

5.7-5.8 GHz Base Station Transceiver

BTR5857

INSTALLATION AND OPERATION GUIDE
FOR SYSTEM OPERATORS



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(formerly WaveCom Electronics Inc.)

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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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Specifications subject to change without notice — Printed in Canada

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Approved: G.C.

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. The user should not attempt servicing. There are no user serviceable parts inside. Refer all servicing to factory qualified personnel.
4. 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.

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. 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.

INFORMATION TO USER

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

CAUTION: Any changes or modifications not expressly approved by VCom Inc. could void the user's authority to operate the equipment.

CAUTION: This device must be professionally installed.

WARNING:

In order to comply with the FCC radiofrequency exposure limits of 1.1310, this equipment must be installed in such a way as to provide a minimum separation distance of 1.5m from the transmitting antenna to persons nearby.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF fields in excess of Health Canada's limits for the general population; consult Safety Code 6, obtainable from Health Canada's Website www.hc-sc.gc.ca/rpb.

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1.0 GENERAL INFORMATION

1.1 Functional Overview

The VCom BTR5857 is a low cost 5.7 to 5.8 GHz Base Station Outdoor Unit (ODU) for use with VCom TRI5758 in broadband fixed wireless systems. The BTR5857 cost and performance makes it ideal for both point-to-point and point-to-multipoint systems. The BTR5857 combines a low noise downconverter, high power upconverter and high rejection duplexer to offer a quick and easy to install base station ODU for BWINTM BASED ON DOCSISTM.

1.2 Module Features

- Up to +15 dBm output power with 64QAM; +20 dBm with QPSK
- Digital temperature compensation - guarantees specifications over full operating temperature band
- High reliability, state-of-the-art design using microstrip, MMIC and surface mount technology
- Meets unlicensed-band maximum allowable transmit power of +31 dBm EIRP
- High Receive Gain of 38 dB allows for optimal Downstream signal recovery for high SNR
- Automatic transmit RF mute (transmits only when an IF signal is present)
- Low Noise Figure; < 6 dB typical
- All local oscillators are frequency synthesized and locked to a common internal high stability reference
- Conservative component derating and 100% burn in help ensure reliable operation
- Fully weatherized unit, suited for outdoor mounting

1.3 Specifications

1.3.1 BTR5857 Base Station Transceiver Specifications

TRANSMIT SPECIFICATIONS

IF Input Frequency	516-540 MHz
Bandwidth	one or more RF carriers (4 x 6 MHz)
RF Output Frequency Range	5775-5799 MHz (Low Band Option) 5799-5823 MHz (High Band Option)
Frequency Response (any 6 MHz band)	± 0.3 dB
Rated Output Power at Antenna Port	+15 dBm (64QAM); +20 dBm (QPSK)
Spectral Mask	Compliant with ETSI EN 301 021 v1.5.1, section 5.3.3, system type D
Phase Noise	<-85 dBc/Hz @ 10 KHz
Gain	30 dB (± 1 dB over temp)
IF Level for RF Activation	18 ± 2 dBmV

RECIEVE

RF Input Frequency Range	5727-5751 MHz (Low Band Option) 5751-5775 MHz (High Band Option)
Frequency Response (any 6 MHz band)	±0.3 dB
IF Output Frequency Range	18-42 MHz
Noise Figure at Antenna Port	<6 dB including duplexer loss
Gain	38 dB (± 2 dB over temp)
Phase Noise	<-85 dBc/Hz @ 10 KHz

GENERAL

Frequency Setting and Stability over Temperature	± 15 kHz
Frequency Setting and Stability over 10 years	± 25 kHz
IF Connector	F female, 75 ohms
RF Connector	N female, 50 ohms
Return Loss	10 dB
Power Requirement	12 to 28 VDC (+21 V to +28 V nominal)
Power Consumption	12W maximum
Operating Temperature Range	ETS 300 019 Class 4.1 (-30 to +40°C ambient) full specifications ETS 300 019 Class 4.1E (-45 to +45°C ambient) operational
Antenna Beamwidth	90°, Omnidirectional available
Antenna Compliance	ETSI EN 302 085
Spurious Emissions	ETSI EN 301 390, FCC Part 15, Industry Canada RSS-210
EMC Compliance	ETSI EN 300 385
Mounting	Standard - Pole (1" to 1.75" (25mm to 44mm) diameter) with polarization , azimuth, elevation adjustment. Optional - wall mount
Dimensions	12" x 12" x 2.5" (305 mm x 305 mm x 64 mm) maximum
Weight	5.5 lbs. (2.5 kg)

SYSTEM CONFIGURATIONS

BTR5857-T5775_5799-R5727_5751	Outdoor 5.7 GHz Base Station Transceiver Low Band (Transmit: 5775-5799 MHz, Receive: 5727-5751 MHz)
BTR5857-T5799_5823-R5751_5775	Outdoor 5.7 GHz Base Station Transceiver High Band (Transmit: 5799-5823 MHz, Receive: 5751-5775 MHz)

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2.0 INSTALLATION

2.1 Unpacking the Unit

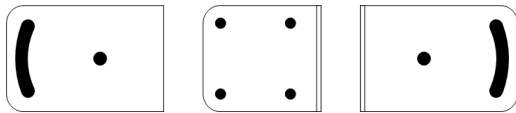
Carefully remove the equipment from its packing material and set it on a solid surface, such as a table or desk. If it appears damaged in any way, notify the carrier, and keep all packing materials for inspection by the carrier's agent.

2.2 Mounting the Unit

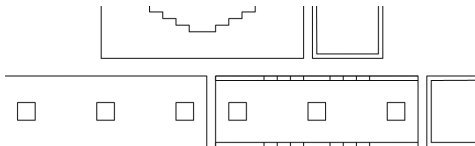
2.2.1 Mounting the BTR5857

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

- 1 L-bracket (taped to one of the foam pieces inside the box)



- 1 pole catch



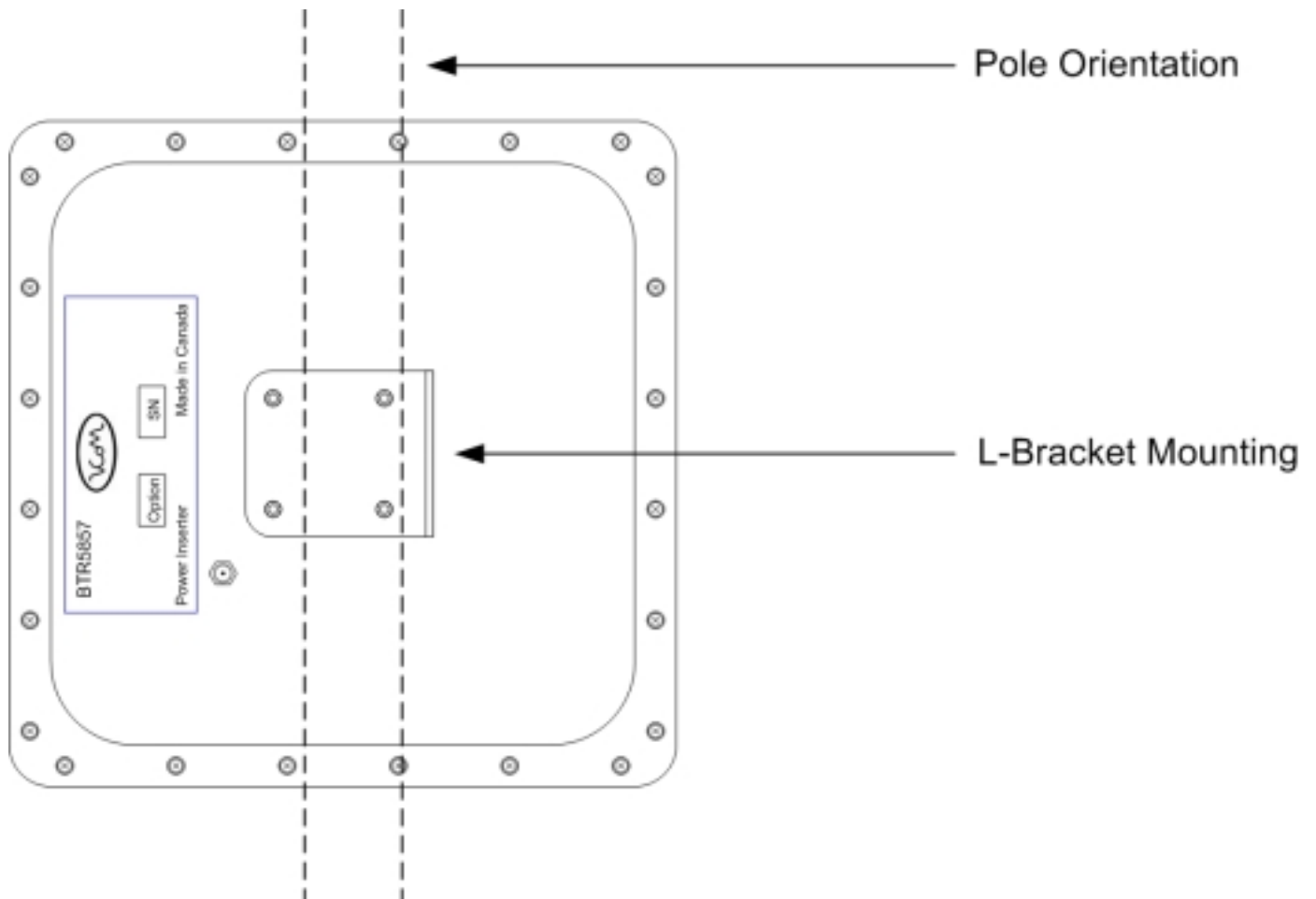
- 1 V-bolt
- 4 #10-32 flange locknuts for connecting L-bracket to cover
- 2 ¼ - 20 flange locknuts for connecting V-bolt and pole catch to the pole

The BTR5857 was designed for mounting on 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.

Step 1 – Attach L-Bracket to BTR5857

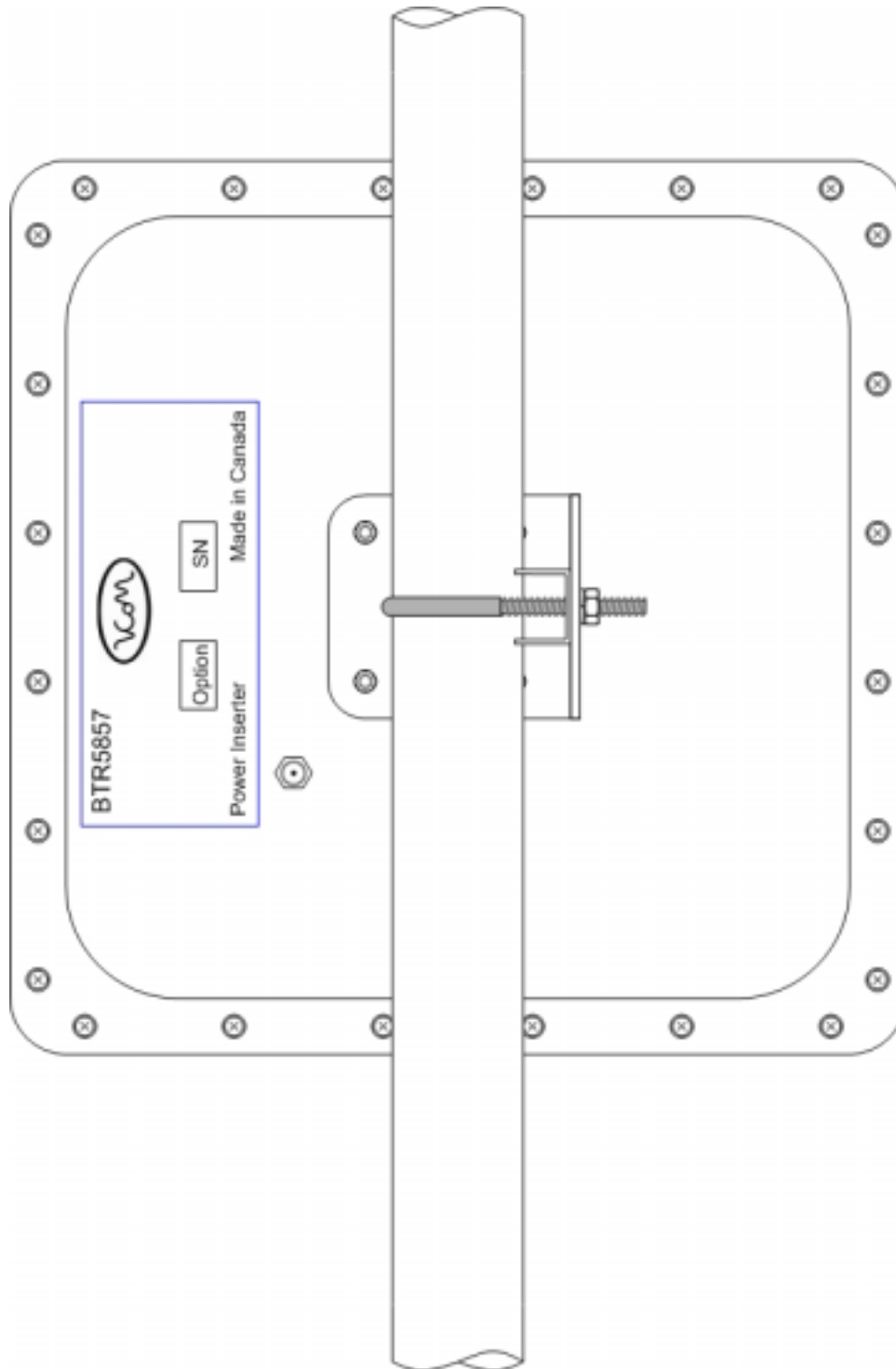
Before the unit can be attached to the pole, the L-bracket must be attached to the back of the transceiver as shown in Diagram 2.2A. Secure the L-bracket to the cover using the #10-32 locknuts.

DIAGRAM 2.2A: L-BRACKET ORIENTATION



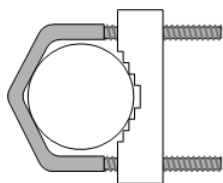
Once the L-bracket is in place, the unit can be mounted to the pole. The pole catch, V-bolt and L-bracket are oriented as shown in Diagram 2.2B.

DIAGRAM 2.2B: BTR5857 MOUNTED TO POLE

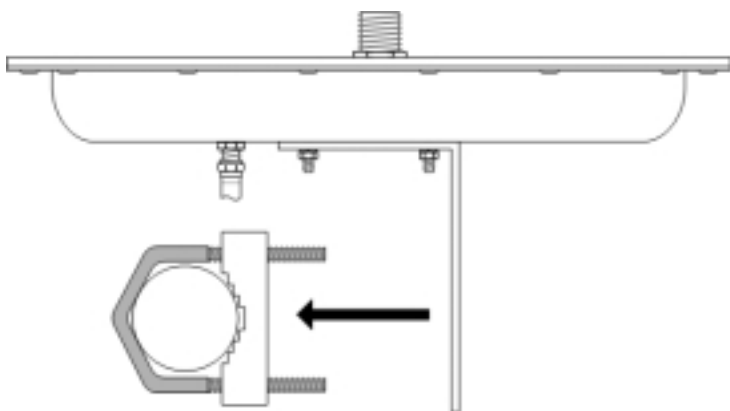


STEP 2 – Position V-bolt and pole catch around pole

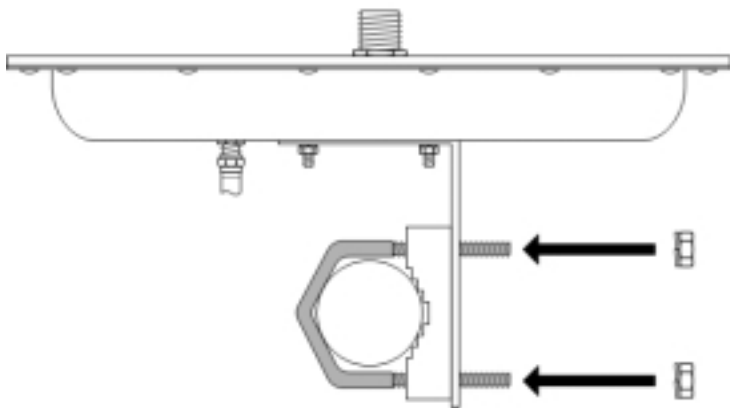
To attach the BTR5857 to the pole, first position the pole catch over the threads of the V-bolt and hold against the pole with one hand.



Hold V-Clamp and Pole
Catch on Pole as shown



Mount BTR5857 Unit on
Pole as shown



Fasten Bolts as shown

STEP 3 – Position BTR5857 against pole

Using the other hand, bring the BTR5857 up to the pole catch and grab V-bolt, pole catch and L-bracket in a single hand. Ensure that the pole is inside the “L” of the L-bracket and not on the outside of the L. This is necessary to ensure stability during high winds.

STEP 4 – Tighten BTR5857 against pole

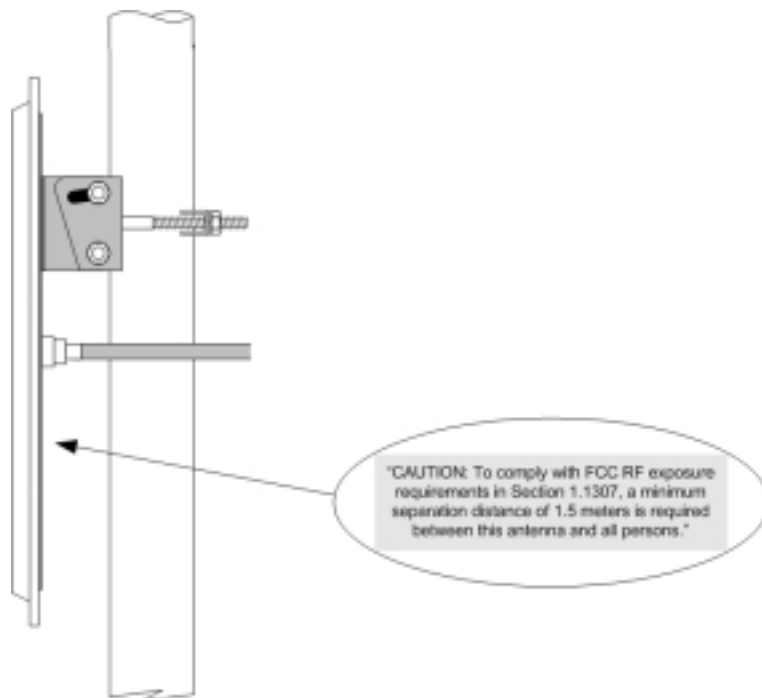
Tighten both ¼” locknuts against the L-bracket so that the unit is held against the pole but can still be rotated and tilted up and down for antenna alignment. The locknut closest to the antenna can be tightened almost all the way while the back one should be approximately finger tight.

2.2.2 Applying the Self-Adhesive Label to the Antenna

Mount the antenna according to the manufacturer’s instructions.

- ☛ Included with the BTR5857 unit is a self-adhesive label for application to the antenna. To operate the BTR5857 in compliance with FCC regulations, you must apply the included label to the antenna used with the BTR5857. 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



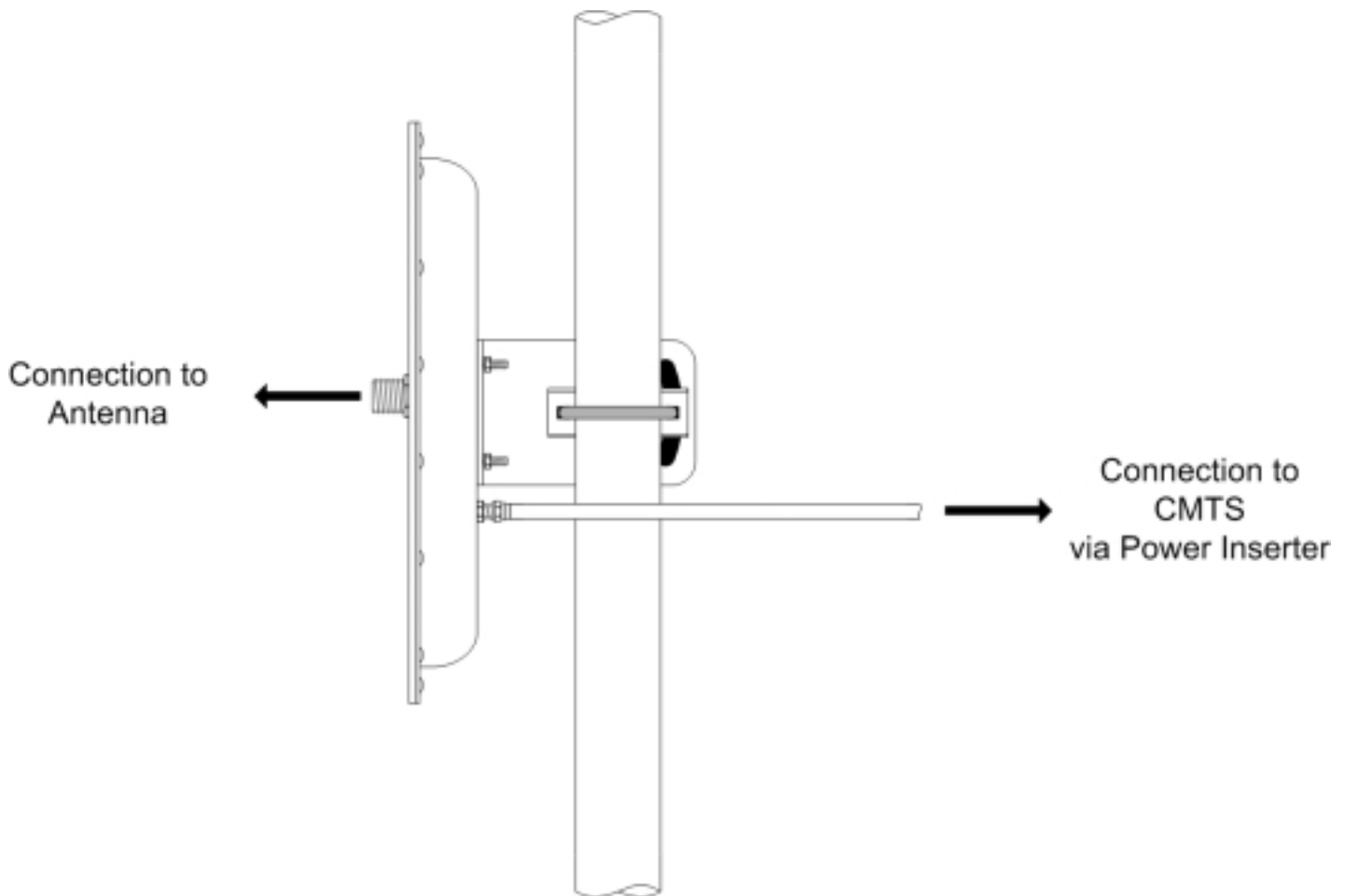
2.3 Connection to the Antenna and Power Inserter

Connections to the BTR5857 are made as shown in Figures 2.3A, 2.4A

Please note:

- 1) Connect the BTR5857 to the Antenna via the N-Connector.
- 2) Connect the BTR5857 to the CMTS via the F-Connector. Note that the BTR5857 is actually connected to the Power Inserter. The Power Inserter is then connected to the CMTS.
- 3) Cover all outdoor connections to the BTR5857 using self-amalgamating tape to prevent moisture from penetrating the connections.

DIAGRAM 2.3A: CONNECTION TO THE ANTENNA AND POWER INSERTER



2.4 Connection to CMTS, Power Inserter and Wall Adapter

Connections to the BTR5857 are made as shown in Diagrams 2.3A and 2.4A

Please note:

- 1) Connect the BTR5857 F-Connector to the power inserter, located indoors with the CMTS. The power inserter is then connected to the CMTS. The power inserter has three connections:

DC POWER	Connect to wall adapter with RG-59 cable with F connectors
TO MODEM	Connect to CMTS upstream port
TO TRANSCEIVER	Connect to BTR5857

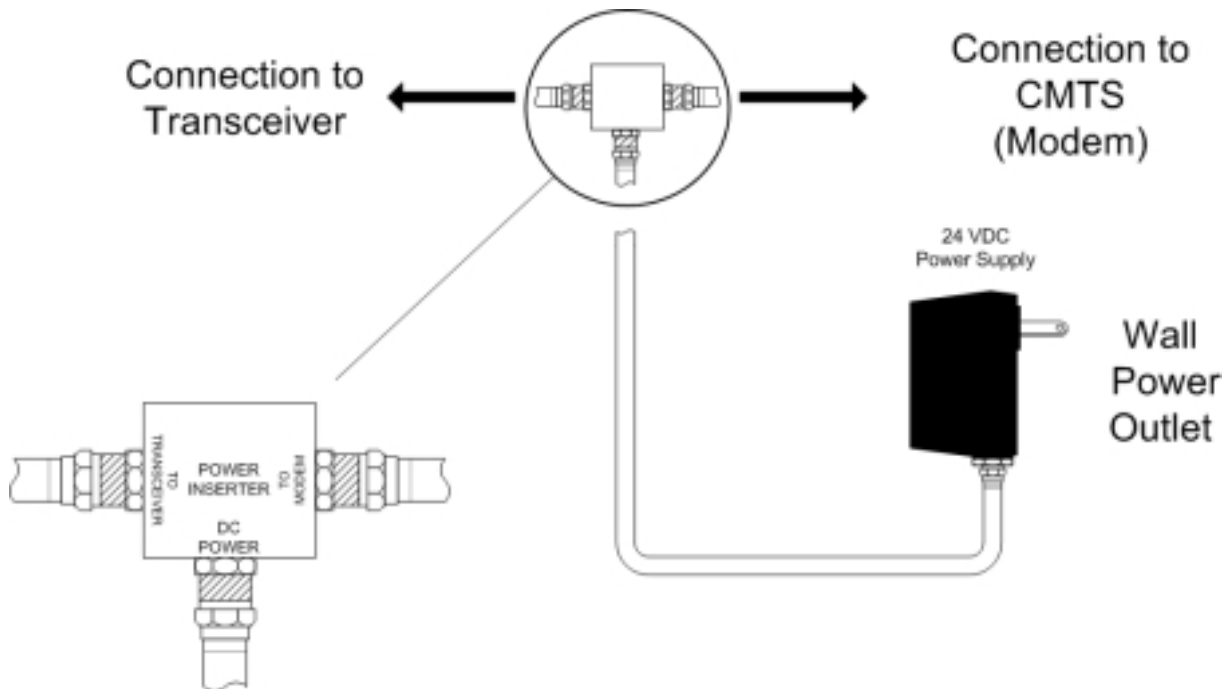
WARNING!



If the power inserter is not correctly connected, the BTR5857 will not operate, and there is the potential to damage the CMTS.

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).

DIAGRAM 2.4A: CONNECTION TO CMTS VIA POWER INSERTER

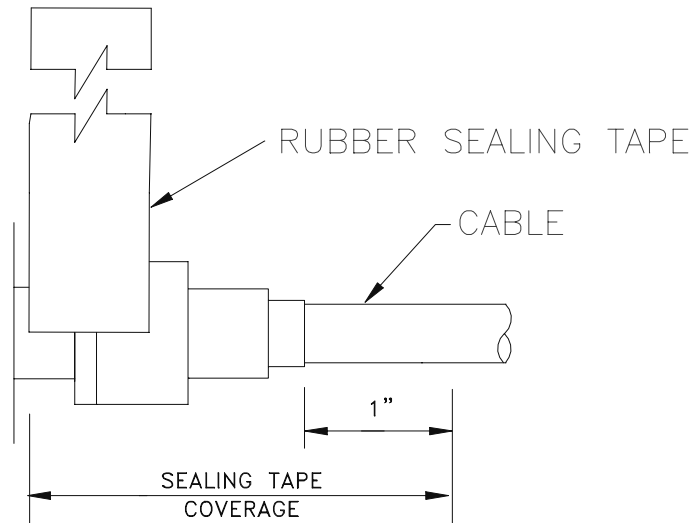


2.4 Waterproofing Connections

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 that the connectors be sealed 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 a 6" (15 cm) length of rubber self-amalgamating sealing tape to use on the outdoor connection of the BTR5857.

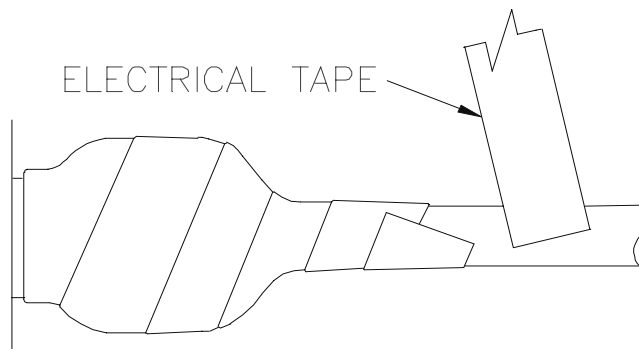
Step 1

Use a 6" section of rubber sealing tape. Starting at the BTR5857 end, stretch the tape and wrap it around the connector as close as possible to the wall of the BTR5857. Overlap the tape by approximately one-half of its width so that it can form a seal with itself. Extend the wrapping to approximately one-inch past the end of the connector.

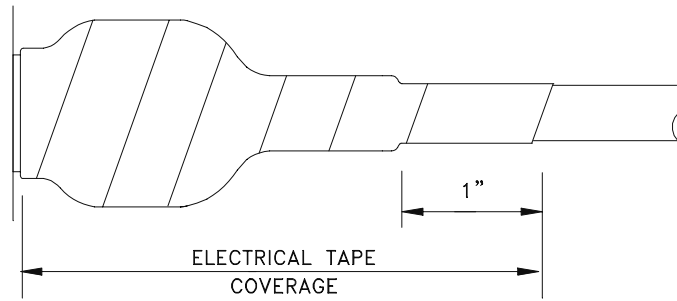


Step 2

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 BTR5857 end and without breaking the tape, wrap back down to the cable end.



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



3.0 WARRANTY AND SERVICE POLICIES

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

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.

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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