

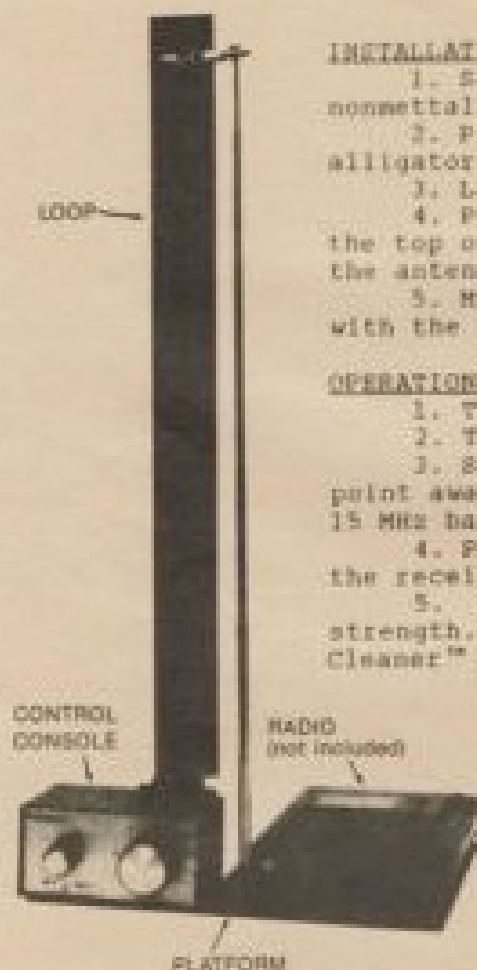
2007

CHANNEL CLEANER™ SWL LOOP

**OPERATOR'S
MANUAL**

**PALOMAR
ENGINEERS**

MODEL PA-420 CHANNEL CLEANER™



INSTALLATION

1. Set the Control Console and Platform on a flat nonmetallic surface such as a table or a wooden box.
2. Plug the loop into the Control Console so the alligator clip at the top points to the Platform.
3. Lay the radio down on the Platform.
4. Pull up the radio's antenna until it reaches the top of the loop. Open the alligator clip and grasp the antenna with it.
5. Move the radio slightly so the antenna lines up with the loop.

OPERATION

1. Turn the "Q" knob to MAX.
2. Turn on the radio. Tune in a strong station.
3. Set the switch on top of the control console to point away from the radio. Except when listening on the 15 MHz band when it should point toward the radio.
4. Point the edge of the loop - which is opposite the receiver's antenna - toward the station.
5. Rotate the "Tune" knob for a peak in signal strength. The MHz calibration numbers on the Channel Cleaner™ panel show the approximate setting.
6. Tune slightly clockwise looking for a dip in signal strength. At the same time turn the "Q" knob slowly counterclockwise. This will make the dip deeper.
7. Turn the whole Console/Platform/Radio assembly slightly to make the dip deepest.
8. Make small adjustments of "Q", "Tune" and loop direction to get the deepest possible null.
9. Rotating the assembly to either side should cause the signal to reappear.

HELPFUL HINTS

1. Hardware stores in the U.S. sell inexpensive plastic kitchen turntables. If you set your Channel Cleaner™ on one of these it is easy to rotate to find the null direction. A pair of slippery cover magazines make a fairly good turntable. Or you can just pick the whole assembly up and turn around. However, the capacity of your hand and body may disturb the operation. It is best to keep as clear of the radio and Channel Cleaner™ as possible.
2. If you don't get a pronounced signal peak with the "Tune" control move the radio's whip antenna closer to the loop. You may have to move it right against the loop. Use a piece of masking tape to hold it there.

3. Don't connect anything to the radio. No power supply, tape recorder, or headphones. This can destroy the null. If you must use headphones, keep the wire in the direction of the loop either forward or backward.

4. The null can be hard to find when signals are very strong and the receiver is synthesized and push-button controlled. Such sets have extremely good AGC action so small changes in signal strength are almost imperceptible. In that case, reduce the received signal strength by shortening the whip until the background noise is audible. The null will be apparent then by change in signal strength or background noise.

5. Channel Cleaner™, like any compact nulling device, has a narrow rejection notch which is not effective with signals that are spread in azimuth. Spreading is caused by propagation disturbances, presence of side- or backscatter and the like. At any given time and waveband perhaps 10% of signals will yield poor nulls. Don't be discouraged! Best results are normally obtained with relatively strong, slowly fading signals.

6. Once you get a null you can turn the Channel Cleaner™ in any direction to eliminate another station on the frequency. No further adjustment of the controls is needed. However, if you change frequency by 20 or 30 KHz or so, you will have to adjust the "Tune" control slightly to keep the null depth.

7. The null will be deepest when loop direction, "Tune" and "Q" controls are all set correctly. And the direction indication will be most accurate then. A slight change in any one of the three will make the signal reappear. When that happens, you have the exact correct adjustment.

8. Sky-wave fading makes it difficult to find the best null adjustment. The Channel Cleaner™ should be swung back and forth by small amounts at a rate faster than the fading. This helps distinguish amplitude changes due to direction from those due to fading. A turntable helps greatly.

THEORY OF OPERATION

Channel Cleaner™ reduces interference in shortwave reception by creating a single fan-shaped null which can be pointed toward the source of interference, (for example a cochannel radio station) whose location is appreciably different from that of the desired station. It is intended for use with small battery-powered receivers with whip antennas. It is effective against either sky-wave or surface-wave interference, and is the first compact device able to "notch out" fading sky-wave signals. In the case of sky waves, the average amount of rejection that can be expected under favorable circumstances is approximately 20 dB. Considerably greater rejection can be expected in the case of ground or surface waves.

3. Don't connect anything to the radio. No power supply, tape recorder, or headphones. This can destroy the null. If you must use headphones, keep the wire in the direction of the loop either forward or backward.

4. The null can be hard to find when signals are very strong and the receiver is synthesized and push-button controlled. Such sets have extremely good AGC action so small changes in signal strength are almost imperceptible. In that case, reduce the received signal strength by shortening the whip until the background noise is audible. The null will be apparent then by change in signal strength or background noise.

5. Channel Cleaner™, like any compact nulling device, has a narrow rejection notch which is not effective with signals that are spread in azimuth. Spreading is caused by propagation disturbances, presence of side- or backscatter and the like. At any given time and waveband perhaps 30% of signals will yield poor nulls. Don't be discouraged! Best results are normally obtained with relatively strong, slowly fading signals.

6. Once you get a null you can turn the Channel Cleaner™ in any direction to eliminate another station on the frequency. No further adjustment of the controls is needed. However, if you change frequency by 20 or 30 KHz or so, you will have to adjust the "Tune" control slightly to keep the null depth.

7. The null will be deepest when loop direction, "Tune" and "Q" controls are all set correctly. And the direction indication will be most accurate then. A slight change in any one of the three will make the signal reappear. When that happens, you have the exact correct adjustment.

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Channel Cleaner™ reduces interference in shortwave reception by creating a single fan-shaped null which can be pointed toward the source of interference, (for example a cochannel radio station) whose location is appreciably different from that of the desired station. It is intended for use with small battery-powered receivers with whip antennas. It is effective against either sky-wave or surface-wave interference, and is the first compact device able to "notch out" fading sky-wave signals. In the case of sky waves, the average amount of rejection that can be expected under favorable circumstances is approximately 30 dB. Considerably greater rejection can be expected in the case of ground or surface waves.

The Channel Cleaner™ consists of an elongated vertical loop antenna plated on a strip of epoxy-glass printed-circuit board which plugs into a socket located on top of the control console. The radio is placed on the platform with its whip immediately beside an edge of the loop, as shown in the illustration. No metallic connection to the radio is required - capacitive coupling does it all. (The clip is for mechanical stability only.) The Channel Cleaner™ requires no external or internal power.

The operating controls consist of a capacitor which tunes the loop to resonance (TUNE control); a variable resistor in shunt with the coil which varies the sensitivity of the resulting tuned circuit (Q control), and a switch for extending the operating frequency range.

Null direction is altered by rotating radio and Channel Cleaner™ as a unit. Tuning action is somewhat similar to adjusting a preselector, in that the tuned circuit must resonate at, or very close to, the operating frequency of the receiver. Channel Cleaner™ achieves its directional action by adding voltage from the resonant loop to the whip's voltage via capacitive coupling. Since best directional discrimination (greatest null depth) occurs when these two voltages are equal, some way to adjust the loop's output relative to that of the whip is needed. This may be done by (a) varying spacing between loop and whip, or (b) varying loop Q by means of the Q control.

MANUFACTURED IN U.S.A.

Channel Cleaner™ is manufactured under an agreement with GRI International, 333 Ravenswood, Menlo Park, California 94025, U.S.A.

PALOMAR ENGINEERS

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Palomar Engineers stocks ferrite beads and cores for ham radio and radio frequency interference (RFI) suppression. We also carry coaxial common mode chokes, Sleeve baluns, CUBE Baluns™, line isolators, and voltage & current balun/unun kits in ratios 1:1, 2:1, 4:1, and 9:1 used for antenna matching and radio station noise floor reduction.

Ferrite Toroid Mix 31,43,61, 77	RFI Suppression Kits	SNAP ON Ferrite Beads
Balun/Unun Kits 1:1 2:1 4:1 9:1	SLIP ON Ferrite Beads	CUBE Baluns™ 1:1 2:1 4:1 9:1
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Kurt Sterba Products	Super Choker™	Sleeve Baluns

Check website for latest product updates, prices

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