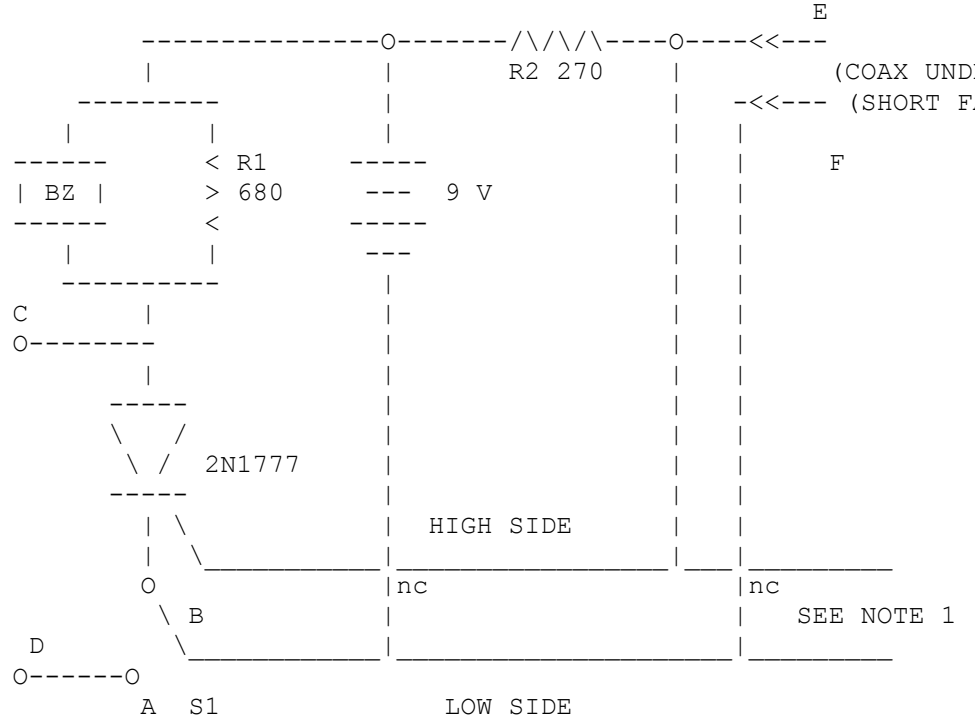
Coax Tester

From Brian G3YRH @GB7CAM.#12.GBR.EU (Additions Jun 06)

Co-ax cable tester
==========

This tester detects steady short or intermittent open circuits. Momentary open circuits or steady short circuits trigger a buzzer.

Schematic : Detection of intermittent discontinuities or steady shorts.



NOTE 1: Alternative: Single wire under test or jumper to test internal continuity of tester.

BZ = Buzzer
S1 = Switch
2N1777 = Silicon Controlled Rectifier
nc = No Connection
RESISTANCES ARE IN OHMS.

To test coaxial cable for intermittent discontinuities or steady shorts, place cable at points E and F, then short far end of coax.

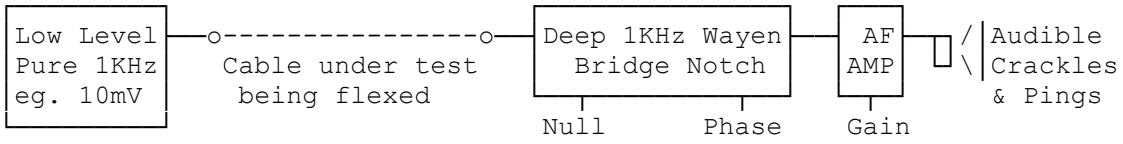
Details

A simple, portable, lightweight testing circuit sounds a long duration alarm when it detects a steady short circuit or a momentary open circuit in a coaxial cable or other two conductor transmission line. The tester is sensitive to discontinuities that last 10uS or longer. Previously, there was no simple, portable instrument to detect momentary shorts or discontinuities. Such conventional instruments as ohmmeters and lamp or buzzer type continuity checkers give visible or audible indications of steady open or closed circuits only.
To detect an intermittent open circuit in a coaxial cable, the far end of the cable is shorted by a jumper, and the tester is connected as shown in the upper portion of the figure, with the switch in position B. If the cable is in good condition, the high side terminal remains ungrounded, the silicon controlled

rectifier remains off, and the buzzer does not sound. If an opening occurs in the centre conductor or shield of the coaxial cable, the current from the high side terminal to the low side terminal that would be otherwise shunted by the cable flows into and triggers the silicon controlled rectifier and thereby turns on the buzzer. Even if the coaxial cable starts to conducts again, the buzzer remains on until the silicon controlled rectifier is reset by turning the switch to position A. An intermittent discontinuity in a single wire (or an internal discontinuity in the tester) can be detected in this manner if no coaxial cable is connected and the wire or jumper is connected as shown in dashed lines. (See Note 1).
To detect a steady short circuit, the jumper (At note 1) is removed. If the buzzer does not sound, there is a steady short circuit between the inner and outer conductors. If the buzzer does sound, then the cable is either good or open.
The tester is used extensively for detecting intermittent open shorts in accelerometer and extensometer cables. The tester can also be used as an ordinary buzzer type continuity checker to detect steady or open circuits. For this purpose, the switch is set a position A and the probe leads are connected as shown by dashed lines in the lower portion of the figure (points C and D). In this case the silicon controlled rectifier is not part of the circuit, and the buzzer remains on only so long as the circuit under test provides a conducting path.
This work was done by Bobby L. Anderson of Rockwell International Corp. for Marshall Space Flight Centre. No further documentation is available.

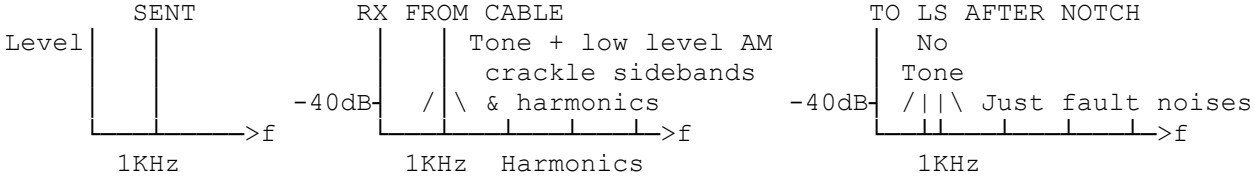
NASA Tech Briefs January 1990.
rgds Brian g3yrh@gb7cam

By G8MNY
One method I have seen & used for RF/AF cables, was to use an AF tone null system..



This system can find these annoying intermittent faults before they are actually a hard fault somewhere in the cable. Faulting using a low level AC rather than DC, does not cause the intermittent fault to weld up the cable wires, so it does not hide the fault on testing.

HOW IT WORKS
The OSC applies a low level AF signal to the cable. The far end of the cable is attached to the AF deep notch filter that can be adjusted with null depth & phase controls to completely null out the original signal.



Any discontinuity in the cable signal will change the level slightly & that will produce low level AM sidebands & even harmonics. The AF amp boosts these so they can be clearly used while flexing the cable to locate the faulty part (end) of the cable. Replacement/repairs can then be done (shorten cable) if appropriate. [Try this out on lap screened Phono AF leads!! :-)]

Although this was a dedicated tester, it can be made up out of testgear you may have. E.g. AF Osc, AF Distortion meter, & an AF amp & LS.

Why don't U send an interesting bul?

73 de John G8MNY @ GB7CIP