



WORLD CUSTOMS ORGANIZATION
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CLASSIFICATION OF THE "PIX-DSX-1 DIGITAL CROSS-CONNECT"

(Item VIII.4 on Agenda)

Reference Documents :

42.493 (HSC/22)

I. BACKGROUND

1. In 1996, at the request of the United States Administration, the Secretariat gave its opinion on the Harmonized System classification of a "centralized cross-connect (distribution frame) for digital telephone signals".
2. On 9 September 1998, the Secretariat received a note from the United States referring to that earlier correspondence and asking that the classification question of the "PIX-DSX-1", presented as a digital cross-connect, be submitted to the Harmonized System Committee. The question first appeared on the Committee's agenda for the 22nd Session. Due to lack of time, the question was not examined at either the Committee's 22nd or 23rd Sessions.
3. On 29 September 1999, the Secretariat received the following note from the United States Administration.

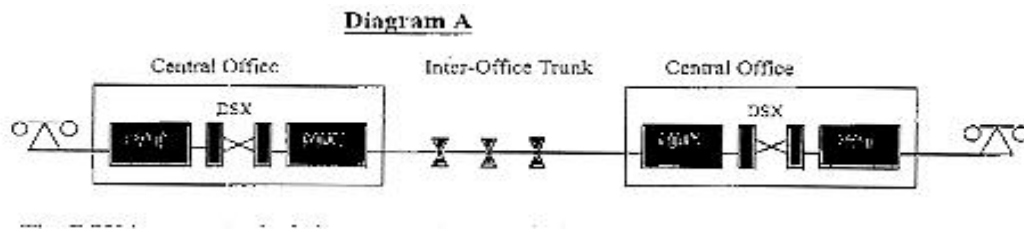
II. NOTE FROM THE UNITED STATES ADMINISTRATION

Comments from ADC Telecommunications

4. The term DSX is an acronym for Digital Signal Cross-Connect. It is a device located in the digital portion of a telecommunications *network*¹. The technology and equipment used in a telephone network is quite complex. A simplified description of a telephone network is set forth in Diagram A.

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5. When a telephone call is placed, the signal travels by cable (copper or fiber) to a central office where it is routed (SWT) and combined (MUX) with other calls. The combined calls are transmitted to the receiving central office via the inter-office trunk. The telephone signals are then separated and routed to the receiving parties.
6. The DSX is typically located between network elements such as digital switching systems², channel banks³, office repeaters⁴ and multiplexers⁵. The DSX serves as the common location for testing, patching and cross-connecting digital network equipment. Without the DSX, the telephone service provider would be forced to take down the telecommunications circuit in order to accomplish these functions⁶.



7. The DSX is comprised of three port telephone jacks (Monitor, IN, and OUT ports), terminal blocks, and lamp sockets with LEDs (tracer lamp). These elements are interconnected with copper wire and/or printed circuit paths.

¹ For purposes of this discussion, the *network is* the path, with its associated medium and equipment, that is used to transmit a telephone signal from its point of origin to its destination.

² Digital switching systems route telephone signals.

³ Channel banks convert analog signals to digital signals.

⁴ Office repeaters reconstruct telecommunications signals.

⁵ Multiplexers combine telephone signals.

⁶ Diagram B shows how digital equipment is connected without the DSX. Diagram C shows how a telecommunications circuit is formed with the DSX.

Testing

8. When service has been turned up and network failure occurs, testing provides rapid trouble isolation necessary for quick service restoration.
9. Testing can be accomplished through the monitor jack (non-intrusive) or through the IN/OUT (intrusive) jacks.
10. Non-intrusive testing is performed by connecting a patch cord from the monitor jack to a test set. This method monitors active service to observe signal integrity while not interrupting service.
11. Intrusive testing is performed by connecting a patch cord to the IN/OUT jacks which terminates the signal from the two network elements to the test set for further testing and evaluation.

Patching

12. Patching provides two benefits :
 - 1) Service restoration - once a failure is detected in the network, service can be quickly restored by patching around the failure onto a spare facility or alternate route.
 - 2) Ease in cutovers - DSX hot cut procedure allows for in-service cutovers when upgrading to a new generation of equipment by first patching to a new equipment and then changing the cross-connect jumpers to the new circuit configurations.
13. A patch cord, connected to the IN/OUT jacks, is used to temporarily bypass a semi-permanent cross-connect jumper and directs a signal from the original configuration to a spare facility, restoring service on a temporary basis.

Cross-Connecting

14. Cross-connection provides two benefits :
 - 1) Non-dedicated connection - any two network elements may be quickly connected as demands for service arise by permanently cabling and terminating equipment cables to the DSX when equipment is installed. Then, when service orders are issued, a short cross-connect jumper completes the circuit connection.
 - 2) Circuit reconfiguration - when changes are needed in the network, DSX facilitates quick and easy circuit reconfiguration by using the patching process, removing the existing cross-connect jumpers, and reconnecting them to change the circuit configurations.

LED (Tracer Lamp)

15. The use of the tracer lamp is an important part of the reconfiguration process as previously described. In a high-density central office environment the crossconnects or circuit configurations are not always readily apparent. By inserting a plug into the monitor jack of the known equipment, the tracer lamps for the known and unknown equipment will flash and then remain lit, thus allowing the engineer to ascertain the circuit configuration. Without this functionality, the tracing of the circuit would be a lengthy process.

Connecting Elements

Diagram B

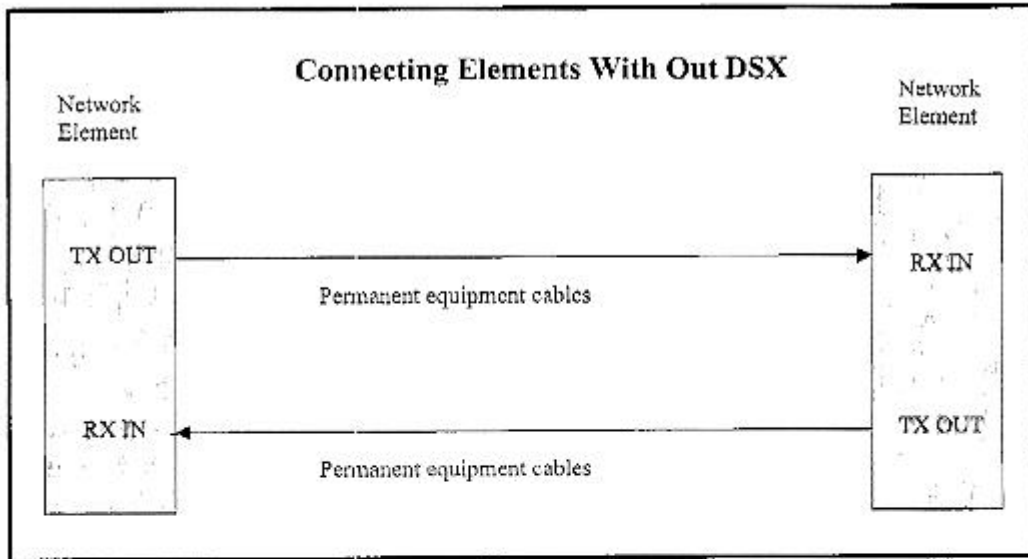
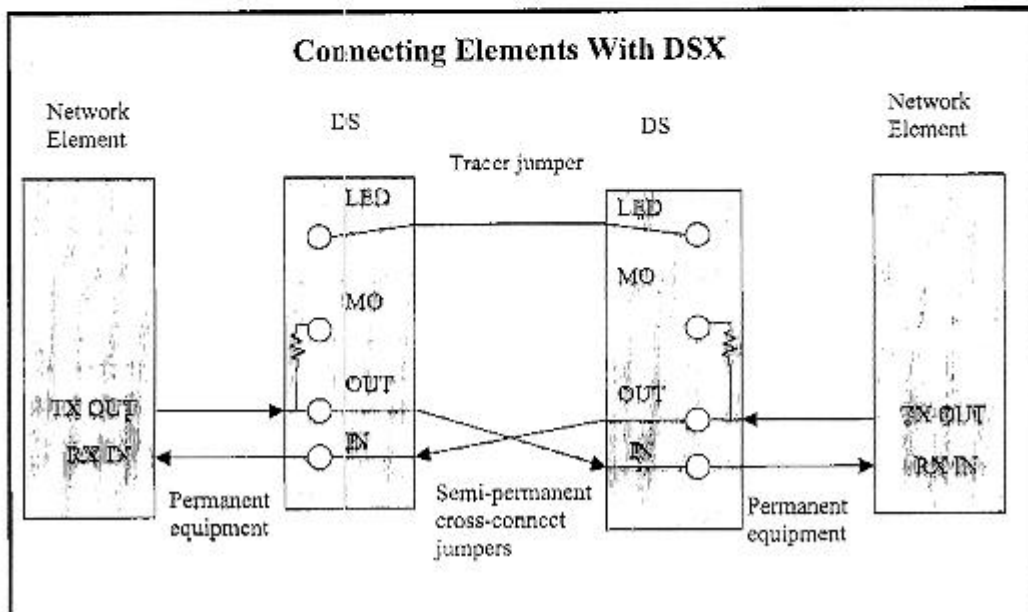


Diagram C



III. CONCLUSION

16. The Committee is invited take account of the additional information provided in the note from the United States Administration when it examines this Agenda Item.