Simple Optical Microphone
by David Mierzwinski

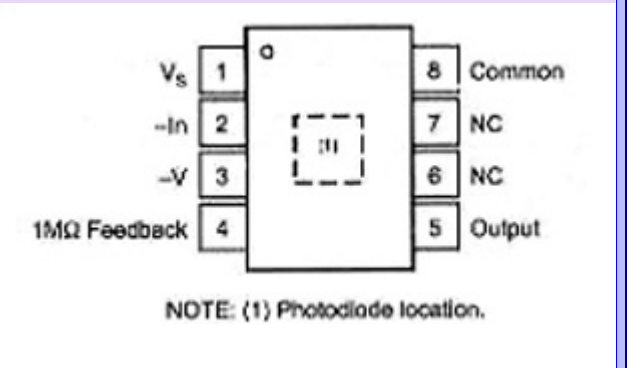
For nearly a year, I have been conducting various experiments in an attempt to enhance the chances of clear EVP captures. These experiments have led me down many different paths including the use of electromagnetic fields, Tesla coils, audio resonance in musical instruments, 13 tones, etc. In my most recent experiments, I have begun exploring the properties of light. This has been exciting and has produced some encouraging results. I would like to share a simple project some of you may wish to replicate and experiment with. Even if you do not succeed in getting EVP captures with this device it is still a very interesting "science project" and will provide yourself and others with entertainment and wonder.

What this project is about
This project explores the unusual properties of light given off by a basic oil lamp. I discovered in my experiments, testing various light sources, that the flame of an oil lamp, when detected by a photodiode and amplified to a high degree, is capable of acting as a carrier to transmit sound. This "sound" is rather noisy by nature, and from what I have observed, can be used, along with our voices, by Spirits. In fact, to optimize this system, it is best to use your own voice to set up the link for maximum clarity and strength. This seems to be the optimum settings for Spirit voices as well.

What parts are required
The Burr-Brown division of Texas Instruments (www.burr-brown.com) makes the best combination of photodiode and amplifier I have found. This part is the "eye" or receiving end of the optical signal from the oil lamp. This part is all self-contained requiring only a few external connections and a nine-volt battery which will power the device chip for a year or more. I was able to find this part on eBay, or you can check with a distributor in your area (not Radio Shack). I bought my oil lamp from K-Mart. It is the large size lamp with a wide flat wick (important). The cost was around $7. The other parts and cables can be obtained from your local Radio Shack store.

Parts List
- Oil lamp with wide flat wick and clear glass chimney
- High quality digital recorder or use computer to record (Olympus VPN-240 PC used in my experiments)
- Burr-Brown OPT101 single photodiode transimpedance amplifier chip
- Nine volt battery to power chip/amp
- Cables or project board and socket to mount OPT101
- Radio Shack Mini Amplifier 277-1008C (used for set-up only)
- Clear Voice Denoiser Software (for post processing filtering)
  [Editor: Audacity should provide the necessary noise reduction as well.]

Oil lamp light source, optical detector/amp mounted on "breadboard" material. Audio recorder connected at "microphone in" with cable equipped with two "alligator clips." The small white box is the Radio Shack mini amp.



The component pin diagram for Burr-Brown OPT101 optical detector/amp. The end of the chip with a notch has pins 1 and 8.

Construction
Now, this is the part that requires patience; how you decide to construct will depend on your ability. I preferred to use a simple perforated project board and soldered with point-to-point technique. How you make the connections to the chip is really up to you. Keep lead lengths as short as you can so you do not pick up stray signals. I think Radio Shack sells wire-wrap and a hand tool for those who do not wish to solder. A socket for the chip is a good idea.
Use the component pin above as a guide to make your connections. This diagram shows the chip pin numbers looking from the top (window side), keep this in mind when connecting from the bottom or a socket. Make the following connections:

- Tie together or jumper pins 8 and 3, we will then call this (common).
- Connect your nine volt battery (Radio Shack sells a pre-made battery connector) Plus or red connects to pin 1; black or minus goes to common.
- The only other connection goes to your recorder. I used a pre-made cable from Radio Shack that came with 1/8 mono phone plug on one end and a red and a black alligator clamp on the other end.
- Connect as follows, microphone positive or "high" to pin 5, microphone minus or "low" to common.

Whew, that's the hard part, are you still reading this?

Setup and Test
This chip receiver you just constructed is very, very sensitive to light and modulations of light. You can experiment with it in many different ways. Keep in mind it will pick up your ordinary room lights and you will hear the loud 60 Hz component of the light. It will pick up light from your computer screen and also light from an infrared remote or computer link. For the oil lamp microphone to work properly you must be mindful of these stray sources of light and work in an area where the only source of light will be the oil lamp itself. Also make sure windows are closed and there are no drafts in the room to cause undue vibration to the flame in the lamp.

Setup is easier with the use of the Radio Shack mini amplifier. The amplifier is not too sensitive to low frequencies so it has properties of a good filter built right in. Place your receiver (optical chip) at about the same level as the oil lamp flame so the light from the lamp falls on the chip window. Keep the lamp about two feet away from the chip.

Connect your output cable to the jack marked "Input" on the mini amp. Turn up the gain about half way on the amp. You will notice if you turn up the flame on the lamp too high you will hear noise and flutter in the mini amp. Speak with a loud voice near the lamp. Adjust the lamp flame for the loudest clearest sound of your voice or an assistant's voice. You may need to hold the amp near your ear to hear this signal. Find the "sweet spot" by adjusting the distance of the chip to flame and the flame size for best clarity.

Recording and Processing
Once you have optimized your setup for best clarity you can try some recordings. Simply plug into your recorder mic input and record. You can try silence or speaking in a loud voice or even playing music. You may notice you will have some of the same challenges as our Spirit friends in having the proper energy to be clearly heard. Speaking in a slow halting cadence seems to work well. Do not be surprised if your words are changed when using this device to record your voice. I suggest a script or another recorder used for control. Due to the noisy nature of this process I recommend post processing of the recording. I found Clear Voice Denoiser used with custom settings to be sufficient. Basically the low frequency component introduced by the flame needs to be suppressed so the voices can be more clearly heard. If you get to the point of recording I will be happy to furnish you with the required custom settings that have worked the best for me.

Have Fun!
I hope this very simple technique works as well for you as I have observed. Do not be disturbed if your voice winds up sounding like a Spirit voice, it is the nature of this technology. Have fun speaking through the aether and hopefully you will have a breakthrough contact.