Extended Control Space

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New control words are needed

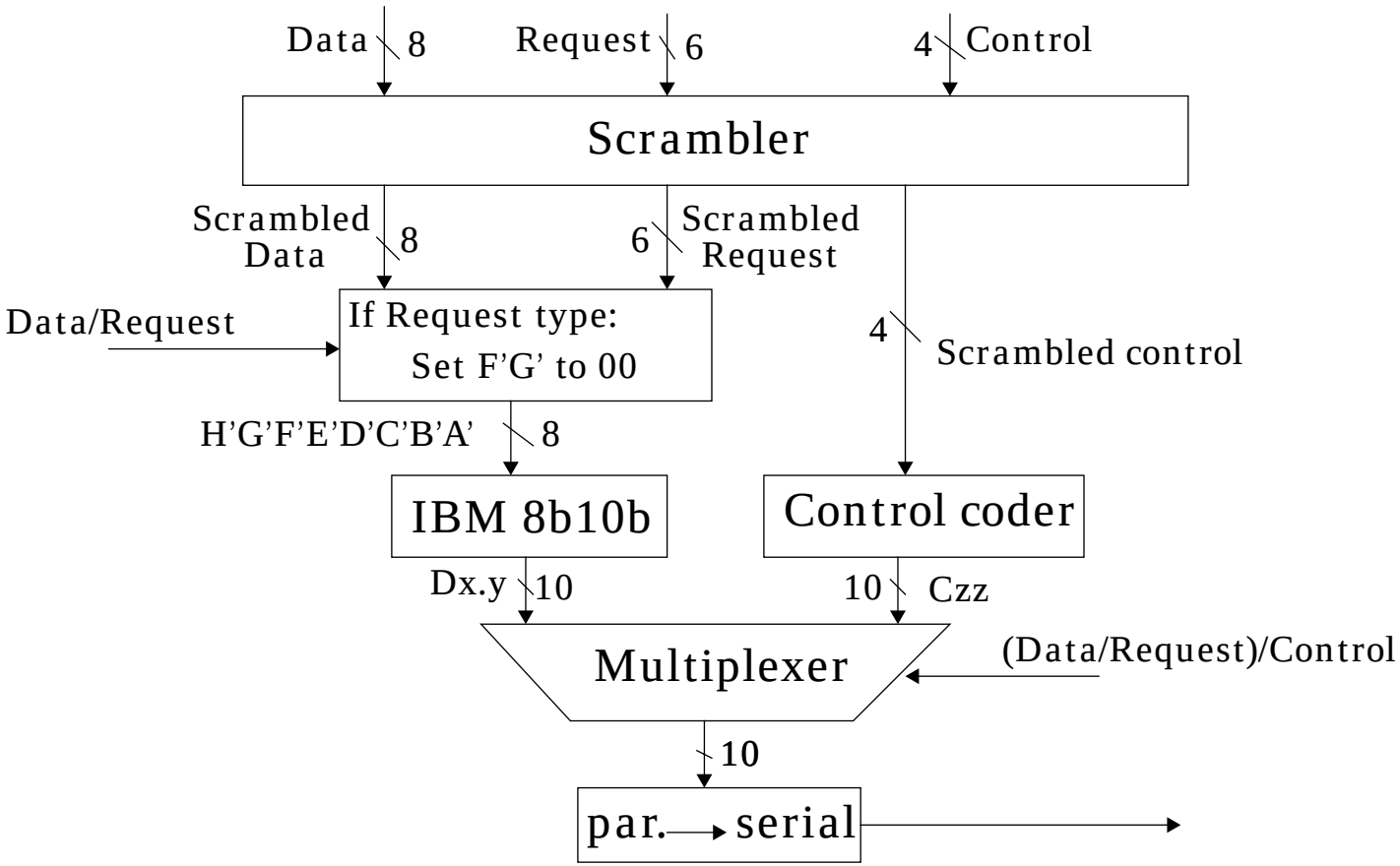
Control table is almost full (only 1 spare) and more controls words are needed for:

- Suspend / Resume in 1394a: SUSPEND, DISABLE_NOTIFY
- BOSS scheme: Requests with priorities, Grant, Arb_reset
- Future use

Options:

- use ESC + CONTROL: limited amount of new words
- use DATA words for BOSS requests and re-organise Control table
- other ?

2nd Option


Data
8
Request
6
4
Control
Scrambler
Scrambled Data
8
6
Scrambled Request
Data/Request
If Request type:
Set F'G' to 00
4
Scrambled control
H'G'F'E'D'C'B'A'
8
IBM 8b10b
Control coder
Dx.y
10
10
Czz
Multiplexer
(Data/Request)/Control
10
par.
serial

New control allocation

- New control words are scrambled and mapped to either:
  - Czz (set of 16 words as in table 10-6 of draft standard)
  - Some data words (enough to accomodate many BOSS requests)

Data like stream between packets

- Bus Reset and Packet delimiters must be distinct from data:
  - Bus Reset
  - Start of packet: DATA_PREFIX (rd>0 & rd<0)
    SPEEDa, SPEEDb (rd>0 & rd <0)
  - End of Packet: DATA_END (rd>0 & rd <0)
    DATA_END_ERR (rd>0 & rd<0)

→ Czz

End of Packets

BOSS scheme needs to send Grant and / or Arb_reset immediately after a packet has ended.

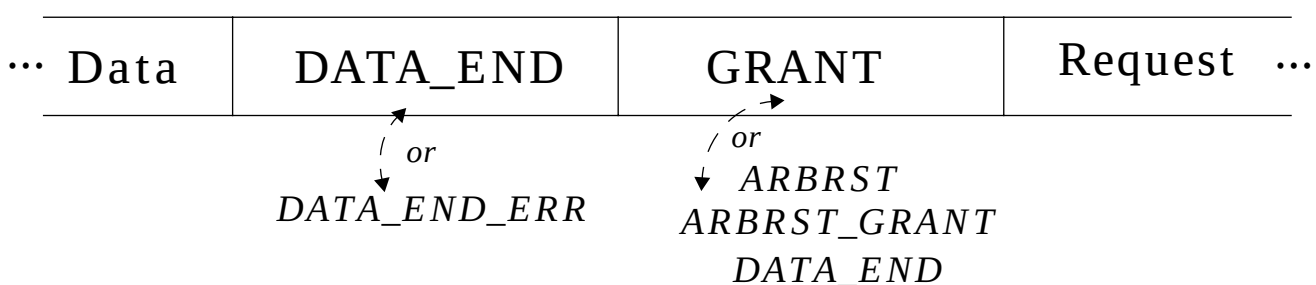
→ Three new words (mapped to Czz) are defined:

- GRANT (send Grant and no Arb_reset)
- ARBRST (send Arb_reset but no Grant)
- ARBRST_GRANT (send both Arb_reset and Grant)

→ Czz

(no Grant and no Arb_reset is simply indicated by DATA_END)

Example:

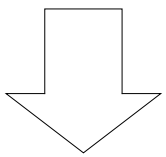


What is left?

We have left to assign:

- IDLE, PARENT_NOTIFY, CHILD_NOTIFY, SUSPEND, DISABLE_NOTIFY
- BOSS Requests
- Other requests used for synchronisation:

  Training req., Operation req. (see Bport spec.), Illegal req.



All can be scrambled and mapped to some Data words: Request Types

Request Types

During Requests (majority of non-packet time), descrambler loss of synchronisation will lead to wrong requests being received.

- How can we detect this is happening? ⇨ Illegal Request

Errors could give Illegal req. even though descrambler is still synchronised

- Request types should be robust (precaution for future use as well)

Question: Is there an easily addressable set of Data words allowing detection of 1 single bit error (through Hamming distance and disparity checks)?

Answer: Exhaustive search was carried out and the larger set satisfying the requirement contains 64 Data words and is unique:

⇨ H'00E'D'C'B'A' or in other words {Dx.0, Dx.4}

Summary

Control state	Control symbol (SRQP)		H'00E'D'C'B'A' ⟷ {Dx.0, Dx.4}
	rd>0	rd<0	
ARBRST_GRANT	0000		PARENT_NOTIFY (1) CHILD_NOTIFY (1) SUSPEND (1) DISABLE_NOTIFY (1) Training Req. (1) Operation Req. (1) Illegal Req. (1) BOSS Req. } (57) Spare }
GRANT	0001		
Spare	0010		
Spare	0011		
SPEEDa	1101		
SPEEDb	1000	0100	
DATA_PREFIX	1001	0101	
DATA_END	1010	0110	
DATA_END_ERR	0111	1011	
ESCAPE	1100		
ARBRST	1110		
BUS_RESET	1111		

Notes:

- IDLE is now a BOSS Request (Request_none).
- ESCAPE is kept in Czz table for possible (unforeseen) future use.