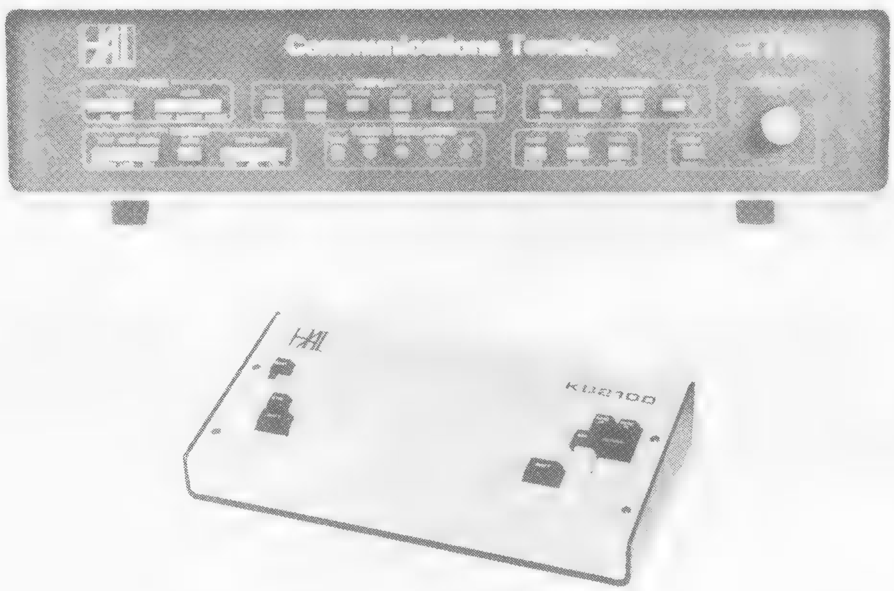
EQUIPMENT REVIEW

Reviewed by, Bruce Bathols, VK3UV
From an operators point of view only

HAL CT2100 COMMUNICATIONS TERMINAL AND HAL KB2100 KEYBOARD

One of the latest pieces of equipment to pass across my bench was the HAL CT2100 Communications terminal and the HAL KB2100 matching keyboard.

Here are some of the specifications as taken from the leaflet accompanying the terminal.



- Send or receive ASCII, Baudot, or Morse code
- RTTY and Morse demodulators are built-in
- RTTY speeds of 45, 50, 74, 100, 110, 300, 600 and 1200 baud — ASCII or Baudot
- Four RTTY Modems: "high tones", "low tones", "103 Modem tones", and "202 Modem tones"
- Three shifts for high and low tones (170, 425 and 850 Hz)
- Crystal-synthesized transmit tones
- Send and receive Morse code at 1 to 100 WPM
- Characters displayed on 24 line screen
- Choose either 36 or 72 characters per line
- 2 pages of 72 character lines or 4 pages of 36 character lines
- Split-screen for pre-typing transmit text
- Audio, current loop, or RS 232 data 1/0
- Printers available for hard-copy of all 3 codes
- On-screen RTTY tuning bar plus LED indicators
- ALL ASCII control characters; half or full duplex
- Brag-tape storage of 8-256 character messages in MSG2100 EPROM option
- Two programmable HERE IS messages

The station transceiver used for testing was the ICOM IC72OA for HF, and the Icom IC290A for VHF. All tests were conducted using AFSK only, although it would have been a simple matter to wire up the FSK facility on the IC72OA. Only the RTTY 45 Baudot and CW functions were tested, however other Baudot speeds and ASCII codes are an integral part of the terminal (see specs).

RTTY REPORT

Having had some previous experience with RTTY computer terminals, it did not take long to interface the HAL terminal to the HF transceiver. As one would expect, the terminal is no toy and care must be taken to ensure the correct connections are made.

A very comprehensive instruction manual gives explicit detail on the unit's operation and capabilities.

To the newcomer to this type of equipment, there is a special section in the manual for those that cannot wait to read the manual fully, and gives basic instructions for hooking up the terminal to receive signals in the interim.

After satisfying oneself that all appears to be in order initially, it is then strongly recommended that you sit down quietly for an hour or so and read the operations manual thoroughly. It is a bit like the old adage "If all else fails, read the instructions first". So HAL have included the initial testing chapter for the impatient. Full marks to HAL for that facility.

After becoming fully accustomed with the terminal, and also soldering up the various connectors (supplied) required for the audio and switching functions, I started looking for weak RTTY signals on 20 metres. The terminal performed admirably and printed up 100 per cent copy from signals which were barely audible to the ear.

The built in tuning indicators were particularly sharp, and in conjuction with the passband tuning system of the transceiver, excellent rejection of adjacent interfering signals was made.

Signals well into the noise floor were printed perfectly and no copy was lost.

Hooking up an old Model 15 Teletype and loop supply to the loop keyer on the rear of the terminal, gave a hard copy of what was displayed on the screen. On transmit, the separate keyboard was most simple to use. The keyboard itself is lightweight and connected to the terminal by a length of 'curly' cord. This enabled operation in comfort with the keyboard resting on my knees. I could have placed the keyboard on the operating desk or any other convenient location.

As a fair majority of RTTY operators are two finger typists, the built in buffers of the terminal retained each word in memory until the space bar was activated. That means it does not matter what speed you are able to type at, the terminal would send each completed word at a preset rate, then wait for you to make up another word until the space bar was hit again. In the intervening periods, the terminal sent the 'letters' code. This facility makes a 'hunt and peck' typist look like a 60 WPM expert secretary.

Wrap around half screen facilities are included and enable the operator to commence typing a reply into the buffer memory while still receiving the other station. If a quick break was needed in response to a query while typing up the next reply, the buffer could be by-passed at the push of a button, the special query replied to, then back to receiving and typing up the buffer again without disturbing the contents of the original buffer.

With such ease of operation and ability to receive RTTY signals under all conditions, I was able to spend many hours on this mode without feeling frustrated or tired.

To gain any satisfaction from RTTY you must possess a very stable receiver, as the passband in the RTTY terminal is very narrow, and a few hertz off the operating frequency will result in garbled or nil copy.

CW TESTS

All of the functions applicable to the RTTY mode, is also applicable to the CW mode, so my comments here will be restricted to basic impressions only. After making the appropriate connections to the transceiver, I embarked on an expedition into the 40-50 WPM CW world.

I felt I was cheating myself as I normally have a little difficulty running 20 WPM CW on a hand key or electronic keyer. Tuning into a CQ call running 40 WPM on 20 metres, being able to read on screen every letter, and then reply at the same speed was an unusual feeling. However, the other operator was also using a 'computer' generated CW signal.

Coming back to reality for a while, and to the hand sent code showed up the usual faults with computers and CW reception. I have never been a great advocate for computers and CW reception, and unless the CW is sent with the correct spacing, errors in reading on the screen will occur. However, the HAL terminal has built in provision for varying weight factors and automatic speed adjustment, and lessens the error rate on hand received morse considerably. There were no problems on the terminal's CW transmit mode.

GENERAL

One item not included in this otherwise top line communications terminal was a TV modulator. The video output is designed to feed a direct monitor only and for use with a portable TV set as is the case with many other computerised RTTY/CW terminals, necessitates the extra purchase of that item. Never-the-less, my tests were conducted with BOTH a normal monitor and a modulated TV set on channel 1. The display on the monitor was far superior in clarity to a TV set using the special modulator.

CONCLUSION

One would be hard pressed to find any fault with the HAL terminal and keyboard. Although not the cheapest unit on the market, the extra facilities it provides is more than justified. The test units were supplied by EMTRONICS, 649 George Street, Sydney NSW 2000, telephone (02) 211 0531, to whom enquiries regarding price and delivery should be made. **AR**

The 22 S . . . A Common Fault

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From "Gateway" February 1982

The 22S is a very popular 2 metre transceiver, hundreds of them are used in Melbourne alone, their frequency control uses a diode matrix system to select a channel in a 25 kHz increment.

The printed circuit board is very susceptible to intermittent faults which produces an "out of lock" condition, these faults are annoying but can be repaired in time.

This article is not about the "out of lock" fault, but of a secondary fault that may arise from this condition . . . the frying of the voltage regulator.

The circuit Fig. 1 is of a voltage regulator that supplies half of the set with power, RF oscillators, mic. pre-amp stages and the PLL board.

The circuit is duplicated in Fig. 2 in a simplified form. It shows a typical zener reference assigning 9.6 volts to the base of a series regulating transistor via a diode. The transistor has full supply voltage (13.8 typ.) applied to the collector via a 15 ohm ¼W resistor and thus 9 volts regulated appears at the emitter.

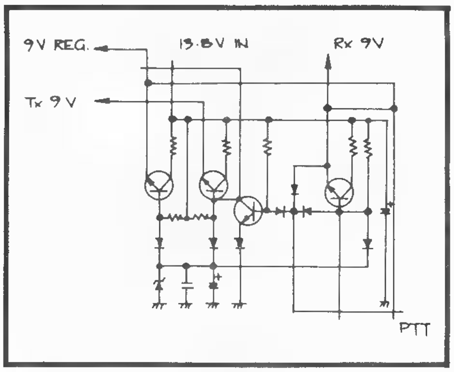

FIG. 1

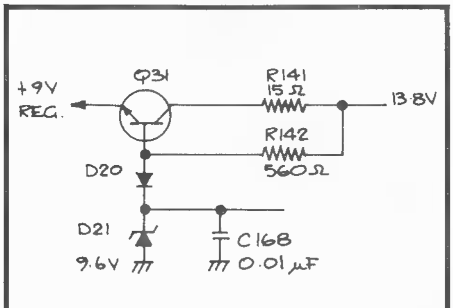

FIG. 2

Under normal operating conditions 86 milliamps is drawn through the regulator, there is an input-output voltage difference of approximately 4.8 volts, minus the 0.6 volt drop across Q31. There remains 4.2 volts across R141. The resistor therefore dissipates 360 milliwatts.

This means that the resistor in circuit is underrated and has on many occasions burnt out, though usually it just gets very hot. If the set goes out of lock either through a fault condition or if a channel position has been selected,, that is vacant of diodes, the idle current shall rise from 86 to 100 milliamps. The extra current will in a very short interval cook the resistor, which shall rise in resistance and simulate many other faults, particularly in the phase-locked loop board by providing less than 9 volts.

This effect may occur more frequently to those who use an "external programmer" comprising eight switches as, through usage, they tend to fall out of lock more frequently.

It is therefore suggested that, whenever routine maintenance to the 22S is being done, that this resistor, R141, be replaced with a ½W version of the same value. It's only a little modification but it could save some major headaches. **AR**