

Wearable Polysomnograph

Advanced Medical Electronics Corporation

Advance Information

A full-featured 16-channel wearable polysomnograph that records locally, or transfers data off-body using a plastic optical fiber connection or wireless digital radio.

FEATURES:

- 16 data channels, including:
 - Pulse Oximetry and Heart Rate,
 - EEG (4 channels),
 - EOG (2 channels),
 - EMG (2 channels),
 - EKG,
 - Chest Effort (2 channels),
 - Airflow (thermoresistive or optional pressure based),
 - Body Position,
 - Snore Sensor.
- Small Package: 0.85 x 3 x 6.5 inches.
- Lightweight: 8 ounces.
- Low Power: 2 AA batteries last 12 hours.
- Impedance Testing.
- Optical fiber connection (option).
- Wireless digital radio connection (option).
- Solid-state recording memory module (option).



The wearable polysomnograph is worn high on the chest using an elastic holster. It records locally, or transfers data off-body using an optical fiber connection or wireless digital radio.

DISCUSSION:

The wearable polysomnograph integrates all sensor signal conditioning into one package. Integrated sensors include a Nonin pulse oximeter and Pro-Tech Services position sensor. The respiratory effort channels are configurable for use with either Pro-Tech Services piezo effort bands or the new quantifiable effort bands. Amplifiers for Pro-Tech Services respiratory airflow sensors and snore sensors are also included.

The circuitry for the six channels of EEG and EOG are contained on a single circuit card assembly inside the wearable polysomnograph package. This circuit card is optional, allowing the same platform to be used in applications not requiring EEG. The wearable polysomnograph includes impedance testing for all electrode channels.

As an option, a Pro-Tech Services pressure transducer can be included in the wearable polysomnograph package. This connects to a filtered cannula through a luer taper port. The pressure transducer replaces the airflow and snore sensors.

The wearable polysomnograph transmits data continuously over either an internal 900 MHz digital radio or a plastic optical fiber. The optical fiber can be connected to a small wearable solid-state recording memory-module that is connected to a computer using a USB connection for data readout. The ability to transmit polysomnograph data off the body with a wireless connection allows the patient to sleep untethered while a technician monitors the data locally or over an Internet connection.

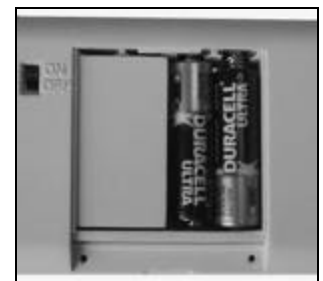
COMPACT DESIGN:



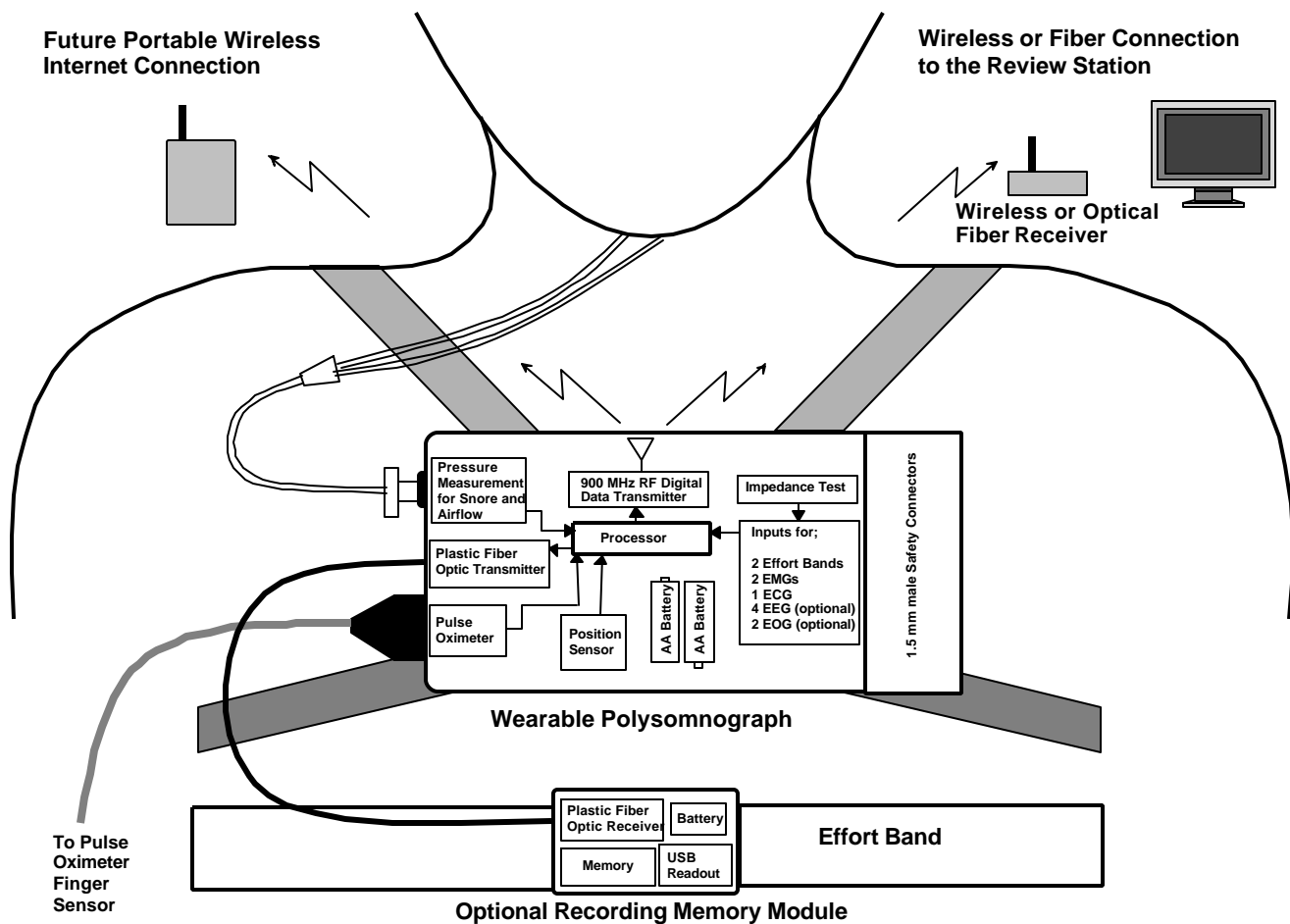
The complete wearable polysomnograph package.



Nasal cannula, optical fiber, and oximeter connections.



Two AA batteries last 12 hours.



FLEXIBLE CONNECTIVITY:

The wireless digital radio and plastic optical fiber options of the wearable polysomnograph allows the flexibility for many different connectivity schemes. They make the wearable polysomnograph suitable for both clinical and portable applications.

The plastic optical fiber connection to a small recording memory module allows for portable testing. The module is worn in a pocket adjacent to the wearable polysomnograph. The plastic fiber optic link can also be used to connect the wearable polysomnograph to a review station in a clinical application. The use of the internal wireless transmitter adds the additional flexibility of monitoring the polysomnograph data in real time without a tether.

Advanced Medical Electronics has developed software to send the data received from the wearable polysomnograph and low-light video in real-time over the Internet. This allows remote monitoring of sleep studies across a campus or across the country. Future designs will allow a portable battery powered receiver to record and relay the data over a cellular Internet connection.

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