

Edwards Wireless Physiologic Monitoring System

Product Description

The Wireless Physiologic Monitoring System is a wireless link designed to replace the standard interconnect cable used for connecting the disposable pressure transducer to the patient monitor. The system uses the Wireless Medical Telemetry Service radio frequency bands to transmit the blood pressure waveform to the patient monitor. The system is designed to perform as a single channel device or multiple units simultaneously on the same patient. The system also allows for multiple patients to have multiple links, all in the same critical care unit. A color/number selection feature on each X and M unit allows the user to “channel” select unique pairs for a given patient setup.

The Wireless Physiologic Monitoring System includes the transducer transceiver unit, the monitor transceiver unit, the IV pole holder system that accommodates multiple DPT's/transceivers and the Disposable Pressure Transducer. The system also involves a radio frequency identification system for purposes of establishing the unique and protected link between modules. The wireless system shall operate exclusively with an Edward's Disposable Pressure Transducer designed for the Lightning. The transducer module (X unit) plugs into the disposable pressure transducer and is self powered by a battery. The monitor module (M unit) plugs into the patient monitor at the input for pressure measurement and obtains its operating power from the monitor using power that is normally expended for transducer excitation. M units are also available with supplemental battery or can be used with a qualified AC/DC adapter to supply supplemental power to bedside or transport monitors that do not conform to guidelines for driving pressure transducers (BP22).

System Radio Frequency Transmission Architecture

Time Division Multiple Access (TDMA) is the preferred protocol for implementing shared channel use with guaranteed latency and freedom from self generated interference. The system shall utilize a self organizing scheme, providing multiple timeslots on a single Radio Frequency channel. To allow operation of systems in adjacent areas, the units will have frequency programming agility. The system will search for existing links and available time slots. A time slot will be assigned by the X unit and confirmed with the unlinked M unit. Once a time slot is assigned and occupied, other links will be prevented from using the same. Each information packet transmitted is CRC encoded and verified to prevent “crosstalk” of information between other links. Once a link has been established, a unique address (derived from a unit specific identifier) will be exchanged between the module pair. This address will be maintained until further reassignment by the user. This will allow for reconnection in the event of a temporary signal loss.

Radiofrequency Identification (RFID) for Link Execution

The Wireless Physiologic Monitoring System module pairs will perform a linking protocol upon activation by the user. The security of proper handshake will be accomplished by using a close proximity Radio Frequency ID system. A transponder badge with a unique identifier will be "read" by both X and M units. Only the pair seeing the same transponder will be allowed to link. Once they have linked, they will assign their own communication address so that they will only talk to each other until they are intentionally divorced. Once a pair has linked, the same unique transponder can be used to link another pair. The transponder will be of a semi permanent design that can be carried by the user and used endless times. There is no battery in the transponder so there is no limit to functional life, only loss or damage.

The final function of the RFID transponder will be to set the frequency channel. Several links coexist on the same frequency channel in the TDMA scheme. Several channels can be programmed into the WMTS bands. Special administrative transponder badges will be used to program the selection of those channels.

Color and number channel selection

An additional layer of differentiation will be a "color" channel set by the operator. This allows for predetermining which units are permitted to talk to each other. Each X and M unit shall have a selector function that allows the user to assign pairing. This function identifies each unit with a color corresponding to color coding practices currently used in marking pressure monitoring lines. The color and number (for color blind operators) is electronically recognized by the unit. Only the pair seeing the same RFID transponder and of the same color will be allowed to link. The color channel strategy allows for several X or M units to be linked with the same RFID device simultaneously without risk of crossover.