

### FEATURES

- IEEE 802.15.4 ZigBee wireless interface
- PC/104-compatible with XBee Pro transceiver
  - Up to 1 mile range (line of sight)
  - Operates in the 2.4GHz ISM band
  - 60mW transmit power output (100mW EIRP)
- Optional GPS Support
  - Lassen GPS receiver module provides position, velocity and time (PVT) data
  - Supports TSIP, TAIP, and NEMA 0183 protocols
  - Very low power required
  - Supports pulse output for accurate time standard
  - External powered antenna connection via a standard SMA connector
- Base I/O address and interrupt settings with jumpers
- For use in transportation, utilities, security, and remote monitoring applications
- +5 volt only operation
- Low power required
- RoHS compliant
- Small size: 3.6" x 3.8" (90-mm x 96-mm)
- Operating temperature: -40°C to +85°C

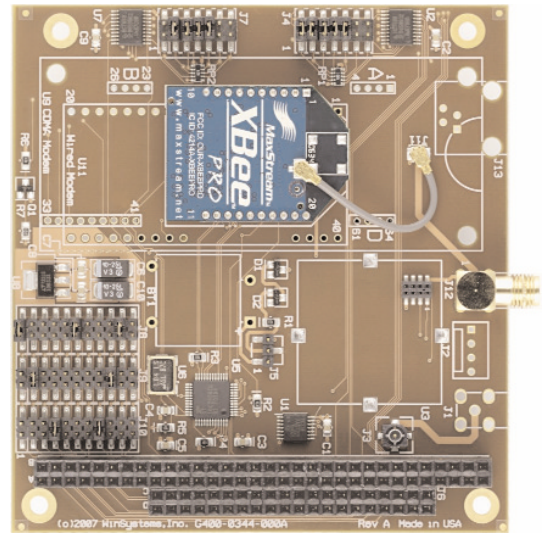
WinSystems' PCM-ZigBee is a PC/104-compatible board configured with a ZigBee wireless transceiver plus an optional Trimble GPS receiver. It addresses the unique need of most remote monitoring and control and sensor network applications. The PCM-ZigBee will operate over the full industrial temperature range of -40° to +85° Centigrade.

### FUNCTIONAL CAPABILITY

**ZigBee Standard** - ZigBee was created to address the market need for a cost-effective, standards-based wireless networking solution that supports low data-rates, low-power consumption, security, and reliability.

ZigBee uses the PHY and MAC layers defined by the IEEE 802.15.4 standard for short-distance wireless communications. The board operates at 2.4GHz which is in the ISM (Industrial, Scientific, and Medical) frequency band. The module complies with Part 15 of the FCC rules and regulations and has been certified for use in several European countries as well.

802.15.4 provides a robust foundation for ZigBee, ensuring a reliable solution in noisy environments. Features such as energy detection, clear channel assessment and channel selection help the device pick the



best possible channel, avoiding other wireless networks such as Wi-Fi. Message acknowledgement helps to ensure that the data was delivered to its destination. Multiple levels of security ensure that the network and data remain intact and secure.

**ZigBee Wireless Modules** - The board is configured with either an XBee or XBee-Pro transceiver that is wired to a SMA RF connector on the edge of the board. The difference between these two modules is the amount of power consumed (1mW vs. 60mW) and signal range. For the XBee-Pro configuration, the indoor and urban range is up to 300 feet (100m) and outdoor line-of-sight is up to 1 mile (1500m). For the XBee the urban range is 100 feet (30m) and outdoor range is 300 feet (100m). Selection of the antenna type and placement has a major impact on the range.

By default, the XBee modules are configured to support NonBeacon communications. NonBeacon systems operate with a peer-to-peer topology and are not dependent upon Master/Slave relationships. This provides fast synchronization times and fast cold start times. It can also be programmed to support NonBeacon mode as either a Coordinator or End Device. In a NonBeacon (w/Coordination) system, the Coordinator mode can be configured to use direct and indirect transmissions. It will also support Unicast or Broadcast communications.

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The ZigBee module requires a serial asynchronous data stream for command and data. If the data can not be sent out immediately (for example if it is currently receiving data) then the serial data will be stored in a buffer and sent when the RF channel is clear.

**Serial Controller** - A 16C552 dual channel UART is the serial communication controller that interfaces to the PC/104 bus. It has two independent, double buffered, asynchronous channels that are 16C550 software compatible. The UART contains on-chip software programmable baud rate generators with data rates selectable from 1200 through 115,200 bits per second. Each channel has a 16 byte transmit and receive FIFO. This increases the service interval giving the external CPU additional time for other applications and reducing the overall interrupt servicing time.

Automatic hardware RTS and CTS flow control is used to prevent data overrun to the local receiver FIFO and remote receiver FIFO.

One of the UART channels is wired to the ZigBee module and the other is wired to the optional GPS module. Each UART has a separate I/O jumper block to map it within the PC/104 address space.

**Optional GPS** - This board can support an optional Trimble Lassen IQ GPS receiver. This is a very low power GPS solution designed to provide position, velocity, and time (PCT) data using the most popular standard protocols: TSIP (Trimble Standard Interface Protocol), TAIP (Trimble ASCII Interface Protocol), and NMEA 0183. These protocols are compatible with most commercial navigation or map software packages. Also, a battery is included to store data.

The PCM-ZigBee does not normally include the GPS module. It is a custom configuration option. Contact the factory for pricing and availability.

**Interrupts** - Interrupts are generated on error conditions and/or receive and transmit buffer status for each of the serial channels. Each of the interrupt outputs is wired to a jumper header and then to the PC/104 Bus connector. The PCM-ZigBee supports IRQ channels 3, 4, 5, 6, 7, 9, 10, 11, 12, 14, and 15.

If the GPS module is installed, then the 1 pulse per second output can be connected to an IRQ input.

**PC/104 Interface** - The PCM-ZigBee is I/O mapped. Each channel requires eight contiguous port addresses and each is independently decoded within the 10-bit I/O map from 0 to 3FF hex.

**Antenna Options** - The PCM-ZigBee uses a SMA connector for the most flexible cabling and antenna options. A dipole, omni-directional or yagi antenna can be used. When integrating high-gain antennas, European regulations stipulate the maximum EIRP power maximums. It is the responsibility of the OEM to make sure that they comply with the applicable FCC regulations and to the European harmonized EMC and low voltage/safety standards.

**Power Supply** - A 3.3 volt regulator is on board to supply power to the XBee or XBee-Pro module so that the PCM-ZigBee board only requires +5 volts to operate.

**RoHS** - The board is RoHS-compliant.

## SPECIFICATIONS

### Electrical

PC/104 bus: 16-bit, stackthrough

Power: TBD mA @+5V

### Mechanical

Dimensions: 3.6" x 3.8" (90mm x 96mm)

### Connectors

ZigBee: SMA

PC/104: 64-pin, 0.100" (32-pin double row)

40-pin, 0.100" (20-pin double row)

Jumpers: 0.020" square posts on 2-mm centers

### Environmental

Operating Temperature: -40° to +85° Celsius

## ORDERING INFORMATION

PCM-ZigBee-G-1 PC/104 ZigBee card with XBee transceiver

PCM-Zigbee-Pro-G-1- PC/104 ZigBee card with XBee-Pro transceiver

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