

ECMA

Standardizing Information and Communication Systems

**Private Integrated Services Network
(PISN) -
Reference Configuration for PINX
Extension Lines**

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Brief History

In general, the PTS infrastructure consists of a series of transceivers, i.e. functional groupings which can perform reception, amplification, regeneration and sending of physical signals presented to them on the extension line. In the simplest case these transceiver functional groupings may be NULL, i.e. the extension line consists of a simple physical wiring.

This ECMA Standard establishes the rules according to which a generic PTS functional grouping can be modelled to match the particular needs of an application, requiring active equipment in the extension line.

This Standard is based upon the practical experience of ECMA member companies and the results of their active and continuous participation in the work of ISO/IEC JTC1, ITU-T, ETSI and other international and national standardization bodies. It represents a pragmatic and widely based consensus.

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1 Scope

This ECMA Standard specifies a reference configuration (RC) for the extension line of a private integrated services network exchange (PINX) including high level functions in addition to the physical termination system specified in part 1 of this Standard.

Since such high level functions appear application dependent and can occur, in principle, in any multiplicity and combination, no firm allocation of functional groupings and thus no firm reference points can be indicated. Instead, the principles for combining functional groupings associated with the physical termination system and allocating reference points are specified in this Standard.

Examples for some combinations of functional groupings and the allocation of reference points are given in Annex A.

The principles are not intended to require any specific implementation of a PINX, but only to provide guidance for the specification of PINX capabilities.

The principles are sufficient to support ISDN-like applications. It can be extended to also support non-ISDN-like applications.

2 Normative references

The following publications contain provisions which, through reference in this text, constitute provisions of this Standard. All publications are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the publications indicated below.

ISO/IEC 11579-1 Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Part 1: Reference configuration for PISN Exchanges (PINX) (1994)

ITU-T Rec. I.411 ISDN user-network interfaces - Reference configurations (1993)

ITU-T Rec. I.412 ISDN user-network interfaces - Interface structures and access capabilities (1988)

3 Symbols and abbreviations

ATM	Asynchronous Transfer Mode
CBR	Constant Bit Rate
CES	Circuit Emulation Service
CF	Control Function
FRP	Fixed Radio Part
IWF	InterWorking Function
MRP	Mobile Radio Part
PET	Private Exchange Termination
PINX	Private Integrated Services Network eXchange
PISN	Private Integrated Services Network
PLT	Private Line Termination
PNT	Private Network Termination
PTS	Private Termination System
RC	Reference Configuration
RP	Reference Point
SW	SWitching

TA	Terminal Adapter
TCF	Transceiver Control Function
Tcvr	TransCeIVeR functional grouping
TE	Terminal Equipment
TE2	Terminal Equipment type 2

4 Definitions

For the purposes of this Standard, the following definitions apply:

4.1 Extension line

The circuit interconnecting the terminal equipment with the PINX, thereby bridging the distance between the terminal and the centralized SW function. Depending on implementation, the extension line can be part of the PTS or the PTS can be attached to the extension line at one of its ends.

4.2 Terminal equipment

See ISO/IEC 11579-1.

4.3 Transceiver

A functional grouping which can perform the reception, amplification, regeneration, multiplexing, de-multiplexing and sending of physical signals presented to it on the extension line.

5 PINX extension line reference configuration

The extension line reference configuration for a PINX provides for a private termination system (PTS), as specified in part 1 of this Standard, and may include High Level applications on top of the PTS infrastructure, as appropriate for the functions to be performed on the extension line, see figure 1.

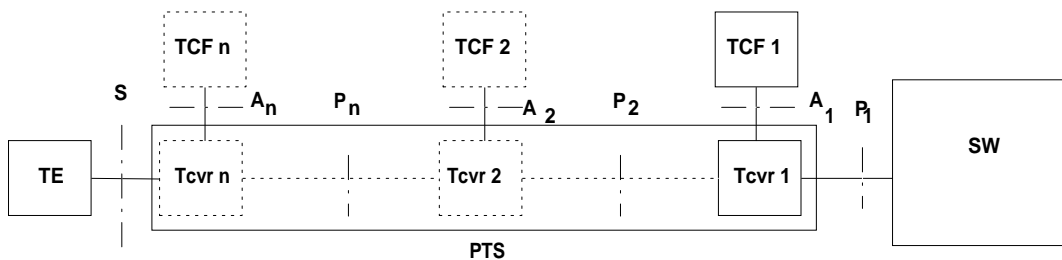


Figure 1 - Extension line reference configuration

5.1 Transceivers

In general, the PTS infrastructure consists of a series of transceivers, i.e. functional groupings which can perform reception, amplification, regeneration and sending of physical signals presented to them on the extension line, in either direction of transmission. The number of transceivers can vary from 0 to any sensible number. The transceivers may act in a stand-alone manner or may act as a pair.

If multiple instances of transceivers need to be modelled, they shall be interconnected via multiple instances of P reference point, the individual instances being distinguished by appropriate indexes.

NOTE 2

Examples of the various applications of the reference configuration are given in Annex A.

5.2 Transceiver Control Function functional groupings

The individual transceivers can be under the control of transceiver control function functional groupings (TCF).

TCFs shall be connected to their corresponding transceivers via an instance of A reference point. If multiple instances of TCFs need to be modelled, each of them shall be connected to its Tcvr via its own instance of A reference point, the individual instances being distinguished by appropriate indexes.

TCFs can communicate with other TCFs or with high level functions on the TE or on the SW. TCFs can take a specific name, depending on the particular application they support.

Non-TCF High Level entities are outside the scope of this part of this Standard and are not shown in figure 1, but are shown in Annex A for better understanding of the overall context.

6 Reference points (RP)

A letter has been allocated to that reference point which is the subject to this Standard.

6.1 A reference point

The A reference point defines the boundary between a transceiver functional grouping of the PTS and its TCF functional grouping.

Depending on the implementation, a physical interface can exist at the A reference point. If applicable, its physical, electrical and procedural characteristics shall be specified at the A reference point.

6.2 P reference points

6.2.1 P₁ reference point

The P₁ reference point shall define the boundary between the SW and the PTS, or between the SW and the first TCVR in the PTS, respectively. In the case that the PTS functions are NULL, the P₁ reference point will coincide with the S reference point.

6.2.2 Further P reference points

If applicable, further P reference points (P₂...P_n) shall define the boundaries between multiple transceiver functional groupings inside the PTS.

Depending on the implementation, a physical interface can exist at any instance of P reference point. If applicable, its physical, electrical and procedural characteristics shall be specified at that instance of P reference point.

Annex A

(informative)

Examples for PTS Functional Groupings and Allocation of Reference

Examples for PTS functional groupings are transceivers to support applications on extension lines such as:

- 2-wire/4-wire conversion (basic access only)
- wireless PISN mobility;
- campus cabling.

On a particular implementation of extension line, these applications can exist on their own or they can co-exist in various combinations.

The concept of the extension line reference configuration enables easy concatenation of any number of transceivers in the PTS, as well as the accommodation of their control functions.

For simplicity, the applications described in this annex are described in an isolated way.

A.1 2-Wire/4-Wire Conversion

Figure A.1 shows an arrangement which provides a 2-wire extension line as a cost efficient means to bridge larger distances, compared with the 4-wire cabling in accordance with the standards for a basic access S interface of terminal equipment to a PINX.

In its lower part figure A1 shows an arrangement of functional groupings which is comparable to that in ITU-T Recommendation I.411 for the ISDN user-to-network access.

Except for the letter “P” indicating that this is private equipment on an extension line than on the access to the public ISDN rather, the same functional groupings appear on the access to the PINX, i.e.:

- a private exchange termination (PET),
- a private line termination (PLT),
- a private network termination (PNT).

These functional groupings provide the functions similar to the corresponding functional groupings on a public user access to the ISDN, i.e.

- to handle extension line related operation and management (non-switching) functions of the PINX;
- to terminate the PINX to the extension line,
- to terminate the extension line with regard to the TE.

In this example the PLT is assumed to provide a 2-wire interface to the PNT, which it converts to a 4-wire S interface to the TE(s).

Extension line related operational and management functions will be executed between the PET and PNT, e.g. the activation of test loops.

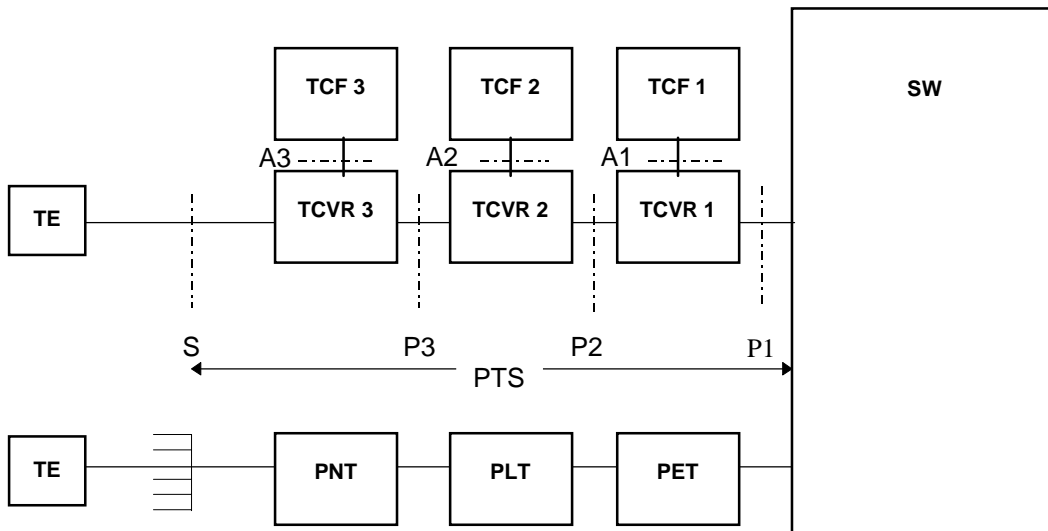


Figure A.1 - 2-wire-to-4-wire conversion on an extension line

A.2 PISN wireless mobility

Figure A.2 shows an example for a specific combination of PTS functional groupings which satisfies the requirements for describing an extension line including the equipment for wireless mobility.

Two cases are depicted:

In Case 1 the equipment encompasses a fixed radio station at the wired end of the extension line and a wireless handset. This arrangement is known as “wireless end-system”. Strictly, this arrangement does not fall under the scope of this Standard, since all functional groupings needed are beyond the extension line, i.e. in the TE functional grouping. Still case 1 is shown here to illustrate the difference to case 2.

In Case 2 the equipment encompasses a fixed radio station at the wired end of the extension line and a complex mobile part which provides full S-bus capability to multiple, ordinary, wired terminals. This arrangement is known as “wireless intermediate system”, the best known application of which is the “radio local loop”.

In case 1 the radio interface appears at a reference point outside the scope of this standard, whereas in case 2 the radio interface appears at an instance of P reference point.

Both transceivers require high level functions to perform the typical wireless mobility functions, e.g. paging for a desired wireless extension before the actual setup of an incoming call, etc. Also the typical PISN access functions are to be performed in the fixed radio part functional groupings, e.g. TEI mapping between the MAC_ID at the radio interface and the TEI value obtained from the PINX.

For better understanding also a high level function (“Home & Visitors’ Data Base”) connected to the SW is shown, i.e. the data base and other functions which communicate with the MRP CF and the FRP CF.

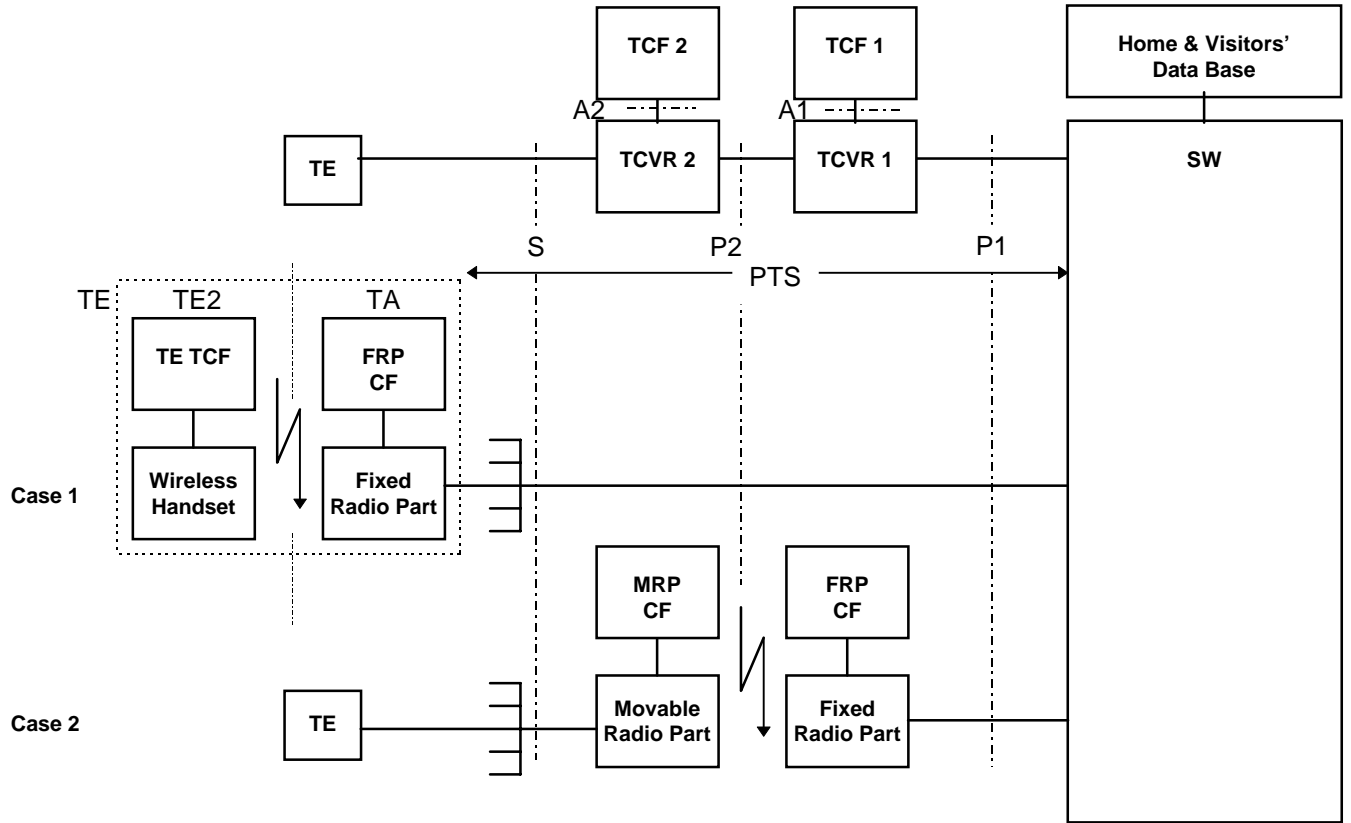


Figure A.2 - Application of the extension line reference configuration to PISN wireless mobility

A.3 Campus cabling

Figure A.3 shows an example for a specific combination of PTS functional groupings which satisfies the requirements for campus cabling (i.e. cabling on a larger customer premises) where the extension line plant is run on an ATM backbone network laid out on the campus for various transmission tasks.

In this case transceivers convert from different presentations of the physical signals within the ATM section to outside the ATM section. A basic rate narrow-band TE is connected to a PINX via an interworking function providing an ATM circuit emulation service (CES-IWF2). The CES-IWF2 performs the mapping to an ATM CBR channel. At the termination of the ATM connection, an ATM CES IWF1 re-maps the information into circuit mode and sends it to the PINX.

The two ATM CES IWFs therefore virtually extend the CBR link between the TE and the PINX across an intermediate ATM network. Control plane and user information sent by either the TE or the PINX are transported transparently through the ATM network. The circuit emulation function preserves bit integrity.

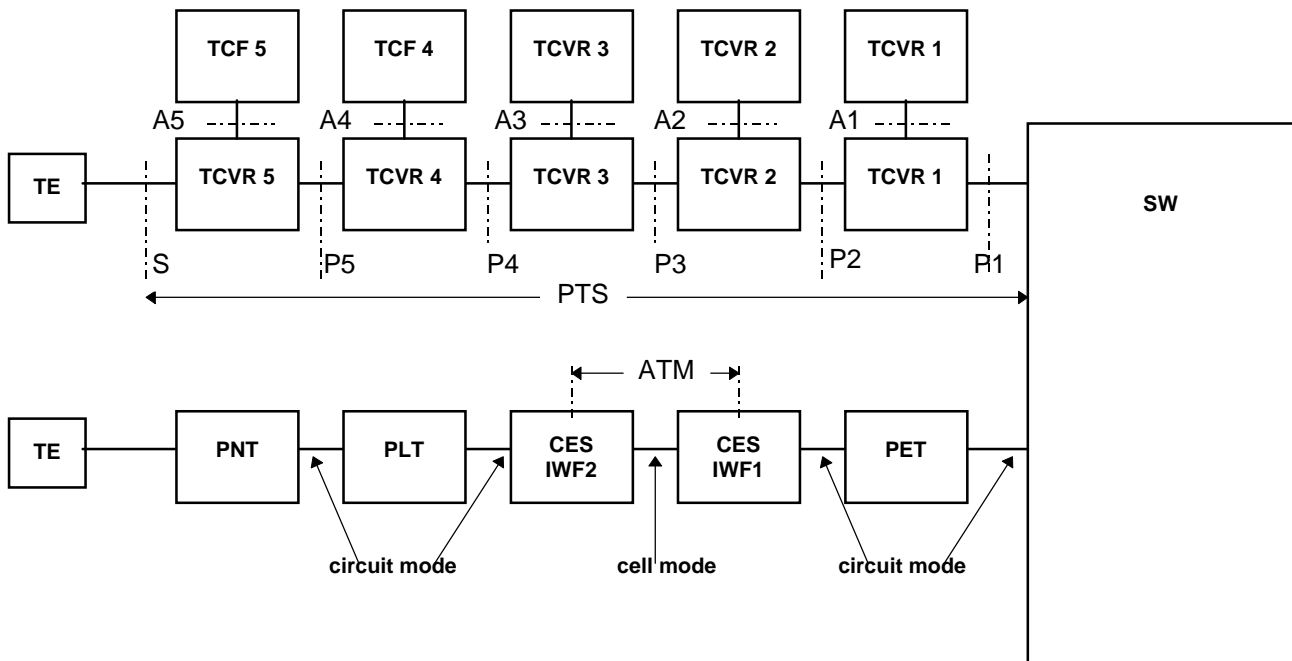


Figure A.3 - Application of the extension line reference configuration to campus cabling

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