Appendix A

Equipment Specifications

Bathy-500MF Multi-Frequency Survey Echo Sounder
- Depth Range: 0-15, 0-30, 0-60, 0-120, 0-240, 0-480, 0-1920 Feet; 0-10, 0-20, 0-80, 0-160, 0-640 Meters
- Phasing: 0-120, 60-180, 120-140, 180-300, 240-360, 300-240, 360-480 Feet, Auto; 0-40, 20-60, 40-80, 60-100, 80-120, 100-140, 120-160 Meters, Auto
- Accuracy rating: ±0.5 percent
- Chart Record: 8.5 inch X 90 feet high-contrast thermal paper
- Digital Display: LCD (4 line X 16 characters) 0.25 inch characters; Depth display: 0.75-inch characters; Back-lighting: Electro-luminescent Resolution: 0.01 units for depths less than 100 meters; 0.01 for depths greater than 100 meters; 0.1 feet on all ranges
- Frequency: Any single frequency (user selectable & changeable via keypad) from these: 33Khz, 40Khz, 50Khz, 200Khz (Acoustic output=600 watts)
- Depth Alarms: Shallow and deep (selected by keypad)
- Sound Velocity: 4600-5250 feet/second (1393-1590 meters/second); user selected by keypad
- Offset: 0 to +30 feet or meters (allows the user, via keypad, to adjust for the transducer depth)
- Geographic Position: NMEA-0183 GGA or GLL format for GPS/DGPS
- Data I/O Compatibility: COM1 provides bi-directional interface to PC or other peripheral device; this port accepts external annotation from external sources such as hydrographic software. This port also allows remote control of all echo sounder functions using Ocean Data’s Windows 95/98/NT based software. Com2 accepts GPS/DGPS inputs and provides additional (from COM1) data outputs.
- Data Outputs: ODEC PMS dt (True Depth & Status); Atlas DESO-25; Odom Digitrace; Odom Echotrac; NMEA DBT; NMEA DBS
- Input Power: 11-30 volts d.c. (1.5 amps @ 12v. 0.5 amps @ 30v.)
- Dimensions: Height (including handle) 19 inches; width 17.5 inches; depth 9 inches
- Weight: 35 lbs (recorder with transducer)
- Operating Temperature: -10°C to +50°C / Humidity 95% non-circulating

Bathy-500MF Transducer (P/N P01540)
- Resonant Frequency: 208 KHz
- Nominal Impedance: 50 ohms
- Beamwidth (@ 3 dB point): 8 degrees
- Cable: 30 feet (with plug to mate with recorder)
- Housing Material: Brass (with urethane acoustic window)
- Piezo Material: Barium titanate

Horizon DS150 Single-beam Echo Sounder
- Power Supply: 0.7 to 16.6 VDC 15 mA nominal, 35mA with backlight on
- Operating temperature: 32° to 114° F (0° to 45° C)
- Accuracy rating: ± 2 percent
• Size of display: 4.4 x 4.4 x 1 inches (112 x 112 x 20 mm)
• Overall depth: 1.4 inches (35 mm) behind panel
• Display type: Twisted Nematic (TN), gray background
• Illumination: Red LED
• RF Interference: Less than 6 dB maximum quieting on any marine radio channel with 3 dB gain antenna within 1 meter of instrument head
• Depth: 3 to 400 ft, 1 to 120 meters, or -.5 to 67 fathoms
• Alarms: Shallow and deep water, Audio and LCD flag
• Display unit selection: Feet, meters or fathoms, keypad selectable
• Display damping: Three levels keypad selectable
• Keel Offset: Keel/propeller or waterline, ±9.9 ft, ±1.6 fathoms or ±3.0 meters, user selectable trend indication
• NMEA outputs: DPT, DBT
• Proprietary Outputs: Alarm and Trend arrows
• Display unit selection: Feet, meters or fathoms, keypad selectable
• Display damping: Three levels keypad selectable

**Infinities USA Model 220 ultrasonic water level loggers**

• Number of measurements in memory: 3906
• User programmable interval: 1-reading/second to 1-reading/6 months
• User interface to Logger: PC or opt. HP 48GX or 48G+ calculator w/ software
• Data logger power: Four AA alkaline batteries
• Data logger battery life, typical: 4 years
• Data logger range: 18 feet
• Minimum target distance: ~16 inches
• Ranging environment: inside 1 1/4” to 3” PVC sch. 40 pipe
• Temperature compensation: 0F to 120F
• Humidity: to 100%
• Accuracy: +/- 1% of distance measured
• Resolution: ~0.04 inches or 1mm
• Ultrasonic Frequency: 49.7kHz
• Data download rate: 150 measurements per second
• Download medium: serial cable
• Hewlett-Packard 48GX storage: multiple data loggers, 40,000 measurements

**Trimble DSM212H Integrated GPS/MSK Receiver**

**Standard Features**

• 12-channel GPS receiver
• Integrated GPS and dual channel MSK beacon receiver
• Outputs positioning reports at 1, 5, or 10 Hz
• Isolated power supply
• Positioning based on carrier-phase filtered L1 pseudo-ranges

• Two programmable RS-232 serial ports:
  o NMEA-0183 output or RTCM SC-104 output
  o RTCM SC-104 input
  o TSIP input and output
• 1PPS output
• Windows configuration software
• DSM212 operation manual
• Compact L1 GPS and MSK H-field loop antenna
• 15 meter RG58 antenna cable
• Power/data cable
• 12Pin to data cable

Performance Characteristics
• 12-channel, parallel tracking, L1 C/A code with carrier phase filtered measurements and multi-bit digitizer
• Differential speed accuracy: 0.1 knot (0.1 mph, 0.16 km/h, 5.6 cm/s)
• Differential position accuracy: Less than 1 meter horizontal RMS (at least 5 satellites, PDOP < 4 and RTCM SC-104 standard format broadcast from a Trimble DSM12RS or equivalent reference station
• Time to first fix: < 30 seconds, typical
• NMEA messages: ALM, GGA, GLL, GSA, GSV VTG, ZDA, RMC, MSS

Physical Characteristics
• Size: 14.5cm W x 5.1 cm H x 19.5 cm D
• Weight: 0.76kg (1.68 lb)
• Power: 5W (max), 10 to 32 VDC
• Operating temperature: -30°C to +65°C
• Storage temperature: -40°C to +85°C
• Humidity: 100% condensing, unit fully sealed

MSK Beacon Dual-Channel Receiver
• Frequency Range: 283.5 KHz to 325.0 KHz
• Channel spacing: 500 Hz
• MSK modulation: 50, 100 & 200 bits/second
• Signal strength: 10 µV/meter minimum @ 100BPS
• Dynamic range: 100 dB
• Channel selectivity: 70 dB >500 Hz offset
• Frequency offset: 17 ppm maximum
• 3rd order intercept: +15 dBm @ RF input (min. AGC setting)
• Beacon acquisition time: <5 sec, typical

AMREL Rocky II Plus
• CPU: Intel Pentium, 366 MHz Pentium II
• Ram Memory: 64MB SDRAM standard
• Storage: Removable 2.5” HDD (available 6GB up to 10GB); Removable 3.5” 1.44MB FDD
• Display: 12.1” 800 x 600; AGP compliant 128-bit video engine with 256-bit bus 2.5MB embedded SDRAM
• Keyboard: 89-key KB standard keycap with dust cover and Windows 95 keys ready; PS/2 compatible touchpad
• Power System: Removable 10.8V 4500mAh Lithium ion primary battery; secondary 10.8V 4500mAh Lithium ion battery pack (DR202 compatible) swappable with FDD; smart battery and smart charger
• I/O Ports: 2S, 1P, CRT, external kb, eternal FDD, Fax/Modem (RJ-11), LAN (RJ-45), Audio, PS/2 mouse, USB, port replicator; 2 PCMCIA type II slots or 1 type III slot; LAN, radio modem etc, Cardbus and ZV port support; IrDA-compliant infrared transceiver (fast IR 4 MB/sec transfer rate)
• Dimension: 312 mm x 246 mm x 62.5 mm; Weight approximately 4.7 kg; rain and dust proof, shock resistant structure; magnesium case

**Dell Dimension XPS T750MHz Pentium III**
• 768MB DSRAM Memory with ECC
• V.90/56K PCI DataFax Modem
• 8x/4x/32x CD-RW
• 32MB NVIDIA geForce Plus AGP Graphics Card
• 18GB 10K SCSI Hard Drive
• 3.” Floppy Drive
• 3Com US Robotics 3C905C-TXM 10/100 Remote Wake Up Nic