

## MODEL 241 PORTABLE SPLIT-BEAM SYSTEM



The *Model 241 Portable Split-Beam System* is a portable version of the *Model 243 Digital Split-Beam System*. Designed specifically for fisheries and plankton evaluations, the *Model 241 System* provides most of the primary functions of the *Model 243 System* in a lighter, more compact, less costly package using less power.

Combining powerful digital signal processing hardware with a MS *Windows*-based user interface, the *Model 241 System* produces results in real time, with several data display and storage options. With the addition of *Model 540 Split-Beam Transducer(s)* and a laptop computer, the *Model 241 System* is the most advanced, reasonably priced portable hydroacoustic system available for fisheries and plankton evaluations.

### A Brief Overview:

- High resolution data output, with up to 1400 range (e.g., depth) strata each as narrow as 10 cm, and pulse widths as short as 0.1 msec, and data summarized up to every 6 sec.
- Simultaneous real-time echo integration, target strength (convertible to fish length), three-dimensional target tracking (with TS calculation per tracked fish), and echo counting, in addition to direction of fish movement and fish velocity.
- *FM Slide/Chirp* signals providing up to a 15 dB gain in signal-to-noise ratio.
- Records the raw, unthresholded split-beam signal (all four quadrants' channels, sync, and sum-beam signal).
- Via a modem, the *Model 241 System* can be operated remotely from virtually anywhere in the world with reliable telephone and/or fiber optic communication. This has proven invaluable for remotely operating a client's system from HTI's offices for software upgrades, downloading data, and addressing quality control issues.

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## MODEL 241 PORTABLE SPLIT-BEAM SYSTEM

<b>Power Supply:</b>	Nominal 12 VDC standard (100, 120, 220, and 240 VAC convertors optional).
<b>Dimensions:</b>	432 mm length x 254 mm width x 109 mm height (17 x 10 x 4.3 inches) without PC or transducer.
<b>Weight:</b>	9 kg (20 lb) for 12 VDC version, without PC or transducer.
<b>Operating Frequency:</b>	Single frequency: 120 kHz, 200 kHz, or 420 kHz.
<b>Operating Temperature:</b>	0-50°C (32-122°F).
<b>Power Consumption:</b>	30 watts without PC or printer.
<b>Transmit Power:</b>	100 watts standard.
<b>Dynamic Range:</b>	Total dynamic range is 130 dB in 10 kHz bandwidth.
<b>Chirp/FM Slide Option:</b>	Increases non-reverberant signal-to-noise ratio by up to 15 dB (PW = 1.25 msec).
<b>Transmit Level:</b>	Output power is adjustable in four 6 dB steps over a 18 dBw range (+2, +8, +14, +20 dBw).
<b>Receiver Gain:</b>	Overall receiver gain is adjustable in five 6 dB steps over a 24 dB range (-12, -6, 0, +6, +12 dB).
<b>Time Varied Gain:</b>	Simultaneous 20 log R + 2 $\alpha$ R and 40 log R + 2 $\alpha$ R TVG. Spreading loss and alpha programmable to nearest 0.1 dB. Nominal TVG range is 108 dB; total TVG range is 120 dB. TVG start/end is selectable in 1 m steps from 1-200 m. Crossover of 20/40 log R TVG curves is selectable from 1-200 m.
<b>Receiver Blanking:</b>	Start and stop range blanking is selectable in 1 m steps.
<b>Pulse Width:</b>	Selectable from 0.1 msec to 1 msec in 0.01 msec steps. Receiver bandwidth is automatically adjusted to optimize system performance for the selected pulse width.
<b>System Synchronization:</b>	External or internal trigger. Sync output and trigger input provided.
<b>Bottom Tracking:</b>	Fixed, manual, and automatic bottom tracking modes.
<b>Ping Rates:</b>	Internal trigger rate 0.5-40 pings/sec.
<b>Signal Outputs:</b>	Detected outputs maximum calibrated output of 2.5 volts peak. Suitable for display on oscilloscopes or chart recorders. Undetected outputs maximum calibrated sine wave output of 5 volts peak-to-peak main beam, 5 volts peak-to-peak formed beams (at center frequency of 12 kHz), suitable for use with data recorders. Processed strata/bottom/echo monitor w/selected echo indicators, for oscilloscope. Two signal outputs can be user-designated from any of the following: 20 log R and 40 log R detected out (composite beam) Undetected composite beam, as well as undetected up, down, left, or right beam
<b>Real Time Data Displays:</b>	Echogram, echoscope, and several others, including System Status: Indicates operation, sample, data, file status, disk space, and GPS position. Fish Densities: Relative fish/plankton density by range bins. Total Echoes: Raw and tracked echoes by range bins. Stacked Bar Chart: Fish frequency vs. range (e.g, depth), and TS color bin. Horizontal Stacked Bar: Fish frequency vs. angle off axis, and TS color bin. Scatter Plot: Echo X-Y location (angle off axis) in the beam (also X-Z and Y-Z). 3D Display: User-controlled rotation.
<b>Angular Resolution:</b>	<+/- 0.1° (6° beam width, 200 kHz), using split-beam transducer and quadrature demodulation.
<b>Echo Integration:</b>	Digital echo integration in real time in up to 1400 surface-locked depth strata, with up to 1400 range-dependent echo level thresholds. Time based summaries from as few as 6 sec. Bottom tracking modes.
<b>Target Tracking:</b>	Simultaneous three-dimensional target tracking, with real-time screen displays for up-to-the-second updates. Real-time updates at selectable intervals of mean target strength of tracked fish, cumulative number of echoes received, current bottom depth. Up to 50 range-dependent echo level thresholds.
<b>Multiplexing:</b>	Sampling of two split-beam transducers switched by time (slow multiplexing) or by ping (fast multiplexing). Optional external multiplexer permits sampling of up to 16 single-beam or split-beam transducers.
<b>Digital Chart Recorder:</b>	Internal <i>Digital Chart Recorder</i> , using optional PC printer to create echograms.
<b>Data Recording:</b>	<i>Digital Data Tape Interface</i> and optional Digital Audio Tape (DAT) recorder directly record the digitized split-beam data, permitting complete reconstruction of the raw data.
<b>Transducers:</b>	See <i>Model 540 Split-Beam Transducer</i> specification sheet for beam widths, maximum depths, and available cable lengths. All HTI transducers are preamplified to maximize signal-to-noise ratio.
<b>Positioning:</b>	GPS position recorded to data file or to DAT (GPS unit not included).
<b>Remote Operation:</b>	Modem and communication software permits full remote operation, data transfer, and quality control of the <i>Model 244 System</i> from anywhere in the world with reliable telephone communication.
<b>Computer Requirements:</b>	Minimum desktop 2 GHz, 128 MB RAM (256 MB recommended), <i>Windows2000/NT</i> , 50 GB HD (100 GB recommended), <i>Lantastic</i> . Contact HTI for more detailed specifications.
<b>Note:</b>	Specifications subject to change without notice. These specifications supersede all earlier versions.