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1. Introduction

At the last meeting in Nürnberg, a working basis on the bit assignment of the Application Channel was proposed (see Annex 7 to Doc. #181R). This document first proposes a method to deal with essential and optional facilities, then lists up the control & indication signals to be transmitted using the bit protocol through the Application Channel, and finally proposes a bit assignment of those control & indication signals to the 24 bits in the Application Channel.

2. Principle to deal with optional facilities

Codec facilities are classified into essential ones and optional ones. All the essential facilities should be provided by any standardized codec to ensure compatibility, whereas optional facilities may not be provided by all codecs. Hence we have to prepare a mechanism to enable interworking between a codec with optional functions and a codec without them.

Here it is proposed that the optional facility indication signal and the operational mode indication signal be defined. The former indicates which facilities a codec has, while the latter indicates which facility is activated at the time. If once the codec has identified the facilities the other end's codec has, it can switch on/off its own facilities and show in which mode it is operating. It should be noted that if there is no return channel to indicate facilities as in broadcasting mode, then the codec should operate in default mode or with all the optional facilities switched off.

As an example, demand refresh is taken up. Demand refresh has been defined as optional (see Section 5.4/Doc. #181R). It means that every codec has cyclic refresh facility, while some codecs may have demand refresh in addition to mandatory cyclic refresh facility. If only one end has demand refresh, the both ends should operate in cyclic refresh mode. If demand refresh is provided in both ends, however, it should be activated so that additional bits for cyclic refresh (say 5-10 % of the total 300 kbit/s) be utilized for improving the picture quality and that the decoder output picture will quickly recover from transmission errors. In this case, there is no need to indicate the operational mode since demand refresh should always be activated as far as it is available.

Another example is video encryption. In this case, it may not be activated even if both ends have the facility, thus operational mode need be indicated.

3. Control & indication signals to be transmitted

There are three categories in the codec-to-codec signals. The first category is the one already identified and recorded in Annex 7 to Doc. #181R, which is named 'Control Command/Response' here.

The other two categories, 'Optional Facility Indication' and 'Operational Mode Indication', are introduced according to the principle mentioned above.

The following items belonging to each category can be listed at the moment:

A. Control Command/Response

FUR: Fast Update Request   1 if required
FPR: Freeze Picture Request   1 if required
CRS: Clock Rate Source   1 if network clock required
VLR: Video Loop Request   1 if required
DLR: Digital Loop Request   1 if required
LPD: Looped Ports Detection   1 if detected

B. Optional Facility Indication

VEF: Video Encryption   1 if provided
AEF: Audio Encryption   1 if provided
ECF: Forward Error Correction   1 if provided
VSF: Video Scramble   1 if provided
DRF: Demand Refresh   1 if provided

C. Operational Mode Indication

VEM: Video Encryption   1 if activated
AEM: Audio Encryption   1 if activated
ECM: Forward Error Correction   1 if activated
VSM: Video Scramble   1 if activated

4. Bit assignment

A guideline was given to the bit assignment of codec-to-codec signals in Annex 7 to Doc. #181R. According to this guideline, a bit assignment to the 3 bytes (24 bits) is proposed as shown in Figure 1. The three categories are assigned as follows;

1st byte (Bit 17 - 24): Floor management etc.
2nd byte (Bit 25 - 32): Optional facility indication and
                        operational mode indication
3rd byte (Bit 33 - 40): Control command/response

Each control & indication signal word comprises of 4 consecutive bits of 1 or 0 so that a simple majority logic can be applied at the decoder, such as if 3 or 4 bits indicate 1(0), the output is 1(0), while if the break is 2 to 2, the output does not change from the previous value.

As for the Fast Update Request and Freeze Picture Request, a 80ms interval is assumed. If more frequent transmission is necessary, it can be reduced to 20ms by using the remaining bit positions, 2nd to 7th and 10th to 15th multiframes.

5. Conclusion

A method to deal with optional facilities and a bit assignment to the control & indication signals have been proposed. If so agreed, this content should be included in the Flexible Hardware specification.
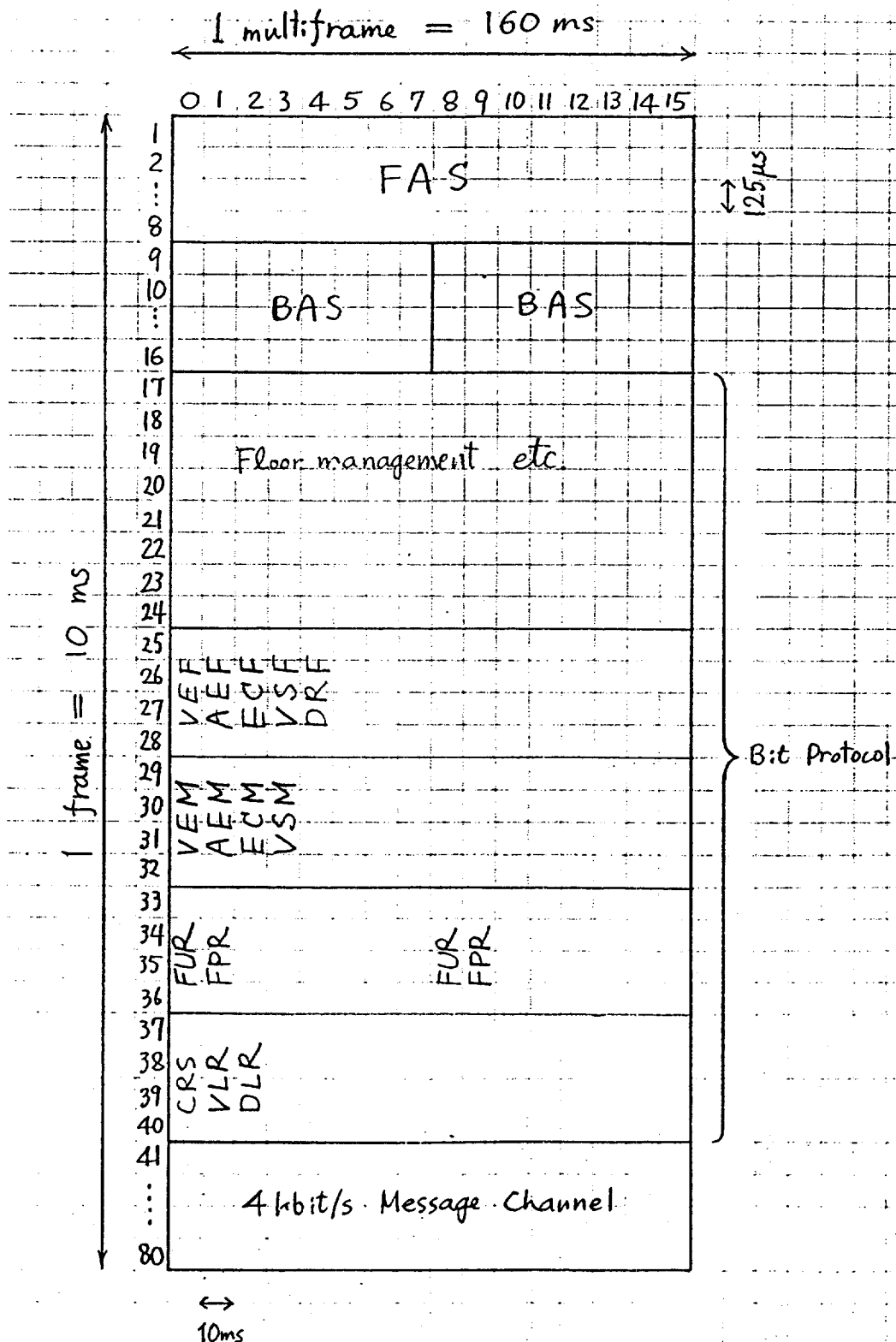

Figure 1 Bit assignment for control & indication signals
in Service Channel