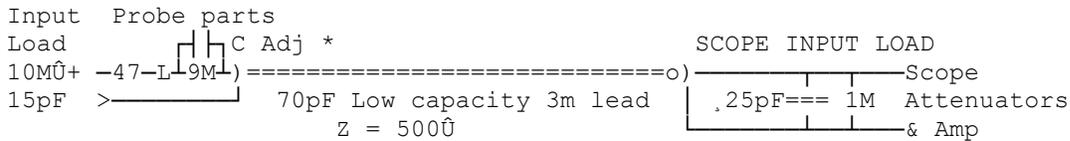
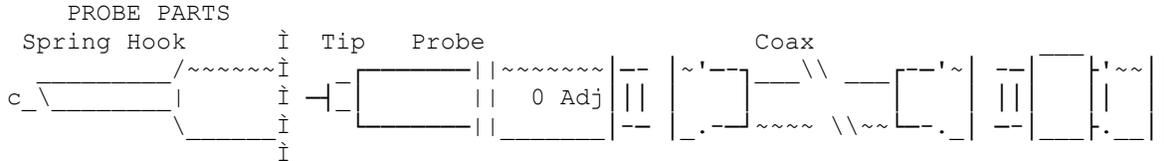


type which here is a very fine single strand core polly foam insulated high impedance type. There is often a tweak on the probe (tuned circuit + L shown & a series scope R) to improve HF & pulse performance.

Only usable on DC AF & low Z circuits where the loading is not important. e.g. DC up to 6-10MHz on 75Ω terminated systems. Voltage limited by probe & scope. Able to see low signal levels.

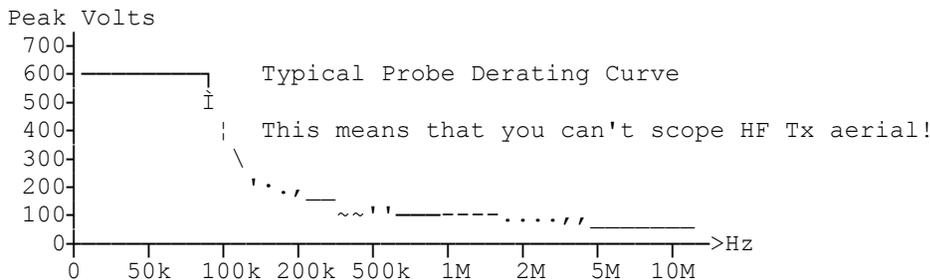
10:1 TRIMMED PROBE

These are the most common probe, with in built attenuator reducing input load. Must be calibrated before use on that scope/input! Not able to see very low signal levels.



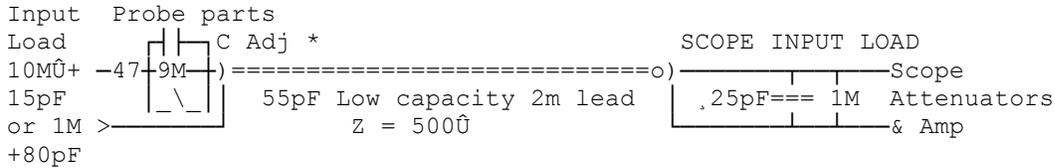
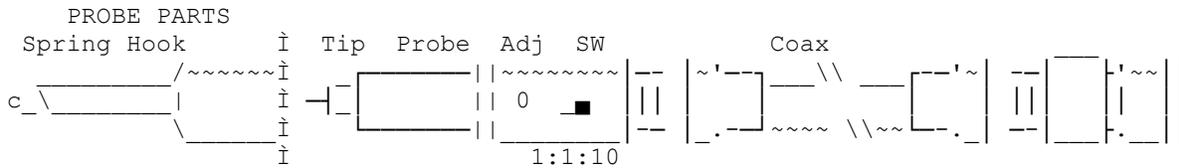
The accurate series 9MΩ gives the 10:1 DC calibration with the scope input R. The trimmer C in the probe has to be exactly 1/9 of the total capacitance of the scope & lead, then the probe's frequency & phase (pulse) response will be flat. So the probe is designed for a particular lead! Note the more complex tiny probe components are to improve bandwidth & pulse response.

Usable DC-60MHz (3.5nS rise time). Voltage limited by probe design/10x scope input. Some older larger 10:1 probes (e.g. Tektronix) use an adjustable moving capacitance tube & have a much higher rated voltage & are useful for mains & SMPS & line output work, where the peak pulse voltages can be over 1kV @ 50kHz, which most of the smaller probes CAN NOT safely handle! See the rating curve for your probe...



1:1/10:1 SWITCHED PROBE

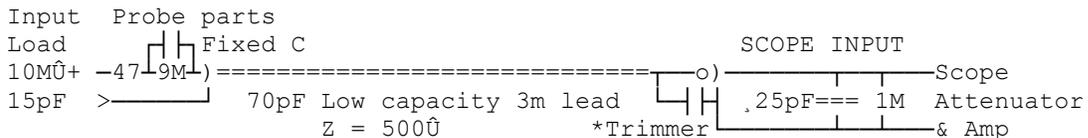
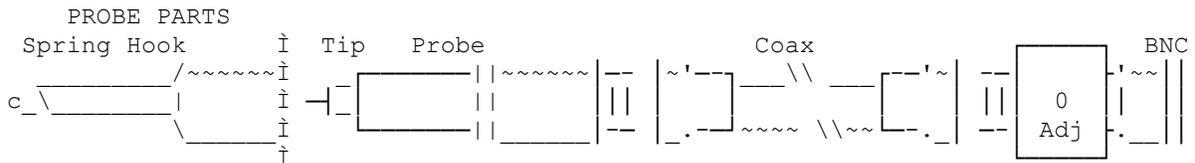
These are also common, with a built in switched attenuator reducing input loading on 10:1. & the 1:1 option for seeing small signals, but note the loading changes when switching. On 10:1 mode, it must be calibrated before use on that scope/input!



Usable up to 6-10MHz @ 1:1, & 60MHz @ 10:1. Voltage limited by probe & switch design/10x scope input or scope input @ 1:1. Due to the added switch & risk to the scope I would not use this type on any high voltage like mains or SMPSU testing!

10:1 TRIMMED SCOPE END

These are the less common, with a fixed probe capacitor, the trimmer is put at the scope end. As it is the scope input capacitance that varies scope input to scope input, this approach lets the probe maker better match the components (e.g. series Ls & Rs etc) to get a better frequency/pulse response, however the probe tip capacitance is a little bit higher!
 Must be calibrated before use on that scope/input!
 Not able to see very low signal levels.

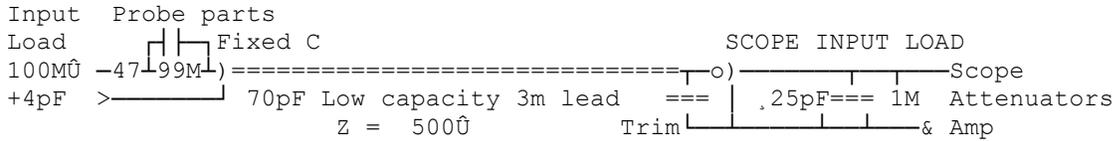


The accurate series $9M\Omega$ gives the 10:1 DC calibration with the scope input R. The fixed C in the probe has to be exactly 1/9 of the total input capacitance & the scope end *trimmer is adjusted for this.

probe design/10x scope input, this may be higher than the probe end trimmer type.

100:1 TRIMMED PROBE

Same as above but are less common, usually scope end trimmed allowing for high voltage with the larger in built attenuator reducing input loading by 100, useful on sensitive large signal DC or where higher capacity probe can't be used, if there is enough signal!
 No good for low signal levels!

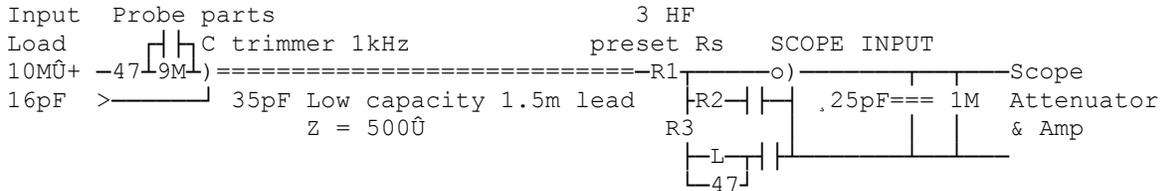
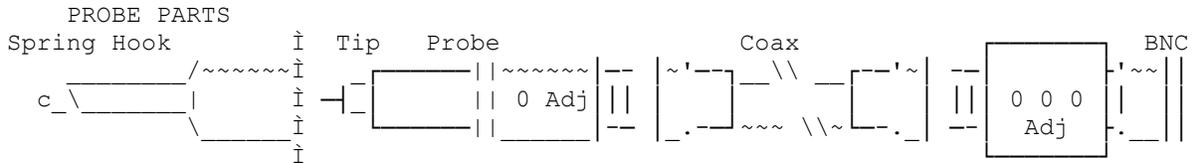


The accurate series 99MΩ gives the 100:1 DC calibration with the scope input R. The high voltage C in the probe has to be exactly 1/99 of the total input capacitance for the probe to be flat.

Usable DC-60MHz. Voltage limited to by probe design/100x scope input e.g. 1.5kV Even so some are not rated for SMPSU work see derating curve above, where the peak spike voltages may be 1kV @ 50kHz!

10:1 SCOPE & PROBE TRIMMED

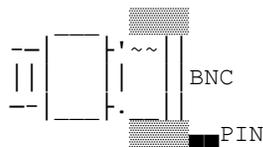
These are far less common, with a trimmer capacitor & presets. They give the best performance & must be calibrated before use on that scope/input! Not able to see very low signal levels.



Usable DC-300MHz where the loading is not important. Voltage limited to by probe design/10x scope input. The probe trimmer affects 1kHz & the 3 scope end presets all affect different HF frequencies allowing good calibration on square wave harmonics to over 300MHz & a pulse rise time of 1.4nS.

AP BNCs

This a surrounding locking pin system that tells the scope you have a 1:10 probe fitted, for on screen calibration information etc.



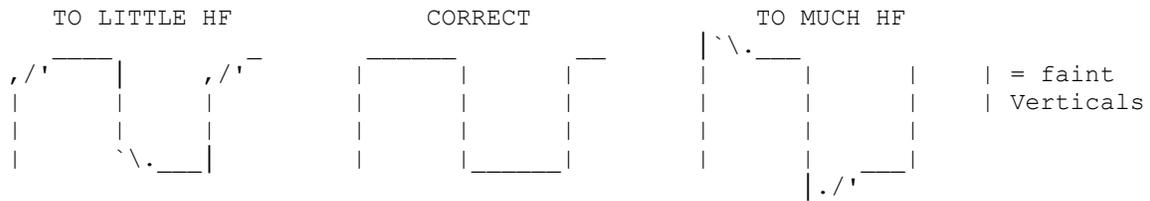
PROBE PARTS INTERCHANGEABILITY

Various makers often use similar parts, but not always! E.g. Tip threads can be different, & also the tip length & diameter making it incompatible to some makes of probes hooks.

Screw on leads are also made in slightly different ways & may no be compatible!

CALIBRATING A SCOPE PROBE *

Connect the probe to the scope 1kHz square wave calibrator & set the input, trigger & timebase range to show a large square wave. Then using the insulated tool provided adjust the trimmer...



With a 2 (or more) trimmer probe a higher frequency test square wave of 1MHz will be needed for the scope end trimmer(s). Adjust the trimmers in much the same way, endeavouring to get the best square "corner pulse" shape possible.

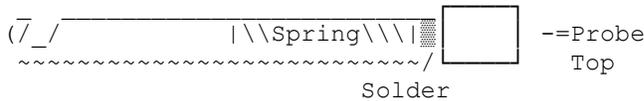
FAULTY SCOPE ATTENUATOR

If the wave shape changes (other than height) as the scope input attenuator is changed, then the scope attenuator needs recalibrating, as the input capacity (& hence the probe response) should not change if the scope is set up OK!

PROBE FAILURE

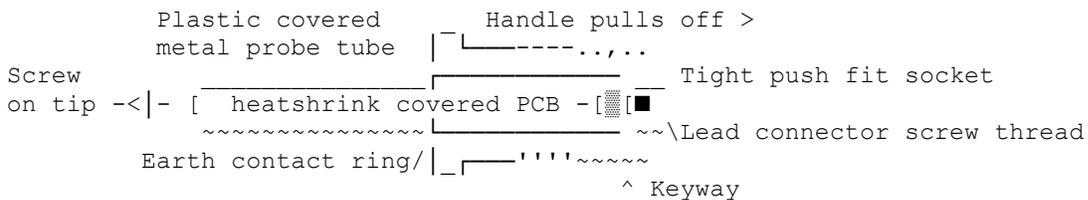
Tips: These can brake the screw in tip off as there is huge leverage with the whole probe on the end, but you can get spares with probes.

Hooks: The hook sleeve will melt if left on components while soldering! The hooks also break, (made of wire or metal strip) due to the leverage factor.



I have made long lasting replacement hooked strips from scrap junior hacksaw blades cut into strips & filled out the hook shape. A good solder (try ally solder) & key filing are needed to attached!

Body: These fail due to broken internal wires to the socket, & also fractured PCB. The assembly can be difficult to take apart. but all the plastic covers are push fit. A broken multiplying R is usually fatal, unless you want a 1:1 probe! Be careful not to lose the red tweaker cover when sliding the hand cover off. Switched versions need extra care!



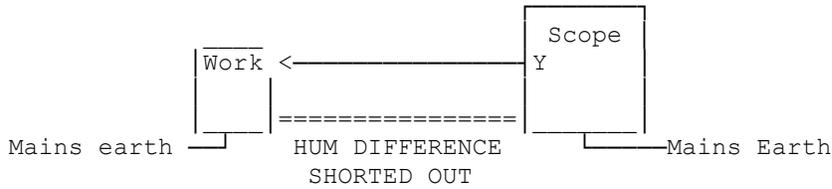
Note some probes use a metal plated plastic body are not metal at all!

Leads: These fail:- a) broken intermittent inner of very thin (hair gauge) lose single core as it will not stretch, b) the push on crimped outer connectors. these have just a centre pin to make connection to the movable inner wire. Repairing by shorting the lead by much my uncalibrated it!

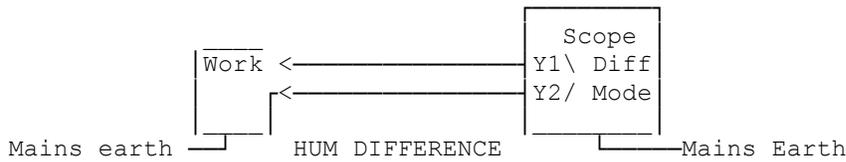
Bnc: If moulded on type little can be done. Box type these can fail due to movement of the plug/socket wires to the PCB & although fiddle are easily repaired.

PROBE PICKUP/HUM LOOPS

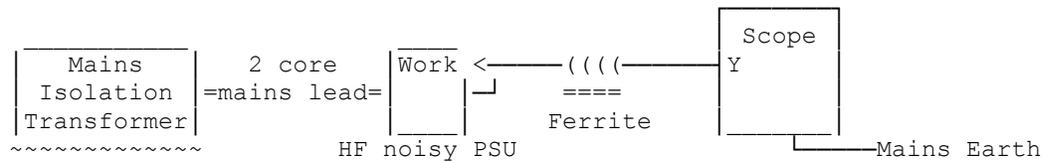
With different earth potentials & high capacity from mains filters to chassis it is quite normal to see unwanted signals on a sensitive range on the scope. This not helped by long resistive scope leads, so 1st try a thick bonding lead from the scope earth point to the work (NO LIVE chassis use isolation transformer).



Differential mode can be useful to, where you use both scope inputs to see the difference..



For HF noise try the ferrite ring trick on the mains or scope probe lead & see the common mode noise disappear.



Why Don't U send an interesting Bul?

73 De G8MNY @ GB7CIP