WHEELCHAIR NAVIGATION AID

User Guide

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January 30, 2012

The wheelchair navigation aid includes many advanced features and controls. This user manual should guide you through the process of becoming acclimated with the product as well as well as determine locations of controls.

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Features

1. High Resolution Ultrasonic Sensors

High resolution ultrasonic sensors provide accurate range finding data within 1 inch. They also find ranges up to 255 inches away.

2. High Speed Microprocessor

A digital signal controller enables high speed reading of ultrasonic sensors, as well as well supported low latency interrupts. The controller also provides high speed serial data transmission to allow for seamless integration with data logging units for debugging, and general logging.

3. Fault Monitoring and Diagnostics Mode

An onboard diagnostics mode will monitor specific attributes such as onboard battery voltage and enclosure temperature, with a single push button it allows the user to monitor these parameters as well as enable data logging over the serial port.

4. Backlit LCD Screen

Backlit LCD screen allows user to clearly view range finding information in low light environments. The screen's brightness can also be changed at the users selection via an onboard knob

5. Integrated Battery

A high energy density integrated battery pack allows for isolated power rails from the power wheel chairs battery system. By splitting this system up it all but eliminates any power faults due to the device, as well as allows the unit to be used on power chairs with a variety of power voltages (24V Vs 12V)

6. Visual and Auditory Range Warnings

In the event that a fault occurs and an object is found to be closer that preset thresholds, a warning is issued to the user with a built in buzzer. The unit will also display the offending range on the LCD display.

7. High Power LED Path Lighting

The unit supports external high power high efficiency LED lighting which will light the path directly in front of the wheelchair.
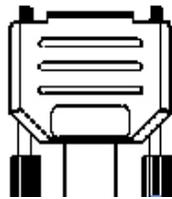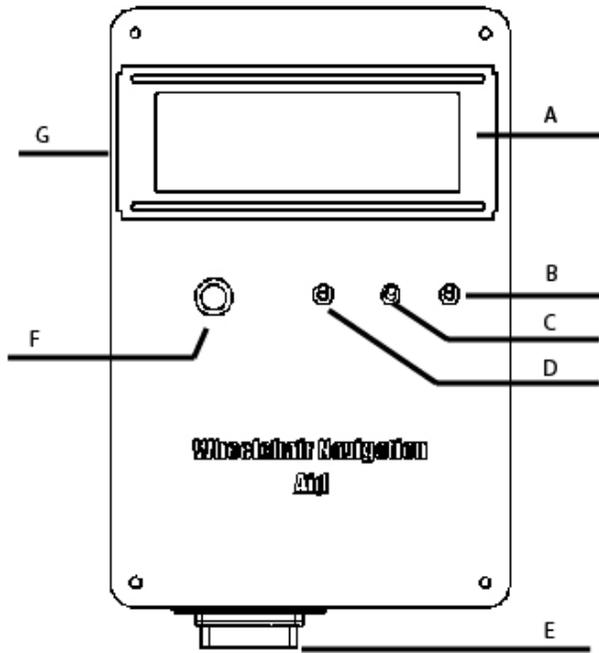
LCD Control Box Layout

Part Location	Name	
A	LCD Screen	
B	Master Power On/Off	
C	Silent Mode On/Off	
D	LED Path Lighting On/Off	
E	Data and Power Connector	
F	Mode Push Button	
G	LCD Brightness Knob	

LCD Screen:

1. Master Power Toggle Switch

This switch controls the master power to the entire unit. When the switch is in the on position the unit is powered up, and the embedded processer is collecting data as well as serving data to the user via the LCD screen. When the switch is in the off position the connection between the onboard battery stored in the control box and the embedded processer circuit board is severed thus turning the device off.

2. Silent Toggle Switch

The silent toggle switch is used when the unit does not need to be fully powered off but the user wishes to turn off the screen, and any sound indications. This feature is especially useful for movie theaters, and when minimal attention from others is required. The switch has two states on and off.

3. LED Lighting Toggle Switch

The LED lighting toggle switch controls the high power LED lighting on the front of the chair. When the switch is in the on position the LEDs are lit, when the switch is in the off position the LEDS are off. Note that keeping the LEDs on for prolonged periods of time will drain the onboard battery quicker.

4. Data Connector

This connector joins the LCD unit to the master control box. This cable transfers important data as well as power.

5. Mode Push Button Switch

The mode button controls additional modes onboard. These modes include, monitoring distances with sensor array, monitoring ambient temperature, and monitoring the units built in battery pack. Each press of the button cycles the menus on the screen

6. LCD Brightness Knob

The LCD brightness knob changes the intensity of the backlit display. The knob is infinitely adjustable and is changed by simply turning the knob.

Modes of Operation

The mode button will allow the controller to cycle through different modes of operation. Each mode allows a specific function critical to the user or debugging any problems.

1. Distance Sensing Mode

In distance sensing mode, the sensor array is parsed and its data is processed. When an object gets too close to the chair the integrated buzzer in the LCD control box emits a warning tone. The distances are also displayed on the LCD for the user to monitor.

Figure 1 Normal Mode

The mode will show the ranges on each senser, in the event that an object is too close to a particular sensor an alert comes up on the screen in addition to an auditory alert.

Figure 2 Alert Detected

2. Diagnostics Mode

In diagnostics mode the temperature of the enclose as well as the battery voltage is displayed. This data will help the user keep track of usage, as well as any faults before they occur, such as over temperature or a drained battery. In addition the until will send said data over the USB connection for optional data logging
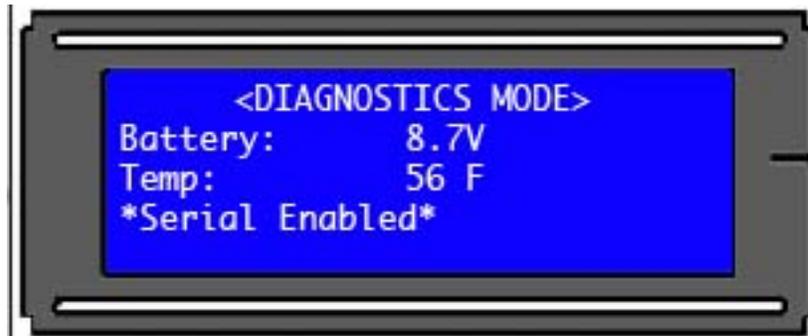

Figure 3 Diagnostics Mode