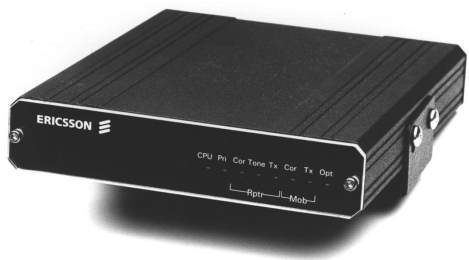
Operator's Manual

VRC
Vehicular Repeater



ERICSSON

NOTICE!

This manual covers Ericsson and General Electric products manufactured and sold by Ericsson Inc.

NOTE!

Repairs to this equipment should be made only by an authorized service technician or facility designated by the supplier. Any repairs, alterations or substitution of recommended parts made by the user to this equipment not approved by the

NOTICE!

SAFETY INFORMATION

The operator of any mobile radio should be aware of certain hazards common to the operation of vehicular radio transmissions.

A list of the possible hazards are:

1. **Explosive Atmospheres**

   Just as it is dangerous to fuel a vehicle with the motor running, be sure to turn the radio off while fueling the vehicle. Do Not carry containers of fuel in the trunk of the vehicle when the radio is mounted in the trunk.

2. **Interference To Vehicular Electronic Systems**

   Electronic fuel injection systems, electronic anti-skid breaking sys-tems, electronic cruise control systems, etc., are typical of the types of electronic devices that may malfunction due to the lack of protec-tion from radio frequency energy present when transmitting. If the vehicle contains such equipment, consult the dealer for the make of vehicle and enlist his aid in determining if such electronic circuits perform normally when the radio is transmitting.

3. **Dynamite Blasting Caps**

   Dynamite blasting caps may be caused to explode by operating a radio within 500 feet of the blasting caps. Always obey the "Turn Off Two Way Radio" signs posted where dynamite is being used. When transporting blasting caps in your vehicle:

   a. Carry the blasting caps in a closed metal box with a soft lining.

   b. Leave the radio OFF whenever the blasting caps are being put into or removed from the vehicle.

4. **Radio Frequency Energy**

   To prevent burns or related physical injury from radio frequency energy, do not operate the transmitter when anyone outside of the vehicle is within two feet of the antenna.

OPERATING RULES AND REGULATIONS

Two way FM radio systems must be operated in accordance with the rules and regulations of the Federal Communications Commission (FCC). As an operator of two way radio equipment, the user must be thoroughly familiar with the rules that apply to the intended type of radio operation. Following these rules will help to eliminate confusion, assure the most efficient use of existing radio channels, and result in a smoothly functioning radio network.

When using the radio, remember these rules:

1. It is a violation of FCC rules to interrupt any distress or emergency mes-sage. In conventional mode the radio operates in much the same way as a telephone "party line" therefore always listen to make sure that the line is clear--that no one else is on the air--before sending any messages. If someone is sending an emergency message--such as reporting a fire or asking for help in an accident--**KEEP OFF THE AIR!**

2. Use of profane or obscene language is prohibited by Federal Law.

3. It is against the law to send false call letters or a false distress or emergency message.

4. The FCC requires that conversations be brief and confined to business. To save time, use coded messages whenever possible.

5. Using the radio to send personal messages (except in an emergency) is a violation of FCC rules. Only those messages essential for the business operation may be sent.

6. It is against the Federal law to repeat or otherwise make known anything overheard on the radio. Conversations between others sharing a commu-nications channel must be regarded as confidential.

7. The FCC also requires that the caller be identified at certain specific times by means of call letters. Refer to the rules that apply to the particu-lar type of operation for the proper procedure.

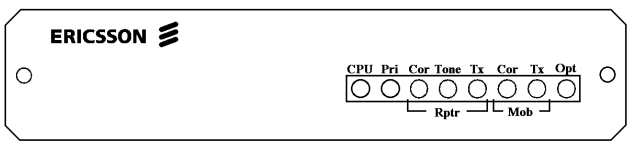
8. No changes or adjustment shall be made to the equipment except by an authorized or certified electronic technician.

INTRODUCTION

The Vehicular Repeater Conventional (VRC) is designed to provide extended portable communication coverage by repeating conventional transmissions in both directions through an existing high power mobile radio.

VRC FRONT PANEL

The VRC has 8 LEDs to indicate the current status of the repeater:



CPU Flashes at approximately 1 Hz rate to indicate proper operation of the on-board microprocessor.

Pri Indicates the VRC is at priority status and will repeat all transmissions, portable-to-base and base-to-portable. In multi-vehicle applications, only one VRC/mobile combination should be at priority status.

Repeater

Cor Indicates the VRC is receiving carrier from a portable (**Tone** LED should also be on) or another VRC (**Cor** LED only).

Tone Indicates the VRC is decoding the sub-audible tone from the portable. This LED should only be on when the repeater **Cor** LED is also on. If the VRC is the priority unit, the **Mob**ile **Tx** LED should also be on.

TX Indicates when the VRC is transmitting to the portable.

Mobile

Cor Indicates that a transmission is being received by the mobile. If the **Pri** LED is on, the **Rptr Tx** LED should also be on. If the VRC is not at priority status, the **Rptr Cor** LED should be on indicating that another repeater is handling the transmission.

Tx Indicates when the mobile is being keyed by the VRC.

Opt The option LED is used to indicate program mode (on steady) when the programming cable is inserted, or to indicate a problem with the radio portion of the repeater (rapid flashing). If the **Opt** LED flashes at approximately 10 Hz rate, contact your service center.

FUNCTIONAL DESCRIPTION

Generally, vehicular repeaters are used as mobile extenders in cross-band operation; i.e., the link is UHF and the mobile is low band or VHF. In-band operation is possible, but care must be taken to prevent interference between the mobile's higher power transmitter and the repeater receiver. Proper frequency selection and antenna placement are important even in cross-band operation, but especially for in-band use. The use of low power pre-selector cavities may be placed in line with the repeater antenna cable since it is simplex and low power.

The VRC operates on UHF simplex frequencies. The portables must transmit with a CTCSS tone, but should be carrier squelch receive, or use a decode tone different from the transmit tone. Part of the multi-vehicle format dictates that all of the VRCs must be able to monitor all link traffic on site and be able to determine if a portable is transmitting, or if other repeaters are transmitting.

When the user leaves the vehicle, the VRC must be activated via the mobile radio front panel or a separate switch. When the mobile radio is receiving carrier and proper CTCSS tone, the VRC will begin transmitting on the portable's receive frequency. The user is able to hear and respond to all radio messages, including other portables at the site. The VRC can be programmed to give the portables priority in a conversation by periodically sampling for portable activity (carrier and proper CTCSS tone) during base-to-portable transmissions. During sampling, if the VRC detects a portable transmission, it will cease transmission, key the mobile radio and repeat portable-to-base. This allows the portable to respond during repeater hang time or during full duplex interconnect calls. Priority sampling can be enabled/disabled through PC programming and interval can be programmed between 0.25 seconds and 2.5 seconds in 0.25 second increments.

The VRC has a fixed 3-minute time out timer for base-to-portable transmissions. If the mobile carrier operated relay (COR) is active for more than 3 minutes (and the VRC is the priority unit), the VRC will send a double blip and cease transmission until the mobile COR is inactive. The 3 minute time-out is in effect regardless of whether the VRC is programmed for priority sampling or not.

MULTI-VEHICLE OPERATION

When the VRC is first activated, it will transmit a short "lock tone" that alerts the user that the system is functioning. It will then assume the priority status and be ready to repeat any base-to-portable or portable-to-base transmissions. If another unit arrives on scene and is activated, it too will transmit a "lock tone". When the first VRC detects the "lock tone" from the second unit, it will increment a "priority counter" and will

no longer repeat any transmissions. The recently arrived unit will be the priority repeater, and the first unit will be one count away from priority. This process will continue for each unit that arrives at the scene, creating a priority hierarchy for up to 256 vehicles, each with a unique count and only one unit at priority status. The VRC will not transmit it's "lock tone' if the radio channel is busy when first enabled. It will wait in non-priority status until all transmissions cease, then send it's "lock tone" and become the priority unit.

Even though the other VRCs are not a priority status, they will continue to monitor the channel for activity. If the priority unit leaves the scene or becomes disabled, the other units will detect the condition to repeat and determine that there is no priority unit repeating the transmission. They will then begin decrementing their priority counters until one of them reaches the priority status and begins repeating the transmission. Since the VRCs are all at different counts, only one will reach priority status and begin transmitting. The other units will sense the new priority repeater and cease counting down, preserving the priority hierarchy.

If another unit were to arrive from a different scene and it is still the active priority, there will be two active repeaters on the air when a condition to repeat exists. When one of the VRCs unkeys to check for portable activity, it will detect the presence of the other active VRC and increment it's priority counter and cease transmission. This is the self-clearing mode to prevent radio interference.

If the portable user is out of the vehicle and the mobile radio is keyed by the local microphone inside the vehicle, the VRC will detect the local PTT and repeat the transmission to the other portables so that both sides of the conversation will be

heard by everyone on the link. The local microphone repeat function can be enabled/disabled via PC programming.

The VRC also has a local receive audio speaker jack that enables a person inside the vehicle to monitor portable-to-base transmissions that are being repeated through the mobile.

If portable users wish to communicate portable-to-portable without accessing the mobile VRC repeater, the may transmit on the same frequency without CTCSS tone (or a different CTCSS tone); the VRC only responds to carrier and proper CTCSS tone from the portables.

LIMITED WARRANTY AND REPAIR INFORMATION

An explanation of the Limited Warranty's benefits and exclusions follows.

What does your warranty cover?

- Any defect in material or workmanship.

For how long after the original purchase of the equipment?

- One (1) year.

What will we do?

- Repair your Equipment or provide you with a new or, at our option, a reconditioned unit in the event repairs cannot be made.
- The exchange unit (repaired or replacement) is warranted for the remainder of your product's original one (1) year warranty period.

How do you make a warranty claim?

- Contact Pyramid Communications [(714) 901-5462] for return authorization prior to returning any defective merchandise.
- Properly pack your unit. Include any cables and other parts and accessories which were originally provided with the product. We recommend using the original carton and packing materials.
- Include in the package your name and address, a description of the defect and a copy of the sales receipt or other evidence of date of original purchase.
- Ship the unit standard UPS or equivalent to:
  Pyramid Communications
  5142 Bolsa Avenue #103
  Huntington Beach, CA 92649
- Pay any charges billed to you for service not covered by the warranty. Returned units that are out of warranty shall be deemed as authorization for repair and sender shall be responsible for all reasonable repair costs.
- The repaired (or new or reconditioned) unit will be shipped to you prepaid freight.

What does your warranty <u>not</u> cover?

- Customer instruction. Your Operator's Manual provides information regarding operating instructions and user controls. For additional information, ask your dealer.
- Any labor charges incurred in removal/installation of defective or repaired units.
- Installation and set-up service adjustments.
- Damage from misuse or neglect.
- Products which have been modified or incorporated into other products.
- Products purchased or serviced outside the USA.
- Changes that provide improvements or enhance performance.
- Any unit which is not new when sold to the first end user or unit whose serial number has been altered or removed.
- Damage or loss occurring during shipment (claims must be presented to the carrier) or shipping charges to return defective units for repair.

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