



# **AMPS Band Transceiver**

## **TR850**

INSTALLATION AND OPERATION GUIDE  
FOR SYSTEM OPERATORS



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**VCom's Corporate Mandate**

is to be a leading worldwide designer and manufacturer of state-of-the-art communications equipment and components. Through the remarkable success of our customers and business partners, VCom innovations are achieving this goal.

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## **SAFETY PRECAUTIONS**

1. Before installing and operating this equipment, read all Safety, Installation and Operating sections. Retain this manual for future reference.
2. Follow all instructions — Failure to do so may result in damage to the unit or severe personal injury.
3. Servicing should not be attempted by the user. There are no user serviceable parts inside. Refer all servicing to factory qualified personnel.
4. Shock Hazard — An electrical shock hazard exists when the chassis cover is removed as is required to set internal controls. Always disconnect power from the unit before removing the cover.
5. Cleaning — Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.

**Warning** Do not work on the system or connect or disconnect cables during periods of lightning activity.

**CAUTION:** To comply with FCC RF exposure requirements in section 1.1307, a minimum separation distance of 1.5 meters is required between this antenna and all persons.

## **LES PRÉCAUTIONS DE SÉCURITÉ**

1. Avant d'installer ou d'opérer cet équipement, lisez, toutes les sections de sécurités, d'installations et d'opérations. Gardez ce manuel comme source de référence.
2. Suivez toutes instructions - si non, vous risquez d'endommager la machine ou de vous blesser sérieusement.
3. N'essayez, pas de réparer cet équipement vous même. Référez toutes revisions nécessaire au personnel qualifié de la manufacture.
4. Risque de choc - Il y a un risque de décharge électrique qui existe quand la couverture du châssis est enlevée, comme est nécessaire pour ajuster les contrôls internes. Il faut toujours couper l'électricité avant d'enlever le couvercle pour faire aucun ajustage.
5. Le nettoyage - n'utilisez pas de nettoyeurs aérosols ou liquides. Utilisez un tissu humide pour nettoyer.

**Attention** Ne pas travailler sur le système ni brancher ou débrancher les câbles pendant un orage du foudre.



Important Installation Instructions

**CAUTION:** To comply with FCC RF exposure requirements in section 1.1307, a minimum separation distance of 1.5 meters is required between this antenna and all persons.

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## **1.0 GENERAL INFORMATION**

### **1.1 Functional Overview**

The VCom **TR850** is an AMPS Band Transceiver for use in wireless systems. The TR850 integrates an LNA, upconverter, power amplifier, RF and IF diplexers to provide a one-box solution for two-way wireless RF communications. The TR850 and antenna are situated outdoors and connected to a cable modem indoors by standard RG-59 cable. A single RF connector on the weatherproofed enclosure provides the interface to the transmit/receive antenna for rapid setup. The Transceiver is configured to work with standard cable modem frequency plans and levels, permitting direct connection. The Transceiver also includes an RF mute function to reduce power consumption and broadband noise emissions.

### **1.2 Module Features**

- +24 dBm output for high reverse channel system gain
- Low Phase Noise
- Automatic transmit RF mute (transmits only when an IF signal is present)
- Fully weatherized unit, suitable for outdoor mounting

## 1.3 Specifications

### TRANSMITTER SPECIFICATIONS

IF Input Frequency	17-42 MHz
RF Output Frequency	824-849 MHz
Linear Output Power	+24 dBm at RF port
Output P1dB	+27 dBm at RF port
Spectral Mask	FCC CFR 47 Part 22.917
Gain	20 ± 2 dB at 23°C
Gain Flatness (Frequency Response)	± 1.0 dB in any 3MHz band
Gain Stability over Temperature	± 2.0 dB over -40°C to +60°C ambient
Phase Noise	-87 dBc/Hz @ 10 kHz
Spectral inversion	No spectral inversion
IF Level for RF Activation	-46 ± 3 dBm maximum
RF Activation/Mute Response Time	<2 microseconds max

### RECEIVER SPECIFICATIONS

Frequency	869-894 MHz
Gain	24 ± 2 dB at 23°C
Gain Flatness (Frequency Response)	± 1.0 dB in any 6MHz band
Noise Figure	<5 dB typical, 6.0 dB maximum

### GENERAL

Frequency Stability	± 20 kHz (-30 to +60°C)
Frequency Stability over time	< ±35 kHz over 10 years
RF Connector	N female, 50 ohms
IF Connector	F female, 75 ohms
DC Supply	+10 to 28 V (+24V nominal), +10W
Operating Ambient Temperature	-40°C to +60°C
Size	5" x 7" x 1" (12.7cm x 17.8cm x 2.5cm)
Weight	2.2 lbs. (1 kg)
Mounting	Pole mount, 1" to 1.75" diameter pole

### RF PORT SPECIFICATIONS

RF Return Loss	Better than 8 dB in transmit and receive RF bands
RF Spurious Emissions	FCC CFR 47 Part 22.917

### IF PORT SPECIFICATIONS

IF Return Loss	Better than 10 dB over transmit and receive IF bands
IF Spurious Emissions	≤ -30 dBm from 100-860 MHz except receiver frequency range ≤ -80 dBm, receiver frequency range

Specifications subject to change without notice.

## 2.0 INSTALLATION

### 2.1 Unpacking the Unit

Carefully remove the equipment from its packing material and set it on a solid surface, such as a table or desk. If it appears damaged in any way, notify the carrier, and keep all packing materials for inspection by the carrier's agent.

### 2.2 Mounting the Unit

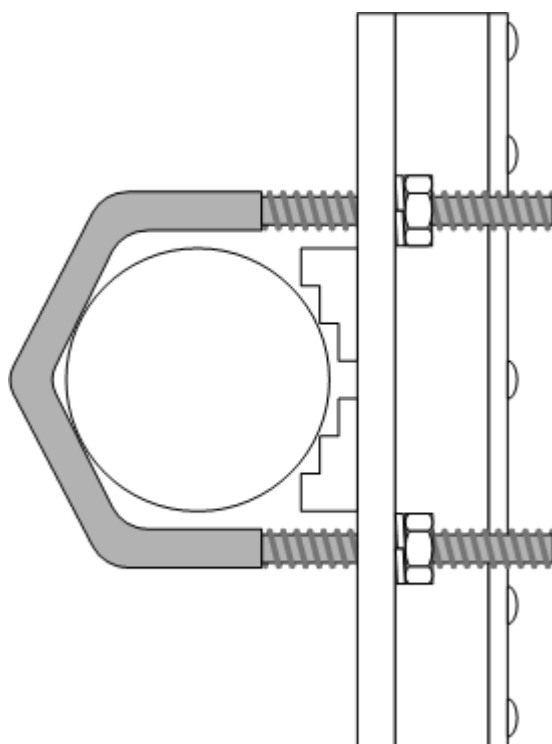
#### 2.2.1 Mounting the TR850

The following hardware is included in the box for mounting the TR850 to the pole:

- 1 V-bolt
- 2 ¼"x20 flange locknuts for connecting V-bolt and pole catch to the pole

The TR850 was designed for mounting to a pole with a diameter of 1.0" to 1.75". Please ensure that the pole used is attached securely to the building or other mounting location. Simply secure the TR850 unit to a pole as shown in Figure 2.2A with F-Connectors on the bottom.

**DIAGRAM 2.2A: MOUNTING THE UNIT**



**Top View of TR850  
Mounted to the Pole**



### 2.2.2 Mounting the Antenna

Mount the antenna according to the manufacturer's instructions.

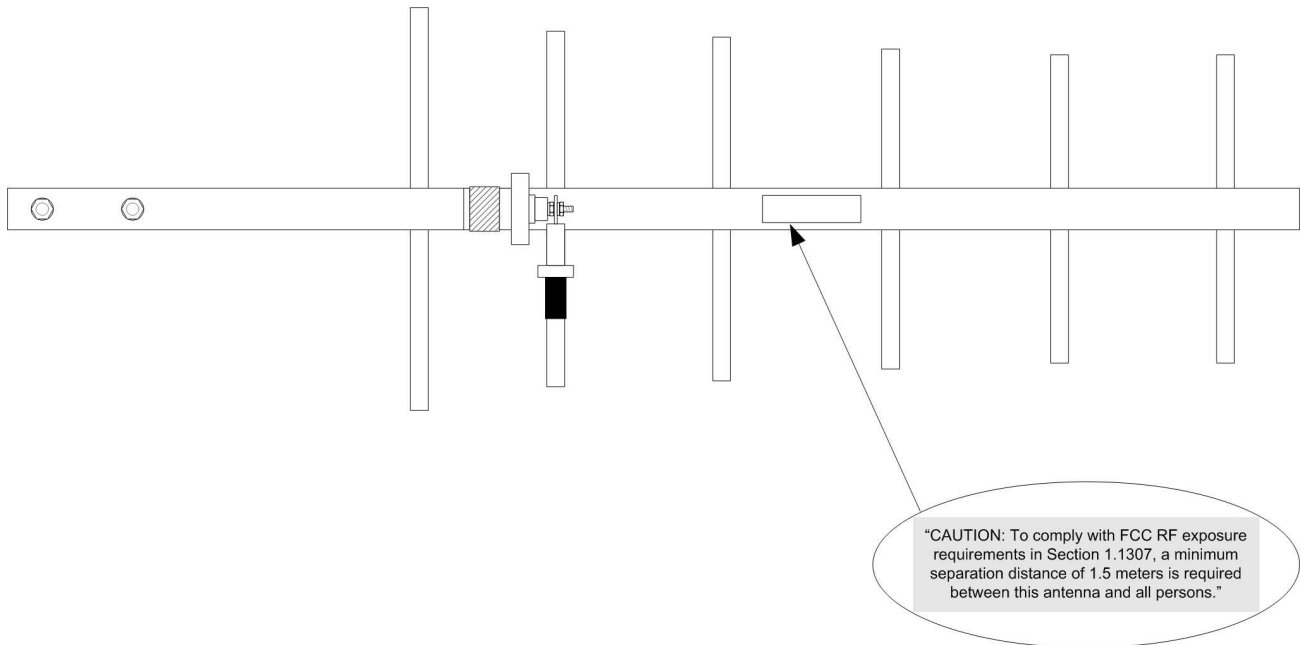
- ☛ The TR850 is intended for use with planar arrays and Yagi antennas. Please consult table 2.2B for further information.

**TABLE 2.2B: ANTENNA LIST**

Transceiver Power		Antenna Type	Antenna Gain
[Watts]	[dBm]		
0.25	+24	Yagi	10 dBi
0.25	+24	Flat planar array	9 dBi
0.25	+24	Window mount planar array	7 dBi

- ☛ Included with the TR850 unit is a self-adhesive label for application to the antenna. To operate the TR850 in compliance with FCC regulations, you must apply the included label to the antenna. Peel off the protective backing from the label and affix it to the antenna such that the label is readable from a distance of 5 feet.

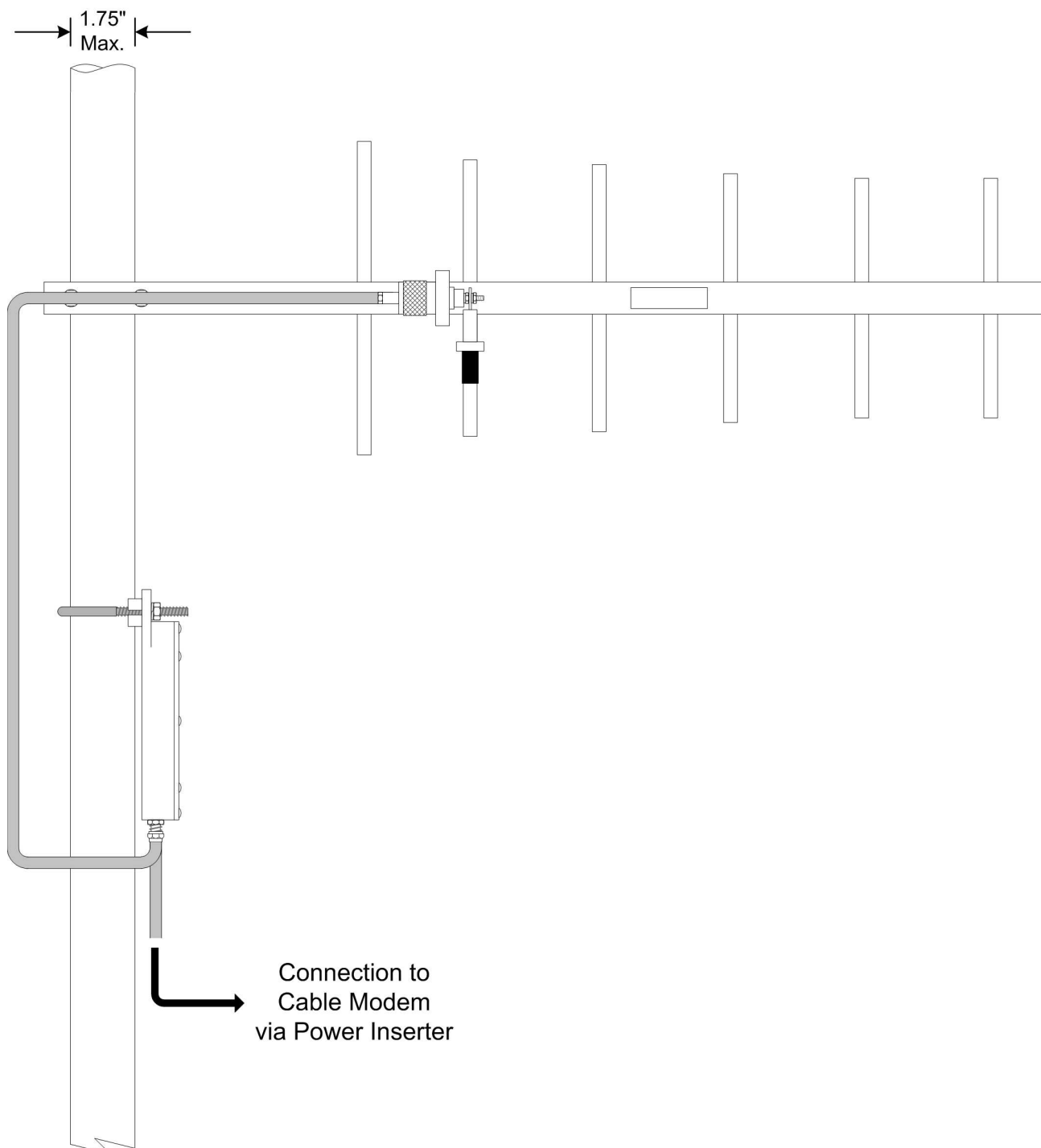
**DIAGRAM 2.2C: APPLYING THE SELF-ADHESIVE LABEL**



## 2.3 Connection to the Antenna

Connect the TR850 to the Antenna via the F-Connector

**DIAGRAM 2.3A: CONNECTION TO THE ANTENNA**



## 2.4 Connection to the Power Inserter and Cable Modem

Connections to the TR850 are made as shown in Diagrams 2.3A and either 2.4B or 2.4C depending on which power supply and inserter came with the TR850.

The power inserter has three connections:

DC POWER	Connect to wall adapter with RG-59 cable with F connectors
TO MODEM	Connect to cable modem
TO TRANSCEIVER	Connect to TR850

### WARNING!

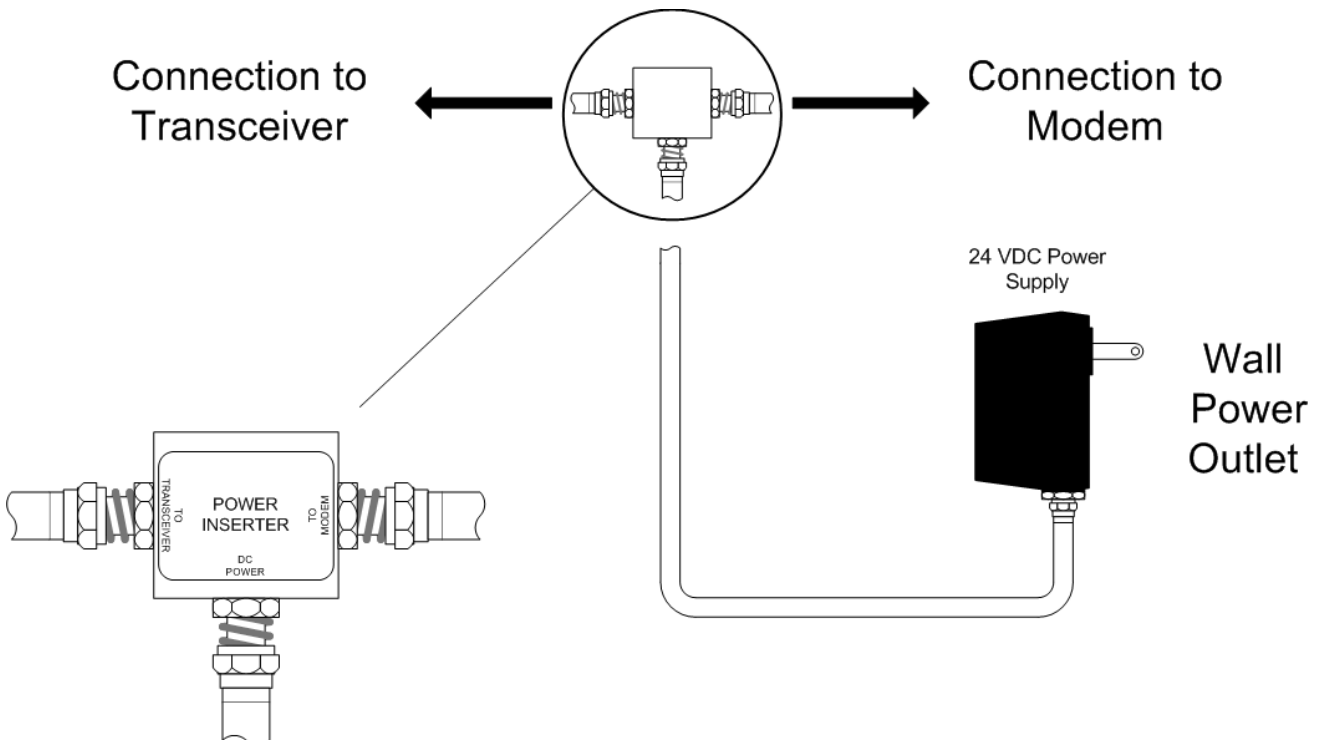


If the power inserter is not connected correctly, the TR850 will not operate, and there is the potential to damage the cable modem.

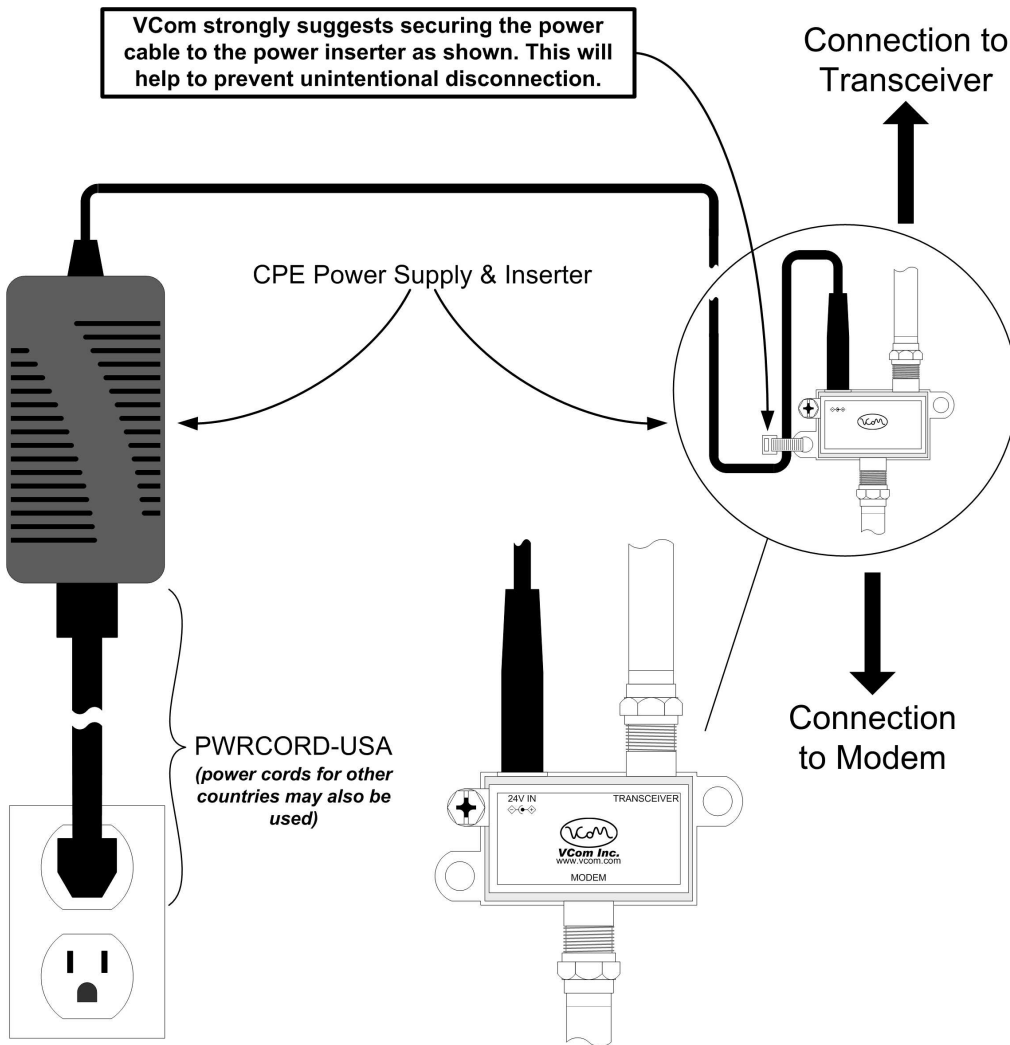
Ensure that all wires and cables are hooked up before plugging into the AC adapter/power supply (i.e. hook up to the power supply last).

After connection, both connectors **MUST** be waterproofed with the supplied rubber sealing tape. See Section 2.5 for details.

**DIAGRAM 2.4A: CONNECTION TO CABLE MODEM VIA POWER INSERTER USING PS24V750MA-01**



**DIAGRAM 2.4B: CONNECTION TO CABLE MODEM VIA POWER INSERTER USING CPE POWER SUPPLY & INSERTER**



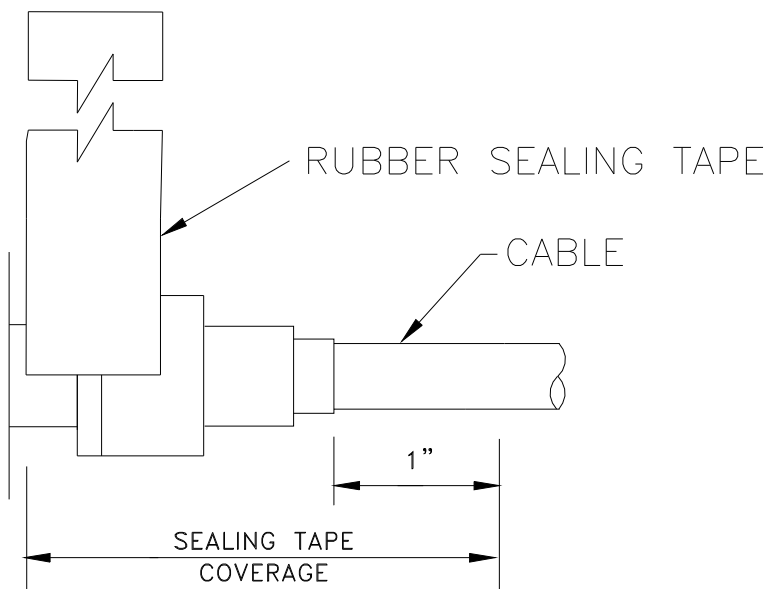
## 2.5 Waterproofing Connections

Many transceiver problems can be attributed to environmental conditions (including vibration), which can loosen cables and permit moisture to penetrate the connectors. It is highly recommended to seal the connectors using a technique similar to the one described below. This will provide moisture protection and keep the connections tight. For your convenience, VCom has provided two 6 inch lengths of rubber self-amalgamating sealing tape to use on the two connections of the TR850.

### STEP 1

Use one 6" section of rubber sealing tape. Starting at the TR850 end, stretch the tape and wrap it around the connector as close as possible to the wall of the TR850. Overlap the tape by approximately one-half of it's width so that it can form a seal with itself. Extend the wrapping to approximately one inch past the end of the connector.

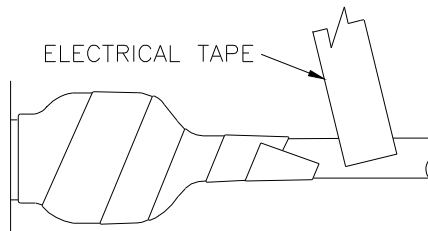
**DIAGRAM 2.5A: WATERPROOFING CONNECTION – STEP 1**



### STEP 2

Cover the sealing tape with electrical tape (not provided). Start approximately one inch further down the cable, and stretch the tape, overlapping by one-half. Wrap to the TR850 end and without breaking the tape, wrap back down to the cable end.

**DIAGRAM 2.5B: WATERPROOFING CONNECTION – STEP 2**



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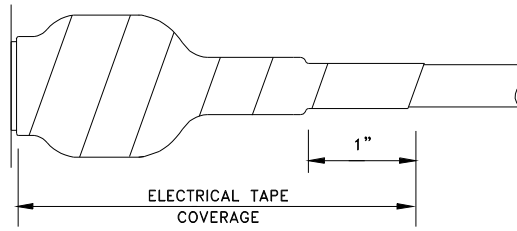
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### STEP 3

When done, the connection should be tightly wrapped with tape, with a good seal to the cable.

**DIAGRAM 2.5C: WATERPROOFING CONNECTION – STEP 3**



## 3.0 WARRANTY STATEMENT AND SERVICE POLICY

### 3.1 Warranty Statement

VCom warrants its products to be free from defects in workmanship or materials for a period of two years. The warranty begins on the date of the original shipment from VCom to its customer. No claim may be allowed for expenses incurred in installation or use. No other expressed or implied warranties shall apply to the goods sold. VCom is not responsible for delayed shipments, other loss beyond VCom's control, or consequential damages of any kind arising in connection with the use of its products. This warranty is a return-to-factory warranty only. During the warranty period VCom will at its option, replace, repair or refund the price paid for any item which is returned for service. This warranty does not apply to units that have been physically or environmentally abused.

### 3.2 Service Policies: How to Return an Item for Service:

Before returning any item for service, an R.M.A. (Returned Material Authorization) number must be assigned by VCom. A unique R.M.A. number will be assigned for each item being returned. When requesting an R.M.A. number, please be prepared to provide the model, VCom serial number, original invoice number, your purchase order number and an adequate fault description. The serial number of a unit can be found on a barcode label similar to the one pictured below. R.M.A. service is available Monday to Friday from 8:30 a.m. to 4:30 p.m. CST (statutory holidays excepted).



To obtain an R.M.A. number you may:

**Call:** (306) 955-7075, press '0' for Operator, or '3' for Service Dept.

**Fax:** (306) 384-0086 — Attention: R.M.A. Request

**Email:** [support@vcom.com](mailto:support@vcom.com)

Once an R.M.A. number has been assigned, please refer to it in all correspondence and make certain that all applicable R.M.A. numbers are clearly marked on the outside of each package being returned. You must also ensure that each product is shipped to VCom in its original shipping container (or equivalent) via Prepaid carrier, with appropriate insurance and customs documentation (where required). VCom will not accept collect shipments, damaged shipments or shipments unaccompanied by an R.M.A. number.

**For items still under Warranty** – Items will be returned from VCom Inc. to its customer via prepaid ground carrier. The customer is responsible for any additional costs incurred, including custom clearance and duties. Any alternate means of shipment must be requested by the customer and will be subject to additional charges.

**For items no longer under Warranty** – Items will be returned from VCom Inc. to its customer via prepaid ground carrier at the customer's expense. The customer is responsible for any additional costs incurred, including custom clearance and duties. Any alternate means of shipment must be requested by the customer and will be subject to additional charges.

**Shipping Instructions will be provided by the repair center when the RMA number is sent to the customer.**

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### **3.3 Repair Charges and Warranty Exemptions**

Items returned beyond the warranty period or items that do not qualify for warranty service are subject to additional out-of-warranty repair charges. Descriptions of these charges and warranty exemptions are below:

- 1) Repair turnaround time is typically 5-14 business days after receipt of the item at VCom. A Flat Rate Repair Charge will apply to all out-of-warranty items. Flat Rate Repair Charges are subject to change without notice.
- 2) Any faults due to customer error (ie - incorrect set-up or configuration settings) are subject to the current Test Fee and will be exempt from warranty.
- 3) Items returned with inadequate fault descriptions are subject to the current Test Fee and are exempt from warranty.
- 4) In the event that no fault is found, the item is subject to the current Test Fee and will be exempt from warranty.
- 5) Any product exhibiting external damage (either from shipping, improper handling or use) will be subject to inspection. If said damages are determined to be the cause of failure, the item will be exempt from warranty.  
All repairs to correct the external damage are subject to Time & Materials Charges (parts and labor at current rates).
- 6) Items with damage caused by unauthorized repairs or by external devices are subject to current out-of-warranty Flat Rate Repair Charges and are exempt from warranty.
- 7) All products returned for Factory Optioning are subject to the applicable current Option Charge plus Test Fee. Factory-optioned products carry the balance of the original warranty or a 90 day warranty, whichever is greater.

All out-of-warranty repairs must be approved by the customer in writing. No repairs will be made until the customer's Purchase Order or Out-Of-Warranty Repair Authorization is received.







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