

Radio Control Transmitter Field Strength Meter

The Transmitter Field Strength Meter is designed to check the transmitted field strength from the antenna to ensure models are not lost through flying out of radio range.

Features

- Tests 29, 36, and 40 MHz transmitters
- Low cost, most parts recovered from a defunct radio cassette
- Easily built, four parts only
- Detects poor signal strength caused by:
 - Antennas with open circuit segments
 - Open circuit antenna contacts
 - Faulty final amplifier transistors

Circuit Description

The Field Strength Meter (FSM) design is of the wave absorption meter type where the transmitted signal provides the power to drive the meter movement. The transmitted signal induces a voltage into L1 and is rectified D1. C1 filters the voltage and it is applied to the meter. L1 and C1 are designed not to resonate, so the response of the FSM is not frequency dependent and can be used for all frequency bands used in Australia.

Obtaining the Components

C1, D1, and M1 can be recovered from a defunct radio cassette. The exact value of C1 is not critical, so any disc ceramic capacitor around 2nF in value can be used. D1 can usually be found in the radio section as the AM or FM detector. Germanium types are usually in a clear glass package. The prototype was built with a meter from a radio cassette and was found to require approximately 500 microamps for full-scale deflection. Most radio cassette meter movements appear to have this rating. The number of turns on L1 may need to be modified for other types of meter. Obtain a plastic box approximately 130 x 68 x 42mm in size.

Construction

The FSM contains only four parts and is constructed using point to point techniques on the back of a plastic box lid. Follow the construction diagram on the circuit diagram. L1 is wound on a 15mm diameter former (a cardboard tube from a fax paper roll) using either 0.5mm enameled copper wire or 0.5mm single strand plastic insulated circuit wire. Place a hole in the former as close to the end as possible. Measure 20mm along the former and place another hole. Wind L1 leaving about 200mm tails. Initially, tape L1 in position as it may have to be adjusted.

Testing

Bring a transmitter antenna near to L1 and check the meter needle deflects. To calibrate, place the lid on the box. Fully extend a known good transmitter antenna and place at right angles to L1 so it is touching the bottom of the box. Adjust the position of L1 until a full-scale deflection of M1 is achieved. Glue L1 into place.

Installation

Mount the FSM on a non-metallic vertical surface a little above waist height.

Meter Reading

Below half scale is a low reading. Above half scale is a normal reading.

Low Meter Readings

Low readings indicate low signal output. The biggest problem is the antennas become coated in oil from engines and this attracts dirt and dust. The resistance between segments increases, and hence causes poor transmitted field strength. Depending on the severity of contamination, two methods are described that require the antenna to be removed from the transmitter. For minor contamination, spray the extended antenna with a penetrating lubricant (CRC, WD40, etc). Retract and extend the antenna, and wipe with paper towel to remove the loosened dirt. For extensive contamination, soak it in methanol or clean fuel before applying the method described above.

The next problem is where the outer segment of the antenna slides. The contacts can become covered with oil causing an open circuit. Clean the antenna as above, and the contacts with methylated spirits. The other problem is the contacts can wear away with use. Visually check the contacts make proper contact.

The least likely of problems are the transistor in the final amplifier fails, or the transmitter tune has drifted due to age. A range test does not always find these problems. Seek qualified help if the problem cannot be easily resolved.