BASE STATION TRANSCEIVER

IduBST1918

INSTALLATION AND OPERATION GUIDE
FOR SYSTEM OPERATORS

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Advanced Broadband Products

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	Saskatoon, SK Canada S7L 6H7

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.

VCom Inc.
BST1918 Manual; ml_bst1918_02 (Sept 2005)
Approved: C.H.

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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.

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 contrôlcs 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, any antenna which is connected to a BST1918 requires a minimum distance of 1.5 meters between it and all persons.

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1.0 GENERAL INFORMATION

1.1 System Overview

The BST1918 combines low noise high power transceiver(s) and sophisticated management capability to offer a radio solution for 1.9 GHz **BWIN™ BASED ON DOCSIS™** base stations. Out-of-band signaling over the single cable connection with the VCom BST1918 allows for full SNMP management (via the WM4040) of the operational parameters. Built-in power detectors allow for easy input and output level configuration.

1.2 BST1918 Features

- High output power: +31 dBm carrier level with 64QAM
- Automatic transmit power control automatically corrects for cable loss and input level changes
- RF output mutes when changing output configuration or in a switchover situation
- Low noise: <4 dB including duplexer loss
- Digital temperature compensation to guarantee specifications over full operating temperature range
- All local oscillators are frequency synthesized and locked to a common high stability reference from the WM4040
- FLASH memory for easy software updates
- Externally connected antennas (60°, 90°, 120°, Omni)
- High reliability, state-of-the-art design using microstrip, MMIC and surface mount technology
- Conservative component derating and 100% burn in help ensure reliable operation

Full SNMP management when combined with the WM4040:

Monitors	Controls	Alarms
Transmit IF Level	RF Output Power Setting	Phase Lock Lost
Transmit RF Level	RF Output Power Mode (closed-loop power control, open loop gain control)	Overheating
Receive IF Level	RF Output Mute	Loss of Transmit IF
Internal Temperature	Receive Gain	Transmit RF Level
Module Serial Numbers		
Transmit Phase Lock		
Receive Phase Lock		

1.3 Specifications

<u>BST1918 BASE STATION TRANSCEIVER SPECIFICATIONS</u>

<u>TRANSMIT</u>

IF Input Frequency	555.0 -570.0MHz (2MHz channels)
	555.2 - 569.8MHz (6MHz channels)
Bandwidth	Channel size: typical 6MHz, adjustable through WM404x
IF Input Level	+10 dBm nominal (total power)
IF Detector Accuracy	±1.0 dB typical
RF Output Frequency Range	<u>Block B:</u> 1950.0 – 1965.0MHz, (2MHz channels)
	1950.2 – 1964.8MHz, (6MHz channels)
	<u>Block C:</u> 1975.0 – 1990.0MHz, (2MHz channels)
	1975.2 – 1989.8MHz, (6MHz channels)
Frequency Response (any 6 MHz band)	1.0 dB peak-peak
Rated Output Power at Antenna Port	+31 dBm (QPSK, 16QAM, 64QAM)
Output Power Stability	±1.0 dB over frequency and temperature
Output Power Control Range	20.0 to 32.0 dBm
Output Power Control Modes	Closed-loop on specified output power or open-loop on specified gain (compensated for IDU cable loss and temperature variations)
Spectral Mask	Compliant with FCC CFR 47 Part 24
Phase Noise	<-51 dBc double sideband integrated over 10 kHz to 2.5 MHz
MER (equalized)	⩾38 dB
IF Cable Compensation Range	15 dB
Spectral inversion	No spectral inversion

<u>RECEIVE</u>

RF Input Frequency Range	1870-1885 MHz, Block B
	1895-1910 MHz, Block C
Frequency Response (any 3 MHz band)	0.6 dB peak-peak
IF Output Frequency Range	27-42 MHz
Noise Figure at Antenna Port	<4 dB including duplexer loss at maximum gain
Integrated Gain	55 dB nominal
Gain Control Range	±10 dB
Output Third Order Intercept Point:	+20 dBm at maximum gain
Phase Noise	<-95 dBc/Hz @ 10 kHz
	<-51 dBc double sideband integrated over 10 kHz to 2.5 MHz
IF Detector Accuracy	±1.0 dB typical
Spectral inversion	No spectral inversion
Image Rejection	> 75 dB

<u>GENERAL</u>

Remote Control Interface	Bi-directional signalling with WM4040
Connectors	N female, 50 ohms
Power Requirement	-40.5 to –57VDC operational
Power Consumption	60W maximum
Operating Temperature Range	10°C to 40°C
Mounting	Standard 19" (48.3 cm), 2U (3.5") rack space (3U in dual configuration)
Dimensions	19" (w) x 14.9" (d) x 3.5" (h) (48.3 x 37.9 x 8.9 cm)
Weight	30.8 lbs. (14kg)

Specifications subject to change without notice.
The DOCSIS™ acronym belongs to CableLabs®

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 Operating Environment

- Front to back cooling; no clearance required above or below, but ample clearance at front and back.
- D to operate at temperatures ranging from 0 to 40°C (50 to 104°F). As with all electrical equipment, operation at excessive temperature accelerates the deterioration of components. For this reason, measures should be taken to prevent the build up of excessive heat in the rack.

2.3 Power Requirements

All power on the unit is supplied by the WM4040 via a –48VDC connection multiplexed over the IF cable. Only one BST1918 can be connected to a WM4040.

2.4 Rack Mounting

The chassis is designed for standard rack mounting in a 19" equipment rack. It requires 2U (3.50") of vertical rack space. It should be installed in a rack allowing access to the back of the unit. The transceiver should be isolated from strong RF radiation emanating from local equipment in the rack.

2.5 Module Installation/Replacement

1. Power off the desired BST1918 module by disabling the IDU in the corresponding WM4040 module. Ensure that the "DC Power" LED is off.

2. Wait 15 seconds to allow voltage to dissipate on the WM4040 connector, then disconnect the WM4040 and antenna cables from the rear of the corresponding module

3. Using a screwdriver, loosen the corresponding rear panel captive screws

4. Using a screwdriver, loosen the corresponding front panel captive screws until the module is free to pull forward.

5. Remove the module and set off to the side being sure to keep the unit sitting on the bottom guide rails

6. Insert the replacement module and retighten the front panel captive screws

5. Retighten the rear panel captive screws

6. Reconnect to the WM4040 using the included RG-58 cable. If this cable is not long enough to bridge the gap between units, ensure that 50 ohm RG-58 cable is used and the length does not exceed 10ft

7. Turn on the IDU and configure the IF/RF levels using the WM4040

8. Reconnect the rear panel antenna cable

9. Enable the IDU output

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3.0 OPERATION

3.1 Front Panel Description

<u>DIAGRAM 3.1A: FRONT PANEL – BST1918</u>
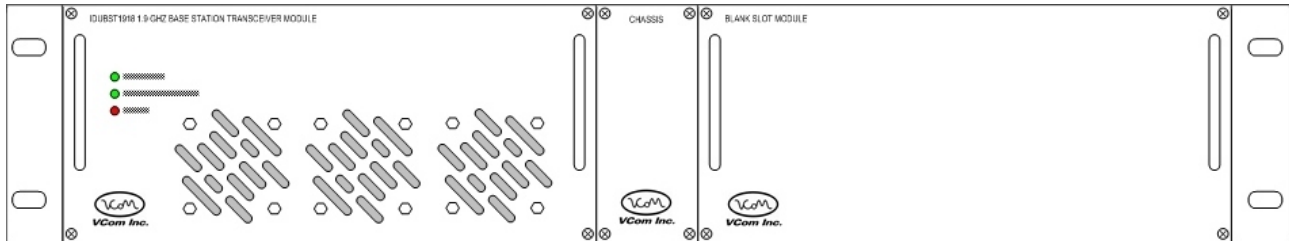
As shown in Diagram 3.1A, the power/control module front panel has 3 indicator LEDs. The BST is entirely configured and queried through the front panel display of the corresponding WM4040 module.

<u>DC POWER LED</u>

When the green DC POWER indicator is illuminated, the module has been correctly installed and enabled by the WM4040.

<u>OUTPUT ENABLED LED</u>

When the green OUTPUT ENABLED indicator is illuminated, the internal output circuitry is enabled to provide an RF output. The OUTPUT ENABLED indicator does not necessarily indicate the presence of an output; it only reflects that the module is capable of an RF output if an IF input is applied and the levels configured.

<u>ALARM LED</u>

The red ALARM indicator fills two functions – alarm indicator and firmware update indicator. A solid Alarm LED indicates an alarm condition and detailed alarm information is available by viewing the LCD display of the WM4040 for status and error codes. A flashing Alarm LED indicates that the BST1918 firmware is being updated by the WM4040.

3.2 Operating Modes

For detailed information on the operating modes and controls, please refer to the WM4040 manual. The BST1918 has the following capabilities:

BST1918 Capabilities: (refer to WM4040 manual for detailed description of modes)

WM4040 Mode	WM4040 Menu	WM4040 Remote Interface Command
Transmit Frequency	Tx XXXXX.XXXXMHz	ORF
Output RF ALC Enable/Disable	Out RF ALC	AE OR
Output RF Threshold Enable	Out RF Thres En	TE OR
Output RF Threshold Set	Out RF Thres H S	TS OR
	Out RF Thres L S	
Output RF Power Set	Out RF Power Set	PS OR
Output RF Attenuation Set	Out RF Atten Set	ORA
Output IF Attenuation Set	Out IF Atten Set	OIA
RF Output Enable/Disable	Output	OE
Automatic Cable Compensation	Auto Cable Comp	ACE
Downstream Cable Loss	IDU-ODU Cble Lss	DCL
IDU Temperature	IDU Temperature	RTM

4.0 REAR PANEL CONNECTIONS
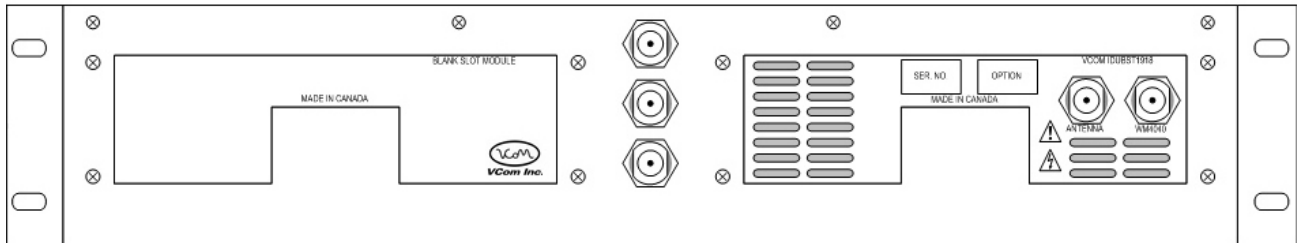
IDUBST1918 REAR PANEL

WM4040

The BST1918 is connected to the WM4040 by a single IF cable connection which carriers the following signals:

-48VDC power

Low frequency signaling channel

18-42 MHz (or sub-band) for the upstream received signals

90 MHz high stability frequency reference

Sub-band of 555-570 MHz for the downstream-transmitted signal

There is active DC voltage on this cable and caution should be used when connecting and disconnecting the unit. Be sure to have the IDU disabled in the corresponding WM4040 module when handling this cable. An over-current shutdown circuit is used to prevent damage to either the WM4040 or BST1918.

ANTENNA

This connector should be tied to the feed cable for the antenna. Both transmit and receive signals are present on this cable.

5.0 WARRANTY AND SERVICE POLICIES

5.1 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.

5.2 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.

5.3 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 (i.e. - 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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