“BST” Wireless Vital Sign Transducer

Model: VM2000 series

User’s Manual

BioSenseTek Corp.

“BST” Wireless Vital Sign Transducer

Caution!
Please read this manual carefully before operating the system.
This instrument is for reference only.

About

Wireless vital sign transducer is the medical instrument suitable for patient’s vital sign transducing, this instrument contains the ECG amplifier (Transducing terminal) and a patient lead which can obtain vital signs from patients. Vital sign is transferred wirelessly to the receiver, and then to the computer by TCP/IP.

Wireless vital sign transducer will take a small, easy to carry device, so that patients can get continuous vital sign monitoring; it can monitor several patients at once, protect patient safety, reduce the burden of health care workers, increasing productivity, improving the quality of health care.

The system, using a set of wireless receiver, can simultaneously monitor multiple groups of wireless ECG machine, its signal transducing area can be modified in accordance with the current situation needs by the set-ups of antenna through major space.

Features

1. Continuous monitor for vital signs
2. Applicable for detecting Lead I, II or III
3. Transmitting via radio frequency (RF) and TCP/IP
4. A “Wireless Vital Sign Transducer-Receiver” can receive several vital signs from different “Wireless Vital Sign Transducers-Transmitter” simultaneously.
5. RF indicator for network connection failure
6. LED indicators for power status: full-charged, power exhausted and in-charging (Transducer-Transmitter turns off automatically while charging)
7. RF ranges from 863MHz~870MHz.
8. Support communication interface of the medical instrument, transferring vital sign to the computer when the vital sign has be measured completely.

Specification

Vital Sign Transducer - transmitter(VM2B9D)(ECG)

Hardware Specification:

Item	Specification
Dimensions	L62mm x W55mm x H13mm
Power	Built-in rechargeable 650 mA Li-ion battery, voltage 3.7V
Weight	<50g, include a patient lead wire for ECG signal
Suggesting operating temperature	15℃~ 40℃
Suggesting operating humidity	30% ~ 80% (non-condensing)

Function Specification:

Item	Specification
Skin temperature	Range: 20℃~ 45.5℃, Resolution: 0.1℃
Heart Rate	1. Gain：200
	2. Frequency Response：0.5Hz ~ 40Hzmax
	3. CMRR：90dB
	4. ADC：12bit
	5. Sample Rate：600Hz
	6. Data Rate：150Hz
Patient posture	G-Sensor
Range of RF	RF 922MHz ~ 928MHz
Output power of RF	10dBm

Protocol:

Item	Specification
RF Data	Acquire the data which conform “BST” RF protocol.

Vital Sign Transducer - transmitter(VM2B9D-3)

Hardware Specification:

Item	Specification
Dimensions	L70mm x W30mm x H11mm
Power	RC2032
Weight	<20g
Suggesting operating temperature	15℃~ 40℃
Suggesting operating humidity	30% ~ 80% (non-condensing)

Function Specification:

Item	Specification
Skin Temperature	Range：30℃~ 45.5 ℃, Resolution: 0.1℃
Heart Rate	1. Gain：400
	2. Frequency Response：3Hz ~ 40Hz
	3. CMRR：90dB
	4. ADC：12bit
	5. Sample Rate：600Hz
	6. Data Rate：150Hz
Patient posture	G-Sensor
Range of RF	RF 922MHz ~ 928MHz
Output power of RF	10dBm
Interface	ECG electrode Electrode buckle

Protocol:

Item	Specification
Data	Acquire the data which conform “BST” RF protocol.

Vital Sign Transducer - receiver(VM2B9M)

Hardware Specification:

Item	Specification
Dimensions	L72mm x W57mm x H14mm
Antenna length	56.6mm
Power supply	DC 5V 500mA
Weight	50g
Suggesting operating temperature	15℃~ 40℃
Suggesting operating humidity	30% ~ 80% (non-condensing)

Function Specification:

Item	Specification
Range of RF	RF 922MHz ~ 928MHz
Output power of RF	10dBm
Interface	TCP/IP
Transmission Rate	100M

Accessories:

Coupler

Hardware Specification:

Item	Specification
Dimensions	L51 mm x W51 mm x H11mm
Weight	<70g
Operating temperature	5℃~45℃
Operating humidity	30%~70% (non-condensing)
Cable Dimensions	1.5m in length
Interface	DB15

Function Specification:

Item	Specification
Range of RF	RF 922MHz~928MHz
Output power of RF	10dBm
Accelerometer	3-Axis
Sound effect	60dBA
LED	R.G.B 3-colors LED
RF	1. Range of RF: RF 922MHz~928MHz
	2. Output power of RF: 10dBm

	3. PCB Antenna

Patient lead wire

Item	Specification
Dimensions	600mm in length
Connect	Custom connector
Snap	ψ4.2mm(male side ψ3.9mm)

Charging Cable

Item	Specification
Dimensions	1000mm±5%
Connect	USB / Custom connector
Maximum current	500mA

Maintenance

1. Wipe the surface of “Wireless Vital Sign Transducer-Transmitter” with a soft and dry cloth.
2. Wipe the conductive gel, dirt or stains with a damp cloth if necessary.
3. Do not use alcohol-based or solvent-based cleaners to clean the “Wireless Vital Sign Transducer-Transmitter”.

Caution

1. The retrieved data can help physician diagnose. It is not intended as a sole means of diagnosis.
2. Do not store or leave the devices in a place where is exposed directly to sunlight or subject to high temperatures.
3. Do not take apart or attempt to service the devices yourself, which affects the precision and safety.
4. Testing for electromagnetic compatibility (EMC) has been performed on the device. Keep away from microwave or RF devices is recommended.
5. If there is any other wireless transmission module, antennas or equipment, verify that our RF channel will be not overlapped.
6. The device should not be used adjacent to or stacked on top of other equipment. If the device must be used adjacent to or stacked on top of other equipment, verify that the device operates in an acceptable manner in the configuration in which it will be used.
7. Some stimulators may cause interference with the signal.
8. Do not use sharp or hard objects to depress keys, only use fingertips.
9. Do not attempt to clean the device or patient’s cables by submersing into a liquid, autoclaving, or steam cleaning.

10. This product should be kept in a dry environment. Avoid from running into any kind of liquid.
11. To avoid the possibility of serious injury or death during defibrillation, do not come into contact with device or cables. Additionally, proper placement of defibrillator paddles in relation to the electrodes or removing the device and cables is required to minimize harm to the patient.
12. Extensive exercise may cause lead off, or result in poor quality of measurements.
13. If our devices directly or indirectly cause any illness or safety concern, please remove them from users.
14. The product has been certified as a low-powered RF transmission device. Any enterprises, shops, and user are not allowed to modify the working frequency, enhancing the amplifier, or altering the original function.
15. Low-powered RF transmission devices are not allowed to interfere with flying safety and legal telecommunication. If the interference is detected, stop using the device and change the working frequency to the band without interference.
16. The above-mentioned telecommunications follow the related laws of wireless telecommunications. Low-powered RF transmission devices should be able to endure the interference of legal telecommunication, and science and medical radio wave-generated electronic facilities.
17. Power failure or abnormal shutdown may cause data loss. Don’t close PC or software while system is operating，if PC or software is accidentally closed please restart PC and execute this software.

Contraindication

1. People with disabilities may not have safe and accurate testing result.
2. Not allow for Fetal.

Troubleshooting

If you experience a problem with devices, refer to the following troubleshooting guide. If problem persists, please contact your local reseller or *BST Service*.

1. Check if the transmitter is connected to the patient's lead wire properly.
2. Check if the electrode is tightly contact with user's skin.
3. Check if the user's skin is too dry, there is an improper grounding of the computer or any interference from the background. Clean the user's skin with some water or alcohol, make sure the computer is grounding properly, or exclude the interference of electronic devices.

＊＊＊Please dispose the devices properly according to the local disposal laws＊＊＊

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Instruction of signs

2012	Manufacturer Manufacture date	SN	Serial number
	Please follow the instruction	LOT	Lot number
	Recycling sign for electric and electronic device	⎓	Direct current
	Electrode contact part with body-Protection level BF sign (Electrode patch, which is used to transfer electric energy and physiological signal.)		

Operation Instruction

Vital Sign Transducer - Receiver (VM2B9M)

1. Screw the antenna on to the wireless transmission receiver.

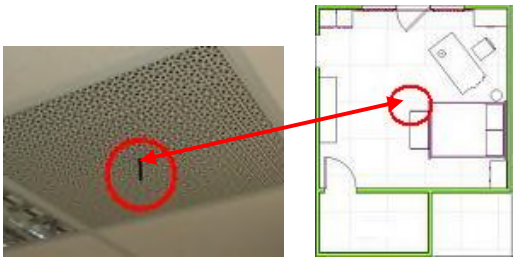
2. Connect the USB DC 5V 500mA power supply to the wireless transmission receiver.
   (Power supply is not included in the standard accessory, please use the proper power supply according to the local regulation.)

3. Connect wireless transmission receiver and PC via RJ45.

The maximum valid transducing distance is 500M in idea open space, but varies with different actual using scenario.

It is suggested receiver be set at the center of user's activity area and have it up side down, ex: The receiver of patients' transmitter in hospital should be placed up side down at the center.

▼



Vital Sign Transducer - Transmitter (VM2B9D)(ECG)

4. Connect the physiological signal transmitter with patient lead wire.

5. Press the power on bottom of vital sign transmitter.

6. Clip the ECG electrode with vital sign transmitter and attach it to the lower left torso.
   Clip another ECG electrode with patient lead wire snap and attach it to the upper right torso.

(Please choose the ECG electrode conform to standard of the medical regulation)

7. Switch off: Shut down automatically while charging.

8. Charging:

8.1. Unplug the patient lead wire.

8.2. Plug in the charging cable.

8.3. Connect the USB side of the charging wire to 5V 500mA power supply to begin charging. (power supply is not included)

(Power supply in the picture is for reference. Please use the proper power supply according to the local regulation)

8.4. LED on the switch will turn red while charging.

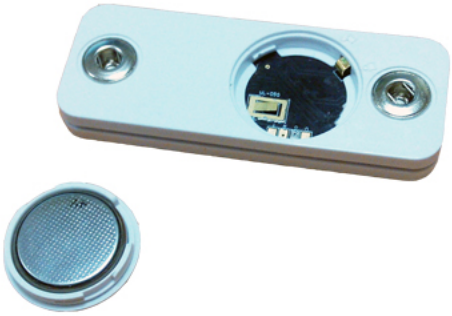
8.5. LED on the switch will turn green when fully charged.

8.6. The charging time is roughly 2.5 hours, depending on the condition of the battery.

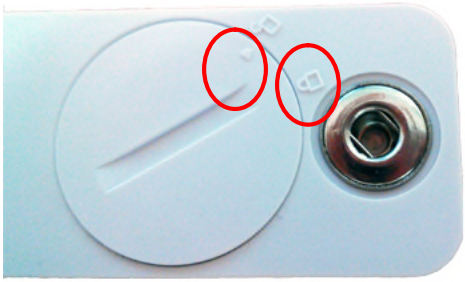
Vital Sign Transducer - Transmitter (VM2B9D-3)

1. Unplug the battery cover.

2. Set R2032 battery.



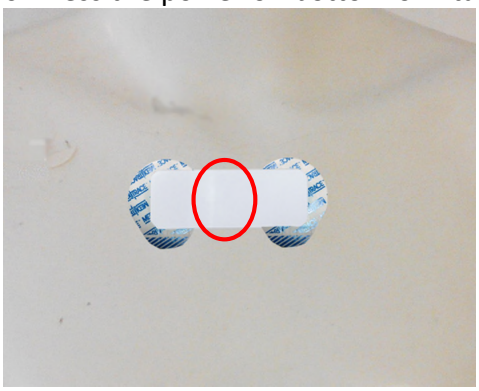
3. Plug the battery cover, the triangle turn to lock sign.



4. Clip the ECG electrode with vital sign transmitter.

5. Attach the vital sign transmitter on the patient's colpus.

6. Press the power on bottom of vital sign transmitter.



7. The vital sign transmitter continuous detect around the clock, no turn off function.

Indication signals on the transmitter: ▼

LED	Work Status	Indication
Green LED	Flash	Normal Work
Red LED	Flash	Low Power

Indication signals on the receiver: ▼

LED	Indication
AP	Lights-on after internet connected
LAN	Always on after 10 seconds blinking
VT	Blinking while receiving data
PWR	Power indicator

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a 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, uses, 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.

FCC Caution:

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.