

*FINAL YEAR REPORT*  
*OPTICAL LINK FOR STEREO*  
*HEADPHONES*

*A project report presented in partial  
fulfillment of the requirements for the award  
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Thank You.

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# OPTICAL LINK FOR STEREO HEADPHONES

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## SYNOPSIS

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Optical link for stereo headphones is a personal headphones receiver with a safe, non-interferencing infrared (IR) optical link back to the transmitter. It solves the problem of long cable. It is used by simply plugging the transmitter into the TV's earphones socket. Any similar sound source can be used. The range of the system is sufficient for greater than the average sized room. The receiver will even work at short range with reflections off walls. The mode of transmissions for the IR carrier system is frequency modulation (FM).

Input signal from the signal source are divided into the right channel and left channel. The power level of the input signal is controlled by the variable resistor. Output from the variable resistor is fed into the conventional transistor amplifier. The input is amplified to provide the necessary signal level and a stable source to drive the LM566 Voltage Controlled Oscillators (VCO).

At the LM566, the right channel VCO has components selected to set the centre operating frequency at 110kHz, while the left channel components are selected for 256kHz operation. Output from the VCO which delivers a triangular waveform is shaped closer to the sine wave by the following RC components which act as a simple filter.

After the two carriers are mixed via resistor, the resultant signal is AC coupled to the output stage. This stage operates in class A to provide a linear transmission of the mixed FM signal. The output current is fed into parallel-series IR LED's bank and limited by the ~~the~~ 6.8ohm emitter resistor.

The IR signal from the transmitter is indicated by two photodiodes at the receiver. A CMOS Hex Inverter is used as an active element of the amplifier stages. Each inverter is configured as a near-linear amplification mode with the output fed back to the input via resistor.

To recover the audio signal from the FM carriers, LM566 Phase Locked Loop (PLL) chips are used. PLL 1 decodes the right channel 110kHz carrier and the PLL 2 the left channel 256kHz carrier.

Before the audio signal can be heard, it must be amplified by the LM386 Low Voltage Audio Power Amplifier. These amplifiers are only low power and are ideally suited to 32 - 100 ohm headphones use, but they can also drive high efficiency speakers.

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