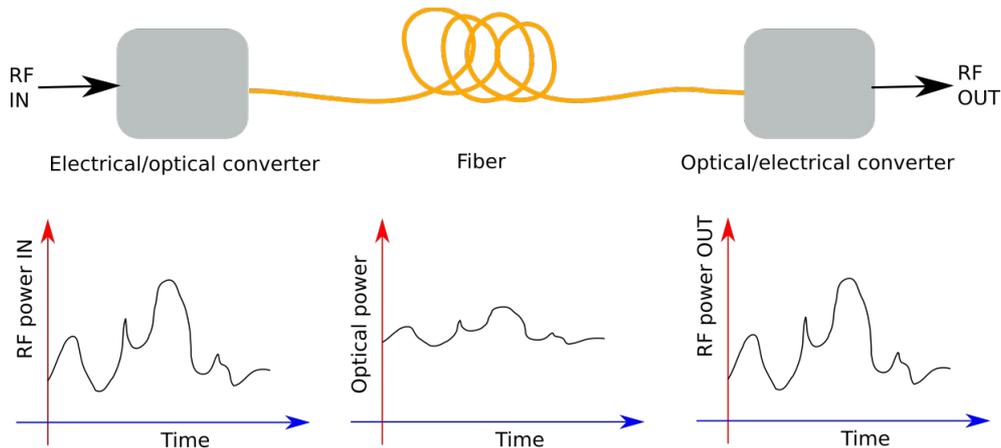
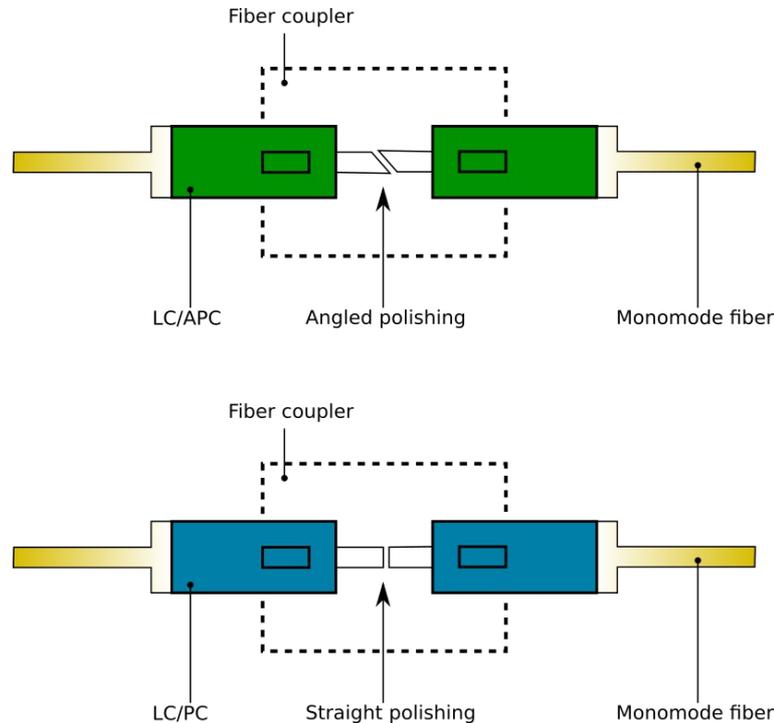


## How does it work.

Radio over fiber (RoF) is a technique used to transport radio-frequency signal on optical fiber. This technique is analog, they are no digital conversion neither error correction. So frequency of signal are not altered by the RoF link.



1. Converters are used to change the propagation medium. From electric lines to optical fiber and from optical fiber to electric lines.  
Electric to optic is performed by an optical modulator, the incoming RF signal modulate the power of the LASER diode.  
Optic to electric is performed by a photodiode, it demodulates input light to electrical signal.
2. Optical fiber offer low loss. At 1310nm loss is 0,5dB/Km.  
Fiber is lightweight, signal on fiber is ideally isolated from external signals/electromagnetical fields. It can't rust. Mounted on a drum it can be used on field quickly compared to coax cables.  
*BSRF equipments must be used with monomode fiber.*
3. Connectors. Connectors allows to connects equipments. The more connections you have in the path the more loss you'll get in the RF path. It means you need to carefully take this in account to get the best from your equipment. Connectors must be carefully inspected and cleaned if needed.  
*BSRF equipments must be used with APC connectors when connecting equipments. We can add internal patchchord to make equipments compatible with PC connectors.*
4. Polishing. Green connectors are APC (Angled Physical Contact) it allows to reduce back reflection from perturbing laser. Blue connectors are PC(Physical Contact) they are less effective to reduce back reflection.



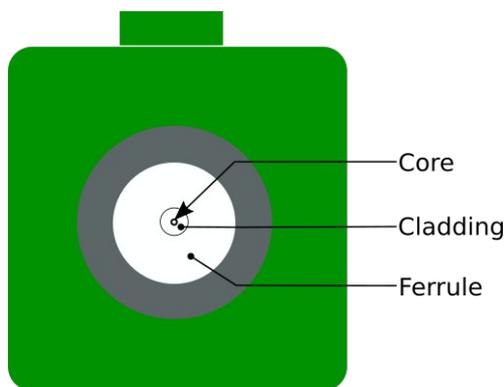
*Illustration 1: Mating of fiber connectors (LC/APC and LC/PC)*

## FAQ.

1. Does it work like network devices ? NO, it's an analog modulation, you've to pay attention on optical loss. As a rule of thumb every time you loose 1dB on the optical path you'll loose 2dB on RF path.
2. How far can I remote antenna ? If you use just one fiber between equipments, you can put the remote 10km from the base (5dB of optical loss leads to 10dB of RF loss). If you add more connections between equipments or if connectors are dirty this distance will be reduced.
3. How can I get the best from RoF for wireless microphones applications ? Well as usually the way you place antenna is still important, the idea is to avoid too strong signals and too weak signals !! As converter is active device it can be overloaded this lead to intermodulation and rising noise. With a well defined antenna position, clean fiber, sometimes filter on big rig, you will get the best RF coverage.
4. How can I get the best from RoF for IEM application ? Well as usually the way you place antenna is still important. It's never a good idea to put the TX antenna near or in front of a RX antenna. As AFB-350 and AFB-450 have a broadband amplifier onboard, you should consider using an external filter to reduce noise generated by amplifier. If you feel not

comfortable with that we are here to help (really!).

5. How to handle wireless microphone multi-zone coverage with RoF ? The best idea is to alternate A and B diversity antenna. Because diversity receivers switch from A to B selecting the best signal. You should avoid the case where two A (or B) antennas are near of each others because you can have drops depending on frequency and position of emitter... If you have to put A antennas (or B) near each others consider using directive antenna to « select » area of coverage.
6. Can I consider not inspecting fiber before an installation ? It's the same when you wear glasses, generally it's quite hard to clean them when you drive... Seriously it must be done before an installation with proper tools.
7. How can I inspect fiber ? The best way is to use a video inspection tool (ie: VIAVI/JDSU P5000i, USB with free software, is widely used, safe for eyes). But ones can use affordable microscope with a X200/X400 magnification (**WARNING ! Don't use it while equipment is powered as it could lead to permanent damage of your eyes**). You also need the proper microscope tip to adapt to the kind of connector (LC/PC,LC/APC,SC/PC,SC/APC...). Of course we can help you on that topic.



Front view of connector

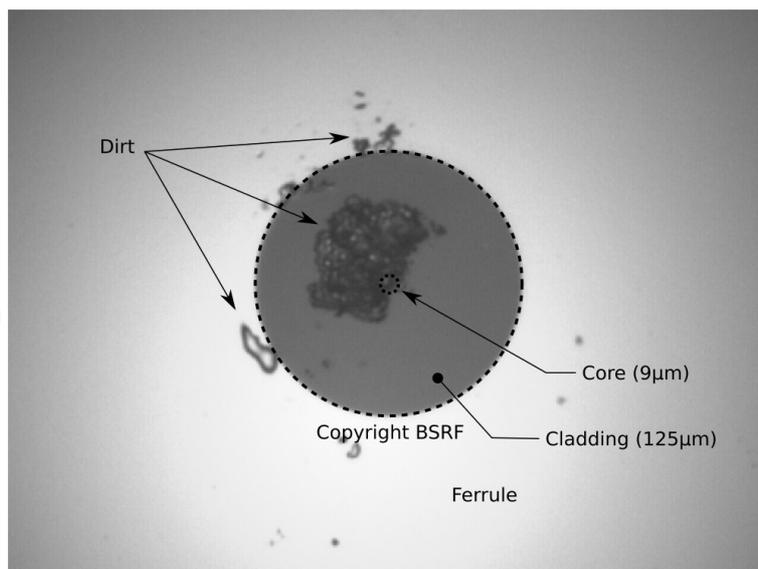


Illustration 2: Fiber inspection (monomode fiber)

8. How can I clean fiber ? We use two technique : the first one if dirt is light we use an automatic pencil to do it (ie :IBC LC, www.usconec.com). If it doesn't work with the pencil we use Clean Wipes and Alcool from Sticklers. It requires a little training.