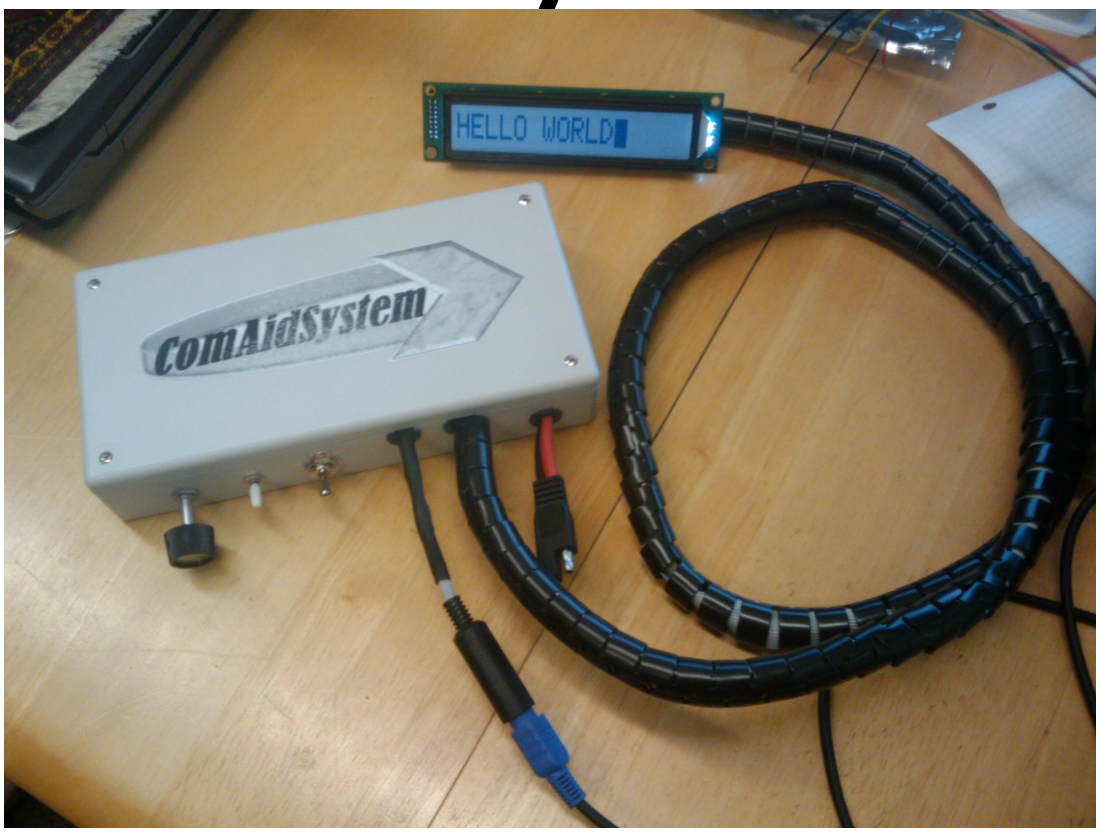
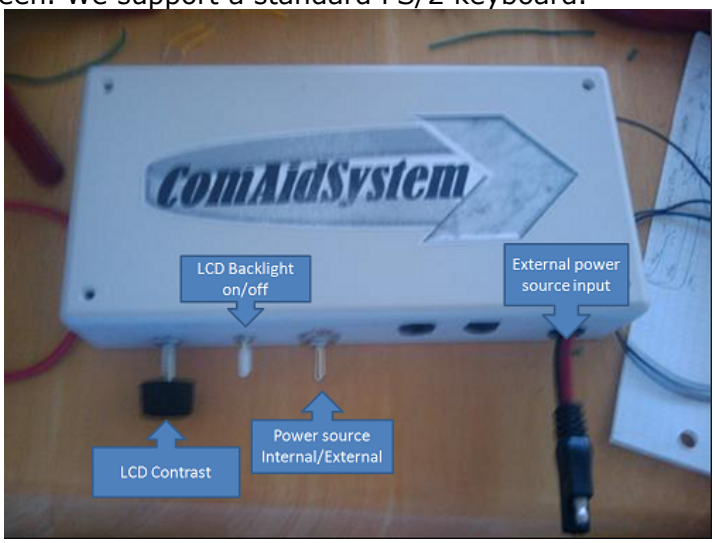
ComAidSystem 1.0



User manual

This device was designed to aid people with on-road communication with a deaf driver. It is designed to aid a deaf person in having a conversation when reading lips is not appropriate. These situations include driving a car or boat.

This device allows a user to type messages using a keyboard while another user reads the message from a screen. We support a standard PS/2 keyboard.



Keyboard functions

F1: Stop

F2: Slow down

F3: Turn on H-lights

F4: Turn H-lights off

F5: Big Truck Behind

F6: Turn off wipers

F7: Turn wipers on

F8: Take next exit

F9: Turn signal off

F10: Pull over...siren

F11: Honk from left

F12: Honk from right

ESC: Emergency stop

DELETE: clears screen

ENTER: nop

BACKSPACE: clears last char

UP ARROW: go straight ahead

LEFT ARROW: turn left

RIGHT ARROW: turn right

DOWN ARROW: turn around

PG_UP: yes

PG_DOWN: no

Only the F-keys (F1 through F12) are programmable.

Regular programming
Syntax: < Press L-CONTROL key > < Type in new text > < Press Fx function key >

or (optional but better):

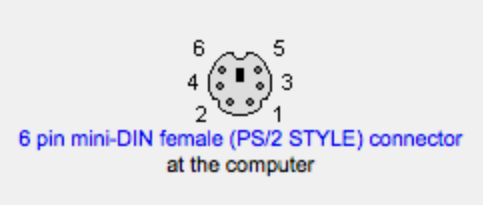
< Press L-CONTROL key > < Type in new text > < Press ENTER key > < Press Fx function key >

NOTE: The system needs to be reset after programming to ensure best system stability

Reversible programming (reverts to default displays)
Syntax: < Press L-CONTROL key > < Press HOME > < Press Fx function key >

NOTE: The system needs to be reset after programming to ensure best system stability

Keyboard Connection



The connector for the keyboard is designed to accept any IBM PC PS/2 compatible keyboard. This device accepts the scancodes from the "Set 2" specification of scancodes.

Pin	What it does
1	Data from keyboard to device
3	Voltage Ground
4	Voltage +5 Volts
5	Control Clock to keyboard from device

Maintenance

Power

This device has 2 power sources. One is a 9-volt battery that is located inside the main box. The other is a Regulated Switching Power DC/DC Converter. The power is controlled via a

DPDT (Double Pole Double Throw) switch. The concept of this switch is to not to shut the unit off but to select the power source. To set the unit off you would turn it to external power and unplug the external power. Most cars turn off their Cigarette lighter outlets when the car is turned off to save energy. This device will work seamless in those situations as it will power off when the car is off.

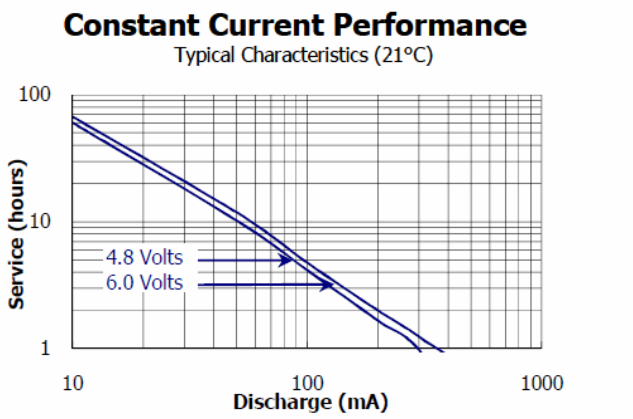
This device has a voltage regulator to turn both the 9-volt and 6-volt inputs into the 5-volts that run the entire device.

Analysis of the device using a hand held voltage meter revealed a current draw of 40ma without significant fluctuation during AVR interrupts, LCD character printing, or keyboard presses. In two cases the power can differ. If the back-light is turned off then the current draw is -20ma. When the Number Lock LED is illuminated the current draw is +20ma. The keyboard provided with this device does not have a Number Lock led

Battery

The battery is a standard 9 volt battery. The following information is from <http://data.energizer.com/PDFs/522.pdf>.

With a current draw of 40ma the graph to the right shows approximately a 20 hour service life for the device on a single battery. This is only for a constant discharge.



If the back-light was off the expected service life of the battery at a 20ma current drain would be 30 hours.

Battery Service Life Table

AVR	LCD Screen	Current Draw (ma)	Service Life (Hours)
On	On	40	20
On	Off	20	30

Car Adapter

This device receives power via a custom connector connector. This connector is expected to deliver between 5 and 9 volts with at least 60ma of current.

The power adapter supplies 2000ma at 6V to the unit.

Fuse

The fuse is located in the connector for the car receptacle. By unscrewing the tip this will expose the 2 amp fuse.

Troubleshooting

Check the connections
- Power adapter or battery (only one is needed at a time)
- Check LCD connector
- Check Keyboard connector

Blocks on screen	May be caused by the Programmer switch being on. When the switch closes the circuit to ground then it is in programming mode. This may also be caused by a bad contrast setting. Turn the knob clockwise turn down the contrast
Nothing on the screen	Check all the connections or see if the contrast setting is wrong. Turn the knob to the left for a darker picture Check the fuse Check if voltage is live on the bread board
The words are upside down	Try to rotate the screen 180 degrees

List of parts

9-Volt battery
LCD Screen - NHD-0116GZ-PSW-FBW
AVR Microcontroller - Atmel - ATMEGA168-20PU
PS/2 Keyboard - Adesso - MCK-91
Power Adapter - HQ Power - CARS2000 Regulated Switching Power DC/DC Converter
100K ohm Potentiometer for contrast
SPST switch for back-light
DPDT switch for power source selector