ITU-T Telecommunication Standardization Sector
Study Group 15
Experts Group for Video Coding and Systems
in ATM and Other Network Environments

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Source : Japan
Title : Use of AAL5 for adapting narrowband audiovisual terminals to broadband ISDN environments.
Purpose : Discussion

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1 Introduction

There is a user demand for carrying certain types of constant bit rate (CBR) or "circuit" traffic over Asynchronous Transfer Mode (ATM) networks. As ATM is essentially a packet- rather than circuit-oriented transmission technology, it must emulate circuit characteristics in order to provide good support for CBR traffic.

This document describes use of ATM Adaptation Layer 5 (AAL5) for adapting narrow-band audiovisual terminals, as defined in Recommendation H.320, to broadband ISDN or ATM LAN environments. The terminal conforming to this technical specification interworks with the same type of terminals accommodated in B-ISDN or ATM LAN as well as existing H.320 terminals accommodated in N-ISDN.

2 Terminal Specifications for applying AAL5 to Narrow-band terminals

Figure 1 shows a network configuration for terminals with interworking function (gateway) between N-ISDN and B-ISDN.

Such interworking function has been assumed to use AAL1 over ATM constant bit-rate virtual channel so far[1]. On the other hand, AAL5 is provided for data transmission which is efficiently performed in ATM network with simplified cell assembly and disassemby mechanism. Furthermore as the use-to-network signaling is provided with AAL5, it is possible to unify AAL function, AAL5, in the terminal. (e.g. data transmission, call control, interworking between Frame Relay and ATM, etc.) As almost all of the commercially available ATM I/F chips are supporting AAL5, it is easy and cost effective to implement the interworking function.

It is noted that the H.320 adaptation discussed here can also be considered as a guarantied bandwidth case for H.32Z[2].

2.1 Terminal architecture

Figure 2 shows a protocol stack of a terminal using AAL5 for the network interface. Figure 3 shows a Protocol Data Unit (PDU) structure of AAL5. In this terminal, the adaptation of H.320 functions over B-ISDN or ATM LAN is achieved through AAL5. Since a terminal in Synchronous Transfer Mode (STM) network such as N-ISDN has a common clock in transmitter and receiver, the transmission clock of a terminal for data transmission in ATM network is derived from the receive clock which is recovered by using adaptive clock method. If a remote terminal is also a terminal in ATM network, the transmit clock in the calling end is made of a network clock and a transmit clock in the called end uses a receive clock which is recovered by using adaptive clock method. This identification of the network environment is carried out by using the signaling information.

Figure 4 illustrates an ATM interface structure for applying AAL5.

2.2 Gateway architecture

In order to realize interworking between an AAL5 terminal in ATM network and a H.320 terminal in STM network such as N-ISDN, a gateway unit is necessary to translate the protocol difference between the networks. The configuration of gateway unit to connect between a terminal with ATM network interface and the one in STM network is shown in Figure 5. Since the clock recovery is done by the terminal side, the gateway unit can be configured with simple buffering circuitry and AAL5 controller only, and need not have such circuits as PLL's. Obviously the signaling level gateway functionalities should also be implemented according to ITU-T specification.

3 Comparison between a terminal based on AAL1 and a terminal based on AAL5

Characteristics of the terminal using AAL5 are summarized as follows;

- For those terminal equipment where both signaling and data services are also supported by the broadband terminal equipment (B-TE), AAL5 will necessarily be present.

- When early deployment of audiovisual communication terminals in ATM environment is considered, the current wide availability of AAL5 chips makes AAL5 a reasonable choice.

Comparison between a terminal based on AAL1 and a terminal based on AAL5 is summarized in Table 1.

Table 1 Comparison between a terminal based on AAL1 and a terminal based on AAL5

	based on AAL1	based on AAL5
packing efficiency	efficient at low bit rate	efficient at high bit rate (depends on PDU size)
complexity	high	low
Cell loss detection	detectable	undetectable
Bit error correction	may be possible	may be possible
delay	low	relatively high (depends on PDU size)
flexibility	little	large
Network common clock	not necessary (Note	not necessary
the availability of chips	a few	many
Gateway equipment	large circuit size	small circuit size

Note) A H.32Y terminal requires a common network clock.

5 Conclusion

The terminal architecture using AAL5 for adapting narrow-band audiovisual terminal has been studied in this document. Also the gateway equipment using AAL5 has been studied. As compared with the terminal using AAL1, several advantages of the terminal using AAL5 have also been raised. The SG15 Experts Group should urgently discuss such terminal specifications and gateway functions.

Reference

[1] AVC-717 Draft Recommendation H.32Y, Nov. 1994, Singapore

[2] AVC-718 Draft Recommendation H.32Z, Nov. 1994, Singapore

Annex to AVC-728

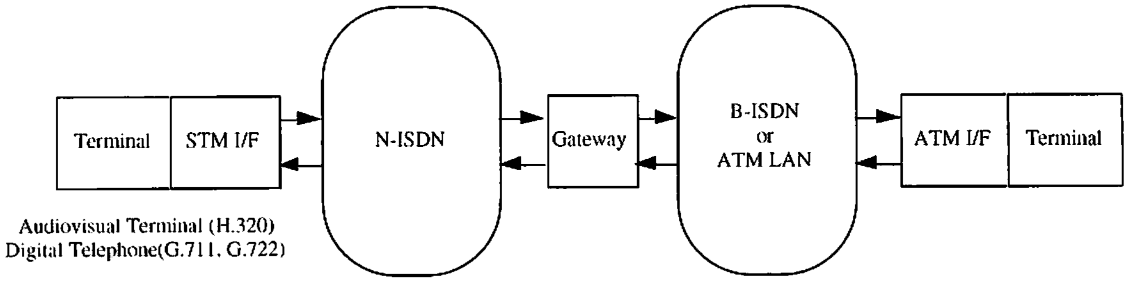

Fig.1 Network Configuration between STM and ATM

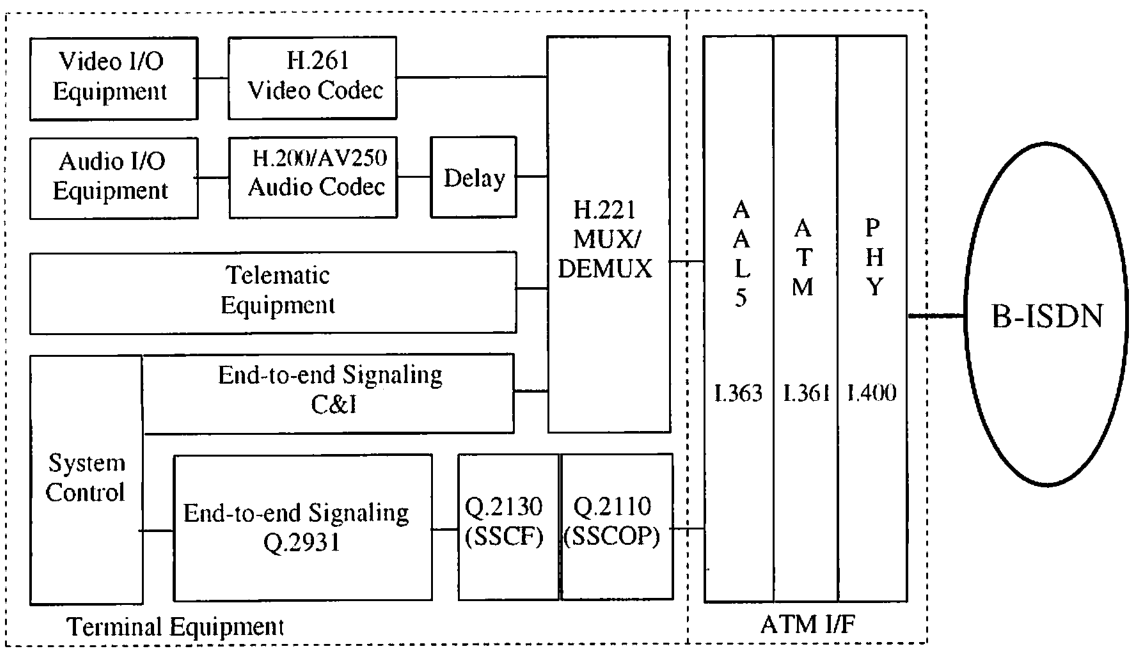

Fig.2 Protocol stack of this terminal

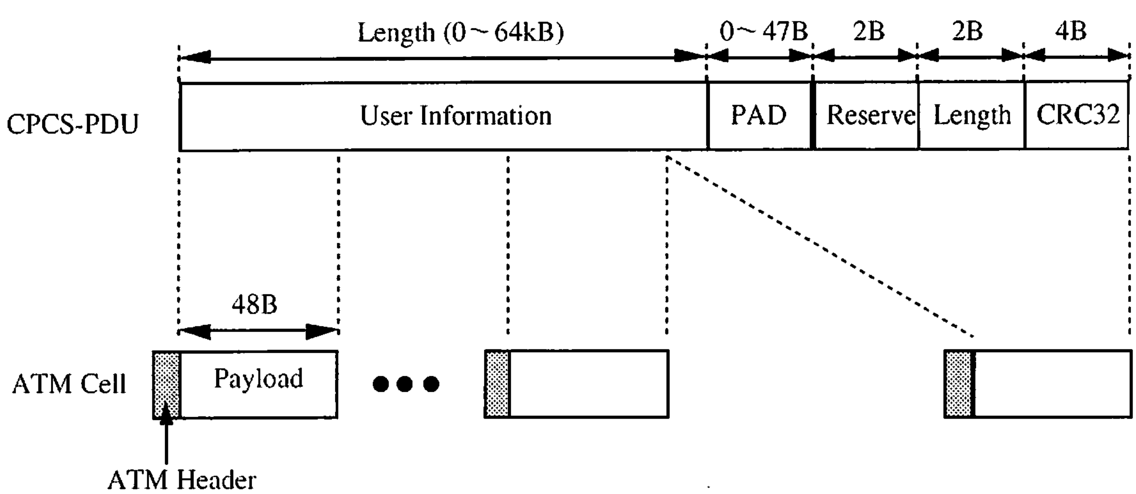

Fig.3 PDU Format of AAL5

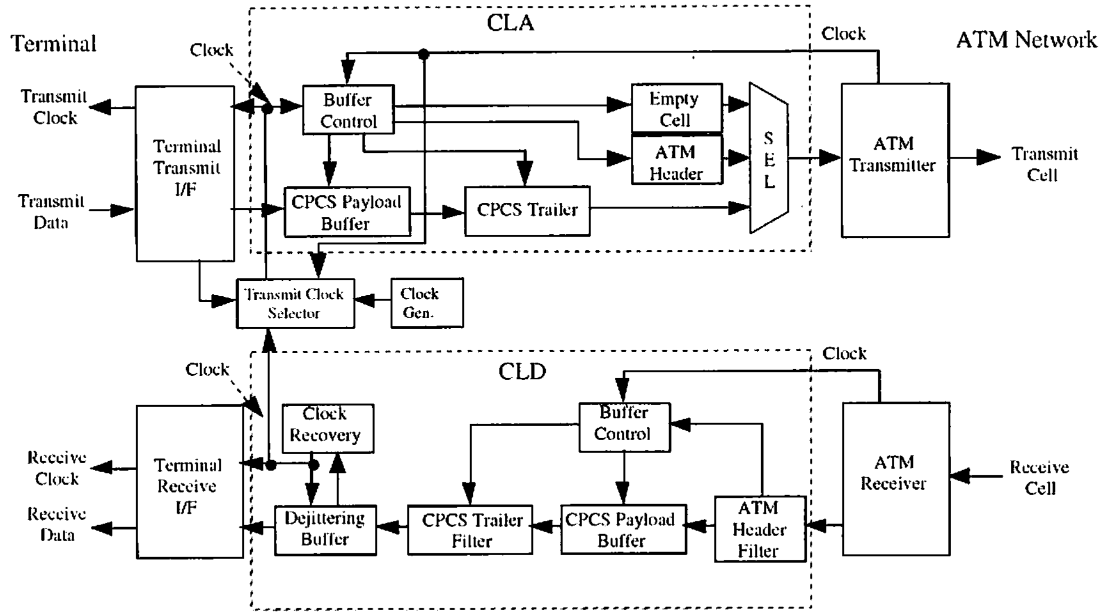

Fig.4 ATM I/F for applying AAL5

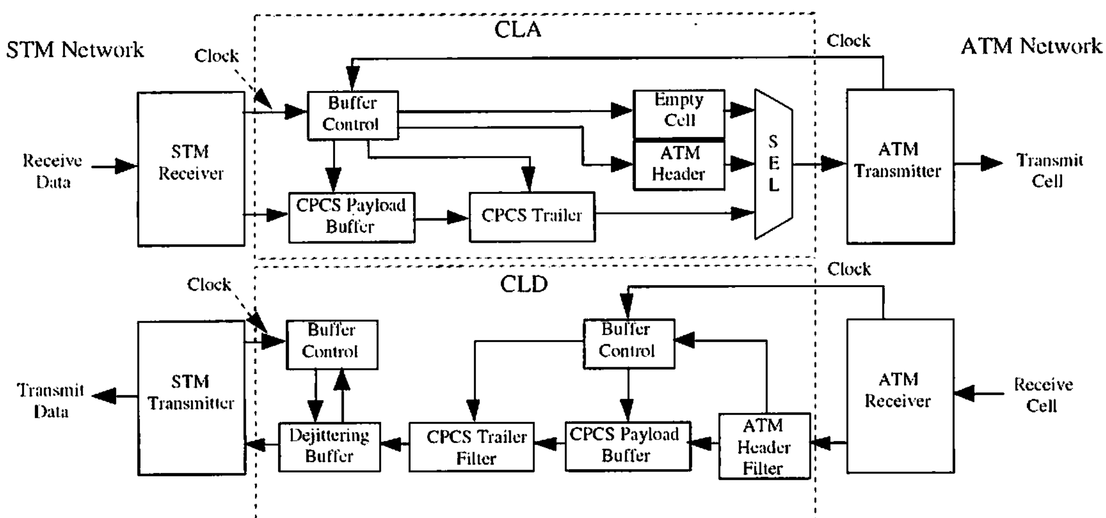

Fig.5 Gateway Equipment for applying AAL5