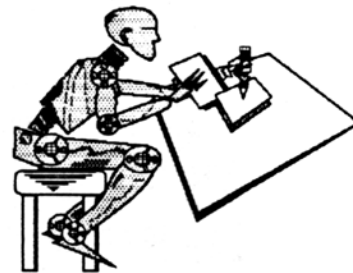# DPRG

DALLAS PERSONAL ROBOTICS GROUP

January 1994   A Newsletter for Personal Robot Enthusiasts

Gemini Robot Catalog

Mike Fowler of Temecula, California has acquired the technology for the Gemini robot designed in 1984. Since Mike is one of the original designers of the Gemini robot, he has set out to make sure it lives on. The Gemini can be purchased in subassembly form with kits such as:

> Voice Input / Output System
> Propulsion Controller
> Robot Control Computer
> Infrared Receiver / Transmitter
> Robot Navigation Training Course
> and much more.

Mike has sent the DPRG a copy of his catalog which includes a price list (very reasonable). See Roger at the January meeting or contact Mike at:

> Michael Fowler
> 30772 Loma Linda Rd.
> Temecula, CA 92592
> Phone: (909) 694-1983
> Fax/BBS: (909) 694-3084

The Gemini Robot

Dallas Infomart
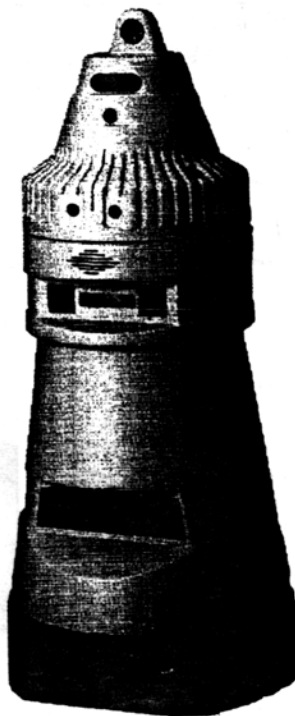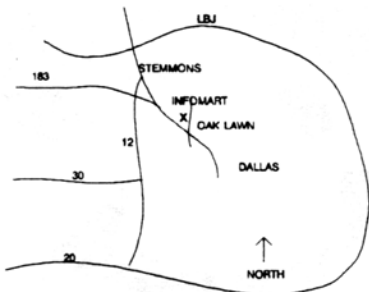
AI/Robotics BBS (214) 258-1832

Meeting Agenda January 22, 1994

At the January meeting we'll continue trying to persuade our robots to complete the contest course. In Feburary we'll setup the course once again for the contest.

We'll also elect a new president and club officers for 1994. If you're interested in a position, please attend.

And we'll do the normal distribution of data books from Motorola, Signetics, and CDI and swap sources for parts.

President's Note

1993 is over and a new year has begun. This time last year I was thinking about running for the DPRG presidency. I was wondering what could be done to increase interest in personal robotics and the DPRG. I then realized that my interest was always re-ignited by the monthly newsletter and came to the conclusion that the newsletter was the best tool for the job. In January I accepted the position and began the design of the first newsletter. At that time the average monthly meeting attendance was about 5. Due to a computer mishap, the club's mailing list was toast and had to be reconstructed from old (very old) printed records. My concern was that many members would be missed. In February, after throwing together some robot chit-chat, a schematic and a cartoon, the first news letter was published. I was astonished to find over 20 people showed up to the February meeting! Every month the attendance grew, often to over 30. Then we linked up with Steve Rainwater who runs one of the largest AI and robot BBS's in the US. Steve added a special section for the DPRG and generated even more interest. We were then listed in Nuts & Volts magazine resulting in newsletter requests from around the nation. Then we were mentioned in Midnight Engineering magazine which caused even more interest. All from a silly newsletter! Needless to say, there is no lack of interest in personal robotics. We're looking forward to another great year as we watch our enthusiasm for personal robotics continue to spread. See you at the meeting.

Roger Arrick

Laser Range Finder, Death of Ultrasonics?

By Roger Arrick
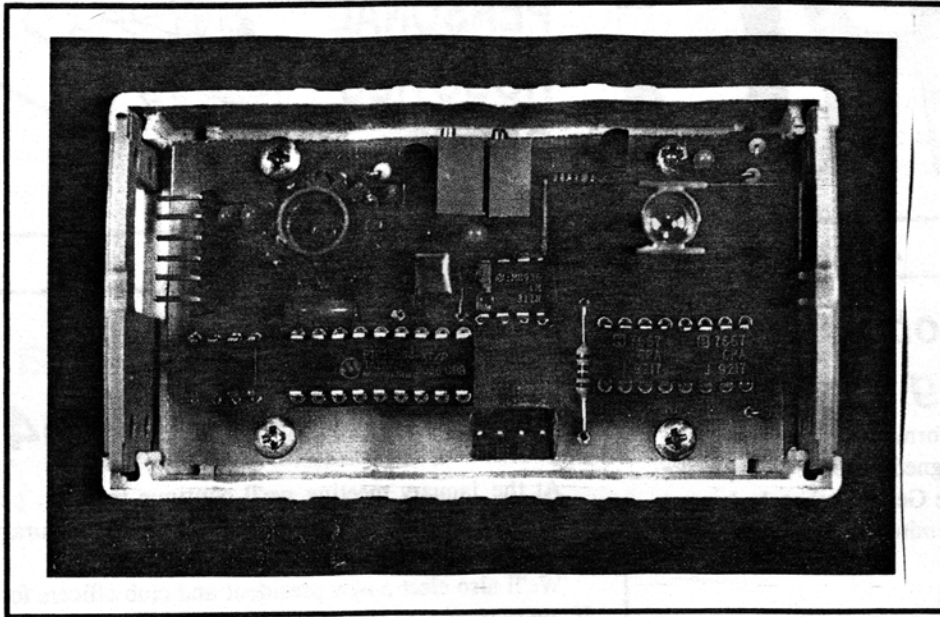
It was December, just before Christmas. As normal, I walked calmly to my mailbox and extracted the typical pile of junk-mail, bills and missing robot notices. Among the unwanted postal debris was something I actually requested and even looked forward to - the Circuit Cellar INK Computer Applications Journal. I returned to my dwelling to sit in my heavily padded executive chair in front of my maxed-out PC, shortwave radio, and sagging shelf of programming books. Innocently, I scrolled through the pages unaware of what life-changing event was about to punch me directly in the command module. There it was, on page 48, the annual design contest results. First place was no less than a complete laser range finder by Tom Ward. Based on a linear CCD array and a laser diode, the entire thing fit in a plastic box about 2" x 4" and about 1" deep. A PIC microcontroller was programmed to read the dot of laser light as it bounced off of unsuspecting objects and returned to the CCD where the distance was determined in inches up to yards and sent out using an RS-232 serial port. I promptly screamed, this is it! Just what I and many other robot builders need - range finding that's faster than ultrasonics and not prone to the other problems that plague that technology. Since there was no more information about its builder than his name, I got on the Circuit Cellar BBS and poked around, finally leaving a message asking how I could get in touch with him. Then I shot off a letter to the magazine editor who promised to forward it to Mr. Ward. In January, I received a letter from Michael Ward saying that Tom was out of the country and that complete plans would be published in a future issue of Circuit Cellar Magazine, possibly the May 94 issue. If this circuit really works, is cheap to build and can provide fairly accurate readings at speeds greatly exceeding other methods, It will make a MAJOR impact on the building of personal robots. Unless Tom Ward supplies the DPRG with information first, keep an eye on the Circuit Cellar Magazine. I predict a winner here.

Something Interesting

Sensor Detects Humans

Model H4741 is a human-body sensor that can turn on welcome lights, air conditioners, interactive store displays, and other things after a person walks to within 15 feet of the sensor. Module consists of pyroelectric detector, signal processing CMOS IC, domed lens, cadmium sulfide (CdS) photocell, and an LED. When a human body crosses the detection zone of the pyroelectric detector, an output transistor turns on and provides a high-level signal to an external device. The CdS cell differentiates between daytime and nighttime, turning the sensor off at night, for example, and a built-in timer allows a choice of eight "on" times between 1 second and 17 minutes. When the detector senses a person, the timer begins operating, sending an output sig- nal after preset time elapses. H4741 draws 0.5 mA from a 4.75 vdc to 10 vdc supply and operates from -10°C to 50°C. Con-

tact David Leinwand at HAMAMATSU CORP., 360 Foothill Rd., Bridgewater, NJ 08807-0910. (908) 231-0960
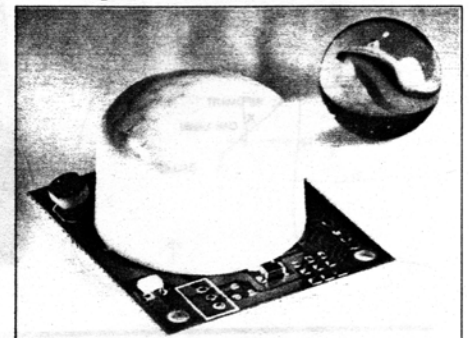
Collision Avoidance, The Infrared Way

Collision detection and avoidance is an important part of any robot. Collision detection is usually accomplished with simple bumper switches but collision avoidance is not so easy. An avoidance system must detect an object by seeing it without relying on contact. A common way to achieve this is with an infrared transmitter/receiver circuit. If you've looked at some of these circuits, you may be surprised at their complexity. For an infrared circuit to work best, there needs to be more than just a transmitter and receiver. The receiver needs to have the circuitry to pick up the transmitter's pulse train while filtering out noise and other unwanted signals. There is a simple solution to this problem found at Radio Shack stores, it's there GP1U52X Infrared Receiver/Demodulator. It is designed to receive 40Khz pulse trains from a transmitter, filter out unwanted signals and deliver TTL output. For a couple of bucks, you can't beat it! Just set up a transmitter with this receiver and your in business with a system that can detect objects several inches away. The actual range will depend on the transmitter's power and the object's reflective characteristics. The following information is included with the unit. Part # 276-137.

GP1U52X INFRARED RECEIVER/DEMODULATOR

Features:

- Rejects all sources not modulated at 40kHz for reliable operation
- Compact size for miniature applications
- Operates from 5V, making direct connection to TTL or CMOS components easy
- Coil-free design provides total immunity from external noise induced by magnetic fields
- Built-in low-pass filter on the power supply helps isolate the circuitry from power supply noise

General Description

The GP1U52X Infrared Receiver/Demodulator is a hybrid IC/infrared detector circuit designed for use as a highly reliable infrared detector for televisions, VCRs, audio components, and so on. It is also ideal as a low-cost detector for hobbiest applications.

The GP1U52X uses a pin photo diode that has its peak sensitivity in the near infrared range. The built-in filter blocks visible light to reduce or eliminate false operation caused by other light sources.

The output of the photo diode feeds into a preamplifier/limiter to provide a clean signal to the rest of the circuit. The band pass filter then rejects all signals outside the pass band (40 kHz +/- 4kHz). The remaining signal is fed to the demodulator, integrator, and wave-shaper circuit (see the Block Diagram). The output is a clean waveform without the carrier.
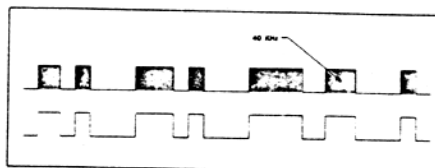

TRANSMITTER
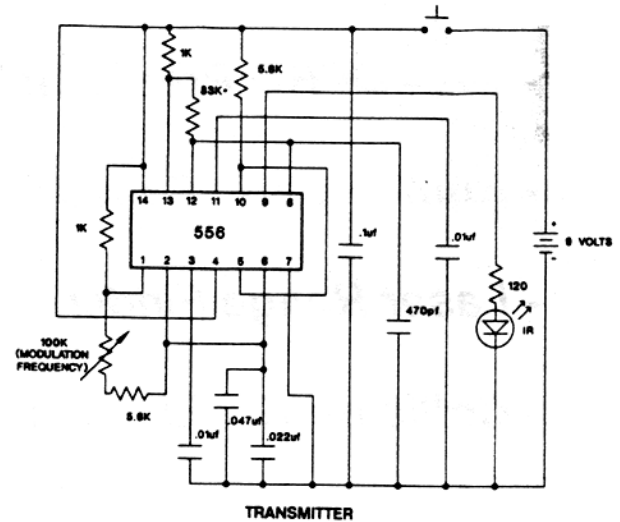
*Ground Pin 6 and adjust for 40 kHz ± 2 kHz from Pin 9 with parallel/series resistance.

RECEIVER

V+ = 5V (6.6V MAX.)

Package Outline

1—Vout
2—Vcc
3—GND
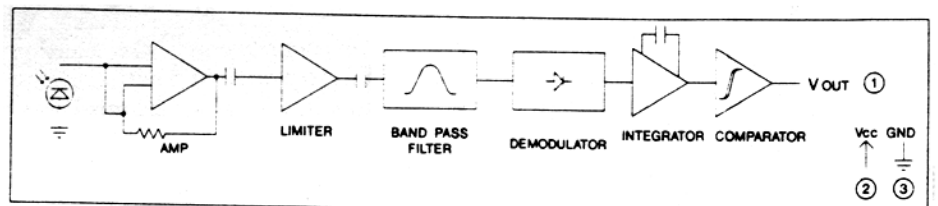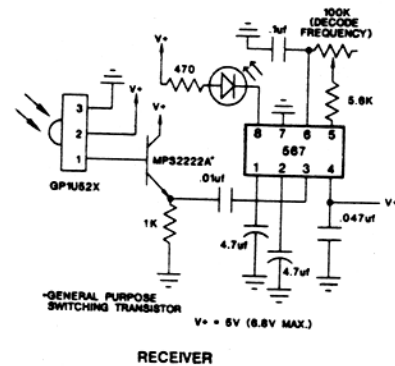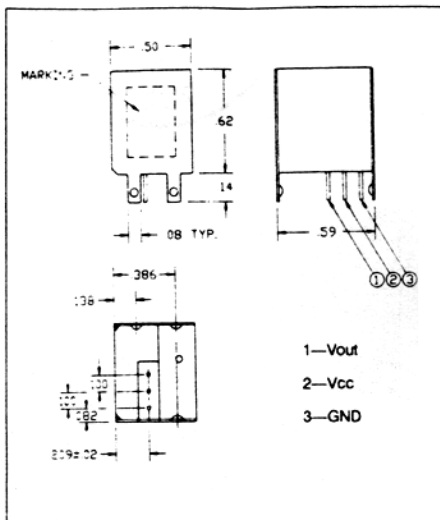
Block Diagram

Timing Diagram

Specifications

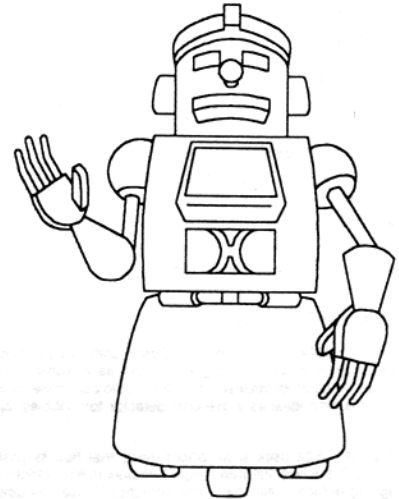|	
Maximum Supply Voltage	6.3V
Recommended Operating Voltage	5.0V +/- 0.3V
Current Dissipation (ICC)	5.0mA
Bandpass Center Frequency	40 kHz
-3dB Band Width of 40 kHz	4 kHz
Infrared Passband	980 nm +/- 100 nm

DPRG

DALLAS PERSONAL ROBOTICS GROUP

January 1994 NEWSLETTER

Inside -

- 1994 DPRG President Wanted

- Human Body Sensor, AI CD Rom

- Laser Range Finder

- Collision Avoidance Made Easier

Send To: