Operation of the AM/FM Retrans

There is one problem with the interface between an FM radio (RT-524) and an AM radio (AN/GRC-106): How do you key an RT-524 with an audio signal?

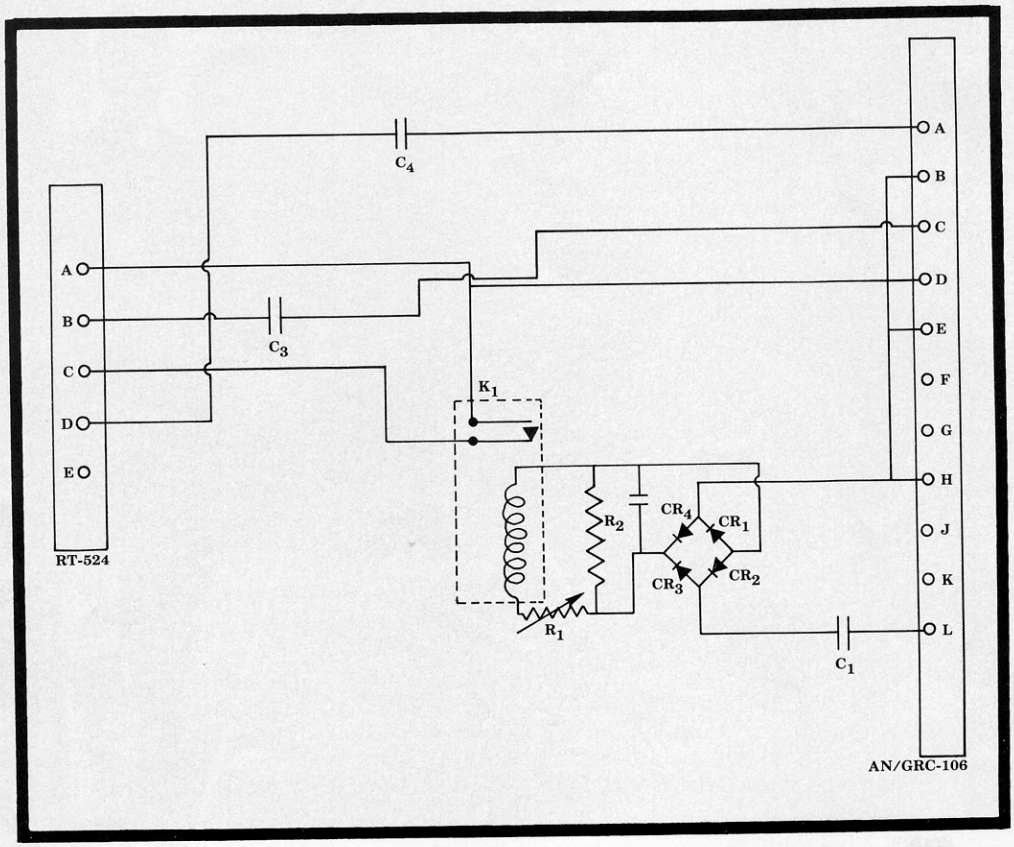
by Lt. Col. Robert B. Wiltshire and CW2 James Moore

A ground commander deployed to some remote area of the world may well need to contact a supporting or higher command up to several hundred miles away and not have access to telephone communications from his location. A solution to this problem lies in developing a way to talk from his FM command net in a secure mode over a long distance via AM radio. A method to accomplish this has been developed by the personnel of the 67th Signal Battalion Electronic Maintenance Facility.

There is one problem with the interface between an FM radio (ie, RT-524) and an AM radio (ie, AN/GRC-106) which makes the operation seem "IMPOSSIBLE." This problem is "How do you key an RT-524 with an audio signal?"

This problem can be overcome very easily if you take the audio output from the GRC-106 and feed it into a rectifier circuit. Take this output and apply it to a relay. Take the output from the relay contacts, apply them to the keyline of the RT-524 and ground. This will serve as a keyline when audio is being sent to the input of the FM radio.

There are NO interface problems going to the AN/GRC-106 since it has a built-in Voice Operated Transmit (VOX) circuit. The only other consideration that should be taken is the difference in DC potential that may exist between the output and input of both radios. All signal paths between radios require DC blocking capacitors to eliminate unwanted hum in the audio.

The circuitry for this retrans is very simple. C1, C3 and C4 serve as DC blocking capacitors. CR1-CR4 make up a full-wave bridge rectifier which provides the DC voltage for operation of relay K1. C2 and R2 work together to provide a time-constant/time-delay to prevent the relay (K1) from over reacting to noise and fading from the HF radio. R1 serves as a Threshold Control that determines what the input level will be before the FM radio is keyed. Relay (K1) serves as a keyline for the FM radio.

After using all of the complex devices in the Army inventory, none of which, this circuit was designed by CW2 James Moore and MSG Walter Brooks and built by SP4 Cowles. For further information contact them at AVN 780-2372.