

**Branchpoint Technologies** 

# **AURA™ Monitor Pack**

INSTRUCTIONS FOR USE

TK101-A

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## 1. SYSTEM DESCRIPTION

This AURA™ Monitor Pack (TK101-A) contains one AURA™ Monitor (TX101-A), two rechargeable batteries (TB101-A), one battery charger (TC101-A), one power supply, and one antenna (TA101-A).

This pack is intended to be used with  $AURA^{TM}$  Sensor Tray and  $AURA^{TM}$  Data Receiver Pack, which are part of the  $AURA^{TM}$  ICP Monitoring System (Figure 1 and Table 1).

The AURA™ Monitor is a non-sterile, non-implantable hand-held device powered by rechargeable lithium ion batteries (included in this pack). The device has an OLED display screen and is controlled by buttons on its control panel. The AURA™ Monitor receives intra-cranial pressure (ICP) data via RF telemetry from a coupled AURA™ Sensor and relays the ICP waveform to a paired AURA™ Data Receiver. The AURA™ Data Receiver makes it possible for the data obtained by the AURA™ Monitor to be displayed onto bedside patient monitor.

The AURA™ Antenna is placed above the AURA™ Sensor to provide power and receive data. It is held in place by the sterile Antenna Holster provided in the AURA™ Sensor Tray (SP101).

Component	Model #
AURA™ Sensor	SP101
AURA™ Monitor	TX101
AURA™ Antenna	TA101
AURA™ Data Receiver	DG101
AURA™ Battery	TB101
AURA™ Battery Charger	TC101

Table 1: Components of the AURA™ ICP Monitoring System.



Figure 1: AURA™ ICP Monitoring System.

# 2. INDICATIONS FOR USE

The Branchpoint  $AURA^{TM}$  ICP Monitoring System is intended for use by a qualified neurosurgeon in the direct monitoring of intracranial pressure in intraparenchymal applications.

# 3. CONTRAINDICATIONS

This device is not intended for any use other than that indicated. This device is not designed, sold, or intended for use as a therapeutic device.

## 4. RELATED INFORMATION

Before using the  $AURA^{TM}$  Monitor, read and follow all instructions, warnings, and precautions provided in the  $AURA^{TM}$  Monitor Pack manual and in the manuals for the other system components. Manuals for the other system components are listed below.

- AURA™ Sensor Tray Instructions for Use
- AURA™ Data Receiver Pack Instructions for Use

These manuals are also made available on the Internet and can be found at www.auramonitor.com.

## 5. WARNINGS

There are no user-serviceable components inside this device. Refer servicing to authorized personnel only. Unauthorized servicing, modification, or internal access may be hazardous or damage the product.

Use only the Branchpoint Technologies supplied  $AURA^{TM}$  Data Receiver and software application with the  $AURA^{TM}$  Monitor.

No modifications of this equipment are allowed unless approved by Branchpoint Technologies. Additions or modifications may interfere with system performance.

The AURA™ Monitor is MR Unsafe – keep away from magnetic resonance imaging (MRI) equipment.

Do not subject the AURA™ Monitor to temperatures outside of the 0°C to 50°C (32°F to 122°F) storage range. Exposure to high temperatures may cause the AURA™ Monitor to overheat and may reduce its performance and service life.

The AURA™ Monitor Pack components are only for use in non-condensing humidity conditions.

Do not discard the AURA™ Monitor in a fire or incinerate.

Do not immerse the AURA $^{\text{TM}}$  Monitor in liquid of any kind. AURA $^{\text{TM}}$  Monitor will be permanently damaged if it is submerged in liquid. Continued usage after submersion may result in further damage. If the AURA $^{\text{TM}}$  Monitor gets wet, turn the device off, disconnect all cables, remove the battery, wipe the wet surfaces dry, and contact Branchpoint Technologies customer service. Do NOT attempt to dry the AURA $^{\text{TM}}$  Monitor in an oven, microwave, or dryer.

Only power the AURA $^{\text{TM}}$  Monitor with the provided lithium-ion batteries. Using other sources of power may be hazardous or cause damage to the AURA $^{\text{TM}}$  Monitor. Only recharge the lithium-ion batteries with the provided charger and power supply (REF# WSA515MD). Using other sources of power may be hazardous or cause damage to the batteries.

The AURA™ Battery Charger should be positioned to allow immediate disconnection from the supply mains. Connection and disconnection can be established by plugging and unplugging the power supply from mains.

Always keep the spare battery charging while the other is in use to ensure continuous availability of power. Change batteries as needed.

Never use a damaged battery or damaged AURA $^{\text{TM}}$  Monitor. Doing so could result in user injury.

To avoid risk of electric shock, do not disassemble the AURA $^{\text{TM}}$  Monitor, batteries, battery charger, power supply, or antenna.

Tampering with the AURA $^{\text{TM}}$ Battery could result in a hazard, such as fire, explosion or shock.

By design, the  $AURA^{TM}$  Monitor and its antenna emit radio frequency in the 13.56 MHz and 2.4 GHz bands. This may interfere with nearby medical or office equipment. When using the  $AURA^{TM}$  Monitor, closely monitor equipment in the vicinity to verify normal operation.

The presence of other equipment operating in the same frequency bands used by the  $\mathsf{AURA}^\mathsf{TM}$  Monitor may interfere with communication. Interference can occur even if the other equipment complies with the International Special Committee on Radio Interference (CISPR) emission requirements. This RF interference can be reduced by increasing the distance between the interfering device and the  $\mathsf{AURA}^\mathsf{TM}$  Monitor. If communication problems persist, refer to the Troubleshooting section of this manual.

The use of any accessories with the AURA™ Monitor other than those specified by Branchpoint Technologies in this manual may result in increased emissions or decreased immunity of the AURA™ Monitor and may cause decreased functionality or unintended operational behavior of the AURA™ Monitor.

The use of the AURA™ Monitor around strong sources of electromagnetism and electric fields should be avoided.

For disposal of the AURA™ Monitor Pack, follow applicable hospital procedures and local regulations or return the product to Branchpoint Technologies. Improper disposal of products may pose biohazards or environmental hazards.

During normal or single fault conditions, the AURA™ Antenna may reach a maximum temperature of 43°C. There is a safety cutoff to prevent temperature from exceeding this value and mitigate the likelihood of detrimental clinical effects.

Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.

Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the AURA $^{\text{TM}}$  ICP Monitoring System or AURA $^{\text{TM}}$  Battery Charger, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

The Emissions characteristics of this equipment make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or reorienting the equipment.

# 6. PRECAUTIONS

Do not disassemble, alter, or modify any parts of the AURA™ Monitor or AURA™ Data Receiver.

The  $AURA^{TM}$  Monitor Pack shall not be placed in oxygen rich environments. Use only the designated Branchpoint Technologies  $AURA^{TM}$  Monitor and appropriate software application to communicate with the  $AURA^{TM}$  Sensor and  $AURA^{TM}$  Data Receiver.

The AURA™ Monitor is intended for use by or under the direction of healthcare professionals only.

The AURA™ Sensor and Antenna Holster are type BF applied parts. The AURA™ Monitor, AURA™ Antenna, batteries, battery charger, and AURA™ Data Receiver are accessible parts.

Mishandling (such as dropping or crushing) could damage the AURA™ Monitor.

If you suspect damage to the AURA™ Monitor, contact your Branchpoint Technologies representative or the customer service department for instructions and return packaging.

The AURA™ Monitor has been classified with an International Protection Marking of IP43. The AURA™ Monitor is therefore not waterproof or explosion-proof and cannot be sterilized. Do not use it in the presence of flammable gas mixtures containing anesthetics, oxygen, or nitrous oxide.

The AURA™ Monitor may be affected by electrostatic discharge (ESD). If ESD occurs and the AURA™ Monitor's functionality is affected, attempt to reset the AURA™ Monitor or contact Branchpoint Technologies for instructions.

AURA™ ICP Monitoring System has not been evaluated for pediatric use.

Avoid sources of ionizing radiation. If ionizing radiation must be used, avoid focusing near the AURA $^{\text{TM}}$  Sensor placement site. Ionizing radiation may damage the device, however, the damage may not be immediately detectable.

## 7. INSTRUCTIONS FOR USE

### INSPECT THE PACKAGING

Visually inspect for mechanical and functional integrity of the packaging and its contents as well as the legibility and adherence of the AURA  $^{\text{\tiny{M}}}$  Monitor labels. If there is evidence of damage or tampering, do NOT use the product. Contact Customer Service, and Branchpoint Technologies will provide instructions for return.

Package contents include:

- AURA™ Monitor (1)
- AURA™ Antenna (1)
- Lithium Ion 11V rechargeable batteries (2)
- Battery Charger (1)
- Power Supply (1)

### **CONTROL PANEL**



Figure 2: AURA™ Monitor Controls.

### INSERTING AND CHANGING THE AURA™ BATTERY

To remove the battery:

- Press the release buttons on the sides of the battery pack (Figure 3).
- Slide the battery pack towards the bottom of the AURA™ Monitor (Figure 4).
- Lift up to remove the battery pack from the AURA™ Monitor (Figure 5).



Figure 3: Press locking buttons simultaneously to release battery.



Figure 4: Slide battery to guide markers.

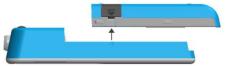


Figure 5: Lift and remove battery.

To insert the battery into the AURA™ Monitor:

- Line up guide markers on the sides of both the battery and AURA™ Monitor (Figure 6).
- Insert the battery into the AURA™ Monitor.
- Slide the battery forward into the AURA™ Monitor until the locking mechanism is activated (Figure 7).

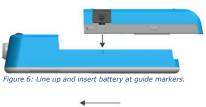




Figure 7: Slide battery into place.

### **CHARGING THE AURA™ BATTERY**



Figure 8: Slide batteries into battery charger.

To charge a battery, gently slide it into the battery charger (Figure 8). The LEDs next to the batteries will illuminate according to Table 3 below.

LED Indicator	Indication
LED Indicator does not illuminate	No battery is charging
LED Indicator is solid blue	The battery is charging
LED Indicator is solid green	The battery is fully recharged
LED indicator is blinking blue	An error with the battery has been detected

**NOTE:** Battery Status LED indicator blinking blue indicates there is an error with the battery. Try to remove then re-insert the battery. If problem persists, replace the battery or contact Customer Service.

Charge the spare battery when not in use to ensure ready availability of power for the  $AURA^{TM}$  Monitor.

Each battery will typically provide at least 8 hours of battery life.

### TURNING THE AURA™ MONITOR ON AND OFF

To turn on, press the power button.

To turn off, press and hold the power button for two seconds until the display screen is deactivated.

### **READING BATTERY LEVEL**

The battery level icon located on the upper right corner of the screen indicates the remaining battery level (Figure 9). The icon will be empty and flashing when the battery level is critically low.



Figure 9: Battery level icon on the upper right corner of the AURA™ Monitor screen.

### CONNECTING AND DISCONNECTING THE AURA™ ANTENNA

To connect the AURA $^{\text{TM}}$  Antenna to the AURA $^{\text{TM}}$  Monitor, align the arrows on the cable and connector (Figure 10) and until they click together (Figure 11). To disconnect the AURA $^{\text{TM}}$  Antenna, hold the cable by the plug and pull. Do not pull the cable. Pulling on the cable may damage it in a way that is not visibly detectable.



Figure 10: Align the arrow markings on the antenna cable and the AURA $^{\rm TM}$  Monitor.



Figure 11: Plug antenna cable into AURA™ Monitor.

### **RUNNING IN-PACKAGE CHECK FOR AURA™ SENSOR**

Before unpacking the  $AURA^TM$  Sensor Tray box, the User can run in-package check for the pre-implantation status of the  $AURA^TM$  Sensor.

To run in-package check:

- Plug the antenna cable into the AURA™ Monitor.
- Turn the AURA<sup>™</sup> Monitor on and select the  $\Box$  button for in-package check.



The AURA™ Monitor will start searching for the AURA™ Sensor.

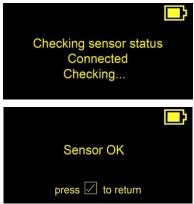


 Slowly move the AURA™ Antenna around the marked area on the AURA™ Sensor Tray box (Figure 12). The green light will illuminate on the antenna when the antenna is at the proper location. Hold the antenna at this location.



Figure 12: Positioning the AURA™ Antenna at the sticker on the AURA™ Sensor Tray box to run in-package check.

 If an AURA™ Sensor is found, the AURA™ Antenna will connect to the AURA™ Sensor and show its status.



- If no AURA™ Sensor is found, the AURA™ Monitor will display "No Sensor Found." Select the button to re-run the in-package check and try to move the AURA™ Antenna around the marked area again as the AURA™ Sensor within the box may slightly shift during transportation. If failure persists, please contact Branchpoint Technologies for further instruction.
- Another option to run in-package check is to remove the sterile pouch from the AURA™ Sensor Tray box and position the AURA™ Antenna over the AURA™ Sensor visualized through the translucent side of the pouch.

### **CONNECTING TO AN AURA™ SENSOR**

Ensure that an  $AURA^{TM}$  Antenna is connected and turn the  $AURA^{TM}$  Monitor on. The device will display the following screen as it seeks an  $AURA^{TM}$  Sensor to connect to.



**CAUTION:** DO NOT run an in-package check after the sensor has been inserted. This will lead to an erroneous failure message for functional sensors.

Place antenna directly over the AURA™ Sensor and into the Antenna Holster provided in the AURA™ Sensor Tray (Figure 13). The Antenna Holster will hold the AURA™ Antenna securely in place. The LED on the AURA™ Antenna will illuminate green upon successful connection to an AURA™ Sensor.



Figure 13: Antenna Holster being affixed onto scalp above AURA™ Sensor.

**CAUTION**: Please ensure that the AURA<sup>TM</sup> Antenna does not rest on or contact the patient's skin.

Upon successful connection, the AURA $^{\text{\tiny TM}}$  Monitor will display the sensor's serial number then begin to stream ICP data.



If an AURA $^{\text{TM}}$  Sensor is not found within 20 seconds, the screen will display the following screens:



Press  $\square$  to command the antenna to search for a sensor connection again.

**NOTE:** If  $\square$  is not pressed within 2 minutes, the AURA<sup>TM</sup> Monitor will turn off to save power.

After successfully pairing with the AURA<sup>TM</sup> Sensor, The AURA<sup>TM</sup> Monitor is now ready to pair with the AURA<sup>TM</sup> Data Receiver. Press  $\square$  button to start paring with the Data Receiver or open the menu and select "Pair Receiver."

### PAIRING WITH AN AURA™ DATA RECEIVER

After pressing  $\square$  to start pairing the AURA $^{\text{TM}}$  Monitor with the AURA $^{\text{TM}}$  Data Receiver, the screen will ask the user to plug the AURA $^{\text{TM}}$  Data Receiver into the patient monitor.



Ensure that the target  $AURA^{TM}$  Data Receiver is connected to the patient monitor (Figure 14) and is calibrated (see  $AURA^{TM}$  Data Receiver Pack Instructions for Use for directions).



Figure 14: AURA™ Data Receiver connecting into Patient Monitor IBP Port.

Press 

✓ to continue pairing with a data receiver.

Select the serial number that matches the printed serial number on the label of the AURA™ Data Receiver being paired to (Figure 15).





Figure 15: Example of printed serial number on the label of AURA™ Data Receiver.

Select "Connect."



The AURA™ Monitor will start pairing with the AURA™ Data Receiver.



After successfully paired with the AURA<sup>TM</sup> Data Receiver, the AURA<sup>TM</sup> Monitor will display the ICP.



**NOTE:** If the AURA™ Data Receiver is not calibrated, after selecting "Connect," the screen will display reminders to calibrate receiver.





Calibrate receiver according to  $AURA^{TM}$  Data Receiver Instructions For Use. After calibration for receiver is complete, the  $AURA^{TM}$  Monitor will automatically display the ICP.

To unpair an  $AURA^{TM}$  Data Receiver, press the Menu button and choose "Unpair Receiver" from the drop-down menu and then confirm unpairing. Unpairing will also occur when the  $AURA^{TM}$  Monitor is turned off. Note that if an  $AURA^{TM}$  Data Receiver is briefly turned off and on, connection to the prior  $AURA^{TM}$  Monitor may be automatically re-established.

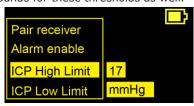


### SETTING ICP ALARM LIMITS AND ALARM

To enable an alarm when the acquired ICP reaches the high or low limit set by the user, select the Menu button to get to the following screen. Select "Alarm Status" and then "Enable." To disable the alarm, select "Disable."



The User can set ICP alarm thresholds. To do so, select ICP High/Low Limit and use the Up and Down buttons to set the ICP threshold value. The LED light will flash when the alarm sounds for these thresholds as well.



**NOTE:** The factory default ICP low alarm trigger value is 7 mmHg and the default ICP high alarm trigger value is 20 mmHg. If the User changes these trigger values, they will persist across power cycles. Trigger values do not reset to factory settings if the device is turned off and on.

## **AUDIO TONES**

The following table describes the audio output (including frequency, duration and tone) for different events.

Table 4: AURA<sup>™</sup> Monitor Audio Output.

Event	Event Description	Audio
Startup	At power up.	880 Hz 250ms tone
Button Selection	Button (any except on/off) pressed.	880 Hz 50ms tone
Alarm (High Priority)	Enabled alarm condition detected. Audio pattern output repeatedly every 5 seconds until alarm cleared or user mutes the alarm.	AAA-AA AAA-AA A = 440 Hz 100ms tone with 4 harmonics space indicates 50ms gap - indicates 250ms gap   indicates 2.5 second gap
Alarm (Medium Priority)	Enabled alarm condition detected. Audio pattern output repeatedly every 5 seconds until alarm cleared or user mutes the alarm.	A A A A = 440 Hz 150ms tone with 4 harmonics space indicates 150ms gap
Alarm (Low Priority)	Enabled alarm condition detected. Audio pattern output repeatedly every 20 seconds until alarm cleared or user mutes the alarm.	C A C = 523 Hz 200ms tone with 4 harmonics A = 440 Hz 200ms tone with 4 harmonics space indicates 200ms gap
Fault (Low Priority)	Fault condition detected. Audio pattern output repeatedly every 30 seconds until power off or user mutes the fault.	CA C = 523 Hz 200ms tone with 4 harmonics A = 440 Hz 200ms tone with 4 harmonics space indicates 200 ms gap
Sensor Pairing	The antenna pairs with the sensor.	D A D D = 587 Hz 100 ms tone A = 880 Hz 50 ms tone D = 1174 Hz 100 ms tone space indicates 50 ms gap
Sensor Unpairing	The Antenna unpairs from the Sensor.	D A D D = 1174 Hz 100 ms tone A = 880 Hz 50 ms tone D = 587 Hz 100 ms tone space indicates 50 ms gap
Data Receiver Pairing	The Monitor pairs with a receiver.	<b>D D D</b> = 587 Hz 100 ms tone <b>D</b> = 1174 Hz 100 ms tone space indicates 50 ms gap
Data Receiver Unpairing	The Monitor unpairs from a receiver.	D D D = 1174 Hz 100 ms tone D = 587 Hz 100 ms tone space indicates 50 ms gap

# 8. MAINTENANCE RECOMMENDATIONS

### **BATTERIES**

If the AURA™ Monitor will not be used for some time, remove batteries from the device and place in charging dock to ensure that fully-charged batteries are readily available when needed.

### **CLEANING**

Keep AURA™ Monitor Pack devices and accessories away from dust and dirt. Clean the external surfaces of the devices immediately after each use and prior to re-use.

Do not use harsh chemicals, cleaning solvents, or strong detergents to clean any of the devices. Do not spray or pour cleaning solutions directly onto any devices or submerge them.

Recommended cleaning procedure:

- 1. Turn off the device.
- Use a clean, soft, lint-free cloth dampened with isopropanol, Cidex® or a non-staining chemical disinfectant to wipe the external surfaces of the devices.
- Follow applicable hospital cleaning procedures and instructions on the cleaning agent.
- 4. If the device came in contact with blood or bodily fluids, perform intermediate disinfection per FDA and CDC guidelines.
- Follow applicable instructions for the cleaning agent to remove excess cleaning solution or residue. Otherwise, wipe devices using a clean, dry, lint-free cloth.
- 6. Visually inspect the devices to ensure surfaces are free of residue and soil. Inspect for any signs of wear or damage to the devices such as discoloration and cracking. If damage is detected, discontinue use and contact the Manufacturer.

### **SERVICE**

There are no user-accessible or user-serviceable parts or components in the AURA™ Monitor Pack. If any service, repair, or replacement of internal components is needed, the AURA™ Monitor Pack must be returned to Branchpoint Technologies. For instructions and return packaging, contact Branchpoint Technologies using the information on the back cover of this manual. When requesting service, please provide information concerning the nature of the failure and the manner in which the equipment was used when the failure occurred. The model number and serial number should also be provided.

### MAINTENANCE CHECK

Perform a visual inspection and verify the following prior to each use:

- Mechanical and functional integrity of the AURA™ Monitor, cables, and accessories.
- Legibility and adherence of the AURA™ Monitor labels.

### **DISPOSAL**

To dispose of, return, or exchange an AURA<sup>™</sup> Monitor, contact Branchpoint Technologies using the information on the back cover of this manual or dispose in accordance with appropriate hospital policy. Do not dispose of the AURA<sup>™</sup> Monitor in the trash or at electronics recycling facilities.

# 9. TROUBLESHOOTING

This section presents potential AURA™ Monitor operational issues and recommended solutions. Contact Branchpoint Technologies using the information on the back cover of this manual for additional assistance.

# TROUBLE CONNECTING WITH THE AURA™ SENSOR OR POOR QUALITY OF SERVICE

- The AURA™ Monitor will display the messages: "Sensor Connection Lost," "Reposition Antenna, Check Connections," or "Sensor Error" to indicate an AURA™ Sensor connection issue.
- Reposition the AURA™ Antenna and check connections until a good connection is re-established between the AURA™ Sensor and AURA™ Monitor.

**NOTE:** If the AURA<sup>IM</sup> Monitor cannot connect to an AURA<sup>IM</sup> Sensor, try repositioning the AURA<sup>IM</sup> Antenna.

# TROUBLE CONNECTING WITH THE AURA™ DATA RECEIVER OR POOR OUALITY OF SERVICE

- The AURA™ Monitor will state "No Receivers Found" if it does not find any receivers ready for connection. In this case, verify that no other AURA™ Monitor is already connected to the target AURA™ Data Receiver.
- The AURA<sup>™</sup> Monitor will display the words "Pairing Failed," "Receiver Error," or "Connect Receiver" to indicate failure to connect with a selected AURA<sup>™</sup> Data Receiver. If the AURA<sup>™</sup> Monitor fails to communicate with the AURA<sup>™</sup> Data Receiver or determines there is a poor Quality of Service, it will automatically disconnect from the AURA<sup>™</sup> Data Receiver.
- Verify there are no potential sources of interference in close proximity to the AURA™ Monitor or AURA™ Data Receiver.
- Check the connection of the AURA™ Data Receiver to the patient monitor.
- After verification, reset the AURA™ Monitor.

### POINT MEASUREMENT MODE

In point measurement mode, the patient monitor displays ICP as a series of flat line values (10 to 30 seconds at each consecutive averaged value) instead of an ICP waveform. The point measurement mode allows the ICP monitoring system to operate in a low power state. When in this mode, try re-positioning the AURA™ Antenna for better alignment with the AURA™ Sensor. The system will automatically transition out of point measurement mode when the issue is resolved.

### **ALARMS**

Table 5 lists all possible alarms that can be displayed to the User based on their significance, LED indicator status, and the audio alarm priority.

If a medium priority and a low priority alarm are active at the same time, the  $AURA^{TM}$  Monitor will only sound the medium alarm.

If two or more medium alarms are active at the same time, the AURA™ Monitor will cycle through all of them and display the alarm text for each alarm as shown in Table 5.

Table 5: Alarms Condition, Display, LED status, and Audio Alarm output level.

Alarm Condition	Display		ED Audio Alarm	
Max. ICP Exceeded	Flashing "HI" text to left of ICP average		Medium	
Min. ICP Exceeded	Flashing "LO" text to left of ICP average	Υ	Medium	
In Package Check Failure	"Sensor Check Failure"	N	None	
Monitor Over Temperature	"Monitor Cooling"	N	Medium	
Battery Temperature High	Screen 1: "Battery Temp High" Screen 2: "Change Battery, Check Manual"	Ν	Medium	
Low Battery	Screen 1: "Battery Low" Screen 2: "Change Battery"	N	Medium	
Critically Low Battery	Screen 1: "Battery CRITICAL" Screen 2: "Change Battery"	N	Medium	
Receiver Not Calibrated	Screen 1: "Receiver Not Calibrated" Screen 2: "Calibrate Receiver"	N	Low	
Receiver Issue	Screen 1: "Receiver Error" Screen 2: "Connect Receiver"	N	Low	

# 10. COMPLIANCE STATEMENTS

### EMI/RFI

This equipment has been tested and found to comply with the applicable limits for medical devices, IEC 60601-1-2:2007.

Although this testing shows the device to provide reasonable protection against harmful interference in a typical medical installation, there is no guarantee that interference will not occur in a particular installation. If the device does cause harmful interference the user is encouraged to try and correct the interference by the following measures:

- Reorient or relocate the device
- Increase the separation between the devices
- Connect the equipment to an outlet on a different circuit
- Contact Branchpoint Technologies using the information on the back cover of this manual

**NOTE:** "Harmful interference" is defined by the FCC as follows: Any emission, radiation or induction that endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radio communications service operating in accordance with FCC rules.

### **ESSENTIAL PERFORMANCE**

Essential performance is maintained as long as the AURA $^{\text{TM}}$  ICP Monitoring System can be brought back into a functional state to measure and display ICP to the user without requiring surgical intervention to remove or replace the sensor.

The performance limit for ICP measurement accuracy is  $\pm$  2 mmHg for ICP values of 0 to 20 mmHg, and  $\pm$  10% for ICP values above 20 mmHg during normal and single fault conditions.

# FEDERAL COMMUNICATIONS COMMISSION (FCC) COMPLIANCE

AURA™ Monitor contains FCC ID T7V1740.

AURA™ Antenna contains FCC ID 2AJW602. This product complies with Part 18 of the FCC rules.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference; and
- This device must accept any interference received, including interference that may cause undesired operation

**CAUTION**: Changes or modifications not expressly approved by Branchpoint Technologies could void the user's authority to operate the equipment.

## 11. PRODUCT INFORMATION DISCLOSURE

Branchpoint Technologies has exercised reasonable care in the selection of materials and the manufacture of these products. Branchpoint Technologies excludes all warranties, whether expressed or implied, including but not limited to, any implied warranties of merchantability or fitness for a particular purpose. Branchpoint Technologies shall not be liable for any incidental or consequential loss, damage, or expense, directly or indirectly arising from use of these products. Branchpoint Technologies neither assumes nor authorizes any person to assume for it any other or additional liability or responsibility in connection with these products. Branchpoint Technologies intends that this device should be used only by physicians with educational and training background enabling the proper use of the device.

# 12. TECHNICAL SPECIFICATIONS

# AURA™ ICP MONITORING SYSTEM TECHNICAL AND PERFORMANCE SPECIFICATIONS

Frequency response	10 mmHg: 34 Hz
The maximum frequency response of the AURA™ ICP	20 mmHg: 38 Hz
Monitoring System, including the ICP readout display, at peak pressures of 10, 20, and 50 mmHg.	50 mmHg: 23 Hz
	AURA™ Monitor displays a 1 second moving average.
Slew rates	10 mmHg: 0.79 mmHg/ms
The slew rates (the system's fastest output during a	20 mmHg: 1.68 mmHg/ms
unit of time) from zero to peak and peak to zero for peak pressures of 10, 20, and 50 mmHg.	50 mmHg: 2.06 mmHg/ms
Time constants	With increasing pressure:
The time constants for full-scale deflection of the	10 mmHg: 5.75 ms
system, with both increasing and decreasing pressure.	20 mmHg: 5.62 ms
	50 mmHg: 8.03 ms
	With decreasing pressure:
	10 mmHg: 7.74 ms
	20 mmHg: 8.99 ms
	50 mmHg: 9.10 ms
Pressure range of the AURA™ ICP Monitoring System including display range.	-20 to 100 mmHg
Accuracy of ICP range.	-20 to 20 mmHg: ± 2 mmHg
	20 to 100 mmHg: ± 10%
Length of time over which the device will maintain	29 Days
the specified accuracy.	
Pressure stability over temperature.	The stability of pressure measurement is not affected by sensor temperature between 25°C to 39°C.
The expected drift of the zero-point reading of the AURA™ Sensor.	First 24 hours: < 0 ± 2 mmHg per day
	29 days:
	< 0.3 mmHg per day

# **AURA™ MONITOR SPECIFICATIONS**

Physical dimension and weight			
Height	7.8 inches		
Width	3.7 inches		
Depth	1.8 inches		
Weight (with battery inserted)	700 grams		
Tempera	ture limits		
Operating	15°C to 30°C		
Storage	0°C to 50°C		
Humidi	ty limits		
Operating	20-85% R.H., non-condensing		
Storage	20-85% R.H., non-condensing		
Pressui	re limits		
Operating	795 mmHg to 700 mmHg		
Storage	795 mmHg to 375 mmHg		
	ansmission nd AURA™Antenna)		
Frequency range 2.40 - 2.48 GHz			
Output power	0dBm (0.001 watts)		
Modulation	GFSK FHSS		
Wireless power (AURA™Antenna)			
Frequency range	13.553 - 13.567 MHz		
Output power (variable)	Less than 4.5W		
Transmission distance			
AURA™ Antenna to AURA™ Sensor	1.5 cm		
AURA™ Monitor to AURA™ Data Receiver	7 meters		
Software			
Version	BLE: SW-0008 rev. A		
	MCU: SW-0006 rev. C		

# **AURA™ ANTENNA SPECIFICATIONS**

Physical dimension and weight			
Height	3.3 inches		
Width	1.8 inches		
Depth	0.8 inches		
Weight	63 grams		
AURA™ Antenna cable length	5 ft 0.2 inches		
Transmission	n distance		
AURA™ Antenna to AURA™ Sensor	1.5 cm		
AURA™ Monitor to AURA™ Data Receiver	7 meters		
Wireless power			
Frequency range	13.553 - 13.567 MHz		
Software			
Version	BLE: SW-0008 rev. A		
	MCU: SW-0002 rev. D		

# **AURA™ BATTERY SPECIFICATIONS**

Battery			
Туре	Li-ion, rechargeable		
Capacity	5600 mAh		
Charge duration	Operating: 8 hours (typical)		
Voltage	11.1 V		
Physical dimensi	on and weight		
Height	5.2 inches		
Width	3.4 inches		
Depth	1.1 inches		
Weight	400 grams		
Temperatu	re limits		
Operating	15°C to 30°C		
Storage	0°C to 50°C		
Humidity limits			
Operating	20-85% R.H., non-condensing		
Storage	20-85% R.H., non-condensing		
Pressure limits			
Operating	795 mmHg to 700 mmHg		
Storage	795 mmHg to 375 mmHg		

# **AURA™ BATTERY CHARGER SPECIFICATIONS**

Charger AC power supply input requirements			
Voltage	100 - 240 VAC		
Frequency	50-60 Hz		
Charger Power	Supply output		
Voltage	15 VDC		
Power	30W		
Chargin	g output		
Voltage	12.6 VDC per charging bay		
Current	895 mA per charging bay		
Physical dimens	ions and weight		
Charger			
Height	5.8 inches		
Width	5.8 inches		
Depth	3.0 inches		
Weight	375 grams		
Charger Power Supply			
Height	3.3 inches		
Width	2.8 inches		
Depth	1.9 inches		
Weight (with cable)	450 grams		
Temperature limits			
Operating	15°C to 30°C		
Storage	0°C to 50°C		
Humidity limits			
Operating 20-85% R.H., non-condensing			
Storage	20-85% R.H., non-condensing		

### Guidance and Manufacturer's Declaration - Emissions

The AURA<sup>TM</sup> Intracranial Monitor System and AURA<sup>TM</sup> System Battery Charger are intended for use in the electromagnetic environment specified below. The customer or user of the AURA<sup>TM</sup> Intracranial Monitor System and AURA System Battery Charger should ensure that they are used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment – Guidance	
RF Emissions CISPR 11			
System	Group 2	The AURA™ Intracranial Monitor System uses Group 2 limits. The AURA™ Intracranial Monitor System must emit electromagnetic energy in order to perform its intended function. Nearby equipment may be affected.	
Battery Charger	Group 1	The AURA™ System Battery Charger RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.	
RF Emissions CISPR 11	Class A	The ALIDAM Takes even in Marihay Cychese and ALIDA	
Harmonics IEC 61000-3-2	Class A	The AURA™ Intracranial Monitor System and AURA System Battery Charger are suitable for professional establishments only.	
Flicker IEC 61000-3-3	Complies	establishments only.	

### Guidance and Manufacturer's Declaration - Immunity

The AURA™ Intracranial Monitor System and AURA™ System Battery Charger are intended for use in the electromagnetic environment specified below. The customer or user of the AURA™ Intracranial Monitor System and AURA™ System Battery Charger should ensure that it is used in such an environment.

Immunity	IEC 60601	Compliance	Electromagnetic Environment –
Test	Test Level	Level	Guidance
ESD	±4kV Contact	±4kV Contact	Floors should be wood, concrete or ceramic tile. If floors are synthetic, the r/h should be at least 30%
IEC 61000-4-2	±8kV Air	±8kV Air	
EFT	±2kV Mains	±2kV Mains	Mains power quality should be that of a typical commercial or hospital environment.
IEC 61000-4-4	±1kV I/O's	±1kV N/A	
Surge IEC 61000-4-5	±1kV Differential ±2kV Common	±1kV Differential ±2kV Common	Mains power quality should be that of a typical commercial or hospital environment.
Voltage Dips/ Dropout IEC 61000- 4-11	>95% Dip for 0.5 Cycle >95% Dip for 1 Cycle 30% Dip for 25/30 Cycles >95% Dip for 250/300	>95% Dip for 0.5 Cycle >95% Dip for 1 Cycle 30% Dip for 25/30 Cycles >95% Dip for 250/300	Mains power quality should be that of a typical commercial or hospital environment. If the user of the AURA™ System Battery Charger requires continued operation during power mains interruptions, it is recommended that the AURA™ System Battery Charger be powered from an uninterruptible power supply or a battery.
Power Frequency 50/60Hz Magnetic Field IEC 61000- 4-8	3 A/m	3A/m	Power frequency magnetic fields should be that of a typical commercial or hospital environment.

### Guidance and Manufacturer's Declaration - Immunity

The AURA™ Intracranial Monitor System and AURA™ System Battery Charger are intended for use in the electromagnetic environment specified below. The customer or user of the AURA™ Intracranial Monitor System and AURA™ System Battery Charger should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance
Conducted RF IEC 61000-4-6	3V 0.15MHz-80MHz 6V <sup>1)</sup> in ISM between 0.15MHz and 80MHz <sup>2)</sup> 80% AM at 1kHz	3V 0.15MHz-80MHz 6V <sup>1)</sup> in ISM be- tween 0.15MHz and 80MHz <sup>2)</sup> 80% AM at 1kHz	PROFESSIONAL HEALTHCARE FACILITY ENVIRONMENT
Radiated RF IEC 61000- 4-3	3V/m 80MHz - 2.7GHZ 80% AM at 1kHz	3V/m 80MHz - 2.7GHZ 80% AM at 1kHz	PROFESSIONAL HEALTHCARE FACILITY ENVIRONMENT

<sup>1)</sup> r.m.s. before modulation is applied.

 $<sup>^2</sup>$  The ISM (industrial, scientific, and medical) bands between 0.15 MHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz; and 40.66 MHz to 40.70 MHz. The amateur radio bands between 0.15 MHz and 80 MHz are 1.8 MHz to 2.0 MHz, 3.5 MHz to 4.0 MHz, 5.3 MHz to 5.4 MHz, 7 MHz to 7.3 MHz, 10.1 MHz to 10.15 MHz, 14 MHz to 14.2 MHz, 18.07 MHz to 18.17 MHz, 21.0 MHz to 21.4 MHz, 24.89 MHz to 24.99 MHz, 28.0 MHz to 29.7 MHz and 50.0 MHz to 54.0 MHz.

### Guidance and Manufacturer's Declaration - Immunity

The AURA™ Intracranial Monitor System is intended for use in the electromagnetic environment specified below. The customer or user of the AURA™ Intracranial Monitor System should ensure that it is used in such an environment.

Test Frequency	Band¹	Service <sup>1</sup>	Modulation <sup>2</sup>	Maximum Power	Distance	Immunity Test Level
MHz	MHz			W	Meters	(V/m)
385	380-390	TETRA 400	Pulse modulation <sup>2</sup> 18 Hz	1.8	0.3	27
450	430-470	GMRS 460, FRS 460	FM <sup>3</sup> ± 5 kHz deviation 1 kHz sine	2	0.3	28
710 745 780	704-787	LTE Band 13, 17	Pulse modulation <sup>2</sup> 217 Hz	0.2	0.3	9
810 870 930	800-960	GSM 800/900, TEETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation <sup>2</sup> 217 Hz	2	0.3	28
1720 1845 1970	1700- 1900	GSM 1800; CDMA 900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation <sup>2</sup> 217 Hz	2	0.3	28
2450	2400- 2750	WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulation <sup>2</sup> 217 Hz	2	0.3	28
5240 5500 5785	5100 - 5800	WLAN 802.11a/n	Pulse modulation <sup>2</sup> 217 Hz	0.2	0.3	9

NOTE If necessary to achieve the IMMUNITY TEST LEVEL, the distance between the transmitting antenna and the ME EQUIPMENT or ME SYSTEM may be reduced to 1 m. The 1 m test distance is permitted by IEC 61000-4-3.

 $<sup>^{\</sup>scriptsize 1}$  For some services, only the uplink frequencies are included.

<sup>&</sup>lt;sup>2</sup> The carrier shall be modulated using a 50 % duty cycle square wave signal.

 $<sup>^3</sup>$  As an alternative to FM modulation, 50 % pulse modulation at 18 Hz may be used because while it does not represent actual modulation, it would be worst case.

# 13. PACKAGING AND DEVICE SYMBOLS

The Following symbols may be used on the  $AURA^{TM}$  Monitor, its accessories, and their packaging.

Symbol	Specification	Symbol	Specification
	Consult instructions for use	<b>~</b>	Manufacturer
1	Temperature limitations	سا	Date of Manufacture
<b>***</b>	Atmospheric limitations	STERILEEO	Sterilized using ethylene oxide
<u></u>	Humidity limitations	STERRUZE	Do not resterilize
SN	Serial Number	(( <u>~</u> ))	Non-ionizing electromagnetic radiation
REF	Reference/ Catalogue Number	$\triangle$	Caution
LOT	Lot Number		Do not use if package is damaged
$\square$	Use-by date	2	Do not reuse, single-use device
ETL CLASSIFIED  LINE INTERPRETATION  Intertek  5010848	Mark for Nationally Recognized testing for safety standards Conforms to AAMI STD E560601-1 IEC STD 60601-1-6 IEC STD 60601-1-8	NON STERILE	Non-sterile
X	WEEE- Waste, Electrical, and Electronic Equipment (WEEE). Indicates separate collection for electrical and electronic equipment (i.e., do not throw this device in the trash).	<b>R</b> €	Caution: Federal (USA) law restricts this device to sale by or on the order of a physician
Æ	Federal Communications Commission (FCC)	IPXX	International Protection Rating
☀	Type BF Applied Part		Class II Electrical Appliance
Ж	Non-Pyrogenic	Li-lon	Contains Lithium Ion Batteries
MR	MR Unsafe	NA	NA

# 14. ASSOCIATED DEVICE LABELS

### PN T-0020 AURA™ Battery Charger Label



Distributed By: Branchpoint Technologies, Inc. 1 Technology Drive, Suite I-811 Irvine, CA 92618 USA +1 949 829 1868



XXXXXXXXX

IP21 PTI PN: PTM01695

MYYYY-MM-DD  $\mathbf{R}_{\mathbf{x}^{ONLY}}$ INPUT: 15VDC OUTPUT: 12.6VDC BPT PN: T-0014 r. A LABEL PN: T-0020 r. D

CAUTION:

CAU HON:

-FOLLOW MANUFACTURER'S INSTRUCTIONS.

-POWER ONLY WITH ASTRODYNE POWER SUPPLY
MODEL NO. WSAS15MD.

-NO USER-SERVICEABLE COMPONENTS INSIDE.

REFER SERVICING TO AUTHORIZED PERSONNEL ONLY.

# PN T-0032 AURA™ Battery Label



YYYY-MM-DD PTI PN: PTM01692 3ICR19/66-2



1 Technology Drive, Suite I-811 Irvine, CA 92618 USA+1 949 829 1868

XXXXXXXXX

xxxxxxxxx

REF

SN

LOT

Rechargeable Li-ion Battery 11.1V, 5600mAh (62.16Wh)

CAUTION: TB101-A

- RISK OF FIRE AND BURNS. - DO NOT OPEN, CRUSH, HEAT AROVE 45°C, OR INCINERATE
- FOLLOW MANUFACTURER'S INSTRUCTIONS. - CHARGE ONLY WITH AURA™ TC101 CHARGER.
- NO USER-SERVICEABLE COMPONENTS INSIDE. REFER SERVICING TO AUTHORIZED PERSONNEL ONLY.



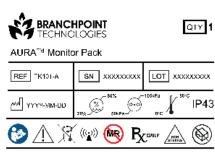
### PN T-0012 AURA™ Monitor Label



### PN T-0039 AURA™ Antenna Label



### PN T-0019 AURA™ Monitor Pack Sales Container Label





Package Contents:

- AURA \*\* Nonitor AURA \*\* Antenna Irihium-hon 11 1V Rechargeable Batteries (2) Battlery Charger Power Supply Instructions for Use



Contains EGC ID: T7V1740

IEC STD 60601-1-8 Distributed By: Branchpoint Technologies, Inc.

1 Technology Brive: Suite i-811, Irvine: CA 92618 USA +1 (949) 829-1868 Palentinfo, www.branchpt.com/palents

Lacel PN T 0019 i. C

# PN T-0022 AURA™ Monitor Pack Shipping Container Label

From: To: Branchpoint Technologies Customer 1 Technology Drive, Suite i-811 Address 1 Irvine, CA 92618 City, State Zip USA

Country

PO #: XX-XXXX REF TK101-A

QTY: 1



GUDID: (01)01234567890123(17)1234567890



Shipping Barcode: (01)01234567890123(17)1234567890

PN T-0022 - A

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The AURA™ Monitor Instructions For Use intends to provide all necessary information for proper operation of all AURA™ Monitor models.

Do not operate any component of the AURA™ ICP Monitoring System without completely reading and understanding these instructions.

### CAUTION:

FEDERAL LAW (U.S.) RESTRICTS THIS DEVICE TO SALE BY OR ON THE ORDER OF A PHYSICIAN.

For further information contact: Branchpoint Technologies 1 Technology Drive, Suite i-811 Irvine, CA 92618 United States Tel.: +1 (949) 829-1868 www.branchpt.com

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