SMPTE STANDARD

for Television — Four-Circuit Fiber Optic Connector

1 Scope

This standard describes an interface for a general purpose fiber optic connector for interconnection of television equipment. For information on testing for physically demanding applications, the reader is directed to the informative references listed in annex B. The connectors may find use in a variety of other signal transmission applications. The design accommodates both single mode and multimode optical fibers.

The standard defines connectors that are hermaphroditic by construction, allowing cable plugs to mate with like cable plugs as well as bulkhead receptacles, while maintaining polarization.

Separate physical packaging design objectives will result in the availability of both cable and bulkhead connectors for installation in harsh environments.

Connector and optical termini adhering to the limits of the interfacial dimensions of this standard will intermate. Applicable tolerances to the basic dimensions shall be such that the combined value of these tolerances shall not exceed the limit described in note 5.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

ANSI/TIA/EIA-455-B-98, Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components

3 Connector specifications

3.1 Construction

The connector for terminating a four-fiber cable shall be a hermaphroditic cable plug. The jam-nut mount receptacle shall accept four individual single-channel cables. The hermaphroditic cable plug shall feature a threaded coupling ring which when backed off shall expose a male threaded end which in turn shall be capable of mating to a like cable plug with the coupling ring in the forward position.

The connector cable plug shall strain-relieve a single-jacket multifiber cable. Each connector shall accommodate a total of four contacts — two pins and two sockets.

Single mode connectors shall have a durable yellow marking, visible before and after mating, to give an indication of the fiber type inside the connector. Multimode connectors shall not require any special marking.

3.2 Contacts

The optical contacts shall meet the requirements of this standard (see figures 4 and 5) when retained inside connectors as described herein. The optical contacts shall have cylindrical abutting ceramic ferrules. For single mode applications, optical ferrules shall be physical contact (PC) polished or for

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enhanced performance, super PC polished. For multimode applications, optical ferrules may have flat surfaces. The optical alignment mechanism should be a split sleeve, which shall be retained by the socket contacts. The contacts shall provide stated optical performance when terminated with standard single mode and multimode 125-micron diameter clad fibers.

4 Mechanical interface dimensions

4.1 Mating interface dimensions

The mating interface dimensions for each connector configuration (plug and receptacle) shall be in accordance with figures 1, 2, and 3.

4.2 Contact locations

The contacts shall be located in the plug cavities as follows (see figure 3):

Sockets – Cavities 1 and 2
Pins – Cavities 3 and 4

5 Performance

The connectors shall meet the performance requirements of the entire standard throughout the temperature range.

5.1 Insertion loss:

MM: 0.75 dB max
SM: 0.70 dB max, PC polished
SM enhanced: 0.50 dB max, super PC polished

5.2 Return loss:

SM: ≥ 35 dB, PC polished
SM enhanced: ≥ 50 dB , super PC polished

5.3 Temperature range:

– 55° to + 85° C

NOTES

1 Figures 1 through 5 specify interface dimensions and intermateability requirements.

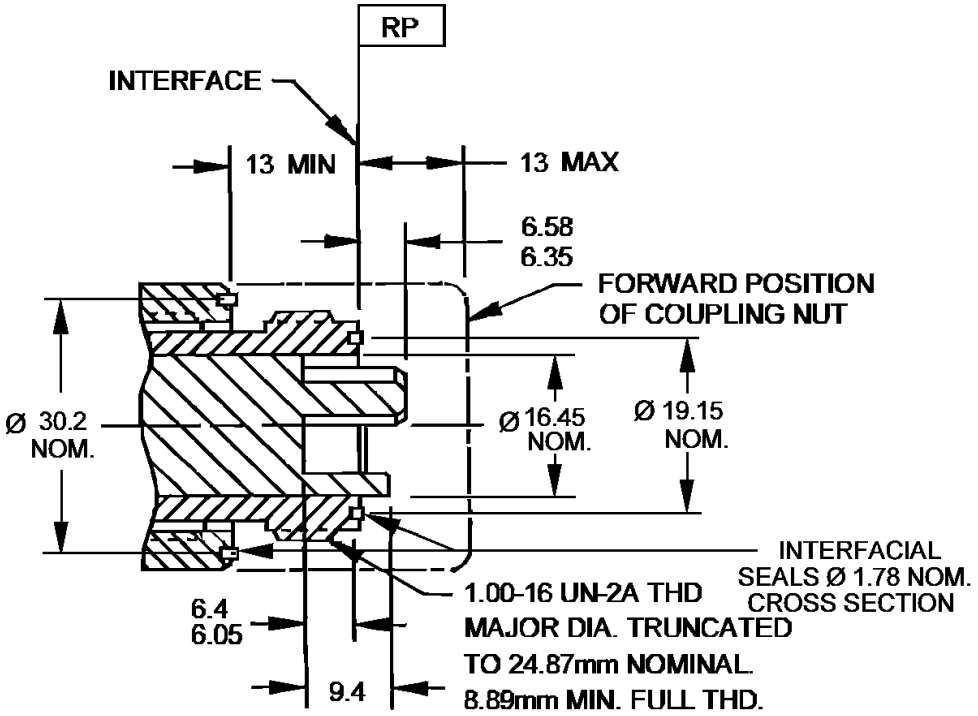
2 All dimensions are in millimeters except for mating thread call-outs which are in English.

3 Dimensions from the reference plane to the end of the guide bushing shall be measured with contact in the connector (see figures 1, 2, 4, and 5).

4 The pin terminus spring shall apply a 31 N to 13 N load when fully mated.

5 Mating cavities shall be aligned to their basic positions (see figure 3) within a 0.25 circle, regardless of feature size.

6 The design of the sleeve shall be such that it provides alignment of 2.0005 – 1.9995 diameter ferrules.



NOTE – In order to achieve channel integrity with hermaphroditic connectors, proper channel-to-channel wiring shall be observed.

Figure 1 – Plug interface section A-A

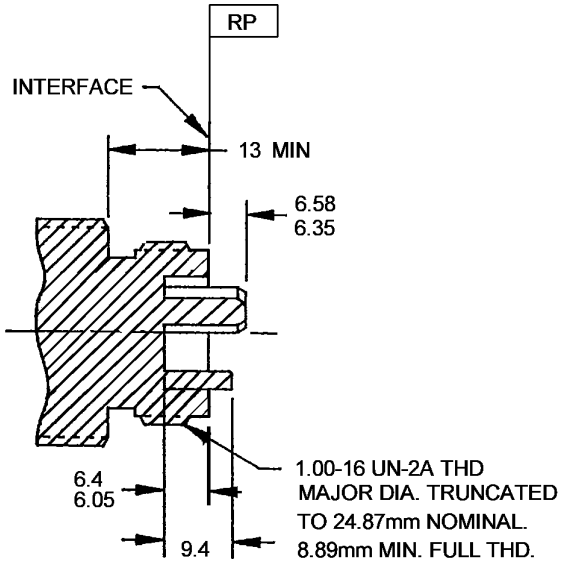


Figure 2 – Receptacle interface section A-A

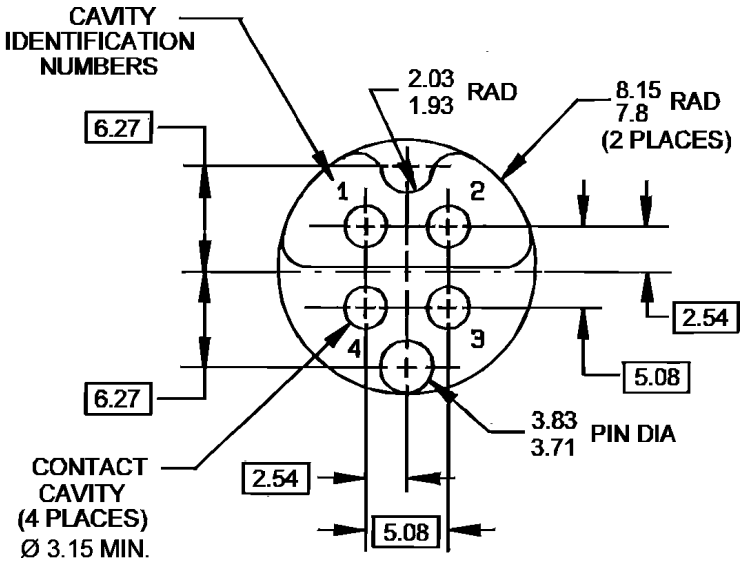


Figure 3 – Face view (see figures 1 and 2 for view A-A)

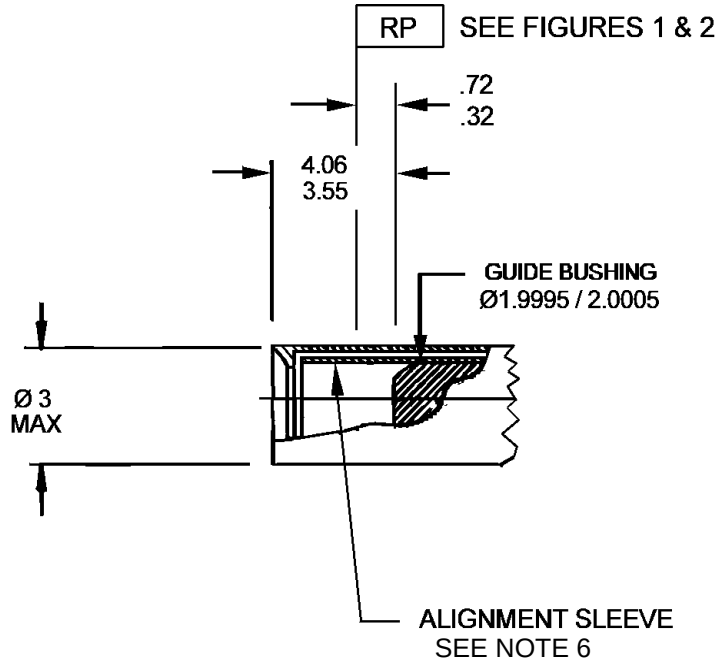


Figure 4 – Socket contact

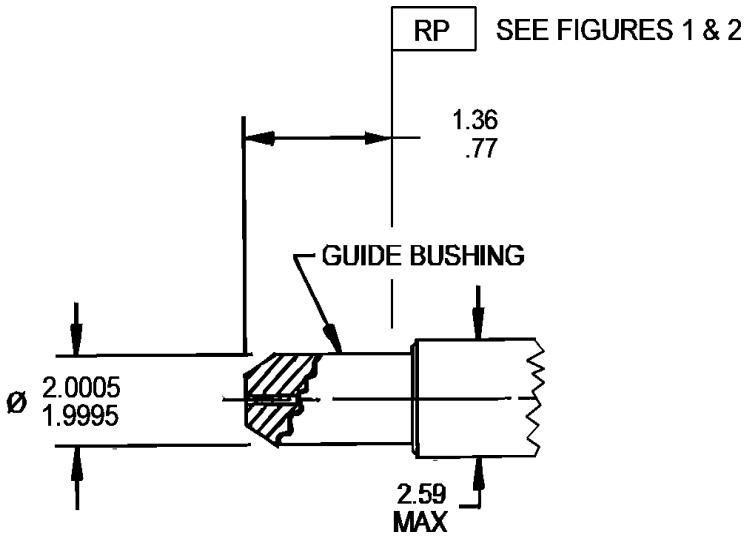


Figure 5 – Pin terminus

Annex A (informative)
Channel integrity

In order to achieve channel integrity with hermaphroditic connectors, proper channel-to-channel wiring should be observed (see figure A.1).

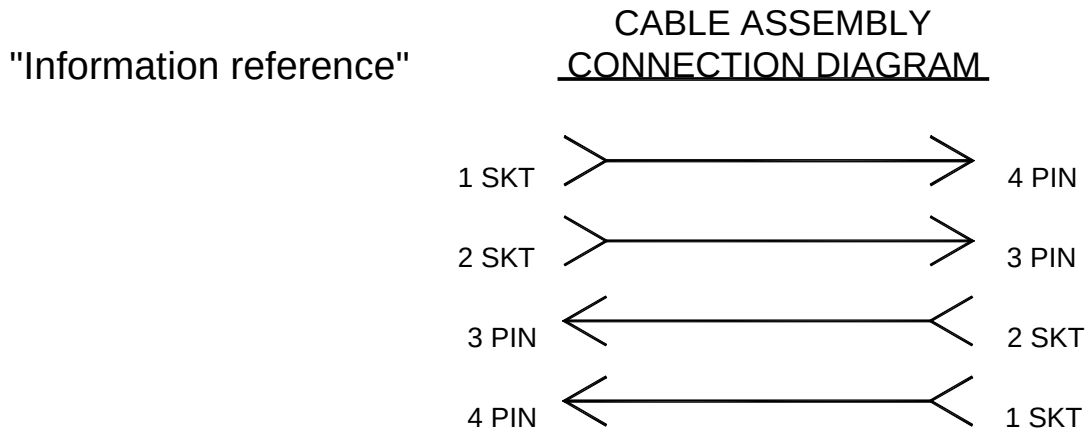


Figure A.1 – Channel-to-channel wiring

Annex B (informative)
Bibliography

ANSI/EIA-364-26B-99, TP-26B — Salt Spray Test Procedure for Electrical Connectors, Contacts and Sockets

ANSI/EIA-455-4B-93, FOTP-4 — Fiber Optic Component Temperature Life Test

ANSI/EIA-455-21A-88, FOTP-21 — Mating Durability for Fiber Optic Interconnecting Devices

ANSI/EIA-455-26A-85 (R96), FOTP-26 — Crush Resistance of Fiber Optic Interconnecting Devices

ANSI/EIA/TIA-455-6B-92, FOTP-6 — Cable Retention Test Procedure for Fiber Optic Cable Interconnecting Devices

ANSI/EIA/TIA-455-12A-89, FOTP-12 — Fluid Immersion Test for Fiber Optic Components

ANSI/TIA/EIA-455-2C-98, FOTP-2 — Impact Test Measurements for Fiber Optic Devices

ANSI/TIA/EIA-455-3A-89, FOTP-3 — Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components

ANSI/TIA/EIA-455-5B-94, FOTP-5 — Humidity Test Procedure for Fiber Optic Components

ANSI/TIA/EIA-455-11B-94, FOTP-11 — Vibration Test Procedure for Fiber Optic Components and Cables

ANSI/TIA/EIA-455-13A-96, FOTP-13 — Visual and Mechanical Inspection of Fiber Optic Components, Devices, and Assemblies

ANSI/TIA/EIA-455-34A-95 (R96), FOTP-34 — Interconnection Device Insertion Loss Test

ANSI/TIA/EIA-455-56B-95 (R99), FOTP-56 — Test Method for Evaluating Fungus Resistance of Optical Fiber and Cable

ANSI/TIA/EIA-455-107A-99, FOTP-107 — Determination of Component Reflectance or Link/System Return Loss Using a Loss Test Set

TIA/EIA-455-36A-86, FOTP-36 — Twist Test for Fiber Optic Connecting Devices