

Conversion of GE S-550 Control Head from 16 Channels to 32 Channels (by Adding an A/B-Mode Switch)

by N0GSZ

The GE S-550 came in several variants, including a 16-channel non-scanning version, a 16-channel scanning version, a 32-channel non-scanning version, a 32-channel scanning version, and a fully optioned version. Since the more sophisticated versions are more desirable for amateur use, we'll assume other hams have already picked those out of the pile at the swapmeet, leaving you with only a 16-channel version. Since you will inevitably need at least 17 channels, let's explore how to convert a 16-channel version to a 32-channel version.

The 32-channel version has a mode button to the right of the LED numeric display. If your control head has that mode button, congratulations! Otherwise, read on.

The basic GE control heads (i.e., those that don't download channels/frequencies into the radio but instead simply select among channels/frequencies already programmed into the radio) signal to the radio the selected channel via five binary signal lines denoted as FB5 through FB1. The rotary channel selector switch encodes values for FB4 through FB1. That leaves FB5 to be controlled by some other mechanism. The 16-channel control heads don't do anything with FB5. The radio provides a pull-up resistor for FB5, so FB5 remains at a high logic level (i.e., approximately +5 volts) unless it is pulled low (i.e., to ground) by the control head. Since the 16-channel control heads don't pull FB5 low, FB5 always remains high with a 16-channel control head.

Inside a VHF high-band Rangr radio, there are two sockets for EEPROMs. The one selected when FB5 is high is ICS706. Next to it is ICS707, which is selected when FB5 is low. You'll need to have two EEPROMs (i.e., one for each of the two sockets) if you want the radio to be able to tune to the 32 channels of which the modified control head will be capable of selecting. Both EEPROMs are programmed the same way, as if they were each for a different 16-channel Rangr radio.

Begin by removing the mounting stand from the S-550. Remove the three white nylon connectors from the back of the control head (note that they are keyed to prevent ambiguity during reinstallation). Turn the S-550 upside down and remove the two screws located between the three control knobs. Open the case by lifting it apart and the front and hinging it open along the tabs and slots that run across the rear. As you hinge it apart, the top and bottom halves will separate. Disconnect the display board's ribbon cable from the system board, allowing the top and bottom halves of the control head to be completely separated. Remove the screws from the back of the display board to allow it to be separated from the top half of the enclosure. On the top half of the display board, look for a wire jumper soldered across the J4 position. If the wire jumper is there, desolder and remove it. Reinstall the display board on the bottom of the top enclosure half, being careful to align the buttons in the top enclosure half before tightening the screws.

Mount a SPST switch as an A/B-mode switch at a convenient location on or near the control head. Solder the leads of the SPST switch across the J4 jumper location of the display board. The closed position of the switch will select mode A, and the open position will select mode B.

Look at the control head system board in the lower half of the control head enclosure. Make sure R312, R301, C305, R362, and Q302 are missing from system board. If they are present, proceed to reassembling the control head. However, if they are missing, as they likely are, continue. Remove the scan board (or non-scan board) from the system board in the lower half of the control head enclosure. Remove the screws attaching the system board to the lower half of the control head enclosure. Remove the system board. If the brass channel selector knob limit pin is extended in the forward direction (into the back of the channel selector knob, it may be difficult to remove the system board. In that case, the brass channel selector knob limit pin may be removed or the channel selector knob may be pulled slightly forward on its shaft (or removed entirely from the shaft, if care is taken to record its orientation relative to the shaft to facilitate

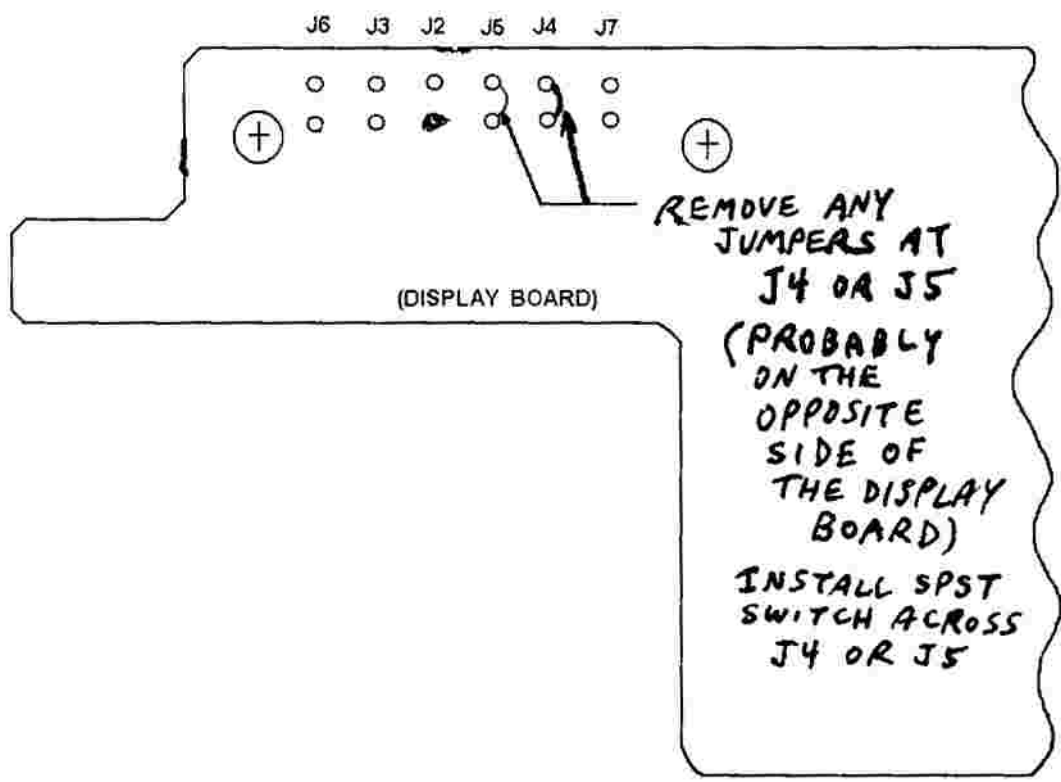
proper reinstallation). With the control head system board removed, desolder the PCB holes for R312, R301, C305, R362, and Q302 so that new components may be soldered into those holes.

Check that a jumper wire is installed between the collector and emitter (i.e., the outer two terminals) of the PCB pads for Q316 (the transistor itself should not be present). If the jumper wire is missing, install it.

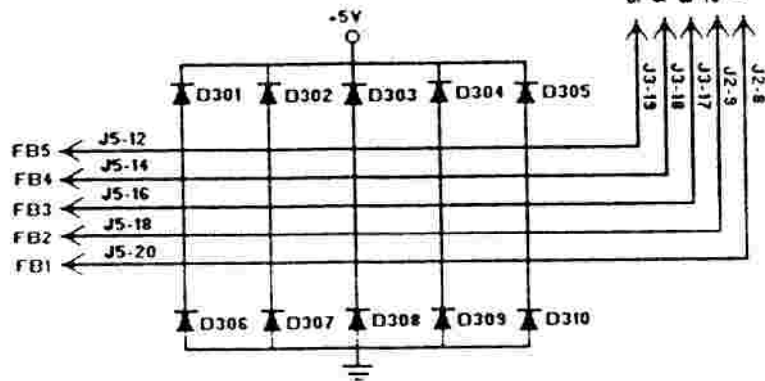
Solder a 270-ohm $\frac{1}{2}W$ resistor at the R312 pads. Solder a 2.7K $\frac{1}{4}W$ resistor at the R301 pads. Solder a 0.01uF capacitor at the C305 pads. Solder a 10K $\frac{1}{4}W$ resistor at the R362 pads. Install a NPN TO-92-packaged transistor (e.g., a 2N2222A or 2N3904) at the Q302 pads.

Reinstall the system board in the lower half of the control head enclosure, being careful if the brass pin for the channel selector stop in the back of the channel selector knob is installed in the forward position. Plug in the scan board (or non-scan board), being careful to align both rows of pins. Plug in the display board ribbon cable, being very careful to align both rows of pins. Align the tabs and slots of the upper and lower halves of the enclosure at the rear of the enclosure. Hinge the enclosure back together. Reinstall the two screws in the bottom of the enclosure between the three control knobs. Reconnect the three white nylon connectors to the back of the control head.

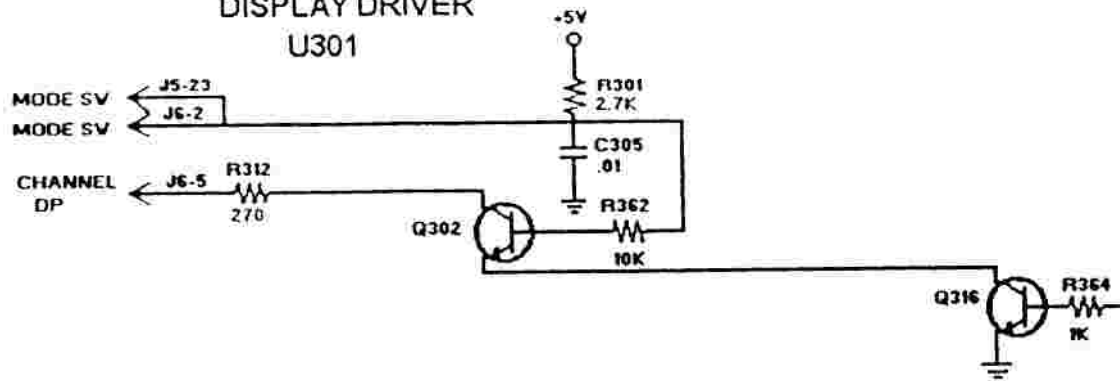
Make sure both EEPROMs are properly programmed and installed in the radio. Test the modified control head. The decimal point should indicate mode selection by being dark when mode A is selected and illuminated when mode B is selected. If the control head is equipped with a scan board, the scan board should be capable of scanning up to 16 channels selected from either or both of modes A and B. If an attempt is made to add a 17th channel to the scan list, three horizontal bars will be displayed on the scan channel LED display. Pressing any of the SCAN, ADD, or DEL buttons clears the three bars without performing a SCAN, ADD, or DEL function.

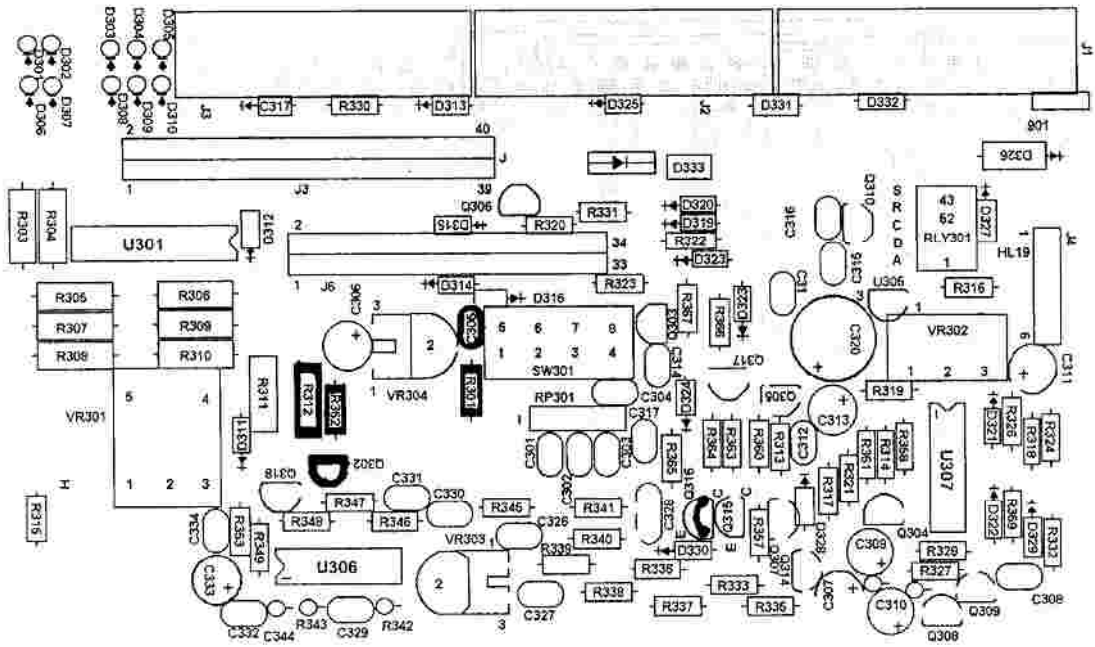


RADIO FREQUENCY CONTROL



DISPLAY DRIVER U301





(RC-7564)
 (19A704936, Sh. 1, Rev. H)
 (19A704936, Sh. 2, Rev. H)