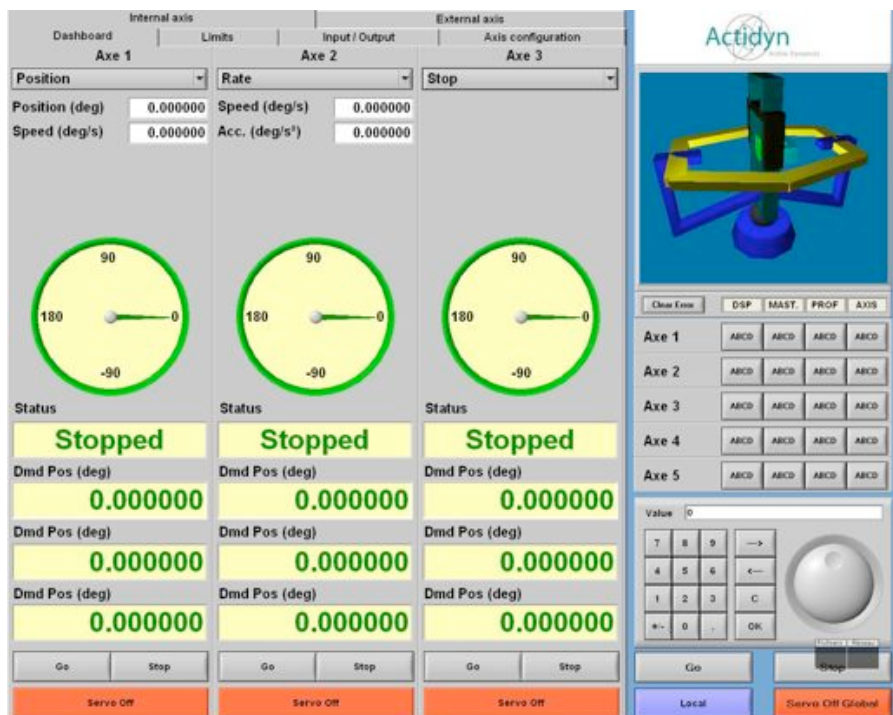


AXIDYN ND

MOTION SIMULATOR CONTROLLER

- Up to 5 axis real time control
- 5 kHz servo loop update rate
- High accuracy and high dynamic



The **AXIDYN ND** is a flexible digital controller designed for single or multi-axis motion simulators used for testing and calibrating inertial grade guidance systems and for HWIL simulation platforms.

High accuracy combined with high dynamic response is achieved by use of resolver & Inductosyn transducers.

This makes the **AXIDYN ND** an excellent solution for new systems integration as well as for existing simulators upgrade.

The instrument can be remotely controlled using standard interfaces such as RS232C, IEEE488 and Ethernet or with very high speed parallel interface for HWIL systems.

User's interface can be run from any standard PC using network connectivity. This permits the operator to select and monitor any of the following modes of operation, command motions, simulator status from a remote control room

SYSTEM ARCHITECTURE

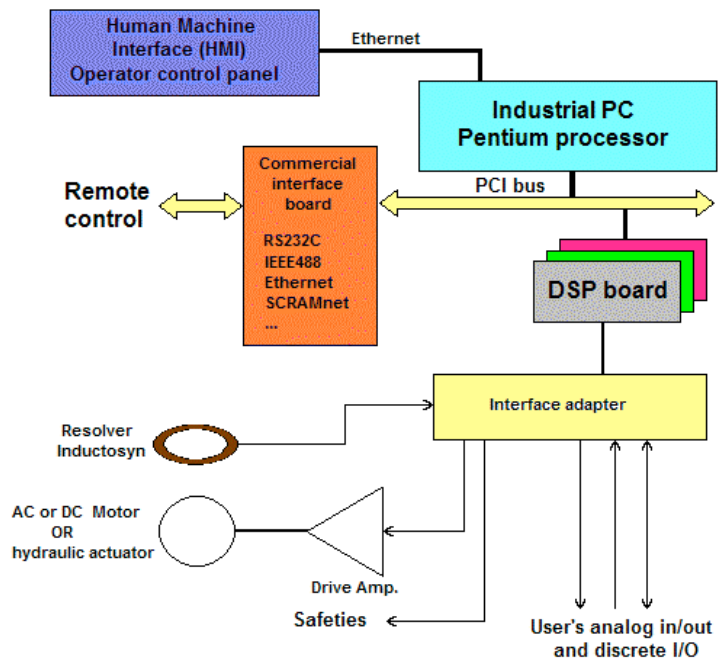
The controller uses a PC based architecture operating under Linux real time kernel to achieve deterministic response time in remote control mode. Axes are controlled by a dedicated digital signal processing board (up to 3 axes per board).

The PC based architecture also allows **AXIDYN ND** to offer a large choice of interface by using commercial available interface cards. The system includes all necessary hardware to generate resolver & Inductosyn carrier, acquire and digitally demodulate feedback from these encoders, manage motion simulator safety by both hardware and software, control either AC or DC drive amplifiers and/or hydraulic actuators.

A set of analog inputs is reserved for user purposes to drive motion profile generator.

A set of analog outputs can also be used to monitor internal variables (or axis status).

Digital inputs and outputs are available to monitor and drive external sensors and small devices. The DSP boards are synchronized from either an internal high stability clock or an external user's clock reference tested and used automatically if in tolerances.



OPERATION MODES



The **AXIDYN ND** controller operates in four operational modes: Position, Rate, Sine and Track.

Used in every operational mode, the motion profile generator let the servo loop operates in the same configuration, either using classical P.I.D or state variable control.

The motion profile generator associated with a set of configurable limits for each mode of operation enables the user to change selected profiling mode with smooth transitions.

All control modes can be combined with scalable analog inputs to drive motions from external devices;

Sine mode is mainly used to estimate unit under tests frequency response. The profile generator delivers to the servo loop a sine wave state vector command controlled in phase, amplitude and frequency, with programmable slew rate.

In case of multi axis motion simulators sine mode is synchronized between each axis to produce motions with precise relative phase.

Track mode is preferred for H.W.I.L. simulation platforms.

The controller is interfaced with a host real time computer to produce accurate sampled trajectories while keeping axis in operating range of position, rate and acceleration.

Position mode provides high accuracy and high stability positioning for static tests at any angle position.

Motions between points are rate and acceleration controlled and limited.

Rate mode is preferred while testing inertial systems at constant angular rate.

This mode is acceleration controlled which produces smooth transition when changing set point to another rate. This also prevents the axis from any overshoot

ADDITIONAL FEATURES

For applications requiring ultra accurate timing, external reference can be used through a dedicated phase lock loop circuitry with no missing or added clock cycle.

Events outputs are available that can be setup to deliver N pulses per revolution to synchronize external hardware at accurate position intervals or for calibration or test purposes.

All internal computations are made using double precision arithmetic. This provides a very high computing accuracy and consequently the controlled axis global position accuracy is mainly limited by mechanical performances, encoder accuracy and effect of thermal deformation. The controller also uses inverse FFT error modeling algorithm to compensate systematic reproducible errors.

Flexible build in data logging can be triggered by software and/or by hardware to record at a user's selectable rate the axes status. Build in ADC & DAC automatic calibration enables users' to swap of a failed DSP board with no additional calibration

AXIDYN ND SPECIFICATION

Overall performances

Number of axis	1 to 5
Controlled axis per board	1 to 3
Servo loop update rate	Selectable between 625 hz and 5 khz
Servo loop type	Classical PID and state vector or hybrid
Limits (1 set per board)	Position, rate and acceleration

Position

Accuracy RSS	< 0.05 arc sec
Position stability	< 0.02 arc sec
Command resolution	< 0.001 arc sec

Rate

Rate range (with 720p ind)	± 4000
Accuracy	5 ppm standard (optional 0.5 ppm)
Resolution	0.00001 °/s
Rate dynamic	> 10 ¹⁰
Acceleration	up to 200 000 deg/s ²

Data format

Units	User's selectable(degrees, radians or rev
Position	floating point signed or unsigned

User I/O (per DSP board)

Analog inputs	8, +/10V, 16 bits user's scalable
Analog outputs	8, +/10V, 16 bits user's scalable.
Position event pulse	2, N/rev, 13ns resolution 106ns width
Clock output	1 at servo update rate frequency

Remote interface

Standard	RS232C, Ethernet TCP/IP.
Real time	SCRAMnet
Options	IEEE488 (others consult ACTIDYN)

User interface

Language	English, French. Others on demand.
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Rack mounted 17" flat panel Pc with touch screen.

Desktop PC with up to two LCD display available on request

ACTIDYN SYSTEMES ALSO MANUFACTURES THESE EQUIPMENTS TO BETTER SERVE YOU

