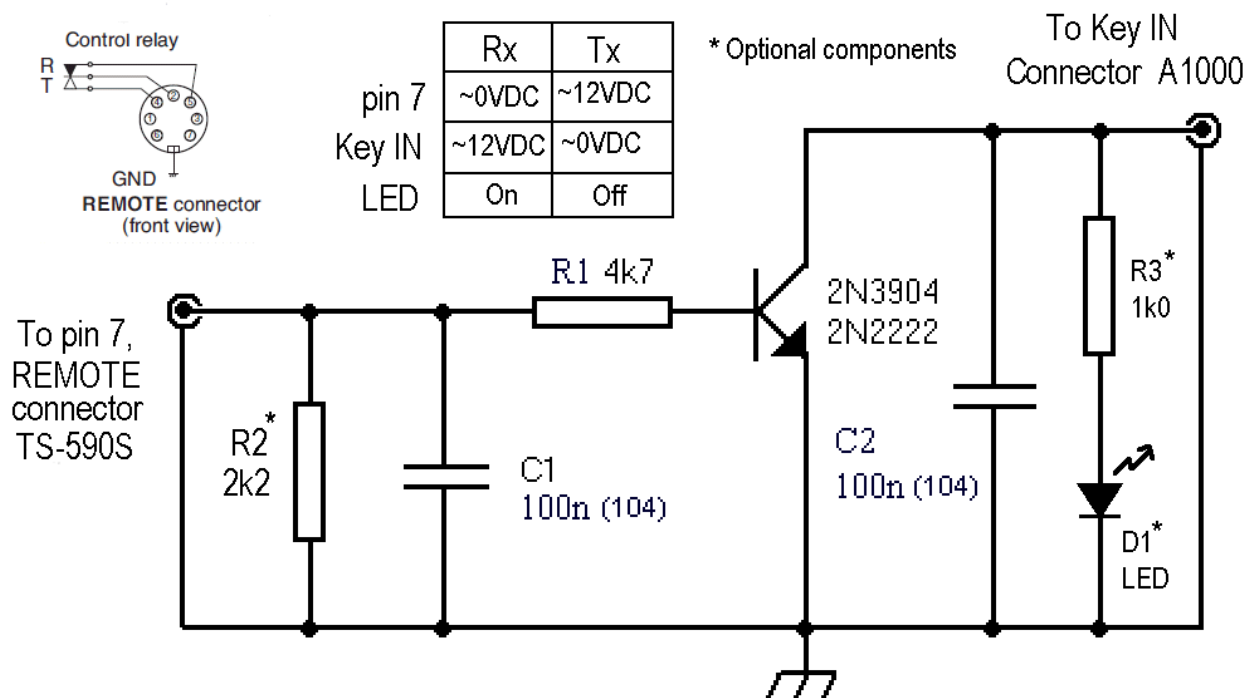


A simple interface for the Kenwood TS-590S & Acom A1000 amplifier by Paul Evans, W4/VP9KF.

There seem to have been repeated requests for an amplifier interface on the TS-590S, Hamlogger (Logger32), N1MM+ Groups, etc. online. Strangely, most of these have ended up with a drift towards using the clunky relay in the TS-590S, rather than using the 'High when keyed' (pin 7) output on the Remote connector. THIS INTERFACE **MAY NOT BE NEEDED FOR THE TS-590SG** (pin 7 can be active high or pulling low). Refer to p55 of TS-590SG manual and menu options 59 (HF) and 60 (50MHz). IF IN DOUBT about the current required by your amplifier circuit, USE THIS INTERFACE.



With the decoupling capacitors shown it performs well next to high RF fields. **Do not omit them or falsing or RF feedback will occur.** *R2 is optional & may be needed if your rig lets pin 7 float a little high on receive, or if you use a higher gain transistor than the 2N3904 (or if you have a ground/hum problem). The symptom is that the A1000 will not go back to full receive. **R2 was not required in my interface.** R3 & D1 are optional to show status of amplifier keying, mine doesn't key with 1k0 load.

The parts really are non-critical. A tiny square of vector board (or Vero board) is all that's needed to make this circuit, or you can build it inside the 7 pin DIN connector shell itself. Any small NPN transistor such as the [2N3904](#) (capable of switching 60V at 200mA) may be used. No power is required as it is used as an open collector pull-down for the A1000 switching line.

It can be built into a small box with female phono connectors. Cables can then be <7 pin DIN to phono male> and <phono male to phono male>. These cables should be screened (shielded) to keep RF out.

USA translation: Phono = 'RCA connector'

On the 'Remote' connector the center wire is connected to pin 7 and **ground is picked up by soldering to the metal connector shell.** Use a good ground between each part of your station.

Setting up the TS-590S: Press MENU and turn the Multi knob until you reach 53 for HF or 54 for 50MHz. Use M.IN and SCAN to change the selection to '1' (pin 7 enabled, relay not).

Note the current limits in the references below. These are for tiny SMT devices; Q19 [SSM3K15AMFV](#) & R40 in the TS-590SG. The TS-590S uses a more substantial PNP device, Q17 (not SMT) [2SB1188Q](#). Build the interface to prevent internal damage to the rig, if you are in *any* doubt.

TS-590S Reference

LINEAR AMPLIFIER CONTROL

When you connect an external HF or 50 MHz linear amplifier to the transceiver using the **REMOTE** connector, select "1", "2", or "3" to activate the internal relay and/or DC output (12 V) so you can interface with the HF/ 50 MHz linear amplifier. The DC output (12 V) works without any annoying chattering sounds ("1") but the output current is limited to 10 mA. If your linear amplifier control circuit draws more than DC 12 V/ 10 mA, use relay switching ("2" or "3") instead.

Also, some linear amplifiers require a long transmission delay time because of the slow antenna relay switching time. In this case, select "3" for slow switching (25 ms delay).

- 1 Press **[MENU]**, then press **[Q-M.IN]/ [Q-MR]** or turn the **MULT/CH** control to select Menu No. 53 (HF) or 54 (50 MHz).
- 2 Press **[M.IN]/ [SCAN (SG.SEL)]** to select "oFF", "1", "2", or "3".
- 3 Press **[MENU]** to exit Menu mode.

Parameter	Linear Amp. Control	
oFF	All controls	Disabled
1	DC output (12 V)	Enabled
	Relay	Disabled
	TX delay	10 ms
2	DC output (12 V)	Enabled
	Relay	Enabled
	TX delay	10 ms
3	DC output (12 V)	Enabled
	Relay	Enabled
	TX delay	25 ms

Note: If CW Full Break-in is enabled, 10 ms transmission delay is applied regardless of the settings in Menu Nos. 53 and 54.

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TS590SG Reference

LINEAR AMPLIFIER CONTROL

To connect the linear amplifier to the **REMOTE** connector on the rear panel and to operate in the HF or 50 MHz band, you can configure to enable or disable the control signal state and the transmission delay time.

- 1 Press **[MENU]**, then press **[Q-M.IN]/ [Q-MR]** or turn the **MULT/CH** control to select Menu No. 59 (HF) or 60 (50 MHz).
- 2 Press **[M.IN]/ [SCAN (SG.SEL)]** to select "oFF", "1", "2", "3", "4", or "5".
- 3 Press **[MENU]** to exit Menu mode.

Setting	RL Terminal Operation *1	Relay Operation *2	Delay *3
oFF	-	-	-
1	While TX: 12 V	OFF	OFF
2	While TX: 12 V	ON	OFF
3	While TX: 12 V	ON	ON
4	While TX: Short to GND	OFF	OFF
5	While TX: Short to GND	OFF	ON

*1: Semiconductor Switch output. When transmitting, set it to either perform a voltage output or a short circuit to GND. It is possible to perform the operation quietly, without activating the relay. As a guide, a current of 10 mA or lower can be controlled. In order to protect the internal circuit, a resistance of 100 Ω is inserted in series and the voltage is shifted according to the flow of the electric current. For example, when an electric current of 10 mA flows, the voltage decreases (when set as 1/2/3) or increases (when set as 4/5) by 1 V. Use a range that does not cause any problems with your equipment.

*2: Mechanical Relay Operation. You can switch the signal of the high voltage like a vacuum tube linear amplifier. It is possible to control the terminal voltage of TL-922 (approximately -140 V).

*3: This function extends the time from when the transmission starts to when the signal is sent (normally approximately 10 ms), and from when the transmission ends to when audio output starts to be received (normally approximately 25 ms). When using a linear amplifier or other device that takes a relatively long time to switch between receiving and transmitting, or transmitting and receiving, such as the TL-922, you can prevent problems such as noise or malfunctions.
 Delay Time:
 CW/FSK: approx. 25 ms
 SSB/AM/FM: approx. 45 ms

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Please note: This circuit is open-hardware. Do not change these notes or remove reference to the design source. You may link to it, but do not copy to other servers or group files.