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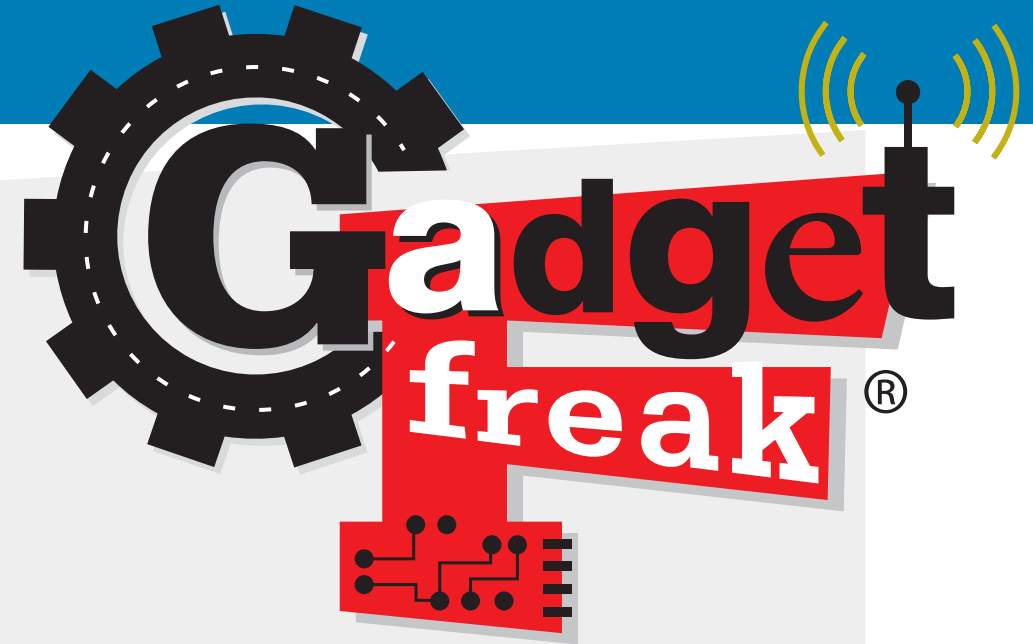
## What is Gadget Freak?

Gadget Freak celebrates reader-created inventions from makers, inventors, and DIY enthusiasts all over the world. *Design News* and *Allied Electronics* are looking for the coolest DIY electronics projects. Have you built a better mousetrap? Improved upon an existing device? Or even created a whole-new solution to an everyday problem? Then we want to hear from you! Share your creativity and your inventions with the Design News community. No idea is too wild. We want to take a look.

If your project is selected, you'll receive a **\$500** check and your gadget will be featured online and in an upcoming print issue of *Design News*. Every project accepted is

automatically entered into our **Gadget Freak of the Year** contest. One project, chosen by reader vote, will receive a **\$6000 grand prize** and a trip to Anaheim, Calif. (just blocks from Disneyland) for the Golden Mousetrap Awards ceremony at the [Pacific Design & Manufacturing Show](#). Second place will receive **\$2500** in prize money and third place will receive **\$1500**.

Submit your project at: [www.DesignNews.com/GF](http://www.DesignNews.com/GF)



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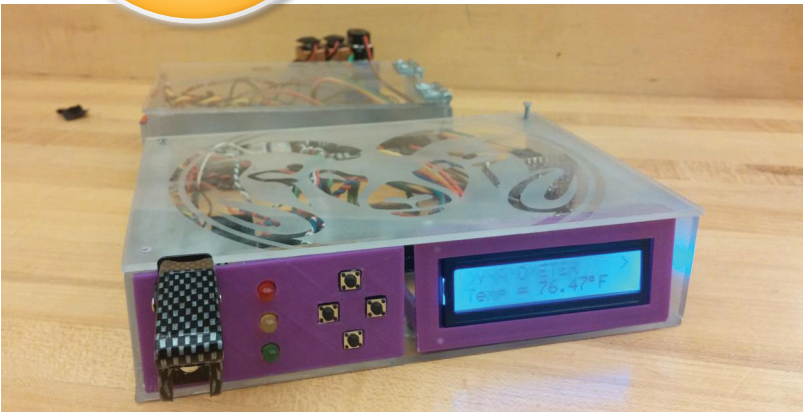
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## The Attack Dyno

The Attack Dyno is a convenient and affordable way to bring an attack timer and dynamometer right to the comfort of your own vehicle. The whole design is built to fit right into the space of a standard do-it-yourself aftermarket car stereo. With the convenience of concealment and very little user input, the Attack Dyno will calculate many more things than your standard dynamometer or attack timer will. The design of the Attack Dyno is catered to the curious side of any car enthusiasts. With the ability to output vehicle torque, speed, horsepower, 1/4 mile times, 0-60 mph acceleration times, ambient air temperature, and more, the Attack Dyno is perfect for those who want to experience and gain knowledge of their vehicle's full potential without breaking the bank.



It has a magnetic reed switch that the user needs to first mount to their vehicle. Comprised of two components, the reed switch is attached to the consumer's wheel using simple double sided automotive tape. The reed switch is attached to the vehicle's caliper while the corresponding magnet is attached to the actual wheel of the vehicle at no more than 0.5 inches apart.

[Click here to read the full article.](#)

→ Click here to see more of what you need including build instructions, a full parts list, and more photos

### Allied Parts List

Amt	Part Description	Allied Part #
5	10 kΩ Resistor	70022898
1	1kΩ Resistor	70022897
7	330Ω Resistor	70183332
1	3 kΩ Resistor	70024689
4	Momentary Switch	70128182
1	Piezo Speaker	70115837
4	Diode	70015970
1	SWITCH-DPDT	70192820

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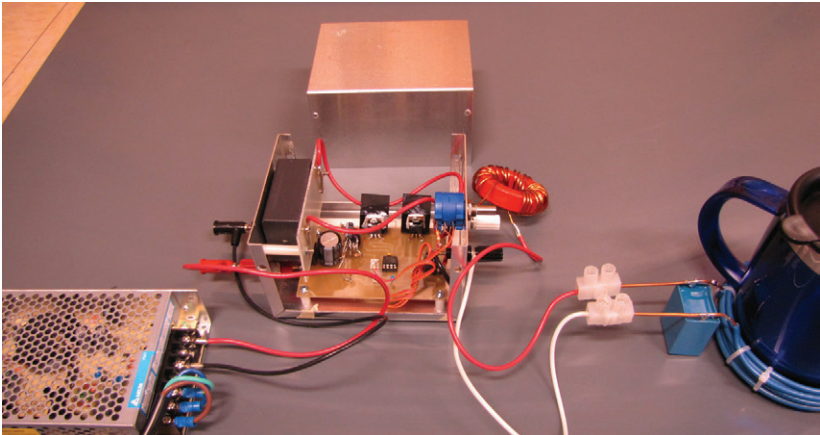




## A Better Coffee Mug Warmer

Most of the coffee mug warmers available in the market utilize resistive heating. These warmers can be used with ceramic mugs or outer-body stainless steel mugs, but they aren't suitable for stainless-steel mugs that use a plastic outer cover for insulation.

Furthermore, resistive heating warmers are inefficient; most of the heat generated by the heating element is lost in the environment rather than warming coffee. A coffee mug warmer employing induction heating can target stainless steel mugs with or without the outer plastic cover. The mugs with the outer plastic cover are highly efficient, as there is less chance for heat-escape. An RF generator is connected to a coil, which creates oscillating magnetic field around the coil. A stainless-steel coffee mug, if placed on top of the coil or brought



in close proximity to the coil, will induce eddy current in the stainless steel body - causing the generation of heat. Coffee put inside the mug will be kept warm or heated according to individual's test. The temperature can be controlled by controlling the current in the coil.

[Click here to read the full article.](#)

### Allied Parts List

Amt	Part Description	Allied Part #
1	H-Bridge, MOSFET Driver, Oscillator	70017317
1	Capacitor	70195788
2	Capacitor	70195939
1	Resistor	70024412
1	Potentiometer	70154227
2	Polarized Capacitor	70187364
1	Zener Diode	70061648
1	Resistor	70522113

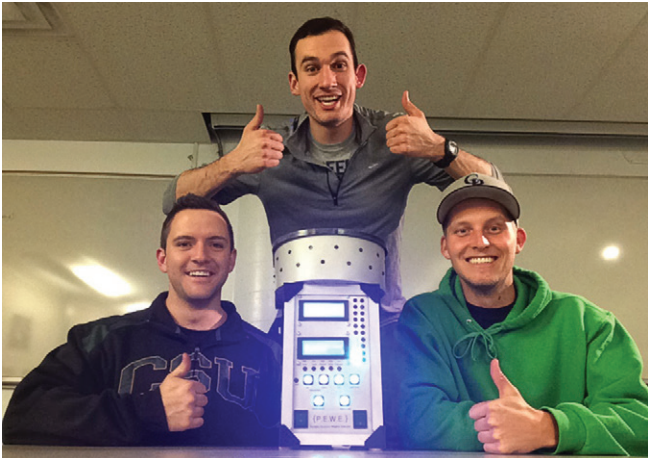
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## Portable Weather Station

Matt Todd, Max Beard, and Kyle Roberts are three Mechanical Engineering students from Colorado State University who have designed a portable weather station. The Portable Electronic Weather Evaluator (PEWE) is equipped with multiple sensors: a barometric pressure sensor; an anemometer for measuring wind speed; an altitude sensor; and a thermistor to measure the change in temperature. On the PEWE's front panel, as seen in Figure 2, there are 10 LED's along the right side that light up proportionally to measure the wind speed as well as another 10 LED's that correspond proportionally to measure the temperature. There are also two LCD displays. The top LCD displays all of the sensors readings. The bottom LCD displays a logic statement corresponding to the sensors readings as well as the PEWE's introduction



when the device is turned on. Below the LCD's are five LED's that, from left to right, display high temperature, low temperature, high altitude, high wind, and low pressure. These LEDs also correspond to logic statements that are displayed on the bottom LCD screen.

[Click here to read the full article.](#)

### Allied Parts List


Amt	Part Description	Allied Part #
17	LED;Blue;5mmDIA	70052941
18	LED;Red;5mmDIA	70061549
13	LED;Green;5mmDIA	70062980
3	LED;Orange;5mmDIA	70079171
3	LED;Yellow;5mmDIA	70226772
2	LCD;20X4;Blue	70456316
2	Switch;Rocker;ONOFF	70131602
2	9VoltBattery	70182128

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## The Handy Rival

The Handy Rival is an arcade game that allows an individual to play rock, paper, scissors against a robotic hand. When the user puts on the glove, movement is detected and the displays turn on (see figure 1). Blinking LED lights prompt the user to select either the “Best of Three Rounds” or the “Best of Nine Rounds” button (see figure 2). After a button is pushed, the LEDs stop blinking and the game begins.

There are four beeps to synchronize the user with the timing of the “rock... paper... scissors... shoot.” On the fourth beep or the “shoot,” the user and the robotic hand show their selection by use of the familiar rock, paper, or scissors hand signal. If the user wins, the victory sound plays and one point is added to the “Player” score on a 7-segment display (see figure 2).



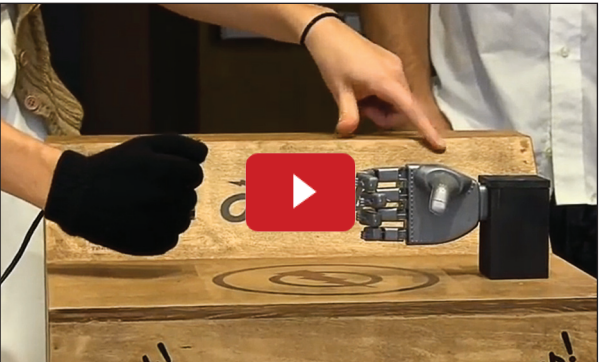
If the user loses, the defeat sound plays and a point is added to the “Rival” score on a separate 7-segment display. In the event of a tie, a neutral beep sounds, no points are awarded, and the round is replayed.

[Click here to read the full article.](#)

[Download the full build instructions here.](#)

### Allied Parts List

Amt	Part Description	Allied Part #
2	Servo Motor	70050414
1	PIR Sensor	70372366
2	Reed Switch	70168917
1	Power Source	70213306
1	Speaker	70115728

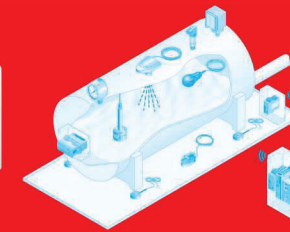


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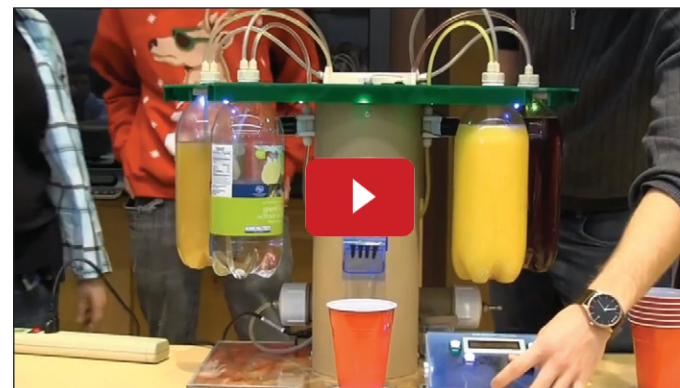
The Gadget Freak<sup>®</sup> Files Case #269

## The Leaky Tree

The Leaky Tree is a high-quality device designed to dispense ice and one of four mixed drinks that can be selected by the user. This device was created to quickly mix complex drinks with great precision as well as entertain the user in the process.

The Leaky Tree will conveniently pour an equivalent cold mixed drink for you with just a push of a button. It uses an Arduino mega and a PIC16F88. The Arduino Mega has nearly all of its DIO pins used and is the main brain for the entire project. The PIC communicates with the Arduino via a binary signal and controls the LCD Screen. RGB LEDs in the upper portion, ice container, and coaster light up in many colors and patterns to convey information and create a fun light show for the user.

[Click here to read the full article.](#)



### Allied Parts List

Amt	Part Description	Allied Part #
1	Slime Threaded Compression Valve Stem	e1333750
3	1/4" Quick Connect "T"	70244708
1	1/4" OD .170" ID Polyurethane Tubing, 25'	70071227
2	16x2 LCD w/RGB Backlight	70039305
4	Power Transistors	70014125
4	Flyback Diodes	70061674
1	Temperature Sensor	70120319
1	Relieving Regulator with Integrated Gauge	70070491
3	1/4 npt to 1/4" Quick Connect	70070335

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# Motion Sensor Light Switch

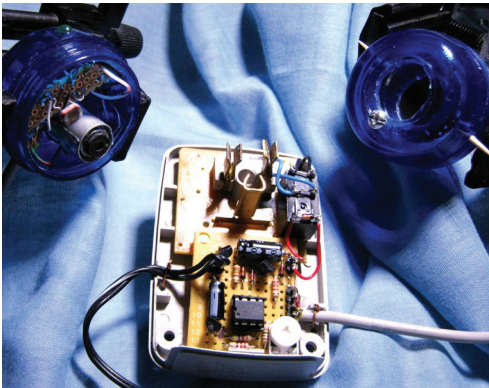
Are there light switches in your home that aren't as conveniently located as you would like? This laser-based switch decoder and driver allows for flexible control of those lights located in less than ideal places.

I live in an apartment. My kitchen is boring and can be accessed from either end of a central counter. This laser based control, mounts just below the cabinets, scans across the entire sink's counter surface using a single beam of a modified laser pointer. The interrupter beam is detected, processed to provide multiple possible hand based gestures, and the result drives a small relay that enables and disables the light fixture directly over the sink. Sure makes getting a drink of water a bit more interesting.

There are three assemblies in this project. Fashioned out of pill containers and a modified surge protector

assembly, they include a wall mounted reflecting mirror, an enclosure with the laser, photo resistor, an indicator LED, an assembly providing AC based power, controller, and relay hardware.

[Click here to read the full article.](#)

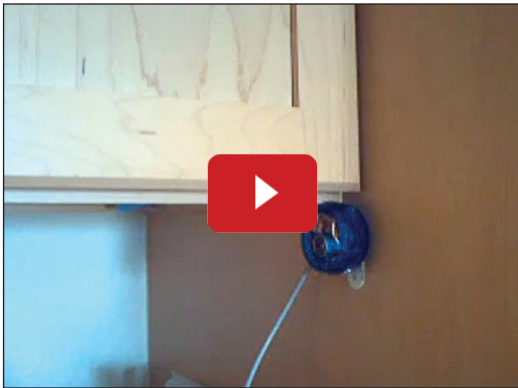


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## Allied Parts List

Amt	Part Description	Allied Part #
1	Photo Resistor	-
1	Laser Pointer	-
1	Green LED	70061509
1	78L05 Semiconductor	70099964
2	4.7K ohm 1/4W Resistor	70183356
1	2.2K ohm 1/4W Resistor	70183348
1	330 ohm 1/4W Resistor	70023924
2	2N3904 NPN Transistor	70055539

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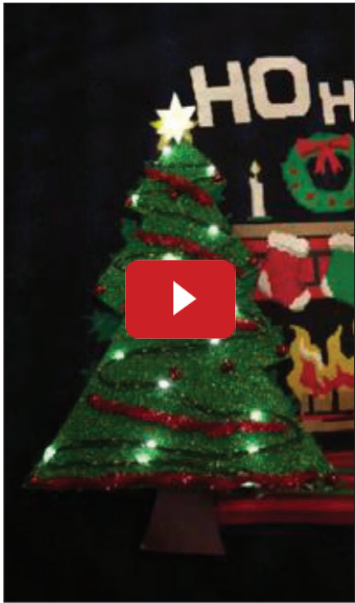


# An Ugly Electric Christmas Sweater

The holiday season is upon us and that means people will be preparing for that most time-honored of traditions — The Ugly Christmas Sweater party. This year you can get a leg up on your competition by building your own. And nothing takes an ugly pattern over the top like making it light up. A control board, some Christmas light string, and some all-around craftiness are all that’s needed to create this sweater with a selectable lighting pattern. This project uses a Christmas tree design, but with enough know-how you can probably fashion the lights into any disgusting pattern you want. To operate the sweater, turn the master switch to the on position and press the momentary button in the tree stump until the flash sequence is to your liking.

[Download the full build instructions here.](#)

[Download the control board firmware here.](#)



→ Click here to see more of what you need including build instructions, a full parts list, and more photos

Allied Parts List		
Amt	Part Description	Allied Part #
1	Battery Holder, 3 AAA, Holder, A.B.S., Spring steel, Nickel Plate, 6 inches long	70182671
1	Capacitor; Ceramic; Cap 0.1 uF; Tol 10%; Vol-Rtg 50 VDC; Radial; X7R; Bulk	70122993
1	Capacitor; Aluminum Electrolytic; Cap 10uF; Vol-Rtg 16V; Radial; nHg	70067785
2	Capacitor; Ceramic; Radial; 22pF; 5%Tolerance; 50V	70079242
8	Light Emitting Diode	
1	Modular Jack, RJ25, 6 Position, Right Angle PCB Mount, Cat 3, Black	70042934
4	SS T092 GP XSTR NPN 40V - LEAD FREE	70099744
5	Resistor; Carbon Film; Res 33 Ohms; Pwr-Rtg 0.25 W; Tol 5%; Axial; Cer-Core	70023888
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# A French Revolutionary Clock

I was asked to build an analog metric clock with hour, minute, and second hands that would run on Great Britain mains power. I have built clocks using 1 RPM synchronous motors, which run in step with 60 Hz 120v power. My first thought was to use a 50 Hz synchronous motor. But doing the math reveals this to be problematic. There are  $60 \times 60 \times 24$  or 86,400 seconds per in standard time, but  $10 \times 100 \times 100 = 100,000$  seconds per day in metric time. So a metric second is .864 of a standard second. With 100 metric seconds per revolution of the seconds hands, that makes 86.4 standard seconds per revolution,  $60 / 86.4 = .694444444$  RPMs. Not easy to find a synchronous motor like that.

What kind of motor could operate accurately at an unusual speed? I decided a stepper motor would work. My first thought along this line was to use one motor at the proper RPM for the seconds hand, and gears to drive the minutes

and hours hands. But a divide by 100 gear train would require four sets of wheels and pinions to be compact. I decided to use a separate stepper motor for each hand.  
[Download the full build instructions here.](#)  
[Download the metric clock source code here.](#)



→ Click here to see more of what you need including build instructions, a full parts list, and more photos

## Allied Parts List

Amt	Part Description	Allied Part #
1	pushbutton switch, SPST	70155673
1	0.1 uF ceramic capacitor	70195854
1	USB extension cable	70101425
1	USB power supply	70124201
1	USB plug, US	70124138
1	USB plug, UK	70124093

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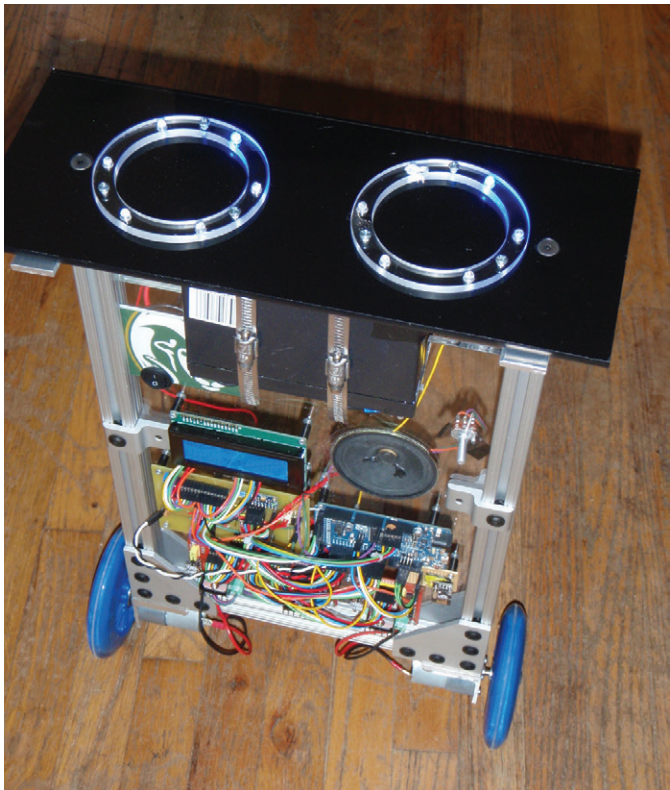


# Drink Delivery Vehicle – Inverted Pendulum

The DDV-IP is an inverted pendulum driving machine. DDV-IP stands for Drink Delivery Vehicle – Inverted Pendulum. The concept is a two-wheeled self-balancing robot that can deliver cold beverages to thirsty folks on hot summer days. A wireless RF remote enables manual control of the device beyond the act of self-balancing. All of the features of the DDV-IP result in an effective delivery vehicle while providing entertainment to the user.

The concept is similar to balancing a broom on your fingertip. The pivot point of the device is its center of gravity, located near the top center.

[Click here to read the full article.](#)



## Allied Parts List

Amt	Part Description	Allied Part #
12	LED; Blue; 5.9mmDia	70079165
12	Resistor; Thick; Film; Res 330 Ohms; 0.125 W; 1%	70154695
1	Battery, Lead Acid, 12V, 7.2A, .250 Termination	70141087
1	Fuseholder; In-Line; 32VDC Max; wire leads; for ATC Automotive fuses	70149748
1	Speaker, Round; 5000 Hz; 84 dB; Micro Miniature; Mylar	70115727
1	Switch, Rocker, SPST, ON-OFF, Black with Black Actuator, 10A, 125VAC	70207289
1	Conn; Term Strip; Barrier; 6Pole; 11.10mmPitch; DBLRow; 22-14; Series1546670; 25A; 300V	70088627
1	Trimmer; Cermet;Rest 50 Kilohms; PCB; 1 Turns; Pwr-Rtg 0.5 W;Tol 10%	70154887
1	REGULATOR, VOLTAGE, POS. 9V, TO-220 PKG	70013895
1	VOLTAGE REGULATOR 5V, TO-220 PKG	70013702

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## A Gadget's Call for Assistance

Friends of Andrew Morris needed a device that could detect a stroke victim's groan and convert the sound into a signal so caregivers would know when help was needed.

After trying unsuccessfully to create a device that could detect the characteristics of the victim's groan, Andrew remembered an answering machine -- from 30 years ago -- that could detect gaps and brief interruptions in the audio that helped the machine detect the difference between

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a dial tone and a human voice. So Andrew designed a circuit to do just that, thus giving the stroke victim the voice to call for assistance.



### Allied Parts List

Amt	Part Description	Allied Part #
	Conn; AV; Power; Jack; Mini; 2.0mmPinDia; Str; SldrLugs; LongBushing; forS760, S760K, S761K	70214189
2	PowerSupply; AC-DC; 5V@1A; 90-264V In; WallPlug; Retail; Switching; 5W; GS Series	70069886
1	Switch; Panel; 250 mA; Solder Terminal; Copper Alloy (ROHS); Mount hdw supplied	70214234
1	Switch, Pushbutton; Panel Mount; 1000 V(RMS) (Min.); 0.5 A; Wire Lug	70156111
2	Toggle Switch; SPDT; RoHS Compliant	70155934
1	SWITCH, TOGGLE, SUBMINIATURE, BAT LEVER, THREADED BUSHING, SOLDER LUG, DPDT	70192084
1	Knob; Control; Dia 19/32in; Line or Slot; Thermoset	70097796
1	Knob; Phenolic, Brass (Bushing); 21/32 in.; 1/4 in.; 15/32 in.; 6-32	70097793
1	Transducer; 40 mA (Max.); 5 VDC; 2400 Hz; -40 to degC; Pin Termination	70115802
1	Pot; Cnd Pl; Rest 10 Kilohms; Panel; 1 Turn; Linear; Pwr-Rtg 0.5W; Shaft Dia 0.25In	70153802

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## It's a Gadget Freak Blast from the Past

Rob Spiegel, Senior Editor, *Automation & Motion Control* - 3/11/2016

It's been years and years of Gadget Freaks. Design News launched its popular feature, Gadget Freak, more than a decade ago. Since then, we have posted nearly 300 original gadgets.

When we launched Gadget Freak, we didn't even present original gadgets. We searched the Internet and collect what we thought was cool. One was the first Apple iPhone, which we found quite amazing. That quickly exploded into something quite larger than a quirky gadget.

The Gadget Freaks we've presented here are the first original gadgets that we began to present in 2009. As you'll see in the slideshow on this page (with links to each Gadget Freak presented), we started out with some very sophisticated devices. The goal was to offer something cool with sufficient instructions that would enable you to build it in your home shop.

### Mow Bot – November 2009



Check out the gadget that mows your lawn while you're in the hammock. [Click here.](#)  
(Source: Design News)