An Automated, Repeater S.A.M.E. Weather Alert Using a Radio Shack 12-261 Weather Radio and an NHRC-4 Two Port Controller

By Stewart Rabinowitz, KE5UT

I wanted to have my local UHF repeater re-broadcast NWS severe weather warnings when the NWS encodes S.A.M.E. signals for our county and then, after the warning voice message ends several minutes later, extinguish the repeater audio transmission without operator intervention. But how to do that?

Taking a COS signal from the warning LED of my Radio Shack 12-261 S.A.M.E. weather radio would leave the transmitter on repeating the same messages over and over because it is my impression that the NWS does not quickly transmit coding to deactivate the warning LED light. As control operator, I did not want to have to act to terminate the repeater's re-broadcast of the NWS transmission.

The repeater uses an NHRC-4 controller. The NHRC-4 has a single digital control which is already being used for PA fan control. That left audio only to somehow both key the repeater when the NWS transmits its warning coding for the county and terminate re-broadcast of the NWS warning message.

Bu how could I use *only* audio to accomplish this objective? Use a VOX circuit with the level critically set to provide a COR voltage active high when it detects audio! But that still leaves the issue of turning the audio off. I sought out the RS 12-261S.A.M.E. weather radio because it decodes the S.A.M.E. signal to squelch the radio's audio when the NWS broadcasts the close-squelch coding instead of a weather radio that broadcasts the NWS message for a fixed period of time, usually 5 minutes, and then abruptly silences itself.

I bought and built a Ramsey VOX kit for under $10.00. To gain greater hang time control, I replaced R7 with a variable 500K trim pot. I also added a 10K pot across the VOX microphone input to adjust VOX sensitivity. There is no need for an anti-VOX circuit because in this configuration there is no microphone to pick up and re-introduce audio into the VOX circuit.

As to the place to pick off the receiver audio, the RS 12-261 has digital volume control and I have no schematic for the radio. To overcome this limitation, I used speaker audio through a RS audio output transformer in reverse: An 8 ohm radio load converted to 1K controller-useable high impedance. I placed the audio output across two 10K pots in parallel: one mentioned above for the VOX sensitivity and one for audio level control into the NHRC-4 controller, effectively leaving a 5K load across each one.

Several additional touches finished off the project:

1. Because the repeater is located some distance from the nearest NWS transmitter, the RS weather radio needed an outdoor antenna to provide the best S/N ratio on receive compared to using the whip antenna on the RS radio. I used an ancient

Cushcraft AR-2 antenna just outside the shack near the single point ground, at about 5' for added signal. Now the NWS signal is full quieting.

2. The NHRC-4 has no jumper selectable way to choose de-emphasized or flat audio for either port. It is either hard wired one way or the other. When I built the controller as a kit, I chose to de-emphasize the audio on both ports. Now I needed flat audio. With a small breadboard, I built a jumper-selectable addition to the controller. Now in a matter of seconds, I can choose either one.

3. The Radio Shack 12-261 weather radio powers from 9VDC. Rather than rely on the provided wall wart, I created a 9VDC supply from a 12 VDC source using an LM7809. The 12DVC source for the LM7809 has about a 180AH battery back up. Now, if power is lost, the radio continues on beyond the capacity of the little 9V backup battery within the radio.

4. I am a great fan of using old computer power supply boxes for projects. They are mostly shielded, easy to get and work on, and have plenty of room for 8-terminal terminal strips to interconnect various repeater components. I used one for the Ramsey kit, the 9V power supply, and associated wiring, with room to grow.

The last step was to place the repeater on a service monitor to set levels. Now the NWS audio the repeater re-broadcasts and the NWS audio broadcast on 162.XXX are nearly indistinguishable in quality and are matched in level to the main port repeater audio level.

We have not had severe weather since I built this project, but I expect it will enhance Skywarn operations by providing net control with current warnings are they are broadcast without tying up any of our county wide repeaters which may also be in use during such operations.

Thanks to Gerald Marchant, WB5NZV for his assistance with this project.