

TECHNICAL INTELLIGENCE



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Tools of the Trade

The Optoelectronics R-10 Interceptor

With the introduction and popularity of the Uniden Close-Call and Radio Shack Signal-Stalker scanners with near-field reception capability, I decided to discuss the original near-field receiver that started it all, the Optoelectronics R-10 Interceptor. While it was primarily marketed to scanning hobbyists, the Interceptor was not a "scanner". It was a near field receiver. As such, it had different capabilities and applications in mind than what most scanner dweebs were used to at the time.

The first thing that many scanner dweebs failed to realize with the R10 was that its operation was different than that of a conventional VHF/UHF "scanner" receiver. That's because its role in RF work was different. With a scanner one either programs in specific frequencies into channel memories and then has the unit "scan" through them, or they program a high and low end of a frequency range and search that range for frequencies which have activity on them. A scanner is also a lot more sensitive than the R10, which enables it to receive radio signals from long distances. The R10 is much less sensitive than a scanner. That's because it's intended to receive radio communications in the near field. Depending on the power, elevation, and antenna of the transmitter in question this near field range can extend up to a couple miles, but is usually much less. Instead of having memory channels or a search function, the R10 just sweeps its entire frequency range looking for a transmitter that is of adequate enough signal strength to be considered near field.

Having an interest in hobbyist COMINT and unusual RF gear, when I saw the ad for R10 in one of the scanner magazines, I drove over to Lentini's one Saturday shortly afterwards to purchase one. Soon afterwards I had the thing attached to a mag-mount scanner antenna and was driving down the Berlin Turnpike and I-84 to see what I could hear. The R-10 became part of a portable COMINT (Communications Intelligence) kit consisting of a Radio Shack PRO-43 handheld scanner, Radio Shack handheld frequency counter, Standard C528 dual-band ham HT, and an Interceptor all packed in a Pelican case. That kit followed me everywhere. It has been out to Nevada when I took a day off from attending Comdex to visit the "Black" (now White) Mailbox just outside Rachel. It had



also visited Virginia a few times where Stormbringer and I hung out on the back porch of his girlfriend's apartment a few stories up, hooked up various pieces of RF receiving equipment to Yagi antennas, and aimed them at nearby towers to see what could be heard. During one of those trips Stormbringer offered to buy the frequency counter from me because he didn't have one and wanted something inexpensive to play with. The kit then received its first of many upgrades in the form of an Optoelectronics Scout, complements of the infamous and now defunct EEB(Electronic Equipment Bank) in

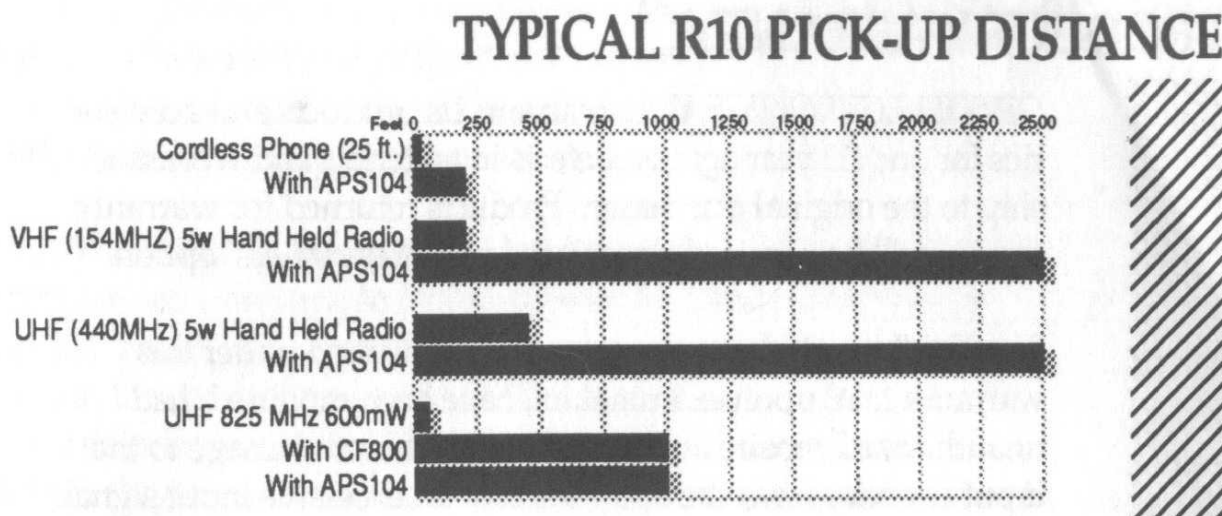
Vienna, VA. (I miss their catalogs.) Of all the places I have done hobbyist COMINT, I'd have to say that the Washington DC metropolitan region was by far the most interesting. New York City comes in a close second, but the interference... Interestingly enough of all the upgrades that portable COMINT kit has received over the past ten years, the two items that have remained the same are the Pelican case and the R-10 Intereceptor.

The R10 made a great sensor system for alerting one to RF activity in your immediate area. For quick acquisition tactical signal intercepts, the R10 was excellent. A quick acquisition situation is when you notice or suspect nearby RF communication activity (i.e.. someone who's talking on a handheld radio nearby, being caught in a traffic jam, etc.), you want to know what the parties are saying, and a frequency search may be difficult or not possible. If you ever tried to do a frequency search with a scanner while driving down the highway at 55+ MPH, you know what I'm talking about. I once used the R10 to good effect while caught in a traffic jam that resulted from a five-car accident a half mile down the highway I was traveling on. Within minutes, the R10 had successfully intercepted several transmissions relating to the accident.

The wide spectrum coverage of the Interceptor did have a drawback. In populated areas it would lock on strong signals such as paging transmitters and broadcasters. You could often adjust the squelch to reduce or eliminate these signals, but it resulted in a shorter signal acquisition range. What I usually wound up doing was to hit the skip button repeatedly so it would go in search of more relevant signals to monitor. Optoelectronics did offer an FM broadcast notch filter, the N100. I eventually purchased one and it did help with eliminating signals from that source. Optoelectronics also made the APS104 active preselector which helped reduce reception of unwanted signals while enhancing reception range on signals of interest. The APS104 was priced a little beyond my budget at the time, so I never got to play with one.

Being that the Interceptor was technically a piece of "test equipment", it was for a time exempt from the ECPA laws regarding scanners capable of monitoring cellular phones. Interestingly enough, Optoelectronics offered CF802 Cellular Band Pass Filter and Amplifier. This was an 825 - 845 MHz. pass band filter combined with a 10dB gain amplifier. It was suggested that it be used with their RD800 825-870 MHz. rubber duck antenna "to increase typical reception distance to between 750 and 1000 feet" according to the copy of their 1996 web site on <http://www.archive.org/>. This particular capability was well written about by authors such as Lee Lapin and in the cellular interception article that appeared in Phantasy.

Optoelectronics later came out with the R11, an "improved" version of the R10. They also



started offering a deluxe near field receiver called the Opto Xplorer. The Xplorer is still available from them. Uniden and Radio Shack (GRE) have recently started offering scanners with near field reception capability. The Uniden name is "Close Call", and Radio Shack calls it the "Signal Stalker". Where it once cost \$300 to have near field reception capability ten years ago, you can now walk into a Wall Mart and plunk down \$99.95 for a Uniden BC92XLT scanner. While the BC92XLT does not have 30-2000 MHz. frequency coverage and is not fast enough in spectrum sweeping to detect and monitor frequency hopping spread spectrum signals, it covers the frequency bands of interest to most hobbyists and has the ability to lock out unwanted signals.

If I didn't own an Interceptor, and all I wanted to do was monitor nearby radio communications, I would forego acquiring a used one. For keeping track of the locals one of the many Close Call/Signal Stalker scanners perform admirably, and you can get started on the ground level for about half the cost of a used Interceptor. If you want to detect and monitor nearby RF activity at **any** 30-2000 MHz. frequency (that includes the ones that are blocked in American-market scanners) and don't particularly care about the frequency of the nearby signal, then acquiring a used R-10 might be for you. I had recently learned that Aceco, the maker of many Opto "clones", makes a unit that appears to be similar to the Interceptor called the FC5001. Their street price is around \$100, but they are cellular blocked and the frequency coverage is only 30-900 MHz.

During the discussions that preceded this article, some people were requesting suggestions for a digital/analog nearfield receiver and or freq. counter that would cover up to 3 GHz. or higher. Unfortunately, there is no "do all" receiver at the time of this writing, although Uniden is supposedly working on a handheld P-25 trunktracker with Close-Call and 100 KHz. to 1300 MHz. coverage (minus cellular). There were however, a few items that came close. The top contenders for a "do all" unit were:

❖ **AOR AOR8600MkII receiver with P25-8600 P-25 decoder board option and Optoelectronics Digital Scout.** You could probably rig up an interface for the Digital Scout to reaction tune the AOR8600. The Digital Scout doesn't go up all the way to 3 GHz. however. AOR was working on a P-25 card for their AOR8200. Nothing yet though.

<http://www.aorusa.com/ar8600mk2.html>

<http://www.optoelectronics.com/digitalscout.htm>

❖ Any communications receiver (Icom, AOR, Yaesu, et. al.) that has (or could be fitted with) a 10.7 MHz. IF output can be used with the **AOR ARD25**. Many of the Icom and AOR receivers will work with Optoelectronics (and clones) frequency counters.

<http://www.aorusa.com/ard25.html>

❖ **Uniden BC396T.** It has P-25, trunktracking, and "Close Call" all in one portable package. It's missing some frequency coverage however

http://www.uniden.com/productpop/00_productpop.cfm?prd_code=BCD396T

❖ **Alinco DJ-X2000** This is a handheld receiver with 100 KHz. to 2.15 Ghz. frequency coverage and reaction tuning mode.

<http://www.alinco.com/Products/DJ-X2000/>

❖ Another distinct possibility that some friends of mine are looking into is the **GNU Project Radio** at <http://www.gnu.org/software/gnuradio/>

❖ **OSCOR OSC-5000 Countermeasures Receiver.** The unit for those of you with \$20,000+ worth of spare cash burning a hole in your pocket. The stock unit goes up to 3 GHz. There are downconverters to extend that range to 21 GHz., and you can get a 10.7 MHz, IF output option and attach an AOR ARD25 to it.

<http://www.tscm.com/reioscor.html>

WILDFLOWER'S NOTES

At most, one has to be creative yet thrifty to stretch a dollar. There is always ways to construct or make alternatives from salvaged or dollar store materials useful for the home, workshop, or the field. It may not look like a commercial made product, but as long as it functions, why worry! Here are a few projects.

P38 CAN OPENER

One of the tools in a household or in the field is a good can opener. The P38 was deigned for opening "C-RATS", military canned food. P stood for perforation, the 38 stood for the number of perforations made to open the average can of food. Not only used for cans, this small steel tool could be used as a pry tool, screwdriver, fishing lure, or a thin wire cutter. But as the military switched to "MRE" pouched packed foods, the majority of civilian food still came in cans. Thus the P38 survives in many households and field camp kitchens. My only gripe with the P38, is it is tiny to hold in cold or injured hands, especially if opening #10 size cans. However I found a way to modify this tool to make it easier.

Materials Used

P38 CAN OPENER may come in several different sizes from military surplus
1/8" X 1" BOLTS, WITH NUTS
LENGTH OF 3/4" X 3/4" SQUARE WOOD SECTION

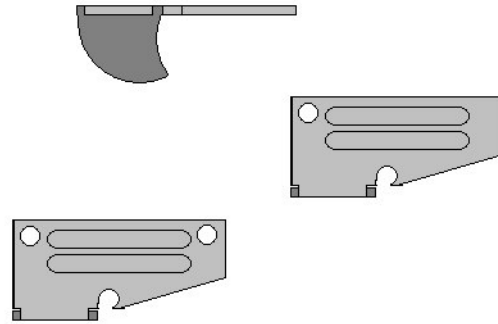
Tools Used:

DREMEL or equivalent
RULER or measuring tape
PENCIL
SCREWDRIVER & PLIERS

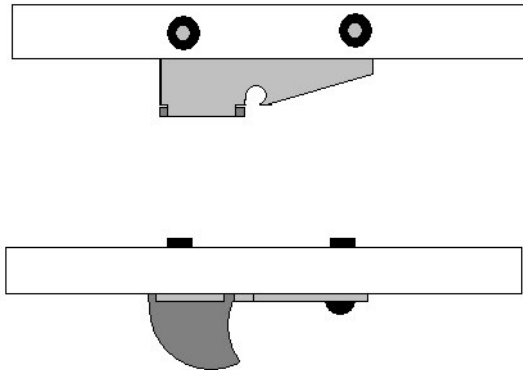
This modification now allows me to open easily large #10 cans, even with cold or injured hands.

HOMEMADE FIRE STARTER

On a cold, wet day; a good hot fire to warm by is most welcome. However starting up a fire can be a pain when even the tinder is a bit



A) I start by drilling an extra 1/8" hole at the other end as shown in the illustration.



B) And then bolt it to a pre-drilled 6"x 3/4" x 3/4" section of wood as shown in next illustration.

wet, especially as the cold night approaches. And if you have limited matches, along with cold numb hands, this can be a frustration of hell, period! It is easier when you have a good source as a prepared fire-starter, to light up your wet tinder and fuel. One can buy various types, but this article shows how to make your own at home.

Materials Needed

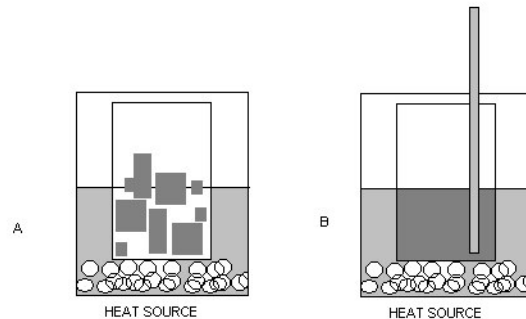
WAX old candles, wax crayons, or canning wax
SAWDUST from the workshop saw, pet bedding, or sawmill, or substitute dry shredded paper
LINT from the cloths dryer, or substitute chopped dry rags
PAPER EGG CARTON from supermarket, never use plastic or foam versions. Substitute small paper cups

Tools

WATERPUMP PLIERS or #10 "Vise-grips" pliers
SAFETY GOGGLES
HEAVY GLOVES or "oven mitts"

And also

COFFEE CANS one "3 lb", one "1 lb"
GLASS MARBLES or pea gravel
STIRRING WOOD STICK OR SPOON
STOVE OR HOT PLATE
QT SIZE ZIPLOCK STORAGE BAGS
SEVERAL PACKS OF PAPER MATCHES



Note: Melting wax is best done in a double boiler setup, as too much heat could vaporize the melting wax resulting in a fast splattering of hot wax on ones body inflicting painful burns!

Note: Recommend wearing safety goggles and gloves.

Note: My "double boiler" consists of a "1 lb" coffee can resting on a bed of marbles, or small stones, in a larger "3 lb" coffee can.

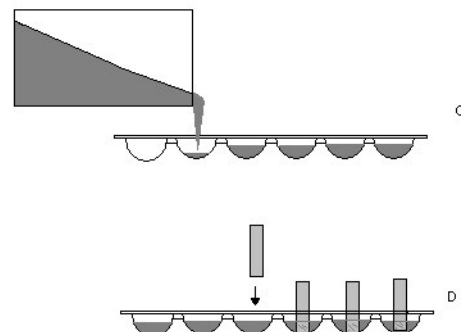
A) Fill the small can with wax chunks and pieces half way up. Place can on marble bed inside the larger can, add water between the two cans, and place with pliers the boiler on a hot heat source as in "A".

B) When wax is melted , stir in a 50/50 equal volume to the melted wax of dry sawdust and lint. Keep stirring till all well mixed together,. As in "B".

C) Prepare paper egg carton by removing top lid. The bottom cup tray is for the hot mixture. Cut the top into 1/2" x 3" stripes, and put aside.

D) Wearing gloves, holding with pliers, the hot can of hot mixture, filling the cups of the paper egg carton tray as in "C".

E) Insert the prepared paper stripes into each cup as in



“D”.

F) Put the hot can aside, unless you have more mixture and prepared egg carton trays, to cool off. Shut off stove or hot plate. Let everything cool off.

G) After a few days to a week of cooling, take the now hardened tray and cut the cups into separate sections. In heavy duty zip-lock bags, place two of the cup sections along with a book or box of matches and seal. This way one can now have six prepared fire-starter kits for the emergency kit.

TO USE

Carefully gather dry tinder and dry wood into a “Tipi”, which one or two fire-starters are just placed in a hollow into the “Tipi” stack, then ignite the paper stripe with a match. Tend your tinder and start wood burning till you have enough hot coals before adding bigger wood chunks.

Note: Add a 18”x 18” section of heavy aluminum foil to your fire starter kit. This can serve as a dry fire base on wet or frozen ground, allowing for a faster fire startup.

Note: In a true survival situation, gathering and bagging extra dry tinder and start wood, perhaps storing in plastic bread bags. This gathered on a dry day, so that if the weather changes again, you will have some dry fuel for your next campfire.

HEAT REFLECTOR

This is a simple heat and light reflector for the home and shop.

Materials Needed:

FLAT STURDY CARDBOARD appliance and furniture shipping boxes

WHITE GLUE or dry paste mix for wallpaper

ALUMINIUM FOIL from supermarket or dollar store

PAINT BRUSH 2 to 4 inch wide

PLASTIC TRAY kind that’s used for takeout food orders

SPONGE a small household utility type

And Also

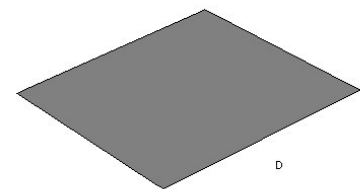
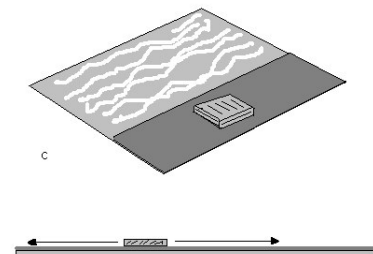
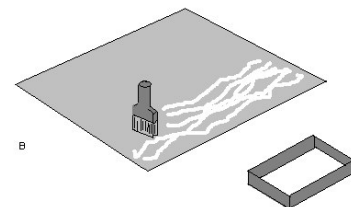
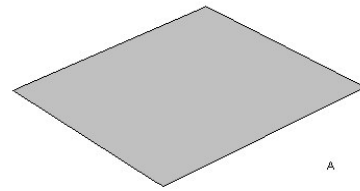
FLAT TABLE or plywood sheet on sawhorses

MEASURING RULER the old wood yardstick is ideal

BOX CUTTER and extra blades

PENCIL or marker pen

A) Start by measuring and cutting sheet to size desired as in “A”



B) Pour some white glue, add a little water to thin in out in the tray. With the brush coat one side of the cardboard sheet as in “B”

C) Now with “shinny side” up, place down a sheet of foil on the glued surface. Use a small wet sponge in a back and forth motion to squeeze out air pockets and excess glue as in “C”. Repeat action with next foil section until it is covered as in “D”

D) Let the finished reflector “D” dry for at least a few days or better a week, before using.

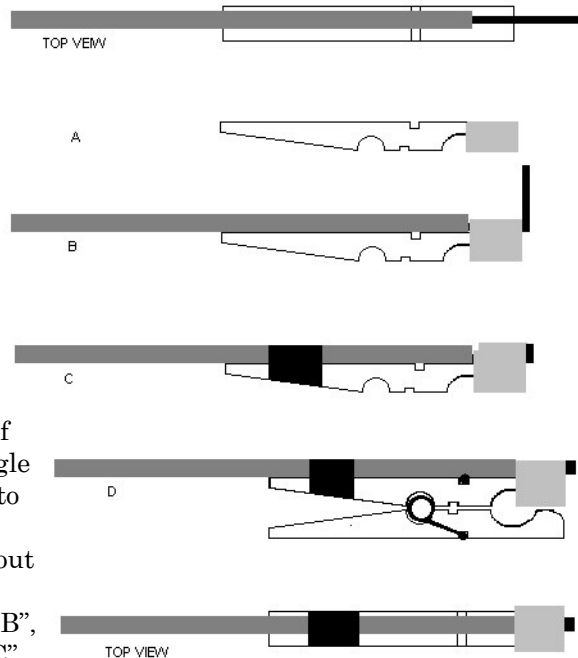
Such Uses are:

- Place a sheet behind a steam radiator to reflect heat into the room.
- Place a sheet under a mattress to reflect back body heat when sleeping.
- Place one under a throw rug to reflect heat back to the feet.
- Use the sheets in walls to reflect heat back in on cold days, sun heat on hot summer days.
- Use a section as a windshield sunshade.
- Place a sheet behind a lamp to reflect back more light.
- Use the sheets in constructing solar cookers or solar ovens. Or reflect sunlight into a house.

CLOTHSCLIP JUMPERS

Used to buy proper jumper wires with clips at local radio shack. Too often either lost or stolen, it was getting expensive to buy replacements, therefore was able to come up with a homemade version for the various hookup electrical projects. Using salvaged lamp wire, plastic electrical tape, aluminum ductwork tape, and cloths clips from a dollar store; one can make many new jumpers with clips, which probably never get “borrowed” or stolen.

- A) Start by removing one of the wood arms from the cloths clip / spring assembly. Next strip 1” of insulation from each end of 12” section of a single lamp cord. Cut the aluminum ductwork tape into ½” x 3” sections.
- B) Now start by wrapping the tape section once about the end of clip as in “A”. Lay bare wire over clip end, then wrap over the bare wire again as in “B”, then fold wire back over itself and tape again “C”. Tape with plastic electrical tape the body of insulated wire near the clip tail “C”.
- C) Repeat for other end with another cloths clip.
- D) Reassemble each end cloths clips as shown in “D”.
- E) Now you have a homemade jumper with clips.



LAST WORDS

Working with salvaged items combined with dollar store stuff, not only creates a more independent self, but as prices rise, the ability to stretch a dollar should save your money for those purchases you absolutely need. There are so many out there going to suffer because they need it “brand new”, you will see many whom won’t be able to stay out of debt trying to afford fuel, food, or fix the teeth. Those whom live as I do, will always stay “financially solvent” with a few extra bucks in the wallet! After all, real survival is now, day to day; not after a disaster! Think about it!



One Call Missed?
Cellular phone-activated IED recovered in Iraq.

