

# SBX-3 THE INTELLIGENT RADIODEACON RECEIVER

- Dual channel design for hands free, automatic operation
- Two full duplex serial ports for separate RTCM and status message output
- Power and lock LED's for quick verification of receiver status
- New receiver front-end (patent pending) for better adjacent channel and out of band signal rejection
- High sensitivity for unbeatable performance
- Fast beacon acquisition times for quick system startup
- Compact footprint for ease of integration
- Low power consumption for power sensitive applications
- Compatible with both 12 VDC or 5 VDC active antennas

## State-of-the-Art

CSI is proud to introduce the latest innovation in 300 kHz DGPS radiobeacon receiver technology, the SBX-3.

Government authorities around the world have installed and continue to expand 300 kHz radiobeacon networks to provide position correction information to users of the Global Positioning System. The data provided by this **free** service enhances GPS accuracy from 100 m (95%) to 1 - 5 m (95%).

The SBX-3 is a high performance beacon sensor designed to receive these 300 kHz differential GPS signals. It is used in many applications and industries, including Asset Tracking, Precision Agriculture, Vehicle Navigation, Terrestrial and Hydrographic Surveying, GIS Data Collection, and Marine Navigation.

The SBX-3 is CSI's fourth generation receiver, and sets a new standard to which other beacon receivers will be compared. It offers cold start times of less than one minute, low power consumption, a compact footprint, two independent receiver channels, two serial ports, and a digital architecture.

## Dual Channel

Two independent receiver channels allow the SBX-3 to continuously monitor all available beacon signals. The receiver's

first channel tracks the best station while the second searches for other beacons in the area. When the SBX-3 identifies a superior signal, the primary channel automatically switches to that beacon without operator intervention.

## Digital Design

The digital design of the SBX-3 provides CSI Engineers more freedom to develop high performance, dynamic signal processing algorithms, with little compromise. Through its advanced digital architecture, the SBX-3 will reliably acquire beacon signals even in the most demanding environments including those with weak signals and electromagnetic noise.

## Backward Compatible

With the same mechanical form factor, electrical requirements, and feature-set as the CSI SBX-2, the new SBX-3 will plug into any SBX-2 integration without mechanical, electrical, or software changes.

## Input / Output

The SBX-3 offers two full duplex serial ports for separate communications to a GPS receiver and micro-processor. Use of both serial ports adds to the efficiency of an integration, eliminating the need to separate receiver status information from



industry standard RTCM correction data. This feature eliminates potential messaging conflicts with many GPS receivers on the market.

## Antennas

CSI offers a wide selection of antennas for use with the SBX-3. Options include E-field Whip, H-field Loop, and combination GPS/beacon antennas.

A new addition to CSI's antenna lineup is the AVL-1 Antenna Coupler (patent pending), designed to connect the SBX-3 to your vehicle's AM/FM radio antenna. The AVL-1 provides signals to both your AM/FM radio and the SBX-3 without performance degradation.

## Evaluation Kit

The SBX-3 Evaluation Kit contains all equipment necessary for you to rigorously test the SBX-3. Various antenna, and accessory configurations are available.

## Warranty

CSI is committed to supporting its products and offers a one-year warranty on parts and labor.

Contact us to discover how the SBX-3 will enhance your GPS solution.



# SBX-3 THE INTELLIGENT RADIODEACON RECEIVER



## RECEIVER SPECIFICATIONS

|                             |                                       |
|-----------------------------|---------------------------------------|
| Receiver Channels:          | 2 independent channels                |
| Frequency Range:            | 283.5 to 325.0 kHz                    |
| Channel Spacing:            | 500 Hz                                |
| MSK Bit Rates:              | 50, 100, and 200 bps                  |
| Tune Modes:                 | Automatic and Manual                  |
| Cold Start Time:            | < 1 minute                            |
| Warm Start Time:            | < 2 seconds                           |
| Demodulation:               | Minimum Shift Keying (MSK)            |
| Sensitivity:                | 1.5 $\mu$ V for 6 dB SNR<br>@ 200 bps |
| Dynamic Range:              | 100 dB                                |
| Frequency Offset:           | $\pm$ 10 Hz                           |
| Adjacent Channel Rejection: | 65 dB $\pm$ 1 @ $f_0 \pm 400$ Hz      |
| Antenna Input Impedance:    | 50 $\Omega$                           |

## COMMUNICATION SPECIFICATIONS

|                             |   |
|-----------------------------|---|
| Interface Level:            | 5 V HCMOS                               |
| Serial Ports:               | 2 full duplex                           |
| Baud Rate:                  | 1200, 2400, 4800 (default),<br>and 9600 |
| Correction Output Protocol: | RTCM SC-104                             |
| Command/Status Protocol:    | NMEA 0183 V2.0                          |

## ENVIRONMENTAL SPECIFICATIONS

|                        |                                    |
|------------------------|------------------------------------|
| Operating Temperature: | -30°C to +70°C                     |
| Storage Temperature:   | -40°C to +80°C                     |
| Humidity:              | 95% non-condensing                 |
| EMC:                   | EN61000-4-2 ESD<br>EN61000-4-4 FTB |

## PIN-OUT, CONNECTOR J1

| PIN | SIGNAL                        |
|-----|-------------------------------|
| 1,3 | Analog ground                 |
| 2   | Antenna input                 |
| 4   | Antenna power supply (output) |

## PIN-OUT, CONNECTOR J2

| PIN    | SIGNAL                                   |
|--------|--|
| 1,2    | Antenna power supply (input)             |
| 3,4    | Power supply input                       |
| 14     | TXD0, output                             |
| 15     | TXD1, output                             |
| 16     | Lock indicator (0.5 mA max, active high) |
| 17     | RXD0, input                              |
| 18     | RXD1, input                              |
| 19     | Internal reset output (active low)       |
| 20     | External reset input (active low)        |
| 21, 22 | Analog ground                            |
| 23, 24 | Digital ground                           |

## POWER SPECIFICATIONS

|                        |   |
|------------------------|---|
| Input Voltage:         | 5 VDC $\pm$ 5%                            |
| Power Consumption:     | < 0.75 W nominal                          |
| Current Consumption:   | < 150 mA nominal<br>(no antenna)          |
| Antenna Input Voltage: | + 5 VDC or + 12 VDC<br>externally applied |

## MECHANICAL SPECIFICATIONS

|               |   |
|---------------|---|
| Dimensions:   | 76.2 mm L x 50.8 mm W x 13.8mm H<br>(3.0" L x 2.0" W x 0.54" H) |
| Weight:       | 30 g (1.1 oz)   |
| Connector J1: | 1 x 4 pin header, 0.1" spacing                                  |
| Connector J2: | 2 x 12 pin header, 0.1" spacing                                 |

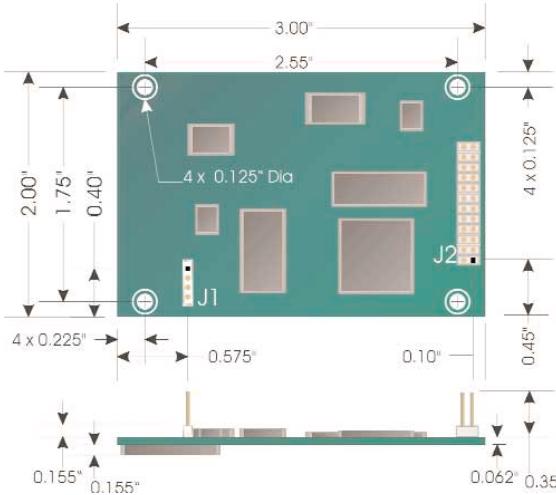
## NMEA 0183 INPUT / OUTPUT

- Receiver Automatic and Manual tune command
- Receiver performance and operating status queries
- Baud rate selection command (proprietary)
- Command to force a cold start (proprietary)
- \$PSLIB NMEA command Support

## EVALUATION KITS

- SBX-3 evaluation kit with E-field beacon Whip antenna
- SBX-3 evaluation kit with H-field beacon Loop antenna
- SBX-3 evaluation kit with GPS/H-field beacon antenna
- SBX-3 evaluation kit with GPS/E-field beacon antenna

Evaluation kits contain everything necessary to evaluate the SBX-3 engine.



Official CSI Dealer

Avery label #05260 (laser print)

