

"The Clinical Advantage"™

Researcher's Tool Kit

BIODEX MULTI-JOINT SYSTEM



BIODEX
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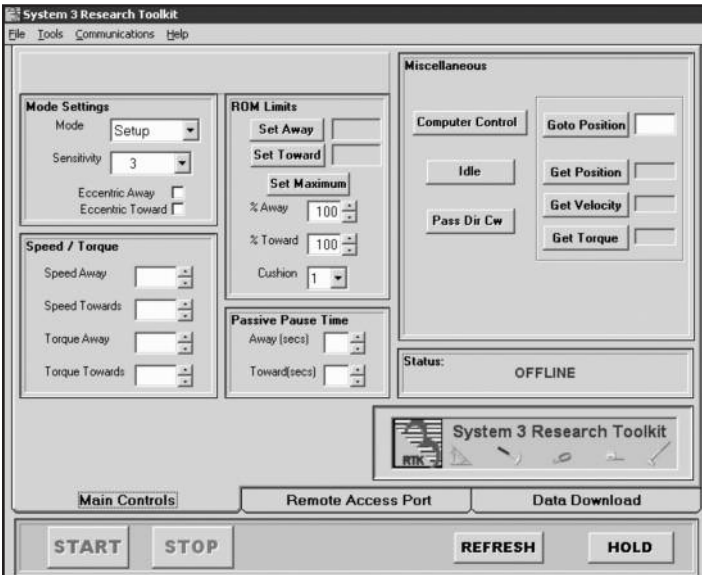
BIODEX MULTI-JOINT SYSTEM RESEARCHER'S TOOL KIT

For System 3 and System 4

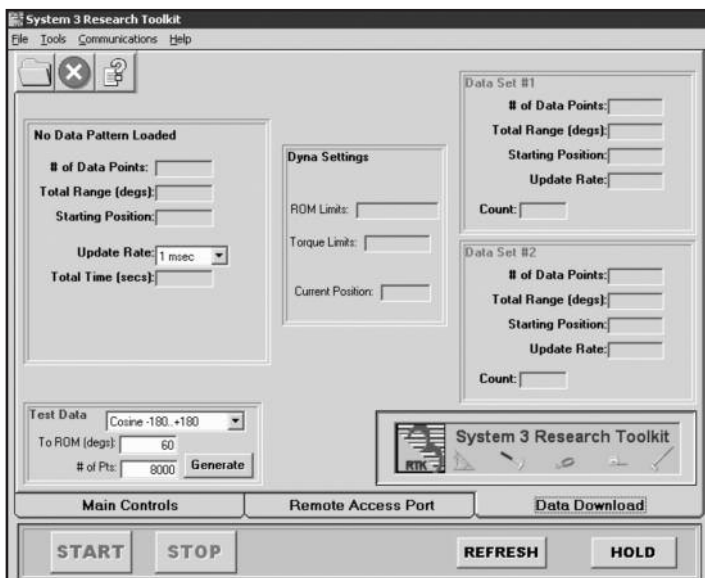
WHAT IS THE TOOL KIT?

The Researcher's Tool Kit gives the advanced System 3 or 4 user more specialized, direct control of the system not otherwise available through the front panel of the unit or via the software application. The tool kit was developed with the researcher in mind and, in fact, researchers contributed directly in the definition of the features and functions the tool kit offers.

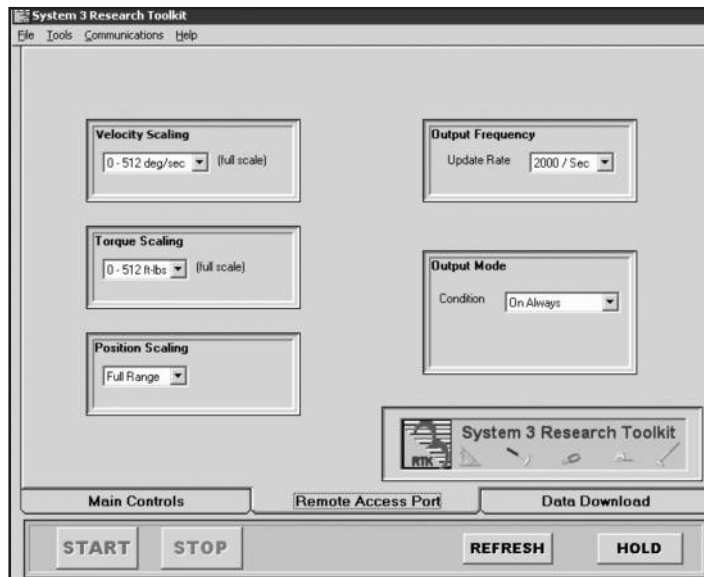
WHAT ARE THE MAIN FEATURES?



Main Control Screen - provides discrete control and finer adjustment of dynamometer settings. Speed can be set to any 1 deg/sec increment and torque to any 1 ft-lb increment.



Data Download for Motion Control - a user provided data file of positional data can be downloaded to System 3 or System 4 and executed to follow a custom pattern of motion. Tools such as MATLAB (from The MathWorks), MathCad (from MathSoft) or Prism (from GraphPad Software) can be used to generate these pattern files.



Remote Access Port Control - The Remote Access port is an output of analog signals of velocity, torque and position data in real-time directly from the motor control Digital Signal Processor (DSP). In addition to the real-time data, a synchronization pulse is issued whenever the real-time data is updated. The synchronization pulse can be used by the monitoring equipment to know when the real-time data output has changed.

NOTE: All controls can be accomplished via a simple ASCII - based command interface. A terminal or terminal emulation host can be used to type in commands and display the results, or a custom developed program can issue the control commands for specialized, automated control.

WHAT DOES IT CONSIST OF?

The Researcher's Tool Kit consists of the necessary connecting cables, software and manual. System 3 models, to be tool kit enabled, must be a Revision 2 model with the enhanced firmware. A "host" system supporting an RS-232 interface is required to act as the controller.*

WHAT ARE THE REQUIREMENTS?

The requirements to install and run the PC Windows-based tool kit program is a 32-bit version of Windows (95/98/NT/2000/XP), a minimum of 128 MB of memory (256 MB for 2000 and XP), and 9 MB of available disk space. The software is installed from CD via a SETUP program which will step you through the process.*

** NOTE: The Researcher's Tool Kit is best run on a separate computer so it can operate simultaneously with the Biodex Application Software.*

BIODEX MULTI-JOINT SYSTEM ANALOG SIGNAL INTERFACE

For System 3 and System 4

ANALOG SIGNAL RESOLUTION EFFECTED BY SCALE FACTOR

The analog signals range from 5 volts to +5 volts, resulting in a total range of 10 volts. The software provides scaling options separately for all three analog signals, so if typical usage is well below the maximum levels, 1 ft-lb increments can be seen on typical analog monitoring equipment. For example, applying a range of +/- 0 to 64 ft-lb, the output resolution scale factor would look as follows:

128 ft-lb = 10 volts, 1 ft-lb = 78.1 milli-volts 78.1 milli-volts is well above the worst case of signal noise (15 – 35 mV), so increments as low as 1/4 to 1/2 ft-lb can be seen reliably. The original System 3 design had only a 0 to 5 volts range on the analog signals (e.g. half the resolution of System 3 Rev 2), therefore this example has 16 times the resolution of the original System 3!

830-107 Interface Kit, EMG
For REV 2 systems containing integral analog signal outputs (no separate card required).

830-109 Interface Software
For REV 2 systems containing integral analog signal outputs and pre-connected cable. REV 2 unit shipped after 2/01/05.

See Specifications at right



SPECIFICATIONS

ANALOG SIGNAL INTERFACE (REV.2) FOR SYSTEM 3 AND SYSTEM 4:

This optional feature provides real time analog voltage representations of torque, position, and velocity signals from the dynamometer. These can be used as inputs to real time data acquisition systems.

GENERAL:

Accuracy:	± 2%.
Resolution:	16 Bits.
Minimum Vout Increment:	152.5uV
Signal Noise:	15 mVrms [20KHz Bandwidth]. 35 mVpp [20 µS minimum, 150µS maximum width].
Response Time:	500µS.
Connector:	DB-15 male "D" Connector.
Output Short Circuit Duration:	Infinite.
Output Impedance:	100S

INDIVIDUAL SIGNALS:

Torque	Analog torque signal 5 volts is cw torque (512 ft-lbs) 0.0 volts is 0 ft-lbs -5.0 volts is ccw torque (512 ft-lbs) Scale Factor= 9.76 mV/ft-lbs.
Velocity	Analog velocity signal 5 volts is full scale cw speed (512 deg/sec) 0.0 volts is 0 deg/sec -5.0 volts is full scale ccw speed (512 deg/sec) Scale Factor= 9.7mV/[deg/sec]
Position	Analog position signal 4.60 volts is when dyna shaft is fully cw -4.28 volts is when dyna shaft is fully ccw Scale Factor= 28.7 mV/[deg] Total ROM is 306 degrees; Total Vout =8.88V
Synchronization	Digital TTL pulse Active High 29µs Pulse width Continuous Indicates voltage output update, [~2KHz], mode dependent

CONNECTOR PIN DESIGNATIONS:

(Connecting Cable is not provided. This must be provided by end user)

PIN #	DESIGNATION	DESCRIPTION
1	Common	Signal ground
2	Torque	Analog torque signal
3	Velocity	Analog velocity signal
4	Position	Analog position signal
5	Syncout	TTL pulse
6-9	Reserved	Do not connect!
10	Common	Signal ground [same as pin 1]
11-15	Not connected	

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