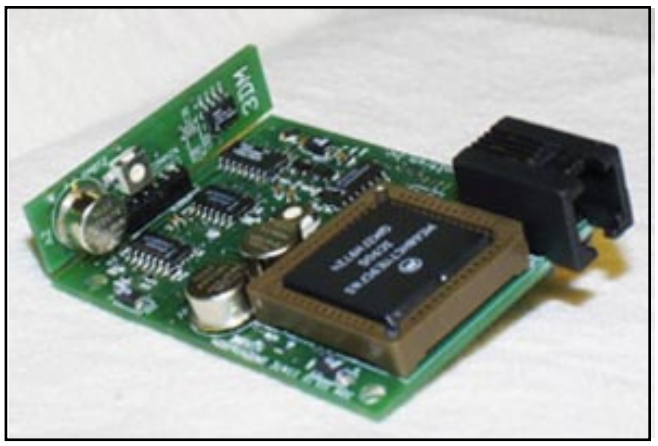
# 3DM™

SOLID STATE
PITCH, ROLL, AND YAW
MODULE

This solid state orientation sensor combines micro-miniature, solid state sensors with embedded software to meet the needs of a wide variety of applications.

Orthogonal arrays of magnetometers and accelerometers are used to compute the pitch, roll and yaw angles over a wide angular range. Since the 3DM relies on Earth's gravitational and magnetic field vectors, no pulsed magnetic field reference is required.



Actual Size

## APPLICATIONS

- navigation systems
  *compassing, guidance*
- biomedical
  *joint angle tracking, control systems*
- civil engineering
  *structural deflections, geomechanics*
- computer science
  *animation input, pointing devices*
- virtual reality
  *tracking systems, gaming input devices*

Sourceless operation, combined with embedded software (for angle computation) allows the user unrestricted freedom of movement. The output may be programmed to provide raw magnetic field and accelerometer outputs, or processed pitch, roll, and yaw outputs. 3DM's can be used alone or combined in networked arrays.

As with all MicroStrain products, every device is carefully tested prior to shipment, and calibration data are included with each order.

To place an order, or for more information, call us today at 800-449-3878.

MicroStrain®

# *How it works*

An orthogonal array of DC accelerometers is used to measure the orientation of the module with respect to Earth's gravity vector, providing pitch and roll information (fig.2).

These data are used to perform Eulerian coordinate transformations of Earth's magnetic field vector, as measured by an orthogonal array of magnetometers. This is used to compute yaw.

3DM nodes on the network perform these calculations; the host module then provides a data stream of pitch, roll, and yaw in degrees from each polled module.

## 3DM™

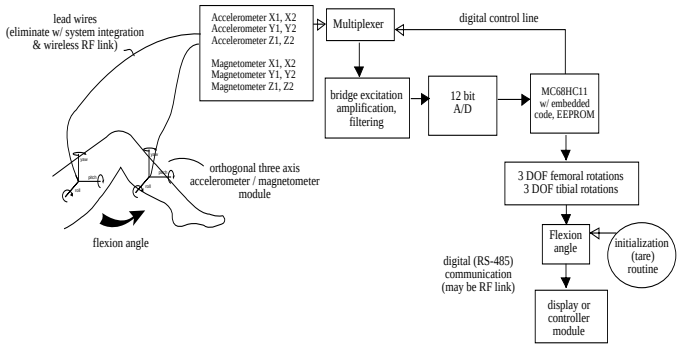



Fig. 2: Block diagram of MicroStrain's 3 DOF Angle Tracker

## SPECIFICATIONS

- Range — *yaw: ±180 degrees; pitch: ±180 degrees; roll: ±70 degrees*
- A/D resolution — *12 bits*
- Filter — *Infinite Impulse Response*
- Angle resolution — *Pitch: < 0.1 degrees; Roll: < 0.1 degrees; Yaw: < 0.1 degrees*
  *(angle resolution specs. taken at most aggressive filter setting)*
- Temperature drift — *Pitch: +/- .025 %/deg C.; Roll: +/- .083 %/deg C.; Yaw: +/- .057%/deg C.*
  *(temperature specs. represent 95% confidence intervals)*
- Accuracy — *Pitch: ±0.7 degrees typical (yaw from 0 - 360 deg. & roll=0 deg.)*
  *Roll: ±0.7 degrees typical (yaw from 0 - 360 deg. & pitch =0 deg.)*
  *Yaw: 1.5 degrees typical (pitch & roll=0 deg.)*
  *(accuracy specs. taken at constant ambient temp.)*
- Update rate — (angle mode) *30 Hz/ 3 channels*; (raw mode) *70 Hz/ 6 channels*
- Output modes: — *raw: ax,ay,az accel. bx,by,bz mag. field units: pitch, roll, & yaw in degrees*
- Output format — *RS-232 serial, or RS-485 multidrop network*
- Transmission rate — *9600 bits/sec*
- Supply voltage — *5 volts DC min.*
- Supply current — *50 milliamps/node*
- Connectors — *sensor: RJ11 type; power: min. coaxial jack*
- Operating temp. — *- 25 to 70 degrees C*
- Module size — *1.7" wide, 2.3" long, 0.3 " thick or 1.46" wide, 5.5" long, 0.63" thick*
- Module mass — *26.3 grams*

**Patents Pending**


MicroStrain®

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