UFL and Balanced Connectivity & Calibration Kit Overview
The choice of a connector is not by the *basic accuracy* but rather by the *system accuracy* taking all effects into account.

Therefore UFL is often a better and less expensive choice than SMA!
quick overview

The MegiQ BalCal kit is a probe- and calibration set that allows you to easily connect, measure and calibrate into UFL and balanced RF circuits.

The BalCal kit contains:

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choice for UFL

Most connectors are too bulky for miniature RF electronic circuits and influence the system you are measuring too much.

UFL brings a solution! Though basic accuracy is not as good as with a good SMA or N-type connector, the system accuracy in real life situation is often far better when used in miniature electronics.

This makes UFL a very good choice for coaxial common mode connection in small applications.

See the picture above and imagine the trouble you would encounter, both mechanically as well as electrically, when using SMA on this location.

advantages

When use with care UFL will give you a lot of advantage:

• the footprint is small, you can design in test points in your design
• it does less influence the fields near to the connector
• they are inexpensive
• they are small
• the cables assemblies use thin cables
• when using the footprint in your design, you can dis-embed just up to the point of interest, i.e. already on your PCB!

disadvantages

There are of course also some disadvantages:

• the quality of the connector itself is lower that that of a good SMA
• they are not very sturdy when mating and unmating, use with care!
• there are good, but also some very bad UFL cables around
• you need special calibration OSLT tools (which you find in the kit)

These disadvantages are by far cancelled out by the advantages when it comes to very small PCBs.
design in
The footprint of the UFL jack is small, so in most cases you can design the footprint in on your target PCB. You can even leave this footprint in the final product. This way you can probe impedances on your PCB, without having to change the topology of the PCB before or after measurement: no “sudden bulky connectors” changing the complete RF behaviour!
The UFL has a far better system accuracy!
This is one of the most important advantages of UFL making them a far better choice than the “better” SMA or N-types in many cases!

real life use
The real life use is simple, it is a 50 ohm coaxial connector like an SMA is, so use is straight forward. But they are small, so perhaps you will have to wear glasses when mating or un-mating the UFLs.
Use connector contact lubricant, This will greatly influence life of the connector and making them easier to insert or release.

UFL calibration
The kit contains the needed OSLT calibration tool for UFL. It is mounted on a 4-layer PCBs with three thickness of layers.
For every thickness and circuit (O,S,L or T) there are two identical circuits, so you can calibrate 1- or 2 port circuits in one go. You can see now in one glance that you are calibrating just up to the point ON the PCB!

measurement
Once you've calibrated the set-up, and you've the UFL-jack on the PCB you want to test, it is easy to connect and make the measurements you want!

choice for symmetrical
In many circuits the RF-signal is not referenced “against earth” (or against a ground plane) but symmetrical.
Most of the time there is no shielding, it is not really needed, because unwanted radiation from the transmission lines is stopped by carefully balancing the line. Often such a line consists of two conductors in parallel, fed and loaded in a balanced way.
These lines are also called Lecher Lines.
Note, symmetrical does not always imply that there is no reference to earth. we discern “Balanced” and “Differential” in this manual. See figures on the side.
Many antennae are balanced by nature, like the open and folded dipole and many loops. (examples of non-balanced antennae: ground-plane antenna, inverted-F, ...)

Symmetrical antennae are often less sensitive to grounding of the system, so in case of portable equipment, less sensitive to position and way of holding it in the hand. Furthermore there are a lot of chips out there that have differential inputs and outputs.

choice differential / balanced

The Balanced kit contains:
- Probe for true balanced
  (3 ... 3000MHz, both SMA and UFL to balanced pin adapter)
- Probe for differential
  (0...4GHz, Dual UFL to differential pin adapter).

The Differential probe is more broadband, with no balun involved, but its use is limited to systems insensitive to pulling both sides with 50 ohm to earth. You will need at least two-ports on your VNA and will have to do the subtraction between the two channels by yourself.

In case you want to do a 2-port differential measurement, you will need 4 ports on the VNA! So in practice differential probes are limited to symmetrical 1-port measurements.

In most cases the true Balanced probe will be the better choice. It is less broadband (still 3 ... 3000 MHz). You will not pull any side of the system to earth and will only need one port on you VNA for each balanced port.
balanced calibration

The kit contains OSLT calibration tools for the balanced/differential probes. You can calibrate the system up to “on the PCB” since you will have find same blank pin headers in the kit that are used in the calibration tool.

As with the UFLs, only a very small area is needed for these pin headers, so in most cases you can incorporate the footprint for the test-points headers in you design. We strongly recommend to do so!

You have the choice between three load impedances, 50, 100 and 200 ohm. There is a “test-circuit” which is actually a LCR-series connection.

Using the “test-connection” is not really needed, but gives you a good impression of the use of the balanced probe.

convinced?

Order Now at www.megiq.com/shop
Or send a mail to sales@megiq.com with your contact details.

And, if you are not convinced, do not hesitate to contact us!