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DATA COMMUNICATION OVER THE TELEPHONE NETWORK

MANAGEMENT INFORMATION MODEL FOR V-SERIES DCE'S

ITU-T Recommendation V.58

(Previously "CCITT Recommendation")

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation V.58 was prepared by ITU-T Study Group 14 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 20th of September 1994.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

CONTENTS

Recommendation V.58

MANAGEMENT INFORMATION MODEL FOR V-SERIES DCE'S

(Geneva, 1994)

The ITU-T,

considering

(a) that V-Series Recommendations form a set of specifications for DCEs including the definition of external interfaces, basic and special functions and testing facilities;

(b) that it is expected that further Recommendation will be published specifying newer DCEs, which offer enhanced management capabilities;

(c) that Recommendation M.3010 defines the principles for a Telecommunications Management Network (TMN);

(d) that Recommendation G.773 defines the protocol suites for Q-interfaces;

(e) that Recommendation M.3100 defines a Generic Network Information Model for the exchange of management information;

recommends

that the management of V-Series DCEs be carried out using the information model defined in accordance with the details contained in this Recommendation.

1 Introduction

1.1 Scope

This Recommendation provides an information model for the V-Series DCEs. It identifies the Telecommunications Management (TMN) object classes required for the management of Network Elements (NEs) defined by the Recommendations of the V-Series. These objects are relevant to information exchanged across standardized interfaces defined in Recommendation M.3010 TMN architecture. The managed object classes in this Recommendation are specialized from the generic managed object classes defined in Recommendation M.3100 Generic Network Information model.

This Recommendation does not define:

- the means by which management information may be exchanged among network elements;
- the network level management process.

The information model defined in this Recommendation is concerned with the management of network elements, the equipment by which they are implemented and the functions contained within them. More precisely, it applies to the Equipment Domain visible at the Element Manager to Element interface, and is only concerned with the information available within that domain. Information proper to the domain of a Network Level Management Process is not included within this model.

1.2 Compliance Requirements

The Recommendation does not require DCE behaviour that is inconsistent with other V-Series Recommendations, or with national regulatory requirements, and shall be interpreted accordingly.

In order to be compliant with this Recommendation an implementation must:

- support at least the vSeriesDce Managed Object,
- if a Managed Object is supported, then at least the associated mandatory package shall be supported;
- if a package is supported, then all attributes, actions and notifications within the package shall be supported. If any of these relate to functions that are not implemented within the DCE, then any attempt to use the attribute or action will result in no change to the state of the DCE.

1.3 Structure of this Recommendation

Clause 2 provides an overview of the information model in this Recommendation. Clause 3 describes the information model using the notation mechanisms in Recommendation X.722 Guidelines for the Definition of Managed Objects. The relationships between managed object classes contained in this Recommendation are defined in clause 4. Appendix I contains some background information.

2 Information Model Overview

The V-Series DCEs information model is based on the Generic Network Information model of Recommendation M.3100. The information exchanged at a management interface is modelled using design principles outlined in Recommendation X.720 Management Information Model. Resources are modelled as objects, and the management view of a resource is a managed object. Objects with similar attributes may be grouped into Object classes. An object is characterized by its object class and object instance, and may posses multiple attribute types and associated values. The terms “managed object class” and “managed object instance” apply specifically to objects that are being managed. This Recommendation specifies the properties of the resource visible for management.

An object class may be a subclass of another Class. A subclass inherits attribute types, packages and behaviour of the super class, in addition to possessing its own specific attributes and properties. The object classes specific to the V-Series DCEs are all derived from super classes in the Generic Network Information Model Recommendation M.3100.

3 Object Classes

Object classes and attribute types are defined only for the purpose of communicating network management messages between systems, and need not be related to the structure of data within those systems.

NOTES

1 Where BIT STRING is used to identify options or selections a 0 indicates non-availability or disabled, a 1 indicates availability or enabled.

2 The request and confirm arguments of an Action are named actionNameReq and actionNameConf respectively.

3 The CallProgress, DceBitrate, DceBitrateRange, DteBitrate, EventPriority and PhoneNumber types are defined in 3.9.

3.1 V-Series Call Control Managed Object

3.1.1 Managed Object Template

vSeriesCallControl MANAGED OBJECT CLASS

-- *Source ITU-T SG14 Q4*

-- *Status final draft 6 June 1994*

DERIVED FROM "Recommendation M.3100: 1992":managedElement

CHARACTERIZED BY

callControlPkg PACKAGE

ATTRIBUTES

audioMonitor GET-REPLACE,
autoAnswerEnable GET-REPLACE,
autoCallEnable GET-REPLACE,
autoCallModeSelect GET-REPLACE,
autoCallModesSupported GET,
autoRestoralEnable GET-REPLACE,
availableNumberCapacity GET,
blackListingActive GET,
callProgressState GET,
dceModeActive GET,
dceModeSelect GET-REPLACE,
dceModesSupported GET,
defaultCallAttemptsTimer GET-REPLACE,
dialBackupEnable GET-REPLACE,

directCallNumber **GET-REPLACE,**
displayCallProgressMessages **GET-REPLACE,**
pauseDuringDialTime **GET-REPLACE,**
ringsBeforeAnswer **GET-REPLACE,**
telephoneNumbers **GET-REPLACE,**
v25bisMode **GET-REPLACE;**
ACTIONS
dialConnect,
dialDisconnect,
NOTIFICATIONS
callProgressEvents,
revertedToLeasedLine,
switchedToDialBackup;

REGISTERED AS
{ccitt(0), recommendation(0), v(22), v58(58), vSeriesCallControl(0)};

3.1.2 Attributes

audioMonitor ::= SEQUENCE {
monitorEnable
ENUMERATED {
off (0),
alwaysOn (1),
monitorDial (2),
monitorCallSetup (3)
},
monitorVolume ENUMERATED {
low (0),
normal (1)
}
}

Description: This attribute controls the operation of the audio monitor (typically a loudspeaker) which provides audible indication of modem dialling operations.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesCallControl audioMonitor (0)}

autoAnswerEnable ::= BOOLEAN
Description: This attribute is used to enable or disable auto answer or dial backup answer mode.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesCallControl autoAnswerEnable (1)}

autoCallEnable ::= BOOLEAN
Description: This attribute is used to enable or disable autocall or dial backup call mode.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesCallControl autoCallEnable (2)}

autoCallModeSelect ::= ENUMERATED {
none (0),
v-25 (1),
v-25bis (2),
v-at (3),
cct108-1 (4)
}

Description: Indicates which automatic call mode is selected in the DCE.
Operations: GET-REPLACE
Behaviour: Must be one of autoCallModesSupported
Applications: Configuration Management
Registered as: {vSeriesCallControl autoCallModeSelect (3)}

autoCallModesSupported ::= BIT STRING {

none	**(0),**
v-25	**(1),**
v-25bis	**(2),**
v-at	**(3),**
cct108-1	**(4)**
}	

Description: Indicates which automatic call modes are implemented in the DCE.

Operations: GET

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesCallControl autoCallModesSupported (4)}

autoRestoralEnable ::= BOOLEAN

Description: This attribute is used to enable or disable automatic restoral to leased line.

Operations: GET-REPLACE

Behaviour: See dceModeActive

Applications: Fault Management

Registered as: {vSeriesCallControl autoRestoralEnable (5)}

availableNumberCapacity ::= INTEGER (0..255)

Description: Number of storage locations for maximum length telephone numbers remaining.

Operations: GET

Behaviour: Limits range of directCallNumber

Applications: Configuration Management

Registered as: {vSeriesCallControl availableNumberCapacity (6)}

blackListingActive ::= BOOLEAN

Description: Indicates whether or not blacklisting is active in the DCE.

Operations: GET

Behaviour: Specification not required

Applications: Fault Management

Registered as: {vSeriesCallControl blackListingActive (7)}

callProgressState ::= CallProgress

Description: Indicates the state in the calling process the DCE is in.

Operations: GET

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesCallControl callProgressState (8)}

dceModeActive ::= ENUMERATED {

leasedPointToPoint	**(0),**	
leasedMultipointControl	**(1),**	
leasedMultipointTributary	**(2),**	
dialAutocall	**(3),**	
dialAutoanswer	**(4),**	
dialBackupCall		**(5),**
dialBackupAnsw	**(6)**	
}		

Description: If DCE is capable of operating in leased line or GSTN mode, this parameter indicates the current mode of operation.

Operations: GET

Behaviour: See dceModeSelect

Applications: Configuration Management

Registered as: {vSeriesCallControl dceModeActive (9)}

dceModeSelect ::= BIT STRING {

leasedPointToPoint	**(0),**
leasedMultipointControl	**(1),**
leasedMultipointTributary	**(2),**
dialAutocall	**(3),**
dialAutoanswer	**(4),**
dialBackupCall	**(5),**
dialBackupAnsw	**(6)**
}	

Description: If DCE is capable of operating in leased line or GSTN mode, this parameter specifies the selected mode(s) of operation.
Operations: GET-REPLACE
Behaviour: More than one mode can be selected, if dialBackupEnable or autoRestoralEnable is TRUE.
Applications: Configuration Management
Registered as: {vSeriesCallControl dceModeSelect (10)}

dceModesSupported ::= BIT STRING {

leasedPointToPoint	**(0),**
leasedMultipointControl	**(1),**
leasedMultipointTributary	**(2),**
dialAutocall	**(3),**
dialAutoanswer	**(4),**
dialBackupCall	**(5),**
dialBackupAnsw	**(6)**
}	

Description: Indicates the modes the DCE can support.
Operations: GET
Behaviour: See dceModeSelect
Applications: Configuration Management
Registered as: {vSeriesCallControl dceModesSupported (11)}

defaultCallAttemptsTimer ::= INTEGER (0..255)
Description: This attribute defines the time in 10 second increments between call attempts.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Fault Management
Registered as: {vSeriesCallControl defaultCallAttemptsTimer (12)}

dialBackupEnable ::= BOOLEAN
Description: Enables the DCE to dial backup.
Operations: GET-REPLACE
Behaviour: See dceModeSelect
Applications: Fault Management
Registered as: {vSeriesCallControl dialBackupEnable (13)}

directCallNumber ::= SEQUENCE OF PhoneNumber
Description: In GSTN mode this determines the default call number. In Leased Line mode this determines the dial backup number.
Operations: GET-REPLACE
Behaviour: This is a list of stored telephone numbers. In GSTN mode these will be tried in order. In Leased Line Mode when using double dial backup the numbers will be regarded as pairs, the first as the transmit direction, second as receive direction, etc. The maximum number of phone numbers remaining is given by availableNumberCapacity.
Applications: Configuration Management
Registered as: {vSeriesCallControl directCallNumber (14)}

displayCallProgressMessages ::= BOOLEAN
Description: Determines whether or not call progress messages are presented to the DTE.
Operations: GET-REPLACE
Behaviour: e.g. CFI in V.25 *bis* or "ringing" in draft Recommendation V.at (V.25 *ter*)
Applications: Configuration Management
Registered as: {vSeriesCallControl displayCallProgressMessages (15)}

pauseDuringDialTime ::= INTEGER (1..8)

Description: Sets the amount of time, in seconds the DCE pauses upon encountering the "pause during dialling" character (e.g. comma).
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesCallControl pauseDuringDialTime (16)}

ringsBeforeAnswer ::= INTEGER (0..15)

Description: Determines the number of rings the DCE must wait before answering a call.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesCallControl ringsBeforeAnswer (17)}

telephoneNumbers ::= SEQUENCE OF

```
SEQUENCE {
    numberRef       INTEGER (0..255),
    number          PhoneNumber,
    blacklisted     BOOLEAN
    }
```

Description: Presents the list of phone numbers stored in the DCE.
Operations: GET-REPLACE
Behaviour: Replacing the blacklisted parameter may not be allowed
Applications: Configuration Management
Registered as: {vSeriesCallControl telephoneNumbers (18)}

v25bisMode ::= ENUMERATED {

```
    startStop       (0),
    hdlc            (1),
    syncCharacter   (2)
    }
```

Description: Indicates the V.25 *bis* mode used at the DTE and DCE interface.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesCallControl v25bisMode (19)}

3.1.3 Actions

Name: **dialConnect**

dialConnectReq ::= CHOICE {

```
    useProgrammedNumber     [0]     BOOLEAN,
    useNumberRef            [1]     INTEGER (0..255),
    number                  [2]     PhoneNumber,
    doubleDialNumbers       [3]
                    SEQUENCE {
                    number1         PhoneNumber,
                    number2         PhoneNumber
                    }
    }
```

dialConnectConf ::= CallProgress

Description: This action instructs the DCE to establish a dial up connection.
Operations: Multiple Response Action
Behaviour: If the DCE is in dial up mode this action instructs it to establish a connection, i.e. to autocall.
If the DCE is in leased line mode this action instructs it to establish a dial backup connection. If useProgrammedNumber is present, then the DCE shall dial the programmed number.
If the DCE is already connected this action instructs it to disconnect and redial.
Applications: Configuration and Fault Management
Registered as: {vSeriesCallControl dialConnect (20)}

Name: **dialDisconnect**

dialDisconnectReq ::= NULL

dialDisconnectConf ::= CallProgress

Description: This action is used to disconnect the DCE when in dial up or dial backup mode.

Operations: ACTION

Behaviour: If the DCE is in dial up mode, this action disconnects any calls in progress and returns the DCE to the enabled unlocked state.

If the DCE is in dial backup, i.e. leased line mode, this action disconnects the DCE and attempts to re-establish communications over the leased line.

Applications: Configuration and Fault Management

Registered as: {vSeriesCallControl dialDisconnect (21)}

3.1.4 Notifications

```
callProgressEvents ::= SEQUENCE {
                                    priority EventPriority,
                                    callEvent       ENUMERATED {
                                                        ringing         (0),
                                                        busy            (1),
                                                        numberUnavail   (2),
                                                        noDialTone      (3),
                                                        connected       (4)
                                                        }
                                    }
```

Description: Indicates state transitions during calling.

Operations: NOTIFICATION

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesCallControl callProgressEvents (22)}

revertedToLeasedLine ::= EventPriority

Description: Indicates that the DCE has reverted to leased line from dial backup.

Operations: NOTIFICATION

Behaviour: Specification not required

Applications: Fault Management

Registered as: {vSeriesCallControl revertedToLeasedLine (23)}

switchedToDialBackup ::= EventPriority

Description: Indicates that the DCE has switched to dial back up from leased line.

Operations: NOTIFICATION

Behaviour: Specification not required

Applications: Fault Management

Registered as: {vSeriesCallControl switchedToDialBackup (24)}

3.2 V-Series Data Compression Managed Object

3.2.1 Managed Object Template

```
vSeriesDataCompression MANAGED OBJECT CLASS
-- Source ITU T SG14 Q4
-- Status final draft 6 June 1994

DERIVED FROM "Recommendation M.3100: 1992":managedElement

CHARACTERIZED BY
        dataCompressionPkg      PACKAGE
        ATTRIBUTES
        compressionActive               GET,
        compressionEfficiency           GET,
        compressionSelect               GET-REPLACE,
        compressionSupported            GET;
```

CONDITIONAL PACKAGES

v42bisPkg PACKAGE
ATTRIBUTES
v42bisCompressionActive GET,
v42bisCompressionSelect GET-REPLACE,
v42bisDictionarySizeActive GET,
v42bisDictionarySizeSelect GET-REPLACE,
v42bisDictionarySizeSupported GET,
v42bisMaximumStringLengthActive GET,
v42bisMaximumStringLengthSelect GET-REPLACE,
v42bisMaximumStringLengthSupported GET;
NOTIFICATIONS
lossOfSynchronization;
PRESENT IF "compressionEnable is v42bisonly";

REGISTERED AS

{ccitt(0), recommendation(0), v(22), v58(58), vSeriesDataCompression(1)};

3.2.2 Attributes

compressionActive ::= ENUMERATED {

none (0),
v42bisActive (1),
reserved (2),
vendorSpecificActive (3)
}

Description: Provides the current state of the data compression function.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesDataCompression compressionActive (0)}

compressionEfficiency ::= INTEGER (0..65535)

Description: Number of bytes transferred into the encoder divided by the number of bytes transferred out of the encoder for either the current or last call expressed as a percentage.
Operations: GET
Behaviour: Value is reset at call establishment.
Applications: Performance Management
Registered as: {vSeriesDataCompression compressionEfficiency (1)}

compressionSelect ::= ENUMERATED {

disabled (0),
v42bisonly (1),
reserved (2),
vendorSpecific (3)
}

Description: Enables or disables the data compression function.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesDataCompression compressionSelect (2)}

compressionSupported ::= BIT STRING {

none (0),
v42bis (1),
reserved (2),
vendorSpecific (3)
}

Description: Indicates the data compression alternatives that are supported by the DCE.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesDataCompression compressionSupported (3)}

v42bisCompressionActive ::= ENUMERATED {

none	**(0),**
txOnly	**(1),**
rxOnly	**(2),**
both	**(3)**
}	

Description: Contains the value of the V.42 *bis* data compression request parameter (P0) established for the current or last call.
Operations: GET
Behaviour: If Recommendation V.42 *bis* is not enabled for the current or past call, then the value will be set to None.
Applications: Configuration Management
Registered as: {vSeriesDataCompression v42bisCompressionActive (4)}

v42bisCompressionSelect ::= ENUMERATED {

none	**(0),**
txOnly	**(1),**
rxOnly	**(2),**
both	**(3)**
}	

Description: V.42 *bis* compression mode to be established at the next call.
Operations: GET-REPLACE
Behaviour: Sets the value of the V.42 *bis* data compression request parameter (P0) to be used for subsequent calls.
Applications: Configuration Management
Registered as: {vSeriesDataCompression v42bisCompressionSelect (5)}

v42bisDictionarySizeActive ::= INTEGER (512..65535)
Description: Number of dictionary code words established for the current or previous call.
Operations: GET
Behaviour: Value which has been set by V.42 *bis* parameter (P1).
Applications: Configuration Management
Registered as: {vSeriesDataCompression v42bisDictionarySizeActive (6)}

v42bisDictionarySizeSelect ::= INTEGER (512..65535)
Description: Number of Dictionary code words.
Operations: GET-REPLACE
Behaviour: Sets the value of the V.42 *bis* number of dictionary code words parameter (P1) to be used for subsequent calls.
Applications: Configuration Management
Registered as: {vSeriesDataCompression v42bisDictionarySizeSelect (7)}

v42bisDictionarySizeSupported ::= INTEGER (512..65535)
Description: Number of Dictionary code words.
Operations: GET
Behaviour: Indicates the value of the V.42 *bis* number of dictionary code words parameter (P1) supported by the DCE.
Applications: Configuration Management
Registered as: {vSeriesDataCompression v42bisDictionarySizeSupported (8)}

v42bisMaximumStringLengthActive ::= INTEGER (6..250)
Description: String length in characters established for the current or previous call.
Operations: GET
Behaviour: Value which has been set by the V.42 *bis* parameter (P2).
Applications: Configuration Management
Registered as: {vSeriesDataCompression v42bisMaximumStringLengthActive (9)}

v42bisMaximumStringLengthSelect ::= INTEGER (6..250)
Description: Preferred maximum string length in characters.
Operations: GET-REPLACE
Behaviour: Sets the value of the V.42 *bis* maximum string length parameter (P2) to be used for subsequent calls.
Applications: Configuration Management
Registered as: {vSeriesDataCompression v42bisMaximumStringLengthSelect (10)}

v42bisMaximumStringLengthSupported ::= INTEGER (6..250)

Description: Maximum string length in characters supported by the DCE.
Operations: GET-REPLACE
Behaviour: See v42bisMaximumStringLengthSelect.
Applications: Configuration Management
Registered as: {vSeriesDataCompression v42bisMaximumStringLengthSupported (11)}

3.2.3 Actions

None.

3.2.4 Notifications

lossOfSynchronization ::= EventPriority

Description: This notification indicates that an error (for example a procedural error) or a loss of synchronization has been detected by the data compression function.
Operations: NOTIFICATION
Behaviour: In most cases the call will be disconnected.
Applications: Fault Management
Registered as: {vSeriesDataCompression lossOfSynchronization (12)}

3.3 V-Series DCE Managed Object

3.3.1 Managed Object Template

vSeriesDce MANAGED OBJECT CLASS
-- Source ITU T SG14 Q4
-- Status final draft 6 June 1994

DERIVED FROM "Recommendation M.3100: 1992":equipment;

CHARACTERIZED BY
vSeriesDcePkg PACKAGE
ATTRIBUTES
equipmentType GET,
eventThreshold GET-REPLACE,
manufacturerID GET;
ACTIONS
selfTest;
NOTIFICATIONS
equipmentFailure,
powerOn,
powerOnFailure,
resetNotification;

CONDITIONAL PACKAGES
internationalPkg PACKAGE
ATTRIBUTES
countryOfInstallationSelect GET-REPLACE,
countryOfInstallationSupported GET;
PRESENT IF "multi-country product"

downloadableConfigPkg PACKAGE
ATTRIBUTES
disconnectConfiguration GET-REPLACE,
powerOnConfiguration GET-REPLACE,
presetConfigurationRange GET,
userConfigurationRange GET;
ACTIONS
invokeConfiguration,
loadConfiguration,
storeConfiguration,
viewConfiguration;
PRESENT IF "DCE supports downloadable configurations"

backupDcePkg PACKAGE
ATTRIBUTES
backedUpStatus GET,
backUpObjectInstance GET-REPLACE,
PRESENT IF "the DCE has a backup relationship with another DCE",

frontPanelLockoutPkg PACKAGE
ATTRIBUTES
frontPanelAccessEnable GET-REPLACE;
PRESENT IF "the DCE has a front panel which can be disabled";

REGISTERED AS
{ccitt(0), recommendation(0), v(22), v58(58), vSeriesDce(2)};

3.3.2 Attributes

backedUpStatus ::= BOOLEAN

Description: This attribute indicates if the V-Series DCE has been backed up after failure.

Operations: GET

Behaviour: Set to TRUE if DCE has failed and been backed up by a standby unit. Set to FALSE in all other cases.

Applications: Fault Management

Registered as: {vSeriesDce backedUpStatus (0)}

backUpObjectInstance ::= OBJECT IDENTIFIER

Description: This attribute identifies a managed object which has a backup relationship with the V-Series DCE, for example a standby unit.

Operations: GET-REPLACE

Behaviour: To be defined

Applications: Configuration and Fault Management

Registered as: {vSeriesDce backUpObjectInstance (1)}

countryOfInstallationSelect ::= IA5 String

Description: Specifies the country in which the DCE is installed to control behaviours within national limits.

Operations: GET-REPLACE

Behaviour: Specifies the country of installation as an IA5 value (see countryOfInstallationSupported for format), according to the values specified in ITU-T Recommendation T.35. If set to null, indicates that the country of installation is unknown or irrelevant.

Applications: Configuration Management

Registered as: {vSeriesDce countryOfInstallationSelect (2)}

countryOfInstallationSupported ::= IA5 String

Description: Allows the Network Management System to determine the country codes which may be written to the countryOfInstallationSelect attribute.

Operations: GET

Behaviour: Lists the T.35 country codes that may be selected as values of the countryOfInstallationSelect for the DCE. Each value is represented in the form of an IA5 representation of the T.35 hexadecimal codes followed by a comma (for example "3A, 49, D2,").

Applications: Configuration Management

Registered as: {vSeriesDce countryOfInstallationSupported (3)}

disconnectConfiguration ::= SEQUENCE {
configurationType ENUMERATED {
none (0),
user (1),
preset (2)
},
configurationRef INTEGER (1..255)
}

Description: Specifies which of the stored configurations, if any, will be copied into the active configuration when a call is disconnected.

Operations: GET-REPLACE

Behaviour: The indicated reference must be within the relevant range supported or an error results. configurationRef should always be set to 1 if the "none" is specified (which means that the active configuration is unchanged upon disconnection).

Applications: Configuration Management

Registered as: {vSeriesDce disconnectConfiguration (4)}

equipmentType ::= SEQUENCE {

vSeriesDceTypes	**BIT STRING {**	
	dialModem	**(0),**
	leasedLineModem	**(1),**
	},	
lineInterface	**ENUMERATED {**	
	analogue	**(0),**
	digital	**(1)**
	},	
dceImplementation	**ENUMERATED {**	
	rackMount	**(0),**
	standAlone	**(1),**
	internal	**(2),**
	builtIn	**(3)**
	},	
identification	**OBJECT IDENTIFIER**	
	}	

Description: Specific type of V-Series DCE, for example "multiport modem".
Operations: GET
Behaviour: Specification not required
Applications: Configuration and Fault Management
Registered as: {vSeriesDce equipmentType (5)}

eventThreshold ::= EventPriority

Description: This attribute sets the priority below which events will not be reported.
Operations: GET-REPLACE
Behaviour: Controls which events are reported from this and all subordinate managed objects.
Applications: Fault and Performance Management
Registered as: {vSeriesDce eventThreshold (6)}

frontPanelAccessEnable ::= BOOLEAN

Description: This attribute controls access to the DCE via front panel controls.
Operations: GET-REPLACE
Behaviour: To be defined
Applications: Configuration and Security Management
Registered as: {vSeriesDce frontPanelAccessEnable (7)}

manufacturerID ::= SEQUENCE {

manufacturerOI	**OBJECT IDENTIFIER,**
productDetails	**IA5String**
}	

Description: The Manufacturer ID provides a unique reference to the manufacturer of the DCE. The productDetails component may typically be structured into fields for Manufacturer name, product name or ID, software/hardware issue number, product serial number.
Operations: GET
Behaviour: Specification not required
Applications: Manufacturer specific option support
Registered as: {vSeriesDce manufacturerID (8)}

powerOnConfiguration ::= SEQUENCE {

configurationType	**ENUMERATED {**	
	user	**(0),**
	preset	**(1)**
	},	
configurationRef	**INTEGER (1..255)**	
}		

Description: Specifies which of the stored configurations will be copied into the active configuration when the DCE is powered on or reset.
Operations: GET-REPLACE
Behaviour: The indicated reference must be within the relevant range supported (userConfigurationRange or presetConfigurationRange).
Applications: Configuration Management
Registered as: {vSeriesDce powerOnConfiguration (9)}

presetConfigurationRange ::= INTEGER (0..255)

Description: Allows the Network Management System to determine the number of factory preset configuration profiles supported by the DCE.

Operations: GET

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesDce presetConfigurationRange (10)}

userConfigurationRange ::= INTEGER (0..255)

Description: This attribute is used to indicate the number of stored configurations within the DCE. Typically these configurations would affect a number of attributes, including choice of modulation, DTE transfer speed, character format, use of error correction, etc.

Operations: GET

Behaviour: Limits range of invoke, load, store and view Configuration actions.

Applications: Configuration Management

Registered as: {vSeriesDce userConfigurationRange (11)}

3.3.3 Actions

Name: **invokeConfiguration**

```
invokeConfigurationReq ::= SEQUENCE {
                              configurationType   ENUMERATED {
                                                      user      (0),
                                                      preset    (1)
                                                      },
                              configurationRef    INTEGER (1..255)
                              }
```

invokeConfigurationConf ::= NULL

Description: This action is used to invoke one of a number of configurations stored within the DCE.

Operations: ACTION

Behaviour: This action can result in the modification of one or more attributes within the DCE, both in this managed object and its subordinates. Default values of attributes are invoked as configuration 0.

Applications: Configuration Management

Registered as: {vSeriesDce invokeConfiguration (12)}

Name: **loadConfiguration**

```
loadConfigurationReq ::= SEQUENCE {
                              configurationType   ENUMERATED {
                                                      user      (0),
                                                      active    (1)
                                                      },
                              configurationRef    INTEGER (1..255),
                              attributes      SEQUENCE OF
                                                  SEQUENCE {
                                              attributeName  OBJECT IDENTIFIER,
                                              attributeValue  ANY
                                                  }
                              }

loadConfigurationConf ::= CHOICE {
                              noError             [0]     NULL,
                              firstError          [1]     SEQUENCE {
                                                  attributeName     OBJECT IDENTIFIER,
                                                  attributeValue    ANY
                                                      }
                              }
```

Description: Causes the DCE to update the specified profile to include the values specified for all of the attributes included in the request argument.

Operations: ACTION

Behaviour: 1 should be used for the Active configuration. All of the attributes are validated before being stored, so that if any are in error the profile remains unchanged. Any attributes that exist in the profile that are not included in the request retain their previous values.

If unsuccessful, the selected profile remains unchanged. The negative confirmation will contain the attribute and value of the first invalid entry.

Applications: Configuration Management

Registered as: {vSeriesDce loadConfiguration (13)}

Name: **selfTest**

```
selfTestReq ::= ENUMERATED {
                        intrusiveFullTest   (0),
                        safePartialTest     (1)
                        }

selfTestConf ::= SEQUENCE {
                        testImplemented     BOOLEAN,
                        pass                BOOLEAN,
                        resultCode          INTEGER
                        }
```

Description: This Action invokes a self test of the DCE. The nature of this test is not specified, however shall include checks on the operation of hardware components and memory. It is assumed that the test duration is short (typically no longer than 5 seconds) and that a single response on completion of the test is adequate. More specific tests are defined in the Test Function managed object. A full test of DCE functions is assumed to be intrusive, i.e. would interfere with normal operation; a partial test is assumed to be non-intrusive but only able to provide a "health" check.

Operations: ACTION

Behaviour: The Intrusive Full Test terminates calls in progress and disables the DCE.

The Safe Partial Test provides a limited test of the DCE and does not terminate calls in progress.

Applications: Fault Management

Registered as: {vSeriesDce selfTest (14)}

Name: **storeConfiguration**

```
storeConfigurationReq ::= INTEGER (0..255)

storeConfigurationConf ::= NULL
```

Description: This action is used to store the current user configuration within the DCE.

Operations: ACTION

Behaviour: This action can result in the modification of one or more attributes within the DCE, both in this managed object and its subordinates. Default values of attributes are invoked as configuration 0. A request argument value outside UserConfigurationRange shall be regarded as invalid.

Applications: Configuration Management

Registered as: {vSeriesDce storeConfiguration (15)}

Name: **viewConfiguration**

```
viewConfigurationReq ::= SEQUENCE {
                        configurationType   ENUMERATED {
                                                user    (0),
                                                preset  (1),
                                                active  (2)
                                                },
                        configurationRef    INTEGER (1..255)
                        }

viewConfigurationConf ::= SEQUENCE OF
                                SEQUENCE {
                                        attributeName   OBJECT IDENTIFIER,
                                        attributeValue  ANY
                                        }
```

Description: Causes the DCE to send the current values of all of the attributes in the specified configuration profile.

Operations: ACTION

Behaviour: configurationRef = 1 should be used for the active configuration.

Applications: Configuration Management

Registered as: {vSeriesDce viewConfiguration (16)}

3.3.4 Notifications

equipmentFailure ::= SEQUENCE {

priority EventPriority,
faultType ENUMERATED {
memoryFault (0),
deviceFault (1)
}
}

Description: This Event is used to indicate to the management entity that the DCE has detected an equipment fault condition.

Operations: NOTIFICATION

Behaviour: Behaviour of the DCE after this notification is not defined.

Applications: Fault Management

Registered as: {vSeriesDce equipmentFailure (17)}

powerOn ::= EventPriority

Description: This Event is used to indicate to the management entity that the DCE is entering service.

Operations: NOTIFICATION

Behaviour: Requires that DCE has powered on and passed internal self test.

Applications: Configuration Management

Registered as: {vSeriesDce powerOn (18)}

powerOnFailure ::= SEQUENCE {

priority EventPriority,
problemType IA5String
}

Description: This Event is used to indicate to the management entity that the DCE has powered on but is unable to enter service.

Operations: NOTIFICATION

Behaviour: Behaviour of the DCE after this notification is not defined.

Applications: Fault Management

Registered as: {vSeriesDce powerOnFailure (19)}

resetNotification ::= SEQUENCE {

priority Eventpriority,
resetType ENUMERATED {
userInitiated (0),
autonomous (1)
}
}

Description: This Event is used to indicate to the management entity that the DCE has performed a reset.

Operations: NOTIFICATION

Behaviour: Specification not required

Applications: Fault Management

Registered as: {vSeriesDce resetNotification (20)}

3.4 V-Series DTE Interface Managed Object

3.4.1 Managed Object Template

vSeriesDteInterface MANAGED OBJECT CLASS

-- Source ITU T SG14 Q4

-- Status final draft 6 June 1994

DERIVED FROM "Recommendation M.3100: 1992":managedElement

CHARACTERIZED BY

dteInterfacePkg PACKAGE
ATTRIBUTES
antiStreamingTimer GET-REPLACE,
bufferedDataDeliveryTimeoutSelect GET-REPLACE,
bufferedDataDeliveryTimeoutSupported GET,
cct105Mode GET-REPLACE,
cct105to106Delay GET-REPLACE,
cct106Mode GET-REPLACE,
cct107Mode GET-REPLACE,
cct108Mode GET-REPLACE,
cct109Mode GET-REPLACE,
cct109TurnOffDelay GET-REPLACE,
cct109TurnOnDelay GET-REPLACE,
cct116Mode GET-REPLACE,
dteAttached GET,
dteInterfaceStatus, GET,
dteModeActive GET-REPLACE,
dteModesSupported GET,
inactivityTimerSelect GET-REPLACE
inactivityTimerSupported GET,
v13ModeSelect GET-REPLACE,
NOTIFICATIONS
streamingDetected;

CONDITIONAL PACKAGES

startStopAttributes PACKAGE
ATTRIBUTES
autoDetectCharacterFormat GET
cct133ToXonXoffTranslation GET-REPLACE,
characterFormatSelect GET-REPLACE,
characterFormatSupported GET,
echoControlMessages GET-REPLACE,
echoUserData GET-REPLACE,
flowControlSelect GET-REPLACE,
flowControlSupported GET,
longSpaceDisconnectSelect GET-REPLACE,
longSpaceDisconnectSupported GET,
parityBits GET-REPLACE,
responseModeSelect GET-REPLACE,
responseModeSupported GET,
startStopDteInterfaceSpeed GET-REPLACE,
startStopDteInterfaceSpeedAdaptation GET-REPLACE,
v14SignallingRate GET-REPLACE;
PRESENT IF "dteModesSupported includes startStopV14 or startStopErrorControl or startStopBuffered or v25bisMode is startStop";

REGISTERED AS

{ccitt(0), recommendation(0), v(22), v58(58), vSeriesDteInterface(3)};

3.4.2 Attributes

antiStreamingTimer ::= INTEGER (0..255)

Description: Maximum continuous duration in seconds that a multipoint DCE is allowed to transmit.

Operations: GET-REPLACE

Behaviour: The timer is initiated at the OFF/ON transition of circuit 105. If circuit 105 remains on for more than the duration of the timer, then the DCE's line signal will be turned off. When circuit 105 is turned off normal operation resumes – i.e. line signal follows an OFF/ON transition of circuit 105. A value of 0 indicates that the timer is inhibited. When the timer expires, a streamingDetected notification is transmitted.

Applications: Fault Management

Registered as: {vSeriesDteInterface antiStreamingTimer (0)}

autoDetectCharacterFormat ::= SEQUENCE {

```
                    selectFormat        ENUMERATED {
                                            adf8Data2Stop           (1),
                                            adf8Data1Parity1Stop    (2),
                                            adf8Data1Stop           (3),
                                            adf7Data2Stop           (4),
                                            adf7Data1Parity1Stop    (5),
                                            adf7Data1Stop           (6),
                                            adf6Data2Stop           (7),
                                            adf6Data1Parity1Stop    (8),
                                            adf6Data1Stop           (9),
                                            adf5Data2Stop           (10),
                                            adf5Data1Parity1Stop    (11)
                                            },
                    parityBitValue      ENUMERATED {
                                            odd     (0),
                                            even    (1),
                                            mark    (2),
                                            space   (3)
                }
```

Description: Active start stop character format.

Operations: GET

Behaviour: Only valid if selectAutoDetect is TRUE.

Applications: Configuration Management

Registered as: {vSeriesDteInterface autoDetectCharacterFormat (1)}

bufferedDataDeliveryTimeoutSelect ::= INTEGER (0..255)

Description: Specifies the time-out in seconds for delivery of buffered data.

Operations: GET-REPLACE

Behaviour: Applies to buffered start/stop and error control operation. Specifies the maximum amount of time, in seconds, the DCE will wait to deliver buffered received data to the DTE when carrier is lost or a link disconnect is received; circuit 109 is held high until all data is delivered. Also controls the amount of time the DCE will continue sending (and receiving acknowledgement in error control mode) data after a DTE-initiated request for disconnection [e.g. on-to-off transition of circuit 108 or ATH command in draft Recommendation V.at (V.25 *ter*)]. When the timer expires (or if the timer is set to 0), all buffered data is discarded. If the value is set to 255, the DCE will wait indefinitely and not disconnect until all data is delivered.

Applications: Configuration Management

Registered as: {vSeriesDteInterface bufferedDataDeliveryTimeoutSelect (2)}

bufferedDataDeliveryTimeoutSupported ::= INTEGER (0..255)

Description: Allows Network Management System to determine to supported range of values for time-out in seconds of buffered data delivery.

Operations: GET

Behaviour: Specifies the maximum value which can be specified for bufferedDataDeliveryTimeoutSelect.

Applications: Configuration Management

Registered as: {vSeriesDteInterface bufferedDataDeliveryTimeoutSupported (3)}

cct105Mode ::= ENUMERATED {

```
                    normal      (0),
                    on          (1),
                    off         (2)
                    }
```

Description: Sets the operating mode for circuit 105.

Operations: GET-REPLACE

Behaviour: “on” and “off” indicate that the DCE will act as if circuit 105 is permanently ON or OFF, respectively.

Applications: Configuration Management

Registered as: {vSeriesDteInterface cct105Mode (4)}

cct105to106Delay ::= INTEGER (0..1023)

Description: Additional circuit 105 to circuit 106 delay in milliseconds for switched carrier operation, and total circuit 105 to circuit 106 delay for continuous carrier operation.

Operations: GET-REPLACE

Behaviour: If circuit 105 mode is switched carrier, then this delay is in addition to the normal training delay. If circuit 105 mode is continuous carrier, then this is the only circuit 105 to circuit 106 delay. This attribute is only valid if circuit106Mode is normal.

Applications: Configuration Management

Registered as: {vSeriesDteInterface cct105to106Delay (5)}

cct106Mode ::= ENUMERATED {

normal	**(0),**
on	**(1),**
off	**(2)**
}	

Description Provides the capability to explicitly set the state of circuit 106.

Operations: GET-REPLACE

Behaviour: In normal mode circuit 106 is not explicitly forced ON or OFF. In the case of a V.34 secondary channel that shares the same physical interface as the primary channel, this attribute may also be used to control the operation of circuit 121.

Applications: Configuration Management

Registered as: {vSeriesDteInterface cct106Mode (6)}

cct107Mode ::= ENUMERATED {

normal	**(0),**
followsCct108	**(1),**
on	**(2),**
off	**(3)**
}	

Description: Provides the capability to modify circuit 107 operation.

Operations: GET-REPLACE

Behaviour: Normal operation is per V.24 and all other relevant V-Series Recommendations.

Applications: Configuration Management

Registered as: {vSeriesDteInterface cct107Mode (7)}

cct108Mode ::= ENUMERATED {

cct108-1	**(0),**
cct108-2-GotoCommandState	**(1),**
cct108-2-Hangup	**(2),**
cct108-2-Reset	**(3),**
on	**(4),**
off	**(5)**
}	

Description: Provides the capability to modify circuit 108 operation.

Operations: GET-REPLACE

Behaviour: "on" and "off" indicate that the DCE will act as if circuit 108 is permanently ON or OFF, respectively.

Applications: Configuration Management

Registered as: {vSeriesDteInterface cct108Mode (8)}

cct109Mode ::= ENUMERATED {

normal	**(0),**
on	**(1),**
off	**(2)**
}	

Description: Modifies circuit 109 operation.

Operations: GET-REPLACE

Behaviour: In normal mode circuit 109 is not explicitly forced ON or OFF. In the case of a V.34 secondary channel that shares the same physical interface as the primary channel, this attribute may also be used to control the operation of circuit 122.

Applications: Configuration Management

Registered as: {vSeriesDteInterface cct109Mode (9)}

cct109TurnOffDelay ::= INTEGER (0..255)

Description: Provides the capability to modify the circuit 109 turn off delay in increments of 10 milliseconds.

Operations: GET-REPLACE

Behaviour: Delays the turn off of circuit 109 with regard to the loss of line signal. In the case of a V.34 secondary channel that shares the same physical interface as the primary channel, this attribute may also be used to control the turn off delay of circuit 122.

Applications: Configuration Management

Registered as: {vSeriesDteInterface cct109TurnOffDelay (10)}

cct109TurnOnDelay ::= INTEGER (0..255)

Description: Provides the capability to modify the circuit 109 turn on delay in increments of 10 milliseconds.

Operations: GET-REPLACE

Behaviour: Delays the turn on of circuit 109 with regard to the detection of line signal. In the case of a V.34 secondary channel that shares the same physical interface as the primary channel, this attribute may also be used to control the turn on delay of circuit 122.

Applications: Configuration Management

Registered as: {vSeriesDteInterface cct109TurnOnDelay (11)}

cct116Mode ::= ENUMERATED {

off (0),
cct116-1Operation (1),
cct116-2Operation (2)
}

Description: Modifies circuit 116 operation.

Operations: GET-REPLACE

Behaviour: "Off" indicates that the DCE will act as if circuit 116 is permanently OFF.

Applications: Configuration Management

Registered as: {vSeriesDteInterface cct116Mode (12)}

cct133ToXonXoffTranslation ::= BOOLEAN

Description: Enables the translation of circuit 133 transitions to Xon/Xoff characters.

Operations: GET-REPLACE

Behaviour: This attribute is only applicable when circuit 133 is being used as the flow control mechanism. Upon an on to off transition of circuit 133, the DCE transmits an Xoff character to the remote DCE. Upon an off to on transition of circuit 133, the DCE transmits an Xon character to the remote DCE.

Applications: Configuration Management

Registered as: {vSeriesDteInterface cct133ToXonXoffTranslation (13)}

characterFormatSelect ::= SEQUENCE {

selectAutoDetect BOOLEAN,
selectFormat ENUMERATED {
none (0),
cf8Data2Stop (1),
cf8Data1Parity1Stop (2),
cf8Data1Stop (3),
cf7Data2Stop (4),
cf7Data1Parity1Stop (5),
cf7Data1Stop (6),
cf6Data2Stop (7),
cf6Data1Parity1Stop (8),
cf6Data1Stop (9),
cf5Data2Stop (10),
cf5Data1Parity1Stop (11)
}
}

Description: Selects start/stop character format.

Operations: GET-REPLACE

Behaviour: selectAutoDetect shall only be set to TRUE if characterFormatSupported Includes "automatic". selectFormat shall be set to "none" if selectAutodetect is TRUE.

Applications: Configuration Management

Registered as: {vSeriesDteInterface characterFormatSelect (14)}

characterFormatSupported ::= BIT STRING {

automatic	**(0),**
cf8Data2Stop	**(1),**
cf8Data1Parity1Stop	**(2),**
cf8Data1Stop	**(3),**
cf7Data2Stop	**(4),**
cf7Data1Parity1Stop	**(5),**
cf7Data1Stop	**(6),**
cf6Data2Stop	**(7),**
cf6Data1Parity1Stop	**(8),**
cf6Data1Stop	**(9),**
cf5Data2Stop	**(10),**
cf5Data1Parity1Stop	**(11)**
}	

Description: DCE Implemented start/stop character formats.

Operations: GET

Behaviour: Supported range may depend on the value of dteModeActive.

Applications: Configuration Management

Registered as: {vSeriesDteInterface characterFormatSupported (15)}

dteAttached ::= ENUMERATED {

dteOff	**(0),**
dteOn	**(1),**
unknown	**(2)**
}	

Description: The DTE is attached and powered on.

Operations: GET

Behaviour: The method that the DCE utilizes to make this determination is not part of this Recommendation.

Applications: Configuration Management

Registered as: {vSeriesDteInterface dteAttached (16)}

dteInterfaceStatus ::= SEQUENCE {

cctTransition	**BIT STRING {**	
	cct103	**(0),**
	cct104	**(1),**
	cct111	**(2),**
	cct113	**(3),**
	cct114	**(4),**
	cct115	**(5),**
	cct125	**(6),**
	cct142	**(7)**
	},	
cctState	**BIT STRING {**	
	cct105-133	**(0),**
	cct106	**(1),**
	cct107	**(2),**
	cct108	**(3),**
	cct109	**(4),**
	cct116	**(5),**
	cct140	**(6),**
	cct141	**(7)**
	}	
}		

Description: Provides the status of the DTE/DCE interface circuits.

Operations: GET

Behaviour: The circuit transition bitstring entry will be a binary one if a transition has occurred on the corresponding circuit since the last GET.

Applications: Configuration Management

Registered as: {vSeriesDteInterface dteInterfaceStatus (17)}

dteModeActive ::= ENUMERATED {

startStopV14	**(0),**
startStopErrorControl	**(1),**
startStopBuffered	**(2),**
synchronous	**(3),**
syncAfterDial	**(4)**
}	

Description: Type of DTE (sync or start stop async) mode for which the DCE has been configured. For start stop operation, there are three possible operating modes.

Operations: GET-REPLACE

Behaviour: Applies only during data transfer.

Applications: Configuration Management

Registered as: {vSeriesDteInterface dteModeActive (18)}

dteModesSupported ::= BIT STRING {

startStopV14	**(0),**
startStopErrorControl	**(1),**
startStopBuffered	**(2),**
synchronous	**(3),**
syncAfterDial	**(4)**
}	

Description: DTE/DCE transmission modes (synchronous or asynchronous) which the DCE is capable of supporting. There are three possible start stop asynchronous operating modes.

Operations: GET

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesDteInterface dteModesSupported (19)}

echoControlMessages ::= BOOLEAN

Description: Enables the function in which V.25 *bis* and draft Recommendation V.at (V.25 *ter*) control messages appearing on circuit 103 are echoed by the DCE on circuit 104.

Operations: GET-REPLACE

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesDteInterface echoControlMessages (20)}

echoUserData ::= BOOLEAN

Description: Enables the function in which user data appearing on circuit 103 is echoed by the DCE on circuit 104.

Operations: GET-REPLACE

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesDteInterface echoUserData (21)}

flowControlSelect ::= SEQUENCE {

dceByDte	**ENUMERATED {**		
	none		**(0),**
	xonXoff		**(1),**
	xonXoffWithPassThrough		**(2),**
	cct133		**(3)**
	},		
dteByDce	**ENUMERATED {**		
	none	**(0),**	
	xonXoff	**(1),**	
	cct106	**(2)**	
	}		
}			

Description: Selects the flow control methodology which will be utilized by the DCE.

Operations: GET-REPLACE

Behaviour: Some DCEs support different options for DTE by DCE and DCE by DTE flow control. If asymmetric flow control is not available, as indicated by the flowControlSupported attribute, only symmetric values of the dteByDce and dceByDte attributes will be considered valid.

Only dteByDce flow control is supported for a V.34 secondary channel. In the case of a V.34 secondary channel that shares the same physical interface as the primary channel, this attribute may also be used to control the operation of circuit 121.

Applications: Configuration Management

Registered as: {vSeriesDteInterface flowControlSelect (22)}

flowControlSupported ::= SEQUENCE {

```
dceByDte                    BIT STRING {
                                none                        (0),
                                xonXoff                     (1),
                                xonXoffWithPassThrough      (2),
                                cct133                      (3)
                                },
dteByDce                    BIT STRING {
                                none                (0),
                                xonXoff             (1),
                                cct106              (2)
                                },
asymmetricFlowControlSupported      BOOLEAN
}
```

Description: The flow control methodology which the DCE is capable of providing.

Operations: GET

Behaviour: xonXoffWithPassThrough indicates that Xon/Xoff flow control characters received by the local DCE from the local DTE are transmitted to the remote DCE.

Applications: Configuration Management

Registered as: {vSeriesDteInterface flowControlSupported (23)}

inactivityTimerSelect ::= INTEGER (0..255)

Description: Sets the inactivity timeout in minutes.

Operations: GET-REPLACE

Behaviour: Applies to start/stop switched operation only. When a call is connected and no data is transferred (continuous marking condition) on both circuits 103 and 104 for the specified time, the DCE disconnects the call. The function is disabled if the value is 0.

Applications: Configuration Management

Registered as: {vSeriesDteInterface inactivityTimerSelect (24)}

inactivityTimerSupported ::= INTEGER (0..255)

Description: Allows the network management system to determine whether or not the DCE supports an inactivity timer, and the maximum value (in minutes) supported.

Operations: GET

Behaviour: Value 0 indicates that the timer is not supported.

Applications: Configuration Management

Registered as: {vSeriesDteInterface inactivityTimerSupported (25)}

longSpaceDisconnectSelect ::= ENUMERATED {

```
disabled                    (0),
disconnectWhenReceived      (1),
sendToDisconnect            (2),
both                        (3)
}
```

Description: Enables Long Space Disconnect.

Operations: GET-REPLACE

Behaviour: Effective only when the DCE is in start/stop non-error-control operation. If disconnectWhenReceived or Both are selected, and the DCE receives a continuous spacing condition in excess of 1.6 seconds, the call is disconnect. In sendToDisconnect mode, the DCE sends at least 4 seconds of long space upon determining that a disconnect is required.

Applications: Configuration Management

Registered as: {vSeriesDteInterface longSpaceDisconnectSelect (26)}

longSpaceDisconnectSupported ::= BIT STRING {

disabled	**(0),**
disconnectWhenReceived	**(1),**
sendToDisconnect	**(2)**
}	

Description: Allows the Network Management System to determine which modes of long space disconnect are supported by the DCE.

Operations: GET

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesDteInterface longSpaceDisconnectSupported (27)}

parityBits ::= ENUMERATED {

odd	**(0),**
even	**(1),**
mark	**(2),**
space	**(3)**
}	

Description: Determines the value of the parity bit.

Operations: GET-REPLACE

Behaviour: Only applies if selectFormat includes parity. Does not apply if selectAutodetect is TRUE. Refer to characterFormatSelect.

Applications: Configuration Management

Registered as: {vSeriesDteInterface parityBits (28)}

responseModeSelect ::= ENUMERATED {

disabled	**(0),**
shortResponses	**(1),**
verboseResponses	**(2)**
}	

Description: Specifies the response mode to use.

Operations: GET-REPLACE

Behaviour: When disabled, the DCE shall issue no "result codes" of any kind to the DTE either in response to unsolicited events or commands. When shortResponses are selected, the DCE issues responses in their most concise form [e.g. numeric codes in draft Recommendation V.at (V.25 *ter*)]. When verboseResponses are selected, the DCE issues responses in their long or normal form.

Applications: Configuration Management

Registered as: {vSeriesDteInterface responseModeSelect (29)}

responseModeSupported ::= BIT STRING {

disabled	**(0),**
shortResponses	**(1),**
verboseResponses	**(2)**
}	

Description: Allows the network management system to determine the V.25 *bis* and draft Recommendation V.at (V.25 *ter*) response modes supported by the DCE.

Operations: GET

Behaviour: See responseModeSelect.

Applications: Configuration Management

Registered as: {vSeriesDteInterface responseModeSupported (30)}

startStopDteInterfaceSpeed ::= SEQUENCE {

toDte	**DteBitrate,**
fromDte	**DteBitrate**
}	

Description: Sets the speed at the DTE/DCE interface for start stop operation.

Operations: GET-REPLACE

Behaviour: It is advisable to use this attribute only if startStopDte-InterfaceSpeed-Adaptation is disabled.

Applications: Configuration Management

Registered as: {vSeriesDteInterface startStopDteInterfaceSpeed (31)}

startStopDteInterfaceSpeedAdaptation ::= ENUMERATED {

disabled	**(0),**
autoDetectDteSpeed	**(1),**
sameAsLineRate	**(2)**
}	

Description: Sets the method by which DTE interface speed adaptation is accomplished.

Operations: GET-REPLACE

Behaviour: Used in conjunction with the startStop-DteInterface-Speed attribute. If dteModeActive is startStopV14, then startStop-DteInterface-SpeedAdaptation should be disabled.

Applications: Configuration Management

Registered as: {vSeriesDteInterface startStopDteInterfaceSpeedAdaptation (32)}

v13ModeSelect ::= ENUMERATED {

none	**(0),**
txOnly	**(1),**
rxOnly	**(2),**
bothTxRx	**(3)**
}	

Description: Sets the operating mode for the V.13 circuits 105/109 emulation capability.

Operations: GET-REPLACE

Behaviour: txOnly and rxOnly indicate V.13 simulated carrier switching is active only in the transmit or receive direction respectively.

Applications: Configuration Management

Registered as: {vSeriesDteInterface v13ModeSelect (33)}

v14SignallingRate ::= ENUMERATED {

basicRange	**(0),**
extendedRange	**(1)**
}	

Description: Selects between V.14 basic and extended signalling rate ranges.

Operations: GET-REPLACE

Behaviour: Applies to both transmitter and receiver.

Applications: Configuration Management

Registered as: {vSeriesDteInterface v14SignallingRate (34)}

3.4.3 Actions

None.

3.4.4 Notifications

streamingDetected ::= EventPriority

Description: Generated when the anti-streaming timer expires.

Operations: NOTIFICATION

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesDteInterface streamingDetected (34)}

3.5 V-Series Error Control Managed Object

3.5.1 Managed Object Template

vSeriesErrorControl MANAGED OBJECT CLASS

-- Source ITU T SG14 Q4

-- Status final draft 6 June 1994

DERIVED FROM "Recommendation M.3100: 1992":managedElement

CHARACTERIZED BY

errorControlPkg	**PACKAGE**	
ATTRIBUTES		
errorControlActive	**GET,**	
errorControlSelect	**GET-REPLACE,**	
linkState	**GET-REPLACE,**	
maximumFrameLengthActive	**GET,**	
maximumFrameLengthSelect	**GET-REPLACE,**	
maximumFrameLengthSupported		**GET,**
maxRetries	**GET-REPLACE,**	
testFrameOptionActive	**GET,**	
testFrameOptionSelect	**GET-REPLACE,**	
v42BreakOptions	**GET-REPLACE,**	
v42CrcActive	**GET,**	
v42CrcSelect	**GET-REPLACE,**	
v42CrcSupported	**GET,**	
v42DetectionPhaseEnable	**GET-REPLACE,**	
v42FallbackSelect	**GET-REPLACE,**	
v42FallbackSupported	**GET,**	
v42RejectOptionsActive	**GET,**	
v42RejectOptionsSelect	**GET-REPLACE,**	
v42RejectOptionsSupported	**GET,**	
v42Statistics	**GET-REPLACE WITH DEFAULT,**	
v42TimedBreakSupported	**GET,**	
v42UntimedBreakDuration	**GET,**	
windowSizeActive	**GET,**	
windowSizeSelect	**GET-REPLACE,**	
windowSizeSupported	**GET;**	

REGISTERED AS

{ccitt(0), recommendation(0), v(22), v58(58), vSeriesErrorControl(4)};

3.5.2 Attributes

errorControlActive ::= ENUMERATED {

disable	**(0),**
lapm	**(1),**
altProtocol	**(2)**
}	

Description: Indicates the error control method used during the current or previous call.

Operations: GET

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesErrorControl errorControlActive (0)}

errorControlSelect ::= ENUMERATED {

disable	**(0),**
lapm	**(1),**
forceLAPM	**(2),**
forceAltProtocol	**(3)**
}	

Description: Enables error control method that can be used during the next call.

Operations: GET-REPLACE

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesErrorControl errorControlSelect (1)}

linkState ::= ENUMERATED {

linkDisconnected	**(0),**
linkConnecting	**(1),**
linkIdle	**(2),**
linkActive	**(3),**
linkDisconnecting	**(4)**
}	

Description: Indicates the state of the link layer.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesErrorControl linkState (2)}

maximumFrameLengthActive ::= SEQUENCE {

transmitFrameAct	**INTEGER (1..65535),**
receiveFrameAct	**INTEGER (1..65535)**
}	

Description: Indicates the maximum frame length (in octets) negotiated by the DCE.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesErrorControl maximumFrameLengthActive (3)}

maximumFrameLengthSelect ::= SEQUENCE {

transmitFrameSel	**INTEGER (1..65535),**
receiveFrameSel	**INTEGER (1..65535)**
}	

Description: Indicates the maximum frame length (in octets) selected.
Operations: GET-REPLACE
Behaviour: Shall be less than or equal to maximumFrameLengthSupported.
Applications: Configuration Management
Registered as: {vSeriesErrorControl (4), maximumFrameLengthSelect (4)}

maximumFrameLengthSupported ::= SEQUENCE {

transmitFrameSup	**INTEGER (1..65535),**
receiveFrameSup	**INTEGER (1..65535)**
}	

Description: Indicates the maximum frame length (in octets) the DCE can support.
Operations: GET
Behaviour: See maximumFrameLengthSelect.
Applications: Configuration Management
Registered as: {vSeriesErrorControl maximumFrameLengthSupported (5)}

maxRetries ::= INTEGER (1..255)
Description: Determines the maximum number of retries before disconnection (N400).
Operations: GET-REPLACE
Behaviour: See also the callCleared notification; clearCause 93.
Applications: Performance Management
Registered as: {vSeriesErrorControl maxRetries (6)}

testFrameOptionActive ::= BOOLEAN
Description: Indicates whether or not the testframe option is negotiated with the remote DCE.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesErrorControl testFrameOptionActive (7)}

testFrameOptionSelect ::= BOOLEAN
Description: Enables the testframe option to be used if implemented and negotiated with the remote DCE.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesErrorControl testFrameOptionSelect (8)}

v42BreakOptions ::= ENUMERATED {

nonDesNonExp	**(0),**
nonDesExp	**(1),**
desExp	**(2),**
desNonExp	**(3),**
doNotSendBreak	**(4)**
}	

Description: Indicates which V.42 break option is to be used.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesErrorControl v42BreakOptions (9)}

v42CrcActive ::= ENUMERATED {

crc16bit(0),
crc32bit(1)
}

Description: CRC established for the current or previous call.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesErrorControl v42CrcActive (10)}

v42CrcSelect ::= ENUMERATED {

crc16bit(0),
crc32bit(1)
}

Description: Indicates the preferred CRC option to be negotiated for the next call.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesErrorControl v42CrcSelect (11)}

v42CrcSupported ::= BIT STRING {

crc16bit(0),
crc32bit(1)
}

Description: Indicates the CRC options supported by the DCE.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesErrorControl v42CrcSupported (12)}

v42DetectionPhaseEnable ::= ENUMERATED {

disable	**(0),**
useV42DetPhase	**(1),**
useV8ifAvailable	**(2)**
}	

Description: Indicates whether the error control detection phase shall be used.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesErrorControl v42DetectionPhaseEnable (13)}

v42FallbackSelect ::= ENUMERATED {

disconnect	**(0),**
buffered	**(1),**
unbufferedV14	**(2)**
}	

Description: Selects what mode the DCE should enter if it is unable to establish an error control protocol (LAPM or Alternative).
Operations: GET-REPLACE

Behaviour: If the DCE exhausts all of the attempts specified to establish the enabled error control protocol(s), it takes the action specified by this parameter: disconnect the call, enter buffered mode (with flow control), or enter unbuffered V.14 operation without flow control (adjusting the DTE interface speed to match the line speed). The selected method must be one of v42FallbackSupported.

Applications: Configuration Management

Registered as: {vSeriesErrorControl v42FallbackSelect (14)}

v42FallbackSupported ::= BIT STRING {
disconnect (0),
buffered (1),
unbufferedV14 (2)
}

Description: Allows the Network Management System to determine which fallback modes are supported by the DCE.

Operations: GET

Behaviour: See v42FallbackSelect

Applications: Configuration Management

Registered as: {vSeriesErrorControl v42FallbackSupported (15)}

v42RejectOptionsActive ::= ENUMERATED {
useGoBackN (0),
useSREJ (1)
}

Description: Indicates the negotiated reject option.

Operations: GET

Behaviour: See v42RejectOptionsSelect

Applications: Configuration Management

Registered as: {vSeriesErrorControl v42RejectOptionsActive (16)}

v42RejectOptionsSelect ::= ENUMERATED {
useGoBackN (0),
useSREJ (1)
}

Description: Indicates the preferred Reject option.

Operations: GET-REPLACE

Behaviour: Shall be one of v42RejectOptionsSupported

Applications: Configuration Management

Registered as: {vSeriesErrorControl v42RejectOptionsSelect (17)}

v42RejectOptionsSupported ::= BIT STRING {
useGoBackN (0),
useSREJ (1)
}

Description: Indicates the supported reject options.

Operations: GET

Behaviour: See v42RejectOptionsSelect

Applications: Configuration Management

Registered as: {vSeriesErrorControl v42RejectOptionsSupported (18)}

v42Statistics ::= SEQUENCE {
framesSentAcknowledged COUNTER (0..65535),
framesRetransmitted COUNTER (0..65535),
framesReceivedAcknowledged COUNTER (0..65535),
framesReceivedDiscarded COUNTER (0..65535)
}

Description: Reports on V.42 performance.

Operations: GET

Behaviour: framesSentAcknowledged is the number of frames containing user data transmitted by the DCE for which acknowledgement has been received.

framesRetransmitted is the number of frames containing user data retransmitted by the DCE.

framesReceivedAcknowledged is the number of frames containing user data received by the DCE for which acknowledgement has been sent.

framesReceivedDiscarded is the number of frames discarded.

Default value is 0. Counters do not reset to zero if maximum count reached. Counters reset to zero at reconnection.

Applications: Performance Management

Registered as: {vSeriesErrorControl v42Statistics (19)}

v42TimedBreakSupported ::= BOOLEAN

Description: Allows the Network Management System to determine whether or not the DCE supports the transmission of timed breaks.

Operations: GET

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesErrorControl v42TimedBreakSupported (20)}

v42UntimedBreakDuration ::= INTEGER (1..255)

Description: Specifies the duration in 10 millisecond increments of the break to be delivered to the DTE when the DCE receives an untimed break from the remote DCE.

Operations: GET-REPLACE

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesErrorControl v42UntimedBreakDuration (21)}

windowSizeActive ::= SEQUENCE {

transmitWindowAct INTEGER (1..128),
receiveWindowAct INTEGER (1..128)
}

Description: Indicates the window size negotiated by the DCE.

Operations: GET

Behaviour: See windowSizeSelect

Applications: Configuration Management

Registered as: {vSeriesErrorControl windowSizeActive (22)}

windowSizeSelect ::= SEQUENCE {

transmitWindowSel INTEGER (1..128),
receiveWindowSel INTEGER (1..128)
}

Description: Indicates the window size to be negotiated by the DCE.

Operations: GET-REPLACE

Behaviour: Must be less than or equal to windowSizeSupported.

Applications: Configuration Management

Registered as: {vSeriesErrorControl windowSizeSelect (23)}

windowSizeSupported ::= SEQUENCE {

transmitWindowSup INTEGER (1..128),
receiveWindowSup INTEGER (1..128)
}

Description: Indicates the maximum window size supported by the DCE.

Operations: GET

Behaviour: See windowSizeSelect

Applications: Configuration Management

Registered as: {vSeriesErrorControl windowSizeSupported (24)}

3.5.3 Actions

None.

3.5.4 Notifications

None.

3.6 V-Series Line Interface Managed Object

3.6.1 Managed Object Template

vSeriesLineInterface MANAGED OBJECT CLASS

-- Source ITU T SG14 Q4

-- Status final draft 6 June 1994

DERIVED FROM "Recommendation M.3100: 1992":managedElement

CHARACTERIZED BY

vSeriesLineInterfacePkg PACKAGE
ATTRIBUTES
lineTypeActive GET,
lineTypeSelect GET-REPLACE,
lineTypeSupported GET,
transmitLevelActive GET,
transmitLevelAdjustable GET,
transmitLevelSelect GET-REPLACE;

CONDITIONAL PACKAGES

gstnPkg PACKAGE
ATTRIBUTES
lineSignalFailDisconnectTimer GET-REPLACE WITH DEFAULT;
NOTIFICATIONS
callCleared
callEstablished
ringIndication;
PRESENT IF "the lineTypeSelect is GSTN 2 or 4 wire",

lineAutocallPkg PACKAGE
ATTRIBUTES
answerToneSelect GET-REPLACE,
answerToneSupported GET,
busyDetection GET-REPLACE,
callingToneSelect GET-REPLACE,
callingToneSupported GET,
callSetupFailTimer GET-REPLACE,
dialSignalling GET-REPLACE,
dialToneDetection GET-REPLACE,
dtmfToneDuration GET-REPLACE,
pulseDialModeSelect GET-REPLACE,
pulseDialModeSupported GET;
PRESENT IF "the V-Series DCE has an autocall capability";

REGISTERED AS

{ccitt(0), recommendation(0), v(22), v58(58), vSeriesLineInterface(5)};

3.6.2 Attributes

answerToneSelect ::= ENUMERATED {

disabled (0),
enabled (1)
}

Description: Selects the type of answer tone to be transmitted, if any.

Operations: GET-REPLACE

Behaviour: When the DCE is in switched operation and answers a call, and disabled is not selected, answer tone is transmitted in accordance with the capabilities of the DCE and the appropriate Recommendations.

Applications: Configuration Management

Registered as: {vSeriesLineInterface answerToneSelect (0)}

answerToneSupported ::= BIT STRING {

none	**(0),**
v25	**(1),**
v8	**(2)**
}	

Description: Allows Network Management System to determine which Answer Tone modes are supported by the DCE.
Operations: GET
Behaviour: See answerToneSelect
Applications: Configuration Management
Registered as: {vSeriesLineInterface answerToneSupported (1)}

busyDetection ::= BOOLEAN

Description: Specifies whether or not the DCE listens for busy signals (engaged tones) while placing calls.
Operations: GET-REPLACE
Behaviour: If TRUE, the DCE listens for engaged tone after dialling the phone number; if the signal is heard, the call attempt is abandoned. If FALSE, the DCE does not listen for busy signal.
Applications: Configuration Management
Registered as: {vSeriesLineInterface busyDetection (2)}

callingToneSelect ::= ENUMERATED {

none	**(0),**
v25-1100Hz	**(1),**
v25-1300Hz	**(2),**
dceBinaryOne	**(3),**
v8-CallingIndicator	**(4),**
automatic	**(5)**
}	

Description: Selects the calling tone or indicator that will be transmitted by the DCE.
Operations: GET-REPLACE
Behaviour: The automatic option permits the DCE to select the type of calling tone automatically.
Applications: Configuration Management
Registered as: {vSeriesLineInterface callingToneSelect (3)}

callingToneSupported ::= BIT STRING {

none	**(0),**
v25-1100Hz	**(1),**
v25-1300Hz	**(2),**
dceBinaryOne	**(3),**
v8-CallingIndicator	**(4)**
}	

Description: Calling tones or indications that the DCE is capable of transmitting.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesLineInterface callingToneSupported (4)}

callSetupFailTimer ::= INTEGER (0..255)

Description: If the connection has not been established within the duration of this (seconds) timer, the call attempt will be abandoned and the DCE will be disconnected.
Operations: GET-REPLACE
Behaviour: A value of 0 indicates that the call set-up fail timer is disabled.
Applications: Fault Management
Registered as: {vSeriesLineInterface callSetupFailTimer (5)}

dialSignalling ::= ENUMERATED {

dTMF	**(0),**
pulse	**(1)**
}	

Description: Signalling method utilized by the DCE for initial call establishment.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesLineInterface dialSignalling (6)}

dialToneDetection ::= SEQUENCE {

```
                                dialToneRequired    BOOLEAN,
                                pause               INTEGER (0..16),
                                giveUpTimer         INTEGER (0..255)
                                }
```

Description: Specifies whether the DCE should listen for dial tone before dialling, or the amount of time, in seconds, to delay before "blind dialling" (whether or not a dial tone is present).

Operations: GET-REPLACE

Behaviour: If dialToneRequired is TRUE, the DCE must detect dial tone before it begins dialling a call; if no dial tone is detected, the call attempt is abandoned. If dialToneRequired is FALSE, the DCE does not detect dial tone, but instead simply pauses the specified number of seconds after going off hook before beginning dialling if so instructed.

Applications: Configuration Management

Registered as: {vSeriesLineInterface dialToneDetection (7)}

dtmfToneDuration ::= INTEGER (50..255)

Description: Duration of time in milliseconds that a particular DTMF tone is transmitted.

Operations: GET-REPLACE

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesLineInterface dtmfToneDuration (8)}

lineSignalFailDisconnectTimer ::= INTEGER (1..255)

Description: If line signal is lost for the entire duration (in increments of 100 milliseconds) of this period, the call is presumed to have failed and the DCE is disconnected from the line.

Operations: GET-REPLACE

Behaviour: A value of 255 indicates that the timer is disabled.

Applications: Fault Management

Registered as: {vSeriesLineInterface lineSignalFailDisconnectTimer (9)}

lineTypeActive ::= SEQUENCE {

```
                                lineType        ENUMERATED {
                                                    leasedP-P4Wire              (0),
                                                    leasedMultipoint4Wire       (1),
                                                    leasedP-P2Wire              (2),
                                                    leasedMultipoint2Wire       (3),
                                                    gSTN4Wire                   (4),
                                                    gSTN2Wire                   (5)
                                                    },
                                cellularLinkLocal   BOOLEAN,
                                cellularLinkRemote  BOOLEAN,
                                cmePresent          BOOLEAN
                                }
```

Description: Indicates the current line type, whether or not one or more cellular links are present, and whether the connection is passing through circuit multiplexing equipment that is performing a demod/remod function.

Operations: GET

Behaviour: See Recommendation V.8 for details on the indication of cellular links and CME.

Applications: Configuration Management

Registered as: {vSeriesLineInterface lineTypeActive (10)}

lineTypeSelect ::= SEQUENCE {

```
                                lineType        ENUMERATED {
                                                    leasedP-P4Wire              (0),
                                                    leasedMultipoint4Wire       (1),
                                                    leasedP-P2Wire              (2),
                                                    leasedMultipoint2Wire       (3),
                                                    gSTN4Wire                   (4),
                                                    gSTN2Wire                   (5)
                                                    },
                                cellularLinkLocal BOOLEAN
                                }
```

Description: Selects the line type for which the DCE is configured to operate, and whether the local connection is a cellular link.
Operations: GET-REPLACE
Behaviour: See Recommendation V.8 for details on the indication of cellular links.
Applications: Configuration Management
Registered as: {vSeriesLineInterface lineTypeSelect (11)}

lineTypeSupported ::= SEQUENCE {
lineType BIT STRING {
leasedP-P4Wire (0),
leasedMultipoint4Wire (1),
leasedP-P2Wire (2),
leasedMultipoint2Wire (3),
gSTN4Wire (4),
gSTN2Wire (5)
},
cellularLink BOOLEAN
}

Description: Indicates the possible line types for which the DCE can be configured, and whether or not the DCE can be configured to indicate the use of a cellular link.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesLineInterface lineTypeSupported (12)}

pulseDialModeSelect ::= SEQUENCE {
pulseDialRate ENUMERATED {
rate10PPS (0),
rate20PPS (1)
},
pulseDialRatio ENUMERATED {
m33B67 (0),
m38B62 (1),
m40M60 (2)
}
}

Description: Selects the pulse dial configuration.
Operations: GET-REPLACE
Behaviour: When the DCE is using pulse dialling, it uses the rate and make/break ratio specified.
Applications: Configuration Management
Registered as: {vSeriesLineInterface pulseDialModeSelect (13)}

pulseDialModeSupported ::= SEQUENCE {
pulseDialRate BIT STRING {
rate10PPS (0),
rate20PPS (1)
},
pulseDialRatio BIT STRING {
m33B67 (0),
m38B62 (1),
m40M60 (2)
}
}

Description: Allows the Network Management System to determine the configurability of the DCE's pulse dial function.
Operations: GET
Behaviour: See pulseDialModeSelect
Applications: Configuration Management
Registered as: {vSeriesLineInterface pulseDialModeSupported (14)}

transmitLevelActive ::= INTEGER (-20..6)
Description: Indicates the current transmit level in dBm of the DCE at its line interface.
Operations: GET
Behaviour: For a V.34 modem this may be lower than the transmit level selected.
Applications: Configuration Management
Registered as: {vSeriesLineInterface transmitLevelActive (15)}

transmitLevelAdjustable ::= SEQUENCE {

externallyAdjustable BOOLEAN,
internallyAdjustable BOOLEAN
}

Description: This attribute indicates whether the transmit level is adjustable.
Operations: GET
Behaviour: The FALSE condition of these parameters indicates that the Transmit Level are not programmable.
Applications: Configuration Management
Registered as: {vSeriesLineInterface transmitLevelAdjustable (16)}

transmitLevelSelect ::= INTEGER (-20..6)

Description: This parameter sets the nominal transmit level in dBm of the DCE at its line interface.
Operations: GET-REPLACE
Behaviour: If the transmit level can be adjusted externally, this value can be modified only if transmitLevelAdjustable.internallyAdjustable is TRUE. The transmit level of a V.34 modem may be adjusted internally to a level below the nominal transmit power selected above.
Applications: Configuration Management
Registered as: {vSeriesLineInterface transmitLevelSelect (17)}

3.6.3 Actions

None.

3.6.4 Notifications

callCleared ::= SEQUENCE {

priority EventPriority,
clearCause ENUMERATED {
causeUnidentified (0),
-- *Network Management System*
nMSinitiatedDialCall (10),
nMSinitiatedLeasedLineRestoral (11),
nMSinitiatedRedial (12),
nMSinitiatedDialDisconnect (13),
-- *DCE*
powerLoss (20),
equipmentFailure (21),
frontPanelDisconnectRequested (22),
frontPanelLeasedLineRestoral (23),
automaticLeasedLineRestoral (24),
inactivityTimerExpired (25),
-- *DTE Interface*
cct116RestoralRequest (30),
cct108isOffInhibitsDial (31),
cct108turnedOff (32),
-- *Line Interface*
noNumberProvided (40),
blacklistedNumber (41),
callAttemptsLimitExceeded (42),
extensionPhoneOffHook (43),
callSetupFailTimerExpired (44),
incomingCallDetected (45),
loopCurrentInterrupted (46),
noDialTone (47),
voiceDetected (48),
reorderTone (49),
sitTone (50),
engagedTone (51),
longSpaceDisconnect (52),
-- *Signal Converter*
carrierLost (60),
trainingFailed (61),
noModulationinCommon (62),
retrainFailed (63),
retrainAttemptCountExceeded (64),
gstnCleardownReceived (65),
faxDetected (66),

```
                                    -- Test
                                    inTestMode                  (70),
                                    intrusiveSelfTestInitiated  (71),
                                    -- Call Control
                                    anyKeyAbort                 (80),
                                    dteHangupCommand            (81),
                                    dteResetCommand             (82),
                                    -- Error Control
                                    frameReject                 (90),
                                    noErrorControlEstablished   (91),
                                    protocolViolation           (92),
                                    n400exceeded                (93),
                                    negotiationFailed           (94),
                                    disconnectFrameReceived     (95),
                                    sabmeFrameReceived          (96),
                                    -- Data Compression
                                    lossOfSynchronization       (100)
                                    }
                }
```

Description: Indicates that the DCE has gone on hook and that the previously existing network connection has been cleared.

Operations: NOTIFICATION

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesLineInterface callCleared (18)}

```
callEstablished ::= SEQUENCE {
                    priority        EventPriority,
                    speed           DceBitRate,
                    errorControl    BOOLEAN,
                    compression     BOOLEAN
                    }
```

Description: Indicates that the DCE has gone off hook and that a network connection has been established to the remote DCE.

Operations: NOTIFICATION

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesLineInterface callEstablished (19)}

```
ringIndication  ::= EventPriority
```

Description: Indicates that the DCE has detected a ringing signal.

Operations: NOTIFICATION

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesLineInterface ringIndication (20)}

3.7 V-Series Signal Convertor Managed Object

3.7.1 Managed Object Template

```
vSeriesSignalConvertor MANAGED OBJECT CLASS
-- Source ITU T SG14 Q4
-- Status final draft 6 June 1994

DERIVED FROM "Recommendation M.3100: 1992":managedElement

CHARACTERISED BY
        signalConvertorPkg          PACKAGE
        ATTRIBUTES
        gstnCallMode                            GET-REPLACE,
        gstnModulationSchemeActive              GET,
        gstnModulationSchemesSelect             GET-REPLACE,
        gstnModulationSchemesSupported          GET,
        leasedCallMode                          GET-REPLACE,
        leasedModulationSchemeSelect            GET-REPLACE,
```

leasedModulationSchemesSupported **GET,**
transmissionSignallingRateActive **GET,**
transmissionSignallingRatesSelect **GET-REPLACE,**
transmissionSignallingRatesSupported **GET,**
transmitClockSource **GET-REPLACE,**
v22V22bisGuardToneEnable **GET-REPLACE;**

CONDITIONAL PACKAGES

extendedSignalConvertorPkg PACKAGE
ATTRIBUTES
equalizationSelect **GET-REPLACE,**
equalizationSupported **GET,**
fallBackSignalQualityThreshold **GET-REPLACE,**
fallForwardSignalQualityThreshold **GET-REPLACE,**
rateRenegotiationInitiation **GET-REPLACE,**
receiveLevel **GET,**
redialSignalQualityThreshold **GET-REPLACE,**
retrainInitiateCounter **GET-REPLACE WITH DEFAULT,**
retrainRequestsCounter **GET-REPLACE WITH DEFAULT,**
retrainSignalQualityThreshold **GET-REPLACE,**
signalQualityEstimate **GET,**
v32TrellisActive **GET,**
v32TrellisSelect **GET-REPLACE;**
ACTIONS
fallBackRequest,
fallForwardRequest,
retrain;
NOTIFICATIONS
fallBackNotification,
fallForwardNotification,
goodSignalQuality,
lossOfCarrier,
poorSignalQuality;
PRESENT IF "implemented";

v34SignalConvertorPkg PACKAGE
ATTRIBUTES
v34FeaturesActive **GET,**
v34FeaturesSelect **GET-REPLACE,**
v34FeaturesSupported **GET,**
v34PreemphasisFilterActive **GET,**
v34SymbolRateCarrierFrequenciesActive **GET,**
v34SymbolRateCarrierFrequenciesSelect **GET-REPLACE,**
v34SymbolRateCarrierFrequenciesSupported **GET;**
PRESENT IF "V.34 implemented";

REGISTERED AS

{ccitt(0), recommendation(0), v(22), v58(58), vSeriesSignalConvertor(6)};

NOTE – Analogue Parameters are meant to be informative, implementations may differ.

3.7.2 Attributes

equalizationSelect ::= INTEGER (0..255)

Description: Selects a stored equalizer compromise configuration.

Operations: GET-REPLACE

Behaviour: A value of 0 indicates that no compromise equalizer is enabled. A value in excess of equalizationSupported shall be considered invalid.

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor equalizationSelect (0)}

equalizationSupported ::= INTEGER (0..255)

Description: Indicates a maximum number of stored compromise equalizer settings.

Operations: GET

Behaviour: A value of 0 indicates the DCE does not contain a compromise equalizer function.

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor equalizationSupported (1)}

fallBackSignalQualityThreshold ::= ENUMERATED {

disabled	**(0),**
high	**(1),**
normal	**(2),**
low	**(3)**
}	

Description: Determines the quality threshold that causes the DCE to fall back.

Operations: GET-REPLACE

Behaviour: "High" threshold indicates that the signal quality must be worse than the "normal" or "low" threshold setting to cause fall back.

Applications: Performance Management

Registered as: {vSeriesSignalConvertor fallBackSignalQualityThreshold (2)}

fallForwardSignalQualityThreshold ::= ENUMERATED {

disabled	**(0),**
high	**(1),**
normal	**(2),**
low	**(3)**
}	

Description: Determines the quality threshold that causes the DCE to fall forward.

Operations: GET-REPLACE

Behaviour: "High" threshold indicates that the signal quality must be better than the "normal" or "low" threshold setting to cause fall forward.

Applications: Performance Management

Registered as: {vSeriesSignalConvertor fallForwardSignalQualityThreshold (3)}

gstnCallMode ::= ENUMERATED {

normal	**(0),**
answerMode	**(1),**
callMode	**(2)**
}	

Description: Defines whether the DCE is an Answer or Call device in GSTN operation.

Operations: GET-REPLACE

Behaviour: Valid only when DCE is in GSTN mode. Normal is call/answer mode dependent on call originate. answerMode is answer mode regardless of call originate. callMode is call mode regardless of call originate.

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor gstnCallMode (4)}

gstnModulationSchemeActive ::= ENUMERATED {

v17	**(0),**
v21	**(1),**
v22	**(2),**
v22bis	**(3),**
v23CC	**(4),**
v23SC	**(5),**
v26bis	**(6),**
v26ter	**(7),**
v27ter	**(8),**
v29HD	**(9),**
v32	**(10),**
v32bis	**(11),**
v34	**(12),**
v34HD	**(13),**
reserved	**(14)**
}	

Description: Indicates the current modulation scheme.

Operations: GET

Behaviour: CC = Continuous Carrier, SC = Switched Carrier, HD = Half Duplex. The use of V17 and V29HD for facsimile applications is defined in Recommendation T.30.

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor gstnModulationSchemeActive (5)}

gstnModulationSchemesSelect ::= BIT STRING {

v17	**(0),**
v21	**(1),**
v22	**(2),**
v22bis	**(3),**
v23CC	**(4),**
v23SC	**(5),**
v26bis	**(6),**
v26ter	**(7),**
v27ter	**(8),**
v29HD	**(9),**
v32	**(10),**
v32bis	**(11),**
v34	**(12),**
v34HD	**(13),**
reserved	**(14)**
}	

Description: Enables one or more modulation schemes. Enabling more than one scheme provides the possibility to specify a range of modulation schemes the DCE can select from ("Auto-moding").

Operations: GET-REPLACE

Behaviour: Must be included in gstnModulationSchemesSupported.

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor gstnModulationSchemesSelect (6)}

gstnModulationSchemesSupported ::= BIT STRING {

v17	**(0),**
v21	**(1),**
v22	**(2),**
v22bis	**(3),**
v23CC	**(4),**
v23SC	**(5),**
v26bis	**(6),**
v26ter	**(7),**
v27ter	**(8),**
v29HD	**(9),**
v32	**(10),**
v32bis	**(11),**
v34	**(12),**
v34HD	**(13),**
reserved	**(14)**
}	

Description: Modulation schemes implemented in the DCE.

Operations: GET

Behaviour: Specified in gstnModulationSchemesSelect

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor gstnModulationSchemesSupported (7)}

leasedCallMode ::= ENUMERATED {

answerMode	**(0),**
callMode	**(1)**
}	

Description: Defines whether the DCE is an Answer or Call device in leased line operation.

Operations: GET-REPLACE

Behaviour: Valid only when DCE is in Leased Line mode.

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor leasedCallMode (8)}

leasedModulationSchemeSelect ::= ENUMERATED {

v21	**(0),**
v22	**(1),**
v22bis	**(2),**
v23	**(3),**
v26CC	**(4),**
v26SC	**(5),**

v26ter (6),
v27CC (7),
v27SC (8),
v27bisCC (9),
v27bisSC (10),
v29 (11),
v32 (12),
v32bis (13),
v33 (14),
v34 (15),
v34HD (16),
reserved (17),
vendorSpecific (18)
}

Description: Selects the modulation scheme for leased line applications.

Operations: GET-REPLACE

Behaviour: CC = Continuous Carrier, SC = Switched Carrier, HD = Half Duplex. Must be one of leasedModulationSchemesSupported.

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor leasedModulationSchemeSelect (9)}

leasedModulationSchemesSupported ::= BIT STRING {

v21 (0),
v22 (1),
v22bis (2),
v23 (3),
v26CC (4),
v26SC (5),
v26ter (6),
v27CC (7),
v27SC (8),
v27bisCC (9),
v27bisSC (10),
v29 (11),
v32 (12),
v32bis (13),
v33 (14),
v34 (15),
v34HD (16),
reserved (17),
vendorSpecific (18)
}

Description: Modulation schemes implemented in the DCE.

Operations: GET

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor leasedModulationSchemesSupported (10)}

rateRenegotiationInitiation ::= BOOLEAN

Description: Enables automatic initiation of V.32 *bis* or V.34 rate renegotiation.

Operations: GET-REPLACE

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor rateRenegotiationInitiation (11)}

receiveLevel ::= INTEGER (-60..0)

Description: Reports receive signal level in dBm at the line interface of the DCE.

Operations: GET

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor receiveLevel (12)}

redialSignalQualityThreshold ::= ENUMERATED {

disabled	**(0),**
high	**(1),**
normal	**(2),**
low	**(3)**
}	

Description: Determines the quality threshold that causes the DCE to re-establish the connection.

Operations: GET-REPLACE

Behaviour: "High" threshold indicates that the signal quality must be worse than the "normal" or "low" threshold setting to cause re-establishment.

Applications: Performance Management

Registered as: {vSeriesSignalConvertor redialSignalQualityThreshold (13)}

retrainInitiateCounter ::= INTEGER (0..255)

Description: Counts attempted retrains initiated by the DCE.

Operations: GET-REPLACE WITH DEFAULT

Behaviour: Default 0; does not reset to zero if maximum count reached; resets to zero at reconnection.

Applications: Performance Management

Registered as: {vSeriesSignalConvertor retrainInitiateCounter (14)}

retrainRequestsCounter ::= INTEGER (0..255)

Description: Counts retrain requests received by the DCE.

Operations: GET-REPLACE WITH DEFAULT

Behaviour: Default 0; does not reset to zero if maximum count reached; resets to zero at reconnection.

Applications: Performance Management

Registered as: {vSeriesSignalConvertor retrainRequestsCounter (15)}

retrainSignalQualityThreshold ::= ENUMERATED {

disabled	**(0),**
high	**(1),**
normal	**(2),**
low	**(3)**
}	

Description: Determines the quality threshold that causes the DCE to retrain.

Operations: GET-REPLACE

Behaviour: "High" threshold indicates that the signal quality must be worse than the "normal" or "low" threshold setting to cause retrain.

Applications: Performance Management

Registered as: {vSeriesSignalConvertor retrainSignalQualityThreshold (16)}

signalQualityEstimate ::= ENUMERATED {

good	**(0),**
average	**(1),**
poor	**(2)**
}	

Description: Reports an estimate of the signal quality.

Operations: GET

Behaviour: Specification not required

Applications: Performance Management

Registered as: {vSeriesSignalConvertor signalQualityEstimate (17)}

transmissionSignallingRateActive ::= SEQUENCE {

transmit	**DceBitrate,**
receive	**DceBitrate**
}	

Description: Indicates the current DCE signalling rates.

Operations: GET

Behaviour: See transmissionSignalling-RatesSupported and transmissionSignalling-RatesSelect

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor transmissionSignallingRateActive (18)}

transmissionSignallingRatesSelect ::= SEQUENCE {

	transmit	**DceBitrateRange,**
	receive	**DceBitrateRange**
	}	

Description: Indicates the range of bitrates enabled.
Operations: GET-REPLACE
Behaviour: More than one signalling rate can be enabled. The enabled signalling rates must be contained in transmissionSignallingRatesSupported. The actual selected signalling rate is contained in transmissionSignallingRateActive. Some DCE specifications may not allow "Transmit" and "Receive" to be different.
Applications: Configuration Management
Registered as: {vSeriesSignalConvertor transmissionSignallingRatesSelect (19)}

transmissionSignallingRatesSupported ::= SEQUENCE {

	transmit	**DceBitrateRange,**
	receive	**DceBitrateRange**
	}	

Description: Signalling rate supported by the DCE.
Operations: GET
Behaviour: One or more than one signalling rate can be enabled with transmissionSignallingRatesSelect. The actual selected signalling rate is contained in transmissionSignallingRateActive. Some DCE specifications may not allow "Transmit" and "Receive" to be different.
Applications: Configuration Management
Registered as: {vSeriesSignalConvertor transmissionSignallingRatesSupported (20)}

transmitClockSource ::= ENUMERATED {

	internal	**(0),**
	external	**(1),**
	slaveToReceiveClock	**(2)**
	}	

Description: Selects the source of the DCE's transmit timing.
Operations: GET-REPLACE
Behaviour: This attribute applies only to DCEs which use synchronous modulation. For Asynchronous DTE-DCE interfaces, external timing sources are not used.
Applications: Configuration Management
Registered as: {vSeriesSignalConvertor transmitClockSource (21)}

v22V22bisGuardToneEnable ::= BOOLEAN
Description: Enables guard tone in V.22(*bis*) DCEs.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesSignalConvertor v22V22bisGuardToneEnable (22)}

v32TrellisActive ::= BOOLEAN
Description: Indicates whether Trellis coding is active in the V.32 DCE.
Operations: GET
Behaviour: See v32TrellisSelect
Applications: Configuration Management
Registered as: {vSeriesSignalConvertor v32TrellisActive (23)}

v32TrellisSelect ::= BOOLEAN
Description: Enables Trellis Coding in a V.32 DCE.
Operations: GET-REPLACE
Behaviour: In case the value of this attribute is TRUE, this does not prevent the DCE from handshaking to uncoded modulation.
Applications: Configuration Management
Registered as: {vSeriesSignalConvertor v32TrellisSelect (24)}

v34FeaturesActive ::= BIT STRING {

	adaptivePreemphasis	**(0),**
	auxiliaryChannel	**(1),**
	constellationShaping	**(2),**
	nonlinearEncoding	**(3),**
	powerControl	**(4),**

precoding (5),
secondaryChannel (6),
trellisEncoding-16state (7),
trellisEncoding-32state (8),
trellisEncoding-64state (9)
}

Description: Indicates the V.34 features that are currently active.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesSignalConvertor v34FeaturesActive (25)}

v34FeaturesSelect ::= BIT STRING {
adaptivePreemphasis (0),
auxiliaryChannel (1),
constellationShaping (2),
nonlinearEncoding (3),
powerControl (4),
precoding (5),
secondaryChannel (6),
trellisEncoding-16state (7),
trellisEncoding-32state (8),
trellisEncoding-64state (9)
}

Description: Enables one or more V.34 features.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesSignalConvertor v34FeaturesSelect (26)}

v34FeaturesSupported ::= BIT STRING {
adaptivePreemphasis (0),
auxiliaryChannel (1),
constellationShaping (2),
nonlinearEncoding (3),
powerControl (4),
precoding (5),
secondaryChannel (6),
trellisEncoding-16state (7),
trellisEncoding-32state (8),
trellisEncoding-64state (9)
}

Description: Features implemented in the DCE's V.34 receiver.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesSignalConvertor v34FeaturesSupported (27)}

v34PreemphasisFilterActive ::= INTEGER (0..10)

Description: Indicates the current transmit preemphasis filter number.
Operations: GET
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesSignalConvertor v34PreemphasisFilterActive (28)}

v34SymbolRateCarrierFrequenciesActive ::= SEQUENCE {
transmitSymbolRateCarrierFrequency ENUMERATED
{
symbol2400-Carrier1600 (0),
symbol2400-Carrier1800 (1),
symbol2743-Carrier1646 (2),
symbol2743-Carrier1829 (3),
symbol2800-Carrier1680 (4),
symbol2800-Carrier1867 (5),
symbol3000-Carrier1800 (6),
symbol3000-Carrier2000 (7),

```
                    symbol3200-Carrier1829      (8),
                    symbol3200-Carrier1920      (9),
                    symbol3429-Carrier1959      (10)
                    },
receiveSymbolRateCarrierFrequency   ENUMERATED
                    {
                    symbol2400-Carrier1600      (0),
                    symbol2400-Carrier1800      (1),
                    symbol2743-Carrier1646      (2),
                    symbol2743-Carrier1829      (3),
                    symbol2800-Carrier1680      (4),
                    symbol2800-Carrier1867      (5),
                    symbol3000-Carrier1800      (6),
                    symbol3000-Carrier2000      (7),
                    symbol3200-Carrier1829      (8),
                    symbol3200-Carrier1920      (9),
                    symbol3429-Carrier1959      (10)
                    }
                    }
```

Description: Indicates the current symbol rate and carrier frequency for both the transmitter and receiver.

Operations: GET

Behaviour: Specification not required

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor v34SymbolRateCarrierFrequenciesActive (29)}

```
v34SymbolRateCarrierFrequenciesSelect ::= SEQUENCE {
                    symbolRateCarrierFrequency BIT STRING {
                    symbol2400-Carrier1600      (0),
                    symbol2400-Carrier1800      (1),
                    symbol2743-Carrier1646      (2),
                    symbol2743-Carrier1829      (3),
                    symbol2800-Carrier1680      (4),
                    symbol2800-Carrier1867      (5),
                    symbol3000-Carrier1800      (6),
                    symbol3000-Carrier2000      (7),
                    symbol3200-Carrier1829      (8),
                    symbol3200-Carrier1920      (9),
                    symbol3429-Carrier1959      (10)
                    },
                    symbolRateDifference        INTEGER (0..5)
                    }
```

Description: Enables one or more symbol rate carrier frequency combinations in the DCE, as well as selecting the maximum symbol rate difference allowed.

Operations: GET

Behaviour: Some combinations of symbol rate and carrier frequency may be disabled due to regulatory spectrum requirements.

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor v34SymbolRateCarrierFrequenciesSelect (30)}

```
v34SymbolRateCarrierFrequenciesSupported ::= SEQUENCE {
                    symbolRateCarrierFrequency    BIT STRING {
                              symbol2400-Carrier1600      (0),
                              symbol2400-Carrier1800      (1),
                              symbol2743-Carrier1646      (2),
                              symbol2743-Carrier1829      (3),
                              symbol2800-Carrier1680      (4),
                              symbol2800-Carrier1867      (5),
                              symbol3000-Carrier1800      (6),
                              symbol3000-Carrier2000      (7),
                              symbol3200-Carrier1829      (8),
                              symbol3200-Carrier1920      (9),
                              symbol3429-Carrier1959      (10)
                              },
                         symbolRateDifference     INTEGER (0..5)
                    }
```

Description: Symbol rates and carrier frequencies implemented in the DCE.

Operations: GET

Behaviour: V.34 mandates some symbol rate carrier frequency combinations, and therefore these should always be indicated as supported. A value of 0 for symbolRateDifference means that asymmetric symbol rate operation is not supported.

Applications: Configuration Management

Registered as: {vSeriesSignalConvertor v34SymbolRateCarrierFrequenciesSupported (31)}

3.7.3 Actions

Name: **fallBackRequest**

```
fallBackRequestReq ::= ENUMERATED {
        localTransmitter    (0),
        remoteTransmitter   (1)
            }
```

```
fallBackRequestConf ::= BOOLEAN
```

Description: Forces the DCE to attempt to fall back to the next lower signalling rate enabled in transmissionSignallingRatesSelect and supported by gstnModulation-SchemesSupported or leasedModulation-SchemesSupported.

Operations: ACTION

Behaviour: It is advisable to issue this action only if fallBackSignal-QualityThreshold and fallForward-SignalQualityThreshold are disabled. For some modulation schemes this action will initiate a fallback in both directions of transmission. The confirm argument indicates if a reduction in signalling rate occurred.

Applications: Performance Management

Registered as: {vSeriesSignalConvertor fallBackRequest (32)}

Name: **fallForwardRequest**

```
fallForwardRequestReq ::= ENUMERATED {
                                localTransmitter    (0),
                                remoteTransmitter   (1)
                                    }
```

```
fallForwardRequestConf ::= BOOLEAN
```

Description: Forces the DCE to attempt to fall forward to the next higher signalling rate enabled in transmissionSignallingRatesSelect and supported by gstnModulation-SchemesSupported or leasedModulation-SchemesSupported.

Operations: ACTION

Behaviour: It is advisable to issue this action only if fallBackSignal-QualityThreshold and fallForwardSignal-QualityThreshold are disabled. For some modulation schemes this action will initiate a fall forward in both directions of transmission. The confirm argument indicates if an increase in signalling rate occurred.

Applications: Performance Management

Registered as: {vSeriesSignalConvertor fallForwardRequest (33)}

Name: **retrain**

```
retrainReq  ::= NULL
```

```
retrainConf ::= NULL
```

Description: Forces the DCE to initiate a retrain.

Operations: ACTION

Behaviour: Does not trigger a fallBackNotification or fallForwardNotification.

Applications: Performance Management

Registered as: {vSeriesSignalConvertor retrain (34)}

3.7.4 Notifications

fallBackNotification ::= SEQUENCE {

```
priority        EventPriority,
direction       ENUMERATED {
                    transmit        (0),
                    receive         (1),
                    both            (2)
                    },
initiator       ENUMERATED {
                    local       (0),
                    remote      (1)
                    }
}
```

Description: This notification is issued to indicate to the management entity that the DCE has fallen back to a lower signalling rate.

Operations: NOTIFICATION

Behaviour: Only issued after automatic fall back or fall back initiated from the remote DCE and only if the signalling rate is actually changed.

Applications: Fault Management

Registered as: {vSeriesSignalConvertor fallBackNotification (35)}

fallForwardNotification ::= SEQUENCE {

```
priority        EventPriority,
direction       ENUMERATED {
                    transmit        (0),
                    receive         (1),
                    both            (2)
                    },
initiator       ENUMERATED {
                    local       (0),
                    remote      (1)
                    }
}
```

Description: This notification is issued to indicate to the management entity that the DCE has fallen forward to a higher signalling rate.

Operations: NOTIFICATION

Behaviour: Only issued after automatic fall forward or fall forward initiated from the remote DCE and only if the signalling rate is actually changed.

Applications: Fault Management

Registered as: {vSeriesSignalConvertor fallForwardNotification (36)}

goodSignalQuality ::= EventPriority

Description: This notification is issued if the signal quality changes to good.

Operations: NOTIFICATION

Behaviour: Not issued if automatic fall forward results

Applications: Fault Management

Registered as: {vSeriesSignalConvertor goodSignalQuality (37)}

lossOfCarrier ::= EventPriority

Description: This notification indicates that an unexpected loss of carrier has been detected by the DCE.

Operations: NOTIFICATION

Behaviour: Not issued if call cleared

Applications: Fault Management

Registered as: {vSeriesSignalConvertor lossOfCarrier (38)}

poorSignalQuality ::= EventPriority

Description: This notification is issued if the signal quality changes to poor.

Operations: NOTIFICATION

Behaviour: Not issued if automatic fall back results

Applications: Fault Management

Registered as: {vSeriesSignalConvertor poorSignalQuality (39)}

3.8 V-Series Test Function Managed Object

3.8.1 Managed Object Template

vSeriesTestFunction MANAGED OBJECT CLASS

-- Source ITU T SG14 Q4

-- Status final draft 6 June 1994

DERIVED FROM "Recommendation M.3100: 1992":managedElement

CHARACTERIZED BY

testFunctionPkg PACKAGE
ATTRIBUTES
cct140Enable GET-REPLACE,
cct141Enable GET-REPLACE,
erroredBitsReceived GET,
erroredBlocksReceived GET,
loop2Local GET,
loop2LocalEnable GET-REPLACE,
loop2Remote GET,
loop2RemoteEnable GET-REPLACE,
loop3 GET,
loop3Enable GET-REPLACE,
v54Address GET REPLACE,
v54Mode GET REPLACE;
ACTIONS
invokeErrorRateTest,
invokeLoop2Local,
invokeLoop2Remote,
invokeLoop3,
stopErrorRateTest;
NOTIFICATIONS
loop2InvokedByRemoteDce;

REGISTERED AS

{ccitt(0), recommendation(0), v(22), v58(58), vSeriesTestFunction(7)};

NOTE – The Test Object only relates to single port DCEs, its use with multiple port DCEs is for further study.

3.8.2 Attributes

cct140Enable ::= BOOLEAN

Description: If FALSE, signals on circuit 140 are ignored.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Fault Management
Registered as: {vSeriesTestFunction cct140Enable (0)}

cct141Enable ::= BOOLEAN

Description: If FALSE, signals on circuit 141 are ignored.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Fault Management
Registered as: {vSeriesTestFunction cct141Enable (1)}

erroredBitsReceived ::= INTEGER (0..65535)

Description: Contains the number of errored bits received during the last or current bit error rate test.
Operations: GET
Behaviour: Reset to zero by InvokeErrorRateTest. Does not reset to zero if maximum count reached.
Applications: Fault Management
Registered as: {vSeriesTestFunction erroredBitsReceived (2)}

erroredBlocksReceived ::= INTEGER (0..65535)

Description: Contains number of error blocks received during the last or current block error rates test.

Operations: GET

Behaviour: Reset to zero by InvokeErrorRateTest. Does not reset to zero if maximum count reached.

Applications: Fault Management

Registered as: {vSeriesTestFunction erroredBlocksReceived (3)}

loop2Local ::= ENUMERATED {

disabled	**(0),**
enabledInactive	**(1),**
frontPanelInvoked	**(2),**
networkManagementSystemInvoked	**(3),**
remoteInvoked	**(4)**
}	

Description: Contains the status of the digital loop (V.54 loop 2) in the addressed DCE.

Operations: GET

Behaviour: Specification not required

Applications: Fault Management

Registered as: {vSeriesTestFunction loop2Local (4)}

loop2LocalEnable ::= BOOLEAN

Description: If TRUE, the digital loop (V.54 loop 2) of the addressed DCE can be controlled via V.54 remote control and/or the front panel.

Operations: GET-REPLACE

Behaviour: Specification not required

Applications: Fault Management

Registered as: {vSeriesTestFunction loop2LocalEnable (5)}

loop2Remote ::= ENUMERATED {

disabled	**(0),**
enabledInactive	**(1),**
cct140Invoked	**(2),**
frontPanelInvoked	**(3),**
networkManagementSystemInvoked	**(4)**
}	

Description: Contains the status of the digital loop (V.54 loop 2) in the remote DCE.

Operations: GET

Behaviour: Specification not required

Applications: Fault Management

Registered as: {vSeriesTestFunction loop2Remote (6)}

loop2RemoteEnable ::= BOOLEAN

Description: If FALSE, manual control of loop 2 in the remote DCE from the front panel of the local DCE is disabled.

Operations: GET-REPLACE

Behaviour: Specification not required

Applications: Fault Management

Registered as: {vSeriesTestFunction loop2RemoteEnable (7)}

loop3 ::= ENUMERATED {

inactive	**(0),**
cct141Invoked	**(1),**
frontPanelInvoked	**(2),**
networkManagementSystemInvoked	**(3)**
}	

Description: Describes the status of the local analog loop (V.54 loop3).

Operations: GET

Behaviour: Specification not required

Applications: Fault Management

Registered as: {vSeriesTestFunction loop3 (8)}

loop3Enable ::= BOOLEAN

Description: If TRUE, the local analog loop (V.54 loop 3) can be controlled via the front panel.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Configuration Management
Registered as: {vSeriesTestFunction loop3Enable (9)}

v54Address ::= CHOICE {
shortAddress [0] INTEGER (0..255),
longAddress [1] INTEGER (0..65535)
}

Description: Sets the V.54 address of the addressed DCE.
Operations: GET-REPLACE
Behaviour: Operates both for loop 2 and tandem loop 3.
Applications: Fault Management
Registered as: {vSeriesTestFunction v54Address (10)}

v54Mode ::=ENUMERATED {
pointToPoint (0),
multipointOrTandem (1)
}

Description: Choose between V.54 modes.
Operations: GET-REPLACE
Behaviour: Specification not required
Applications: Fault Management
Registered as: {vSeriesTestFunction v54Mode (11)}

3.8.3 Actions

Name: **invokeErrorRateTest**

invokeErrorRateTestReq ::= SEQUENCE {
testType ENUMERATED {
bitErrorRateTest (0),
blockErrorRateTest (1),
both (2)
},
blockLength INTEGER (1..65535),
numberOfBlocks INTEGER (1..65535),
testPattern ENUMERATED {
test63 (0),
test511 (1),
test2047 (2),
binaryOnes (3),
alternatingOnesZeroes (4)
}
}

invokeErrorRateTestConf ::= ENUMERATED {
testInitiated (0),
testRestarted (1),
testNotSupported (2),
noLoopActive (3)
}

Description: Invokes bit and block error rate tests. Test includes generation of the test pattern, reception of test pattern, error counting.
Operations: ACTION
Behaviour: A suitable loop shall be set up first.
Applications: Fault Management
Registered as: {vSeriesTestFunction invokeErrorRateTest (12)}

Name: **invokeLoop2Local**

invokeLoop2LocalReq ::= ENUMERATED {
invoke (0),
revoke (1)
}

invokeLoop2LocalConf ::= ENUMERATED {
loopNowActive (0),
loopNowInactice (1)
}

Description: Invokes/revokes the digital loop (V.54 loop 2) in the addressed DCE.
Operations: ACTION
Behaviour: Specification not required
Applications: Fault Management
Registered as: {vSeriesTestFunction invokeLoop2Local (13)}

Name: **invokeLoop2Remote**

invokeLoop2RemoteReq ::= SEQUENCE {
invokeRevoke ENUMERATED {
invoke (0),
revoke (1)
},
optAddress ENUMERATED {
v54Address (0),
noAddress (1)
}
}

invokeLoop2RemoteConf ::= ENUMERATED {
confirmationReceived (0),
noConfirmationReceived (1)
}

Description: Invokes/revokes the digital loop (V.54 loop 2) in the remote DCE by means of V.54 control from the local DCE.
Operations: ACTION
Behaviour: optAddress is v54Address if invokeRevoke is Invoke and v54Mode is multipointOrTandem.
Applications: Fault Management
Registered as: {vSeriesTestFunction invokeLoop2Remote (14)}

Name: **invokeLoop3**

invokeLoop3Req ::= ENUMERATED {
invoke (0),
revoke (1)
}

invokeLoop3Conf ::= ENUMERATED {
loopNowActive (0),
loopNowInactice (1)
}

Description: Invokes/revokes the local analog loop (V.54 loop 3).
Operations: ACTION
Behaviour: Specification not required
Applications: Fault Management
Registered as: {vSeriesTestFunction invokeLoop3 (15)}

Name: **stopErrorRateTest**

stopErrorRateTestReq ::= NULL

stopErrorRateTestConf ::= SEQUENCE {
numberOfBlocksSent INTEGER (1..65535),
erroredBlocksReceived INTEGER,
erroredBitsReceived INTEGER
}

Description: Aborts bit or block error rate test.
Operations: ACTION
Behaviour: Test results are only defined if the relevant test has been conducted using invokeErrorRateTest.
Applications: Fault Management
Registered as: {vSeriesTestFunction stopErrorRateTest (16)}

3.8.4 Notifications

loop2InvokedByRemoteDce ::= EventPriority

Description: This event is used to indicate to the management entity that the DCE has entered a loop 2 condition invoked by the remote DCE.

Operations: NOTIFICATION

Behaviour: If loop2LocalEnable is FALSE this notification will not be generated.

Applications: Fault Management

Registered as: {vSeriesTestFunction loop2InvokedByRemoteDceloop2 (17)}

3.9 Local defined types

Description: CallProgress identifies the states that the DCE line interface may have.

```
CallProgress    ::= ENUMERATED {
        onHook                  (0),
        waitingForDialTone      (1),
        dialling                (2),
        waitingForRinging       (3),
        ringing                 (4),
        answerTone              (5),
        connected               (6),
        failed                  (7)
        }
```

Description: DceBitrate is used to select or indicate a specific bitrate for the DCE's GSTN interface.

```
DceBitrate      ::= ENUMERATED {
        br75                    (0),
        br110                   (1),
        br150                   (2),
        br300                   (3),
        br600                   (4),
        br1200                  (5),
        br2400                  (6),
        br4800                  (7),
        br7200                  (8),
        br9600                  (9),
        br12000                 (10),
        br14400                 (11),
        br16800                 (12),
        br19200                 (13),
        br21600                 (14),
        br24000                 (15),
        br26400                 (16),
        br28800                 (17),
        br31200                 (18),
        br32000                 (19),
        br33600                 (20),
        br36000                 (21),
        br38400                 (22),
        br48000                 (23),
        br56000                 (24),
        br57600                 (25),
        br64000                 (26)
        }
```

Description: DceBitrateRange is used by the DCE to indicate the range of bit rates that it can support over the GSTN interface.

```
DceBitrateRange     ::= BIT STRING {
        br75                    (0),
        br110                   (1),
        br150                   (2),
```

br300 (3),
br600 (4),
br1200 (5),
br2400 (6),
br4800 (7),
br7200 (8),
br9600 (9),
br12000 (10),
br14400 (11),
br16800 (12),
br19200 (13),
br21600 (14),
br24000 (15),
br26400 (16),
br28800 (17),
br31200 (18),
br32000 (19),
br33600 (20),
br36000 (21),
br38400 (22),
br48000 (23),
br56000 (24),
br57600 (25),
br64000 (26)
}

Description: DteBitrate gives the DTE/DCE interface speed in increments of 5 bit/s.

DteBitrate ::= INTEGER (1..65535)

Description: EventPriority is used to assign a priority to notifications to support subsequent processing.

EventPriority ::= ENUMERATED {

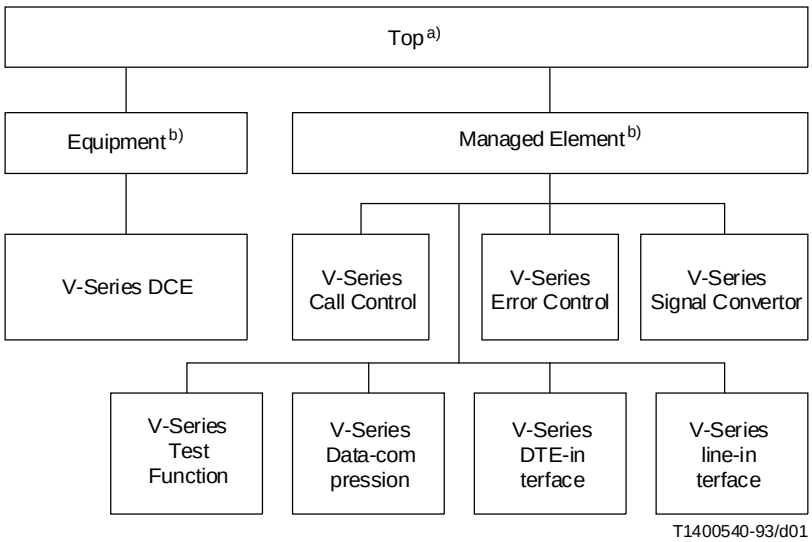
noEvents (0),
majorFault (1),
allFault (2),
faultAndProgress (3),
allEvents (4)
}

Description: PhoneNumber is used to represent a telephone number and associated characters, as defined in draft Recommendation V.at (V.25 *ter*).

PhoneNumber ::= IA5String

4 Relationships between managed object classes

Figure 1 depicts the relations between the managed objects classes specified in this Recommendation.



a) Defined in Recommendation X.721.
b) Defined in Recommendation M.3100.

FIGURE 1/V58

Inheritance Hierarchy

Appendix I

Some additional background information

This Recommendation defines a set of "building block" objects which permit a range of V-Series DCEs to be defined. These "building block" objects are:

- V-Series DCE;
- V-Series Line Interface;
- V-Series DTE Interface;
- V-Series Signal Converter;
- V-Series Call Control;
- V-Series Error Control;
- V-Series Data Compression;
- V-Series Test Function.

These require the use of the objects Equipment and managed Element, which are defined in Recommendation M.3100.

For each Managed Object the Attributes, Actions and Notifications that define its management behaviour are specified.

An Attribute is a parameter, which may be a single value or a set of values. It may be read-only, write-only, or read-write. It may be mandatory or optional.

An Action is a complex activity that the Managed Object is requested to perform, i.e. one that requires more than the change of a single attribute.

A Notification is an unsolicited message from the Managed Object, for example an alarm indication. Notifications may be filtered within a DCE or some intermediate system, hence management systems would not (necessarily) be flooded with "Ring Indication" events.

Objects are related using the containment tree principle. It is the intent of the methodology set out in this Recommendation that most practical V-Series DCE (at least modem) configurations should be representable. The object definitions defined in this Recommendation do not support multiplexing.

Appendix II

List of Attributes, Actions and Notifications

Attribute / Action / Notification

Appendix III

References

References

[1] CCITT Recommendation M.3100 (1992), *Generic Network Information Model.*

[2] CCITT Recommendation M.3010 (1992), *Principles for a Telecommunications Management Network.*

[3] CCITT Recommendation X.720 (1992), Information technology – Open Systems Interconnection – Structure of Management Information: *Management Information Model.*

[4] CCITT Recommendation X.721 (1992), Information technology – Open Systems Interconnection – Structure of Management Information: *Definition of Management Information.*

[5] CCITT Recommendation X.722 (1992), Information technology – Open Systems Interconnection – Structure of Management Information: *Guidelines for Definition of Managed Objects.*

[6] CCITT Recommendation X.208 (1989), *Specification of Abstract Syntax Notation One (ASN.1).*