

Toroidal Inductor Test Fixtures & Measurements Application Note

VANGUARD ELECTRONICS has designed a range of test fixtures specifically to measure the electrical characteristics of radial-lead toroidal inductors. These fixtures are made as accessories to the Hewlett Packard Test Instruments HP 4342A Q Meter, HP 4192 Impedance Analyzer, and the HP 4191A Impedance Analyzer. The fixtures can be ordered from Vanguard either through your local sales representative or by contacting factory sales directly.

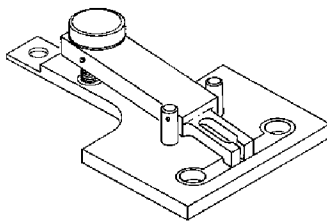
A key feature common to these fixtures is that they provide rapid, easy, accurate and consistent measurements close to the body of the component without having to bend or pre-form the terminal leads. This prevents damage to the leads and maintains solderability. Each fixture has been engineered to minimize residual inductance and fixture capacitance. This results in accurate and repeatable measurements. The fixtures TFT 4192 and TFT 4342 incorporate fixed 1/4 inch spacers from the terminals to the body of the component to satisfy the standardized requirement of 1/4 inch lead length for measurements. The TFT 4191 features a

TEST FREQUENCIES FROM 0.25 MHZ THROUGH 0.79 MHZ.

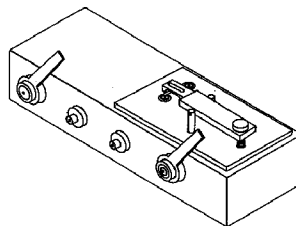
- Hewlett Packard 4342A Q Meter with Vanguard Test Fixture - TFT 4342
or
- Hewlett Packard 4192A Impedance Analyzer with Vanguard Test Fixture - TFT 4192.

TEST FREQUENCIES FROM 2.5 MHZ THROUGH 150 MHZ.

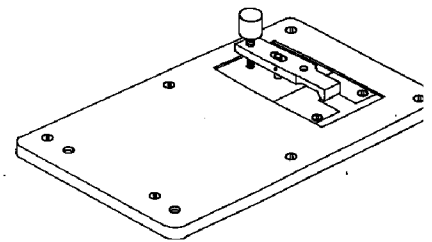
- Hewlett Packard 4191A Impedance Analyzer with Vanguard Test Fixture - TFT 4191.



TEST FIXTURE TFT 4342



TEST FIXTURE TFT 4192



TEST FIXTURE TFT 4191

MAKING PRECISION MEASUREMENTS FROM 2.5 MHZ THROUGH 1 GHZ

Use the Hewlett Packard Impedance Analyzer HP 4191A with Vanguard Test Fixture TFT 4191. (Determine if 1/4 inch lead length is required.)

- Step 1. Calibrate the HP 4191A analyzer as instructed in the HP manual, using the 0 Ω , Open (OS), and 50 Ω calibration terminations. Remove the terminations from the APC-7 "UNKNOWN" Connector.
- Step 2. Select "SPOT FREQ" mode. Enter Test Frequency. Select "ELECT LG" mode. Enter "0".
- Step 3. Select display A3: "I". Select display B1: " \ominus " deg. Observe indicated phase angle (\ominus deg.).
- Step 4. Connect the fixture TFT 4191 to the APC-7 "UNKNOWN" Connector. DO NOT ROTATE THE FIXTURE TO TIGHTEN THE CONNECTION. Press the button on the rocker arm slightly so that the clamp does not touch the center terminal of the fixture and is raised to a height equal to the actual test position. Select "ELEC LG" mode. Empirically enter Electrical Length values (for example 0.60) until the indicated phase angle (\ominus deg) is the same as observed in Step 3 above. Note: Remember, the rocker arm clamp must not touch the center terminal. Determine and record the value of Electrical Length for each test frequency.
- Step 5. Inductance and Q factor measurements. Select display A: "I" mode. Select display B: "Q" mode. Select Test Frequency. Enter "ELECT LG" value determined in Step 4. Press rocker arm button and insert component between clamp and terminals. Release button. Read Inductance and Q factor values indicated on displays A and B respectively. Note: To obtain more accurate measurements of Q factor when the reactance of the inductor under test is less than 50 Ω at the test frequency, proceed to Step 6.
- Step 6. Read inductance only as in Step 5 above, on display A select "ELEC LG" mode. Enter "0" Electrical Length. Read Q factor only as indicated on display B. Disregard the inductance reading when Electrical Length = 0. Note: Remember to