base for the Up/Down feature. Since the radio jumps in 10 khz spaces, this can be awkward for SSB/CW work. For precise Mic tuning, refer to Carl A. Kollar's (K3MJL) article in November 1989 "73 Amateur Radio" regarding "Easy tuning for the Uniden HR2510", which tells how to modify the radio for 100 hz tuning.

In the HTX-100, Realistic opted for the more common 8 pin plug commonly used on amateur transceivers today. Here's the scheme:

Pin 1.....Audio
Pin 2.....Sheild (Ground)
Pin 3.....Scan Down
Pin 4.....Scan Up

Pins 5 and 6....No Connection
Pin 7.....Ground
Pin 8.....No Connection

These are connections within the Mic... The radio connector shows pins 5,6 and 8 connected to other areas within the radio.

Before adding a power Mic to these radios, please note that with the radios "peaked", an overdriven condition will occur. With this in mind, you can do one of two things: either keep the power levels down, or, if you must peak the output levels, please refer to the section "The Power Mod revisited".

15 The Power Mod Revisited

Since the article "Beefing up the Uniden and the HTX-100" appeared in the September 1989 "73s Amateur Radio", there has been a flurry of mail received here regarding different levels of success and failures. ***Please Note*** that a retraction was printed in the November 1989 issue regarding the erroneous output powers. Nuff said...

What the Beef Up/Power Mod **does** accomplish with ***all*** the Uniden-built radios, is that with the aforementioned power mics added, the beefier parts cure the overdriven condition, whether the radio sees a real power increase or not!

Let me regress a moment; in the earlier models of the HR2510, serial numbers 830xxx, these models actually exhibited some power increase. In later models with 950zzz serial numbers, there seemed to be no power increase at all! For some reason, which I don't know, the later versions incorporated a resistor/transistor combo at the RF strip, with a brown wire leading back to the other side of the radio. A power limiting circuit?

Anyway, replacing the pre-driver, and the final transistor will cure the overdrive problem and give a few more watts. For an up-to-date table see below:

What to do...	HR2510	HR2600	HTX-100
Relocate capacitors to bottom of board.	C112, C116	C112, C116	C117, C118
Replace 2SC2086D transistor with ECG/NTE340(*).	Q134	Q31	Q34
Replace MRF477 with MRF497.	Q132	Q32	Q502
Set bias of MRF497 to 80ma.	VR112	VR13	VR11
Check radio output into dummy load and meter capable of 100 watts. Adjust ALC to peak with 1 Khz tone.	VR104	VR5	VR5 (VR6 low power adjust
Spread coils for maximum power.	L121, L123	L14, L16	L14, L16
Check AM/FM carrier and adjust (Up to 20 w)	VR107**	VR8	N/A
Check CW power level and adjust.	VR103	VR4	VR13

* Pinouts are exactly opposite: 2SC2086D=BCE, ECG/NTE340=ECB

** The external carrier level control on the Lincoln replaces the internal pot VR107. The AM/FM carrier and CW level can be adjusted with VR103.

16 AGC Test Tap

Are you an antenna experimenter or QRP (low power) operator? Then you may find that an AGC tap can be useful in measuring incoming signals during test periods. The tap allows you to measure AGC (Automatic Gain Control) voltages while pruning your antenna for maximum efficiency. This is done while another station is transmitting a steady signal, while you measure the voltage at the tap. And as we all know, the antenna can be the most important part in any QRP station!

For this job, you will need one panel mount RCA jack (Radio Shack #274-346) or equivalent. One 10K 1/4 watt resistor (RS #271-1335 Pkg of 5), and a short piece of shielded cable (RG-174 does nicely). Also a small piece of heat shrink, large enough to cover the 1/4 watt resistor and cable.

Cut the ends of the resistor, leaving about 3/16 to 1/4 inch, and tin with solder. At the diodes listed below for the particular model, solder one end of the resistor to the ***unbanded end*** of the diode (anode end). Near this location, drill a hole in the case of the radio, and install the RCA jack, with it's associated ground lug, making sure that nothing of the jack is touching anything inside the radio.

Measure the cable from the end of the resistor you just installed, to the jack, with just a bit extra. Prepare one end to solder the braid/sheild to the ground lug, and the center conductor to the center pin of the jack. The other end of the cable should have the shield and outer jacket removed, exposing just enough center conductor to be soldered to the free end of the resistor. Slip the heat shrink over the end of the cable, solder the center lead of the cable to the free end of resistor, then cover with the heat shrink. Make sure that there are no shorts between the center and the shield.

Now all you need to do is make an adaptor to couple the digital multimeter of your choice to the RCA jack, back down the RF gain control and test away!

Points of connection:

HR2510/Lincoln.....D116
HR2600.....D18
HTX-100.....D5

17 Transverter Topics

Pulled from a Packet BBS (24 Nov, 1990) Subject: Uniden HR2600 on VHF/UHF

Hello Folks!

I recently purchased a Uniden HR2600 and Microwave Modules MMT 144/28 2 meter linear transverter and got both interfaced and working well. The HR2600 has an output power of 25 watt PEP on SSB, CW and 10 watts on AM/FM. The transverter requires only .25 to 25 mw of 28 Mhz drive for proper operation. In an effort to reduce the HR26000 output level to the level required by the transverter, I removed PB-100, a small double sided copper circuit board located under the top cover that supplies +VCC to the driver and final amplifier stages. I then soldered a jumper between TP2 and TP4, the outermost prongs that hold PB-100 in place.

This action provides the HR2600 driver with full +VCC, but removes +VCC from MRF477 final power amplifier. There is more then enough driver energy fed through the final to excite the transverter in this configuration. I've received good signal and audio reports from all the locals when using the transverter and the HR2600 with this simple modification. I believe this modification could make the HR2600 useable with other transverters as well.

DE John, KD2BD

Good deal! The shorting PCB is the same in the HR2510/Lincoln and HTX-100. This should bring more SSB to 2 meters as well as other bands!

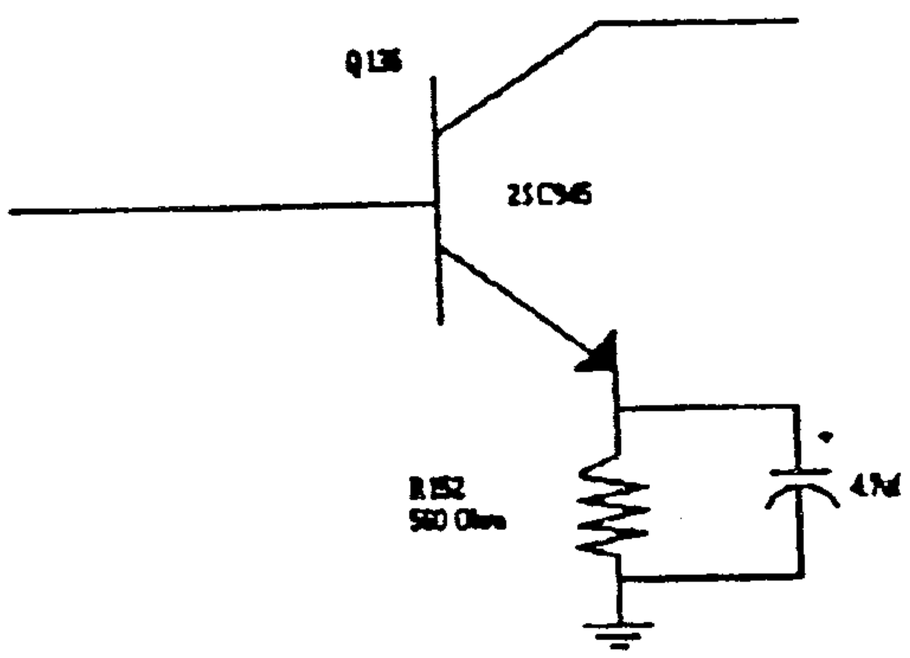
Here's an idea: why not, instead of completely removing the PB-100, devise a switch arrangement to go from "Standard" to "Transverter" settings? Sure, and what if someone forgot to switch to the "Transverter" setting before operating..?

Thanks John!!

18 Miscellaneous Mods

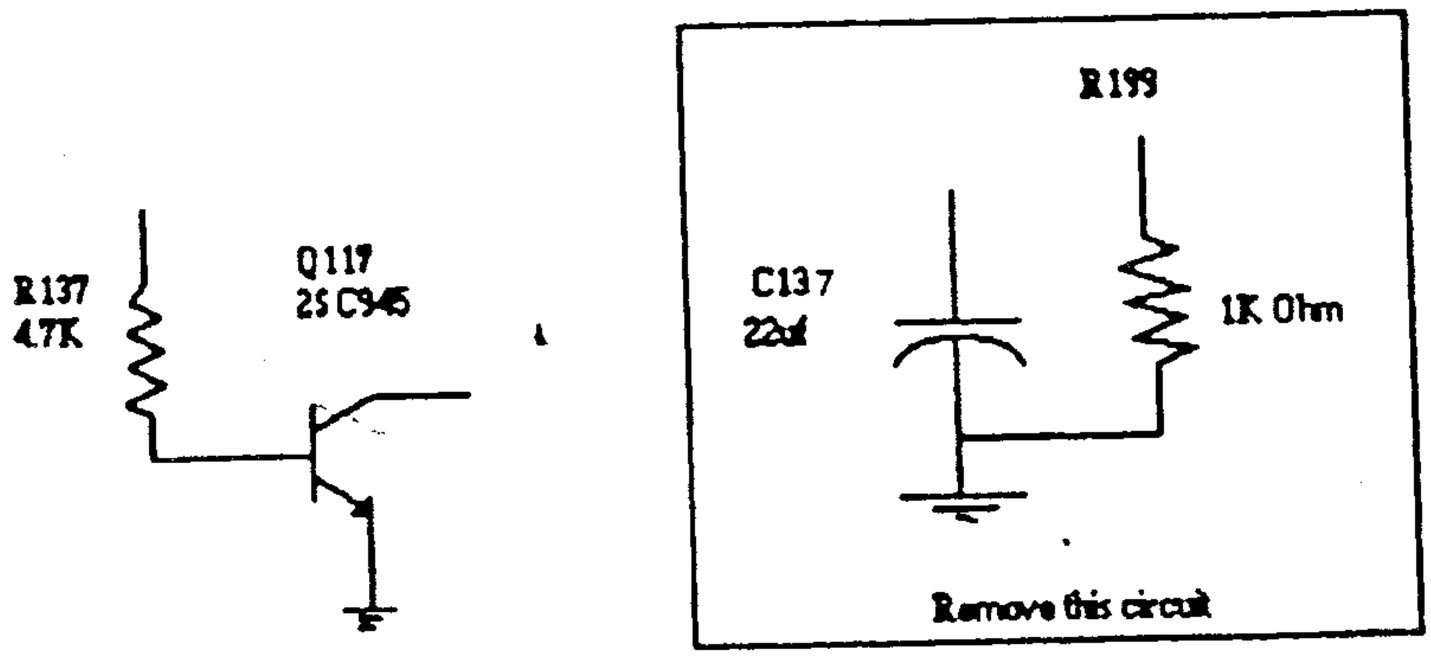
18.1 Increase Receive Audio

Add a 4.7 mf cap in parallel to R152 (a 560 ohm resistor)



18.2 Mute Circuit improvement

Remove C137 and R199 to improve muting



18.3 CW Click

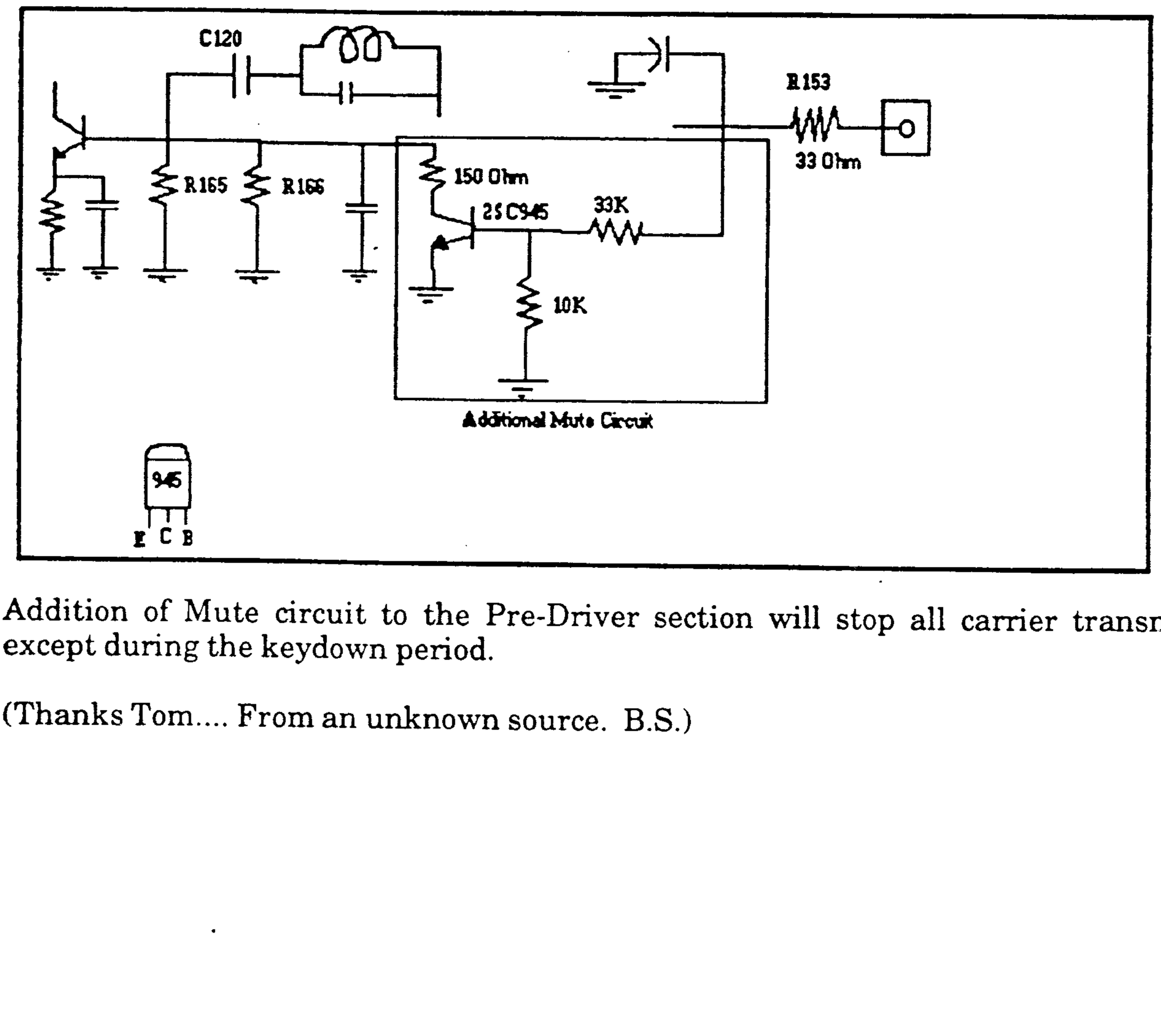
Caused by improper attack time in power control circuit.

Change the following components:

Original Part:	Replaced with:
R21 (1.2K)	560 Ohm
R119 (10K)	5.6K
VR107 (47K)	22K

Note: After mod, re-adjust AM/FM TX power to 10 watts.

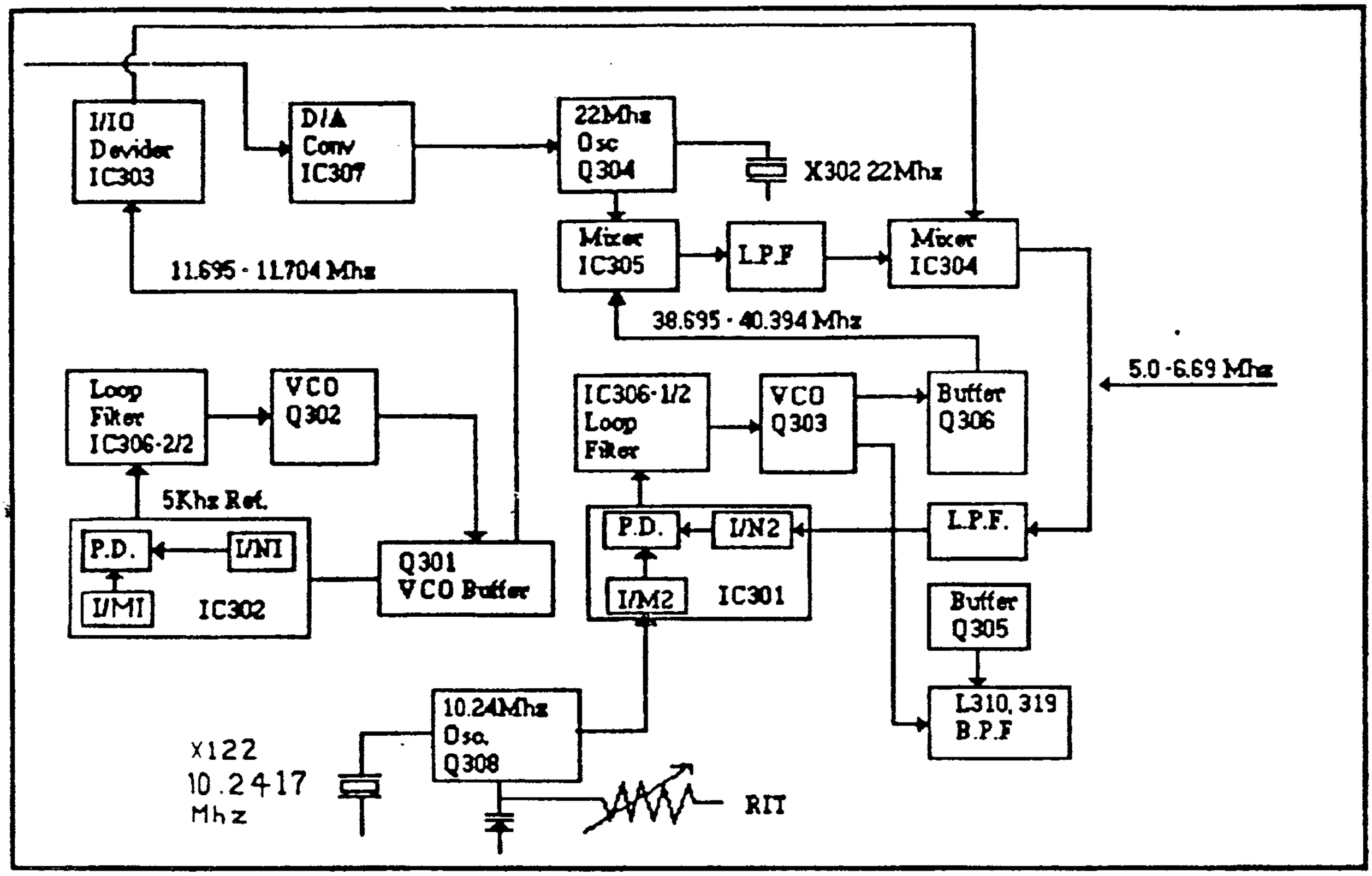
18.4 Transmission of Burst Signal on Stand-By (TX to RX)



Addition of Mute circuit to the Pre-Driver section will stop all carrier transmission except during the keydown period.

(Thanks Tom.... From an unknown source. B.S.)

19 Block Diagram of PLL Circuit



20 Troubleshooting Charts (HR2510)

20.1 Transmitter Section

Note: Refer to the transistor voltage chart and the IC voltage chart for the IC and Transistor terminal voltages.

No Transmission

NG= No Good

Check PTT Switch	NG	Replace defective PTT Switch		
Check Microphone	NG	Replace defective parts		
Check Microphone Jack	NG	Replace defective parts		
Check Microprocessor circuit	NG	See Microprocessor section		
Check pins 7 and 8 of IC104	NG	Replace defective parts		
Check voltages of Q136, Q125 and Q127	NG	Replace defective parts		
Check voltage and frequency at TP5	NG	* See PLL section		
Check antenna	NG	Replace antenna and antenna jack		
Check Antenna wire	NG	Resolder W 13		
Check voltages of Q132, Q133, Q124 and Q134	NG	Replace defective parts		
Check voltages of IC105, IC106 and IC104	NG	Replace defective parts		
Check voltage and frequency of Q106 emitter	NG	Check voltage of Q23	NG	Replace defective parts
Check voltage of Q24 and Q25	NG	Replace defective parts		
TX section is not defective				

20.2 Receiver Section

No reception

Check the Speaker and wire connections	Replace defective parts and or poor soldering	
Check voltage at pin 7 of IC103	Check voltage at base of Q39. If ok go to Microprocessor Section	Replace defective parts
Check voltage at pin 1 of IC103	Replace defective parts	
Check Voltage of Q127 and Q136	Replace defective parts	
Check to see if the SQ control operates normally	Check voltage at pin 5 of IC1	Replace defective parts and or readjust SQ control
Check to see if the voltage level is 1Vp-p and freq is 10.695 Mhz(CW) and 10.6965 Mhz (SSB) at TP3	Check voltage of Q106 E	Replace defective crystal (X122)
Check voltage of Q101-107	Replace defective parts	

20.3 PLL Section

Check if the LCD displays normally	See Microprocessor Section		
Check if freq is 10.24 Mhz at emitter of Q308	Replace defective Q308 and/or X301		
Check if the voltage is 6v at TP301	Check if the voltage is 0.4vp-p and freq is 10.4965 Mhz(SSB) and 10.495 Mhz(CW) at TP302	Check voltage of Q301-302, IC306-212	Replace defective parts
	Check voltage of IC303 and IC302	Replace defective parts	
Check voltage of IC301	Replace defective parts		
Check if the voltage at TP303 is 5.5v at 29.6999 Mhz and 3v at 28.000 Mhz	Check if the voltage is 120mvp-p and freq is 22 Mhz at TP307 (R328)	Check voltage of Q304	Replace defective Q304 and or X302
	Check if the voltage is 120mvp-p and freq is 17.6965 at TP305	Check voltage of IC305, Q303 and Q306	Replace defective parts
	Check voltage of Q306	Replace defective parts	
Check if the freq is 28.000 Mhz - 29.6999 Mhz	Check voltage of Q305	Replace defective parts	
Check if connection of J311 is ok	Replace defective L319 and or L310		

20.4 Microprocessor Section

Check if the LCD displays normally	Check if the clock is 2 Mhz at pins 44 and 45 of IC502	Check if the waveform is as following figure at pin 49 of IC315 when power is on	Check voltage of IC314	Replace Defective parts
			Check voltage of Q316 and Q317	Replace defective parts
			Replace defective Y301	
	Check waveform at pins 1 and 52 of IC502	Replace defective R501		
	Check waveform at pins 6 and 13 of IC502	Replace IC315		
	Replace defective LCD			
Check if S901 operates normally	Check voltage of IC310	Replace defective IC310		
	Replace defective S901			
Check if S605 and S612 operates normally	Replace defective switch(s)			
Check if PTT operates normally	Check voltage at pin 47 of IC315	Replace defective S603 and or Mic Jack		
	Check voltage of Q315	Check voltage at pin 62 of IC402		
		Replace defective IC315		
Check the output of mute and the output of beep.	Replace IC315			

Mute = IC315 pin 63, Beep = IC315 pin 33

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