

FM STEREO MULTIPLEX TRANSMITTER TRAINER

DESCRIPTION



The CL-SIP358, a high-technology FM Stereo Multiplex Transmitter Trainer, is designed to teach and demonstrate the principles of multiplexing two signals on a single RF carrier. The transmitted signal is in the range of 88-108 MHz. The nominal transmitter frequency is 107 MHz.

The FM Stereo Multiplex Transmitter is similar in operation to a commercial transmitter, with a pilot tone, (L+R) and (L-R) signals. The Trainer also serves as an FM sweep generator. The reactance (varactor) modulator is provided with either two audio tones (1 kHz and 400 Hz) or an external stereo signal. The composite signal output includes fully adjustable signals of (L+R), (L-R), (L), (R), and a 19 kHz pilot signal.

The center operating frequency of 10.7 MHz is phase-locked loop controlled against a 4 MHz crystal oscillator. The frequency stabilizing circuitry uses binary ripple dividers and phase comparators. The RF frequency is multiplied up to 107 MHz with wide band commercial deviation.

The two audio tones (1 kHz and 400 Hz) are also crystal controlled from the same 4 MHz crystal oscillator. When used with an FM receiver, the transmitter's oscillator can be swept at 60 Hz in order to study the detector circuit tuning of the receiver. The FM Stereo Receiver (CL-SIP328) is a companion to the transmitter, or any FM receiver can be used. The transmitter suppresses the 38 kHz signal and transmits a 19 kHz pilot tone. Two frequency synthesizers are incorporated into the system design. The transmitter has a variety of test points which are used by the student to observe the various signals and voltages present throughout the system.

FEATURES

- Broadcast RF output in the 88-108 MHz range;
- Commercial-type multiplex stereo with standard pre-emphasis (L+R) (L-R) (+19 kHz);
- Crystal-stabilized phase-locked loop RF oscillator, 10.7 MHz;
- Use as transmitter or RF sweep generator;
- Standard commercial audio deviation capability; and,
- Radiated power less than 100 mW.

EXPERIMENTAL TOPICS

- Introduction to the FM Transmitter;
- Transmitter Circuitry--RF Section;
- RF Multipliers;
- Frequency Deviation by Multipliers;
- Frequency Deviation Modulation Index;
- Toroidal Core Transformers;
- Pulse-Counter AFC System;
- Frequency-Lock AFC System;
- Digital Phase-Locked System;
- Experimental Digital AFC;
- The Crystal-Controlled Section;
- The RF Oscillator Signal;
- Sine Wave Generation of 1 kHz, 400 Hz, 38 kHz;
- Square Wave Generation of 19 kHz;
- Developing Stereo Signals;
- Adding and Subtracting Audio Signals;
- The Experimental Transmitter Encoder Section;
- The Receiver Decoder Section;
- The Deviation Display Monitor;
- The Deviation Modulation Display;
- The Ten-Segment Display;
- The Sweep Generator; and,
- FM Detectors.

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FM STEREO MULTIPLEX TRANSMITTER TRAINER

BASIC EQUIPMENT INCLUDED:

- One (1) CL-SIP358, FM Stereo Multiplex Transmitter Panel; and,
- One (1) CL-SIP358M, Laboratory Manual.

OTHER EQUIPMENT REQUIRED:

- One (1) CL-S300PSB, Power Supply Base;
- One (1) Audio cassette player and tape; and,
- FM stereo radio (local supply).



CL-S300PSB

OPTIONAL EQUIPMENT

- One (1) Stereo Cable, 1 meter length (\$118.4) with miniature plugs.

SPECIFICATIONS

- ✓ Panel measures 8.5 x 14 inches. It is painted on one side, with a green mask on the PCB side;
- ✓ Transmitter broadcasts on approx. 88 and 107 MHz;
- ✓ Provides commercial type stereo multiplex operation: (L+R), (L-R), and pilot;
- ✓ Crystal-controlled oscillator, 10.7 MHz with synthesizer control;
- ✓ Standard audio deviation capability (200 kHz);
- ✓ Deviation monitor and pilot tone level indicator on panel;
- ✓ Radiated power into the final stage: 100 mW;
- ✓ Contains 2 synthesized frequencies: 1 kHz, 390 Hz;
- ✓ 10.7 MHz oscillator section multiplied to 107 MHz;
- ✓ 19 kHz pilot tone generator;
- ✓ Synthesized from 10.7 MHz oscillator;
- ✓ Four malfunction switches are provided;
- ✓ 40 test points;
- ✓ Gold-plated contacts to power supply;
- ✓ The RF oscillator can be swept by 50 or 60 Hz to produce an S-shaped waves at the FM receiver output;
- ✓ The 50-hour course is supplied with a comprehensive lab manual, which includes material about the AM/FM Radio (CL-SIP327B/CL-SIP328DB);
- ✓ All equipment operates on 120/240 VAC, 50/60 Hz; and,
- ✓ Total weight: 3.5 lb (1.59 kg).