# ***ROSS*** *Surveyor* ***Model 960***

**Ross**
Laboratories Inc.

## Complete Hydrographic Survey system in <u>one</u> package!

## Optional Side scan and Sub Bottom module. See 4900 series.


- Integrated DGPS.
- U.S.C.G. Beacon Receiver or External Differential Correction.
- Integrated Ross “Smart” Sounder.
- Hydrographic Software.
- Active TFT color displays.
- Portable, Ruggedized Package.
- 12v DC power.
- USB Data download
- Available in custom configurations.
- 16 button “HYPACK®” hot key keypad

Our ***Model 960*** is a PC based hydrographic survey system designed to fulfill the positioning, depth and surveying needs of the Survey community. Based on the popular 950 Surveyor, the 960 incorperates an independent sounder with dedicated screen and operating keypad, differential GPS (Optional RTK), and data collection computer with its own 12 inch Hi-Bright screen, keypad and mouse. By offering a complete line of hardware and software, including ruggedized PC computer hardware, integrated Differential Global Positioning System, and sounder, the 960 is the ideal system for small open boat survey.

This portable system is a completely ruggedized, splashtight industrial computer in a portable package that can operate on either 12VD.C. or A.C. power. (A.C. using external converter.) Plug in power, antenna, and a transducer and you’re ready to go to work!

A Differential Global Positioning System is integrated into the above hardware package for 12 dedicated, continuous tracking channels of GPS data. The standard integrated DGPS is a Trimble 12 channel model with better than 1m accuracy. The antenna for both the GPS and beacon receiver are combined in one housing with a single interconnect cable. An optional RTK receiver is also available.

***Ross*** **Laboratories Inc. • 3138 Fairview Ave E. • Seattle, WA 98102 USA**
**(206) 324- 3950 • FAX (206) 329- 0250 www.rosslaboratories.com**

# Ross Surveyor Specifications

GENERAL. The Ross Model 960 Surveyor is a complete Hydrographic survey system in one portable splash proof package. It integrates a data logging and processing computer with a DGPS receiver and depth sounder. The system is made up of the three subsystems described in their own sections in this document.

PORTABILITY. The entire package weights approximately 34 pounds without transducers and antenna. External dimensions do not exceed 21.75”x19.5”x8.75” .

POWER REQUIREMENTS. The unit operates an entire eight hour working day from a fully charged 100 amp/hour, 12 volt deep cycle marine battery, OR a 12 volt DC, 15 amp power supply.

OPERATING CONDITIONS. The unit is capable of operating in light rain, temperature extremes from 0° to 40°C (0° to 104°F) and non-condensing humidity from 0% to 95%.

INTERFACING. The GPS subsystem and depth sounder subsystem are internally interfaced to the computer subsystem. External USB and Serial ports allow connection to external devices and downloading of data.

MANUALS. Operation and technical manuals are supplied with the unit.

USER INTERFACE. The unit has two TFT “Hi-Bright” flat panel displays, a 12 inch (survey screen) and a 6.5” (sounder). Two independent 16 button kepads and a splashproof mouse provide the user control of the computer subsystem or the sounder subsystem. A standard USB keyboard can be externally connected to either the sounder or data collection computer.

## Depth Sounder Subsystem

GENERAL. The depth sounder subsystem is able to display a color sonogram on the system’s active 6.5” TFT flat panel display. It also has an adjustable tracking gate that can continuously track a changing seabed without user input.

TRANSDUCER REQUIREMENTS. The depth sounder subsystem is capable of operating at a frequency of 28kHz, 50kHz, 100kHz or 200kHz, or simultaneous operation of any two frequencies.

INTERFACING. The depth sounder subsystem outputs a custom NMEA-0183 string to the data collection software, Coastal Oceanographics “HYPACK®” survey software It is also capable of accepting annotation information from the software package.

DATA STORAGE AND DISPLAY. The entire sonogram (received echo) is stored on the sounders internal hard drive for future playback and printing. The data is stored on a 60.0GB Hard Drive and can be transferred for permanent or temporary storage to a USB memory stick using the external USB connector. The depth sounder system is also capable of logging the digital data on its internal hard drive.

The sonogram files can be played back on the sounder subsection or transferred to an office environment.. An optional Windows playback software package is available for installing on an office computer.

USER INTERFACE  A 6.5" color TFT display continuously displays the color sonogram, and user menus for operating the sounder section of the system. A 16 button keypad provides instant control of common user commands. (depth range, blanking, manual receiver gain) as well as access to the operating menu system.

TIMING ACCURACY. The depth sounder subsystem is based on a crystal controlled clock that is stable and accurate. The overall system depth accuracy is better than 1% of a depth range +/- 0.1. Absolute accuracy is a function of bottom type, bottom slope and transducer beam angle. A "Smart" echo detection algorithm is used to first determine that an echo has adequate echo strength to be digitized and then calculates the digitized depth from the leading edge of that same echo signal. This algorithm should reduce the type of errors which are related to echo signal rise time.

ANNOTATION. The depth sounder subsystem is capable of automatically generating event annotation at user defined fixed time intervals. It also is able to process events and annotation generated by the data collection software.

**Sounder**

| | |
|---|---|
| Scale | Feet, Fathoms, or Meters |
| Range: | 0-25, 0-100, 0-250, 0-500 ft. (or metric equivalent) fixed scales or 25 ft. auto range increments. |

**Display**

| | |
|---|---|
| Display Type: | 1000nit color TFT |
| Size: | 6.5" diagonal |
| Pixels: | 640 X 480 |
| Luminance: | 1000nit backlight with intensity control for night vision |
| Functions: | Operator key pad control panel, Sounding chart, and large numeric depth readout. |

**Transceiver**

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|---|---|
| Frequencies: | 12kHz, 28kHz, 50kHz, 100kHz and 200kHz. Choice of 2 |
| Transmitter output power: | 100 watts low, 1000w high (RMS.) |
| Pulse length: | 0.1msec or .5msec |
| Min Depth | 200kHz – 1.5' (46cm) below draft. |

**Interfacing and Annotation**

| | |
|---|---|
| Serial | One internally connected to the data collection computer. |
| USB | One for sonogram data download. |
| Digital Depth output: | Continuous, user selected interval or requested output using a custom NMEA-0183 sentence. XXX.X Ft. Fa. or M. |
| Compatibility: | HYPACK™, HYDROpro™, and Ross Playback Software |
| Annotation: | Internally generated event marks at 1 minute to 10 minute intervals. |

**Data logging:** Windows™ playback software. Allows playback and editing of "Sonogram" on standard PC when down loaded from 825B's 60GB internal hard drive.

**Controls**

| | |
|---|---|
| Sound Velocity: | 4800 ft/sec ±25% (1463 m/sec ±25%). |
| Draft: | 1' (0.30m) to 100' (30m). |
| Gauge, Tide: | ±100' (±30m). |
| Operating Range: | 25, 50, 100, 250, 500, Feet, Fathom or Meter equivalents. |
| Auto range: | Bottom following 25, 50, 100, 250FT. range window. |
| Annotation: | On / Off, selected items for annotation |

Additional Features: Adjustable Blanking and Bottom Following Gate.
Bar Check depth gate
AGC and TVG functions.

Sounding Rate:

| ***Range*** | ***Soundings/second*** |
|---|---|
| 0' - 25' (0m - 8m) | 10 |
| 0' - 50' (0m - 15m) | 9 |
| 0' - 100' (0m - 30m) | 7 |
| 0' - 200' (0m - 61m) | 5 |
| 0' - 250' (0m - 76m) | 5 |
| 0' - 500' (0m – 152m) | 3 |

GENERAL. The Global Positioning System (GPS) receiver is fully operational and ready for field observation. It receives satellite signals and performs precise 3-dimensional relative (Differential Mode) vector measurement and positioning based primarily on carrier phase and integrated Doppler measurements. The receiver is equipped with all necessary antennas and cables for a fully functional mobile DGPS system. An optional RTK receiver is also available.

ACCURACY. The GPS receiver has an accuracy of better than 1 meter in the real time differential dynamic mode.

FREQUENCY AND TRACKING REQUIREMENTS. The GPS receiver is capable of tracking the L1 and CA Code. It is capable of measuring carrier phase, Doppler, integrated Doppler and pseudo-range (Code phase). It has the capability to output standard NEMA GPS data strings to an internal RS-232 port and also receive differential GPS data input via RTCM 104 rel. 2.0.

INTERNAL RECEIVER TESTING. The receiver can perform self test and checks to detect electronic malfunctions and /or faulty data collection. The receiver also provides notification of failures to the logger software via serial port. The receiver performs any needed NON-FACTORY calibrations automatically.

MULTIPLE SATELLITE TRACKING. The receiver is capable of tracking up to twelve (12) satellites simultaneously, each on an independent channel.

FIELD PLANNING. The internal receiver software computes the availability and positions of satellites for any given time and terrestrial position using data gathered by the GPS receiver. Optional software is also available for use in mission planning functions and provides for satellite rise and set time, satellite elevation and azimuth, PDOP, and other pertinent factors.

GPS RECEIVER SOFTWARE. The software provided computes the availability and positions of satellites for any given time and terrestrial position using broadcast ephemeris gathered by the GPS receiver. The software utilizes positional dilution of precision (PDOP) predictions and horizontal dilution of precision (HDOP) predictions in its position solution.

RE-INITIALIZATION. The receiver has a fast time to first fix of less than thirty (30) seconds after a power interruption.

DIFFERENTIAL RADIO LINK. The unit is provided with a US Coast Guard beacon receiver and data modem interfaced to the GPS subsystem. An external RTCM input can be provided for differential corrections obtained using a dedicated reference station when required.

Note: The GPS differential reference station, if other than a US Coast Guard beacon, will need to have a matching transmitter, receiver, modem, and frequency.

GENERAL. The computer subsystem will be a PC compatible computer with the following minimum specifications:

1. An Intel 1.2Ghz Pentium or better.
2. 2GB of RAM.
3. A 60.0 Gigabyte Hard drive or larger.
4. 2 external serial ports
5. External VGA port.
6. 2 external USB ports
7. Windows XP Pro

INTERFACE PORTS. The computer subsystem is interfaced to the GPS receiver and depth sounder subsystems using internal connections.

DISPLAY AND USER INPUT DEVICES. A 12” active TFT “Hi Bright” Color flat panel display that can be viewed in direct sunlight (brightness of not less than 1000 NITS) always displays the data collection software screen. A 16 button keypad provides instant control of common user commands. (start line, stop line, zoom control, etc.) A sealed 2 button mouse provides quick access to drop down menu items. The keypad and pressure sensitive pointing device (mouse) are sealed industrial components. A standard USB keyboard can be pluged into the external USB connector, providing further control of the system.