System Redundancy with the Crown PIP-USP4 Processor

Providing reliable backup with just a single network connection

Reliability is a critical concern in any audio system, but especially in those used for sound reinforcement; this is often made more confusing when digital transport methods are added. That's why the CobraNet audio networking used in many Crown products has always included provision for backup connections in case of network failure. Since Crown implemented CobraNet in 2001, we've continued to refine the way our audio networking systems operate, in order to make the audio systems you design more reliable, predictable, and user-friendly.

Using the experience we've gained in developing and integrating digital audio products, combined with user feedback we've received from the field, we have improved the way our amplifiers provide override and redundancy functions. With the introduction of the PIP-USP4 family of processor modules for Crown CTs Series amplifiers, system backup functions are now simpler, have greater flexibility, and more intuitive than ever before.

In past products such as the PIP-USP3-CN, we have relied on dual CobraNet connections, so that if one network connection failed the second could take over. However, some users didn't find this solution elegant. Our users expected the network connection to switch based on the loss of audio when in fact this did not always happen. As long as Ethernet traffic of any kind is being received by the card it will not switch to the secondary port. In some applications CobraNet audio can be lost, but some Ethernet traffic remains preventing the desired switchover.

Reducing connections, increasing reliability

To make operation of the USP4 as simple as possible, we have eliminated the second CobraNet port and added an internal three-input automixer for each channel. The mixer allows us to base system backup switching on loss of the audio signal rather than failure of a network component or network connection.

The possible signal sources are networked digital audio, either CobraNet or Ethernet AVB; AES3 digital audio through a removable barrier connector; and analog audio through removable barrier connectors. Through a Windows based computer using HiQnet System Architect software, the user can select a primary input, a secondary input, and a tertiary input on each USP4 in a system.

Typically, CobraNet will serve as the primary input, with the analog input as the backup. If the Digital Audio connection to a USP4 stops receiving audio for any reason, the USP4 can be set to switch automatically to analog (or AES3) input. The USP4 evaluates the status of the audio signals internally on the card without need for communication with other devices, so the sound continues even if the entire network goes down. *See Diagram 1.*

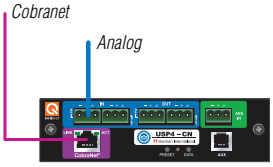

Diagram 1

More options for system backup

The USP4's internal mixer makes it possible to achieve system redundancy in a wide variety of ways, depending on your needs and the other equipment you're using.

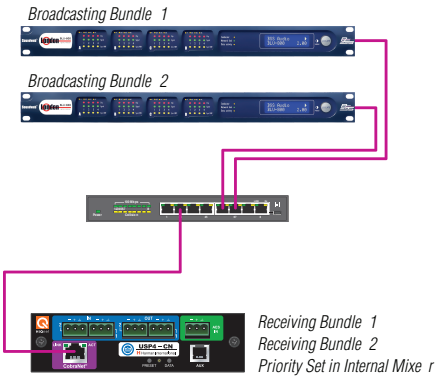

Diagram 2

You can now have redundant signal sources running on the same network. For example, a BSS Audio Blu-80 signal processor to broadcast on Bundle 1 and the second unit can be set to broadcast on Bundle 2. Each USP4 can be set up so that if the primary Blu-80 loses its pathway to the USP4 or the audio stops being sent, the USP4 automatically switches over to receive signals from the backup Blu-80. *See Diagram 2.*

A second signal source may also be connected through the USP4's analog inputs. Thus, a Blu-800 could be sending via CobraNet and BluLink. CobraNet audiois sent directly to the USP4. BluLink is converted to analog audio in the BSS Blu-BOB, then sent to USP4-CN's analog inputs.

If the CobraNet audio from the networked Blu stops for any reason, the analog connection takes over. The backup audio source can be distributed via BluLink between London Blu devices for scalability and simplicity. *See Diagram 3 on next page.*

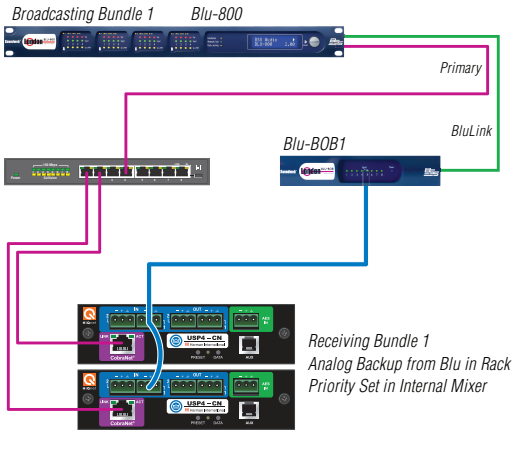

Diagram 3

One USP4 can even back up another USP4 installed in a different amplifier. Simply connect the analog output of one USP4 to the analog input of the other, and set each one to switch to analog input if the network connection fails. *See Diagram 4. These are just a few of the possible configurations.*

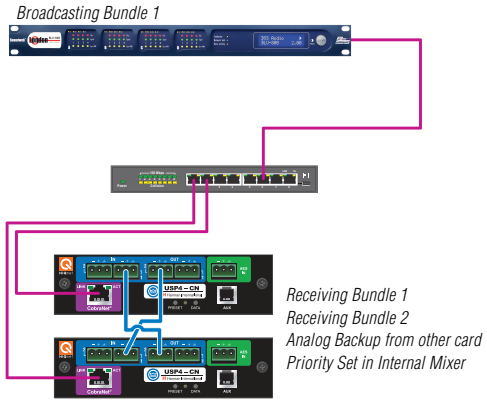

Diagram 4

Advanced system monitoring

Besides its redundancy features, the USP4 offers far more monitoring functions than are available through traditional front-panel controls and indicators. As a result, the USP4 can alert system engineers to problems as they occur, providing the opportunity for engineers to diagnose and possibly correct failures while operation continues in backup mode. Alerts can be displayed on the central control computer. The USP4's auxiliary RJ-11 jack also provides a programmable contact closure connection, allowing an amplifier failure to trigger external warning indicators.

System monitoring functions include:

- Line voltage above or below limit
- Power supply temperature above limit
- Channel temperature above limit
- Channel clipped
- Channel load impedance above or below limit
- Fan error
- Impedance test failure
- Communication status with the amplifier

A system you can count on

The input mixing capability of the USP4 makes digital audio and the CTs Series amplifiers more intuitive, flexible, and reliable for fixed sound reinforcement applications.

The control interface, USP4 input priorities, and error reporting functions can be customized to suit the needs of the user and the application. The result is that you get all the control you need, presented exactly the way you need it. And once you're designed a system that meets your needs, you can easily replicate that system, either as an exact copy or as the starting point for another system.

Systems can be even be monitored remotely through an Internet connection, making it possible to diagnose and correct problems remotely.

Ask your Crown dealer for more information about the PIP-USP4, the CTs Series amplifiers or visit www.crownaudio.com, and the many ways that Crown and HiQnet can make your sound reinforcement systems more reliable and flexible.