# *Revolution*tm **2X**

## Strapdown Electronic Compass

### *General Description*

The Revolution 2X combines a precision 3-axis solid-state magnetometer and a rugged 2-axis electrolytic tilt sensor to provide accurate heading and tilt measurements over a wide range of environmental conditions. The 2X is similar to True North's original Revolution compass but **with double the speed**. The measurement cycle rate is 27.5 Hz, as opposed to 13.75 for the standard Revolution. The device is fully compatible with existing Revolution software.

A key advantage of the Revolution 2X is its quick-connect, external serial interface. While the compass is in-place, and without disconnecting system wiring, a serial cable or available USB cable can be temporarily connected via the RJ12-style modular receptacle. This allows easy access during installation for calibration and tuning. It also provides a valuable diagnostic port and can be used for an auxiliary read-out when needed. In situations where a fixed installation is not desirable, the RJ12 connection can be used exclusively.



**Attitude Display in PC Software**

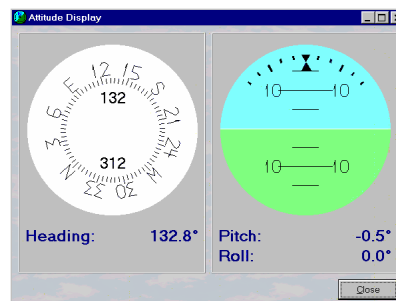Among the host of user definable parameters is the selection of NMEA output data and update rate; operating mode as continuous or query-only; and angle data in degrees, mils, radians, or 16-bit integer (65536 counts per revolution). Compensation for both hard and soft iron influences is built-in.

True North offers a development kit that includes the compass, cable, and software. The Revolution is covered by a full one-year replacement warranty.

### *Features*

- ♦ **High Accuracy**
  - ⇒ Heading within 0.5° or better
  - ⇒ Tilt within 0.2° or better
- ♦ **Wide Operating Range**
  - ⇒ ±40° Pitch and Roll
  - ⇒ ±80° Dip angle range
  - ⇒ Temperature -20° to 70°C
  - ⇒ Local Hard Iron to ±1 Gauss
- ♦ **Fast Response**
  - ⇒ 28 readings per second
  - ⇒ Wake from standby in 75 msec
- ♦ **Single Supply Operation**
  - ⇒ 6 to 30V unregulated DC or
  - ⇒ 5V regulated DC
- ♦ **Low Power**
  - ⇒ 20 mA operating
  - ⇒ 5 mA sample
  - ⇒ 1 mA standby
- ♦ **Wide Selection of Output data**
  - ⇒ Heading, pitch, and roll
  - ⇒ Magnetometer X, Y, and Z
  - ⇒ Dip angle
  - ⇒ Total, horizontal, and vertical magnetic field strength
  - ⇒ Horizontal X and Y magnetic field strength
- ♦ **Choice of Interface**
  - ⇒ Full-duplex RS-232
  - ⇒ Full-duplex RS-485
- ♦ **In-System Configuration and Test**
  - ⇒ PC or laptop can be connected while unit operates in-situ
  - ⇒ Perform hard and soft iron calibration
  - ⇒ Monitor outputs and change user-definable settings

## *Specifications*

### *Heading Performance*

| Parameter | Value | Comments |
|---|---|---|
| Accuracy | $\pm$ 0.5° rms | Typical, Tilt < 35° Dip < 60° |
| Repeatability | $\pm$ 0.3° | No filter |
| Response time | 36 msec | Minimum, no filter |
| Dip Angle Range | $\pm$ 80° | |
| Tilt Range | $\pm$ 40° | |
| Update rate | 28 per second | |

### *Pitch and Roll Performance*

| Parameter | Value | Comments |
|---|---|---|
| Accuracy | $\pm$ 0.2° | Factory calibrated |
| Repeatability | $\pm$ 0.15° | No filter |
| Range | $\pm$ 40° | |
| Settling time | 0.5 sec | No damping |

### *Electrical*

| Parameter | Value | Comments |
|---|---|---|
| Supply Current | 20 mA operating | typical |
| | 5 mA sample | typical |
| | 1 mA standby | typical |
| Supply Voltage ($V_{DD}$) | 6 – 30 Vdc unregulated | |
| | 5.0 Vdc regulated | 4.9 Vdc min |

### *Environmental*

| Parameter | Value | Comments |
|---|---|---|
| Operating Temp | -20 to 70 °C | |
| Storage Temperature | -40 to 125 °C | PC Board, not ABS encl. |
| Humidity | 0 to 90% | Non-condensing |

### *Mechanical*

| Parameter | Value | Comments |
|---|---|---|
| Box | Hammond Mfg1591MFL | ABS |
| PCB Size | 1.6"W x 3.0"L x 0.6"H | H required for tilt sensor |
| PCB Mounting | 4  #4 screws, 1.4" x 2.2" spacing | |
| Weight | 3 oz. in box | |
| Connectors | 8 pin, single-row, 0.1" friction header | |
| | 6 pin RJ12 modular receptacle | |

### *Interface*

| Parameter | Value |
|---|---|
| Signal type | RS232 or RS485 |
| Baud rate | 2400, 4800, 9600, 19200, or 38400 bps |
| Character Format | 8 data, no parity, 1 stop |
| Input Buffer Size | 90 characters |
| Output Buffer Size | 110 characters |
| Output Format | NMEA 0183 |
| Output Data Rate | 1 to 2400 sentences per minute |
| Operating Modes | Continuous or sample |
| Angle Units | Degrees, mils, radians, 16-bit integer |

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