**CLEARSIGN™ II Amplifier**

The CLEARSIGN™ II Amplifier is housed in a chassis that contains a backplane, an isolated power supply, and a stimulator relay with 4 stimulator inputs, ECG inputs, 4 blood pressure inputs, and intracardiac channels in 40-, 80-, 120-, and 160-channel configurations. Features 16-bit A to D conversion and allows for sampling rates of 1, 2, or 4 KHz.

- Physical Dimensions: 16” (40.5 cm) W, 11” (28 cm) H, 17.5” (44.5 cm) D
- Full Weight: 35 lbs (15.9 kg)
- Power: 100-120/200-240 VAC+/− 10%, 50/60 Hz
**Monitors**

**BRAND:** EIZO®, **MODEL:** Flexscan® S210,

**TYPE:** LCD, **SIZE:** 21.3”
- Dual Inputs-compliant (DVI-I and D-Sub mini 15 connectors)
- Dot Pitch: 0.270 mm
- Native Resolution: 1,600 dots x 1,200 lines
- Power Supply: 100-120/200-240 V, 50/60 Hz
- Power Consumption: Max.: 70W, Typical: 33W
- Power-Saving Mode: Less than 2W
- Dimensions: 18.3” (46.5 cm) W, 17.8” (45.3 cm) – 21.1” (53.5 cm) H, 8.2” (20.85 cm) D
- Dimensions Without Stand: 18.3” (46.5 cm) W, 14.2” (36.1 cm) H, 2.5” (6.4 cm) D
- Weight: 21.4 lbs (9.7 kg)
  Without Stand: 14.8 lbs (6.7 kg)

**BRAND:** EIZO®, **MODEL:** Flexscan® S2433,

**TYPE:** LCD, **SIZE:** 24.1”
- Inputs: D-Sub mini 15 pin, DVI-D 24 pin (with HDCP), Display Port (with HDCP)
- Dot Pitch: 0.270 mm
- Native Resolution: 1,920 dots x 1,200 lines
- Power Supply: 100-120/200-240 V, 50/60 Hz
- Power Consumption: Max.: 95W, Typical: 40W
- Power-Saving Mode: Less than 1.5W
- Dimensions: 22.3” (56.6cm) W, 17.9” (45.6 cm) – 21.1” (53.8 cm) H, 8.2” (20.8 cm) D
- Dimensions Without Stand: 22.3” (56.6 cm) W, 14.4” (36.7 cm) H, 3.35” (8.5 cm) D
- Weight: 22.5 lbs (10.2 kg)
  Without Stand: 15.9 lbs (7.2 kg)

**Printers**

**BRAND:** Hewlett-Packard, **MODEL:** P2035,

**TYPE:** B&W Laser Jet
- Physical Dimensions: 10.1” (25.7 cm) H, 14.5” (36.8 cm) D, 14.1” (35.8 cm) W
- Weight: 21.8 lbs (9.9 kg)
- Power: 115V 60 Hz
- Print Speed: Up to 30 ppm
- Processor Speed: 266 MHz
- Print Quality: 600 x 600 dpi
- Input Capacity, max: 250 sheets
- Memory: 16 MB
- Connectivity: IEEE 1284-compliant parallel port
**LS 9900 Diagram and Cables**

1. 115V Isolation Transformer
2. 220V Isolation Transformer
3. Power Cord (115 VAC)
4. Power Cord (220 VAC)
5. Printer Interface Cable
6. Cable, Ethernet
7. Connector on rear panel of the CLEARSIGN™ II Amplifier to LABSYSTEM™ PRO EP Recording System
10. Analog Output and RTO Cable
11. “SYNC ^ ANALOG OUT” Connector at the rear of the CLEARSIGN™ II Amplifier
13. VGA Cables
14. Main Application LCD Video Display
15. Real-Time LCD Video Display
17. DVI to VGA Adapter (Supplied with Video Card)
18. Image Capture (Fluoro) Cables
21. Dual Serial COM Ports
23. Mouse, USB
CLEARSIGN™ II Amplifier Diagram and Cables

1. LED Indicators
2. 12-Lead ECG Cables
3. Blood Pressure Cable
4. Stimulator Cable
5. 40-Channel Junction Box Cable
6. Protective Cap for IC Connector
7. LED Indicators: Link, TX, RX
8. Analog Output Cable
9. Sync Output Cable
10. Analog Input Cable
11. Analog Output 16 Cable
12. Ethernet Cable
13. Equipotential Cable
14. Power Input Cable
15. Main On/Off Switch
**Power Cord, CLEARSIGN™ II Amplifier Platform (Used with 115V configuration)**

The power cord connects to the IEC 320 standard power input receptacle on the back of the CLEARSIGN™ II Amplifier. It has a North American hospital-grade power plug on the opposite end.

**Lead Wire, Ten 36-in. ECG**

Each lead wire set consists of ten 36-in. lead wires, terminated as indicated, which plug into the receptacle on a 12-lead ECG cable. A push button on the side of the receptacle head releases the lead wires.

**NOTE:** If any of the ten lead wires are not used, it is recommended that any vacant position(s) on the 12-lead ECG Cable be plugged with an HPCS Shorting Plug.

**12-Lead ECG Cable**

These trunk cables accept ten ECG lead wires. There is a single connector to the CLEARSIGN™ II Amplifier. The CLEARSIGN™ II Amplifier has a single ECG cable connector.
**HPCS Shorting Plug**
This is an input termination plug connected in place of any unused ECG lead wires.

**Cable, 40-Channel Junction Box**
The cable is a 40-channel (80-electrode) intracardiac junction box cable and provides emergency backup of the pacing capability. In normal operation, the stimulus pulse may be directed to any of the intracardiac junction box sockets on the system. However, the cable also includes a hard-wired circuit, which bypasses the amplifier and terminates in a reserved pair of sockets on the junction box. In case of a CLEARSIGN™ II Amplifier failure, stimulation/pacing can be maintained by moving the pacing electrode pins to these two sockets.

**Cable, Analog Input (Four Rear-Panel Connections)**
This cable provides a single BNC input connection for analog instrumentation inputs with a voltage range of up to +/- 5 volts, DC coupled. The CLEARSIGN™ II Amplifier accepts up to four of these cables.

**Cable, Analog Output (Rear-Panel Connections)**
Used to supply an isolated analog signal to an external analog device.

**Cable, Analog Out 16 (Rear-Panel Connections)**
Used to supply up to 16 isolated analog signals via phone jack connection to external analog devices. Sync connection is also provided.

**Cable, Stimulator (Front-Panel Connections)**
This cable provides a connection between an external stimulator, up to four channels, and the amplifier. An internal bypass connection in the CLEARSIGN™ II Amplifier provides direct connection for emergency pacing on the 40-channel junction box cable.

**Cable, Sync Output (Rear-Panel Connections)**
This cable provides a BNC-compatible output that can be used to trigger external equipment. The output is 0 to 5v. Any recorded channel (other than blood pressure) can be used as a trigger source.

**Cable, Ethernet (Rear-Panel Connections)**
The Cat 5E cable connects the CLEARSIGN™ II Amplifier Network Interface Card (NIC) board in the computer to the CLEARSIGN™ II Amplifier back panel. This cable and its receptacles are fragile and should be inspected for damage frequently and replaced if necessary.

**Cable, Blood Pressure**
This is an adapter cable from the CLEARSIGN™ II Amplifier to the Viggo–Spectramed® brand of disposable blood pressure transducers. For information on adapter cables for other brands of transducers, contact Boston Scientific technical support.

**Cable, Equipotential Junction Box**
The equipotential junction box provides an interconnection to a common ground for equipment used in series.

**Cable, Equipotential Ground**
The equipotential ground cable provides a chassis ground.
# CLEARSIGN™ II AMPLIFIER

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CLEARSIGN™ II AMPLIFIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Class</td>
<td>Class IIB / Type CF</td>
</tr>
<tr>
<td>Amplifier Platform</td>
<td>Proprietary 4 Modules</td>
</tr>
<tr>
<td>Dimensions</td>
<td>16” (40.5 cm) W, 11” (28 cm) H, 17.5” (44.5 cm) D</td>
</tr>
<tr>
<td>Weight</td>
<td>35 lbs (15.8 kg)</td>
</tr>
<tr>
<td>Environmental/Electrical Specification</td>
<td>100-120V~ 1.6A 220-240V~ 0.8A 50-60Hz</td>
</tr>
<tr>
<td>ECG Input</td>
<td>12</td>
</tr>
<tr>
<td>Voltage Range</td>
<td>(+/-) 1 mV to (+/-) 10 mV</td>
</tr>
<tr>
<td>Low Filter</td>
<td>0.01 to 100 Hz</td>
</tr>
<tr>
<td>High Filter</td>
<td>10 to 500 Hz</td>
</tr>
<tr>
<td>Notch Filter</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Input Impedance</td>
<td>&gt;2.5 Mohm @10 Hz</td>
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<tr>
<td>Pressure Input</td>
<td>4</td>
</tr>
<tr>
<td>Range</td>
<td>0 to 300 mmHg</td>
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<tr>
<td>Filter</td>
<td>DC to 100 Hz</td>
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<tr>
<td>Intracardiac Channels Input</td>
<td>40- 80-120-160</td>
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<tr>
<td>Catheters Input</td>
<td>80, 160, 240, 320</td>
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<tr>
<td>Voltage Range</td>
<td>(+/-)1 mV to (+/-) 100 mV</td>
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<tr>
<td>Low Filter</td>
<td>DC to 100 Hz</td>
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<tr>
<td>High Filter</td>
<td>10 to 2,000 Hz</td>
</tr>
<tr>
<td>RF Filter</td>
<td>2,600 Hz fixed</td>
</tr>
<tr>
<td>Notch Filter</td>
<td>50/60 Hz (user selectable in 0.1 Hz increments)</td>
</tr>
<tr>
<td>Adaptive Filter</td>
<td>Mortara</td>
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<tr>
<td>Amplification Factor</td>
<td>2.5uV/bit resolution</td>
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<tr>
<td>Sample Rates</td>
<td>1, 2, 4 KHz</td>
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<tr>
<td>Resolution</td>
<td>16 bits</td>
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<td>Stim Pacing Channels</td>
<td>4</td>
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<tr>
<td>Stim Monitor Channels</td>
<td>4 (stim channel monitor), 4 (stim source monitor)</td>
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<tr>
<td>Analog Inputs</td>
<td>4</td>
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<tr>
<td>Analog Outputs</td>
<td>16</td>
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<tr>
<td>CMRR</td>
<td>&gt; 98dB</td>
</tr>
<tr>
<td>Leakage Current</td>
<td>&lt; 10uA (normal condition, patient auxiliary current)</td>
</tr>
<tr>
<td>Patient Sink</td>
<td>&lt; 10uA (normal condition, applied part to ground)</td>
</tr>
<tr>
<td>Patient Sink Measured at Patient Leads Under Single-Fault Condition</td>
<td>&lt; 50uA (single-fault condition)</td>
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<tr>
<td>Chassis Leakage Current</td>
<td>&lt; 100uA (normal condition)</td>
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<tr>
<td>Communication Interface</td>
<td>Ethernet</td>
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<tr>
<td>Power Dissipation</td>
<td>&lt; 220W</td>
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<tr>
<td>Operating Temperature</td>
<td>+10°C to +40°C</td>
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<tr>
<td>Storage Temperature</td>
<td>-40°C to +70°C</td>
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<tr>
<td>Humidity</td>
<td>30-75%</td>
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<tr>
<td>Humidity Storage</td>
<td>10-95%</td>
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</table>
LABSYSTEM™ PRO EP Recording System (w/CLEARSIGN™ Amplifier)

ELECTRICAL CHARACTERISTICS

Required Electrical Motor (USA): Dedicated 115 VAC/60 Hz/20 A

The power consumption of a LABSYSTEM™ PRO EP Recording System is approximately 1,300-1,400 VA at startup (115 VAC/8.5A peak current) with 800-900 VA consumed at steady state. This includes two monitors, a CLEARSIGNS™ Amplifier, and a laser printer.