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Amendment 1
T.32
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TERMINALS FOR TELEMATIC SERVICES

ASYNCHRONOUS FACSIMILE DCE CONTROL – SERVICE CLASS 2

Amendment 1 to
ITU-T Recommendation T.32

(Previously "CCITT Recommendations")

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).

Amendment 1 to ITU-T Recommendation T.32, was prepared by ITU-T Study Group 8 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 3rd of July 1996.

NOTE

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

CONTENTS

SUMMARY

This amendment includes extensions to support the features in future Recommendation T.30:

- T.85 single-progression sequential image coding (DF, Table 21/T.32);
- V.34 modems (new Annex C/T.32).

Amendment 1 to Recommendation T.32

ASYNCHRONOUS FACSIMILE DCE CONTROL – SERVICE CLASS 2

(Geneva, 1996)

1 Additions to Table 21

TABLE 21/T.32

T.30 session subparameter codes

Label	Function	Value	Description
DF	Data Compression Format	0	1-D Modified Huffman (Rec. T.4)
		*1	2-D Modified read (Rec. T.4)
		*2	2-D Uncompressed mode (Rec. T.4)
		*3	2-D Modified read (Rec. T.6)
		*4	Single-progression sequential coding (Rec. T.85)
		5-7	for capabilities, combinations of Recs. T.85, T.6 and T.4
		*8	Single-progression sequential coding (Rec. T.85) optional L0
		*9-F	for capabilities, combinations of Recs. T.85, T.6 and T.4

2 Add the following new Annex C to Recommendation T.32

Annex C

Procedure for service class 2 support of V.34 modems

(This annex forms an integral part of the Recommendation)

C.1 Introduction

C.1.1 V.34 modems

References in this annex to user data rates greater than 28 000 bits/s are in anticipation of an amended version of Recommendation V.34 expected in 1996.

Recommendation V.34 is standardized for use on the GSTN at rates up to 33 600 bit/s. Recommendation V.34 defines two modes of operation:

- Duplex (clauses 5, 7, 8, 9, 10.1 and 11).
- Half-duplex (clauses 5, 7, 8, 9, 10.2 and 12).

Half-duplex mode supports two channels:

- Half-duplex high-speed primary channel.
- Duplex low-speed control channel.

C.1.2 T.30 procedures for use with V.34 modems

Procedures for V.34 facsimile are defined for both V.34 modes:

- Annex C/T.30, with revisions, defines Group 3 facsimile for duplex V.34.
- Annex F/T.30, defines Group 3 facsimile procedures for half-duplex V.34.

This annex defines procedures for a service class 2 facsimile DCE to implement Annex C/T.30 or Annex F/T.30 with V.34 modems.

C.1.3 V.8 call negotiation

For all uses of Recommendation V.34, procedures defined in Recommendation V.8 are required for negotiating the call type. For T.30 operation, this includes determination of the V.34 mode (duplex or half-duplex) and the direction of the message (send or receive) if half-duplex is used.

This annex defines simple extensions to Recommendation T.32 to support V.8 negotiation implemented by the DCE but hidden from the DTE.

Annex A/V.25 *ter* defines optional procedures for a service class 2 facsimile DCE to implement V.8 call negotiation driven directly by the DTE.

C.2 References

– ITU-T Recommendation V.34 (1996), *A modem operating at data signalling rates of up to 33 600 bit/s for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits*.

C.3 Functions

A DCE compliant with this annex shall provide the following functions to the DTE:

a) procedures to condition V.8 call type negotiation;

b) procedures to constrain the primary channel rate; and

c) DTE indication of the primary channel rate.

C.4 Definitions and conventions

The following definitions apply, in addition to those defined in Recommendations T.30, T.31 or V.34:

C.4.1 **sending DCE**: The DCE which transmits primary channel data in half-duplex mode.

C.4.2 **recipient DCE**: The DCE which receives primary channel data in half-duplex mode.

C.5 Initial V.34 rate controls and indications

C.5.1 Additional BR subparameter codes for V.34 rate controls

Table 21 defines the BR subparameter, for use in setting and indicating the message (Phase C) bit rate. For use with V.34 facsimile Annex C/T.30 or Annex F/T.30), the following new codes are defined, in addition to values 0-5 defined in Table 21. See Table C.1.

TABLE C.1/T.32

Revised BR subparameter values

BR value	Rate in bit/s	+FCC/+FIS description	+FCS description
0	2400	2400 bit/s preferred	2400 bit/s selected
–	–	–	–
5	14 400	14 400 bit/s preferred all with V.8 optional	14 400 bit/s selected
6	16 800	16 800 bit/s preferred	16 800 bit/s selected
7	19 200	19 200 bit/s preferred	19 200 bit/s selected
8	21 600	21 600 bit/s preferred	21 600 bit/s selected
9	24 000	24 000 bit/s preferred	24 000 bit/s selected
A	26 400	26 400 bit/s preferred	26 400 bit/s selected
B	28 800	28 800 bit/s preferred	28 800 bit/s selected
C	31 200	31 200 bit/s preferred	31 200 bit/s selected
D	33 600	33 600 bit/s preferred all with implied Rec. V.8	33 600 bit/s selected
E ..		Reserved for future modulations	Reserved for future modulations

To indicate capability to support Recommendation V.34, the DCE shall include any supported BR values (e.g. 6-D) in response to +FCC=?, +FIS=? and +FCS=? commands.

To indicate preference for V.34 operation, the DTE may set (or accept a default setting of) the BR subparameter to values 6 or above.

To indicate connection with V.34 procedures, the DCE shall indicate the appropriate value in the +FCS:,BR subparameter. If the rate is 14 400 bit/s or below, there is no indication of modulation type.

C.5.2 Selection and indication of V.34 mode

The EC subparameter defined in Table 21 defines codes for Recommendations T.30, T.30 with ECM and Annex C/T.30. The descriptions of these subparameters are amended as follows (see Table C.2):

TABLE C.2/T.32

Amended EC subparameter codes

EC value	Description
0	Rec. T.30, without ECM
1	Annex A/T.30 or Annex F/T.30 with V.34 HD
2	Annex C/T.30 , half-duplex
3	Annex Ce/T.30 , including V.34 FD

To indicate support for half-duplex V.34, the DCE shall include the EC value 1 in response to +FCC=?, +FIS=? and +FCS=? commands.

To indicate support for duplex V.34, the DCE shall include the EC value 3 in response to +FCC=?, +FIS=? and +FCS=? commands.

To indicate preference for V.34 operation, the DTE may set (or accept a default setting of) the EC subparameter to values of 1 or 3. A DCE that implements Annex C/T.30 for duplex V.34 may also support Annex F/T.30 for half-duplex V.34; if so, the default +FCC EC subparameter shall be 3.

To indicate connection with V.34 procedures, the DCE shall indicate the appropriate value in the +FCS: EC subparameter.

C.5.3 V.8 message direction setup

For use with V.8 call type negotiation, the direction of the first message must be determined before the call is placed and answered. Therefore, the DTE shall preconfigure the DCE.

For the calling DCE, the T.32 DCE default value for message direction is to send a facsimile, unless +FSP=1 and +FCR=1. To configure for polling, the DTE shall ensure that +FSP and +FCR are set.

For the answering DCE, the T.32 default value for message direction is to receive a facsimile, unless +FLP=1 and/or +FCR=0. To configure for being polled, the DTE shall set +FLP=1.

For V.34 operation, direction indication is identical to that defined in Tables 11 and 12. If the first message is to send a facsimile, the calling/sending DCE will not indicate +FPO as part of the D command response, and the answering/receiving DCE will indicate +FCS as part of the A command response. If the first message is for polling, the calling/receiving DCE will indicate +FPO as part of the D command response, and the answering/sending DCE will indicate +FTC as part of the A command response.

C.6 V.8 negotiation with DTE control

The DCE may support procedures to allow a DTE to conduct the V.8 negotiation. The procedures defined in Annex A/V.25 *ter* may be used.

C.6.1 Preconfiguration of initial V.34 rate(s)

Preconfiguration of V.34 rates shall be supported using the same BR subparameter, as defined in C.5 above. If the DCE supports the +F34 parameter (B.6.1/T.31), it may be used instead, which also allows the control carrier to be controlled by the DTE. If +F34 is used, then the DCE shall ignore +FIS BR subparameter for that call setup.

C.6.2 Transition from V.8 negotiation

After V.8 negotiation is complete, the Annex C/T.30 or Annex F/T.30 procedures must commence. These begin with V.34 carrier training, as preconfigured by the V.8 negotiation (direction, half- or duplex mode and rates).

The DCE shall decode V.8 negotiation to detect these selections, and conduct V.34 carrier training, and then commence T.30 Phase B operation. The DCE responses are described above. The DTE shall respond with any additional configuration commands, and the appropriate +FDT or +FDR commands, and proceed as defined in 8.3.3 or 8.3.4.

C.7 Sample sessions

In these examples, actions between the DTE and DCE on both the originating and answering side are illustrated. These are simple send and receive examples, derived from Tables II.1 and II.2.

C.7.1 Originate and send a two page facsimile with V.34 half-duplex

Optional T.30 frames are omitted. +FNR=1,1,, +FIS and +FCS subparameters other than BR and EC are not shown.

DTE commands	DCE responses	Local DCE action	Remote station action	Notes
AT+FCLASS=2.1	OK	Set class 2		
AT+FIS=,B,,,,3,,,	OK	Set for Rec. V.34, Annex A/T.30, Annex C/T.30 or Annex F/T.30		
ATD<dial string>	 +FCO +FIS:,B,,,,1,,, OK	off-hook, dial, send CNG detect ANSam send CM get JM send CJ negotiate Rec. V.34 begin control channel get DIS	detect ringing answer detect CNG send ANSam get CM send JM get CJ negotiate Rec. V.34 begin control channel send DIS	 Rec. T.30 selected with JM signal from remote terminal the remote indicated 28 800 bit/s ability
AT+FDT <1st page data> <DLE><mps>	 +FCS:,9,,,,1,,, CONNECT OK	send DCS get CFR switch to primary channel send page FCD switch to control channel send MPS get MCF	get DCS send CFR switch to primary channel get page data switch to control channel get MPS send MCF	in this example, 24 400 bit/s is selected
AT+FDT <2nd page data> <DLE><eop>	CONNECT +FHS:00 OK	switch to primary channel send page 2 FCD switch to control channel send EOP get MCF send DCN hangup	switch to primary channel get page 2 FCD switch to control channel get EOP send MCF get DCN hangup	

C.7.2 Answer and receive a two-page facsimile with V.34 half-duplex

DTE commands	DCE responses	Local DCE action	Remote station action	Notes
AT+FCLASS=2.1	OK	Set class 2		
AT+FIS=,D,,,,3,,,,	OK	Set for Rec. V.34, Annex A/T.30, Annex C/T.30 or Annex F/T.30		select max rate of 33 600 bit/s
	RING	detect ringing	off-hook, dial	
ATA	 +FCO OK	answer detect CNG send ANSam get CM send JM get CJ negotiate Rec. V.34 begin control channel send DIS	 send CNG detect ANSam send CM get JM send CJ negotiate Rec. V.34 begin control channel get DIS	 Rec. T.30 selected with JM signal from remote terminal the remote indicated 28 800 bit/s ability
AT+FDT	+FCS:,B,,,,1,,,, CONNECT <1st page data> <DLE><ETX> +FPS:1,<lc>,0,0,0 +FET:0 OK	get DCS send CFR switch to primary channel get page 1 FCD switch to control channel get MPS	send DCS get CFR switch to primary channel send page 1 FCD switch to control channel send MPS	in this example, 28 800 bit/s is selected
AT+FDR	CONNECT <2nd page data> <DLE><ETX> +FPS:1,<lc>,0,0,0 +FET:2	send MCF switch to primary channel get page 2 FCD switch to control channel get EOP	get MCF switch to primary channel send page 2 FCD switch to control channel send EOP	
AT+FDR	 +FHS:00 OK	send MCF get DCN hangup	get MCF send DCN hangup	