

Data communication and network engineering essay

[Engineering](#)



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A. MADURANGA PONNAMPERUMA In partial fulfillment of the requirements for the Bachelor of Science Special Honors Degree in Information

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Name : L. P. A. MADURANGA PONNAMPERUMA Student Registration Number:

EN 12517466

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Fiber optic cables are used to transmit data at the speed of light. This cable type is completely different than the copper cables. Fiber optic cables offer high bandwidths and low losses which allow high data transmission rates over long distances. There are mainly three common types of fiber optic cables. 1. Single-mode 2. Multimode 3. Graded index. These types are mostly used in communication systems and also they have established medical, military, scanning, imaging, and sensing applications.

INTRODUCTION TO FIBER OPTIC CONNECTORS

Today's and future communication technology demands fast, efficient and safe performance in the data communication process. Large and complex databases all interconnected must be able to receive and transmit data without outside interferences. Fiber optic components are the right solution for complex systems. In order to achieve accurate and precise connections of the fiber ends, very high quality ceramic components are used. Fiber optic connectors made with precision and high quality ceramic components provide a high reliability connection when used with the various adapters.

PRODUCT SPECIFICATION OF FIBER OPTIC CONNECTERS

Optical characteristics : Insertion Loss Return loss Mechanical characteristics :
engagement and separation force Ferrule withdrawal force Cable
retention Durability Vibrations shock Environmental characteristics :
Humidity Change of temperature Dry heat Cold Salt mist

MATERIALS

PART MATERIALS Simplex plug housing Synthetic resin Spring Stainless steel
Ferrule Zirconia Simplex adapter housing Synthetic resin or Zinc Alloy 4
position adapter housing Synthetic resin 5 position adapter housing Synthetic
resin Receptacle housing Zinc alloy Split sleeve Zirconia or Phosphor
Bronze Dust cap Synthetic resin

FIBER OPTIC CONNECTOR TYPES

SC-SIMPLE CONNECTOR : In this simple connector types there are two types
of SC connectors. SIMPLE & DUPLEX CONNECTERS Figure 1 Figure 2 Technical
data : Housing material: Plastic (UL 94V-0) Ferrule: Ceramic Temperature
range: - 40°C to +80°C Mating cycles: 1000 Set with cable boot for cable Ø 0.
9 mm Dust caps Fig 1-single mode Fig 2-Duplex mode A push-on, pull-off type of
multimode or single mode connector with a ceramic ferrule and an SFF
design a simplex or a duplex plastic housing, often used for LANs and data
communication.

SPECIAL FEATURES OF LC CONNECTORS

Flame resistant. Simplified plugs and receptacles. Three types of duplex SC connector : Flexible F type Rigid F type Rigid H type IEC, JIS, standard compliant and intermateability test certified.

FC : FIBER CONNECTOR

Figure 3 Technical data : Housing material: Metal, Nickel plated Ferrule: Ceramic Temperature range: -40°C to +80°C Mating cycles: 1000 Set with cable boot for cable Ø 0, 9 mm Dust caps A screw on metallic connector with a ceramic ferrule; widely used with single mode fiber for active device termination and in high - vibration environment.

ST CONNECTOR : STRAIGHT TIP CONNECTOR

Figure 4 Technical data : Housing material: Metal Nickel plated Ferrule: Ceramic Temperature range: -40°C to +80°C Mating cycles: 500 Set with cable boot for cable Ø 0, 9 mm Dust caps A slotted bayonet (push in, twist out) type of metallic multimode or single mode fiber connector with a ceramic ferrule. Widely use in inter / intra building, data communication and also telecommunication application.

LC : LUCENT CONNECTOR

This connector also have a two types, simple and duplex Figure 5 - Single mode Figure 6 - Duplex mode A push on , pull off, multimode or single mode fiber type of connector containing a standard RJ 45 telephone plug housing with a ceramic ferrule in a simplex or duplex plastic housing. SFF and SFP designs are suitable for high density interconnection and also usual for instrumentation and test equipment interconnections.

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Special advantages of LC connectors:

Doubles fiber density in shelves and outlets-lowering system cost
 Allows easy disengagement in dense space
 Assures high repeatability, maintains transmit/recv direction
 Helps minimize transmission problems
 Improves durability and reduces connect rearrangement effort
 Reduce installation time for field mountable connectors

5. MU CONNECTOR : Figure 7
 Mu connectors are basically made by fiber connector with plastic housing and ceramic ferrule. SFF and SFP designs with packaging density that greater than the SC connector and also smaller. . These connectors are widely use useful for board-mounted applications and high density interconnections.

Special advantages of MU connectors:

Smooth transition from the FCHigher packaging density
 Excellent performance
 Wide application range
 Enough EMI protection

6. MTRJ CONNECTOR : MT FERRULE REGISTER JACKLATCH

Figure 8
 MT-RJ connectors is a small form factor connector that was designed to meet fiber optic monolithic ferrule plastic composite. This connector much like the copper RJ-45 jack. This connector widely use for both local and metropolitan area networks, particularly with high density interconnection.

Special advantages of MT-RJ connectors

Fiber protection, the connector crimp on mechanism shall protect the bare fibers from the air or waterborne contaminants and shall secure the fibers in the ferrule micro holes. The connector shall have a latching mechanism to

hold the connector into the adapter. The connector shall not require index matching material between connector endfaces.

7. 3M™ VOLITION FIBER OPTIC CONNECTOR

Figure 9 Basically this cable contains two parts. Horizontal and Backbone cable. the horizontal cable provides the physical link between the fiber connector patch panel in the floor distributor and the fiber connector in the outlet. Both unitube and tight buffer fiber cables are available and jacket can be PE for outdoor.

Special advantages of 3M™ VOLITION FIBER OPTIC Connector

Minimizing weight and eases cable installation Complete range of cable Fast and accurate fiber identification No small loose parts. Fast easy installation Excellent pull out strength Designed to eliminate the need to touch bare fiber One of the industry leaders in mechanical and optical performance Light rodent protection.

8. EC2000 CONNECTOR

Figure 10 This connector mostly preferred for single mode fiber operation and also exhibits a push-pull latching mechanism, and integrates a protective cap over the ferrule, which acts as a dust shield and shields users from laser emissions. The protective cap is loaded with an integrated spring to ensure proper closing of the cap. SFF and SFP designs similar to the SC type but also contains an eye protection safety cover built the end face.

9. MTP CONNECTOR : MULTIPLE TERMINATION PUSH-PULL LATCH

Figure 11 These type of connectors for multifiber ribbon cable based on multiple MT-RJ connectors in plastic housing. The same style of monolithic ferrule provides a basis for other connectors. This connectors provide an intuitive push-pull latching mechanism for easy insertion. This connectors used for high density inter connections.

10. MPO CONNECTOR

Figure 12 The MPO connector houses an MT ferrule, and so can provide for upwards of twelve fibers in a single connector. Like an MPO connectors operate with a simple push-pull latching mechanism and intuitive insertion. MPO application: Patch cords and Fan-Out assemblies ATM and DWDM high speed communication systems Multimedia CATV and Video Data Telecommunication Networks Industrial

11. SMC CONNECTOR

Figure 13 SMC connectors easily terminate buffered or non-buffered ribbon fiber. This connector has been submitted for review as an industry standard connector. SMC has three different body lengths available, depending on size considerations. The plastic moulded body uses side-mounted locking clips to hold the connector in place.

SUMMERY

FC0. 50-1. 00 dB 0. 20 dB SM, MM Datacom, Telecommunications FDDI 0. 20-0. 70 dB 0. 20 dB SM, MM Fiber Optic Network LC0. 15 db (SM) 0. 10 dB (MM) 0. 2 dB SM, MM High Density Interconnection MT Array 0. 30-1. 00 dB 0. 25 dB

SM, MM High Density InterconnectionSC0. 20-0. 45 dB 0. 10 dB SM, MM
DatacomSC Duplex0. 20-0. 45 dB 0. 10 dB SM, MM DatacomSTTyp. 0. 40
dB(SM)Typ. 0. 50 dB(MM)Typ. 0. 40 dB(SM)Typ. 0. 20 dB(MM)SM, MM
Inter-/Intra-Building, Security, Navy