

Solo

compact and portable

screening and diagnostic

ABR and ASSR



the budget friendly solution

We've listened to you and have integrated your feedback into a portable and cost-effective ABR device. We are excited to introduce the Solo: a sleek, portable, and compact solution for screening and diagnostic ABR and ASSR.

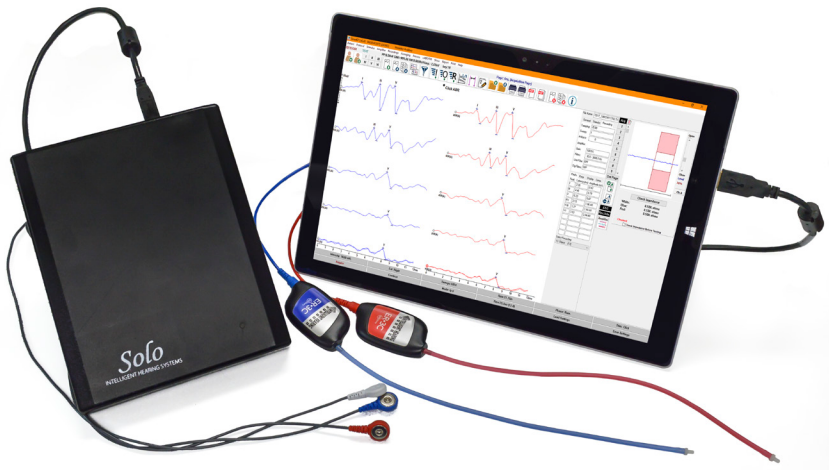
stellar performance

Over 35 years of engineering design experience, combined with unsurpassed expertise in evoked responses, have culminated in the **next generation bio-amplifier** bringing you superior data quality of recordings.

Repeatable, reliable data you can count on

- High definition responses
- Cleaner, more robust responses
- Increased signal-to-noise ratio (SNR)
- Lower residual noise

Reduced test times without compromising data quality

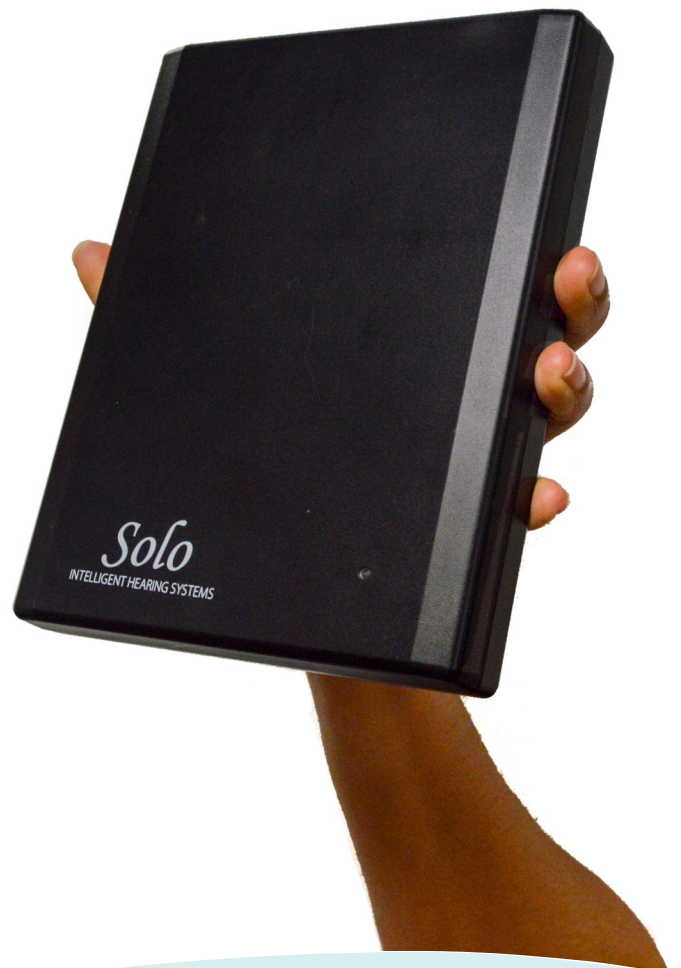


dressed up for performance

The newest member of the Universal Smart Box family, the Solo, is IHS quality in a smaller package

- Ultra light weight, at less than 2 lbs (1 kg)
- USB powered: use with a Windows laptop or tablet
- One recording channel
- Built-in isolation: can be used in any location, including the NICU and OR

Test in more places without sacrificing flexibility



ready for the clinic

Solo is a great tool for recording ABRs and ASSRs in clinics wanting a cost-effective 1-channel solution.

Solo features the iChirp stimulus family

The following modules are available on Solo:

SmartEP

- Click ABR
- Toneburst ABR
- Narrowband and broadband chirp ABR

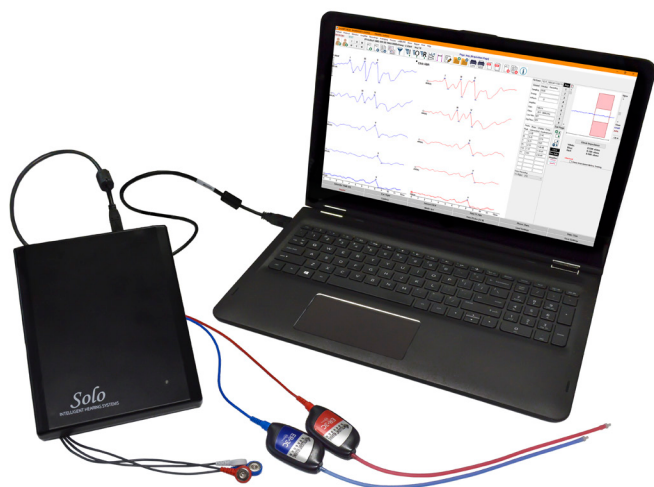
SmartEP-ASSR

- Click and Broadband chirp ASSR
- Single or multi-frequency tone or chirp ASSR

SmartScreener-Plus2

- Automated ABR screening

Add the options that meet your clinic's needs and upgrade at any time.



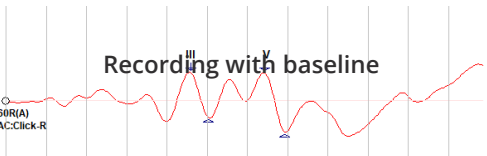
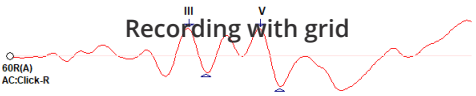
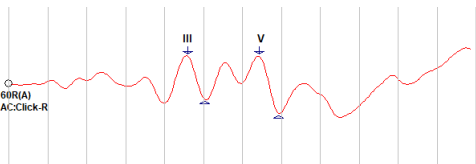
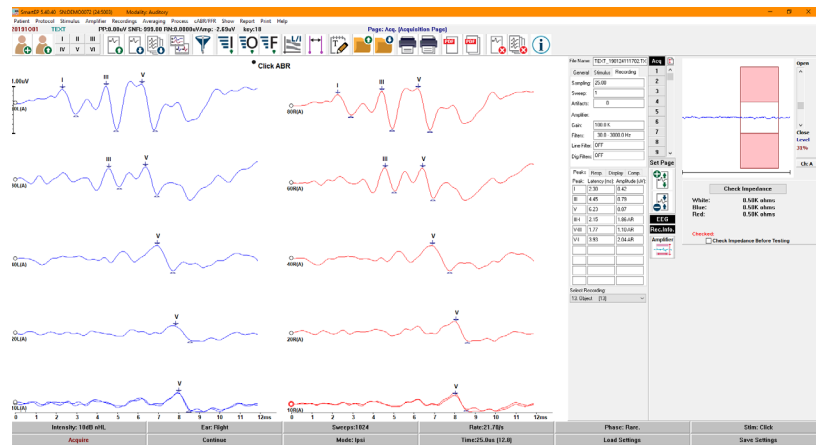
designed for an improved clinical experience

SmartEP

The ideal clinical tool for recording Toneburst, Chirp, and Click ABR.

user friendly interface simplifies acquisition

- Improved toolbar and button design for fast access to key features
- Easy access to all parameters from a simplified control panel and streamlined menus
- Quickly load your own or preset protocols
- Automated impedance checking with on-screen display
- Single channel with automatic electrode switching
- Easily view ongoing EEG display for quick assessment of patient state during testing
- Great variety of options allow you to perform the tests the way you want
- Choose from a variety of stimuli, or generate or import your own custom stimuli
- Display or hide a subtle vertical grid or horizontal baseline



Recording with grid and baseline

streamlined workflow

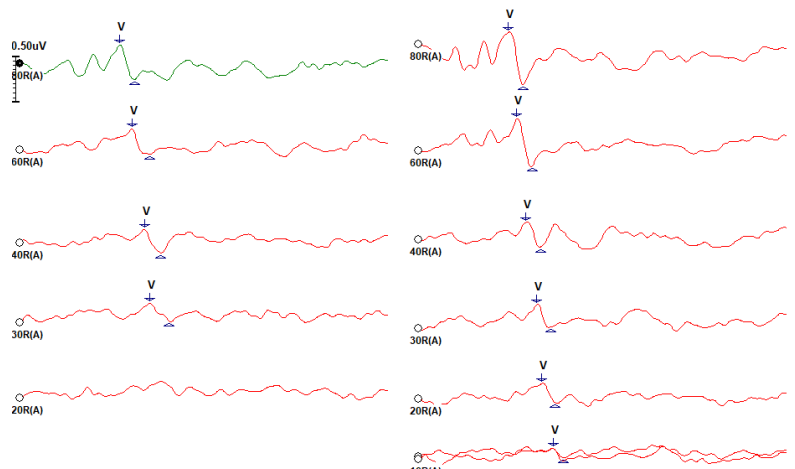
- Easily mark waveforms using over thirty pre-defined peak labels, or create your own custom labels. Easily adjust them using a mouse or keyboard
- View latencies and amplitudes of peaks directly on waveforms and in newly embedded recording information panel.
- Automatically arrange recordings by intensity, acquisition order, or rate
- Quickly resize the waveforms using the zoom in/out buttons
- Customizable page labels and attributes

iChirp™ stimuli included

The intelligent Chirp for SmartEP and SmartEP-ASSR is included in the base package.

- Broad and narrow band (500, 1000, 2000, 4000 Hz)
- Improved threshold detection
- Robust amplitude responses
- Optimized wave V identification
- Optional, innovative custom chirp design utility

Beneficial for recording ABR in awake and active patients.



2000 Hz tone burst ABR vs 2000 Hz iChirp ABR

smart features

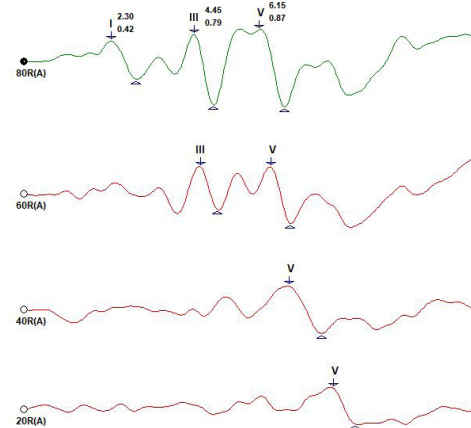
- Latency-Intensity graphs indicating normative data ranges are automatically generated from marked waveforms
- Compare any two recordings with automatic latency difference calculation
- Quickly add, subtract, invert, time shift, or cross-correlate recordings
- Ability to show/hide the contralateral response when recording from both channels
- Display or hide a subtle grid or baseline
- Split-sweep view to visualize single recording repeatability



Peaks	Resp.	Display	Comp.
Calculation Region (ms):			
Start :	4.00		
End:	9.00		
Update			
Update from Cursors			
SNR:	5.74		
Res.Noise:	0.04uV		
Cross Corr:	0.9849		
Select Recording:			
1. EP: Right 20 dB A [1]			

EEG Rec.Info. Amplifier

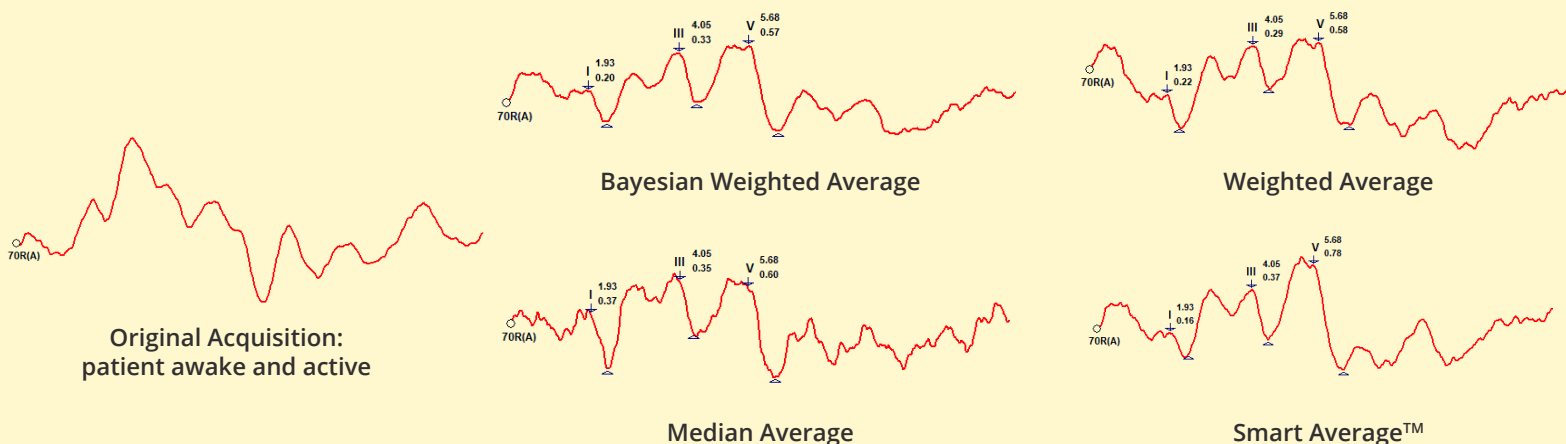
- Easily mark waveforms using pre-defined or custom labels, adjust them using a mouse or keyboard
- View latencies and amplitudes of peaks directly on waveforms and in newly embedded recording information panel.
- Automatically arrange recordings by intensity, acquisition order, stimulus frequency, or rate
- Quickly resize waveforms using the zoom buttons
- Customizable page labels and attributes
- Reports with multi-page display of EP and ASSR data with built-in PDF printing
- Customizable report printouts with options to show/hide parameters and peak label information
- Auto-save reports on program exit



File Name:	SARA00A.2	Acq
General	Stimulus	Recording
Sampling:	25.00	1
Sweep:	1024	2
Antifacts:	0	3
Amplifier:		4
Gain:	100.0 K	5
Filters:	30.0 - 15000.0 Hz	6
Line Filter:	ON	7
Dig Filters:	OFF	8
		9
Set Page		
Peaks: Resp. Display Comp.		
Peak:	Latency (ms):	Amplitude (uV):
I	2.30	0.42
III	4.45	0.79
V	5.15	0.87
III-I	2.15	1.86 AR
V-III	1.70	1.10 AR
V-I	3.85	2.04 AR
Select Recording:		
6. EP: Right 80 dB A [6]		

smarter averaging options

- Record using various averaging methods, including Standard, Median, Weighted, Bayesian Weighted, and Smart Average
- Recalculate block averaged recordings using any of the averaging techniques for further noise reduction
- Seamlessly switch between averaging methods during acquisition
- Averaging techniques can be changed post-acquisition with the option to show as a new recording



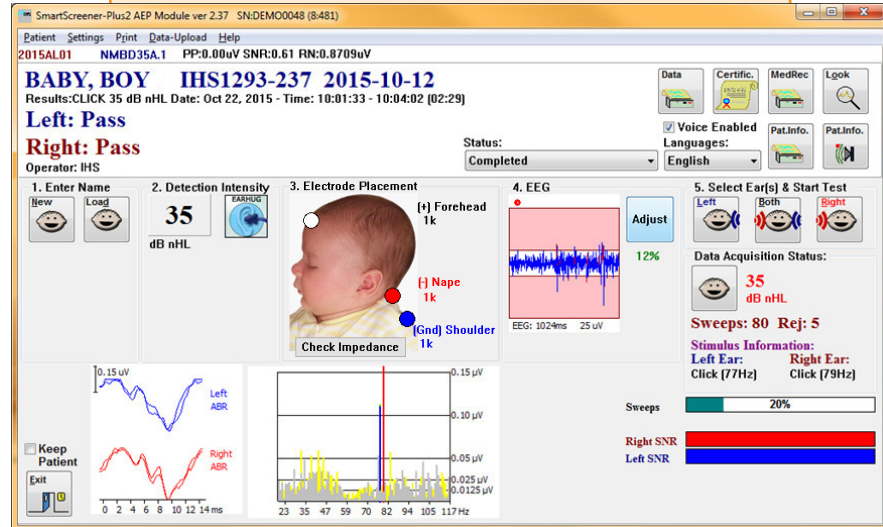
- Objective response measurements provide indicators of recording quality, including SNR, RN, d-prime, Fsp, and Fmp
- Automated averaging stopping rules using residual noise measures allow data to be acquired automatically with consistent quality and noise level criteria

SmartScreener-Plus2

SmartScreener-Plus2 is the most cost-effective, complete, and easy to use infant hearing screener. It is simple to operate, with step-by-step visual operator instructions. Friendly voice prompts and alerts are available to guide you through the screening process.

- Fast, accurate, and reliable automated ABR screening
- Automatic Pass or Refer results
- Screening results in as little as two minutes
- Screen patients of any age
- Setup different users with varying levels of access
- Create ABR protocols with up to three different stimulus levels
- Stimulus Intensity Level may be set and locked by users with administrative privileges
- Display of the ABR waveform
- Integrated Data Back-Up utility allows for a seamless transfer of results to central databases for easy export to Hi*track, OZ-esp, and other databases
- Easily customize and print certificates, parent information letters, and medical records
- Quickly categorize and track pending and completed screenings
- Built-in System Maintenance Utility for easy system checks and automated data quality analysis
- Documents & Videos Module can be setup as desired using user-supplied materials

ABR Screening



- Simultaneous testing of both ears
- Fast, mid-line ABR recording electrode setup requiring only three electrodes
- ABR recording electrode placement and impedance values shown on the screen
- Password protected, user-selectable intensity level



baby-friendly EarHug

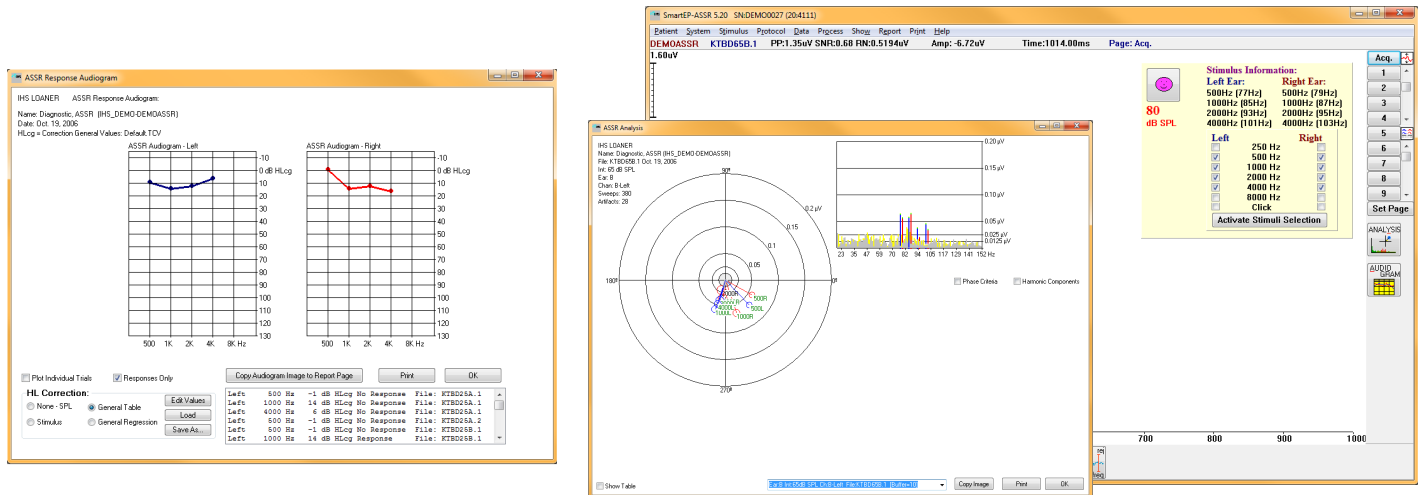
Designed with the baby's comfort in mind.

- Cost-effective disposable ear coupler
- Special flexible material adheres to the skin firmly but is gentle enough for comfortable removal
- Large adhesive surface keeps the EarHug from detaching during screening
- Comfortable design allows the baby to easily fall asleep even when lying on the EarHug

SmartEP-ASSR

Full-featured screening and diagnostic Auditory Steady State Response system.

- Provides quick, accurate threshold detection using automated statistical analysis
- Test both ears at the same time, up to four frequencies per ear
- iChirp (broadband & frequency specific) for robust amplitudes and harmonic component analysis for improved threshold detection and reduced test times
- Automated audiogram generation in both SPL and HL
- Ability to save all recording data for ASSR, including the SNR and RN for future analysis
- Cost effective add-on to SmartEP



Accessories

- All cables feature quick-disconnect connections
- Two types of electrode cables for use with disposable and reusable electrodes
- Shielded ER-3C insert earphones



Solo Technical Specifications

GENERAL SPECIFICATIONS

Evoked Potentials: ABR, ASSR

Audiometry: Audiometer, VRISD

SMARTSCREENER-PLUS2

Stimulus: Clicks, with simultaneous testing of both ears

Option to display or hide: test status indicators, ABR waveforms, spectral graphs

Impedance Measurement: automated, periodically measured to monitor electrode integrity during the screening procedure

EP AMPLIFIER

Channels: Single channel with automatic polarity switching

Gain: 100,000 (fixed)

High Pass Filter: 30 Hz, -12 dB/Oct

Low Pass Filter: 1500 Hz, -12 dB/Oct,

Digital Filters: Finite Impulse Response (FIR/Smoothing), Band Pass, Notch

A/D Converter: 16-bit

Sampling rate:

200 to 40,000 Hz (adjustable)

Recording Window: -2.5 s to 2.5 s (max)

Data points: 1024 per waveform

Artifact Rejection Level: Adjustable: 0-100%, and any region within the analysis time window

Line Frequency Notch Filter:

50 or 60 Hz (-12 dB/Oct)

Common Mode Rejection:

≥ 105 dB @ 1 kHz

≥ 115 dB @ 60/50 Hz, notch filter off

Noise Level: ≤ 0.20 μ V RMS

Input Impedance: > 10 MOhms

Electrode Impedance:

Measuring frequency: 1,000 Hz

Measuring range: 1 - 25 kOhms

ASSR

Gain: 100,000

High Pass Filter: 30 Hz

Low Pass Filter: 300 Hz

Stimulus:

Clicks, Tones, Broadband iChirp and Octave Band iChirps, and user-defined files. Simultaneous testing of both ears

Test up to four frequencies per ear.

Frequencies: 250, 500, 1000, 2000, 4000, and 8000 Hz

EP STIMULUS

Stimulus: Clicks, Tones, Broadband iChirp and Octave Band iChirps, Complex, Speech, and user-defined files

Stimulus duration:

Defined in μ sec or cycles

Click: 100 μ s default (adjustable)

Tones and user files:

up to 500 ms (adjustable),

Stimulus Envelopes:

Rectangular, Blackman, Exact Blackman, Cosine, Cosine Squared (Hanning), Cosine Cubed, Extended Cosine (Rise/fall time), Triangular (Bartlett), Trapezoidal (Rise/fall time), Gaussian

Stimulus presentation: Continuously or only while acquiring. Rarefaction, Condensation, or Alternating polarity

Stimulus Rate:

0.1 - 200 per second,

(dependent on stimulus duration)

Rates > 200/s available in CLAD

Stimulus Output:

Up to 130 dB SPL

Attenuation Range: 150 dB

Level Accuracy: $\pm$ 1 dB

D/A: 16-bit

Frequency:

Range: up to 8 kHz

Frequency Accuracy: $\pm$ 1%

Masking:

Level: up to 125 dB SPL

Frequency Response: Flat to 20kHz (transducer limits determine roll off)

Types: Specific or relative to stimulus level. Contralateral White Noise

INSERT EARPHONES:

Intensity: up to 130 dB SPL

Frequency Range: 125 - 8,000 Hz

Total Harmonic Distortion: <1% @1kHz

DATA AND SECURITY

Encryption: Advanced Encryption Standard (AES) to encrypt patient demographic information (PHI), using a 256-bit key

Data Export: Ability to export to external patient databases such as Oz-eSP, HiTrack and other hospital systems using HL7 protocols (customization fee may apply)

PHYSICAL CHARACTERISTICS:

Dimensions:

18.5 x 14.5 x 3 cm (7.3 x 5.7 x 1.2 in)

Weight: 0.36 Kg (0.8 lbs)

POWER REQUIREMENTS

USB Powered: +5V DC, 0.65 A 3.25W

Fuse Type: Fast Acting

1.5 A, 32 V (IEC 60127-2 compliant)

ENVIRONMENT

Degree of Mobility: Portable Equipment

Location: Indoor use

Temperature:

Operating: 15°C - 35°C (59°F - 95°F)

Transport: -20°C - 50°C (-4°F - 122°F)

Storage: 0°C - 50°C (32°F - 122°F)

Relative humidity: Operating: 15% to 90% at 40 °C non-condensing

Ambient Pressure:

Operating: 78 kPa -104 kPa

Storage: None Specified

Warm-up Time:

None at room/operating temperature

QUALITY SYSTEM

ISO 13485: Manufactured, designed, developed, and marketed under ISO 13485 certified quality systems

STANDARDS COMPLIANCE

Safety and Electromagnetic Compatibility:

IEC 60601-1 Class II, Type BF (Safety)

IEC 60601-1-2 (EMC)

IEC 60601-2-40 (EP)

Electroacoustics - Audiometric Equipment

IEC 60645-7:2009 Type 1

Protection from Fluids:

IPX0 – Ordinary equipment

COMPUTER REQUIREMENTS

Operating System:

Windows 10 or Windows 11

Hardware Required:

Minimum 8 GB RAM

Minimum 5 GB hard drive space

Mouse or other pointing device

1 USB Port

Display:

900 pixels minimum vertical resolution,

Full HD recommended

Power Supply: Grounded, 3-prong power supply, Compliant with IEC 60950

External Storage:

Removable media, network drive, or secure Internet storage site for data backup (recommended)

Printer:

Software includes PDF printing capabilities, hardware printer optional