

8.1 (System Reaction Time)

PROFIBUS

- TSDR(– The reaction time after which a station can respond)
- (i.e., Baud rate)
- Min_Slave_Interval *)
- (The net data length specified)

*) Min_Slave_Interval 가 PROFIBUS

Min_Slave_Interval 2 ms

ASIC Min_Slave_Interval 100 μ s 가 가

, 가 가

Min_Slave_Interval

, 가 Telegram

Telegram/

Telegram Telegram ASIC

“ (rule of thumb)”

“PROFIBUS ASIC” ASIC 가

PROFIBUS-DP 20 가 5 가 12 MBd 10

12 MBd 1Tbit = 1/12,000,000 bit/s = 83 nsec
 1 가 11 (, 1, 1, 1, 8)
 => 1 83 ns x 11 = 0.913 μ sec

$T_{MC} = \text{Telegram} (\text{Telegram} + T_{SDR} +)$

$T_{BC} =$ (, Telegram) .
Telegram

Date Exchange Telegram 9
TBit 가 . (1.5 MBd T_{idl} 36 TBit 가 .) $T_{SYN} = 33$ TBit $T_{idl} = 75$
 , T_{SDR} 1.5 MBd ASIC SPC3
30 TBit 가 . T_{SDR} ASIC
“PROFIBUS ASIC”

11 Telegram Telegram

$$T_{MC} = (2 \times () \times 11 + T_{SDR} + T_{syn} + T_{ID1}())$$

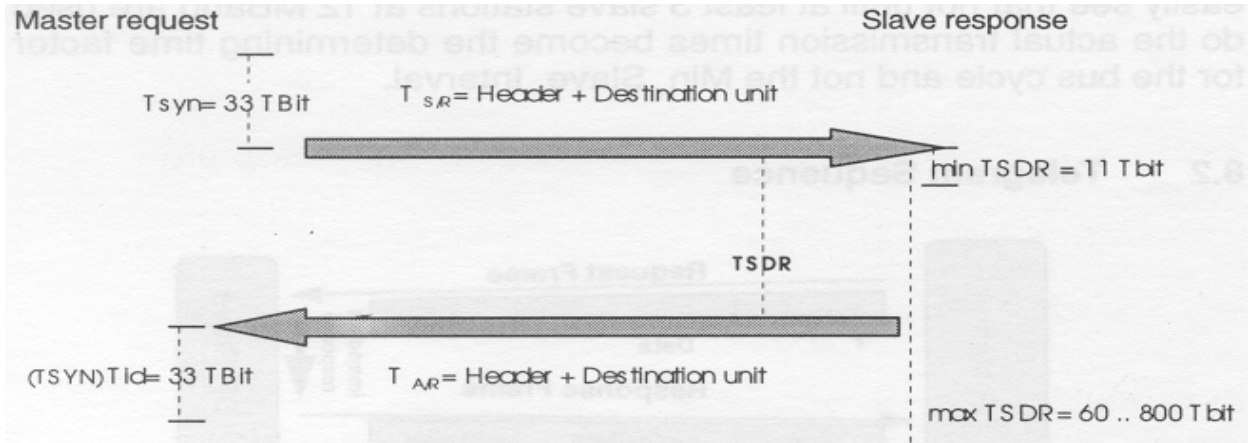
$$T_{MC} = 198 + 30 + 33 + 75 = 336 \times 83 \text{ ns} = 28 \mu \text{ sec}$$

Telegram 28 μ s .

Telegram :

$$T_{MC} = 28 \mu \text{ s} + (: 10 + 20)$$

$$T_{MC} = 28 \mu \text{ s} + 30 \mu \text{ s} = 58 \mu \text{ sec/}$$



11:

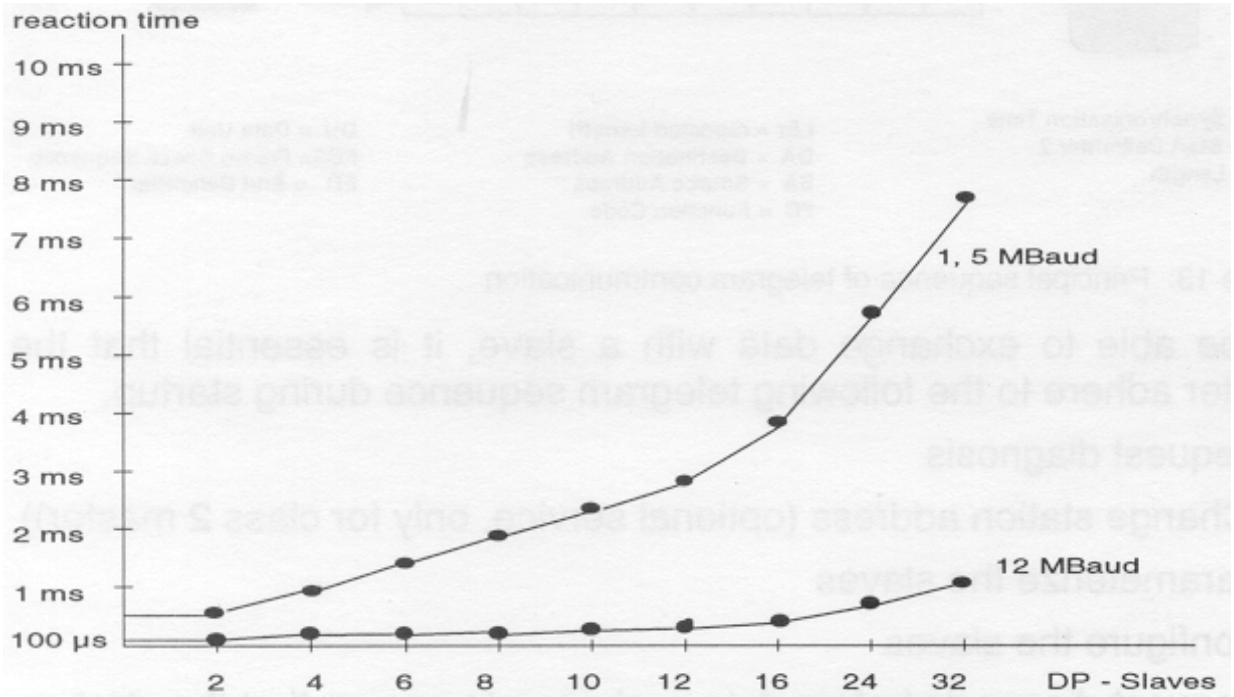
가 .

12 MBd

“

28 μ sec + 1 μ sec”

EN 50 170



가 : 4

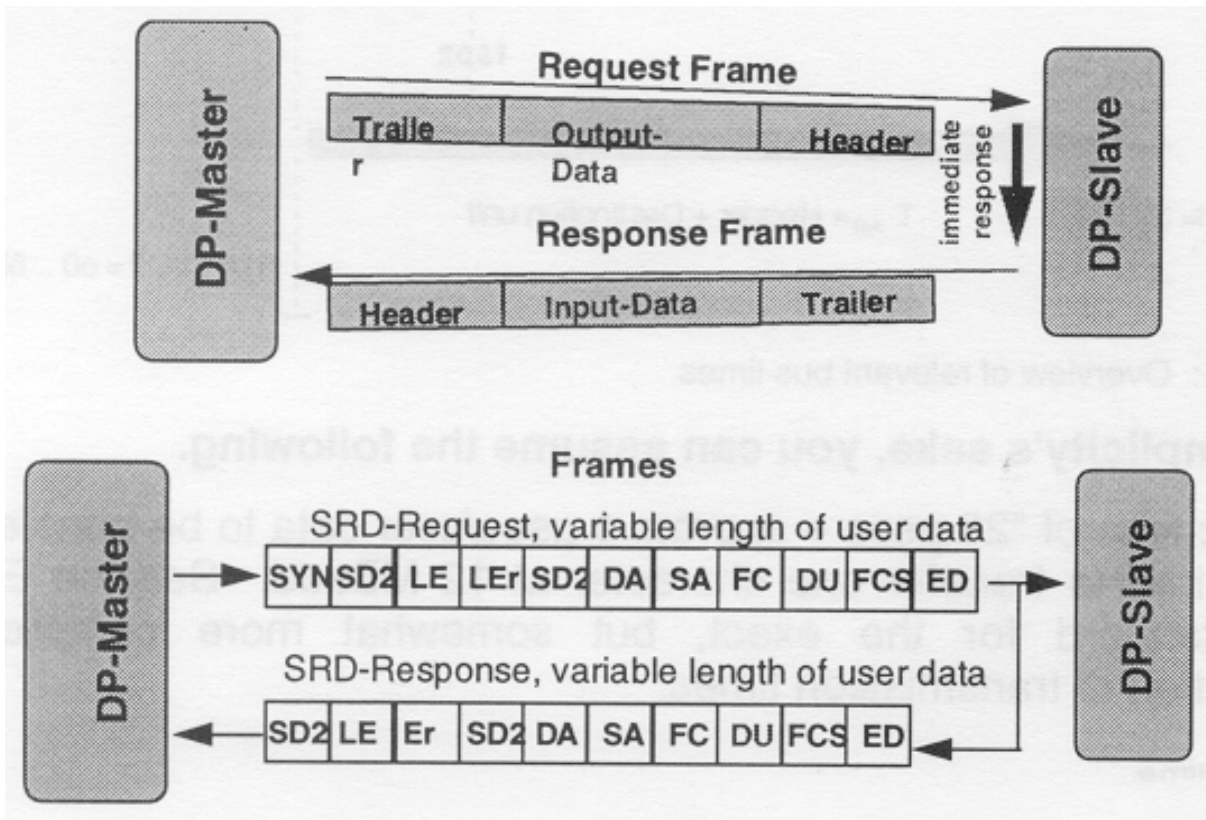
12: PROFIBUS (1.5/12 MBd)

1.5 MBd 12 MBd PROFIBUS-DP
 100 μ sec Min_Slave_Interval 가 SPC3
 가 12 MBd 3 가

Min_Slave_Interval

가

8.2 Telegram



Syn = Synchronisation Time
 SD2 = Start Delimiter 2
 LE = Length

Ler = Repeated Length
 DA = Destination Address
 SA = Source Address
 FC = Function Code

DU = Data Unit
 FCS = Frame Check Sequence
 ED = End Delimiter

13 : Telegram

가

Telegram

1. (Request diagnosis)
2. (, 2))
3. (Parameterize the slaves)
4. (Configuration the slaves)
5. 가
- 6.
7. - global control)

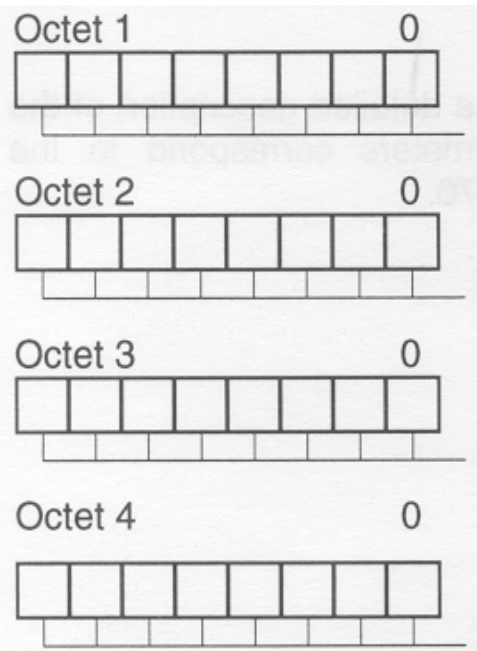
가

	(DA)		(SA)	
DA	SA	MSB = 1()	Telegram DSAP SSAP 가
		SAP(Telegram)	0 , DSAP SSAP 가

8.3

“Power On” 2 Telegram SAP=55
 . Telegram

SD	LE	LEr	SD	DA	SA	FC	DSAP	SSAP	DU	FCS	ED
68H	X	x	68H	8x	8x	x	60/3CH	62/3EH	x..	x	16H



00 = 가 가
 01 = 가 가

8.4

PROFIBUS-DP

Telegram ,
(diagnostic data)

가
Telegram

가

DP

6

(HW)

가

Telegram :

Telegram

EN 50 170

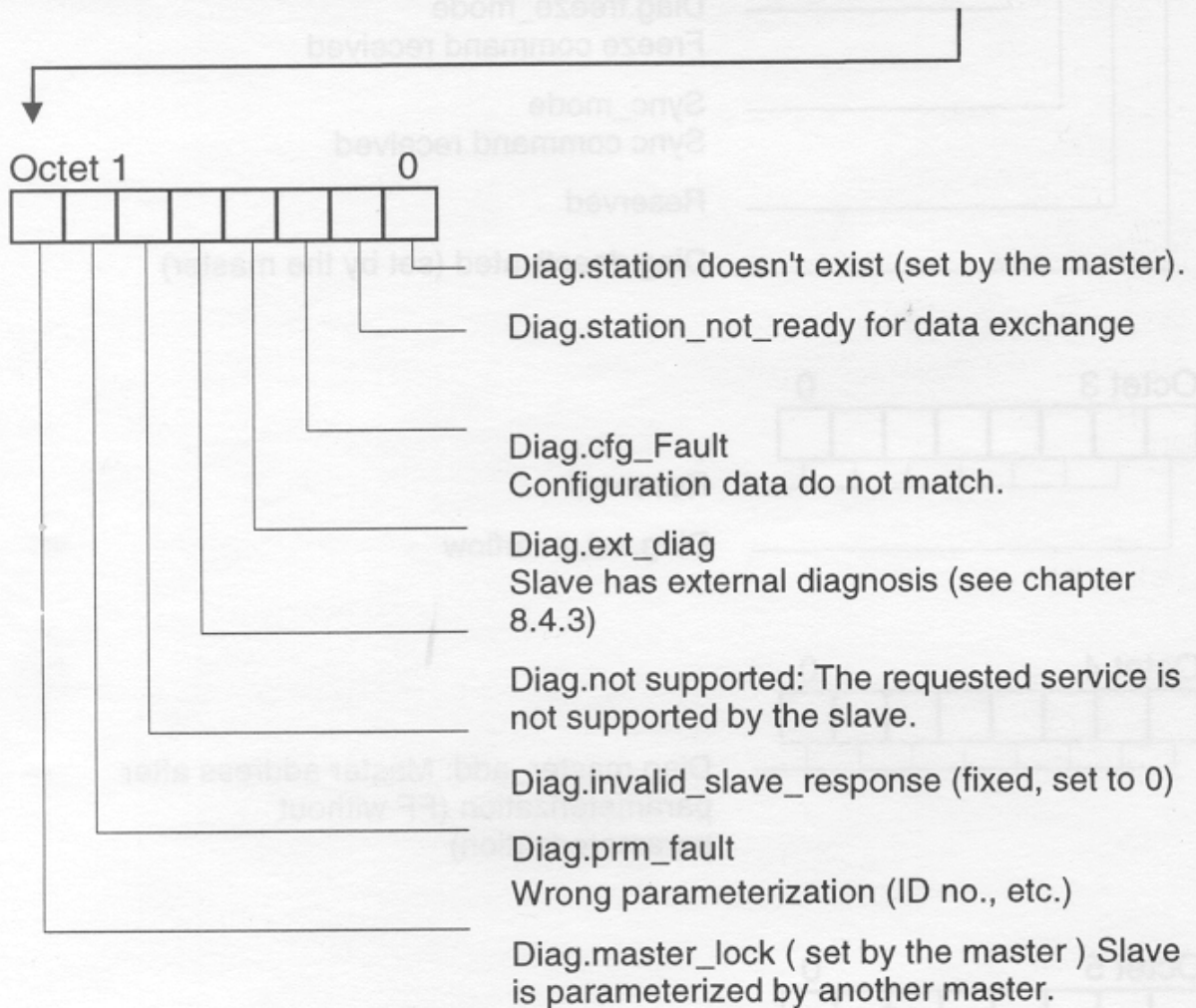
Telegram

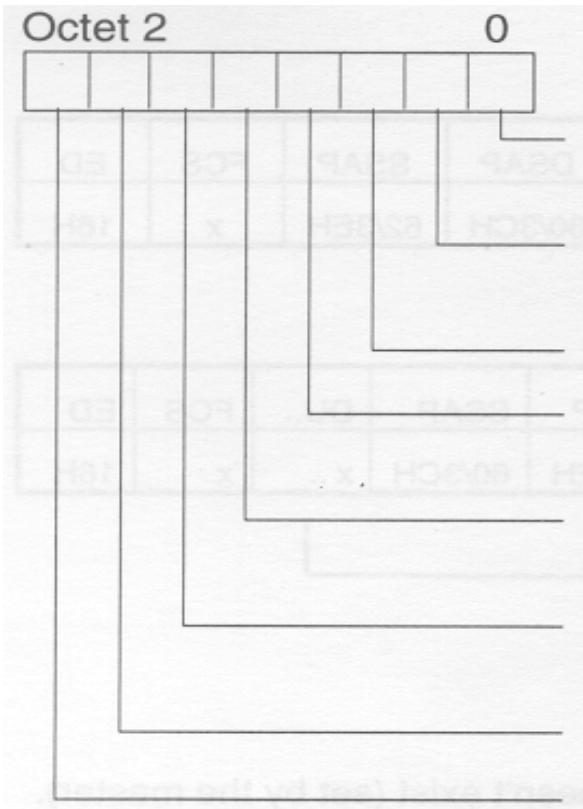
(Diagnostic request)

SD	LE	LEr	SD	DA	SA	FC	DSAP	SSAP	FCS	ED
68H	x	x	68H	8x	8x	x	60/3CH	62/3EH	x	16H

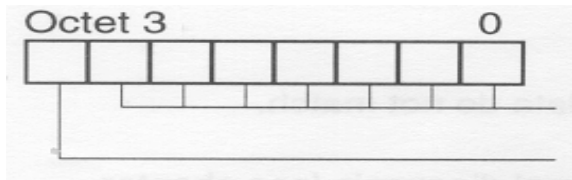
(Response to a diagnosis request)

SD	LE	LEr	SD	DA	SA	FC	DSAP	SSAP	DU..	FCS	ED
68H	x	x	68H	8x	8x	x	62/3EH	60/3CH	x..	x	16H

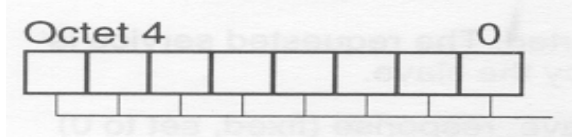




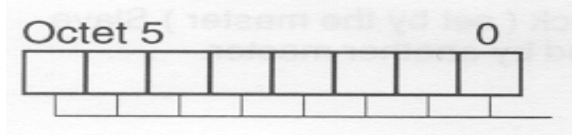
Diag.Prm_req 가
 Diag.Stat_diag (Diag-Bits)
 (fixed), 1
 Diag.WD_ON (watchdog)
 Diag.freeze_mode (freeze)
 Sync_mode
 Diag.deactivated()



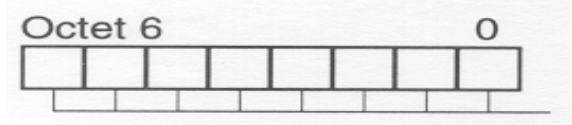
(Reserved)
 Diag.ext_overflow



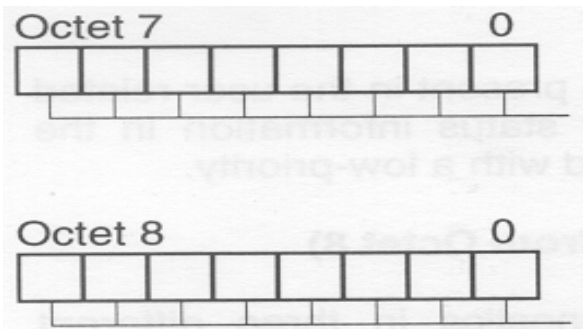
Diag.master_add:
 FF)



,



ID ,



(Length of external diagnosis)

(External diagnosis)

: ASIC

ASIC

Firmware

가

8.4.1 PRM_REQ(Octet 2)

(startup)

: 가

8.4.2 STAT_DIAG(Octet 2)

가

가

, PROFIBUS-DP

Data_Exchange

:

8.4.3 EXT_DIAG:(Octet 1)

가

8.4.4 (application specific) (Octet 8)

3 가

8.4.4.1 a)

가

	Bit 7	Bit 8	Bits 5 to 0
Header byte	0	0	Block length in bytes incl. header
Diagnostic field			
....	Coding of the diagnosis varies with the device		
	and can be specified as desired.		

8.4.4.2 b)

가

(:1 0 x 10).

가

가

	Bit 7	Bit 8	Bits 5 to 0
Header byte	0	1	Block length in bytes
Bit structure	1		1

Identifier byte 7
has the diagnosis

Identifier byte 0
has the diagnosis

8.4.4.3 c)

가

3 가

	Bit 7	Bit 6	Bit 5	Bits 4 to 0
Header byte	1	0	Identifier number	
Channel number	Coding Input/Output		Channel number	
Type of diagnosis	Coding Type of channel			Coding Type of error

8.4.5

EXT_DIAG 가 0

(,).

:

가 50%

가 80%

:

PROFIBUS-DP

가 50%

가 10% 가

가 80%

8.5 EXT_DIAG_OVERFLOW(Octet 3)

가

가

가

8.6

가

PLC/

“ ” 가

가 . , PLC
가 가 .

“ ”
가 , PLC 가

8.7 Telegram

Telegram 가

가 .

- (watchdog)
가

- TSDR (가 가)

- (freeze)/ 가 (,)

- DP 가 (가)

- (global control) Telegram .

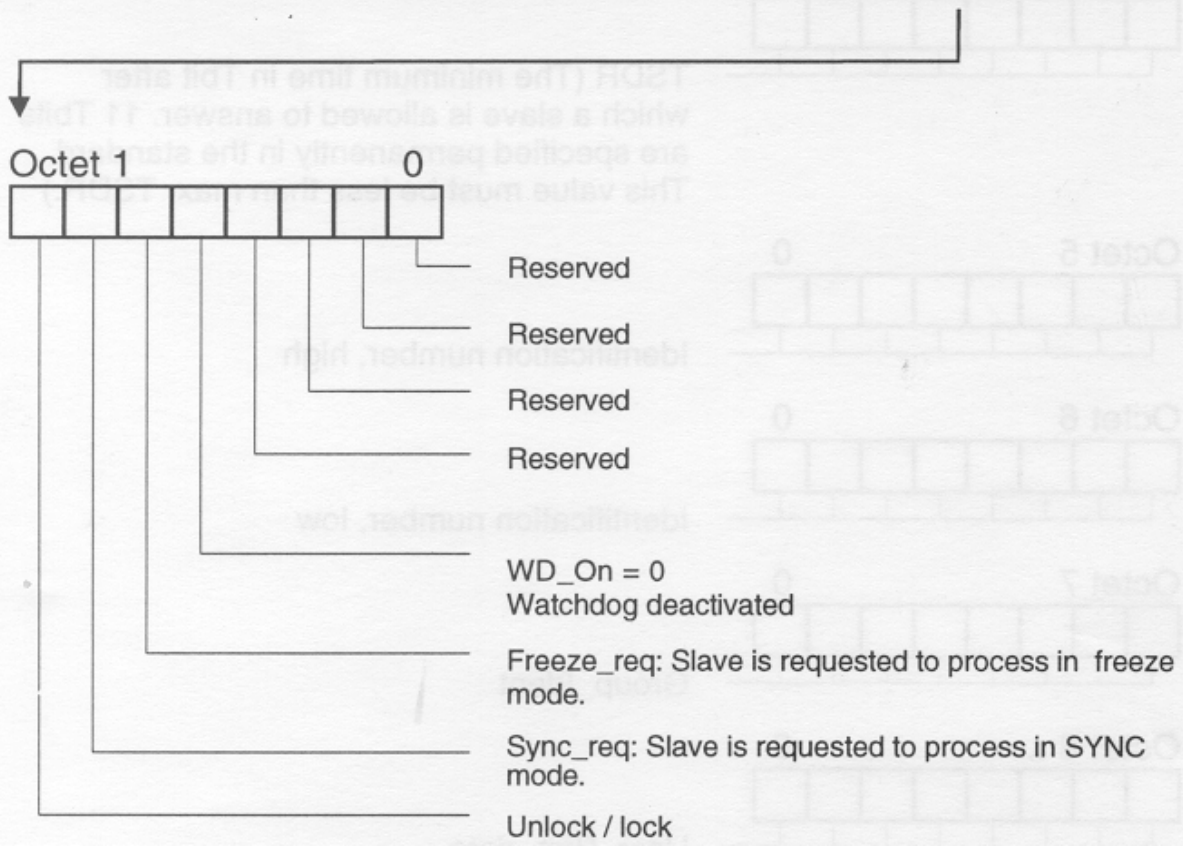
-

- (, Clear)

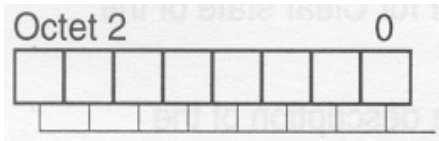
Telegram .

Telegram :

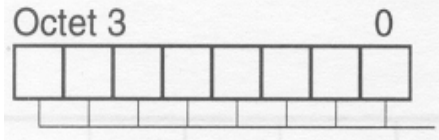
SD	LE	LEr	SD	DA	SA	FC	DSAP	SSAP	DU..	FCS	ED
68H	x	x	x	8x	8x	x	61/3D	62/3E	x..	x	16H



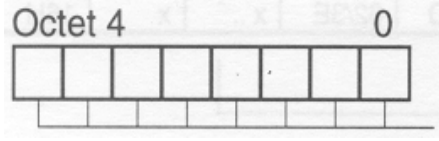
Lock	Unlock	
0	0	TSDR
0	1	DP 가
1	0	DP 가
1	1	DP 가



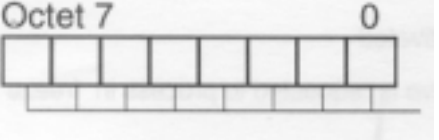
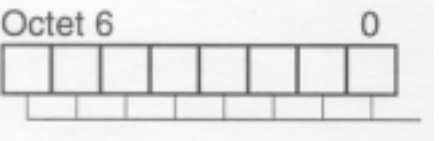
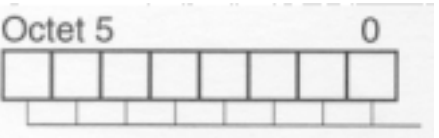
WD_Fact_1 *)



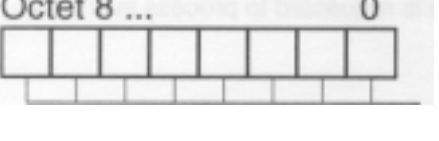
WD_Fact_2: TWD(s) =
10 msec * WD_Fact_1 * WD_Fact_2 *)



TSDR((TBit).
11 TBit 가
TSDR



Group_Ident



User_Prm_data

Telegram

“E5H”(,) .

가

*)

Octet 2 3 10 ms
Octet 2 가

Octet

1 . 12 MBd
ASIC . ASIC

1 ms 가

8.8 Telegram

Telegram . Telegram 가

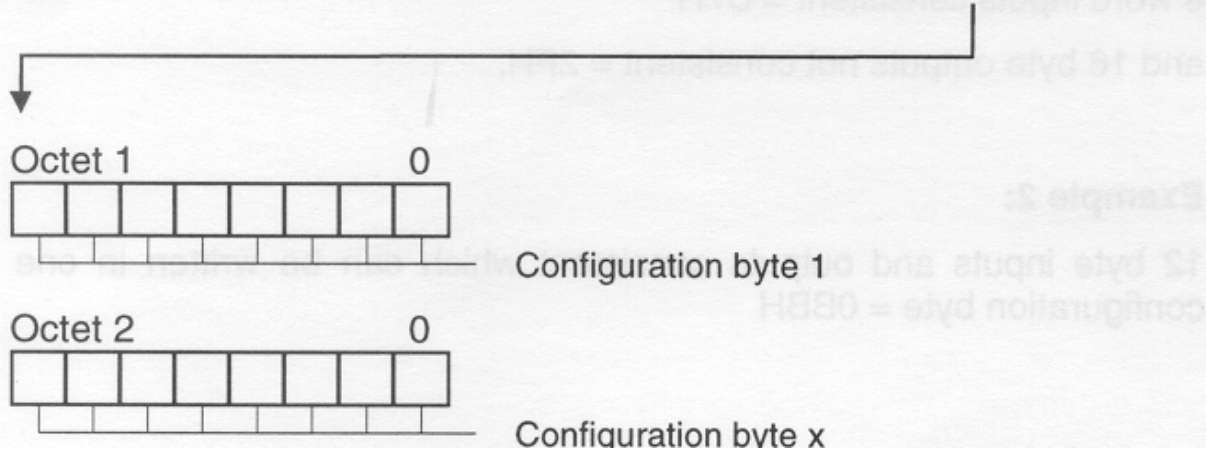
DU Octet 16 . Octet
 Octet /

Telegram "E5H" 가 GSD 가

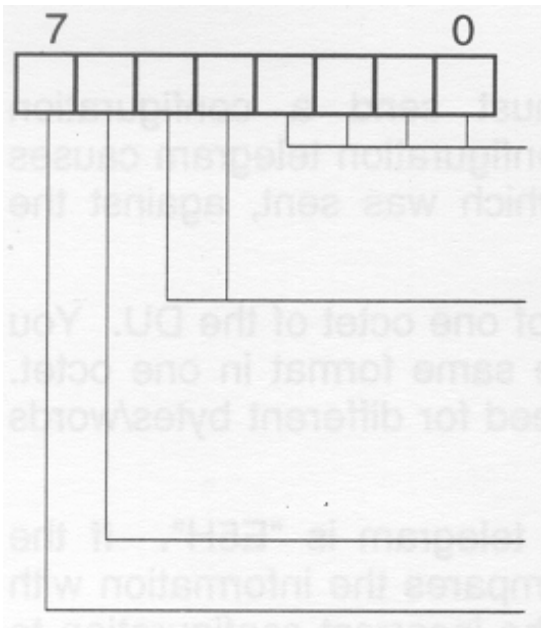
Telegram " "

Telegram

SD	LE	LEr	SD	DA	SA	FC	DSAP	SSAP	DU	FCS	ED
68H	x	x	x	8x	8x	x	62/3E	62/3E	x..	x	16H



Telegram Octet



00 = 1 /
 15 = 16 /
 /
 00 =
 01 =
 10 =
 11 =
 0 = , 1 =
 0 = /
 1 =

2

, "Get_Cfg"

1:

8 = D7H

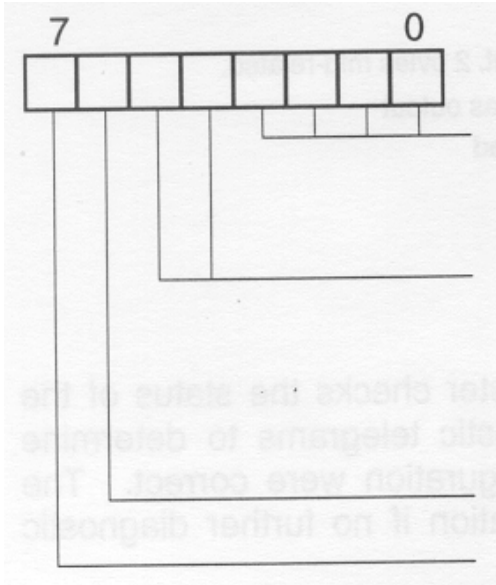
16 = 2FH

2:

12

= 0BBH

()



(Length of the vendor-specific data)

0 =

1-14 =

15 =

*)

0

00 =

01 =

10 =

01 =

1

1

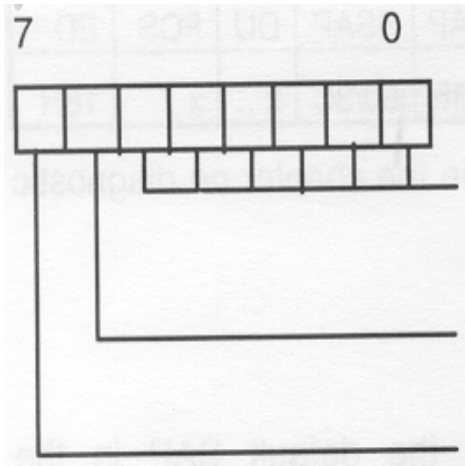
1

*) "Chk_Cfg"

"Get_Cfg"

15

가



I/O

00

1

/

63

64

/

0 =

, 1 =

0 =

, 1 =

8

2

가

Telegram

1	0	0	0	0	0	1	0
1	0	0	0	0	1	1	1

1

, 2

8

(mfq-related)

8.9

Telegram 가

가

SD	LE	LEr	SD	DA	SA	FC	DSAP	SSAP	DU	ED
68H	x	x	68H	8x	8x	x	60/3C	62/3E	x..	16H

SD	LE	LEr	SD	DA	SA	FC	DSAP	SSAP	DU..	FCS	ED
68H	x	x	68H	8x	8x	x	62/3E	58/3A	x..	x	16H

DU Telegram

8.10

Telegram

SAP

()

가

“E5H”

Telegram

SD	LE	LEr	SD	DA	SA	FC	DU..	FCS	ED
68H	x	x	68H	xx	xx	x	x..	x	16H

SD	LE	LEr	SD	DA	SA	FC	DU..	FCS	ED
68H	x	x	68H	xx	xx	x	x..	x	16H

Telegram DSAP SSAP 가 9
 DA SA 0 . DU
 가 (1 - 244).

8.11 Read_Inputs

Telegram Data_Exchange
 Telegram

SD	LE	LEr	SD	DA	SA	FC	DSAP	SSAP	FCS	ED
68H	05H	05H	68H	8x	8x	x	38H/56	3EH/62	x	16H

Telegram Data_Exchange . DSAP/SSAP (mirrored).

8.12 Read_Outputs

Telegram Data_Exchange
 Telegram

SD	LE	LEr	SD	DA	SA	FC	DSAP	SSAP	FCS	ED
68H	05H	05H	68H	8x	8x	x	39H/57	3EH/62	x	16H

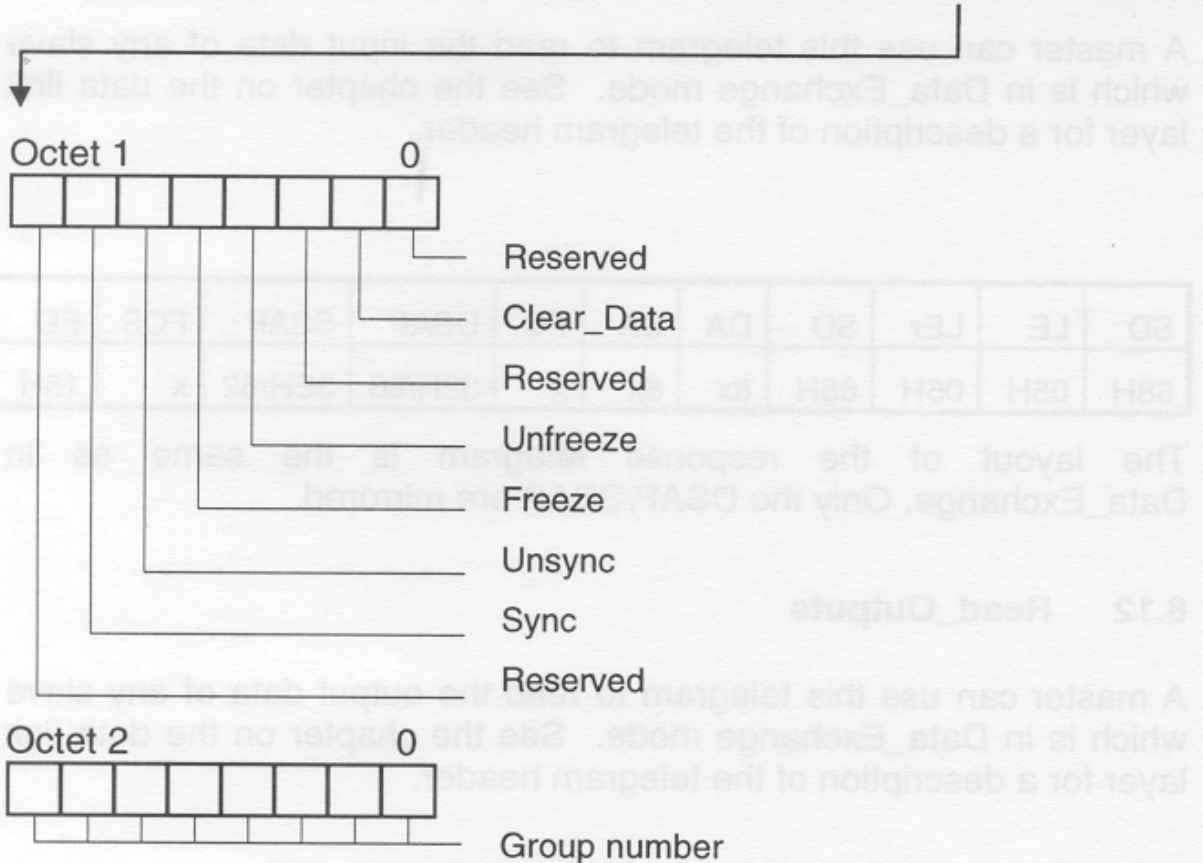
Telegram Data_Exchange . DSAP/SSAP (mirrored).

8.13 (global control)

SDN Telegram (sync),
 (unsync), (freeze), (unfreeze) (clear)
 Telegram . SDN
 Telegram . Telegram

(global control)

SD	LE	LEr	SD	DA	SA	FC	DSAP	SSAP	DU..	FCS	ED
68H	x	x	68H	8x	8x	x	62/3E	58/3A	x..	x	16H



SYNC FREEZE . Clear Data ,
 가 Telegram

FREEZE Telegram 가 가
 (freeze) . SYNC Telegram 가 가
 (freeze)

FREEZE Telegram

. Telegram

가 FREEZE

(freeze)

(Data_Exch)

(freeze)

가

UNFREEZE

Telegram

SYNC/UNSYNC Telegram

FREEZE
SYNC

가

UNSYNC

UNSYNC

가