Good Work Systems

R2 M a r k I I I

Omnimouse

with **I D I** (TM) 1.01

Input Device Intelligence

featuring the **STM**32
32-bit Flash Micro Controller by   STMicroelectronics

The R2 Mark III Omnimouse continues Good Work Systems' development and technological advancement of the R2 ergonomic computer mouse. For the first time ever, the R2 contains its own independent 32 bit computer, the STM32 by ST Microelectronics, and IDI(TM) (Input Device Intelligence) a new hybrid USB technology.

The technological improvements this brings are significant, and the R2 Omnimouse with IDI(TM) is much more than a mouse.

The Omnimouse, for the first time, can coordinate the keyboard and other input devices together for a new level of control and automation that reduces motion, repetition and effort. IDI input integration technology creates a new customizable layer of input actions that easily expands input control *options beyond* simple repetitive key presses.

Say goodbye to the old "one button = one command" paradigm, the new R2 Omnimouse with IDI uses 5 layers of hybrid technology to give you powerful new tools and methods to ease, automate and simplify your PC input.

R2 Omnimouse Technology
- Mouse hardware and shell
  - 7 Buttons + Lift
  - Optical Sensor 100-1600 DPI
- Integrated 32 bit computer
- Input Device Intelligence Operating System
- IDI Scripting Language
- IDI Macros – the content that drives the system

Product Warranty
- 60 day Return Period
- 180 day Product Upgrade Warranty
- 30 month Limited Support Warranty (Registration Required)
- Lifetime Technical, Upgrade and Part Support at Gamingmouse.com

Support Software Included
- Windows Configurator Application (Windows XP and Vista)
- Mac Configurator Application (Mac OS X including Leopard)
- IDI scripting tutorial and tools

MSRP: $69.95 available at Gamingmouse.com and other online and retail hardware distributors.

I. R2 Mouse Hardware

Size and Weight   At 2.5 oz on the desktop, and 2 1/4" across the grip, the Omnimouse is approximately 30% smaller and lighter than the average conventional mouse. Its reduced mass and weight enables faster, more precise, finger active movement with reduced wrist movement.

Finger Active Design   The Rotary grip form function$^{(TM)}$ of the R2 Omnimouse allows it to be held between the thumb and fingers with the little finger on the desktop for natural, comfortable control. The finger-active fingertip grasp of the Omnimouse utilizes the fine motor control of the fingers to improve mouse performance while reducing stress on the hand and wrist. Building on conventional mouse skills, the compound motion of the fingers, hand and wrist utilize natural coordination with the Omnimouse to produce exceptionally fast and precise movement.

Grip Contact Both the Omnimouse contoured side grip and buttons are soft elastomer rubber, providing slip-free, ergo-positive control. The buttons are membrane switch technology and feature smooth click less actuation with zero reset time. Because they require no mechanical reset, membrane buttons can also be actuated very rapidly.

(IDI$^{(TM)}$ technology provides auditory "mechanical click" feedback for the Omnimouse membrane technology buttons via system sound resources.)

Buttons   With 4 buttons on top and 3 button "zones" in the wrap around rubber grip, (total = 7) there is a button at every fingertip. Grip button "zones" lie under the finger tips and extend around the mouse for flexible use. Requiring slight pressure only, these pressure zones perform as standard mouse buttons and can be used for IDI Shift functions that trigger "shifted" commands for the other buttons, multiplying command options. And they have no mechanical parts to break, they are easily user replaceable when

Lift Event   The Omnimouse uses IDI(TM) Tracking Management technology to detect when the sensor is lifted from the surface, and process the event to send a standard button command.

A second command is enabled when the mouse is replaced on the surface. The Omnimouse is small and light and easy to lift, adding another natural, easy way to send commands.

Glides   The Omnimouse achieves considerable freedom from friction by its use of polished steel glides. Three . 187" hardened chrome plated balls elevate the Omnimouse .032" above the desktop with virtually no contact area to cause drag. Especially when used on a hard, smooth mousing surface like the GWS Killenflor Deck (Silk), the Omnimouse glides with exceptional smoothness and ease.

Top Exiting Mouse Cord   The Omnimouse continues the R2 top exiting mouse cord design for virtually cordless performance, especially when used with a cord handling appliance like the GWS Skyhook Mouse Bungee.

3 Color Back lighting The Omnimouse uses 3 plug-in LEDs to provide backlighting for the Omnimouse's transparent buttons. Each LED is programmable, and IDI enables simple macros that create coordinated flashing light patterns IDI backlighting patterns are just another example of user customizable functions where the backlighting can be used to signal device settings like dpi or active shift states. (Backlighting LEDs are pluggable and user replaceable (available in 5 colors.)

Build Quality The Omnimouse is designed to perform reliably, and allow for user replacement of wearable (or customizable) parts, for years of uninterrupted use.

- Tough Single piece Polycarbonate case
- Embedded 100% Steel to Steel screws and nuts for dependable assembly and service
- Modular design for easy part replacement

User Replaceable Parts   Good Work Systems stocks and supports a growing inventory of customized and maintenance Omnimouse parts.

- Top................................(many styles and colors)   • Grip................................(many styles and colors)

- Steel (and Teflon) Glides (Replacement set included with Omnimouse)
- Mouse Cord ....(several styles)
- LEDs ....(Plugin available 5 colors)
- Buttons ....(available 2 grades)

- Optical/Laser Sensor Board
- Pcb Interconnect Cable
- Medallion
- Base Label

Design improvements to Mark III Omnimouse Edition

The Mark III Omnimouse includes several design changes to the R2 model in part based on user feedback:

Separate model support for left and right handed users   One size does not fit all and we have had many requests from gamers and mouse users alike for "equal support" for left handers. The Omnimouse is now available in both left and right handed models, which are identically mirrored versions.

Buttons re-located "toward fingers"   The 4 top buttons are "rotated toward the fingers" by one button, or 15˚ for improved button access with dedicated left/right models.

New Grip with Tactile Finger "Target" Molding   The new Omnimouse grip features molded "target" locators for the fingertips that improve ease of use with the grip button zones.

Gold plated switch contacts   Improved compact gold plated pcb contacts for membrane switches provide the ultimate in button responsiveness and conductivity.

Solid bottom, no detachable base plate or screws Design change to the mouse case makes the Omnimouse even stronger and simpler to maintain. Now only 4 screws.

II. Independent Computer – Omnimouse CPU

The R2 Mark III Omnimouse requires considerable compute capability to run the advanced IDI operating system. This computing capability must use only a fraction of the USB mouse power budget, (100ma Total) and must be fast enough to easily handle the modern mouse sensors' fastest signals. The recently developed STM32 32 bit microcontroller by ST Microelectronics fits these requirements, and with the approximate compute power of the original Pentium computer, was chosen for the Omnimouse's MCU.

The STM32 microcontroller is based on the breakthrough ARM Cortex-M3 core –a core specifically developed for embedded applications requiring a combination of high-performance, real-time, low-power and low-cost operation. The STM32 benefits from the Cortex-M3 architectural enhancements (including the Thumb-2® instruction set) that deliver improved performance combined with better code density, all combined with industry-leading power consumption.

And thanks to its Flash memory based technology, the STM32 can be re-programmed over the Internet from the Configurator Application hosted on the users PC; allowing GWS to tune, upgrade, and even add Omnimouse features *after* the devices are in the hands of users.

Processor: STM32 32-bit Flash Micro controller by ST Microelectronics

MCU Architecture: 32 bit

Clock Speed: 72 MHz

Max Current Draw (@ 72MHz): 27mA

Compute Power: 95 Million Instructions per Second

Pins: 64

Size: .6" square

USB Support: 2.0

Program Flash Memory: 2 Mbits

IDI Memory Support Enabled : 32 Configuration Files; **70** concurrent Threads

Firmware Upgrade: Flash-based, encrypted and delivered over Internet

III. IDI – Input Device Intelligence Operating System

IDI is a powerful new PC input device operating system technology with functionality derived from industrial work and motion studies. In addition to managing the standard communications and functions of a USB mouse, IDI also performs new functions that createl a new integrated PC input mode that is user customizable and efficient.

IDI technology integrates the PC's sound and visual communication systems with the input devices and puts these input resources directly under the user's control. This creates a individually customizable cognitively integrated input setting for the user that improves their efficiency with the PC. And it does this all while operating as a full featured 7 button mouse.

Input Device Integration IDI integrates the PC's independent USB input devices to provide new support for natural coordinated user input.

> **Keyboard:** IDI can connect with any USB keyboard(s) plugged to the PC, monitor its activity, and execute macros based on its key presses independently and in combination with mouse and other device inputs

> **Foot pedal:** IDI can connect with any USB foot pedals and put them under IDI macro control.

Private communication channel IDI establishes a private sound and screen notification channel for use with IDI macros.

> **Sound:** IDI technology allows full use of PC system sound resources for the users' custom use with IDI macros. Sounds can be attached to buttons, keyboard keys, actions and events for feedback and command recognition. IDI also has a "Voice" (generated from .wav files) which can be scripted to provide more specific auditory information to confirm settings, actions. and events in a familiar human "co-pilot" voice in real time. (IDI's voice is female Australian.)

> **Monitor Notification Messaging:** IDI technology uses a transparent screen layer messaging technology[1] to allow the user a customizable personalized text and image display layer for use while in programs with advanced IDI macros and input automation. These screens can display dynamic macro menus as well as application or hardware information (This technology Is in process and will be delivered to the Omnimouse is an upcoming firmware update.)

Standard device management IDI manages all the standard mouse USB functions and protocols enabling the Omnimouse to plug and play when connected to any USB based PC. (Windows, Mac, Linux, Unix)

Enhanced device management IDI technology enables a finer level of control over basic device functions that create improved device performance.

Tracking Algorithms IDI uses the powerful, fast (72Mhz) compute power of the STM32 MCU to "crunch" sensor tracking data with sophisticated Dynamic Acceleration Tracking Algorithms that deliver precisely tuned sensor performance across the full acceleration range. At slow mouse speeds tracking is optimized for smoothness and jitter reduction. At fast speeds tracking is optimized for acceleration and data reporting efficiency that keeps USB bandwidth low and prevents "spamming" game and

application input buffers.

GWS IXP Tracking Algorithm is written specifically for the Avago ADNS-2051 optical sensor and makes use of its excellent data capture and fast process cycling to deliver enhanced, acceleration based tracking tuning for the Omnimouse. (100 to 1600 dpi)

Smart Buttons: IDI technology enables the Omnimouse buttons to send multiple commands per button based on user configurable "Button Macros."

Application Awareness: Holding up to 30 sets of program-specific instructions in onboard memory, the Omnimouse can synchronize all operations with your programs, loading your customized settings automatically as you enter each game or application.

IV. IDI Scripting Language

The Omnimouse is supported with IDI Script$^{(TM)}$ a text based scripting language that controls IDI. IDI Script is a full featured interpreted language used to write IDI macros. The IDI language defines procedures and threads that translate button events, timing and other conditions into actions including Mouse Reports and Keyboard Reports. In form and character IDI has some properties of Basic, Java, and "C".

IDI Script supports:

- Variables
- Constants
- Control Structures
- Expressions
- Logical Comparisons
- Functions (User created and Default)
- Procedures
- Threads

V. IDI Macros

Macros are the units of customization for IDI technology. These small text based scripts are managed in simple Macro Files and can be directly imported to the Omnimouse Configurator Application and assigned to buttons.

The Omnimouse ships with a set of Macros that perform many new functions. Users can easily customize these macros, as IDI macros are structured as templates, and include standard customization notes and instructions that demonstrate how to adapt the features of each macro for different uses. Additionally, Good Work System will support the editing and creation of macros for the Omnimouse and will host a special independent website IDIMama.com for sharing these.

Example IDI Macro:

This macro creates a simple Toggle Button, that will send one command on each even press, and another (different) command on the odd press. It allows the user to creat their own toggle buttons.

The text in the Blue font are the actions that occur on the odd press, and the text in the Green font shows the actions that the macro performs each even press. Users can cut and paste commands

save and test to create their own toggle macros.

```
THREAD Profile

VAR Count

Reset:
Count = 0

Continue:
        WaitForButton(Button, ButtonMask)
        IF Count == 0 THEN
                TypeText("odd press",1,10,30)
                KeyPressHid(00,40,30)
                PlayWav("43649__blubdevis__tik_03.wav", 0, 100)

        ELSEIF Count == 1 THEN
                TypeText("even press",1,10,30)
                KeyPressHid(00,40,30)
                PlayWav("43682__stijn__Click6a.wav", 0, 100)
                GOTO Reset
        FI
        Count = Count + 1

   GOTO Continue

END
```

About Good Work Systems:
     Good Work Systems develops USB hybrid solutions for improved PC productivity and ergonomic efficiency. Headquartered in Berkeley, California, the company has specialized in Gaming and Industrial input solutions since 2000 and is currently developing products for both the Windows and Mac platforms. All products run under the company's flagship proprietary Input Device Intelligence (IDI) technology which enables a new device based hybrid USB technology to automate and streamline PC input efficiency and reduce occupational PC input injury and stress.