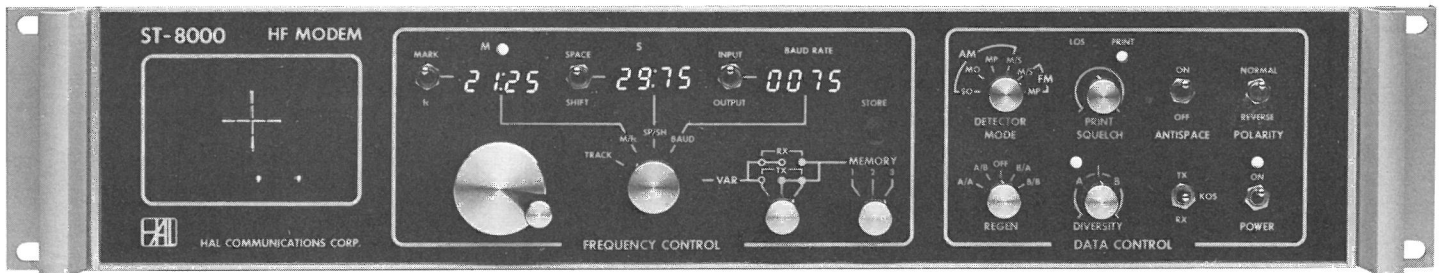




HAL COMMUNICATIONS CORP.
Government & Commercial Products Division
1201 West Kenyon Road
Post Office Box 365
Urbana, Illinois 61801-0365
Phone: (217) 367-7373 TWX: 910-245-0784

ST-8000 HF MODEM



The HAL ST-8000 HF Modem is a high-performance, fully adjustable modulator/demodulator for use in high frequency radio data systems. The HF Modem offers no-compromise performance to assure optimum RTTY and CW operation under all signal conditions. The user-friendly front panel controls eliminate long training periods for new station operators; operation is simple without sacrificing flexibility or performance.

The ST-8000 audio tone frequencies are fully tunable between 400 and 4000 Hz for FSK (Frequency Shift Keyed) or OOK (On-Off Keyed) applications. Receive filter and transmit tone frequencies are synthesized from a quartz oscillator under microprocessor control, assuring high stability and 1.0 Hz resolution. All tuning adjustments are easily made with front panel controls or by remote control. The operator may set either Mark and Space frequencies or Center and Shift frequencies when tuning. When the baud rate is set (10-1200 baud), the micro-processor computes and sets optimum bandwidths for the Input, Mark, Space and Low-Pass filters. Eight programmable non-volatile memories are available for retention of commonly used receive and transmit parameters. The memory controls also allow split-frequency operation, using different receive and transmit tone frequencies.

Either hard-limiting FM or AGC-controlled AM signal processing may be used, providing a very wide dynamic range in either mode. The user has a choice of four data detection modes: Mark/Space (M/S), Digital Multipath Correction (MP), Mark Only (MO), or Space Only (SO). All FSK and OOK teleprinter codes and Morse code (CW) may be demodulated by the ST-8000. Digital regeneration and code/speed conversion capability is

included for serial asynchronous ASCII and Baudot codes at data rates from 45 to 1200 baud.

Front panel adjustable Print Squelch permits tailoring of the signal/no-signal threshold to your receiving system and conditions. LOS (Loss Of Signal) and PRINT indicators show squelch status. The exclusive HAL Infinite Resolution Diversity control provides a positive selection of diversity channel, based upon channel signal strength. The operator has front panel control of antispace and transmit/receive Mark/Space polarity. The transmitter PTT (Push-To-Talk) control line may be controlled manually, by the ST-8000 internal KOS (Keyboard Operated Switch), or by external control signals from the data terminal.

The tuning indicator is a 1.5" x 2.0" CRT that shows both the standard crossed-ellipse Mark-Space pattern and the exclusive HAL Spectra-Tune audio frequency spectrum display. The ST-8000 may be operated from 100-130 or 200-250VAC power lines at 44-440 Hz. The 3.5" high by 12" deep cabinet mounts in a standard 19" rack. Careful attention has been given to RFI shielding and filtering to assure reliable radio system performance.

ST-8000 HF MODEM

SPECIFICATIONS

INPUT DATA:

Data Rate: 10 to 1200 baud
Frequency: 400-4000 Hz
Impedance: 8 or 600 ohms, bal. or unbal; 5K ohms, unbalanced.
Dynamic Range: -65 to +10 dBm (580 uV to 2.5 V)

SIGNAL PROCESSING:

Mode: Hard-limiting FM (-54-dBm threshold)
AGC controlled AM (-65 dBm threshold)
Input Filters: 4 filters: 6-pole $\frac{1}{3}$, $\frac{1}{2}$, 1 Octave tunable, tracked to center frequency of selected Mark and Space tones; 400-4000 Hz fix-tuned.
Tone Filters: Matched 4-pole tunable filters, set to selected Mark and Space frequencies from 400-4000 Hz in 1 Hz increments. M/S filter bandwidths set in 32 steps, automatically tracked with Baud and Shift selected.

DATA PROCESSING:

Detectors: Matched full-wave active detectors. Outputs for Mark Only, Space Only, M/S differential, or Digital Multi-Path Correction
LP Filters: Matched separate Mark and Space 7-pole linear phase tunable low-pass filters. Cut-off frequencies set by Input Baud rate control.
Antispace: Prevents "open loop" on interference.
Print Squelch: Adjustable Print Squelch threshold. Returns to mark hold with Loss of Signal (LOS).
Diversity: Exclusive HAL Infinite Resolution Diversity Control.
Regeneration: Dual digital UART regenerator for ASCII or Baudot data; also provides code and speed conversion (45-1200 bd).
Clock
Recovery: Recovered receive data clock output.

TUNING FEATURES:

Control: Frequencies derived from quartz crystal synthesizers. Set Mark, Space, Shift, and Center frequencies, Input or Output Baud in 1 Hz or 1 Baud increments.
Modes: BAUD — set Input or Output Baud rate
SP/SH — set Space or Shift frequency
MARK/Fo — set Mark or Center frequency
TRACK — maintain Shift and set Mark, Space, and Fo frequencies.
Memories: Eight — non-volatile and programmable. Each memory stores Mark, Space, Fo, Shift, Input Filter, M/S Bandwidth, LP Filter Frequency, Input Baud, Output Baud, and M/S AFSK transmit frequencies.
Memory Modes: TX/RX variable, RX variable/TX memory, TX/RX memory.
Remote Control: Separate terminal port for control of all demodulator parameters. (Serial ASCII; 300-9600 Baud)

TRANSMIT FEATURES:

AFSK Tones: 400 to 4000 Hz increments. Track receiver tones or fixed by memory selection.
AFSK Level: -40 to +10 dBm (rear panel control)
Impedance: 8 or 600 ohms, bal. or unbalanced; transformer coupled or DC isolated output.
PTT Control: Relay closure to ground; internal KOS, terminal KOS control, RS232 RTS signal, or manual front panel control; $\pm 50V$, 0.5 A max.
FSK Output: Logic voltage to drive direct FSK input on transmitter. Polarity and voltage level selectable. (open collector, +5V or +8V for Mark or Space).

DISPLAYS:

Tuning: 1.50 x 2.00 inch rectangular CRT; crossed-ellipse Mark/Space and Exclusive HAL Spectra-Tune 500-3500 Hz spectra display of received signals; CRT beam turned off on LOS (Loss of Signal).
Frequency: Three 4-digit displays show Mark or Fo, Space or Shift, and Input or Output Baud.
LED: Mark, Space, LOS, Print On, A or B Diversity, TX on, and Power on.

INPUT/OUTPUT CONNECTIONS:

TERMINAL DATA: Shielded DB-25S socket.
RS 232C: TXD, RXD, RTS, CTS, CD, DSR, recovered RXC
MIL-188C: TXD, RXD
TTL: TXD, RXD
Misc: Terminal KOS, Motor Control, FSK Output
DIVERSITY: Shielded DE-9S socket to connect second ST-8000 in two-channel diversity system.
REMOTE CONTROL: Shielded DB-25S socket for serial remote control of all front panel parameters.
RECEIVE AUDIO: Stereo $\frac{1}{4}$ " phone jack for audio input.
TRANSMITTER: 4-pin shielded mic. connector; transmit audio and PTT or transmit FSK and PTT.
POWER: IEC AC power connector; shielded and filtered.

PHYSICAL DATA:

Cabinet Finish: Natural aluminum with irridite finish; black vinyl front panel.
Cabinet Style: 19" rack mounting standard, table-top option with tilt-bail included.
Size: 3.50 H x 12 D x 19 W (rack mtg) (8.9 x 30.5 x 48.3 cm)
4.125 H x 12 D x 17 W (table case) (10.5 x 30.5 x 43.2 cm)
Weight: 15 lbs (6.8 kg) net, 20 lbs (9.1 kg) shipping.
Power: 100-120 or 200-240 VAC, 44-440 Hz; 36 Watts.
Power Line Protection: Fused with type 3AG, 1.0 A SB Fuse; Type 1EF2 RFI/EMI Filter (22 dB at 0.15 MHz, 49 dB at 30 MHz).

VERSIONS AND OPTIONS:

ST-8000	Standard rack-mounting HF Modem
ST-8000/DC	HF Modem with 13.8VDC power input
LP-1200	Dual Current-Loop Power Supply

Specifications subject to change without notice.
Infinite Diversity Control, Spectra-Tune, and Digital Multi-path Correction are trademarks of HAL Communications; patents pending.



HAL COMMUNICATIONS CORP.
Government & Commercial Products Division
1201 West Kenyon Road
Post Office Box 365
Urbana, Illinois 61801-0365
Phone: (217) 367-7373 TWX: 910-245-0784