

24 October 1994

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TITLE : Terminal to terminal signalling in H.32X
PURPOSE : Discussion

1. INTRODUCTION

To assist in the progress of H.32X and related standards, there is a need to define call and connection phases, so that signalling procedures can be identified. It is advocated that terminal to terminal signalling procedures should support setup and release acknowledgment of H.222.1 sub channels.

2. CALL PHASES

In H.32X layer 3 signalling defined in Q.2931 [1] sets up one or more virtual channels (connections) for a call. Signalling within H.222.1 must then set up sub channels within each virtual channel. To assist in progress in H.32X, and related recommendations, the call phases should be clearly identified.

The H.32X terminal is required to operate in both uni directional and bi directional modes. Procedures are likely to be different for each mode. In any case they should be explicitly stated.

For the narrowband audio visual terminal, the following call phases are described in Recommendation H.320,

- Call Set Up, (out of band)
- Mode Initialisation
- Common Parameters
- Visual Telephone Communication
- Termination
- Call Release (out of band)

This outline may or may not be applicable to H.32X.

Figure 1 illustrates a possible frame work for further discussion for call phases and signalling in the H.32X terminal. Here H.222.1 sub channels are established and terminated using acknowledgment procedures. These issues are discussed further in section 3.

It has been recommended previously that signalling procedures should appear in one recommendation as a unified procedure [2].

3. SUB CHANNEL ACKNOWLEDGMENT PROCEDURES

3.1. Discussion

In H.221 identification of a "sub channel" carrying one media type was implied by a particular BAS value. In H.222.1 however, each sub channel carrying audio, video, or data, has to be explicitly declared to the receiving terminal.

H.222.1 may operate in one of the following modes,

- uni directional
- bi directional

In a unidirectional connection, acknowledgment procedures are not applicable. Sub channel establishment can only be done by repeated transmission of the signalling information.

In a point to point bi directional connection, acknowledgment procedures are applicable. It should be investigated as to whether acknowledgment procedures are also applicable in point to multipoint connections, and multipoint to point connections.

It is noted that H.221 uses acknowledgment procedures e.g. the A-bit.

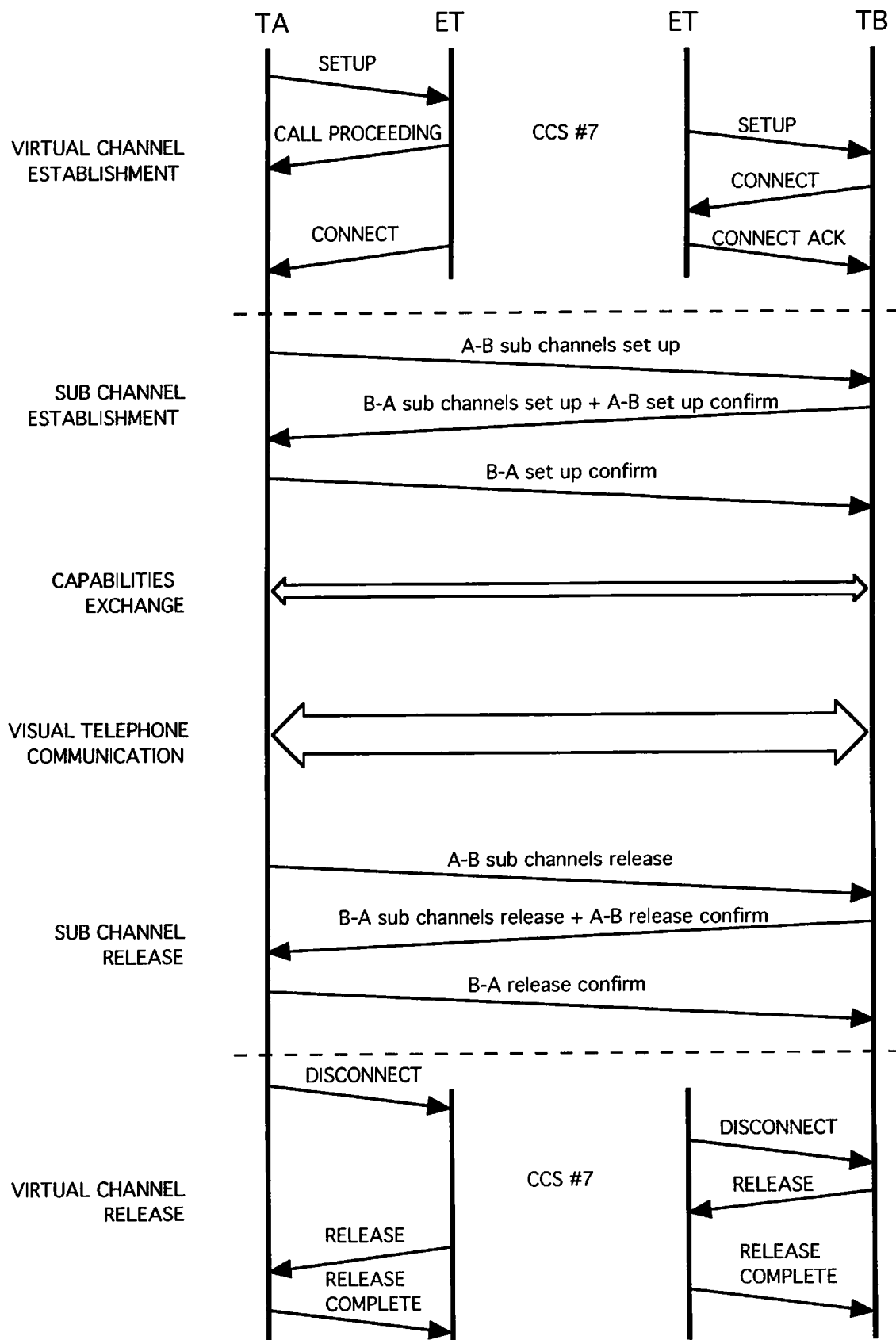


Figure 1. Possible call phases and signalling in H.32X.

It is proposed that an acknowledgment procedure should be defined for the purpose of establishing H.222.1 sub channels. The following points support the use of an acknowledgment signal,

- error conditions can be defined e.g undefined multiplexing identifier.
- synchronisation especially in the case where the remote user is not a human i.e a computer. Transmission cannot begin on a sub channel until it has been correctly established.

In H.222.1 the sub channels known a prior at the receiver, relevant to this discussion, are shown in Table 1. All other audio, video, and data channels must be established using terminal to terminal signalling techniques.

stream	multiplexing field	value	sub channel
Program Stream	stream_id	0xF4	ITU auxiliary data
		0xBC	Program Stream Map
		0xBA	pack start code
		0xBB	system header
Transport Stream	PID	0	Program Association Table

Table 1. H.222.1 sub channels known a prior.

The table shows that in the Program Stream some events can take place at the decoder, before audio, video, and other data sub channels have been established e.g. phase lock loop synchronisation using SCRs. However in the Transport Stream no actions can take place until the Program Association Table and at least one Program Map Table have been successfully received.

It should be investigated as to whether acknowledgment procedures are appropriate for C&I. The proposal in AVC-677 [3] suggests they are. In any case, this is not part of H.222.1. The relationship between descriptors in the Program Stream Map and the information carried in the C&I channel should be investigated.

3.2. Proposed procedure

The procedures here specify sub channel establishment and release procedures for a point to point bi directional channel. Signals in one direction are always positively acknowledged. These procedures would nominally be part of H.222.1. The procedures here are loosely based upon those of the Service Specific Coordination Function at the UNI [4].

For each sub channel, four states are defined being,

- RELEASED - the sub channel is idle
- AWAITING ESTABLISHMENT - a transitory state
- ESTABLISHED - data may be transmitted/received in this sub channel
- AWAITING RELEASE - a transitory state

There may be timers associated with the AWAITING ESTABLISHMENT and AWAITING RELEASE states. In addition it remains to be investigated as to whether a negative acknowledgment signal is required e.g. the protocol data unit was received, but an error was detected.

Six signals are defined as follows,

- ESTABLISH request - request to establish a sub channel
- ESTABLISH confirm - the remote terminal has acknowledged the establishment request
- ESTABLISH indication - a remote terminal has requested establishment of a new sub channel
- RELEASE request - request to release an existing sub channel
- RELEASE confirm - the remote terminal has acknowledged the release request
- RELEASE indication - a remote terminal has requested release of an existing sub channel

Figure 2 shows a state transition diagram. State transitions are driven by the defined signals. Some signals result in the transmission of protocol data units. Other signals result from the reception of protocol data units.

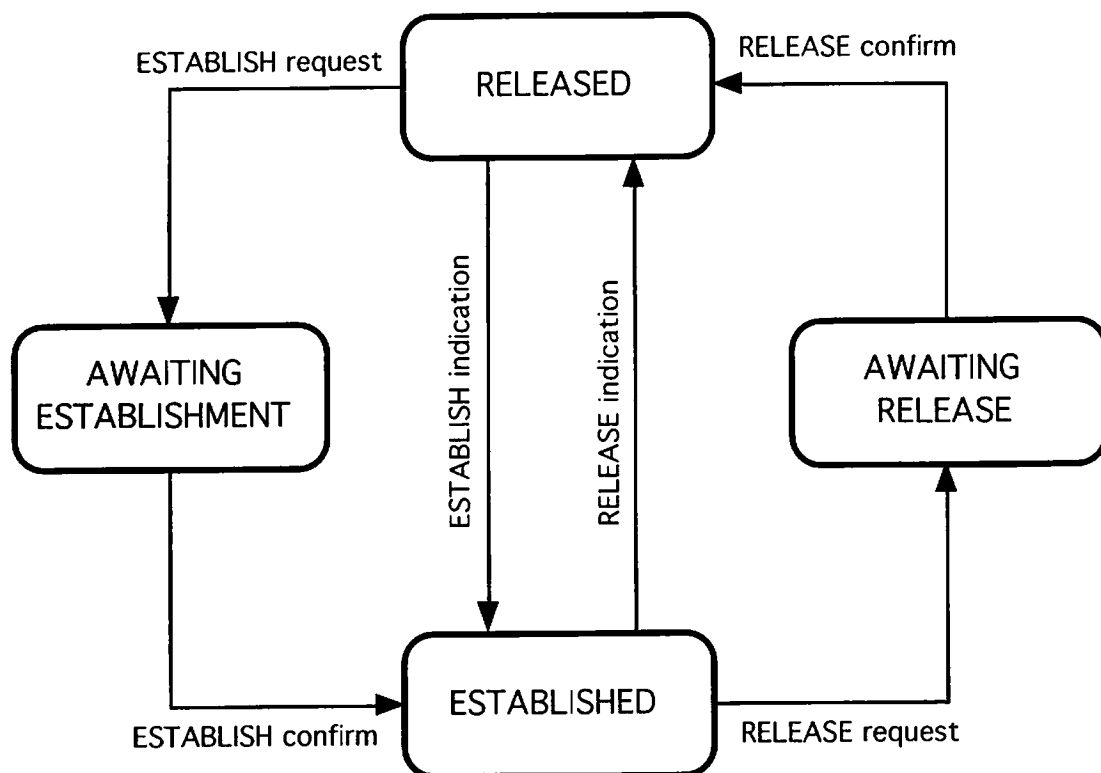


Figure 2. Proposed state transition diagram for H.222.1 sub channel establishment and release

Table 2 shows suitable H.222.1 syntax to support the peer to peer action. Methods to indicate the unspecified parts of Table 1 need to be investigated.

peer to peer action	Program Stream	Transport Stream
request establishment	Program Map Table	PSI
confirm establishment	?	?
release connection	?	?
confirm release	?	?

Table 2. H.222.0 syntax to support indicated peer to peer action

The Program Stream Map and the syntax elements of the PSI contain CRC32 fields. A negative acknowledgment could be issued upon failure of the CRC32 result at the receiver. This remains to be investigated.

It is noted that frame synchronous signalling and mode changes fit simply into these procedures.

4. AAL PARAMETERS AND Q.2931

AVC-666 [5] lists AAL and bit rate values as parameters to be transmitted during capabilities. In addition AVC-677 [3] lists preferred call class, including AAL type. However it is noted that AAL type and AAL parameters may be included in the SETUP message of Q.2931. The AAL parameters information element is transparently carried by the network to the called terminal. As an example, the AAL parameters information element for AAL type 1 includes the following parameters,

- Subtype
- CBR Rate
- Source Clock Frequency Recovery Method
- Error Correction
- Structured Data Transfer Blocksize
- Partially Filled Cells Indicator.

Default values are assumed when parameters are not included, though the first three parameters above are mandatory for AAL type 1.

If the compatibility check fails the user is declared to be incompatible.

5. CONCLUSION

The following is recommended,

- provide a unified description of H.32X signalling procedures.
- consider use of acknowledgment procedures for sub channel establishment and release in H.222.1.

There are open questions relating to the use of multiple virtual channels.

6. REFERENCES

- [1] ITU-T Draft Recommendation Q.2931, "Broadband Integrated Services Digital Network (B-ISDN) Digital Subscriber Signalling System No. 2 (DSS 2) User Network Interface Layer 3 Specification for Basic Call/Connection Control", June 1994.
- [2] AVC-641, "Considerations for H.24X - Communication Procedures for Multimedia on ATM", ITU-T Study Group 15 Experts Group, May 1994.
- [3] AVC-677, "Multimedia System Control: a proposal for H.24P and H.24X", ITU-T Study Group 15 Experts Group, November 1994.
- [4] ITU-T Draft Recommendation Q.2130, "B-ISDN Signalling ATM Adaptation Layer - Service Specific Coordination Function for Support of Signalling at the User-To-Network Interface (SSCF at UNI)", December 1993.
- [5] AVC-666, "H.32X Communication Modes, Terminal Types and Interworking Scenarios between H.32X terminals", ITU-T Study Group 15 Experts Group, July 1994.

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