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BavSonic™
Universal Telephone Audio with BEAM Module
Installation and Service Manual

BavSonic™ Universal Telephone Audio

Table of Contents

Important Safety Instructions

1. READ THESE INSTRUCTIONS

2. KEEP THESE INSTRUCTIONS

3. HEED ALL WARNINGS

4. FOLLOW ALL INSTRUCTIONS

5. DO <u>NOT</u> USE THIS APPARATUS NEAR WATER

6. CLEAN ONLY WITH A DRY CLOTH

7. DO NOT BLOCK ANY VENTILATION OPENINGS. INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS

8. DO <u>NOT</u> INSTALL NEAR ANY HEAT SOURCES SUCH AS RADIATORS, HEAT REGISTERS, STOVES OR OTHER APPARATUS (INCLUDING AMPLIFIERS) THAT PRODUCE HEAT

9. PROTECT THE POWER CORD FROM BEING WALKED ON OR PINCHED PARTICULARY AT PLUGS, CONVENIENCE RECEPTACLES AND THE POINT WHERE THEY EXIT THE APPARATUS

10. ONLY USE ATTACHMENTS/ ACCESSORIES SPECIFIED BY THE MANUFACTURER

11. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL. SERVICING IS REQUIRED WHEN THE APPARATUS HAS BEEN DAMAGED IN ANY WAY, SUCH AS POWER-SUPPLY CORD OR PLUG IS DAMAGED, LIQUID HAS BEEN SPILLED OR OBJECTS FALLEN INTO THE APPARATUS, THE APPARATUS HAS BEEN EXPOSED TO RAIN OR MOISTURE, DOES NOT OPERATE NORMALLY OR HAS BEEN DROPPED.

Additional Safety Instructions

WARNING – TO REDUCE THE RISK OF FIRE OR ELECTRONIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

BavSonic™ Universal Telephone Audio Features

The BavSonic™ Universal Telephone System with BEAM (Bavis Enhanced Audio Module) connects the intercom system of the two outside remote drive-thru lanes to the telephone system. This is a full duplex audio system for maximum intelligibility. Both the incoming and outgoing audio levels are adjustable on the interface.

The customers at the remote-drive-thru locations can call the inside by depressing the CALL BUTTON on either lane. This initiates a call to the telephones in the building that are programmed to receive them. The employees can access each remote lane from the telephones that are given access. If a customer presses the call button and the call is not answered in approximately one minute the call is terminated for 10 seconds then another attempt is made. This will happen five times at which point the interface will reset itself awaiting the next activation of the call button. (Other logical operations available, please consult factory)

Telephone Interface Power and Site Requirements

Power is supplied to the interface through a 110v power cord and is protected by a 1 amp breaker. The customer will supply the 110v power outlet as well as the connections from the telephone system to an area under the counter adjacent to the drive-thru window.

Telephone system requires a standard loop start CO line for each lane, and the phone system to be programed to connect to the interface. This also is the customer's responsibility. This system works well in noisy environments as well as with VoIP telephone systems.

These items should be in place, and the phone system programed, before installing the BavSonic™ Universal Telephone Interface.

Mounting the Interface Assembly

There are two "Keyhole" slots in the base of the assembly's housing, (See page 11). These allow the interface to be easily mounted to the wall, cabinet or counter.

Intercom Connections

There are intercom boards located in both the window lane and remote lane. These boards are connected to the telephone interface via standard CAT 5 wiring. The termination is a type 568B. The connectors for the red cable are RJ45. The blue cable is connected to the screw terminals of the green Phoenix connector. Red cabling designates lane one. Blue cabling designates lane two. Each remote intercom board has a LED, which indicates that it is receiving power.

The base audio boards are calibrated and sealed for use with the BEAM system. There are no user adjustable audio levels on these base audio boards. Both the outgoing and incoming audio levels are adjusted on the interface. The intercom audio board for the window will be near the transaction drawer. The intercom audio board for the TransTrax is located on the customer speaker panel, inside a weatherproof enclosure, of the customer unit located on the outside island.

Plug J1 is for the speaker connection. The connector is a 3-position with positions 1 & 3 being the speaker. For the outside board, plug J2 is an 8-position Microfit, for the inside board, plug J2 is an 8-position RJ45. Plug J3 is for the call button connections. The connector is a 4-position with positions 2 & 3 being the button. Note that positions 1 & 4 are 19vdc power with position 4 being positive. Plug J4 is for the microphone connection. This connector is a 2-position.

Please see page 8 for an overall wiring diagram of the intercom section. Note that the wire tie on the case is for a strain relief of the Lane 2 connecting cable.

It is recommended to install the RJ45 connector directly onto the end of the CAT5 cable for the window lane (lane 1), and to strip and install the wires for the remote (lane 2) directly into the screw terminals of the green Phoenix connector. For situations where tooling is not available to attach the RJ45 to the end of the CAT5 cable for the window lane, we have included a wiring pigtail, (P/N 22066011, see page 9) that can be spliced onto the cable with the crimp connectors provided. For situations where it is preferable not to remove the RJ45 from the Remote lane's cable we have provided a RJ45 to Terminal Barrier Adapter harness, (P/N 22209591, see page 9), that can be plugged onto the RJ45 connector of the Cat5 cable and then, after removing the green terminal barrier shipped on the Interface box, plugged directly into the box.

Telephone System Connections

The Universal Telephone Audio Interface can be used in conjunction with most telephone systems including VoIP. The following information is generic for most systems. If additional information is needed please consult the factory.

The telephone connections on the Universal Telephone Audio Interface are standard RJ11 jacks. There are two two-wire telephone cords that are provided with the interface that should be used to connect the Universal Telephone Audio Interface to the RJ45 connection of the telephone system. One cord is for the WINDOW lane the other for the REMOTE lane.

The CO port should be programmed for loop start. If there is a programmable delay between off hook and connection of the audio path it should be adjusted to the minimum.

Troubleshooting

The Universal Telephone Audio Interface uses a Subscriber Line Interface Circuit (SLIC) to provide a Central Office (CO) line output. The CO line output is a standard two-wire tip ring connection with loop start. This CO line output can be connected to a telecom test set, standard telephone or Key Service Unit (KSU) for testing.

There are three states that CO line output can be in. Note that these are voltages that would normally appear on digital multi-meter, and are to be made at the center two pins of the "Telephone" connection. Values will differ if measured on an oscilloscope.

1) With or without the CO line connected and the receiver on hook, the supervisory voltage should be approximately 26Vdc. Note that a flashing RED LED indicates that the system is running.

2) With the CO line connected and the receiver off hook, the voltage should be approximately 6.5Vdc. Note that a separate YELLOW LED labeled OFF HOOK is provided for each channel to monitor this condition.

3) With the CO line connected, the receiver on hook or without the CO line connected and the YELLOW LED labeled RINGING illuminated, the voltage should be approximately 55Vac at 20 Hz.

4) Without a CO connected and shorting pins 2 & 3 together will cause the OFF HOOK LED to illuminate. Note that if the intercom is connected the audio will most likely squeal due to feedback.

If any of these voltages are not present please consult the factory for assistance.
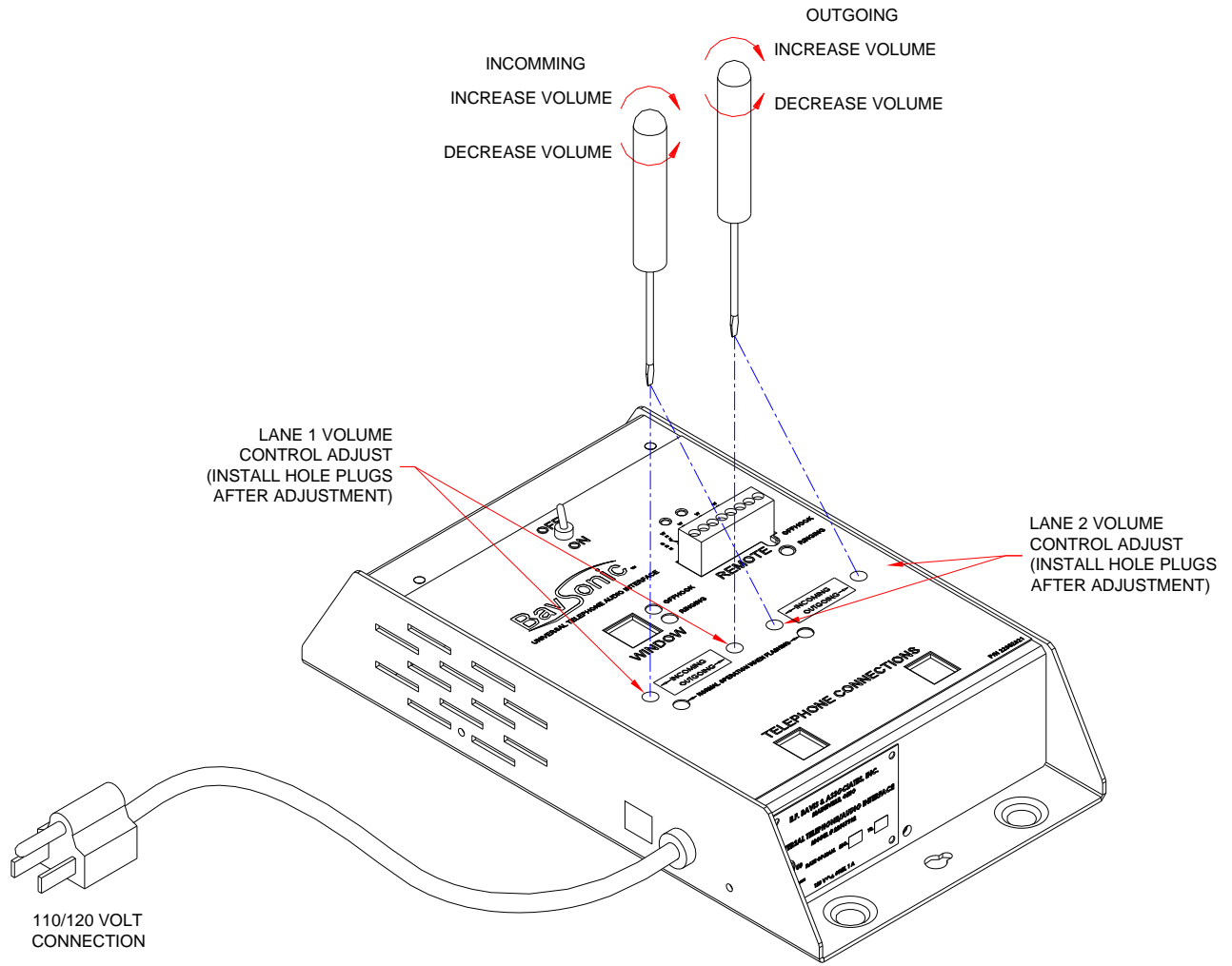
Adjusting the Incoming Audio Level

When using the Bavis Universal (loop start) Telephone Audio Interface with BEAM module in a VoIP environment the audio levels are critically important for good audio. The BEAM module adds the necessary signal conditioning for the G711 encoding (8bit sampling at 8kHz) used in VoIP systems. VoIP systems have inherent delays between when the microphones pick up speech, until that sound comes out of the speakers. When the microphone picks up this sound and rebroadcasts it back to the person talking with delay it is known as echo. Even small amounts of echo destroy the intelligibility of the spoken word. The BEAM module has a very powerful acoustic echo cancellation for use in a VoIP environment.

The standard operation for echo cancellation systems is to converge on a solution to digitally remove all sounds that come out of the outside speaker from the signal coming back from the outside microphone. There are many things that hamper the echo cancellation system efforts at doing this. Three important areas are: 1) Distortion in the audio signal from worn speakers or microphones. For the clearest audio it is important to insure that your speakers and microphones are in good shape with no tears or holes in the speaker cones. The newest Bavis speakers have custom (black) Mylar cones for best performance and longest life. 2) Speakers turned up too high. (Note that the base audio boards for use with the Universal Telephone audio with BEAM module are calibrated and sealed) The audio coming from the outside speaker should be at normal conversation levels, not louder. 3) High amounts of background noise from traffic or wind. The BEAM module has a very powerful voice processing module which reduces background noises (stationary sounds) by up to 10dB.

We added the ability to adjust both the incoming and outgoing audio signals in order to be compatible with all analog telephone ports. These adjustments are under ¼" snap in holes plugs near the status LEDs for each channel. The adjusters are white, located in a blue body. A very small screwdriver is required to make this adjustment. The adjusters are ¾ turn.
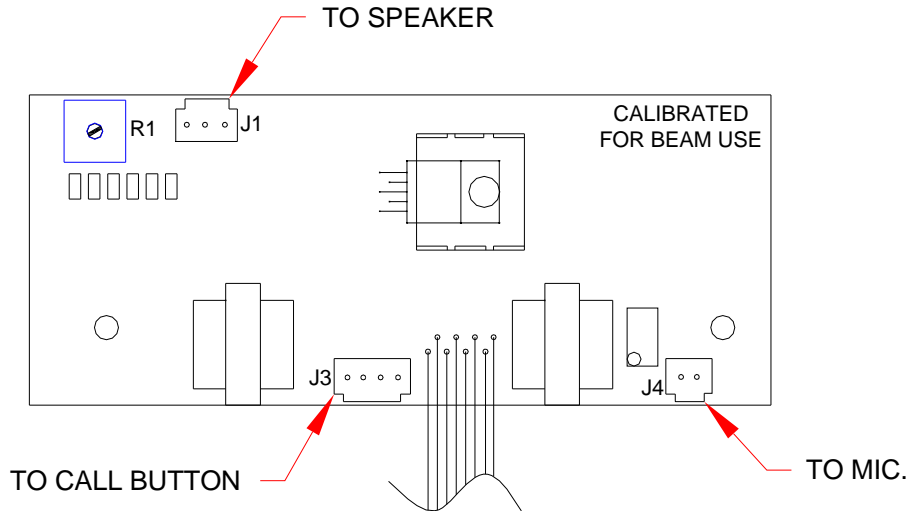
The adjustment procedure is to have someone in a running vehicle in the drive-thru talking to the technician on the telephone. First adjust the outgoing audio level for a normal conversation level, not blaring. Then in small increments turn the incoming audio level down. Normally there will not be any appreciable reduction in the sound level at the handset coming from the drive-thru lane. The AGC (automatic gain system) of telephone system is automatically reducing the signal to an acceptable level. When the incoming sound level does decrease, increase the level slightly until the sound comes back up to the normal level.

Adjusting Audio Level Diagram

OUTGOING

INCREASE VOLUME

INCOMMING

DECREASE VOLUME

INCREASE VOLUME

DECREASE VOLUME

LANE 1 VOLUME
CONTROL ADJUST
(INSTALL HOLE PLUGS
AFTER ADJUSTMENT)

LANE 2 VOLUME
CONTROL ADJUST
(INSTALL HOLE PLUGS
AFTER ADJUSTMENT)

110/120 VOLT
CONNECTION

Base Audio Board and Connector Diagram

MIC & SPEAKER LEVELS ARE PRE-SET
DO NOT ADJUST

TO SPEAKER

R1   J1

CALIBRATED
FOR BEAM USE

J3

J4

TO CALL BUTTON

TO MIC.

8 POS RJ45 TYP
(WIRED 568B)

WHT/ORG
ORANGE
WHT/GREEN
BLUE
WHT/BLUE
GREEN
WHT/BROWN
BROWN

8 POS MICROFIT

AUDIO TO OUTSIDE
SPEAKER

CALL BUTTON

GREEN
WHITE/GREEN
BLUE
WHITE/BLUE
ORANGE
WHITE/ORANGE
BROWN
WHITE/BROWN

AUDIO FROM
OUTSIDE MIC

+19 VDC

-19 VDC
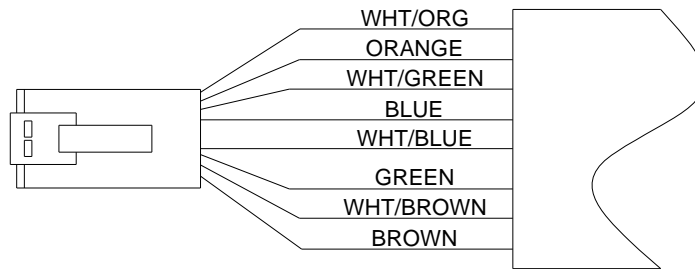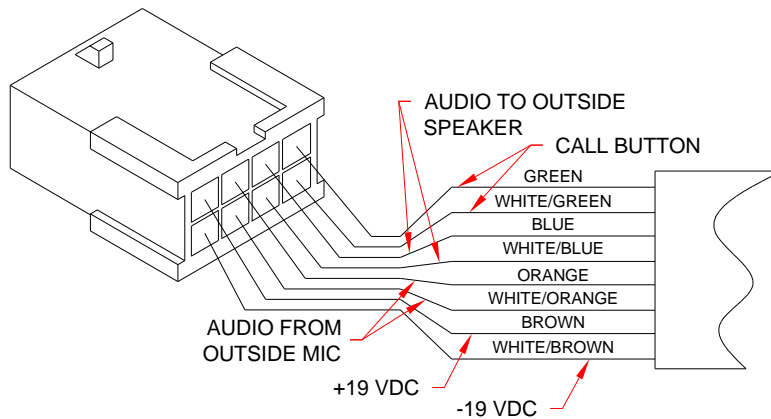
Intercom Wiring Diagram

LANE 2
REMOTE

TO SPEAKER

R1   J1

CALIBRATED
FOR BEAM USE

TO CALL BUTTON

J3   J4

TO MIC.

TO SPEAKER

R1   J1

CALIBRATED
FOR BEAM USE

LANE 1
WINDOW

TO CALL BUTTON

J3   J4

TO MIC.

RJ45

BaySonic

BaySonic

INTERCOM CONNECTIONS
MADE AT TERMINAL BARRIER

BLUE CAT5

OFF
ON

REMOTE

BaySonic

RJ45

WINDOW

RED CAT5 - 14' LONG

RJ11

TELEPHONE CONNECTIONS

RJ11

110/120 VOLT
CONNECTION

RJ45

GREY 14' LONG

RJ45

GREY 14' LONG

8

Interface Label Diagram

OFF
ON

BavSonic ™
UNIVERSAL TELEPHONE AUDIO INTERFACE

WHT/BRN BRN
WHT/ORG ORG
WHT/GRN GRN
WHT/BLU BLU

REMOTE

WINDOW

OFFHOOK
RINGING

OFFHOOK
RINGING

INCOMING
OUTGOING

INCOMING
OUTGOING

←NORMAL OPERATION WHEN FLASHING→

INCOMING AUDIO
GAIN ADJUSTMENT

(INSTALL HOLE PLUGS
AFTER ADJUSTMENT)

OUTGOING AUDIO
GAIN ADJUSTMENT

TELEPHONE CONNECTIONS

P/N 22052021

9
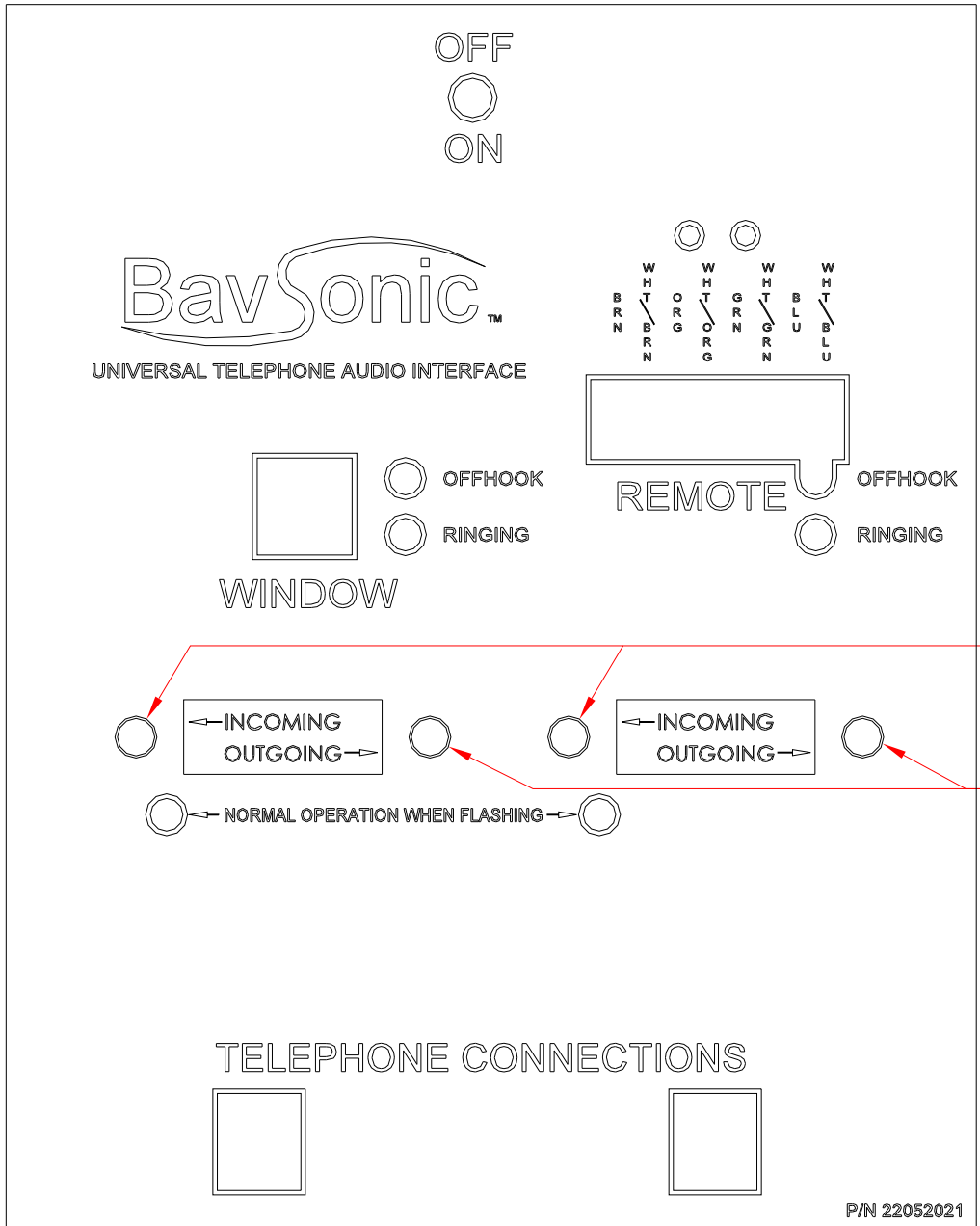
Adapter Harnesses

RJ45 PIGTAIL
P.N. 22066011

RJ45 PLUG

BROWN
WHITE/BROWN
GREEN
WHITE/BLUE
BLUE
WHITE/GREEN
ORANGE
WHITE/ORANGE

6" STRANDED CAT 5 CABLE
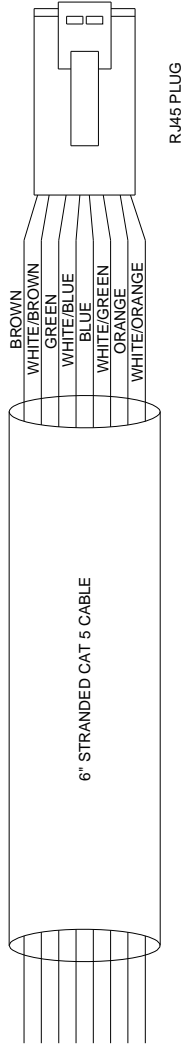
RJ45/TERMINAL BARRIER ADAPTER
P.N. 22209591
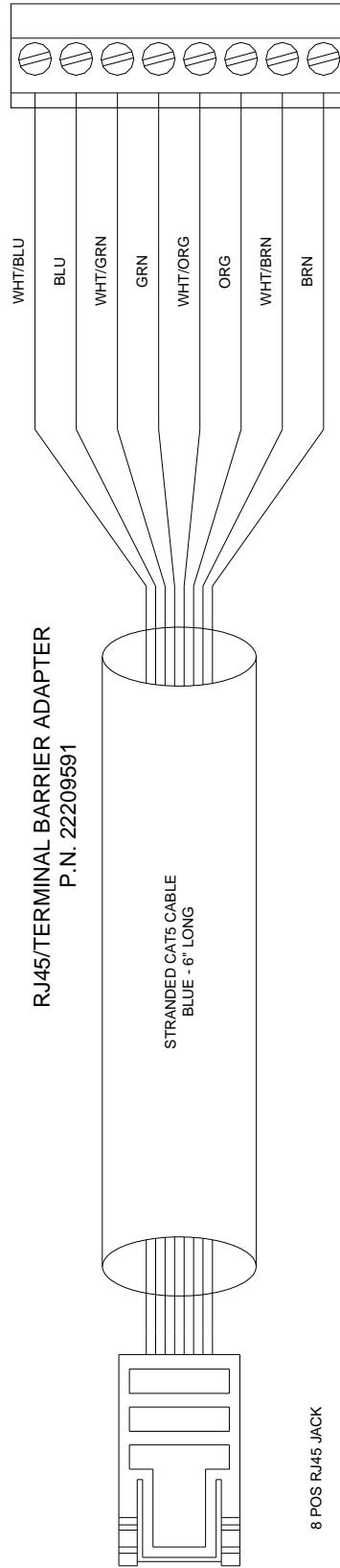
8 POS PHOENIX TERMINAL BARRIER

WHT/BLU
BLU
WHT/GRN
GRN
WHT/ORG
ORG
WHT/BRN
BRN

STRANDED CAT5 CABLE
BLUE - 6" LONG

8 POS RJ45 JACK

Mounting Hole Locations

MOUNTING "KEYHOLE"

OFF
ON

BavSonic ™

UNIVERSAL TELEPHONE AUDIO INTERFACE

WHT/BRN WHT/ORG WHT/GRN WHT/BLU

OFFHOOK
RINGING

REMOTE

OFFHOOK
RINGING

WINDOW

INCOMING
OUTGOING

INCOMING
OUTGOING

NORMAL OPERATION WHEN FLASHING

TELEPHONE CONNECTIONS

P/N 22052021

MOUNTING "KEYHOLE"

11
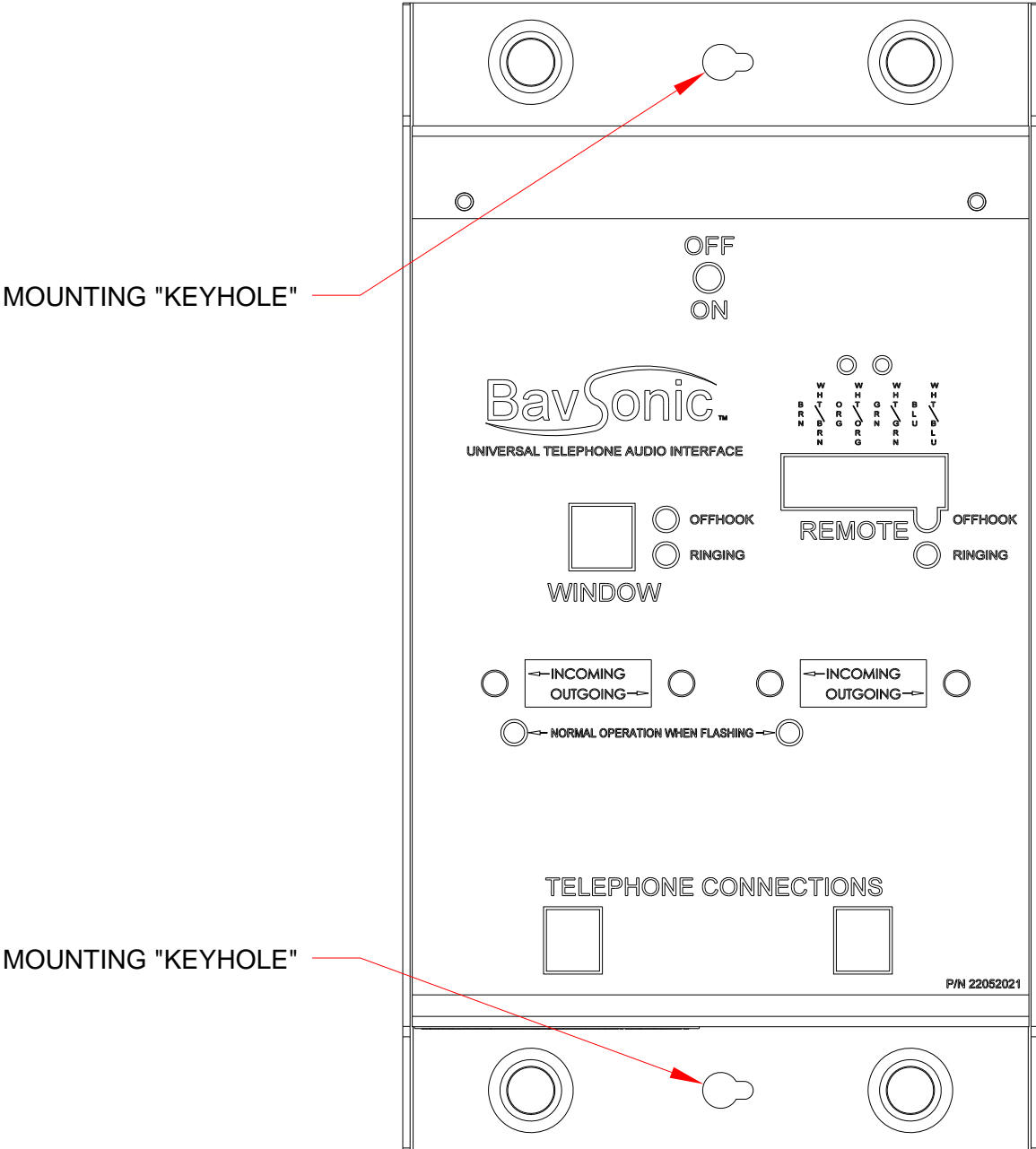
Installation and Service Tool List for Audio

1/8" And 3/8" Flathead Screwdrivers
#0 And #2 Phillips Screwdrivers
1/16" And 3/32" Allen Wrenches
1/2" Open-End Wrench
1/4", 5/16", 11/32", 3/8", And 1/2" Nut Drivers
Wire Cutters
Wire Strippers
Wire Crimpers
RJ45 Connector Crimpers & Connectors
Volt Meter
Electric Drill
Drill Bits
Level
7/8" Unibit
Fish Tape
Loctite