Brief Functional Description
FCC ID: V2W3644

Theory of Operation

The Sage Digital ENDEC monitors audio on six unbalanced input ports, looking for EAS data tones or the two-tone attention signal. When the EAS data tones are received, the ENDEC checks for proper syntax, then a match of at least two headers, then checks against the most recent 10 alerts sent or received for duplicates. Finally, it checks against user settable "filters" that control what is done with the incoming alert. Actions include log only, hold then delete, hold then relay, and immediate relay. The ENDEC will record up to two minutes of audio for each active alert in its internal FLASH memory. The user can assign a priority to each filter, high priority alerts replace lower priority alerts in FLASH audio memory. The EAN message always has the highest priority, and the audio storage is used as a two minute ring buffer so that the length of an EAN message is unlimited. Internally, the ENDEC can store much more than two minutes, but to simplify operations for typical users, the ENDEC makes only the most recently received alert by priority available for relay.

When receiving an alert, the ENDEC restarts its internal audio recorder at the end of the two tone alert signal or at the end of the NWS 1050 Hz attention signal so that these signals are not included as part of the two minute limit, and then are not rebroadcast when the alert is relayed.

An alert can also be originated from the front panel, or with optional hardware or software remote controls. In the case of the required weekly test, only the headers and end of message data is required. For alerts that do require audio, it can be supplied via the "encoder in" connector on the back of the ENDEC, or the microphone input connector on the front of the ENDEC.

Major Block Descriptions

Refer to the "Block Diagram" exhibit.

Power supply. The input voltage of 19v is supplied from an external switching power supply.

Microprocessor Board. All of the user interface functions and overall control of the ENDEC are performed by this board. It has a direct connection to USB, LAN, and two serial ports, as well as the 4x20 character LCD display. Regulated +5v is supplied to this board.

FPGA. This chip provides the glue logic between the CPU, DSP, ADC, and the codecs.

DSP. This chip receives digitized data from the codecs, making the digital audio available to the CPU for storage. It also detects the EAS data tones. It detects the EAS two tone and the NWS 1050 Hz tone. It generates all tones needed for transmission of data, and interfaces to the codecs to provide conversion of stored digital audio to analog when sending an alert.

CODECs. These three chips provide six channels of audio input and two channels of audio output, under direction of the DSP. One output channel drives the speaker/line out for local monitoring, the other output channel is switched into the program stream for alerts.

AES audio. This set of two chips allows the ENDEC to pass through digital audio and to switch in alert audio.

ADC. This chip digitizes the encoder in and the microphone in audio when sending a locally generated alert.

UARTs. An additional four uarts are provided on the main PCB for a total of six.