P. C. Electronics 2522 Paxson Lane Arcadia CA 91007-8537 USA
Tel: **1-626-447-4565** m-th 8am-5:30pm pst (UTC - 8) Tom (W6ORG) & Mary Ann (WB6YSS)
24 hr FAX order line 1-626-447-0489 Email: Tom6ORG@hamtv.com
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Wavecom 2.4 gHz Receiver Modifications

The Wavecom Jr or Sr. is a TV transmitter and receiver system intended for license free operation by anyone and Type Accepted under Part 15 of the FCC Rules. 25 mile line of sight DX is possible with these units after modified, WCI-2.4 board added and direct connection to Andrews 26T-2400 dishes at both ends. The WCRI-2.4 board has dual squelched speaker amps and S-meter output also. Since two of its channels are within the 2410-2450 MHz ham band (ch1 is 2434 and ch 4 2411 MHz), any licensed Radio Amateur can modify them for ham use. For $25 plus $5 shipping Brian Miles, WB7UBB (check or MO to 12015 N 34th ST, Phoenix AZ 85028 - wb7ubb@cox.net) will supply a replacement PIC16C54A with all 4 channels in the ham band (2398, 2412, 2428 and 2442 MHz) and the last channel selected comes on upon turn on. He may also modify your transmitter for 100 mW output. We suggest ATV Research (800-392-3922) for the Wavecom transmitter and receiver. We have the Andrews 24T-2400 dish ($149) and Comet GP-24 13 dBd vertical omni ($199) antennas. If the coax loss is greater than 3-4 dB, we suggest theDowneast Microwave 13LNAH antenna mounted preamp. The Wavecom Transmitter repackaging application note is also available to licensed Radio Amateurs from us on request.

The original work on the Wavecom Jr. was done by Bill Parker, W8DMR and appeared in the Fall 1997 issue of Amateur Television Quarterly Magazine starting on page 20. Dave Hockaday, WB4IUY, followed up with a web site full of info on the Wavecom from various sources - www.ipass.net/~teara/atv4.html - Thanks to all who contributed.

The WCRI-2.4 board is designed to mount on to a UG58 flange mount type N connector which makes a more flexible way to connect to high gain external antennas. The boards should then be repackaged into an aluminum enclosure such as the Hammond 1590D as we illustrate here. The only receiver modification described is taping into the AGCto drive an S-meter. In addition, on the WCRI-2.4 interface board is dual squelched speaker amp. The variable squelch also works off the AGC voltage. If an antenna mounted pre-power amp is added for ultimate sensitivity, the board has a DC coupler to power the preamp amp through the single coax. Both boards can then be repackaged for a nice rugged 2.4 gHz ATV rig.

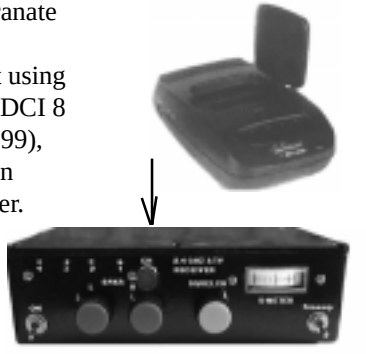
Before doing the modifications, I suggest checking out the Wavecom's operation as is. Normal line of sight DX for Part 15 TV devices is about 150 ft with omnis - 300 ft is Wavecom's spec if the paddle antennas are aligned properly toward each other. If all is well there are 4 screws on the bottom of the receiver case to remove, one of which is through the warranty seal. Pry apart the antenna covers in the seam and cut the coax right before the shield is soldered to the PC board patch antenna. Pull the coax free from the antenna assembly and top cover - you should have at least 5.5" out from the can. Inside there is one screw under the metal can that holds the board. Carefully lift up the can, it is only held by the pin socket and a glued bumper underneath. Now you can remove the last board screw. On the mother board, unsolder and remove the power, video and audio jacks J1 through 5, channel switch SW1 and power switch S2. Jumper S2 on with buss wire across two of the pads. Drill the three .140 dia mounting holes.

Transmitter

Andrews 26T-2400 22 dBd dish (shown horiz - mounts either way)

Comet GP-24 13 dBd omni vertical

Make an alteranate 2.4 gHz ATV repeater input using the omni and DCI 8 pole filter ($299), link or even an inband repeater.



Receiver

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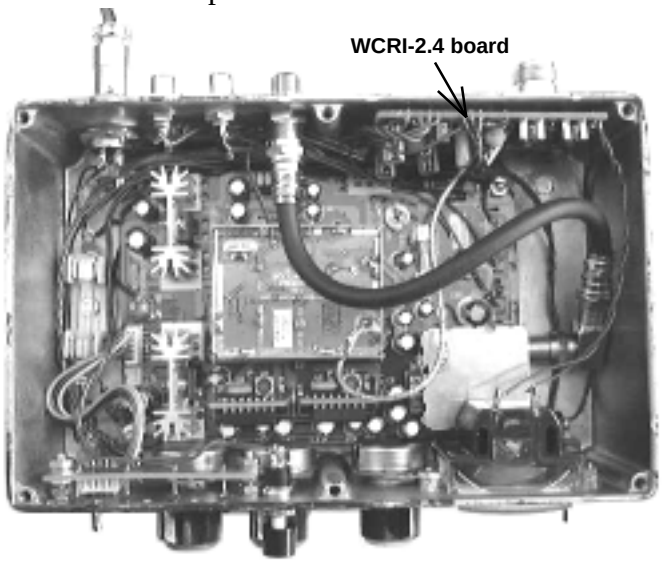
Repackaged Wavecom Receiver for ATV

The Wavecom and WCRI-2.4 interface boards need to be put in a shielded box . Our example shows the Hammond 1590D die cast aluminum box which just fits all the listed parts, or you can use any aluminum chassis or enclosure that is at least 5x7x2.5 inches. The WCRI-2.4 board has dual squelched speaker amps that are wired to front panel controls for easy adjustment and an S-meter output for easy antenna alignment or signal reports. The 4 channel LED indicator board can also mounted to the front panel along with a push button momentary switch - this is optional in case you want to use both channel 1 and 4 which are in the ham band, 2 and 3 are not. Upon turn on, channel 1, 2433 MHz always comes on. On the rear panel are the type N antenna jack to go to the 2.4 gHz antenna and optionally the DC power to an antenna mounted preamplifier. A 4 pin mic jack is used for the 12-14 Vdc input which gives extra pins for any external accessories that may have to be turned on or off, rather than another 2.1x5.0 power jack as comes with the Wavecom's and are difficult to find or mount.

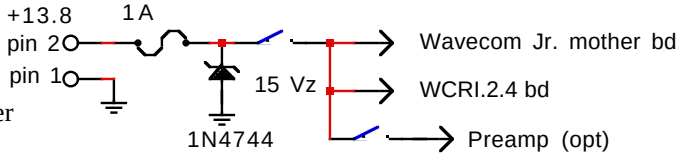
Purchase all the parts and the box before using the drill layout. The parts list and drill diameters are for the Radio Shack and Mouser part numbers but you may want to subsitute other parts and sources.



Parts list

Qty	Description	Source
1	Wavecom Jr or Sr.	ATV Research
1	WCRI-2.4 board	P. C. Electronics
1	UG58 N chassis jack	P. C. Electronics
1	Hammond 1590D box	Mouser 546-1590D
1	4 pin power jack	RS 274-002
1	4 pin power plug	RS 274-001
2	SPST Toggle switch	RS 275-612 or ME108-MS550K
5	RCA phono jack	RS 274-346 or 161-1052
1	Push button switch	RS 275-1547
3	10K panel pot	RS 271-1721 or 31VJ401
1	F81 feedthru jack	RS 278-213
1	F right angle adaptor	RS 278-221
7"	RG59 75 ohm coax	RS 278-1319
2	F plug for RG59	RS 278-222
1	500uA panel meter	391-0301
1	3AG fuse holder	RS 270-739
1	1 Amp 3AG fuse	RS 270-1005
1	1N4744 15V 1W zener	RS 276-564
3	Knob	builders choice
4	Rubber feet	RS 64-2346 or 517-SJ5012
2	4-40x5/8 pan head screw -for LED board	
1	4-40x3/8 pan head screw	
9	4-40x1/2 pan head screw	
21	#4 nut	
21	#4 internal tooth lock washer	
2	#4 solder lug	
151"	#22 wire hookup wire	

RS=Radio Shack, Mouser Parts call 1-800-346-6873



Chassis Wire list

length	From	To
1.25"	Power jack pin 1	Ground lug near fuse holder
1.5"	Power jack pin 2	Fuse holder input
1.25"	On/off switch bottom lug	Fuse holder output - 15 v Zener to ground lug.
7"	On/off switch middle lug	Pre amp switch middle lug

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Wavecom Jr and WCRI-2.4 Board Wiring

Mount the N jack, RCA jacks, Power jack, fuse holder and power switch into the chassis. Wire the power + 13.8 leads. Lay the Wavecom board centered in the chassis and 1/10th of an inch from the fuse holder, center punch and drill the 3 mounting holes in the chassis. Prewire both boards except to the RCA jacks before placing into chassis. Mount the pots, then Wavecom Jr. board, followed by the WCIR-2.4 board. Route the wires around the chassis bottom edges, then mount the F bulkhead jack, meter, channel change push button switch, LED board and finish wiring.

10" to power switch center lug

Drill out .140 hole for board mounting.

4" to Video ouptut RCA jack

6" to Right Audio ouptut RCA jack

5.5" to Left Audio ouptut RCA jack

Right angle adaptor and 7" RG59 Coax to TV Output F jack

*Twist pot and meter leads 1 turn per inch after soldering on both ends.

Buss wire jumper

Drill .140 hole for board mounting.

3" to ground lug under board mounting screw.

5" *twisted pair to channel change push button

PIC 16C54A - replace for 4 ham band only frequencies

7808

Drill .140 hole for board mounting.

*Three 11.5" to Left Speaker pot
CCW W CW

*Three 8" to Squelch pot
CC W CCW

8" to receiver board 7808 output solder pad on bottom.

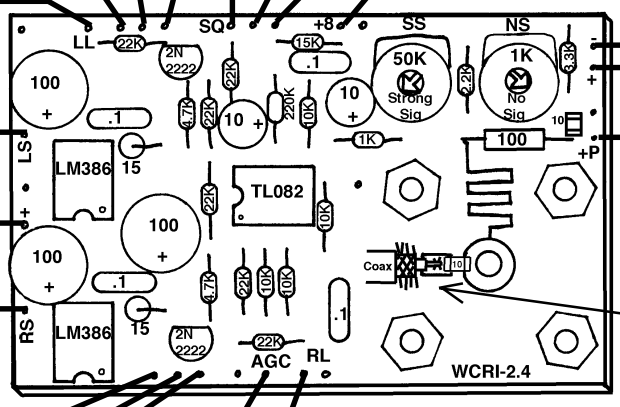
All leads enter from the component side. Cut leads as short as possible on the solder side to prevent shorting out after mounting - check with ohmeter.

3" to Left Line Audio RCA jack

2.5" to Left Speaker Audio RCA jack

7.5" to power switch center lug

3.5" to Right Speaker Audio RCA jack



*5.5" twisted pair to Meter

5" to Preamp power switch (optional)

Solder coax from Wavecom Jr can to ground plane and center solder pad

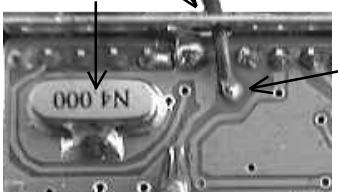
CCW W CW
*Three 10" to Right Speaker pot

5" to Right Line Audio RCA jack

Run wire thru hole in side of can.

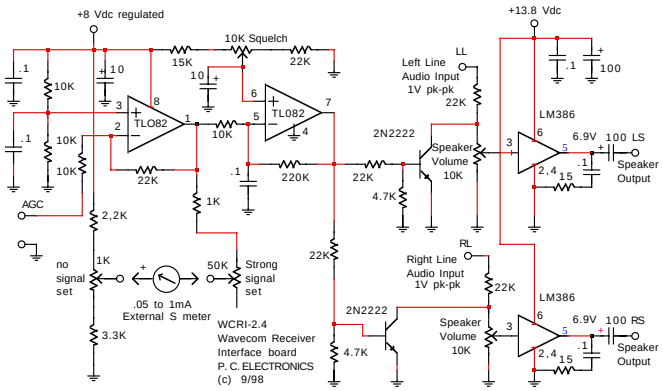
4.5" to solder pad for AGC tap
No signal 3.6V to 4.4V strong signal

4 MHz crystal



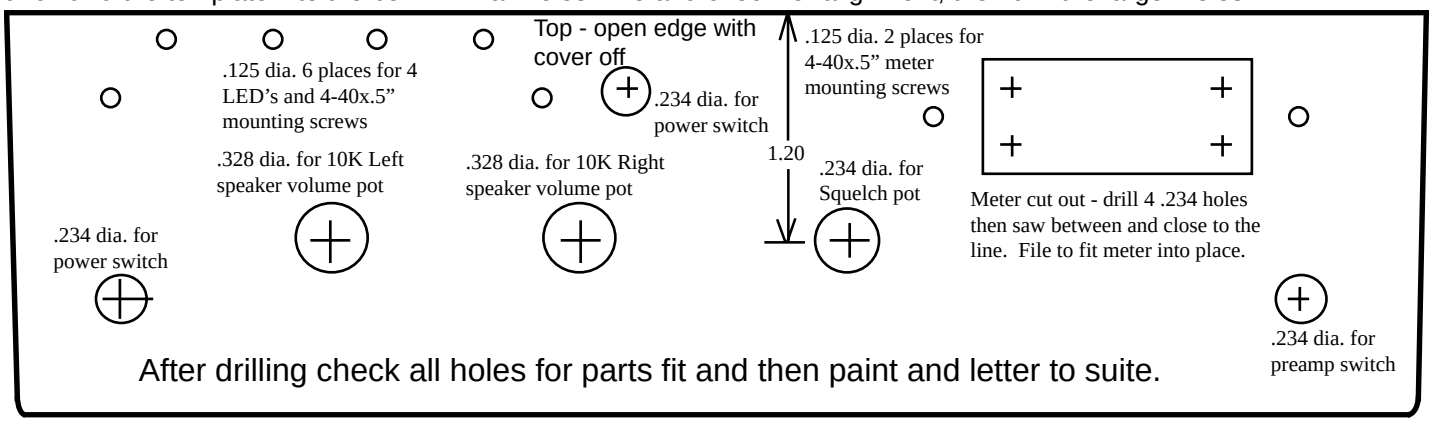
AGC solder pad has no other traces visible going to it.

Can top side



Wavecom Jr. Receiver Repackaged Box Layout and Drill Template (c) P. C. Electronics 2004

Use Hammond 1590D die cast aluminum box. Cut out template on the inside edges of each panel. Align to the top edge on the front and rear outsides. Center the bottom template taking care to align with the noted front/rear sides. Center punch thru the template into the box. Drill all holes .125 and check for alignment, then drill the larger holes.



After drilling check all holes for parts fit and then paint and letter to suite.

Views are from outside