

The HAL ST-6 RTTY Demodulator

Another item of RTTY equipment offered by HAL Communications is the ST-6 demodulator. The ST-6 accepts frequency-shifted audio tones from the station receiver and converts the information into the dc pulses required to operate the teleprinter (or the RVD-1002 video display). A power supply is built into the ST-6 to provide the 60 mA loop current that is required in most TTY loops.

Basically the HAL ST-6 is the deluxe solid-state RTTY demodulator which was designed by Irv Hoff, W6FFC, and which has been described in *Ham Radio*.² A couple of other options have been included which make the HAL version of the ST-6 a truly flexible instrument. In addition to offering switch selection for copying either 850- or 170-Hz shift as Hoff did, HAL has also incorporated a third discriminator designed for copying 425-Hz shift. Although most amateur RTTY operation takes place with shifts of (or close to) either 170 or 850 Hz, there are many stations to be heard outside the amateur bands using 425-Hz shift. Thus, for the cost of a few extra parts, HAL is able to offer the ST-6 at an attractive price to commercial users.

Also available for inclusion in the HAL ST-6 is Hoff's AK-1 afsk oscillator. Information on the AK-1 has also been published.³ Operating with an input from the loop-current portion of the ST-6, the AK-1 section provides amateur-standard audio tones, 2125 Hz for mark, and either 2295 or 2975 Hz for space, depending on whether the shift-selector switch is set for 170 or 850 Hz. (With the switch set at 425 Hz, a steady mark tone only is emitted.) The afsk output may be keyed with an

² Hoff, "The Mainline ST-6 RTTY Demodulator," *Ham Radio*, January 1971, p. 6, and "Troubleshooting the ST-6 RTTY Demodulator," *Ham Radio*, February 1971, p. 50.

³ Hoff, "A.F.S.K. for RTTY," *QST* for February 1969, p. 11.



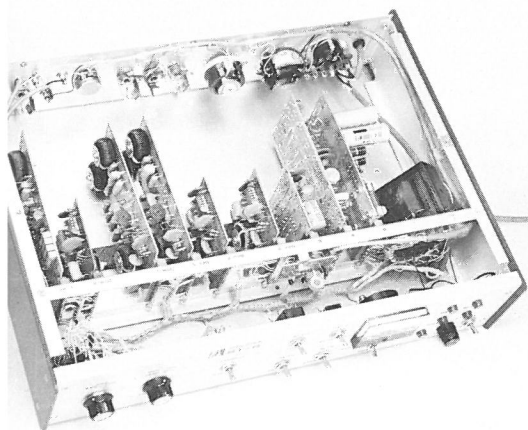
external keyboard connected into the loop, and it is also keyed by a signal being received.

Hoff's afsk circuit was designed with the primary objective being to provide harmonic-free tones with no switching transients in the mark-space transition. The output of the AK-1 section is "clean," and may be fed directly into the microphone input of a vhf a-m or fm transmitter for A2 or F2 RTTY operation in those bands. A number of users of the AK-1 circuit are feeding the tones into the microphone jack of an hf ssb transmitter to obtain frequency-shift keying. This method does provide a satisfactory means of obtaining F1 operation with properly designed and constructed ssb equipment which is correctly adjusted, but there are a few precautions to be observed. Hoff discusses these precautions in some detail.⁴ The user should make certain that carrier and unwanted sideband suppression of his ssb rig are not present to the degree of causing interference in receiving equipment of good engineering design. Too, he should make certain that the rig can withstand the higher-than-average power from that handled with ssb, concerning both the PA tubes and the final plate-supply transformer. In general when using ssb equipment for RTTY operation, the dc input power to the final stage should be no more than twice the plate-dissipation rating of the PA tubes.

Other features of the ST-6 include a normal-reverse switch for ease in copying those stations which transmit "upside down" from amateur convention, autostart, (including motor control), and antispaces circuits. A front panel meter provides a tuning indication, and at the flip of a switch indicates the amount of current flowing in the loop. Another switch offers selection of an efficient limiter circuit, or limiterless (sometimes called two-tone) operation. In limiterless operation, a special threshold corrector circuit is

⁴ See footnote 3.

A peek inside the ST-6 shows that all active components are mounted on nine circuit boards, each with its own edge connector and mating socket. From left to right the boards contain parts for the AK-1 audio oscillator, 850-Hz discriminator, 850-Hz input bandpass filter, 170-Hz bandpass filter, 170-Hz discriminator, 425-Hz discriminator, slicer and loop keyer, antispaces and autostart, and power supplies.



employed in connection with the discriminator circuit. This circuit also enables copy to be made from mark-only or space-only signals.

The ST-6 is available from HAL either wired, adjusted, and tested, or as a package of parts. Although a rather comprehensive instruction booklet is included with the parts package, HAL cautions that this is not a kit in the sense that detailed assembly instructions are provided. Instead, the kit is offered to provide the experienced RTTY enthusiast with a package of quality parts at a reasonable price.

A proliferous amount of information has been published on both the ST-6 and the AK-1 circuits, and even portions of that information need not be repeated here. Suffice it to say that the ST-6 is probably one of the best RTTY demodulators ever devised. When used as a companion unit with the RVD-1002 video display and the RKB-1 keyboard described earlier, an attractive and compact system results, providing the amateur with everything he needs to add RTTY capability to his existing

station. And the flexibility of that system really becomes apparent when one tunes to frequencies *outside* the amateur bands. With manipulation of the normal-reverse switch and the 170/425/850-Hz shift switch on the ST-6 demodulator, and of the 60/66/75/100-wpm push switches on the RVD-1002 video display unit, intelligible copy can be had from just about any RTTY signal one tunes. — K1PLP

ST-6 RTTY Demodulator

Dimensions (HWD) and Weight: 3-3/4 × 17
× 13-1/4 inches, 12 pounds.
Power requirements: 120 V ac.
Colors: Two-tone gray.

Manufacturer: HAL Communications Corp.,
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