

Interpreting RAVE's Front-panel Display

RAVE's front panel display is designed to provide a wealth of information regarding the status of device operation, network communications and audio presence. This reference document discusses the various sections of the RAVE™ display and the parameters that are reported within them.

The front-panel display of the RAVE product consists of four sections: the power indicator, the rotary encoding switches, the network status indicators and the channel metering indicators.

Power

The green "Power" LED is illuminated when the unit has sufficient board-level power. The RAVE products incorporate a universal power supply that supports a wide range of supply voltages. As such, the power LED indicates only that *sufficient* voltage is being supplied to the processor board. The power LED does not indicate whether the AC mains supply is clean or properly regulated. Many applications use power conditioners and UPS units to insure consistent and failsafe operation.

Rotary switches

The front-panel rotary encoding switches indicate the current bundle assignment for outgoing and/or incoming CobraNet™ audio when hardware control is implemented. The actual bundle assignments may differ if they have been altered via the software interface. It is recommended that the rotary switches be configured to duplicate any bundle assignments that are configured via software. This allows visual monitoring when software is unavailable or security protected. It should be noted that the rotary switches are used for assigning a system name to the RAVE device when software control and "persistence" of user-configurable parameters is invoked. In most cases, the system name is more descriptive when edited through the software interface. Therefore, front panel entry is used less often.

The rotary switches can also be used to determine whether the RAVE unit is implementing multicast or unicast bundle delivery.

The rotary switches provide the lowest level of connectivity monitoring between CobraNet devices.

Network status indicators

The network status indicators or “network activity LEDs” provide connectivity, CobraNet and Ethernet operational status of the RAVE unit.

- The green “Link” LED indicates that the RAVE has successfully connected with its link partner. The link partner may be another RAVE device, via a crossover cable, or an Ethernet network device. The “Link” LED does not indicate that valid communication has been established, as could be the case if the link partner were a 10BaseT device or a type of network hardware not supported by RAVE or CobraNet. This LED is useful for determining whether a basic connection has been made on the network or directly with another CobraNet device. A failure at this level is usually the result of faulty CAT-5 cables or an invalid network device.
- The green “100 Mbps” LED indicates that the RAVE has successfully linked at 100 Mbps operation with its link partner. CobraNet supports 100 Mbps operation only and as such, this LED should always remain illuminated. The “100 Mbps” LED does not indicate a valid connection to either an Ethernet switch or repeater hub. To insure proper connectivity, only hubs supporting fixed 100 Mbps operation should be used with repeater network configurations. Additionally, when using Ethernet switches, the ports must be configured for “all-capable” operation and establish connectivity with a RAVE via auto-negotiation.
- The green “RX” and “TX” LEDs indicate communication between RAVE devices. It is normal to see “RX” and “TX” activity even when there is no audio or CobraNet bundle traffic. This is due to RAVE “performer” devices requesting reservations (requests for permission to use a particular bundle) and the “conductor” servicing these requests as well as distributing the network clock. These indicators are not directly related to CobraNet network activity.
- The red “RX Error” and “TX Error” LEDs indicate communications errors between RAVE devices or synchronization problems with the unit. It *is* normal to see these indicators during some extensive polling operations as well as during code upgrades and network switch POST. It is *not* normal to see these error indicators during normal operation. A flickering of the error LEDs may be corrected by resetting the unit. When the “RX Error” and “TX Error” LEDs flash or remain illuminated in unison, a synchronization error may be at fault. This may be the result of exceeding the Ethernet cable lengths or an internal/external clock which does not meet the CobraNet timing specifications. These indicators are directly related to CobraNet network activity.
- The yellow “Conductor” LED indicates the device which is acting as the CobraNet network master. This device sources the system clock and services all “performer” requests. There should only be one conductor per LAN or VLAN.
- The red “Fault” LED indicates a major error with either the hardware or code in the RAVE device. In most cases, the fault LED is illuminated during “fatal” and

unrecoverable conditions. This is most prevalent during the initialization test (POST). This indicator should never be illuminated during normal operation. A possible cause may be failure in uploading code into the unit. Reprogramming, if possible, and/or resetting the unit may correct the problem.

** Refer to the CobraNet Technology Datasheet, available on the Peak Audio website, for a complete list of fault conditions and error codes.*

Channel metering indicators

The metering LEDs serve five functions on the RAVE products. This includes audio metering as well as status and activity information.

Audio metering: The LEDs' primary function is to provide audio metering for each of the 16 audio channels. In this mode, the tri-color LEDs (green, yellow and red) provide an indication of the amount of signal present as well as the amount of headroom available. The signal level at which each of the LED's three colors are illuminated is dependent upon the *input* sensitivity selected for each channel (analog models) or the AES signal's relation to DFS (digital full scale). Refer to the RAVE "Owner's Manual" for details on input sensitivity.

The metering LEDs also perform secondary functions such as indicating the CobraNet firmware revision installed in the RAVE, whether device parameters are currently accessible via software or hardware, error reporting, network bundle assignment values and providing "bundle activity" status. For all of these secondary functions the 16 metering LEDs are split into two 8-channel groups. Note that this discussion applies to version 2 of the CobraNet protocol.

Version 1 can be identified by the rainbow display when powering up the RAVE device. This display scrolls through the three colors on the 16 metering LEDs in a chasing pattern.

The following sections represent the functions of the metering LEDs with version 2 firmware installed.

CobraNet revision: When powering up a RAVE with CobraNet version 2, the major and minor release of the firmware are displayed on the two 8-channel groups in binary format. The left group displays the major release and the right group displays the minor release. For example, if the CobraNet version in the RAVE is 2.8.5, the left group would display a binary 8 and the right group would display a binary 5. In this example, if a "1" indicates illumination and a "0" indicates that the LED is off, 8.5 would be displayed as "00001000 00000101" on the front-panel of the RAVE.

The color of LED illumination indicates the method of accessibility for configuring the management interface (MI) variables. When in hardware mode, the revision is illuminated in red. In software mode, the revision is illuminated in yellow. Software mode is invoked when "flashPersistEnable" is set to the value "1".

Figure 1 shows the RAVE metering LEDs, in hardware mode, indicating CobraNet version 2.8.5.

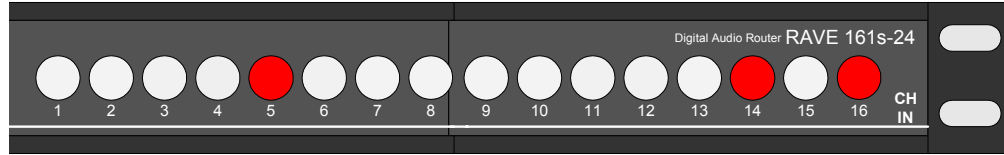


Figure 1

Error reporting: Each release of the CobraNet firmware has an associated list of error codes, which identifies a specific cause in the event that a unit is failing a self-test or is experiencing operational problems. The RAVE devices display this error code on the right 8-channel group of the metering LEDs. The error display indicates a 2-digit hexadecimal value that is referenced in the CobraNet Technology datasheet. This code will be displayed in binary format with red LEDs. Translation to hexadecimal is straightforward. A desktop calculator can perform this function if need be. In the event that a unit should fail, the code can assist a Technical Services representative to troubleshoot the cause. Figure 2 shows error code 60 (decimal), which indicates an audio dropout at the transmitter. (60d = 3Ch = 111100).

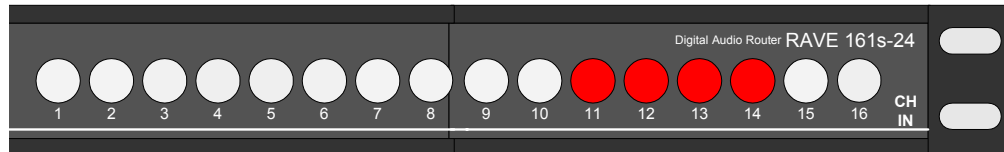


Figure 2

Bundle assignments: When implementing hardware control of the bundle assignments on the RAVE products, the binary value of the rotary encoders is temporarily displayed on the metering LEDs in red. This can be seen by scrolling through the front-panel rotary switches and viewing the metering display. Each time a switch is adjusted, the new value of the rotary encoders is quickly displayed. The value of the leftmost pair of rotary switches is displayed on the left 8-channel group of metering LEDs and the value of the right pair of rotary switches is displayed on the right group of metering LEDs. In multicast mode, the value displayed directly represents the bundle assignment. In unicast

mode, the displayed must be added to 100h to obtain the bundle value. Note that changing bundle assignments via SNMP has no effect on the metering LED display. If we use Figure 2 as an example for the rotary encoders rather than the error display, then the RAVE 161s-24 has enabled only one transmitter. This is shown on the second bank of LEDs. The rotary encoders are at “3Ch”. Adding 100h to the value = 13Ch = unicast bundle value 316.

Bundle activity: One of the most useful features of the metering LEDs on the RAVE products is that they indicate CobraNet connectivity information by providing “bundle activity” status. An active or valid bundle assignment is indicated by illuminating the associated 8-channel group of metering LEDs in dim green. Once viewed, the difference between actual signal presence and bundle activity is very clear. When in multicast mode, the 8-channel transmit group will be illuminated in dim green so long as *only one* transmitter occupies any network address. Remember that multiple transmitters on the same network address assignment is an invalid condition. This condition applies to both public multicast and public unicast delivery types. Note that multicast transmitters will be indicated by the dim green display whether or not there are active receivers tuned-in to the same address. Multicast receivers will also be indicated by the dim green display so long as there is an active transmitter occupying the same bundle assignment. Multiple receivers will be indicated in multicast mode only. In unicast mode, an active transmitter will be displayed in dim green *only if there is active receiver* on the same network address. Conversely, an active unicast receiver will only be displayed when a valid transmitter is active on the same network address.

In short, a valid transmitter in multicast mode requires that only one transmitter be active on any bundle assignment. A valid multicast transmitter does not require a receiver to be “listening”. In unicast mode, an active transmitter *does* require that a receiver be listening. To help clarify, consider the following; multicast traffic is analogous to a radio station such that the station is broadcasting program material whether or not there are listeners tuned in. Unicast traffic is analogous to a telephone call such that a valid connection requires that one initiate the call and that a receiver accept the call.

Figure 3 shows a valid multicast transmitter on bank two with signal metering on channels 9, 12 and 15.

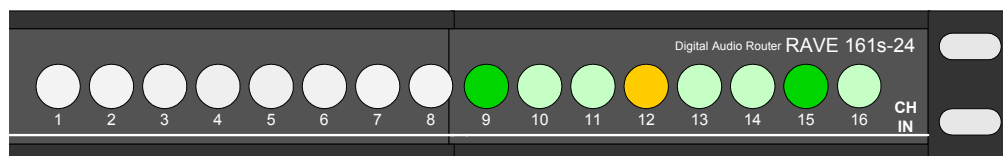


Figure 3