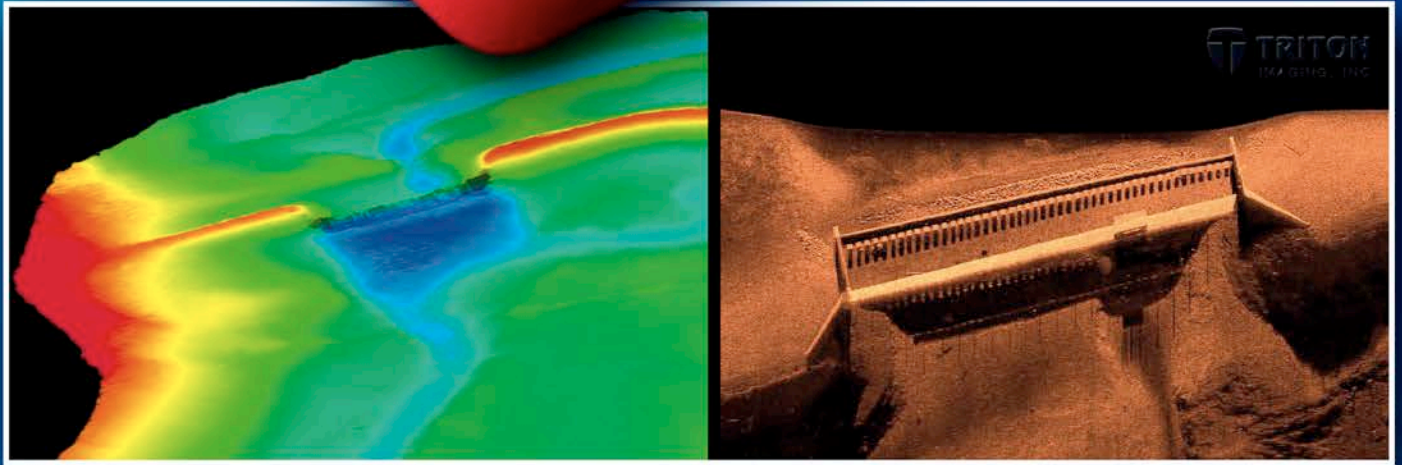


HYDROCHART 3500

*The Difference
Is In The
Image*



SHALLOW WATER SWATH BATHYMETRY & SIDE SCAN SONAR

KLEIN MARINE SYSTEMS, INC.



PROFESSIONAL SHALLOW-WATER UNDERWATER SURVEY MAPPING SYSTEM

The Klein HydroChart 3500 is a lightweight, low-cost, wide-swath, professional shallow-water underwater survey mapping instrument that supports IHO SP-44 Special Order quality bathymetric survey data collection and co-registered dual frequency with high-resolution side scan sonar imagery for navigational charting, dredging and engineering support, habitat characterization, and various other shallow water mapping applications.

Our HydroChart 3500 is delivered completely pre-calibrated with pitch, roll, heave, heading and sound velocity compensation from sensors mounted within the Sonar Head Unit (SHU).

KEY FEATURES

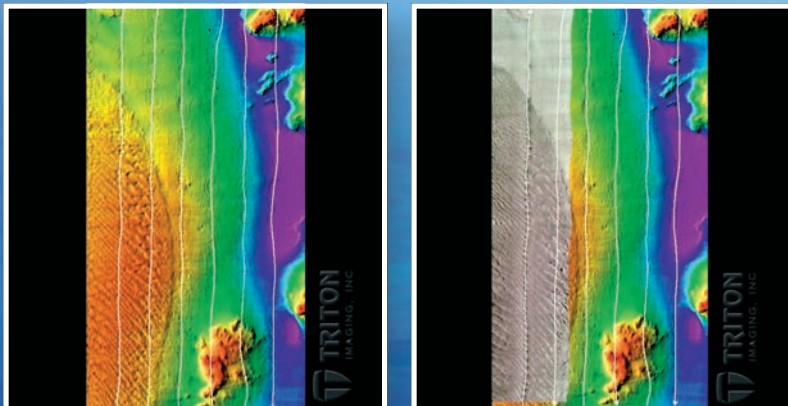
- Co-registered and geo-referenced IHO-quality swath bathymetry with dual frequency high-resolution side scan imagery
- Bathymetry coverage including Nadir up to 12X the water depth or altitude
- Supports an optional sound velocity sensor, providing surface sound velocity measurements
- Supports various Motion Reference Units (MRUs), gyro-heading sensors and navigation equipment, or option to include Klein Motion Sensor (KMS)
- Easy-to-use graphical user interface (GUI) — operates with our SonarPro for enhanced operator control, data acquisition and display of both bathymetry and side scan data
- Output compatible with most third-party post-processing software
- Klein has developed a real-time computed sonar uncertainty for interface with Combined Uncertainty Bathymetric Estimator (CUBE) to provide semi-automatic data processing of soundings
- AC (110/220, 50 to 60 Hz) or 24 VDC input power
- Compact, lightweight and portable

APPLICATIONS

- Shallow water hydrographic survey
- Geophysical survey
- Port and harbor security
- Dredging and salvage operations
- Rapid littoral area assessment
- Shallow water habitat mapping

OPTIONAL TOWFISH ACCESSORIES

- Interface to various external third-party motion sensors
- 10 m, 20 m, or 50 m cable option
- SHU-integrated motion sensor
- SHU-integrated heading sensor
- SHU-integrated sound velocity sensor
- Sound velocity profiler
- Semi-rugged laptop
- Rackmount PC
- Rugged and waterproof reusable shipping container with wheels
- On-site training
- Factory training
- Pre-calibration and patch test (when purchased with SVS, MRU and heading sensors)



Shallow Estuary – Harbor Approach.
Bathymetry displayed in Triton Perspective software with co-registered side scan overlay, without manual editing (images courtesy of GBT Offshore).

The Klein HydroChart 3500 Side Scan Swath Bathymetry Sonar System comes complete and pre-calibrated with pitch, roll, heave, heading, and sound velocity compensation from sensors mounted within the faired pole-mountable Sonar Head Unit (SHU).

A single polyurethane-jacketed, Kevlar®-reinforced, multi-conductor deck cable connects the pole-mounted SHU to the splashproof Topside Interconnect Unit (TIU).

Through the TIU, data output from the SHU are synchronized by a 1 PPS signal and/or serial National Marine Electronics Association (NMEA) data output from a GPS/GNSS navigation system. All resultant survey data are time-synchronized and combined into a stream of output through one Ethernet cable to a Windows-based laptop/computer for recording in Klein SonarPro® and/or third-party survey software.

This is a portable shallow-water survey system that can be easily deployed from a pole configuration or customized for hull mounting.

The complete system is the only side scan bathymetry sonar that supports IHO SP-44 requirements, for Special Order Surveys, which can be verified using Klein's real-time computed sonar uncertainty values — Be Certain with Klein. The sonar has proven capable of supporting Special Order survey requirements to more than 6X water depth, per side (port + starboard) combined swath of 12X water depth).



SONAR HEAD UNIT (SHU)

The HydroChart 3500 Sonar Head Unit (SHU) is a pole-mounted, lightweight (50 lb), swath bathymetry and side scan acoustic imaging survey package containing all sensors within a rigid-frame assembly and protected within a faired housing.

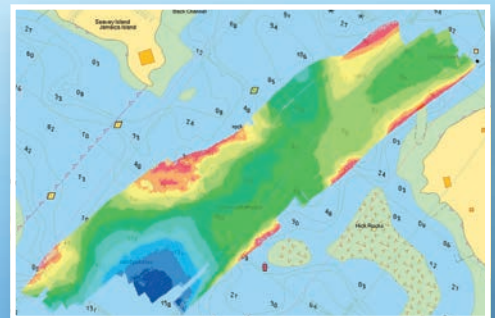
The SHU includes transducers that are comprised of combined 455 kHz bathymetry and side scan arrays and a dedicated 900 kHz side scan array, together with a sound velocimeter, heading sensor, heave, pitch and roll motion reference unit (MRU).

TOPSIDE INTERCONNECT UNIT (TIU)

The HydroChart 3500 Topside Interconnect Unit (TIU) is a very small and lightweight, IP-67-rated (splashproof) enclosure, which manages all power and data connections from the topside to the SHU. The complete system is powered through 120/240 VAC or 24 VDC, drawing less than 30 Watts of power.

The HydroChart 3500 is operated from a PC or laptop (Klein or customer-provided).

Klein SonarPro software is included with the system and available for download and distribution through Klein's website. SonarPro provides an intuitive, real-time, easy-to-use, yet powerful system interface for complete survey planning, mapping, data acquisition, targeting, measurement, reprocessing and review.



Spruce Creek Shallow Water Inspection Survey. Bathymetry displayed in Hypack MBMAX 64 (5 m to 15 m water depth).



C E R T A I N W I T H K L E I N

BE CERTAIN WITH KLEIN

HYDROCHART 3500 SPECIFICATIONS

GENERAL SPECIFICATIONS

Deployment method	Pole configurations or hull mounting
Max water depth	150 m
Frequency	455 kHz Bathymetry and Side Scan 900 kHz Side Scan
Pulse technology	Wideband FM Chirp
Bathymetry coverage	10 to 12 times water depth
Bathymetry across track	5.0 cm
Bathymetry along-track resolution	0.4°
Side Scan swath coverage (2x range)	300 m @ 445 kHz 150 m @ 900 KHZ
Side Scan across-track resolution	1.5 cm
Side Scan along-track resolution	0.21°
Construction	Rugged

SONAR HEAD UNIT (SHU) SPECIFICATIONS

The HydroChart 3500 Sonar Head Unit (SHU) is a pole-mounted, lightweight, swath bathymetry and side scan acoustic imaging hydrographic survey package containing all sensors within a compact, rigid-frame assembly and protected within a faired housing.

Length	37.2 in. (94.5 cm)
Width	11.0 in. (27.9 cm)
Height	10.9 in. (27.7 cm)
Weight (in air)	50.0 lb. (22.7 kg)

Front Cover Images:

Left: Bathymetry displayed in Hypack MBMAX 64.

Right: Side Scan displayed in Triton Perspective
(image courtesy of GBT Offshore).

Survey data courtesy of SubSea Technologies

Cleared for public release April, 2016. Data, including specifications, contained within this document are summary in nature and subject to change at any time without notice at Klein's discretion. Call for latest revision. All brand names and product names referenced are trademarks, registered trademarks, or trade names of their respective holders.



Klein Marine Systems' HydroChart 3500 Sonar System with Integrated Motion, Heading and Sound Velocity Sensors.

TOPSIDE INTERCONNECT UNIT (TIU) SPECIFICATIONS

The Topside Interconnect Unit (TIU) is a compact and lightweight, IP-67-rated (splashproof) enclosure, which manages all power and data connections using Klein SonarPro or various third-party software. The HydroChart 3500 is operated from a PC or laptop (Klein or customer provided). The Klein SonarPro software is included with the system and available for download and distribution through our website.

Length	10 in. (25.4 cm)
Width	8 in. (20.3 cm)
Height	4.5 in. (11.4 cm)
Weight (in air)	3.2 lb. (1.5 kg)
Power	120/240 VAC or 50 to 60 Hz or 24 VDC < 30 Watts
Splashproof	IP-67 rated

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