

Brief Summary:

DataHand Features, Benefits, and Work Results—Including a Review of All Related Studies

The DataHand ergonomic keyboard:

- Reduces the range of finger motion. The finger tips move about 1/2" compared to the conventional keyboards where the whole hand must move many inches. Wrist, arm, shoulder and neck muscles become involved when working on a flat keyboard; on the DataHand keyboard, only the fingers move.
- Reduces key activation forces. The fingers of DataHand operators use 20 grams of force compared to 55 to 100 grams required on the flat keyboard. Research has shown forces below 48 grams reduce risks of musculoskeletal injury. Flat keyboard “bangers” often use forces 4 to 7 times higher than necessary.
- Provides optimal position and support for hands, wrists, and arms. The DataHand design ensures correct pronation and relaxation of the hands, wrists, and arms.

Supporting ergonomic research:

- Knight at Arizona State University, Koeneman at the Harrington Arthritis Research Center, and Ferrell at the University of Arizona determined the DataHand design reduces typing forces on the joint to approximately 20% of those experienced by workers on the traditional flat keyboard. DataHand operators use finger intrinsic muscles and significantly reduce extensor muscle and tendon use through the carpal tunnel.
- The Harrington Arthritis Research Center at St. Lukes Medical Center in Phoenix interviewed early users of the early DataHand DH200 model, finding an initial 25% discomfort reduction and an additional 50% (total 75%), on average, after less than 4 months.
- Rempel, Serina, Klinenberg, Martin, Armstrong, Foulke & Natarajan at the University of California and the University of Michigan concluded that keying finger forces of 48 grams or less should be preferred to minimize biomechanical loads. DataHand finger force specifications are 18 to 24 grams. The DataHand force curve is the inverse of the force curve on the conventional keyboard. The fingers feel an initial breakaway, not increasing force against resistance as the keys are activated.
- USPS Ergonomist, Dr. Soraya Noland, studied DataHand ten-key operators at the Phoenix Rio Salado USPS facility, finding the DataHand device more user friendly and more productive than a conventional ten-key device.
- University of Arizona 1997 Customer Satisfaction Survey of DataHand users found 96.8 percent user satisfaction with strong testimonials giving credit for relief of pain, restoration of working comfort, and saving of careers. Eighty-four percent of users were either extremely or very satisfied, and only one user was dissatisfied.
- About 70 DataHand operators at several industrial test sites have equaled or exceeded conventional keyboard speeds within 30 days. Both actual experience and learning curve data show significant double digit productivity gain and learning acceleration.
- Return on Investment calculations using Internal Rate of Return (IRR) based on corporate data from several locations show payoff of equipment and learning costs within a

year. The productivity gain results from less movement and more comfort, without slow-down caused by fatigue as the day progresses.

Beta Testing Four Operators: minimum 13% productivity gain

Citibank Productivity Study: 6 operators, minimum 8% productivity gain

Evers, Koon Group Productivity Study: 3 operators, minimum 22% productivity gain

USPS Phoenix Zip Code Sorting: minimum 10% productivity gain

USPS Pittsburgh Barcoding: minimum 7% productivity gain; 3 year IRR: 67%

Wachovia Productivity Study: minimum 10% productivity gain; 3 year IRR: 99%

Sun Trust Productivity Study: minimum 8% productivity gain; 3 year IRR: 119%

Card Catalogue Productivity Study: minimum 8% improvement in 30 days; 13% in 60 days

(IRR calculations do not include workmens' compensation savings, which are found to be roughly \$100,000 per year for a typical customer site of 300 employees.

Productivity based IRR of 100% equals pay-off of the investment within one year)

- Fernandez/Stanford University Analysis of USPS productivity data shows a ten percent fatigue-related performance advantage between DataHand operators and flat ten-key operators by the end of a typical work day. In comparison with DataHand operators, traditional ten-key operators maintain speed for the first two or three hours, then start to slow down. This slow-down is attributed to fatigue.

Innovative design makes a clear difference in improving worker comfort, musculoskeletal protection, and productivity. Ergomotion™ is a new word created to describe the beneficially supported minimum movement DataHand operators use to perform keyboard work safely, comfortably, and productively. Ergomotion is the future of keyboard data entry.

For more information, write datahand@datahand.com or call 800-875-7171 and ask for Dan Pavicich or Lynn Martineau