I studied the photos Sgt M sent with great interest. Imagine my surprise when he declared his intent to send me one of his treasures! "My only condition," he said, "is that if you figure out how to get it working, that you'll help me with mine." Sgt M filled out the necessary paperwork to have the radios declared as "war trophies," and they were shipped to North Carolina. Not long after that, a large box appeared at my home in Arizona. I opened it with excitement, and even my wife stood nearby to see what would emerge from carefully padded box. The mystery transceiver had arrived!

A First Glance

Sgt M's package contained two assemblies. The first was a radio set composed of an olive-green radio chassis, a snap-on power supply/accessory unit of some type, and a 15-watt RF linear amp attached to the side of the radio like a sidecar. The second assembly was a green aluminum brick with rows of BNC connectors on opposite ends. This appeared to be some kind of bandpass filter.

All of the hardware was muddy, and peppered with gobs of what appeared to be hardened cement. Since this was, after all, combat military hardware, I thought it reasonable to assume that it would tolerate some moisture. I took the equipment out back and attacked it with the garden hose and a nylon brush. The "cement," it turns out, was sunbaked clay, not unlike the caliche found here in the Southwest. All of the equipment cleaned up nicely.

The transceiver, as received, was composed of three subassemblies. The first, the transceiver itself (part number ER95B), a box-like accessory module (part number BJ231A) which fastens to the bottom of the receiver, and an RF power amplifier module (part number AM215A) which was bolted to the side of the transceiver in "sidecar" fashion.

The transceiver is fitted with all of the operating controls and connectors for a headset and antennas. The controls include two tuning knobs, one of which sets the MHz portion of the desired frequency, the other which sets the KHz portion. Frequency is displayed mechanically through two tiny, round, windows. Selectable frequencies span the range of 26.000 MHz to 71.950 MHz, with a 50 KHz spacing. This means that from end to end, the system provides 920 discrete channels. Since this is a fairly extensive range of frequencies, the designers broke up this span into two bands, which are selectable with a front panel switch.

Additional controls include the obvious, a volume control, a squelch control, and a multi-position mode switch. The mode switch turns the radio on, places it under local or remote control, and allows activation or deactivation of the squelch.

The antenna terminals, which include a BNC as well as a threaded well in which to secure a whip antenna, are located towards the left side of the control panel. At the right of the panel are two circular connectors, identified by Sgt M as "U-79" connectors. (Note: The U-79 is a panel mount connector. The mating connector is called a U-77.) Obviously, these are connection points for the operator's headset.

The accessory module is held into place at the bottom of the transceiver with two spring-loaded suitcase-style snaps, and links to the transceiver internally with a captive DB-25 connector. The outside of the accessory module almost bristles with military-style circular connectors. The side of the module features connectors for power, remote control, for control of the external RF amp, and for interface to what I presume would be an antenna tuner/matching unit. In addition, there are several connectors at the bottom of the module for test and other unknown purposes.

The outboard RF amplifier was attached to the left side of the transceiver. A short length of coax fed the amp from the BNC connector on the face of the transceiver. At the rear of the amp is a short but fat pigtail that links to the accessory module. This must be the conduit through which power and control signals are applied to the amp.

Two interesting contradictions are inherent in the radio I've just described. First, while the radio is clearly of French origin, and the connectors on the accessory module are labeled in French, the front panel controls are labeled in English. Second, while Sgt M had salvaged this radio from a tracked vehicle, its overall design said "manpack" to me. After all, the radio clearly supports the use of a whip, and I could easily envision the accessory module removed and replaced with a similar box filled with batteries.

Dead Ends and Discoveries

The nameplate indicated that the radio had been manufactured by Thomson CSF. I Googled "Thomson," and discovered that they are now doing business under the name "Thales." I found a phone number for the company division in the United States. I spoke with an engineer and inquired how I might be able to get my hands on schematics or service information. He was friendly, though unable to help me. He indicated that the documents pertaining to the radio were controlled by Thales in France. He ended our conversation when he made a peculiar remark, wishing me "luck" in dealing with the French. Hmm.

Next, I composed a letter to Thales in France. I don't speak French, so I composed the letter in English and then used one of the online translation services to convert the message. It was weeks before I heard anything from them, and when I finally did, they simply remarked that the radio was "obsolete" and that they could not help me.

A Google search of "ER-95" yielded little, so I decided to change gears. Since the radio was French, it occurred to me that I should try a search using French words to search with. I initiated searches using words like "transmetteur" (transmitter) "récepteur" (receiver) and "militaires" (military). This path eventually led me to the web site of a French surplus dealer. I scanned through the photos on the web page with the hope that I might find an example of my radio. I eventually stumbled on the image of a set that was identical to mine, but for minor differences associated with the shape of the tuning knobs. The caption read: "TR-PP-13."

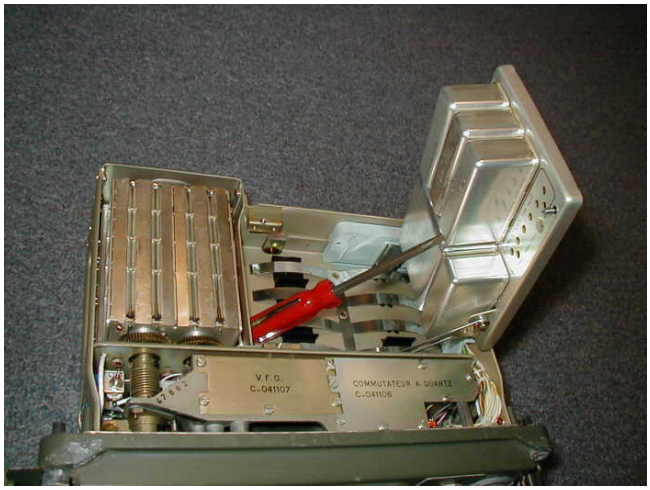
Armed with the discovery that the transceiver was known by nomenclature other than ER-95, I Googled "TR-PP-13." The resulting links led me to a goldmine of information in the form of an article entitled, *The French/Italian TR-PP-13/RV-3 (ER-95A) VHF FM Radio.* This article, authored by J. Feyssac and M. McCabe, was featured in the June 2004 issue of the Vintage and Military Amateur Radio Society newsletter. According to Feyssac and McCabe, most of the NATO armies in the mid 1950's made use of the PRC-10 family of military radios. Military demands for improvements and the growing proliferation of transistors led to the development of the PRC-25 in 1961, and eventually, the PRC-77. France decided not to adopt the PRC-77, but rather, design her own system. This decision led directly to the development of the TR-PP-13, manufactured by Thomson CSF, and the later production of the RV-3, an Italian variant manufactured under license by Elmer.

The VMARS article goes into considerable detail about the design and specifications of the TR-PP-13, including a description of the how the internal frequency synthesis is accomplished. In short, I can say that the receiver is a single-conversion superhet with sensitivity to 0.5uV (18 dB s/n). Audio output is 5 mW. The transmitter (without the outboard RF amplifier) produces 1.5 watts (a 5 to 15 km range). The transceiver contains 46 transistors, and weighs in around 25 pounds.

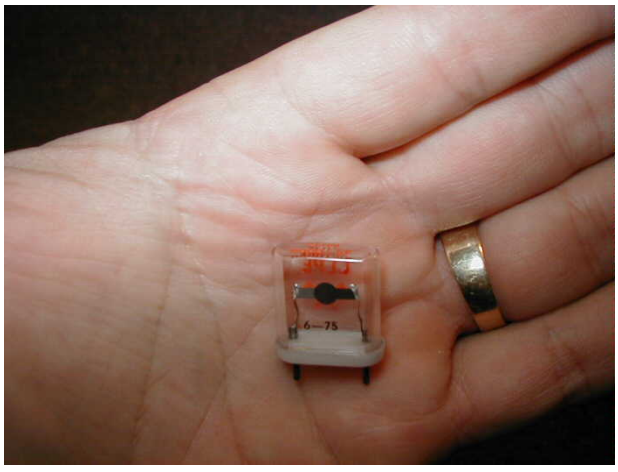
As I had initially suspected, the TR-PP-13 was deployed in at least three different configurations...a manpack, a jeep radio, and a "tank" version. The tank version, system TR-VP-213 (Italian RV-4/213/V,) consists of the radio, the BA-301 power supply (Thomson calls this a BJ231A) and the RF-AM215 amplifier. This is consistent with the hardware that Sgt M sent to me.

Getting the Radio Working

Despite the excellent article by Feyssac and McCabe, I was still without schematics, and still unable to power up the radio. I decided that a look inside might offer some clues. I unsnapped the accessory module from the bottom of the radio, and then I removed the metric Allen-head bolts which secured the radio into its case.



Predictably, the interior exhibits high quality construction. Most of the electronics associated with the radio is housed in small, silver-plated metal modules that plug into to the set. Wiring harnesses are neat, short, tight, bundles. Of course, while this type of construction makes for a rugged set that is easy to service in the field, it makes reverse engineering exceptionally difficult.



Starting with a connector labeled "Alim 24" mounted to the side of the accessory box, I used my ohmmeter to trace some of the wiring. I eventually decided that, on the basis of these measurements, the radio case was a negative ground, and that three pins on the power connector must receive power. I removed the RF amp and its cabling from the radio

(figuring I'd work on that part later). Using alligator leads, I rigged up a current-limited bench supply to provide 24 volts and switched on the radio. There was evidence of a current draw. I turned the radio off.

I was curious about a knurled knob on the face of the transceiver. It was embossed with a curly symbol, reminiscent of a lamp filament. I presumed it might have something to do with a pilot or dial light. I unscrewed the knob, and found an empty lamp socket beneath it. I replaced the bulb and turned the radio back on. The circular windows in which the frequency is displayed lit up. So far, so good.

Next, I had to try to figure out how the headset connector was wired. Unfortunately, the wiring can't be followed from the inside of the radio, and without schematics, my only recourse was trial and error. I powered up the radio and began probing the connector pins with the terminals of a 2000-ohm high-impedance headphone. My logic was that this might help me locate the audio output pins, and even if I crossed something that I should not, momentary contact was not liable to damage anything. I turned the radio on, turned the volume all the way up, and the squelch all the way down. Sure enough, as soon as I touched pins "A" and "B" I heard the hiss associated with an un-squelched FM receiver. I continued probing the connector, and discovered that when terminals "F" and "H" were shunted, a relay inside the radio clicked and the audio was silenced. I was sure that I had found the PTT (push-to-talk) terminals. From that point on, I connected the radio to my 50 ohm dummy load to protect the RF finals and to make sure that I would not unintentionally radiate signals.

A few days later, I discovered Brooke Clarke's website. Posted there, he shows the pinout for the U-79 connector as deployed on PRC family radios. I compared this information to the wiring I had derived through my experimentation, and found that it matched. This suggested to me that the microphone terminals must be pins "C" and "E." I also learned that the PRC family radios utilized carbon microphones, which implied that this radio would require a carbon mike, as well.

I rummaged through my junk box and retrieved an old, standard, telephone handset. These contain a dynamic speaker and a carbon microphone. I gutted the handset and drilled a hole on the handle, near the earpiece, in which to install a momentary-contact PTT switch. I rewired whole thing, fabricated a nice cable, and then terminated that cable with a U-77 connector purchased from Fair Radio Sales. Before finalizing assembly, I gave the handset two or three coats of military-olive-green paint so that it would match the radio.

I made duplicates of my homebrew handset and power cabling, and sent them off with a power supply to Sgt M, along with details of what I'd learned. Last I'd heard, his transceiver fired up and worked fine.

And the RF Amp?

The short story on the RF amplifier is this: Try as I might, I could not get the amplifier to key up. I probed the connector that feeds the amp, but failed to identify any of the signals. I opened the amplifier to study its innards, but nothing there suggested what I must do to get it working. My guess is that something must be strapped on one of the radio's other connectors to enable the operation of the RF power amplifier. Given the relative complexity of the hardware I'm dealing with, combined with the nature of its construction, it is unlikely that I'll get the amp functioning without additional technical documentation. If any of my readers should have an idea as to where I might obtain schematics for this radio, I would be very interested in hearing about it.

So What's the Point?

As far as I can tell, this rig works great. The receiver seems sensitive, and the audio quality of received signals seems pretty good. Even with a makeshift antenna, I can pick up audio from television channels 2 (59.75 MHz) and 4 (71.75 MHz). I have transmitted into my dummy load numerous times, and when my handheld scanner is brought near, the audio quality of the signal emitted by the radio is remarkably clear and crisp. It might be fun to rig up an antenna and try out this radio on the 6 meter band (50 MHz to 54 MHz). The 50 KHz channel resolution and 20 KHz channel width limits one's agility, but looking at the band plan, there are several places I could probably operate. Sgt M send me an email wondering if these radios could be utilized with PSK-31. I don't see why not, assuming a suitable interface was constructed.

A few months back, I penned an article in which I described my restoration of an old BC-348. By far, most readers applauded my efforts, though at least one asked why I would bother. He said, "It's just an old obsolete radio with a lot of hours of work to make it function worse that a $20 Chinese SW radio. So why would we do this?" No doubt this person and others like him would ask the same question about my TR-VP-213. After all, it too is old, obsolete, and of limited value on the ham bands.

The question is a fair one, though I submit that it is only likely to be asked by those who do not understand that a journey can be more important than the destination. As I reflect on my efforts to research and get Sgt M's radio functional, I note that I have learned some history, and some politics. I've corresponded with military radio enthusiasts in the UK, and I've learned a few words of French. I learned some new things about military radios, their ancestry, operation, design, and construction. Most importantly, a mutual appreciation of radio and electronics created the opportunity for, and solidified, my friendship with a serviceman on the opposite side of the globe. If these benefits are not representative of the best face of ham radio, I'm sure I don't know what is.

As for the radio and its history, one can only imagine where it has been and what it has seen in its travels-- from France to the deserts of Iraq... from the deserts of Iraq to brutal combat....from combat to a peaceful boneyard... from the boneyard to North Carolina and then finally to Tucson, Arizona in the United States of America. Oh, if only rigs could talk!

A Brief Editorial Comment

The U.S.A.'s actions in Iraq and elsewhere around the world have been the source of friction between our nation and others, and between the members of our increasingly polarized population. The intent of this editorial is not to advocate any particular position, but simply to suggest that you reflect, from time to time, on the extraordinary sacrifices made by the members of our Army, Navy, Air Force, Marines, and Coast Guard.

If you fly a flag at home or display a "Support the Troops" sticker on your bumper, that's well and good, but I would urge you to take the next step. There are thousands of servicemen overseas who would appreciate a friendly letter from someone back home. Better yet, consider sending a "care" package filled with socks, candy, instant beverage mixes, magazines or similar items. What better way to say "Thank you?"

"What should I send?" you ask. "To whom do I send it?" Start by visiting www.anysoldier.com

Web Article Update: New Information and New Functionality!

After preparing and posting the article above, I continued tinkering with the radio in an effort to get the RF amp running. The breakthrough finally came after I was able to establish contact with Murray McCabe, one of the authors of the VMARS article I described earlier. Murray has accumulated considerable information on the TR-VP-13, including schematics and other critical information. This data is available on CDROM for a very reasonable charge, and I was more than happy to purchase a copy. With this new information, I revised the power harness I had created earlier, and then created a simple shunt or "jumper" for one of the accessory connectors to enable full RF power when I want it. Let me summarize what needs to be done here.

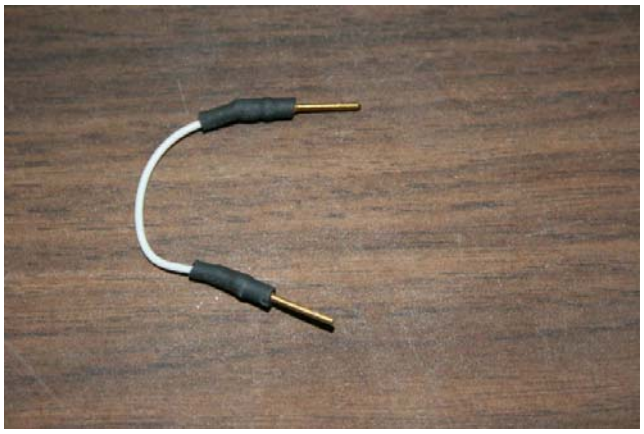
To build the appropriate power cable, one needs a military circular connector with a part number of PT06A-10-6S (or an equivalent.) Cut, strip, and tin six wires for the power harness, and solder one to each of the six connector terminals. The three wires from pins (B), (C), and (D) are joined together and become the positive (+) 24-volt connection to the radio. The three wires from pins (A), (E), and (F) are joined together and become the negative (-) 24-volt connection to the radio. The power harness you've created is attached to the connector labeled "ALIM 24 V." I no longer connect any wiring to the radio housing.

To enable the RF amplifer, one needs to connect pin (E) to pin (G) on the connector marked "TELECOM." For me, this was initially problematic as I was unable to find a mating plug for that connector. Allow me to explain:

At first glance, it appears that the "TELECOM," "ACCORD ANT" and "AMPLI HF" connectors are all the same-- they are, in terms of their outer shells. Where they differ is in a feature called "keying." The pin array in each one has been "keyed" differently, that is to say, the pin set in each connector has been rotated to a different angle. This prevents the

cables from being attached to the wrong connector, even though they may share similar shells.

Digging through my junkbox, I was able to find several connectors that would mate with the "ACCORD ANT." These were plugs with the part number PT06A-12-8P(SR). I was never able to find a plug that would mate with the "TELECOM" connector. I guess the connector keying associated with the "TELECOM" port must be one of the more rare variants.



To work around this, I fashioned a jumper composed of an inch of wire with a gold connector pin soldered on each end. The jumper was installed between pins (E) and (G) on the "TELECOM" connector. To protect the jumper, I took a PT06A-12-8P and drilled out its center, leaving only the hollow shell. This *will* fit the TELECOM connector and acts as a tough cover for the jumper.

I may be stating the obvious, but here are a few additional points to keep in mind: The TR-VP-13 must be connected to the amplifier with a BNC patch cord running between the front of the radio and the front of the amplifier. A 50-ohm antenna is attached to the BNC connector at the rear of the amplifier. Also, at the rear of the amplifier, is a short, thick, cable that links the amp to the connector on the radio marked "AMPLI HF." This cable must be in place for the amplifier to function. Finally, The toggle switch on the front of the amplifier allows you to select the transmit power level.