Identifying Fiber Connector & Polish Types

COMMON FIBER OPTIC CONNECTOR TYPES

ST – STRAIGHT TIP BAYONET

ST connectors have a key which prevents rotation of the ceramic ferrule, and a bayonet lock similar to a BNC shell. Singlemode or Multimode.

LC – LUCENT CONNECTOR

Due to their small size; LC are often found on High-density connections, SFP and SFP+ transceivers and XFP transceivers with a small form-factor. Singlemode or Multimode.

NEUTRIK OPTICALCON RUGGED LC

In a broadcast environment, the opticalCON connector from Neutrik incorporates duo or quad standard optical LC-Duplex connectors in a rugged metal housing. A shutter system protects the connection from from dirt, dust and damage. Single or Multimode.

SC – SUBSCRIBER CONNECTOR

SC connectors offer excellent packing density, and their push-pull design reduces the chance of fiber end face contact damage during connection. Singlemode or Multimode.

SMPTE HYBRID 304M CONNECTOR

Developed by Lemo to meet the SMPTE 304M standard for HDTV camera fiber links in the broadcast market, the connector incorporates two singlemode fibers, two power conductors and two low voltage conductors in a single connector. Shown here is the Lemo 3K.93C SMPTE 304M connector. Singlemode only.

Every fiber connection has two values:

- **Attenuation or insertion loss**
- **Reflection or return loss**

IEC standard 61753-1 5 grades for loss:

- **Insertion Loss - A (best) to D (worst)**
- **M for Multimode**
- **Return Loss - 1 (best) to 5 (worst)**

Insertion loss is the loss of signal power resulting from the insertion of a device in a transmission line or optical fiber and is usually expressed in decibels (dB).

Return loss is the loss of power in the signal returned/reflected by a discontinuity in a transmission line or optical fiber. A loss takes place at discontinuities of refractive index especially at an air-glass interface such as a fiber endface. At those interfaces, a fraction of the optical signal is reflected back toward the source. This reflection phenomenon is called "Fresnel reflection loss," or simply "Fresnel loss."

FIBER OPTIC CONNECTOR POLISH TYPES

PC – PHYSICAL CONTACT

Slightly convex surface with the apex of the curve accurately centered on the fiber, Mated fiber cores come into direct contact with one another. <-40dB Back Relection.

UPC – ULTRA PHYSICAL CONTACT

Higher grades of polish give less insertion loss and lower back reflection. May also be called SPC – Super Physical Contact. <-50dB Back Reflection.

APC - ANGLED PHYSICAL CONTACT

Polished at an angle to prevent light that reflects from the interface from traveling back up the fiber. Generally, angle-polished connectors have higher insertion loss than straight physical contact. Only mate to other angle-polished connectors. <-60dB Back Refecton.

On all connectors, cleaning the ceramic ferrule before each use helps prevent scratches and extends the connector life.

Putting it all together – An SC connector with an angled polish may be designated SC/APC, or simply SCA while the same connector with a Physical Contact polish is designated as SC/PC. Likewise, that same connector with an Ultra Physical Contact polish is desognated SC/UPC. Different connectors are required for multimode, and for single-mode fibers but these designations remain the same.

Most optical fiber connectors are spring-loaded, so the fiber faces are pressed together when the connectors are mated. The resulting glass-to-glass or plastic-to-plastic contact eliminates signal losses that would be caused by an air gap between the joined fibers.

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