This guide is designed to give you a comprehensive understanding of the hardware, carts, supplies, accessories, and electrodes that Cadwell offers to support the Cascade® IOMAX® IONM system.
Dual Cascade IOMAX systems were used in a case successfully separating conjoined twins. Each twin was monitored with a Cortical Module and two Limb Modules. TEMG was key, and the monitorists gave the surgeons valuable information about the cauda.

CADWELL IS ADVANCING THE FIELD OF INTRAOPERATIVE NEUROPHYSIOLOGICAL MONITORING

Cadwell’s IONM hardware, software platforms, remote monitoring offerings and data management solutions are purpose-built with customers in mind. Cascade® Surgical Studio software has free updates and new licensable features added regularly as we proactively seek customer feedback. All of our Cascade product development and production is done in Kennewick, Washington, USA. Our dedicated Application Support and Service teams are the best in the industry. Surgeries come with a risk, especially those that involve the brain, spinal cord or nerves. Intraoperative neurophysiological monitoring (IONM) is performed during many different types of surgeries to reduce the risk of irreversible neurological deficits, such as muscle weakness, loss of sensation, hearing loss and impairment of essential bodily functions. IONM involves multi-modal recording of electrical potentials from the nervous system during operations to detect adverse changes, enable corrective action, and offer surgical guidance.

Cadwell’s Cascade® IOMAX® with Cascade Surgical Studio software, the culmination of nearly two decades of innovation, experience and investment, is the future of IONM.
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ABOUT CADWELL

A HISTORY OF CADWELL
The legacy that John and Carl Cadwell began in 1979 remains entirely focused on providing innovative and easy-to-use neurodiagnostic, neuromonitoring, and sleep diagnostic solutions.

We value customer input, innovation, product quality, intuitive usability, and outstanding user support to set new standards with our neurology solutions for:

- IONM surgical monitoring
- EEG brain monitoring
- EMG, EP, NCS and Ultrasound
- PSG and HSAT sleep diagnostics
- Data management
- Neuro consumables

We are committed to creating cutting-edge neurology technology and providing market-leading customer support. If you have a Feature Request, share it with us at www.cadwell.com/feature-request.

CASCADE IONM REFLECTS DECADES OF INNOVATION
After years of multi-modal IONM-EMG, Cadwell released its first dedicated surgical monitoring product, the Cascade 16-channel, in 1999. The Cascade® IONM product line provided the performance that customers expected. Continued development and customer input helps Cascade IONM dominate the global market in IONM.

CASCADE PATENTS
Cadwell values innovation and collaboration, and our team of hardware and software designers have contributed numerous patents specific to Cascade IONM products.

Visit www.cadwell.com/patents for the complete list.
USA SALES & SUPPORT

Today, Cadwell employs hundreds of people at its Kennewick, Washington, USA headquarters, around the USA in research, hardware design, software design, operations, assembly, marketing, distribution, sales support and customer support.

Cadwell manages a team of sales representatives and installers around the United States and USA territories to serve customers during the sales, onboarding, and training process. USA customers can access software updates and training collateral at cadwell.support. Register at cadwell.support/register.

OUR GLOBAL PRESENCE

Our International Managers in Brazil, China, the Netherlands, Singapore, and the UAE work with our Distributors to serve customers around the world.

We partner with more than 90 distributors to provide Cadwell solutions to physicians, clinics, hospitals, and teaching facilities around the world. Our distributors have direct access to the sales, applications, and support teams at headquarters, and they are the hands and feet of Cadwell as they serve customers in their local markets.

Cadwell distributors provide local assistance at each stage of the process, from importation and commissioning to after-sales assistance and service. Distributors help optimize the customer experience, from selecting the ideal system configuration; to installing, training, and implementing; to providing years of service life into the future.
CASCADE IOMAX IONM

Cascade IOMAX is a module-based neuromonitoring solution that is scalable for simple to complex cases with 8 to 80 channels, and is capable of direct cortical stimulation.

It is a robust system designed to withstand the challenging environment of the operating room. It can function as a cart-based or portable system that maximizes user-configuration choices and simplicity. Custom accessories are designed to reduce noise and increase efficiencies.

Cascade Surgical Studio® (CSS) IONM software streamlines your workflow, delivers clinical excellence, monitors all modalities, strengthens documentation, and lets you stay connected with remote live review and live chat.

The powerful software-based CadX® Surgical Simulator helps you learn or teach IONM outside of the operating room.

FEATURES AND BENEFITS

- Modular design gives greater flexibility for dynamic IONM setups
- Up to 20 E-Stim Outputs up to 100 mA lets you configure multiple stimulation sites simultaneously
- Constant current stimulation limited to 20 mA and supports cortical mapping
- Cortical Module features nine integrated TCS outputs and inputs for cortical applications. Extender pods and cables are available for Cortical Module inputs and outputs, allowing positioning of the Cortical Module away from the surgical table.
- Limb modules offer pulse oximetry inputs to rapidly detect limb perfusion levels in one to four limbs
- A single SafeT® cable connects IOMAX modules at the operating table to the surgical monitoring technologist station. SafeT cables are durable and waterproof, with quick-release metal color-coded connectors. These cables are completely interchangeable between Cortical and Limb Modules and the 32-channel amplifier, and can quick-release from both ends for quick setup and position changes.
- Cortical Module and Limb Module are waterproof and drop-proof to 1 m (3 ft)
- Integrated electrosurgical unit (ESU) detection
SYSTEM DIAGRAM

12 Output Grid
Low Current Electrical Stimulator

LOW CURRENT ELECTRICAL STIMULATOR CABLE

AUDITORY STIMULATOR (HEADPHONES)

VISUAL STIMULATOR (GOGGLES)

9 Output TransCranial Stimulator

16-Channel Amplifier

32-CHANNEL AMP MODULE

32 Channel Amplifier

8 Channel Amplifier

5 Output Electrical Stimulator

PULSE OXIMETER PROBE

COMPUTER

BASE MODULE

CORTICAL MODULE

USB

SafeT Cable

SafeT Cable

SafeT Cable

SafeT Cable

SafeT Cable

SafeT Cable

SafeT Cable

SafeT Cable
CASCADE IOMAX CONFIGURATIONS

CONFIGURE YOUR IOMAX IONM SYSTEM FROM 8-80 CHANNELS

Cascade IOMAX offers durability, simplicity, flexibility, and can be deployed as needed from basic spine to complex spine and complex neuro procedures. The system consists of a computer running Cascade Surgical Studio software, a Base Module, and any of these combinations of Cortical Module, Limb Modules, and 32-channel EEG Amplifier to create an IONM configuration between 8 and 80 channels.

SOLUTION OVERVIEW

Base Module

Cortical Module

32-Channel EEG Amplifier

LCSwap

Up to (4) Limb Modules

PRODUCT AVAILABILITY VARIES BY MARKET.
SafeT cables are waterproof and completely interchangeable between IOMAX modules. Quick-release color-coded metal connectors with protective caps ensure a long life.

Quick Adapts allow for fast and simultaneous connect and disconnect of groups of amplifier recording electrodes.

Cascade IOMAX Cortical and Limb Modules are drop-tested for durability and water resistant for easy clean-up.
SOLUTION OVERVIEW

CASCADE IOMAX HARDWARE

LIMB MODULE
The Cascade IOMAX Limb Module contains an 8-channel differential amplifier, an electrical stimulator, and an SpO₂ and heart rate port.

CORTICAL MODULE
The Cascade IOMAX Cortical Module contains a transcranial stimulator, a 16-channel EEG amplifier, and ports for connecting EP stimulators and E-stimulators, Limb Modules, and amplifiers.

32-CHANNEL EEG AMPLIFIER
Record EEG and direct cortical SSEPs. Add to any existing IOMAX configuration or connected directly to the IOMAX Base Module.

BASE MODULE
The Cascade IOMAX Base Module is a required component for IOMAX power and communication.

LCSPAW STIMULATOR
The LCSwap® stimulator provides a comprehensive switch matrix solution for direct nerve and cortical stimulation.

PRODUCT AVAILABILITY VARIES BY MARKET.
BASE MODULE
The IOMAX Base Module is a required component for each IOMAX system.

The Base Module:
- Connects to the PC and power supply
- Provides power and communication via a single SafeT® cable to the Cortical Module, Limb Module, or 32-channel amplifier at the OR table
- Allows Trigger In/Out interfacing with third-party devices

BASE MODULE POWER CORD
Provides power to IOMAX modules.

A-C USB CABLE
Provides communication from IOMAX modules to PC 1.8 m (6 ft).

TRIGGER CABLE
Optional, for triggering an external device. Plugs into Base Module.

SAFET CABLE
One SafeT cable connects the IOMAX Base Unit to bedside modules, offering simple setup and a cleaner operating room floor. Quick-release color-coded metal connectors with protective caps ensure long life. The entire cable is durable and washable. Cable lengths of 3 m (10 ft) or 8 m (26 ft) are available.

PRODUCT AVAILABILITY VARIES BY MARKET.
CORTICAL MODULE

The IOMAX Cortical Module is designed for close proximity to the patient’s head, and is IP67 waterproof, drop-tested, and easy to clean. It contains both amplifiers and different types of stimulators, and can accommodate 16-80 channels for simple or complex surgeries. Different hardware features can be enabled by purchasing corresponding Cascade Surgical Studio software licenses and IOMAX accessories.

SAFET CABLE

Connects the Cortical Module to the IOMAX Base Module or Limb Modules. Cable lengths of 3 m (10 ft) or 8 m (26 ft) are available.
Top View: Color-coded Auditory, Visual, and Low-Current Stimulator ports.

TCS View: With the built-in transcranial stimulator, you can license either TCS TransCranial Stimulator Single Fixed Pair software or 9 Transcranial Stimulator outputs with montaging.

Cascade IOMAX Cortical Module Front View

Amplifier View
A flexible built-in 16-channel amplifier has a separate Ground Input, 13 Referential Inputs, and three pairs of Differential Inputs.

Bottom View: The green SafeT cable input connects to the Base Module, and the blue SafeT outputs can connect up to four Limb Modules and/or the 32-channel amplifier.

PRODUCT AVAILABILITY VARIES BY MARKET.
CORTICAL MODULE: TCS-9 TRANSCRANIAL STIMULATOR

The built-in TCS-9 Stimulator is a state of the art transcranial stimulator satisfying the widest range of stimulation parameters as well as fully flexible software controlled electrode montaging and output impedance measurement. The TCS-9 is an optional feature and can be licensed both as a single fixed electrode pair stimulator or a stimulator with the ability to freely montage any combination of the 9 available outputs as anode(s) or cathode(s).

- Single pair stimulation - only the first pair of electrodes can be used for stimulation as a fixed anode and cathode.
- Full montaging capability - one or multiple (up to 9 outputs) of the electrodes can be used in any combination as either anode or cathode controlled directly from the software.

QUICK ADAPT

Allows for quick and simultaneous connect and disconnect of all TCS-9 electrodes

TCS-9 TEST ARRAY

The TCS-9 test array allows for the verification of TCS-9 stimulator functionality using the built-in Cascade Surgical Studio Diagnostic suite.

TCS-9 OUTPUT EXTENDER

The optional detachable pod and a 3 m (10 ft) extension cable connects to the Cortical Module TCS outputs to allow positioning of the Cortical Module away from the patient’s head. Disconnect for convenience during setup or positioning.
CORTICAL MODULE: 16-CHANNEL AMPLIFIER

The 16-channel amplifier has a separate Ground Input, 13 Referential Inputs, and three pairs of Differential Inputs. The Referential inputs require a common reference (select E1, E2, E3 or E4 in the software) and can be used simultaneously both for EEG and SSEP recordings. The Differential inputs can be used for recording from facial muscles or similar. Add additional channels with the 32-Channel Amplifier and Limb Modules.

QUICK ADAPT

Allows for quick and simultaneous connect and disconnect of all amplifier recording electrodes.

AMPLIFIER TEST ARRAY

The Cortical Module Amplifier Test Array allows for the verification of referential and differential amplifier functionality using the built-in Cascade Surgical Studio Diagnostic suite.

AMPLIFIER INPUT EXTENDER

This optional detachable pod and a 3 m (10 ft) extension cable connects to the Cortical Module 16-channel amplifier inputs to allow positioning of the Cortical Module away from the patient’s head. Disconnect for convenience during positioning or setup.
PRODUCT AVAILABILITY VARIES BY MARKET.

SOLUTION OVERVIEW

BAEP SUPPLIES

GOLD FOIL EAR TIPS
Gold foil ear tips connect to the reusable ear phone recording lead wire tubing via impedance adaptors. Available in neonate/pediatric and adult ear tip sizes.

EAR TIPS
Ear tips connect to the ear phone tubing by impedance adaptors. Available in pediatric, adult, jumbo, and various neonate/pediatric ear tip sizes.

RIGHT ANGLE INSERT EARPHONE SUPPLIES
Threaded right angle adaptors and threaded foam tips are a convenient and quick way to change out the foam ear tips.

HOOK AND LOOP CLIPS
Stick the Velcro side to Earphone Transducer, and then attach to patient gown to hold recording lead wire in place. 6 / pack.

CORTICAL MODULE: AEP, VEP AND LCS

AS AUDITORY STIMULATOR
The auditory stimulator is integrated into the Cortical Module and is an optional feature enabled by software license. The ER-3C insert headphones (sold separately) are connected by a dedicated color-coded orange cable to the AS output. Cable lengths of 1 m (3 ft 3 in) or 3 m (10 ft) are available.
VS VISUAL STIMULATOR
The visual stimulator is integrated into the Cortical Module and is an optional feature enabled by software license. The LED Goggles are connected to the purple VS output through a dedicated purple color-coded cable. Cable lengths of 1 m (3 ft 3 in) or 3 m (10 ft) are available.

LCS LOW CURRENT STIMULATOR
The built-in Low Current Stimulator is intended for direct stimulation of nerves and/or cortex and is limited to 20 mA / 50 V stimuli. A yellow color-coded cable for connection of a single stimulation probe to the yellow LCS output is provided with the Cortical Module (probes sold separately).

The LED Goggles use disposable adhesive foam so a clean set is available for each patient.
CORTICAL MODULE: LCSWAP STIMULATOR

The LCSwap® is an optional accessory for the LCS output of the IOMAX Cortical Module and provides a comprehensive switch matrix solution for direct nerve and cortical stimulation. Twelve outputs can be independently assigned in the software as anode or cathode; it also includes two paired outputs for hand-held probes (P1, P2). An additional connector (P3) is present for possible future feature expansion. The LCSwap connects by a color-coded SafeT Cable to the LCS output on the Cortical Module.

LCSWAP SAFET CABLE
Connects the LCSwap to the Cortical Module.

LCSWAP TEST ARRAY
The LCSwap Test Array allows for the verification of LCSwap stimulator functionality using the built-in Cascade Surgical Studio Diagnostic suite.

PRODUCT AVAILABILITY VARIES BY MARKET.
PRODUCT AVAILABILITY VARIES BY MARKET.

CORTICAL MODULE ACCESSORIES

BED RAIL MOUNTING HANGERS
Connects to modules for easy hanging from surgical bed rails, chains, or the C2 Cart.

IOMAX CHAIN
Hang the Cortical Module and accessories as needed with the heavy-duty IOMAX chain. Connects to Bed Rail Mounting Hangers on the back of modules.

C-CLAMP BRACKET
With bed rail mounting hanger. Attach modules to IV poles for convenient and secure placement.
LIMB MODULE

The Cascade IOMAX Limb Module is designed to cover all of the IONM needs at the limbs and contains an 8-channel differential amplifier, an electrical stimulator with five switchable paired E-Stim outputs, and connection for measuring SpO₂ and heart rate. The Limb Module is IP67 waterproof, drop-tested, and easy to clean. Use one or two Limb Modules independently with the IOMAX Base Unit, or combine one to four Limb Modules with the Cortical Module. Each requires a SafeT cable.

SPO₂ AND HEART RATE

Rapidly measure and monitor pulse oximetry and heart rate, and detect limb perfusion levels in up to four limbs. SpO₂ must be enabled in each Limb Module to record SpO₂ from multiple sites. SpO₂ sensors sold separately.

PRODUCT AVAILABILITY VARIES BY MARKET.
**Quick Adapts**
Allow for quick and simultaneous connect and disconnect of all E-Stim and amplifier recording electrodes.

**Test Arrays**
Limb Module test arrays allow for the verification of amplifier and stimulator functionality using the built-in Cascade Surgical Studio Diagnostic suite. One set included per system.

**Pocket Chain**
Hang Limb Modules with the Pocket Chain and Bed Rail Mounting Hangers for convenient placement.

**C-Clamp Bracket**
Attach modules to IV poles for convenient and secure placement.

**Bed Rail Mounting Hangers**
Connect to modules for easy hanging from surgical bed rails, chains, or the C2 Cart (2 included).

**Limb Module Accessories**
PRODUCT AVAILABILITY VARIES BY MARKET.
SOLUTION OVERVIEW

32-CHANNEL EEG AMPLIFIER
The Cascade IOMAX 32-channel amplifier is designed to record EEG and direct cortical SSEPs, and can be added to any existing IOMAX configuration or connected directly to the IOMAX Base Module with the standard SafeT cable. It is compatible with Cascade Surgical Studio software v2.5SP1 or higher.

SAFET CABLE
Connects the 32-channel amplifier to the Cascade IOMAX Base Module, Cortical Module, or Limb Module. Cable lengths of 8 m (26 ft) or 3 m (10 ft) are available.
32-CHANNEL EEG AMPLIFIER ACCESSORIES

TEST ARRAYS
The 32-channel EEG amplifier Test Array allows for the verification of amplifier functionality using the built-in Cascade Surgical Studio Diagnostic suite.

INPUT OVERLAYS
Disposable overlays are available to customize input labels. Quantity: (10).

POCKET CHAIN
Hang the amplifier for convenient placement.
CASCADE IOMAX POSITIONING EXAMPLES

Accommodate any surgical table for simple and dynamic product positioning with Cascade IOMAX accessories.

EQUIPMENT KEY:
- EXTENDER PODS
- BED RAIL MOUNTING HANGER
- CHAINS
- C-CLAMP BRACKET

NEURORADIOLOGY

JACKSON FRAME AND IV POLE

PRODUCT AVAILABILITY VARIES BY MARKET.
PRODUCT AVAILABILITY VARIIES BY MARKET.
CSS BENEFITS

• Streamlined IONM workflow
• Simple hardware-first procedure setup
• Capture critical IONM information
• See it how you want it with window docking
• Capture full screen screenshots at every event with CadCapture.
• Deliver clinical excellence
• Monitor all modalities
• Strengthen IONM documentation
• Remote monitoring and integrated live chat
• Optimize quality IONM management
• Feature requests deliver directly to product development
• Citrix Ready (CSS v3.5 SP3+)

CSS SOFTWARE LICENSES

• Cascade Surgical Studio IONM
• TCS TransCranial Stimulator Single Fixed Pair
• TCS-9 TransCranial Stimulator with Montaging
• SpO₂ Measurement
• EEG, DSA, CSA, and EEG Trending
• VEP
• VEP + Goggles
• BAEP
• BAEP + Insert Earphones
• Video
• Remote Monitoring / Direct Connect (for acquisition PCs)
• Reader (for reader PCs)
• Case Data Export
• Automatic Threshold Detection
• CadX Simulator Educator
AUTOMATIC THRESHOLD DETECTION

Fast and accurate pedicle screw threshold testing can be achieved using Automatic Threshold Mode with a specially-designed anatomical interface and dedicated surgeon view (license required).

IMPROVED USER EXPERIENCE

Focus on what’s important with cursor alerts (shown here); windows you can move, dock, and pin; multi-monitor support; and touch screen capability. Most display, acquisition and averaging settings can be adjusted on the fly during data acquisition. You can also add comments remotely and save EMG audio to improve the reviewer experience.
OPTION FOR MULTIPLE VIDEO STREAMS
Integrate an on-screen display from an external video source in CSS (software license and additional hardware required).

MODE-CENTRIC PROCEDURE SETUP
Complete modes (custom or CSS defaults) can be dropped into a protocol in a single step, with all channels, stimulators and amplifiers configured properly. CSS software intuitively assigns channels to modules, and gives users the freedom to specific stimulation parameters.

EEG, CSA AND DSA TRENDING DISPLAYS
Quickly visualize EEG data over time with enhanced analysis of EEG frequency.

USER-SPECIFIC COLOR PREFERENCES
Each user can choose their color preferences for trace window background (light shown above, dark shown to the left), as well as grids, cursors, labels, markers, highlights, cursors, alerts, and more.

TIMERS
Utilize two independent timers with visual and auditory alarms for threshold. Easily track clamp times or use as a reminder to trigger a stimulus.
**CASE DATA EXPORT FOR ANALYSIS**

Case Data Export provides a method for exporting detailed information from one or more cases into a JSON file. Exported case data includes patient and case information fields, trace data with associated information (i.e. mode, channel, stimulus, and cursor details), events and chat, pulse oximetry data, and more.

Options are available to exclude certain types of data such as patient name or specific types of modes. Ideal for research settings, you can now export waveform data, events, and more to EDF+ for analysis in third-party software (license required).
CadX Surgical Simulator

CadX® Surgical Simulator is a comprehensive training and teaching tool that uses the same procedure setups and software functions as you use in the OR. CadX software lets you manipulate the patient control panel to create real-world scenarios for demonstration and assessment purposes. You can simulate realistic IONM data to demonstrate anesthesia effects, surgical effects, technical setup errors, trace characteristics (physiological or not), pedicle screw stimulation, and more. CadX is software-based and requires no hardware.
SOFTWARE - ENTERPRISE SOLUTION

CADLINK DATA MANAGEMENT

CadLink® is a secure, enterprise-level patient and database management system for Cadwell’s Cascade IONM, Arc EEG, and Sierra software. It is Citrix-compatible and has full patient bi-directional HL7 integration with the enterprise EMR. CadLink organizes, manages, and secures your patient files and customized user settings. CadLink is capable of auto-archiving data once the data meets user-configured parameters.

SCALABLE FROM SMALL CLINICS TO MULTI-HOSPITAL SYSTEMS

CadLink is designed for easy setup and operation in either private practice or large neurodiagnostic laboratory settings. CadLink supports multiple users; each with its own test settings and report templates.

SECURE ALL DATA AND COMMUNICATION

Encrypt the transfer and storage of patient data. Point-to-point communication ensures safe and efficient data transfer to the CadLink Server.

ENSURE FAIL-SAFE DATA STREAMING

Safeguard against network connection failures by temporarily saving data locally and automatically streaming trace and video data from recording stations to the centralized storage on the CadLink Server.

CENTRALLY MANAGE SETUP AND UPDATES

Manage CadLink Clients and settings from the CadLink Server. Update Clients independently of Cadwell applications.
EMPOWER COLLABORATIVE FUNCTIONALITY
Access, review and re-монтажe patient data from anywhere on the CadLink network, and document user involvement for HIPAA compliance.

ENABLE REMOTE LIVE REVIEW
Review multiple studies simultaneously from any CadLink client via a local network, Internet, VPN or Citrix Server. Remote reviewers can customize their own view settings.

CHANGE USERS DURING A STUDY
Switch users in an open study and create an audit trail of user involvement. This is ideal for long-term studies or a patient transfer between users.

CUSTOMIZE USER SETTINGS
All users can access their view and color preferences, even during live review.
C2 CARTS

The C2 Cart combines quality, functionality, and flexibility for Cadwell IONM systems and accessories.

FEATURES

- Hydraulic sit/stand
- Worksurface
- Retractable keyboard tray with left and right mouse pads
- Interior column to conceal cables
- Rear travel handle for comfortable transport
- Small pre-installed isolation transformer
- Large locking casters
- IOMAX Storage Bin for hanging modules
- Supply basket with cable brackets

SINGLE MONITOR C2 CART

- Monitor mount for one 24-27 in monitor or All-in-One (AIO) PC
- 120.65 cm (47.50 in) height adjustable column
- Comes standard with a flat worksurface (upgrade to worksurface with a removable drawer)
- For laptop PC, AIO PC, or Small Form Factor (SFF) PC
- Add a camera kit with telescopic pole

DUAL MONITOR C2 CART

- Horizontal or Vertical dual monitor options available
- Monitor mount for two 24 in monitors horizontal “clamshell” or vertical stacked configurations
- 162.56 cm (64.00 in) height adjustable column
- Comes standard with a worksurface with a removable supply drawer. Order extra drawers for multiple technicians.
- For Small Form Factor (SFF) PC
- Add a camera kit with telescopic pole

ACCESSORY BAG

Add an Accessory Bag 40 x 33 x 7 cm (16 x 13 x 3 in) onto the travel handle for extra storage space.
C2 CART DUAL MONITOR, HORIZONTAL OPTION

- Horizontal dual monitors can swivel 270° for surgeon view and fold forward into a “clamshell” for transportation and storage.

C2 CART DUAL MONITOR, VERTICAL OPTION

- Vertical dual monitors
- Worksurface with removable supply drawer
- Isolation Transformer
- Height-adjustable cart column

Camera Kit with telescopic pole

Horizontal dual monitors

Keyboard tray with pull out left and right mouse pads

Cascade IOMAX storage bin
CARRYING CASES

TRAVEL CASE
The travel case is an extremely robust wheeled carry case that adheres to most airlines’ carry-on size requirements. It can fit a complete 48-channel Cascade IOMAX system together with a laptop PC and accessories. This waterproof hard case has a TSA-approved lock, wheels, and a retractable handle. Safeguard your Cascade IOMAX system for storage and transport.

SOFTWARE CASE
Mobilize your laptop with this soft laptop case with zipper 35 x 40 x 7 cm (14 x 16 x 3 in).

SMALL DUFFEL BAG
Store cables and accessories in this duffel bag with zipper 30 x 40 x 15 cm (16 x 12 x 6 in).

PRODUCT AVAILABILITY VARIES BY MARKET.
PRODUCT AVAILABILITY VARIES BY MARKET.
COMPUTERS, AUDIO, AND VIDEO

COMPUTERS, MONITORS, AND ACCESSORIES
Computers purchased from Cadwell include Microsoft Office. Computers may change.

27 IN ALL-IN-ONE (AIO) PC
Requires no external monitor.

27 IN FLAT PANEL WIDESCREEN MONITOR
For use with Laptop or SFF Desktop PC on single-monitor carts.

24 IN FLAT PANEL WIDESCREEN MONITOR
For use with Laptop or SFF Desktop PC (also available in Dual Monitor Kit for SFF). Additional Soundbar Speaker available with this monitor.

SMALL FORM FACTOR (SFF) PC
Use with a single monitor or the Dual Monitor Kit.

HIGH PERFORMANCE LAPTOP PC
Can be used with external monitor(s). Optional portable DVD drive available.

DUAL MONITOR KIT FOR SFF PC
Two 24" flat panel widescreen monitors (not shown).

Y-POWER CORD ADAPTOR KIT
Adapt power cord to supply power to the IOMAX Base Module and laptop PC.

USB MOUSE

PRODUCT AVAILABILITY VARIES BY MARKET.
### AUDIO ACCESSORIES

**SOUND BAR SPEAKER**
Slim and light sound bar with exceptional audio clarity and easy magnetic attachment to select monitors.

**USB SPEAKER**

### VIDEO AND ACCESSORIES

**LOGITECH PTZ PRO VIDEO CAMERA**
Mount the camera on a telescopic camera pole on the C2 Cart and capture live HD 1080p video with 1-10x zoom and enhanced pan/tilt functions controllable in Cascade Surgical Studio software. Requires Video Software License. (Camera hardware and accessories are frequently updated. Call for the latest models.)

**AVIO HD MICROSCOPE ADAPTOR**
Used to connect a microscope to computer for video. Purchase AVIO Microscope Adaptor with or without 3 m / 10 ft HDMI cable. Requires Video Software License.

**BNC/BNC VIDEO CABLE**
Used for Microscope video connection and Color Bullet Camera connection. Choose from 3.6 m (2.0 ft) or 15 m (50 ft) BNC/BNC video cable.
SUPPLIES AND ACCESSORIES

CADWELL DISPOSABLE SURGICAL PROBES
A variety of probes are available for stimulation of direct nerves, pedicle screws, cerebral cortex, tumors, and tissues. Each probe has a 2 m (78 in) lead, is single patient use only, and comes in individual sterile packaging.

MONOPOLAR PROBE
For direct nerve stimulation, pedicle screw stimulation, and stimulating across the bulk of a tumor to identify the course of a nerve. Teflon® coated with a blunt tip for low nerve trauma. Fits easily into the head of poly-axial and fixed-head pedicle screws. Bend shaft up to 30° for microscope use. Available shaft lengths: 90 mm (4 in) and 275 mm (11 in).

BALL-TIP MONOPOLAR PROBE
Stimulate pedicle screws. Insulated shaft helps prevent current shunting. Exposed Ø 2.3 mm ball tip. Bend shaft 30° for microscope use. Multiple shaft lengths for various procedures including lateral access. Individual sterile packaging. Available shaft lengths: 90 mm (3.54 in), 160 mm (6.29 in), and 200 mm (7.87 in).

FLUSH TIP MONOPOLAR PROBE
Suitable for direct nerve stimulation and locating. Individual sterile packaging. Single patient use only. Lead length 2 m (78 in). Shaft length 90 mm (4 in).

CONCENTRIC PROBE
Stimulated with minimum current spread and maximum stimulus specificity. This offers an outer circumferential anode pole and an inner, straight cathode pole separated by insulation and Teflon coated to the tip. Bend the probe shaft up to 30° for microscope use. Shaft length 90 mm (4 in).
SIDE-BY-SIDE BIPOLAR PROBE
Use for direct nerve stimulation or stimulation through a small amount of tissue. Two probe tips limit the spread of current and increase specificity. Tip spacing is adjustable from 2 mm. Add a 30° bend in the shaft for use under a microscope. Individual sterile packaging. Single patient use only. Lead length 2 m (78 in). 90 mm (4 in) bipolar shaft.

BENT BALL-TIP MONOPOLAR PROBE
Stimulate pedicle screws. The 20 cm (7.8 in) insulated shaft after 75° bend helps prevent current shunting and the exposed Ø 2.3 mm ball tip provides a contact area for stimulation. Individual sterile packaging. Single patient use only. Lead length 2 m (78 in). Shaft length: 20 cm (7.8 in).

BIPOLAR CORTICAL STIM BALL-TIP PROBE
Stimulate the cerebral cortex directly. The Ø 2 mm Double Ball tips are spaced 10 mm apart on 30 mm shafts. Individual sterile packaging. Single patient use only. Lead length 2 m (78 in). Bipolar shaft lengths: 30 mm (1.18 in).

DOUBLE BALL-TIP PROBE
Stimulate or record directly from the peripheral nerves and nerve roots. The Ø2 mm Double Ball-Tips are spaced 10 mm apart on 80 mm shafts. Lead length 2 m (78 in). Individual sterile packaging. Single patient use only. Lead length 2 m (78 in). Double shaft lengths: 80 mm (3.14 in).

DOUBLE AND TRIPLE HOOK PROBES
For stimulating or recording directly from the peripheral nerves and nerve roots. Individual sterile packaging. Single patient use only. 90 mm shafts with 5 mm adjustable spacing with 2 m (78 in) leads.
- Double hook probes come in 90°, 100°, and 180°
- Triple hook probes come in 100° and 180°
SUPPLIES AND ACCESSORIES

8-CHANNEL IONM ELECTRODE KIT

A complete touchproof kit for simple or complex spine cases, or for any surgery where eight channels of EMG with SSEPs are appropriate.

1. One 50 x 35 mm ground pad features a larger surface area for maximum noise reduction and a 2 m green lead.
2. One single 13 mm needle electrode with a 2.5 m white lead provides a no waste solution for stimulating probe reference or needle electrode ground.
3. Two sets of disposable surface electrode pairs have 27 x 20 mm pads and twisted red/black and white/black twisted leads to improve impedance and secure patient contact.
4. Eight pairs of twisted subdermal 13 mm needle electrode pairs with 2 m color-coded twisted leads optimize data while minimizing noise during recording or stimulating.
CASCADE IOMAX ELECTRODE KIT

The Cascade IOMAX Electrode Kit is available to USA customers and contains the following items:

CADWELL DISPOSABLE GROUND PADS
Large ground pad with 1.5 m green lead wire. 20/box.

6-LEAD TWISTED SUBDERMAL NEEDLES
6-lead twisted 27G, 12 mm long subdermal needles. 24 sets/box.

QUICK ADAPTS
Simultaneously and quickly insert and remove touchproof leads from amplifiers and stimulators.

CANVAS POUCH FOR QUICK ADAPTS
Small canvas pouch with zipper secures Quick Adapts. 30 x 12 x 5 cm (12 x 5 x 2 in).

PRODUCT AVAILABILITY VARIES BY MARKET.
SUPPLIES AND ACCESSORIES

MISCELLANEOUS ACCESSORIES

CADWELL MULTI-STAGE CLIP
Clip-on style lead wire has a 1.5 mm touch-proof connector with a multi-stage wire form that auto adjusts to any diameter up to 19.05 mm (3/4 in). Ideal for dilators. Lead length 1.83 m (70 in). Sterilized for single use.

CADWELL CLIP-ON LEAD WIRE
Clip-on style lead wire has a 1.5 mm touch-proof connector and a 65° angle plunger tip ideal for clipping onto instruments and probes. Up to 6.35 mm (.25 in). Lead length 1.83 m (70 in). Sterilized for single use.

CADWELL DUAL AND QUAD EXTENSION LEAD WIRES
Extension ribbon cables with touch-proof connectors for the OR. Non-sterile. Blue/white dual extensions available in 1.5 m (60 in) and 4.5 m (180 in) lengths. Quad extensions with blue, green, orange and red leads come with 1.8 m (72 in) leads.

CADWELL REFERENCE JUMPER
Reference jumper features two stackable, 1.5 mm (0.06 in) touch-proof connectors and an ultra-flexible lead wire. Red 2.5 m (98 in) and blue 15 cm (6 in) jumpers available.

NOISE DETECTION PROBE
Allows technologists to quickly locate sources of noise in the operating room. 200 Ep Inductive Amp.

MULTICOLORED VELCRO STRAPS 5-PACK
Manage cables, wire and cords with 1.27 x 20.32 cm (0.5 x 8.0 in) multicolored Velcro straps.

PRODUCT AVAILABILITY VARIES BY MARKET.
DISPOSABLE ELECTRODES

CADWELL DISPOSABLE 4-DISC ELECTRODES WITH LEADS
Ag/AgCl sensor and an extra thick and flexible conductive gel. Use for recording, stimulation and ground use. Designed for patient comfort and user friendliness with soft wires and an optimized connector for easy headbox insertion and extraction. Disc diameter is 20 mm, and lead lengths are available in 1, 1.5, 2, 2.5, and 3 m (39, 59, 79, 98, and 118 in).

ORIGINAL - CADWELL DISPOSABLE 4-DISC ELECTRODES WITH LEADS
Four disposable disc electrodes with hydrogel are attached to wires in red, blue, green, and black. Single patient use only. Individually sealed sets of four leads have 4 mil carbon film, silver/silver chloride coated 19 mm (0.75 in) discs with 1 m (39 in) leads.

CADWELL DISPOSABLE SURFACE ELECTRODES WITH SINGLE AND TWISTED PAIR LEAD WIRES
4 mm carbon film, formulated with silver/silver chloride hydrogel so it is secure and movable. Singles: 12 individually sealed 4-packs with 27 x 20 mm pads and red, white, and black 2.5 m (100 in) leads. Twisted: 24 individually sealed pairs available with 20 x 15 mm or 27 x 20 mm pads and 1.5 m (60 in) or 2.5 m (100 in) red/white and black/white leads. Single patient use only.

CADWELL DISPOSABLE GROUND ELECTRODE WITH LEAD WIRE
Adhesive 40 x 50 mm ground electrode has lead length options of 1, 1.5, 2, 2.5, and 3 m (39, 59, 79, 98 and 118 in).

AMBU® NEUROLINE DISPOSABLE GROUND ELECTRODE WITH LEAD WIRE
Ground electrode with attached 1 m or 1.5 m (40 or 60 in) lead wire and a special green tab for repositioning. Individually packaged and single patient use only.

AMBU® NEUROLINE DISPOSABLE TAB ELECTRODES WITH LEAD WIRES
Self-adhesive electrodes are easy to reposition and feature high quality silver/silver chloride sensor for optimum signal quality. Single patient use only. The three-pack 30 x 22 mm pads have color-coded 50 cm (20 in) or 80 cm (32 in) lead wires. The 28 x 20 mm have a duck-foot style for better grip and a 1.5 m (60 in) lead wire.
SUPPLIES AND ACCESSORIES

NEEDLE ELECTRODES

CADWELL DISPOSABLE SUBDERMAL NEEDLE ELECTRODES
Single 13 x 0.4 mm (0.5 in x 27G) subdermal needles with ultra-sharp tip for low penetration resistance. EO gas sterilized. Four sets of six colors in 1, 1.5, 2, and 2.5 m (40, 60, 80 and 100 in) lead lengths. Single patient use only.

CADWELL DISPOSABLE PARALLEL SUBDERMAL NEEDLE ELECTRODES
Vacuum-smelted, high-elastic and medical grade stainless steel wires. Safe-touch DIN 42802. 13x 0.4 mm (0.5 in x 30G) parallel needle pairs with 1.5 or 2.5 m (59 or 98 in) leads. 10 colored pairs in individual pouches per box. Single patient use only.

CADWELL DISPOSABLE SIX-PARALLEL SUBDERMAL NEEDLE ELECTRODES
Easy to operate and wind during procedures. 10 sets of six-parallel 13 x 0.4 mm (0.5 in x 30G) needles with 1.5 m lead individually packaged in each box. Single patient use only.

TECHNOMED DISPOSABLE EXTRA SMALL SUBDERMAL NEEDLE ELECTRODES
Single 7 x 0.3 mm (0.28 in x 30G) stainless steel needles in four sets of six color-coded 1.5 m (59 in) leads. EO gas sterilized. Single patient use only.

AMBU® NEUROLINE DISPOSABLE SUBDERMAL NEEDLE ELECTRODES
Lancet cut stainless steel 12 x 0.4 mm (0.5 in x 27G) needles with ultra-sharp tip for low penetration resistance, low noise and low impedance level. Color-coded attached lead wires in 0.5, 1, 1.5, and 2.5 m (20, 40, 60 and 100 in) lengths. EO gas sterilized. Single patient use only.

TECHNOMED HOOKED NEEDLE ELECTRODES
Tangle-free, color-coded 2 m (80 in) lead wires and stainless steel lancet cut 21 x 0.45 mm (0.83 in x 26G) needle tip offer easy insertion and clear signals. Red, green, black, white, yellow and blue. EO gas sterilized. Single patient use only.
CADWELL TWISTED DISPOSABLE SUBDERMAL NEEDLE ELECTRODES
Double subdermal needles with ultra-sharp tip available in 7 x 0.4 mm (0.27 in x 27G) needles with 1.5 m (60 in) twisted leads, or 13 x 0.4mm (0.5 in x 27G) needles with 1, 1.5, 2, or 2.5 m (40, 60, 80, or 100 in) twisted leads. Twisted lead wires reduce noise and impedance levels giving a clean, clear signal. Red, green, blue, yellow, orange, and purple twisted with black and white wires. EO gas sterilized. Single patient use only.

CADWELL SIX-TWISTED SET DISPOSABLE SUBDERMAL NEEDLE ELECTRODES
Convenient set of six-twisted subdermal 13 x 0.4 mm (0.5 in x 27G) needle electrodes with 1.5 m (60 in) lead reduces time of setup and lowers cost per needle. EO gas sterilized. Each twisted set comes with red, yellow, blue, green, black and white. 10 sets per box. Single patient use only.

AMBU® NEUROLINE TWISTED DISPOSABLE SUBDERMAL NEEDLE ELECTRODES
Stainless steel 12 x 0.4 mm (0.5 in x 27G) needle with ultra-sharp lancet cut for easy penetration and secure recording. Twisted 1 or 1.5 m (40 or 60 in) lead wires reduce noise and impedance levels giving a clean, clear signal. EO gas sterilized. Red, green, blue, yellow, and orange twisted with black and white wires. Single patient use only.

CADWELL SUBDERMAL CORKSCREW
Standard single stainless steel corkscrew needle keeps it stable during use. Four sets of six lead colors in 1.2 or 2 m (48 or 80 in) lengths. Individual sterile packaging. EO gas sterilized. Single patient use only.

CADWELL STERILE TWISTED CORKSCREW DISPOSABLE NEEDLE ELECTRODES
Stainless steel 0.6 mm (23G) corkscrew needle electrodes with 1.2, 1.5, 2 and 2.5 m (47, 59, 78 and 98 in) twisted lead lengths. Single patient use only.

NEEDLETAPE®
NeedleTape® is safe and effective solution when using Cadwell subdermal needles, twisted subdermal, and corkscrew needles to help prevent needle sticks. 63.5 x 95.25 mm (2.5 x 3.75 in) pieces.
SUPPLIES AND ACCESSORIES

SPECIALTY ELECTRODES AND PROBES

CADWELL ENT DUAL DISPOSABLE NEEDLE ELECTRODES
12 x 0.4 mm (0.47 in) x 30G needle pairs with leads in 1, 1.5, 2, and 2.5 m (39, 59, 78 and 98 in) lengths. 12 dual needles per pouch, 12 pouches per box. Single patient use only.

AD-TECH EPIDURAL SPINAL ELECTRODE
Three platinum contacts are ideal for recording D-waves during motor evoked potential monitoring. 16G Tuohy needle and internal stylet included. Attached 121 cm (48 in) ribbon cable terminates in standard touch-proof connectors. Individual sterile packaging. Single patient use only.

DRAGONFLY® LARYNGEAL SURFACE ELECTRODE
For continuous monitoring of the recurrent laryngeal branch of the Vagus nerve during surgery. When placed on a standard adult endotracheal tube (not included), the blue location markers on the electrode help confirm correct placement in the larynx. This electrode is the preferred electrode at teaching hospitals worldwide. Individually packaged, comes in boxes of five. Single patient use only. Not for EMT use.
- Large 1-channel fits 8-9.5 mm ET Tube with 76 cm (30 in) lead
- Large 2-channel fits 8-9.5 mm ET Tube with 2 m (78 in) lead
- Small 2-channel fits 6-7.5 mm ET Tube with 2 m (78 in) lead
NEUROVISION™ 1- AND 2-CHANNEL COBRA® ET TUBE ELECTRODES

These 3-Plate EMG Endotracheal Tubes are designed for precise placement, impedance optimization, and durability. Electrode geometry creates universal compatibility with single or multi-channel systems. The high volume, low pressure cuff maintains the seal on the trachea. Color coded lead wires can identify the lateral vs. posterior electrode. Hermetically sealed wire connections protect from fluids to maintain a secure connection. 5 per box. Available in 6, 7, and 8 mm tubes.

AD-TECH SUBDURAL STRIP ELECTRODE AND CONNECTION CABLE

For cortical mapping, cortical stimulation, and electrocorticography test procedures. This electrode strip has 1 x 4 or 1 x 6 platinum contact discs 4 mm diameter with 2.3 mm exposure and 10 mm spacing in a flexible silastic body. Individually sterile packaged. Attach to reusable 1.8 m (70 in) connection cables. Also available in a one-piece completely disposable version with 1 x 4, 1 x 6, and 1 x 8 strips. Single patient use only.

DRYTOUCH® SUCTION STIMULATOR PROBE WITH NEEDLES

Provide a dry stimulation field. The ball-tip design delivers repeatable stimulation while simultaneously evacuating conductive fluids that cause electrical shunting. 13 cm needles. Single patient use only.
Cadwell Industries, Inc. is an American, family-owned neurophysiology diagnostic and monitoring solutions provider founded in 1979 by brothers John and Carl Cadwell. We engineer innovative and easy-to-use solutions that efficiently improve patient outcomes.

Our core competencies are full-spectrum EEG; Electrodiagnostic solutions for EMG, NCS, and EP with fully integrated Ultrasound; IONM; Sleep Diagnostics including in-lab PSG and HSAT; and a full suite of essential electrodes and accessories. We combine customer insight with decades of employee expertise to create cutting-edge technology and provide market-leading customer support.

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*Front cover: The main components of the Cascade IOMAX system are Made in the USA as defined by the Federal Trade Commission. Information and products displayed in this document demonstrate sample configurations containing optional components, which may be changed without notice and do not define what is delivered with an order. Actual product configuration and content are determined and confirmed independently at the time of purchase. Product availability may vary between different countries and markets. Please contact Cadwell for additional information.

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