™SynAmps RT

Detailed Overview of Functionality

SynAmps RT is the latest EEG and ERP amplifier from Compumedics Neuroscan. Using the most current technology, the RT, builds on the quality of the past SynAmps series of amplifiers and extends the specifications beyond anything that has come before.

SynAmps RT sets a new standard in amplifier technology, providing a system suitable for recording everything from high sampling rate (20,000 Hz) Auditory Brain Stem recordings and Spike Spindles to true DC recordings of CNV and P300. The SynAmps RT also serves as the recommended platform for recording in the MRI, in conjunction with the MagLink RT system.

SynAmps RT can be used in conjunction with the SCAN software, providing a complete acquisition and analysis system or with the ACCESS SDK, allowing user's custom built software to control and acquire data from the system.

SynAmps RT can also be used with the STIM 2 system for integrated and accurate stimulus presentation or will accept TTL pulses from third party systems.

SynAmps RT can be used with the QuikCap, to provide fast and simple electrode placement or will accept any touch proof electrode as well. Grid, depth and microelectrodes may also be used with the SynAmps RT.

SynAmps 2 systems can be upgraded to the SynAmps RT, which will improve many of the critical specifications. Please contact Neuroscan Sales for specific details.

Feature and Function Summary

Channel Count Per Headbox:
64 Monopolar, 4 Bipolar, 2 High Level

Utilizing the latest technology, SynAmps RT allows for discrete monopolar and bipolar channels, enhancing the flexibility of recordings. Additionally high level inputs are isolated to allow voltage level signals to be merged with the physiological data. Linking headboxes together, allows more then 500 channels to be recorded. A fully isolated, programmable bipolar excitation supply is also provided capable of supplying up to +/- 10VDC at 100mA to external bridges or measurement devices.

Maximum Sampling Rate:
20,000 Per Channel all channels driven

Faster sampling rates allow for more accurate sampling of the analog data being recorded. Signals such as Auditory Brain Stem Response, require these faster rates, while typical ERP measures benefit from increased resolution. These faster rates are also essential for accurately obtaining the artifact associated with the fMRI pulse sequence.

Sampling Method:
All Channels Sampled Simultaneously

Current technology eliminates the problems associated with sample and hold circuits. Utilizing a dedicated 24-bit A to D chip for each channel, the SynAmps RT enhances resolution and accuracy of each sample, by ensuring a more valid measure of the data without decay or skew. The 24-bit resolution, allows for even the most subtle differences in amplitude to be measured accurately.

Recording Bandwidth:
DC to 3000 Hz

Many slow potentials (i.e., P300, MMN, CNV) have components that can only be measured accurately using a DC amplifier. DC amplifiers are also not subject to the AC coupled, filter time constant that distorts recordings after an artifact. The high frequency end of the SynAmps RT's range allows for more accurate recording of artifacts associated with the MRI, which oscillate at MHz frequencies.

Active Noise Cancellation:
Utilizing advanced driven reference technology

SynAmps RT sets a new standard for amplifier design, both in terms of safety and signal quality. Actively sampling environmental noise and applying an antiphase signal to eliminate that noise, elevates the CMRR to unprecedented levels. This technology also provides increased patient isolation, ensuring safety even in the FDA's stringent signal fault production test.

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Recording in fMRI Environments:
Integration with the MagLink RT System

The same amplifier that is used in standard recording environments, can also be used to record EEG data in the MRI, by interfacing to the MagLink RT system. SynAmps RT was built with enough input range and accuracy to sample both the EEG and the fMRI artifact with sufficient resolution to remove the artifact and ensure the EEG is left intact.

10 G Ohm Input Impedance:
Allows both standard impedance or fast preparation to be obtained

SynAmps RT allows you to choose on a subject by subject basis, to prepare the scalp electrode impedance to the scientifically accepted levels or to record with high impedance, due to time or subject constraints. This flexibility allows you the option to maximize your data collection for each subject and collect the best data the situation allows.

Portability and Integration:
Small Package big features

Digital amplifiers are typically small and thus portable, but portability also means unpredictable environmental noise. SynAmps RT has built in technology to function even in the worst electromagnetic fields. Custom solutions such as Mu metal shielding are available, to ensure data quality even under hostile conditions.

System Specifications

Incredible amplifier characteristics even when using a realistic system wide bench test Compumedics Neuroscan sets itself apart by bench testing functional systems to obtain amplifier characteristics. This practice is much different than quoting component level part specifications, as it takes into account the entire system, as the functional system will effect the specific characteristics of each component. Testing the sum of the parts ensures that each SynAmps RT unit meets our strict quality standards.

SynAmps RT Technical Specifications

Monopolar Channel Count	64 Per Headbox up to 512 Channels
Bipolar Channel Count	4 Per Headbox, 16 Per System Unit
High Level Channel Count	2 Per Headbox, 8 Per System Unit
Maximum Sampling Rate	20,000 Hz Per Channel all channels driven
Sampling Method	All Channels Sampled Simultaneous
Amplification Mode	Digital
A/D Resolution	24 Bit
Input Impedance	>1 G ohms
CMRR	110dB
Input Noise	<0.5uV RMS DC to 200Hz,<1.5uV RMS Bandwith DC-3500Hz
Bandwidth	DC to 3500 Hz
Sensitivity (AC Mode)	3 nV/bit
Digital (TTL) Inputs	8 Bit Stimulus, 8 Bit Response TTL
High Level Input Range	+/- 5 V
Impedance Measurement	1K Ohm to 200K Ohm
Device Certification	
EU Risk Classification	2B, CE Marked
Type	CF
FDA Class	II
FDA Product Code	GWQ, GWP, GWF, GWE, GWJ

Safety Specifications

- EN 60601-1 Medical Electrical Devices - General Requirements for Safety
  - US National Deviations for IEC601-1
  - Canadian National Deviations for IEC601-1
- EN 60601-1-1 - Collateral Standard - Systems
- EN 60601-1-2 - Collateral Standard - Electromagnetic Compatibility
- EN 60601-1-4 - Collateral Standard - Programmable Systems
- EN 60601-2-26 - Specific requirements for electroencephalographs

For more information please contact:

Compumedics Limited, Australia:
Headquarters
30-40 Flockhart Street
Abbotsford VIC 3067, Australia
Ph: +61 3 8420 7300
Fax: +61 3 8420 7399
Free Call: 1800 651 751

Compumedics USA, Limited:
6605 West WT Harris Blvd, Suite F
Charlotte, NC 28269
Toll Free: +1 877 717 3975
Ph: +1 704 749 3200
Fax: +1 704 749 3299

Compumedics Germany GmbH:
Global HQ for Compumedics DWL
Josef-Schüttler-Strasse 2
D-78224 Singen, Germany
Ph: +49 7731 79 76 9-0
Fax: +49 7731 79 76 9-99

Your local Compumedics Distributor:

www.compumedics.com

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