INTERNATIONAL STANDARDIZED PROFILE

ISO/IEC ISP 11184-2

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Information technology — International Standardized Profiles FVT1nn — Virtual Terminal Basic Class — Register of VTE-profiles —

Part 2:
FVT115 — A-mode Generalized Telnet VTE-profile

Technologies de l'information — Profils normalisés internationaux FVT1nn — Classe de base du terminal virtuel — Registre de profils VTE —

Partie 2: FVT115 — Profil VTE de téléréseau généralisé mode A

Reference number
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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. In addition to developing International Standards, ISO/IEC JTC 1 has created a Special Group on Functional Standardization for the elaboration of International Standardized Profiles.

An International Standardized Profile is an internationally agreed, harmonized document which identifies a standard or group of standards, together with options and parameters, necessary to accomplish a function or set of functions.

Draft International Standards are circulated to national bodies for voting. Publication as an International Standardized Profile requires approval by at least 75% of the national bodies casting a vote.

International Standardized Profile ISO/IEC ISP 11184-2 was prepared with the collaboration of

— Asia-Oceania Workshop (AOW);

— European Workshop for Open Systems (EWOS);

— Open Systems Environment Implementors' Workshop (OIW).

ISO/IEC ISP 11184 consists of the following parts, under the general title *Information technology – International Standardized Profiles FVT1nn – Virtual Terminal Basic Class – Register of VTE-profiles:*

— *Part 1: FVT121, FVT122 – S-mode Forms and Paged VTE-profiles*

— *Part 2: FVT115 - A-mode Generalized Telnet VTE-profile*

— *Part 3: FVT114 - A-mode Transparent VTE-profile*

Annex A forms an integral part of this part of ISO/IEC ISP 11184. Annex B is for information only.

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Introduction

ISO/IEC ISP 11184 is defined within the context of Functional Standardization, in accordance with the principles specified in ISO/IEC TR 10000, "Framework and Taxonomy of International Standardized Profiles". The context of Functional Standardization is one part of the overall field of Information Technology (IT) standardization activities, covering base standards, profiles and registration mechanisms.

The Open Systems Interconnection (OSI) Standard ISO 9040 for the Virtual Terminal Basic Class Service identifies a requirement for an International Register of VT Control Object type definitions. Procedures for the operation of this International Register are laid down in ISO/IEC 9834-5. ISO/IEC ISP 11184 provides this register. The individual entries in this register constitute Interchange Format and Representation Profiles (F-Profiles) within the framework of ISO/IEC TR 10000.

This part of ISO/IEC ISP 11184 was developed in close cooperation between the three Regional OSI Workshops, namely the OSE Implementors' Workshop (OIW) of the United States, the European Workshop for Open Systems (EWOS) and the OSI Asia-Oceania Workshop (AOW). It was developed under the editorship of OIW from a control object specification contained in the OIW Stable Implementation Agreements, Version 5 (December 1991). The text is harmonized between these three Workshops and it has been ratified by the plenary assemblies of each Workshop.

This part of ISO/IEC ISP 11184 is derived from the Telnet-1988 profile contained in the OIW Stable Implementation Agreements for Open Systems Interconnection Protocols. The control objects, NA and NI, have been changed to model the DO/DONT WILL/WONT negotiation of TELNET options. The size of the elements of the NA and NI negotiation control objects equals the range of TELNET option numbers, including the numbers presently assigned and those reserved for future options. The CO-category of the KB and DI control objects have been changed from "boolean" to "symbolic". A "Go-Ahead" shall be signaled by a control object with symbolic value of GA; therefore, the GA control object has been dropped.

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Information technology - International Standardized Profiles FVT1nn - Virtual Terminal Basic Class - Register of VTE-profiles -

Part 2:

FVT115 - A-mode Generalized Telnet VTE-profile

1 Scope

1.1 General

The concept of Profiles for OSI, and the structure of the International Standardized Profiles that document them, are defined in ISO/IEC TR 10000-1. Such Profiles are divided into a number of different classes and sub-classes. Two of these classes contain sub-classes comprising functions of the Virtual Terminal Basic Class Service and Protocol specified in the base standards ISO 9040 and ISO 9041. These are the Application Profiles (A-Profiles) and the Interchange Format and Representation Profiles (F-Profiles).

The relationship between A-Profiles and F-Profiles is described in 7.3.2 of ISO/IEC TR 10000-1:1995 and is as follows. Application Layer base standards require, implicitly or explicitly, the structure of information carried or referenced by them to be specified for each instance of communication. It is the purpose of F-Profiles to specify such information structures. Particular functional requirements may then be met by the combination of an A-Profile with one or more F-Profiles.

The Virtual Terminal Basic Class Service and Protocol applies to applications requiring interactive communication with terminal systems through the transmission and manipulation of graphical images composed of character-box graphic elements. Through the selection by negotiation of various options, it may be used to realise a wide range of distinct functions. This process of negotiation involves the selection of a set of VT functional units together with a particular Virtual Terminal Environment profile (VTE-profile) and particular values for any arguments of that VTE-profile.

The specification of a VTE-profile and the permitted values for its arguments may themselves reference other types of object defined in accordance with ISO 9040. These are VT control object types and assignment types. The VTE-profiles, control object types and assignment types are thus information structures that require explicit reference within the VT protocol. Particular instances of these structures are fully defined within the base standards, but the base standards also provide for further instances to be defined by registration. Each registered instance constitutes an F-Profile within the framework of ISO/IEC TR 10000. The specification of the selection of options required to realise a particular function and to promote interoperability constitutes a Virtual Terminal A-Profile within the framework of ISO/IEC TR 10000.

The three International Registers of VT information structures and the specifications of VT Application Profiles are each published as a separate multi-part ISP as follows:

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— ISO/IEC ISP 11184 is the Register of VTE-profiles;

— ISO/IEC ISP 11185 is the Register of control object type definitions;

— ISO/IEC ISP 11186 is the Register of assignment-type definitions;

— ISO/IEC ISP 11187 contains the specifications of VT Application Profiles.

This part of ISO/IEC 11184 contains the definitions of the A-mode Generalized Telnet Profile that may be used to fully emulate the IPS TELNET service.

1.2 Position within the taxonomy

The taxonomy of International Standardized Profile for OSI is laid down in ISO/IEC TR 10000-2. Within the classification scheme of this taxonomy, the OSI Profiles specified in this International Standardized Profile are in the Virtual Terminal Registered Object sub-class of the class of Interchange Format and Representation Profiles requiring connection-mode Transport Services.

A Profile within this subclass has a Profile identifier of the form FVTabc, where abc is a structured numerical identifier that identifies the position of the Profile within each of three levels of subdivision of the subclass. The values of a and b are single digits but c is an integer that is not necessarily a single digit.

In principle the ISO Virtual Terminal model allows for multiple classes of operation, although at the time of publication of the International Standardized Profile only the Basic Class has been defined. The value of the identifier component a distinguishes between distinct type of information object as follows:

— a = 1 for Basic Class VTE-profiles;

— a = 2 for Basic Class Control Objects;

— a = 3 for Basic Class Assignment Types.

Values of a greater than 3 are reserved for future developments.

This International Standardized Profile ISO/IEC ISP 11184 contains the specifications of the Profiles with identifiers of the form FVT1bc. For this form of identifier, the component b distinguishes between the two modes of operation of the Virtual Terminal Service as follows:

— b = 1 for A-mode (asynchronous mode) operation;

— b = 2 for S-mode (synchronous mode) operation.

Values of b greater than 2 are reserved for new modes of operation that may be defined in future amendments to ISO 9040. The identifier component c distinguishes between different VTE-profiles with the same mode of operation. The procedures of ISO/IEC 9834-4 require a single register of VTE-profiles to be maintained without regard to their mode of operation. The value of the component c is therefore not directly related to the serial number of the VTE-profile in the register.

This part of ISO/IEC 11184 contains the definition of the A-mode Generalized Telnet VTE-profile with the Profile identifier

FVT115 for A-mode Generalized Telnet VTE-profile.

1.3 Scenario

The specification of the Virtual Terminal Service is given in ISO 9040. It is based on a model in which two VT- users communicate by means of a shared Conceptual Communication Area (CCA) that is a conceptual part of the VT service-provider. Information exchange is modelled by one VT-user updating the content of the CCA and the changed state of the CCA then being made accessible to the peer VT-user. The Virtual Terminal Service has a basic capability that may be enhanced by the addition of one or more optional functional units .

The CCA is structured by the Virtual Terminal Service into a number of components. There is a Conceptual Data Store (CDS) that contains one or two display objects (DOs), a Control, Signal and Status store (CSS) that contains zero, one or more control objects (COs) and in addition there may be one or more device objects. Display objects and control objects have an information content that is modified during the data handling phase of the VT Service. Device objects model certain logical characteristics of real devices. They may also provide linkages between different objects of the CCA and between such objects and real devices.

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There are two modes of operation of the VT Service. In synchronous mode (S-mode) there is a single display object that is updated alternately by the two VT-users while in asynchronous mode (A-mode) there are two display objects, each VT-user having permanent update access to one of them. The mode of operation, the functional units selected and the set of objects present in the CCA at any time constitutes a Virtual Terminal Environment (VTE).

The specification of the VTE, including the type definitions of the objects present, is held in the Data Structure Definition (DSD) component of the CCA. Ownership of the Write Access Variable (WAVAR) that is used during S-mode operation is held in the Access Control Store (ACS). These complete the set of components of the CCA.

A VTE is specified parametrically by a complete and consistent set of values for VTE-parameters defined in ISO 9040. The number of these VTE-parameters is large, so their values are themselves specified in a particular instance by a choice of VTE-profile together with values for any arguments of that VTE-profile. The type definitions of certain control objects may also specify that particular aspects of the CO, such as the initial value of its information content, are to be provided by any VTE-profile that references the CO concerned.

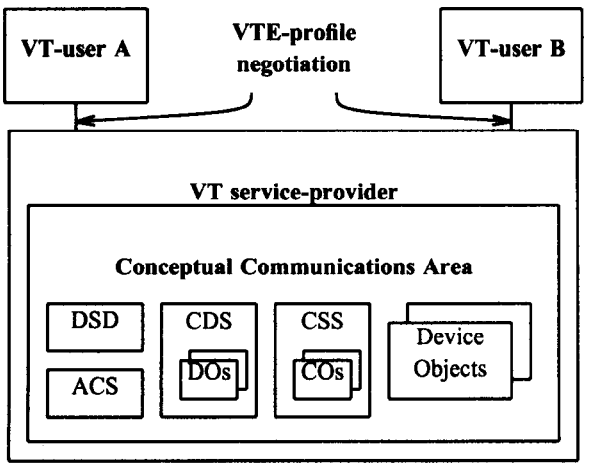

Figure 1 - Negotiation of a VTE through use of a VTE-profile

The VTE in use at any time is determined by negotiation between the two VT-users before entry into the data handling phase. This negotiation takes place by the exchange of VT service primitives that are available exclusively for this purpose, as is illustrated in figure 1. The negotiation shall determine whether or not the VTE is established in accordance with the VTE-profile defined in this part of ISO/IEC ISP 11184. It is possible for the VTE to be changed during the lifetime of a VT- association but only by exit from and subsequent return to the data handling phase.

This part of ISO/IEC 11184 defines the A-mode Generalized Telnet VTE-profile. It provides for the same functionality of the IPS TELNET service.

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC ISP 11184. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this part of ISO/IEC ISP 11184 are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by ISPs to such documents is that they may be specific to a particular edition. Members of IEC and ISO maintain registers of currently valid International Standards and ISPs, and ITU-T maintains published editions of its current Recommendations.

ISO/IEC 2022:1994, *Information technology - Character code structure and extension techniques.*

ISO 2375:1985[1)], *Data processing - Procedure for registration of escape sequences.*

ISO/IEC 7498-1:1994, *Information technology - Open Systems Interconnection - Basic Reference Model: The Basic Model.*

1) The registration authority for ISO 2375 is the European Computer Manufacturers Association (ECMA), 114 rue du Rhone, CH-1204 Geneva, Switzerland, from whom the corresponding register, the *ISO International Register of Coded Character Sets to be used with Escape Sequences*, may be obtained.

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ISO/IEC 8822:1994, *Information technology - Open Systems Interconnection - Presentation service definition.*

ISO/IEC 8824:1990, *Information technology - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1).*

ISO 9040:1990, *Information technology - Open Systems Interconnection - Virtual Terminal Basic Class Service.*

ISO 9041-1:1990, *Information technology - Open Systems Interconnection - Virtual Terminal Basic Class Protocol - Part 1: Specification.*

ISO/IEC 9041-2:1993, *Information technology - Open Systems Interconnection - Virtual Terminal Basic Class Protocol - Part 2: Protocol Implementation Conformance Statement (PICS) Proforma.*

ISO/IEC 9646-1:1994, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts.*

ISO/IEC 9834-1:1993, *Information technology - Open Systems Interconnection - Procedures for the operation of OSI Registration Authorities - General procedures.*

ISO/IEC 9834-4:1991, *Information technology - Open Systems Interconnection - Procedures for the operation of OSI Registration Authorities - Part 4: Register of VTE Profiles.*

ISO/IEC 9834-5:1991, *Information technology - Open Systems Interconnection - Procedures for the operation of OSI Registration Authorities - Part 5: Register of VT Control Object Definitions.*

ISO/IEC TR 10000-1:1995, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 1: General principles and documentation framework.*

ISO/IEC TR 10000-2:1995, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 2: Principles and Taxonomy for OSI profiles.*

ISO/IEC 10731:1994, *Information technology - Open Systems Interconnection - Basic Reference Model - Conventions for the definition of OSI services.*

ISO/IEC 11185-12:1995, *Information technology - International Standardized Profiles FVT2nn - Virtual Terminal Basic Class - Register of control object type definitions - Part 12: FVT2116, FVT2117, FVT2118, FVT2119 - Generalized Telnet Synch, Signal, Negotiation and Subnegotiation Control Objects.*

3 Definitions

For the purposes of this part of ISO/IEC ISP 11184, the following definitions apply.

3.1 General OSI terminology

3.1.1
This part of ISO/IEC ISP 11184 makes use of the following terms defined in ISO/IEC 10731:

a. service primitive;

b. service-provider.

3.1.2
This part of ISO/IEC ISP 11184 makes use of the following terms defined in ISO/IEC 8822:

a. abstract syntax;

b. presentation context.

3.1.3
This part of ISO/IEC ISP 11184 makes use of the following terms defined in ISO/IEC 8824:

a. any type;

b. null type;

c. object descriptor type;

d. object identifier.

3.1.4
This part of ISO/IEC ISP 11184 makes use of the following terms defined in ISO/IEC 9834-1:

a. registration;

b. registration-hierarchical-name.

3.2 Terminology of VT base standards

3.2.1
This part of ISO/IEC ISP 11184 makes use of the following terms defined in ISO 9040:

a. A-mode;

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b. array element;
c. character-repertoire;
d. control object;
e. device object;
f. object updating device;
g. primary attribute;
h. rendition attribute;
i. secondary-attribute;
j. VT-association;
k. VT-environment (VTE);
l. VT-user;
m. VTE-parameter;
n. VTE-profile;
o. VTE-profile argument.

3.2.2
This part of ISO/IEC ISP 11184 makes use of the following terms defined in ISO 9041-1:

a. protocol-element.

4 Abbreviations

For the purposes of this part of ISO/IEC ISP 11184, the following abbreviations apply.

AOW	OSI Asia-Oceanic Workshop;
DM	TELNET Data Mark
EC	TELNET Erase Character
EL	TELNET Erase Line
EWOS	European Workshop for Open Systems;
GA	TELNET Go Ahead
IAC	TELNET Interpret As Command
IPS	Internet Protocol Suite
MIL-STD	Military Standard (U.S.)
NVT	TELNET Network Virtual Terminal
OIW	OSE Implementor's Workshop;
OSE	Open Systems Environment.
RFC	Request For Comments
SB	TELNET Subnegotiation Begin
SE	TELNET Subnegotiation Parameters End
TELNET	Telecommunications Network

All other abbreviations used are defined in ISO/IEC TR 10000 or ISO 9040.

5 Principles of Conformance to VT Profiles

An implementation of the Virtual Terminal Protocol conforms to an FVT1nn Profile that specifies a VTE- profile if the protocol implementation is capable of sending and receiving PDUs for the establishment of a full-VTE in which the VTE-profile name is that specified in the FVT1nn Profile. If the VTE-profile specification includes the definition of any control object types in accordance with clause 14 of ISO 9040 then there is a further conformance requirement. In this case conformance to the VTE-profile requires in addition that the protocol implementation is capable of sending and receiving PDUs corresponding to all update operations permitted for that CO type whenever a CO of that type is present in the VTE.

Conformance of a protocol implementation to an FVT1nn Profile does not place requirements on which protocol elements of the VT Protocol may be used for the establishment of a full-VTE in accordance with that Profile.

NOTE - The conformance requirements would be satisfied, for example, if such a full-VTE could be established through use of the VT-SWITCH-PROFILE protocol elements but not through use of the VT-ASSOCIATE protocol elements.

A system that includes an implementation of the VT Protocol may be claimed to conform also to an AVTnn Profile. Conformance to an AVTnn Profile may place requirements on which protocol elements are to be used for the establishment of a full-VTE in accordance with a particular VTE-profile. Such conformance may also require that values for the emphasis attribute of a display object array element are interpreted by a VT-user in accordance with semantics defined within a VTE-profile specification in accordance with 13.2 of ISO 9040. Conformance to DO or CO semantics is not within the scope of conformance to any FVTnnn Profile.

The conformance requirements of the Virtual Terminal Protocol are specified in clause 13 of ISO 9041-1. The supplier of a protocol implementation which is claimed to conform to ISO 9041-1 is required to complete a copy of the PICS proforma provided in ISO/IEC 9041-2. Annex A of this part of ISO/IEC ISP 11184 provides an ISPICS Requirements List (IPRL) for

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the Profile FVT121 specified herein. This IPRL specifies constraints on the answers that may be given in the completed PICS for a protocol implementation that claims conformance to these Profiles.

6 Entry number

The remaining clauses of this part of ISO/IEC ISP 11184 provide the entry for the A-mode Generalized TELNET VTE-profile in the International Register of VTE-profiles. The entry is structured in accordance with the requirements of ISO/IEC 9834-4.

This Entry is the third in the International Register of VTE-profiles. This register assigns it the entry number:

VTE-03

7 Name of sponsoring authority

This entry is sponsored by the OSE Implementors' Workshop (OIW).

8 Date

The date of submission of this proposal was 1993-12-10.

9 Identifier

The name assigned to an information object by an International Register is required by ISO/IEC 9834-1 to be a registration-hierarchical-name. A registration-hierarchical-name may have more than one form. The permitted forms include an ASN.1 object identifier as defined in ISO/IEC 8824 and a distinguished name as defined in ISO/IEC 9594-2.

In accordance with A.4 of ISO/IEC 9834-4, this register assigns the following object identifier form for the name of this register entry:

{ iso(1) identified-organization(3) oiw(14) vtsig(12) vteProfile(1) generalizedTelnet(5) }

This register does not assign any other form to the names of these entries.

NOTES

1 - The object identifiers given here identify the VTE-profiles as information objects distinct from their operation in accordance with any particular VT Application Profile. Other object identifiers defined by registration authorities operating outside the procedures of ISO/IEC 9834-4 may identify the use of one of these VTE-profiles in conjunction with a particular VT Application Profile. All such object identifiers shall be synonymous for the purposes of the VT Protocol of ISO 9041-1 when an explicit value is negotiated for each VTE-profile argument. However, the use of such an object identifier provides a means to create a mutual agreement between the two communicating VT-users to operate in accordance with a specific VT Application Profile. A VTE-profile specification may delegate the determination of default values for VTE-profile arguments and initial values for VT control objects to the VT Application Profile when such a mutual agreement exists; see for example 13.1 below.

2 - By ISO/IEC 9834-1 a distinguished name for the purposes of the OSI Directory may only be assigned together with an object identifier when the object identifier form is generated under the arc { joint-iso-ccitt(2) country(16) country-name }.

10 Descriptor value

The value of the ASN.1 object descriptor type assigned to this entry is:

"FVT115: A-mode Generalized Telnet Profile".

11 Mode

This VTE-profile is designed for operation in the asynchronous mode (A-mode) of the Virtual Terminal Service.

12 VT functional units

The following VT functional units are required for the operation of this VTE-profile:

— Structured Control Objects;

The operation of this VTE-profile may benefit as follows from the selection of additional VT functional units:

— from the Urgent Data functional unit by the expediting of the transmission of asynchronous terminal and application signals;

— from the Break functional unit by the ability to invoke a destructive interrupt if necessary.

All other functional units are out of scope.

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13 Profile arguments

13.1 Interpretation

This VTE-profile has 2 VTE-profile arguments that are named "r1" and "r2" in accordance with A.8 of ISO/IEC 9834-4. "r2" is a multiple-occurrence VTE-parameter and correspondingly may occur more than once in an ordered list.

All optional VTE-profile arguments have default values that are determined hierarchically. If there is a mutual agreement between the two communicating VT-users to operate this VTE-profile in accordance with a specific VT Application Profile then a default value specified by the Application Profile takes precedence over the default value specified in 13.2.

When a default value is defined for a multiple-occurrence VTE-profile argument and fewer occurrences are negotiated than are required by the value of a parent VTE-parameter, the remaining occurrences take the specified default value. When the occurrences of such an argument form an ordered list, that argument may have a default value which depends on its position in the list.

13.2 VTE-profile argument definitions

r1 - is used to represent the line length as the value of VTE-parameter x-window for both display objects. This argument is mandatory and takes a nonnegative integer value. This argument is identified by the identifier for x-window for display object D.

r2 - is used to designate the repertoires for both display objects. This argument is optional, and may occur a number of times in an ordered list to provide for negotiation of values for the VTE-parameter repertoire-assignment. The value for the VTE-parameter repertoire-capability is implied by the number of occurrences of this profile argument. The VTE-parameter repertoire-capability equals the number of occurrences of this profile-argument plus one. The default is a single occurrence of the value designating the 7-bit ASCII (G0+C0) character set. This argument is identified by the identifier for repertoire assignment for display-object D.

14 VTE-profile body

14.1 Specification

The values specified by this VTE-profile for all VTE-parameters are given below, using the notation defined in A.9 of ISO/IEC 9834-4

```
Display-objects = *(double occurrence)*
{
    {
    display-object-name  = D,*(DISPLAY)*
    do-access            = "WACA",
    dimensions           = "two",
        x-dimension              =
        {
            x-bound      = "unbounded",
            x-addressing = "no constraint",
            x-absolute   = "yes",
                *(See 15.1.4 Attribute Operations )*
            x-window     = profile-argument-r1
        },
        y-dimension              =
        {
            y-bound      = "unbounded",
            y-addressing = "higher only",
            y-absolute   = "no",
            y-window     = 1
        },
    erasure-capability   = "yes",
    repertoire-capability = *(implicitly defined by r2)*,
    repertoire-assignment = profile-argument-r2,
    repertoire-assignment = <ESC> 2/5 2/15 4/2
    },
    {
    display-object-name  = K,*(KEYBOARD)*
    do-access            = "WACI",
    dimensions           = "two",
        x-dimension              =
        {
            x-bound      = "unbounded",
            x-addressing = "no constraint",
            x-absolute   = "yes",
                *(See 15.1.4 Attribute Operations )*
            x-window     = profile-argument-r1
        },
        y-dimension              =
        {
            y-bound      = "unbounded",
            y-addressing = "higher only",
            y-absolute   = "no",
            y-window     = 1
```


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```
        },
    erasure-capability    = "yes",
    repertoire-capability = *(implicitly defined by r2)*,
    repertoire-assignment = profile-argument-r2,
    repertoire-assignment = <ESC> 2/5 2/15 4/2
    },
},

Control-objects = *(multiple occurrence)*
{
    { *(SYNCHRONIZE)*
        CO-name          = SY,
        CO-type-identifier = { iso(1) standard(0)
              9834 vt-co-def(5) misco(0) 16 },
        CO-category      = "symbolic",
        CO-access            = "NSAC",
        CO-size          = 1,
        CO-priority      = "urgent"
    },
    { *(DISPLAY SIGNAL)*
        CO-name          = DI,
        CO-type-identifier = { iso(1) standard(0)
              9834 vt-co-def(5) misco(0) 17 },
        CO-category      = "symbolic",
        CO-access        = "WACA",
        CO-size          = 255,
        CO-priority      = "normal"
        CO-trigger       = "selected"
    },
    { *(KEYBOARD SIGNAL)*
        CO-name          = KB,
        CO-type-identifier = { iso(1) standard(0)
              9834 vt-co-def(5) misco(0) 17 },
        CO-category      = "symbolic",
        CO-category      = "symbolic",
        CO-access        = "WACI",
        CO-size          = 255,
        CO-priority      = "normal"
        CO-trigger       = "selected"
    },
    { *(NEGOTIATION BY INITIATOR)*
        CO-name          = NI,
        CO-type-identifier = { iso(1) standard(0)
              9834 vt-co-def(5) misco(0) 18 },
        CO-structure     = 2,
            *(DO/DONT)*
            CO-element-id  = 1,
            CO-category    = "boolean",
            CO-size        = 256,
            *(WILL/WONT)*
            CO-element-id  = 2,
            CO-category    = "boolean",
            CO-size        = 256,
        CO-access        = "WACI",
        CO-priority      = "normal",
        CO-trigger       = "selected"
    },
    { *(NEGOTIATION BY ACCEPTOR)*
        CO-name          = NA,
        CO-type-identifier = { iso(1) standard(0)
              9834 vt-co-def(5) misco(0) 18 },
        CO-structure     = 2,
            *(DO/DONT)*
            CO-element-id  = 1,
            CO-category    = "boolean",
            CO-size        = 256,
            *(WILL/WONT)*
            CO-element-id  = 2,
            CO-category    = "boolean",
            CO-size        = 256,
        CO-access        = "WACA",
        CO-priority      = "normal",
        CO-trigger       = "selected"
    },
    { *(SUBNEGOTIATION BY INITIATOR)*
        CO-name          = SBI,
        CO-type-identifier = { iso(1) standard(0)
              9834 vt-co-def(5) misco(0) 19 },
        CO-structure     = 2,
            *(TELNET OPTION)*
            CO-element-id  = 1,
            CO-category    = "symbolic",
            CO-size        = 256,
            *(SUBNEGOTIATION)*
            CO-element-id  = 2,
            CO-category    = "character",
            CO-assignment  = <ESC> 2/5 2/15 4/2,
            *(Virtual Terminal Service
              Transparent Set)*
            CO-size        = 1024,
        CO-access        = "WACI",
        CO-priority      = "normal",
        CO-trigger       = "selected"
    },
    { *(SUBNEGOTIATION BY ACCEPTOR)*
        CO-name          = SBA,
        CO-type-identifier = { iso(1) standard(0)
              9834 vt-co-def(5) misco(0) 19 },
        CO-structure     = 2,
            *(TELNET OPTION)*
            CO-element-id  = 1,
            CO-category    = "symbolic",
            CO-size        = 256,
            *(SUBNEGOTIATION)*
```


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```
            CO-element-id  = 2,
            CO-category    = "character",
            CO-assignment  = <ESC> 2/5 2/15 4/2,
            *(Virtual Terminal Service
              Transparent Set)*
            CO-size        = 1024,
        CO-access          = "WACA",
        CO-priority        = "normal",
        CO-trigger         = "selected"
    },
},
Device-objects = *(double occurrence)*
{
    {
    device-name                =
                    DISPLAY-DEVICE,
    device-display-object      = D,
    device-default-CO-initial-value = 1."true",
                    *(on)*
    device-minimum-X-array-length  = 1,
                *(no-constraint)*
    device-minimum-Y-array-length  = 1,
                *(no-constraint)*
    device-control-object      = SY,
     *( { iso(1) standard(0) 9834 vt-co-def(5)
        misco(0) 16 } )*
    device-control-object      = DI,
     *( { iso(1) standard(0) 9834 vt-co-def(5)
        misco(0) 17 } )*
    device-control-object      = NA,
     *( { iso(1) standard(0) 9834 vt-co-def(5)
        misco(0) 18 } )*
    device-control-object      = SBA,
     *( { iso(1) standard(0) 9834 vt-co-def(5)
        misco(0) 19 } )*
     *(SYNC,DISPLAY-SIGNAL,NEGOTIATE-
     ACCEPTOR,SUBNEGOTIATE-ACCEPTOR)*
    device-default-CO-access   = "WACA",
    device-default-CO-priority = "normal"
    *(other device object parameters
      assume corresponding DO values)*
    },

    {
    device-name        KEYBOARD-DEVICE,
    device-display-object      = K,
    device-default-CO-initial-value =
                    1."true",*(on)*
    device-minimum-X-array-length  = 0,
                *(no image required)*,
    device-minimum-Y-array-length  = 0,
                *(no image required)*,
    device-control-object      = SY,
     *( { iso(1) standard(0) 9834 vt-co-def(5)
        misco(0) 16 } )*
    device-control-object      = KB,
     *( { iso(1) standard(0) 9834 vt-co-def(5)
        misco(0) 17 } )*
    device-control-object      = NI,
     *( { iso(1) standard(0) 9834 vt-co-def(5)
        misco(0) 18 } )*
    device-control-object      = SBI,
     *( { iso(1) standard(0) 9834 vt-co-def(5)
        misco(0) 19 } )* *(SYNC,
      KEYBOARD-SIGNAL,NEGOTIATE-IN-
      ITIATOR,SUBNEGOTIATE-INITIATOR)*
    device-default-CO-access   = "WACI",
    device-default-CO-priority = "normal"
    *(other device object parameters
    assume corresponding DO values)*
    }
}
Type of delivery control = "simple-delivery-control".
```

14.2 CO type definitions

Each value of the CO-type-identifier VTE-parameter specified in 14.1 is an ASN.1 object identifier. The CO types are registered CO types for which the type definition is given in ISO/IEC ISP 11185-12.

15 Additional Information

15.1 Control of display object devices

15.1.1 Definitive Values

Sending a KB or DI control object update is the equivalent of sending a TELNET "IAC <command>" sequence. The symbolic value in the KB or DI control object is equal to the TELNET command code as specified in the TELNET Assigned Numbers.

Refer to ISO/IEC 11187 Part 3 for mandatory and excluded values.

The NI and NA control objects are used in place of the DO, DONT, WILL, WONT commands.

The SBI and SBA control objects are used in place of the SB <suboptions> SE command sequence.

The EC and EL commands are replaced by display object updates.

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The IAC is not needed because commands are not embedded in the text.

The recognition of values corresponding to TELNET commands defined in a TELNET option shall be dependent upon the successful negotiation of the TELNET option that defines the additional TELNET command. Unrecognized values shall be ignored.

15.1.2 NI and NA Control Objects

The NI and NA control objects are used to emulate the TELNET option negotiation facility. The facility is symmetric, allowing either party to open negotiation for a change of mode, and every negotiation must be accepted or rejected by the opposite party. The rules for negotiation for each of the option controls are as stated in the TELNET specification and as given below:

a. Only open negotiation for a change from the current state;

b. Only acknowledge negotiation for a change from the current state.

NI and NA are structured control objects consisting of two boolean elements. For full symmetry, both NI and NA have the same value definitions. The first boolean data element stands for DO/DONT and the second boolean data element stands for WILL/WONT. The ordinal position of the boolean value in the data element corresponds to the TELNET option number plus one. This allows the ordinal position of bits 1-256 in the boolean object to represent the TELNET options values of 0-255. DO is represented as a "true" boolean value in CO-element-id 1. DONT is represented as a "false" boolean value in CO-element-id 1. WILL is represented as a "true" boolean value in CO-element-id 2. WONT is represented as a "false" boolean value in CO-element-id 2.

15.1.3 Termination Events

No termination event list is specified so that data buffering and delivery can be controlled according to context. If local echoing is enabled, the local newline or other event shall trigger a VT-DELIVER request. With remote echo a timeout or buffer length may be used to trigger a VT-DELIVER request. This buffer length may be 1.

15.1.4 Attribute operations

15.1.4.1 Binary Mode

When a party wants to change the repertoire assignment for the display object to which it has access, it does so by issuing an update to the modal value for the character repertoire attribute. It should be noted that no mechanism exists for a party to request a change of repertoire assignment for the display object to which it does not have access.

In the specific case of the TCP/IP TELNET binary option, a successful TELNET negotiation must be completed first. Then the party with the access rights to the display object in question is required to perform the secondary attribute modal update. If a negotiation to change to the "binary" repertoire is refused, the current repertoire shall remain in effect. When a negotiation to quit using the "binary" repertoire succeeds, the party with the access rights to the display object in question is required to perform the corresponding secondary modal update to switch to the explicit modal default value.

It is recognized that some implementations may have character set repertoire requirements that are currently outside the scope of TCP/IP TELNET. Implementations such as Gateways that require access to these facilities via non-standard extensions to TCP/IP TELNET shall be able to maintain conformance with VT by utilizing profile-argument-r2 and mapping in both directions between repertoire changes in the TELNET environment and appropriate VT modal attribute updates.

15.1.4.2 Binary Repertoire Usage

While the "binary" repertoire is being used no mapping to the pointer addressing or erase operations shall be done.

15.1.4.3 Character Set Escape Sequences

The repertoire designator "7-bit ASCII (G0+C0)" refers to the repertoire invoked by ISO 2022 defined character set designating escape sequences <ESC> 2/8 4/2, , <ESC> 2/1 4/0. The repertoire designator "7-bit ASCII (G0 only)" refers to the repertoire invoked by ISO 2022 defined character set designating escape sequences <ESC> 2/8 4/2. The designation "binary" refers to the "Virtual Terminal Service Transparent Set" registered in the International

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Register under ISO 2375 register value 125 and invoked by the escape sequence <ESC> 2/5 2/15 4/2. The repertoire designator "Latin Alphabet No. 1, Supplementary Set" refers to the repertoire invoked by ISO 2022 defined character set designating escape sequences <ESC> 2/8 4/1, <ESC> 2/13 4/1.

15.1.4.4 Erase operations

The TELNET EC (erase character) command shall be mapped to a pointer relative (x:=x-1) update and an erase current update. This is the only instance when backward explicit addressing is permitted.

The TELNET EL (erase line) command shall be mapped to an erase-full-x-array update (and erase operation where the extent is defined as <"start-x",Yc,Xc-1> and a pointer update to set x = 1. This is the only instance when an absolute explicit addressing is permitted.

15.1.4.5 Addressing operations

The X address of the pointer can be moved forward only by implicit pointer addressing. Addressing of the Y dimension is limited to the next X-array update operation.

15.1.4.6 TELNET NVT CR,LF Sequence

The VT next X-array update operation shall be sent in place of the TELNET NVT "CR,LF" sequence.

15.2 Control of signalling devices

15.2.1 SYNCH command

The equivalent of a TELNET SYNCH command is achieved by updating the SY control object with the single symbolic value of "SYNCH" (which is mapped onto the integer value 1), and immediately updating the DI (or KB) control object with the symbolic value DM. When an update to the SY control object is received subsequent display object updates are discarded until an update to the DI or KB is received with symbolic value DM. If a VT-BREAK is received after an SY CO update has been received and prior to the corresponding DI or KB CO update with symbolic value of DM, the discarding of updates is terminated. This is necessary because the VT-BREAK may have caused the DI or KB CO update to be purged.

15.2.2 SBI and SBA Control Objects

The SBI and SBA control objects provide subnegotiation for TELNET options, and correspond to the TELNET command sequence "IAC SB <TELNET option code> <subnegotiation> IAC SE". Element id 1 contains the TELNET option code, and element id 2 contains the octets that comprise the subnegotiation. The specification for the TELNET option defines the semantics of the value in element id 2.

16 Usage

16.1 TELNET References

Users of this VTE-profile should refer to the TELNET specification (U.S. MIL-STD-1782 : TELNET PROTOCOL) and RFCs:

854 Protocol Specification
855 Options Specification

and their successors for semantics of the TELNET commands.

16.2 TELNET Options

An implementation can refuse options that it doesn't support. This allows implementations to maintain interoperability while new TELNET options are incorporated.

16.3 VT-BREAK

If the "go ahead" facility has been negotiated then following a VT-BREAK, only the association acceptor has the right to send data. VT-BREAK causes all negotiated TELNET option values to be reset to their initial values. If negotiated values are to be restored, they must be renegotiated.

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Annex A
(normative)

Profile Requirements List

A.1 Protocol requirements

This annex provides a Profile Requirements List (Profile RL) for the Profile FVT115 specified in this part of ISO/IEC ISP 11184. This RL is to be used in conjunction with the Protocol ICS (PICS) proforma for the Virtual Terminal Protocol that is given in ISO/IEC 9041-2. The relationship between the Profile RL and the Protocol ICS is described in clause 5 of this part of ISO/IEC ISP 11184.

The requirements of this RL are given in tables A.1 to A.9. The notation used in the tables is as follows. Individual items in a PICS proforma are referenced by the means specified in 9.3.8.3 of ISO/IEC 9646-7[2]. Such a reference has the form x-y/z, where x is the number of the ISO Standard that specifies the protocol, y is a reference within the PICS proforma of this Standard to the smallest subclause that contains the item concerned, and z is the reference number of the item within that subclause. Where this RL needs to present the constraints on a particular item as two or more separate cases, a suffix of the form '.n' is added to the item reference where n is a serial number that labels the different cases.

The item name is taken from the PICS proforma. The "status" columns of the RL tables take priority over the corresponding "status" columns of the PICS proforma and they use the notation of that proforma. They refine the PICS proforma status values by evaluating conditional expressions or converting optional values to a more specific form. The following conditional values are used in these tables:

c1 If acceptance of TELNET options which make use of subnegotiation then m else n/a.

c2 If acceptance of TELNET options which make use of subnegotiation then o else n/a.

Where an RL table has a "Profile values" column, the status value applies separately to each listed Profile value.

For any column in an RL table that corresponds to an answer column in the PICS proforma, the values listed are the acceptable answers for the item concerned. The following special notation is used in these columns:

Any The RL places no constraint on the answer;
n/a The column is not relevant to this item.

2) ISO/IEC 9646-7:1995, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements.*

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Table A.1 - VT Service requirements

Item reference no. 9041-	Name of item	Status	Profile values	Negotiable
A.2.1/7	Structured Control Objects	m	n/a	n/a
A.2.2/2	A-mode	m	n/a	n/a
A.3.9	type-of-delivery-control	m	"simple-del-ivery-control"	No

Table A.2 - VTE requirements for display object A

Item reference no. 9041-	Name of item	Status	Profile values	Negotiable
A.3.2/1	display-object-name	m	"K"	No
A.3.2/2	erasure-capability	m	"yes"	No
A.3.2/3	DO-access	m	"WACI"	No
A.3.2/4	block-definition-capability	m	"no"	No
A.3.2/6	field-definition-capability	m	"no"	No
A.3.5/1	dimensions	m	"two"	No
A.3.5/2	x-bound	m	"unbounded"	No
A.3.5/3	x-addressing	m	"no constraint"	No
A.3.5/4	x-absolute	m	"yes"	No
A.3.5/4	x-window	m	Any	Yes
A.3.5/6	y-bound	m	"unbounded"	No
A.3.5/7	y-addressing	m	"higher only"	No
A.3.5/8	y-absolute	m	"no"	No
A.3.5/9	y-window	m	1	No
A.3.7.2/4	font-assignment	n/a		
A.3.7.2/5	emphasis	n/a		
A.3.7.2/7	foreground-colour-assignment	n/a		
A.3.7.2/9	background-colour-assignment	n/a		

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Table A.3 - VTE requirements for display object B

Item reference no. 9041-	Name of item	Status	Profile values	Negotiable
A.3.3/1	display-object-name	m	"D"	No
A.3.3/2	erasure-capability	m	"yes"	No
A.3.3/3	DO-access	m	"WACA"	No
A.3.3/4	block-definition-capability	m	"no"	No
A.3.3/6	field-definition-capability	m	"no"	No
A.3.6/1	dimensions	m	"two"	No
A.3.6/2	x-bound	m	"unbounded"	No
A.3.6/3	x-addressing	m	"no constraint"	No
A.3.6/4	x-absolute	m	"yes"	No
A.3.6/5	x-window	m	Any	Yes
A.3.6/6	y-bound	m	"unbounded"	No
A.3.6/7	y-addressing	m	"higher only"	No
A.3.6/8	y-absolute	m	"no"	No
A.3.6/9	y-window	m	1	No
A.3.7.3/4	font-assignment	n/a		
A.3.7.3/5	emphasis	n/a		
A.3.7.3/7	foreground-colour-assignment	n/a		
A.3.7.3/9	background-colour-assignment	n/a		

Table A.4 - VTE requirements for keyboard device

Item reference no. 9041-	Name of item	Status	Profile values	Negotiable
A.3.7.14/1	device-name	m	"KEYBOARD-DEVICE"	No
A.3.7.14/2	default-CO-access	m	"WACI"	No
A.3.7.14/3	default-CO-priority	m	"normal"	No
A.3.7.14/4	default-CO-trigger	m	"not selected"	No
A.3.7.14/5	default-CO-initial-value	m	1."true"	No
A.3.7.14/6	repertoire-assignment	m	Any	Yes
A.3.7.14/7	font-assignment	n/a		
A.3.7.14/8	emphasis	n/a		
A.3.7.14/9	foreground-colour-assignment	n/a		
A.3.7.14/10	background-colour-assignment	n/a		
A.3.7.14/11	minimum-x-array-length	m	0	No
A.3.7.14/12	minimum-y-array-length	m	0	No
A.3.7.14/14	control-objects	m	SY,KB,NI	No
A.3.7.14/13	control-objects	c1	SBI	No
A.3.7.14/14	display-object	m	K	No

--`,,```,,,,````-`-`,,`,,`,`,,`---

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Table A.5 - VTE requirements for display device

Item reference no. 9041-	Name of item	Status	Profile values	Negotiable
A.3.7.15/1	device-name	m	"DISPLAY-DEVICE"	No
A.3.7.15/2	default-CO-access	m	"WACA"	No
A.3.7.15/3	default-CO-priority	m	"normal"	No
A.3.7.15/4	default-CO-trigger	m	"not selected"	No
A.3.7.15/5	default-CO-initial-value	m	1."true"	No
A.3.7.15/6	repertoire-assignment	m	Any	Yes
A.3.7.15/7	font-assignment	n/a		
A.3.7.15/8	emphasis	n/a		
A.3.7.15/9	foreground-colour-assignment	n/a		
A.3.7.15/10	background-colour-assignment	n/a		
A.3.7.15/11	minimum-x-array-length	m	1	No
A.3.7.15/12	minimum-y-array-length	m	1	No
A.3.7.15/13	control-objects	m	SY,DI,NA	No
A.3.7.15/13	control-objects	c1	SBA	No
A.3.7.15/14	display-object	m	D	No

Table A.6 - VTE requirements for Control Objects

Item reference no. 9041-	Name of item	Status	Numbers supported	Extra Information
A.3.8/1	default device CO	m	1	
A.3.8/11	Parametric COs	m	6	FVT2116,FVT2117, FVT2118,FVT2119 (Tables A7 & A8)

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Table A.7 - VTE requirements for Control Object Parameters

Item reference no. 9041-	Name of item	Status	Profile values	Negotiable
A.3.8.1/1	CO-name	m	SY	No
A.3.8.1/2	CO-type-identifier	m	{ 1 0 9834 5 0 16 }	No
A.3.8.1/3	CO-structure	m	1	No
A.3.8.1/4	CO-access	m	"NSAC"	No
A.3.8.1/5	CO-priority	m	"urgent"	No
A.3.8.1/6	CO-trigger	m	"not selected"	No
A.3.8.1/1	CO-name	m	DI	No
A.3.8.1/2	CO-type-identifier	m	{ 1 0 9834 5 0 17 }	No
A.3.8.1/3	CO-structure	m	1	No
A.3.8.1/4	CO-access	m	"WACA"	No
A.3.8.1/5	CO-priority	m	"normal"	No
A.3.8.1/6	CO-trigger	m	"not selected"	No
A.3.8.1/1	CO-name	m	KB	No
A.3.8.1/2	CO-type-identifier	m	{ 1 0 9834 5 0 17 }	No
A.3.8.1/3	CO-structure	m	1	No
A.3.8.1/4	CO-access	m	"WACI"	No
A.3.8.1/5	CO-priority	m	"normal"	No
A.3.8.1/6	CO-trigger	m	"not selected"	No
A.3.8.1/1	CO-name	m	NI	No
A.3.8.1/2	CO-type-identifier	m	{ 1 0 9834 5 0 18 }	No
A.3.8.1/3	CO-structure	m	2	No
A.3.8.1/4	CO-access	m	"WACI"	No
A.3.8.1/5	CO-priority	m	"normal"	No
A.3.8.1/6	CO-trigger	m	"selected"	No
A.3.8.1/1	CO-name	m	NA	No
A.3.8.1/2	CO-type-identifier	m	{ 1 0 9834 5 0 18 }	No
A.3.8.1/3	CO-structure	m	2	No
A.3.8.1/4	CO-access	m	"WACA"	No
A.3.8.1/5	CO-priority	m	"normal"	No
A.3.8.1/6	CO-trigger	m	"selected"	No
A.3.8.1/1	CO-name	m	SBI	No
A.3.8.1/2	CO-type-identifier	m	{ 1 0 9834 5 0 19 }	No
A.3.8.1/3	CO-structure	m	2	No
A.3.8.1/4	CO-access	m	"WACI"	No
A.3.8.1/5	CO-priority	m	"normal"	No
A.3.8.1/6	CO-trigger	m	"selected"	No
A.3.8.1/1	CO-name	m	SBA	No
A.3.8.1/2	CO-type-identifier	m	{ 1 0 9834 5 0 19 }	No
A.3.8.1/3	CO-structure	m	2	No
A.3.8.1/4	CO-access	m	"WACA"	No
A.3.8.1/5	CO-priority	m	"normal"	No
A.3.8.1/6	CO-trigger	m	"selected"	No

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Table A.8 - VTE requirements for Control Object Elements

Item reference no. 9041-	Name of item	Status	Profile values	Negotiable
	CO-name = SY			
A.3.8.2/2	CO-category	m	"symbolic"	No
A.3.8.2/4	CO-size	m	1	No
	CO-name = DI			
A.3.8.2/2	CO-category	m	"symbolic"	No
A.3.8.2/4	CO-size	m	255	No
	CO-name = KB			
A.3.8.2/2	CO-category	m	"symbolic"	No
A.3.8.2/4	CO-size	m	255	No
	CO-name = NI			
A.3.8.2/1	CO-element-id	m	1	No
A.3.8.2/2	CO-category	m	"boolean"	No
A.3.8.2/4	CO-size	m	256	No
A.3.8.2/1	CO-element-id	m	2	No
A.3.8.2/2	CO-category	m	"boolean"	No
A.3.8.2/4	CO-size	m	256	No
	CO-name = NA			
A.3.8.2/1	CO-element-id	m	1	No
A.3.8.2/2	CO-category	m	"boolean"	No
A.3.8.2/4	CO-size	m	256	No
A.3.8.2/1	CO-element-id	m	2	No
A.3.8.2/2	CO-category	m	"boolean"	No
A.3.8.2/4	CO-size	m	256	No
	CO-name = SBI			
A.3.8.2/1	CO-element-id	m	1	No
A.3.8.2/2	CO-category	m	"symbolic"	No
A.3.8.2/4	CO-size	m	256	No
A.3.8.2/1	CO-element-id	m	2	No
A.3.8.2/2	CO-category	m	"character"	No
A.3.8.2/3	CO-repertoire-assignment	m	VT Service Transparent Set	No
A.3.8.2/4	CO-size	m	1024	No
	CO-name = SBA			
A.3.8.2/1	CO-element-id	m	1	No
A.3.8.2/2	CO-category	m	"symbolic"	No
A.3.8.2/4	CO-size	m	256	No
A.3.8.2/1	CO-element-id	m	2	No
A.3.8.2/2	CO-category	m	"character"	No
A.3.8.2/3	CO-repertoire-assignment	m	VT Service Transparent Set	No
A.3.8.2/4	CO-size	m	1024	No

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Table A.9 - PDU requirements

Item reference no. 9041-	Name of item	Profile values	SENDING status	RECEIVING status
A.5.15.4/2.1	coName	SY	m	m
A.5.15.4/2.2	coName	DI,NA,KB,NI	m	m
A.5.15.4/2.3	coName	SBA,SBI	c2	c1

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Annex B
(informative)

TELNET References

For migration or gateway purposes, refer to RFC 1123 "Host Requirements for Applications" to determine which TELNET commands and options are recommended and/or required in conventional implementations.

The semantic definitions used by the Generalized Telnet Display and Control Objects are defined in the following documents:

Table B.1 - Non-normative Materials

Number	Name	Submission date
MIL-STD 1782	TELNET PROTOCOL U.S. Military Standard 1782	10 May 1984
RFC 854	TELNET PROTOCOL SPECIFICATION	May 1983
RFC 855	TELNET OPTIONS SPECIFICATION	May 1983
RFC 1123	REQUIREMENTS FOR INTERNET HOSTS -- Application and Support	October 1989

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ICS 35.100

Descriptors: data processing, information interchange, network interconnection, open systems interconnection, communication procedure, profiles.

Price based on 19 pages

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