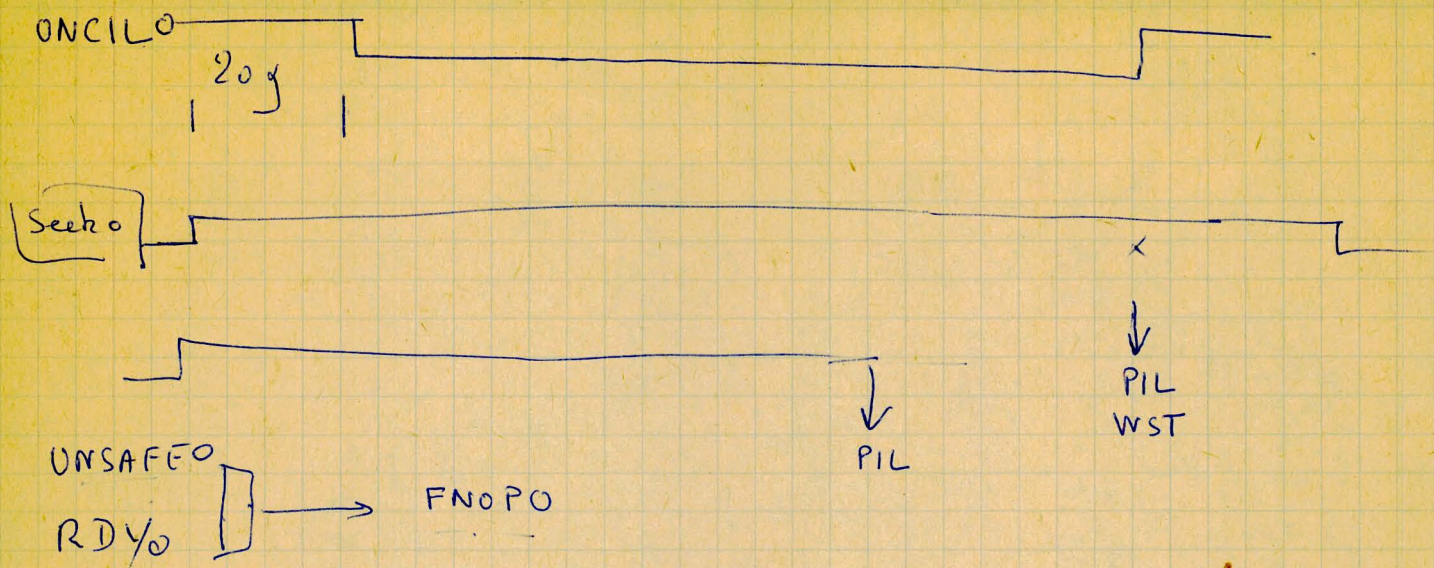
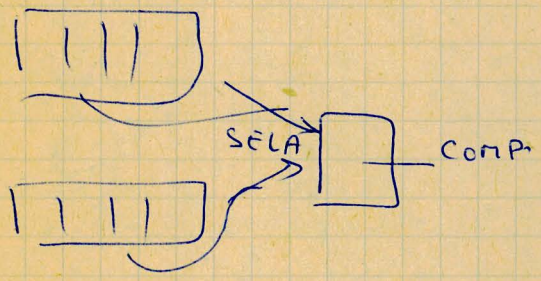
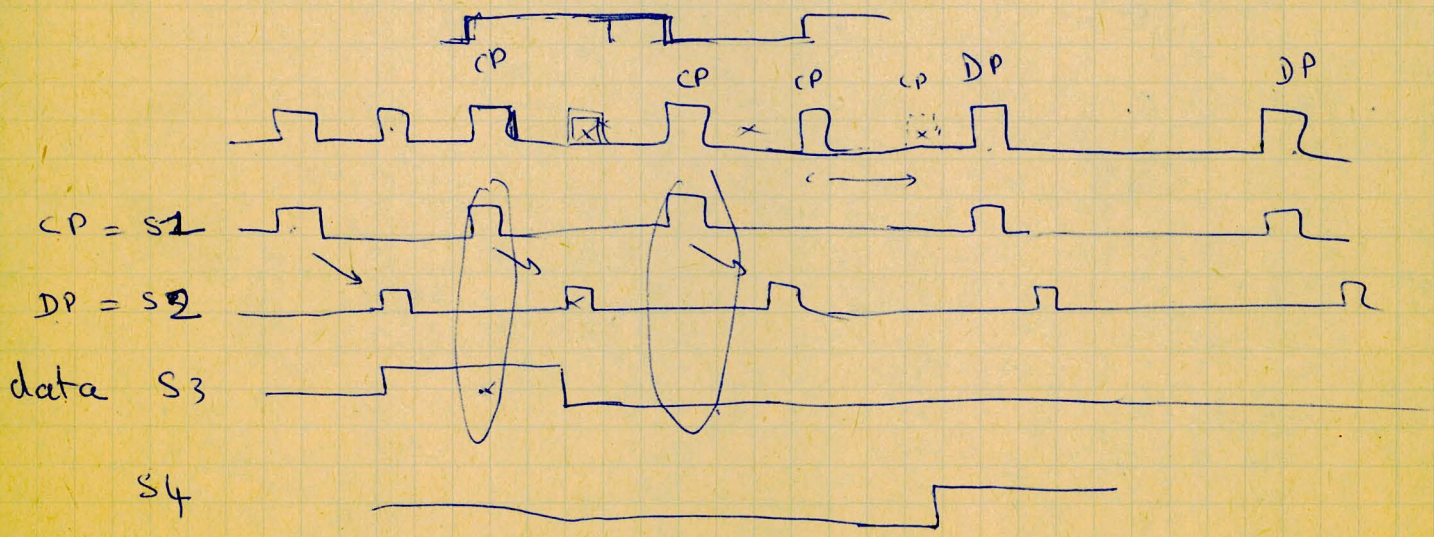
Mr Robert No 20d

POUR CORRECTIONS

0. TABLE OF CONTENTS


ONCILO
20 g
Seeko
PIL
WST
PIL
UNSAFEO
RDY/O
FNOPO


SELA
COMP


CP
CP
CP
CP
DP
DP
CP = S1
DP = S2
data S3
S4

2. APLLICABLE DOCUMENTS

- Engineering Specifications X1210 CN070/03005/523
- SAG EPS MOVING HEAD DISC CONTROL UNIT
- SAG EPS Element 3 - Type of Page 7

5. LOGIC INTERFACE DETAILED DESCRIPTION

5.1 Logic Interface between CPU and Moving Head Disc controller

Signals from CPU

BAD/00 to BAD05/	device address
DAV/	BAD's validation
BOF00/ to BOF02/	I/O function lines
MC/	Master Clear
EOR	End of range (used on the Multiplex only)
BOU00 to BOU15	Data transfer output

Signals from the Controller

ARE/	address recognized line
ACC/	Command accepted
BIN00/to BIN15/	Data transfert or status word
BRIR/	Interrupt request
BR/	Break request on multiplex

Timing :

These signals are ruled by the general timing of the Sagittaire standard interface.

5.2 Logic Interface Between MHD controller and disc unit.

Signal from the disc unit.

ISN1 : Index signal

RDLO : Read Data Signal

SSN1 : Sector Signal

URN1 : Unit Ready Signal

UUN1 : Unit

OCN1 : On cylinder signal

Signal from the controller :

CNBO1N to CNB71N : Control bus signals

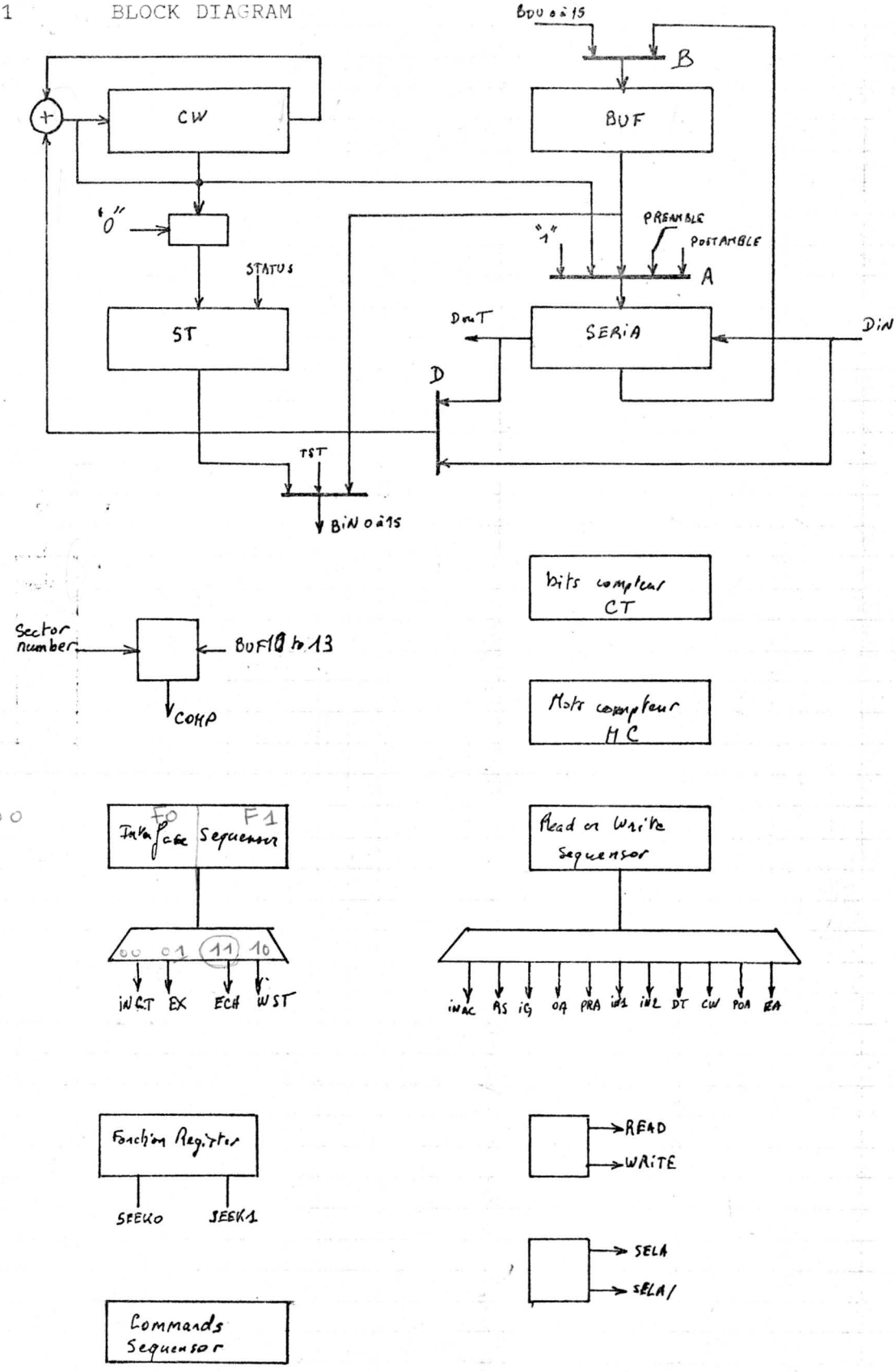
TCS1N : Tag line signal control select

TDS1N : Tag line signal difference select

THS1N : Tag line signal head select

WOO : Write Data Signal

6.1 BLOCK DIAGRAM



J. BUNISSET F. DENJEAN M.DUBREUX

6.2. Flip-Flop Description

BA : BA1 to BA4 : Clock ff for command sequensor

BR : Break request f.f.

BUF : BUF0 to BUF15 : Buffer flip flop for the parallel input or output data

CM : CM0,CM1,CM2,CM3 : Word counter → max 15 Wds?

CT : CT0,CT1,CT2,CT3 : bit counter

CW : CW0 to CW16 : Check word register

COSELA : Command f.f. used to make the control BUS

FCLM : This f.f. is used to clear CM counter and to clock the read or write sequensor

FCOMP : this f.f. memorizes the comparison of sector number and sector address.

FEOR : This f.f. memorizes EOR signal

FMP : Missing pulse f.f.

FNOPO : Not operable f.f.

FST : Request for status word in scanning state

ST : FST1,FST5,FST6,FST9,FST11,FST12,FST13,FST14,FST15 : status f.f. for status word

F0, F1 : Interface sequensor f.f.

HEADSEL : Command f.f. used to make the control BUS

READ : Read or write f.f.

RENA : Read enable f.f.

RWSMR : Master clear read or write sequensor f.f.

RWSPE : Read or write sequensor parallel enable flip flop

RWS : RWS0 to RWS3 read or write sequensor.

SCAN : Scan f.f.

SEEKO : This f.f. memorizes that the first disc is in seek operation

SEEK1 : This f.f. memorizes that the second disc is in seek operation

SELA : f.f. of disc selection

SERIA : SERIA to SERIA 15 : Shift register for serialization

SHVAL : Shift validation

START : Start f. f. of a read or write operation

TACONT : Command f.f. used to make the control tagline

TAGDIF : Command f.f. used to make the Difference tagline

TAGHEAD : Command f.f. used to make the head tagline

WAIT : f.f. used to wait the right sector during a read or write command

WGATE : Write operation is allowed.

6.3 Basic Information

6.3.1 Interface Sequensor

The Interface sequensor has four states

F1.F0

1°) Inactive state : F0/F1/ 0 0

The controller is not working with the CPU

2°) Execute state F0/F1 1 0

The controller executes a CIO command

3°) Exchange state F0F1 1 1

The controller exchange data with the CPU

4°) Wait status state F0F1/ 0 1

The controller is waiting for a send status command.

6.3.2 Different sequences

Scanning : it occurs during inactive state of the controller to indicate if a disk becomes operable

Control sequences : used to send the disks commands (seek, read, write, seek to 0)

Read or Write sequences : these sequences are used to make the sector format in order to read or write the data, they are always started by the control sequences.

6.3.2.1 Scanning

During the incactive state of the interface sequensor a scanning is performed to detect if a disc unit becomes operable
If a disc unit becomes operable an interrupt is sent to the CPU and the interface sequensor switches in wait status state.

6.3.2.2 Control sequences

These sequences are used to drive the disc, they deliver the necessary signals to perform the disc functions like seek, read, write, head select.

These signals are :

- 8 control lines called bus
- 3 taglines

The meaning of the 8 control lines depends the active tagline (see the following figure)

TAG LINE FUNCTIONS			
CONTROL BUS	DIFFERENCE SELECT	HEAD * SELECT	CONTROL SELECT
BIT 0	1	1	WRITE ENABLE
BIT 1	2	Not used	READ ENABLE
BIT 2	4	Not used	SEEK FORWARD
BIT 3	8	Not used	Not used
BIT 4	16	Not used	ERASE ENABLE
BIT 5	32	Not used	SEEK REVERSE
BIT 6	64	Not used	RETURN TO ZERO
BIT 7	128	Not used	Not used

TAG CONTROLLED LINE ORGANIZATION

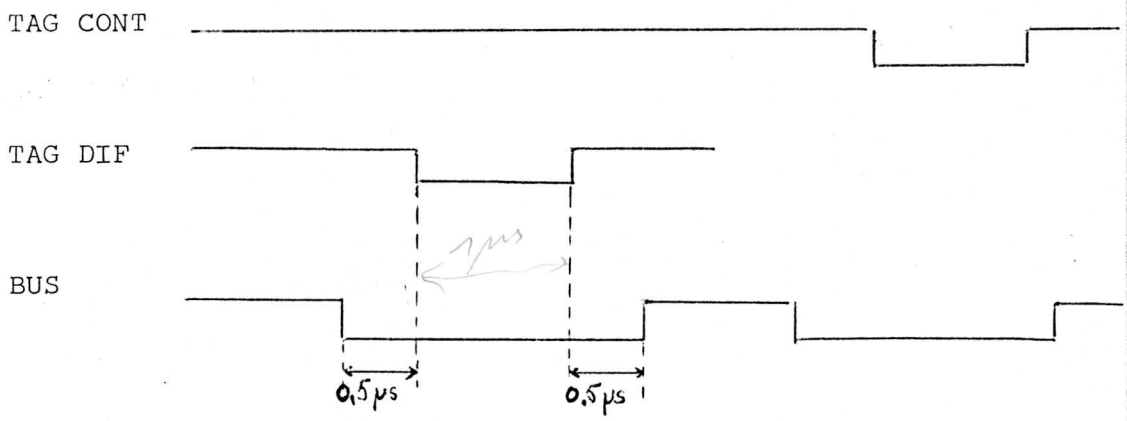
FIGURE 3.(1)

* Head selection code

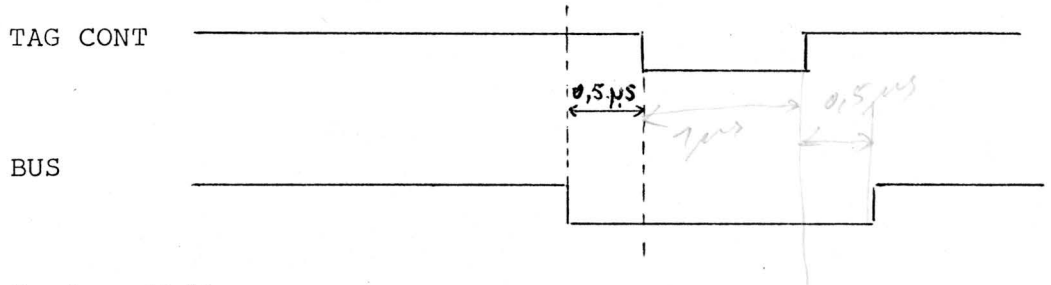
Bit 0	Head
1	00
0	01

Command format for the disc (performed by control sequences)

seek command :



Seek to 0



Read or Write

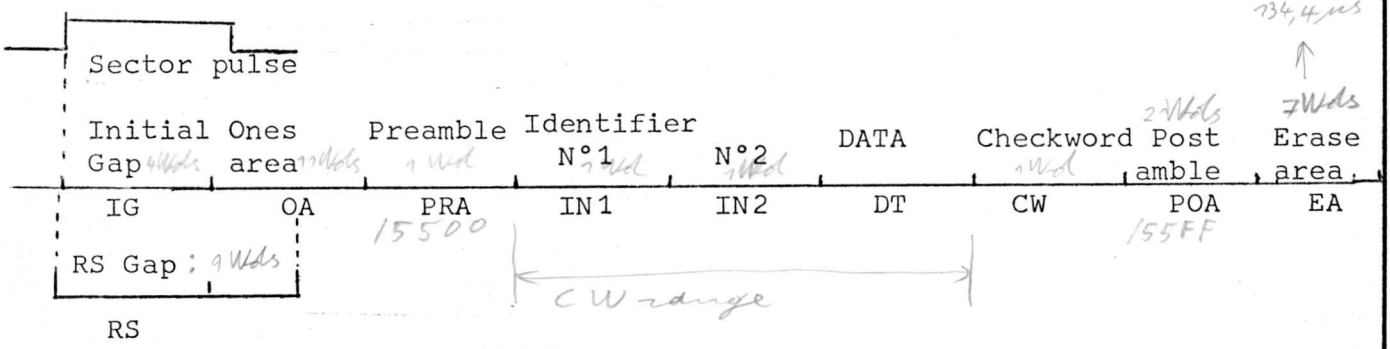
AUTHOR :	SIGNATURE	RESPONSIBLE	APPROVAL
J. BUNISSET		F. DENJEAN	M. DUBREUX

6.3.2.3 Read or Write Sequences

1. Sector Data Format (performed by read or write sequences)

The information on a disc pack is written in sector format. The beginning of a sector is detected with the sector pulses. The first sector is the sector in which the index pulse appears.

The format read or Written during the read or write sequences is as follows :



2. Initial Gap

This Gap is not written in a write command and is not read during a read command. It is due to pulses tolerances. This gap avoids an overlopping between the end of the recording on one sector and the beginning of the recording on the next sector. Its value is 76,8 us (4words of 16 bits)

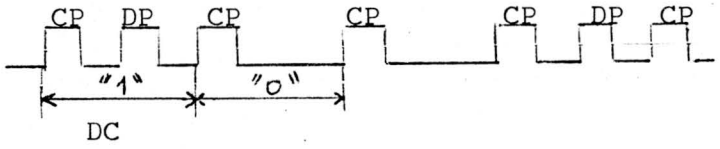
3. Ones Area

This gap is used to be sure to start the read operation in a ones area

11 words of ones are written after the initial gap and the read operation starts 9 words after the detection of a sector pulse (RS gap) that is to say that the read operation starts at the beginning of the 6th word of the ones area in the nominal way.

4. Preamble and synchronization

The data is recorded on the dispack in a double frequency mode



CP = Clock Pulse

DP : Data Pulse

DC = Data Cell

There are clock pulses written at the nominal frequency of 0,833 MHz and, between them, a data pulse if a one is recorded and no pulse if a zero is recorded.

When reading it is necessary to sort data pulses from clock pulses and to synchronize the control unit on the beginning of a sixteen bit word. That is done by means of the preamble its value :

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

Starting the read operation in the ones area, the first time we get a gap between two pulses is the first data pulse of the preamble word. Knowing that we can sort clock pulses from data pulses and, as it is the beginning of a word, a detection of blocks of 16 data cells will enable us to part the information in words.

Moreover the value of the preamble is checked in the controller during the read operation to make sure that the synchronization has been performed correctly.

5. Identifiers N°1 and N° 2

The identifier is used to check that the seek operation has been performed correctly

a) In a write operation the first word sent by the CPU during the exchange is the identifier
It is written twice by the controller.

b) In a read operation the identifier N° 1 is sent to the CPU as first word to be exchanged ;
The second is never sent on the channel. If the length of the exchange is only one word the second identifier is considered as the checkword of the first one. If the two identifiers are different, the status bit n° 13 is set.

c) In both writing and reading, if the length of the exchange is more than one word, the two identifiers are used in the same way as the following record to produce the normal checkword.

6. Data.

The data is written on the disc pack in words of 16 bits.

7. Checkword

The checkword is computed to check the write or read operation. It is written behind the data and is not sent to the CPU in a normal read operation

8. Postamble

When reading the controller must detect the end of recording to stop the operation and to compare the length of the written record asked by the central processor.
For that purpose, the last wrod written on the dispack is the postamble. It is written twice under the control of the control unit without exchange with the CPU

its value :

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

The fifteen clock pulses of this word are missing so that word can be detected when reading from any word where all the clock pulses are present
Moreover, its value is checked during the read operation and if it is not correct the bit n° 13 of the status is set (data fault).

9. Erase area

Because of the distance between the read write gap and the erase gap of the disc heads the erase operation must be continued for 7 words after the writing of the postamble then we are sure that the postamble has been tunnel erased

6.3.2.4 Chaining of sequences

Inactive state F0/F1/

← CIO SEEK accepted

Execute state F0/F1 → Control sequences

← End of seek sequences

Inactive state F0/F1/

Inactive state F0/F1/

← CIO Read or Write accepted

Execute state F0/F1 → Control sequences → Read or Write sequences

← ask for an exchange

Exhange state FOF1

← OTR or INR

Execute state F0/F1

disc not operable

← End of read or write sequences

Wait status state FOF1/

← SST

Inactive state F0/F1/

Inactive state FO/F1/

←——CIO accepted Disc not operable

Wait status FOF1/

←——SST

Inactive state FO/F1

Inactive state FO/F1

←—— Disc becomes operable [End of seek / disc becomes ready]

Wait status state FOF1/

←——SST

Inactive state FO/F1/

Inactive state FO/F1/

←——CIO not accepted

Inactive state FO/F1/

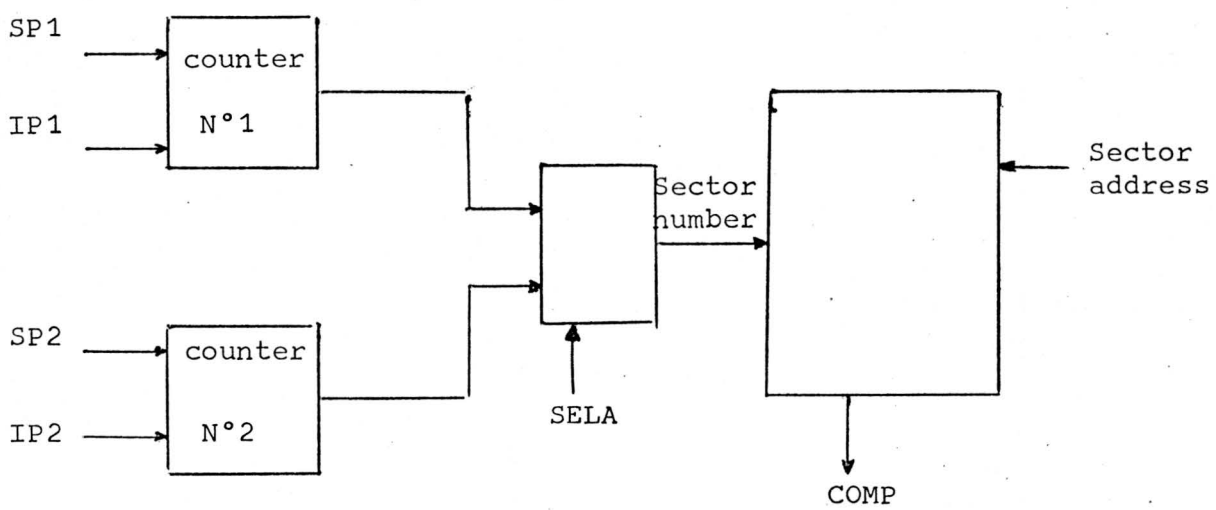
Counting the sectors

Two counters are used to count the sectors one for each disc

The sector pulse is needed for the clock to count up

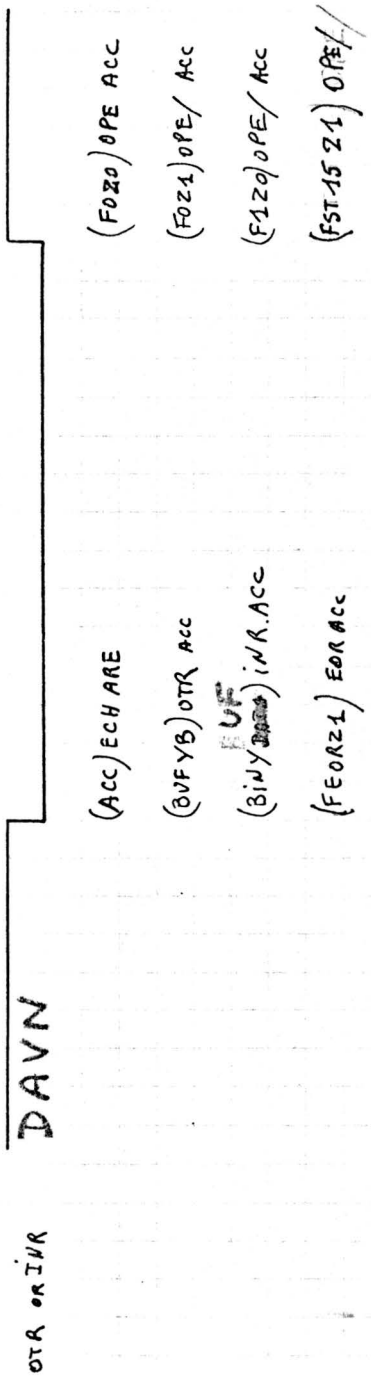
The index pulse initializes the conter on the sector number one → count nbre? (from 0 - 75 ? / from 1 - 76 ?

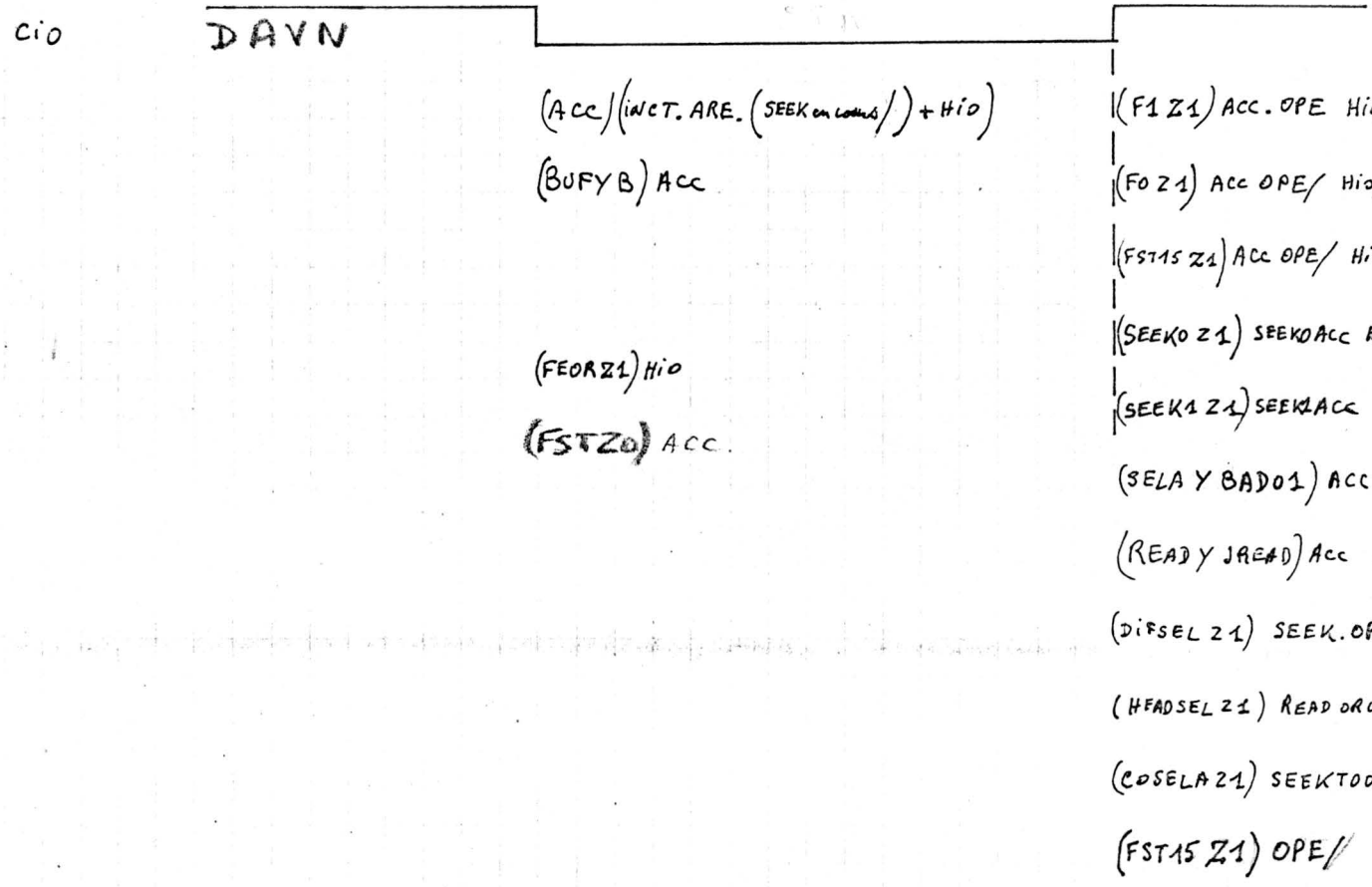
The outputs of each counter are selected by SELA signal to send them to the comparator who make COMP signal.



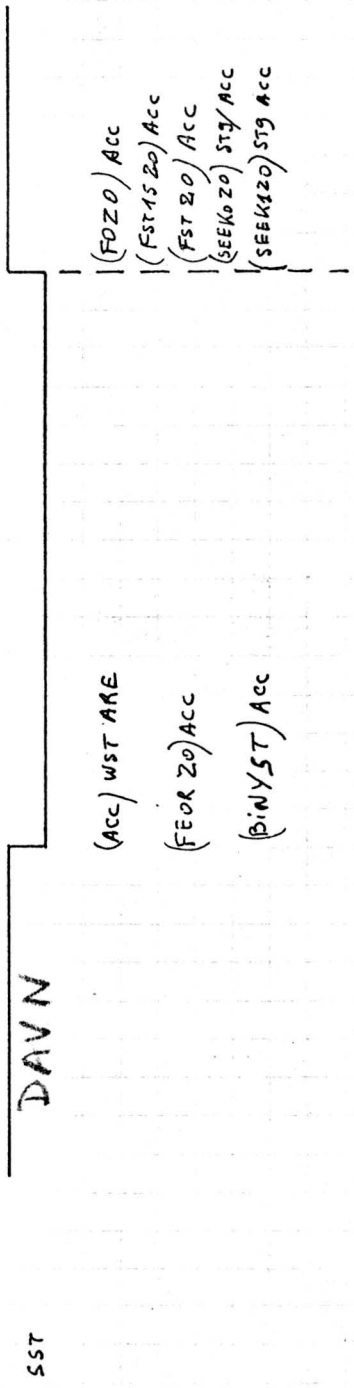
6.4 Sequences

6.4.1 Interface sequences

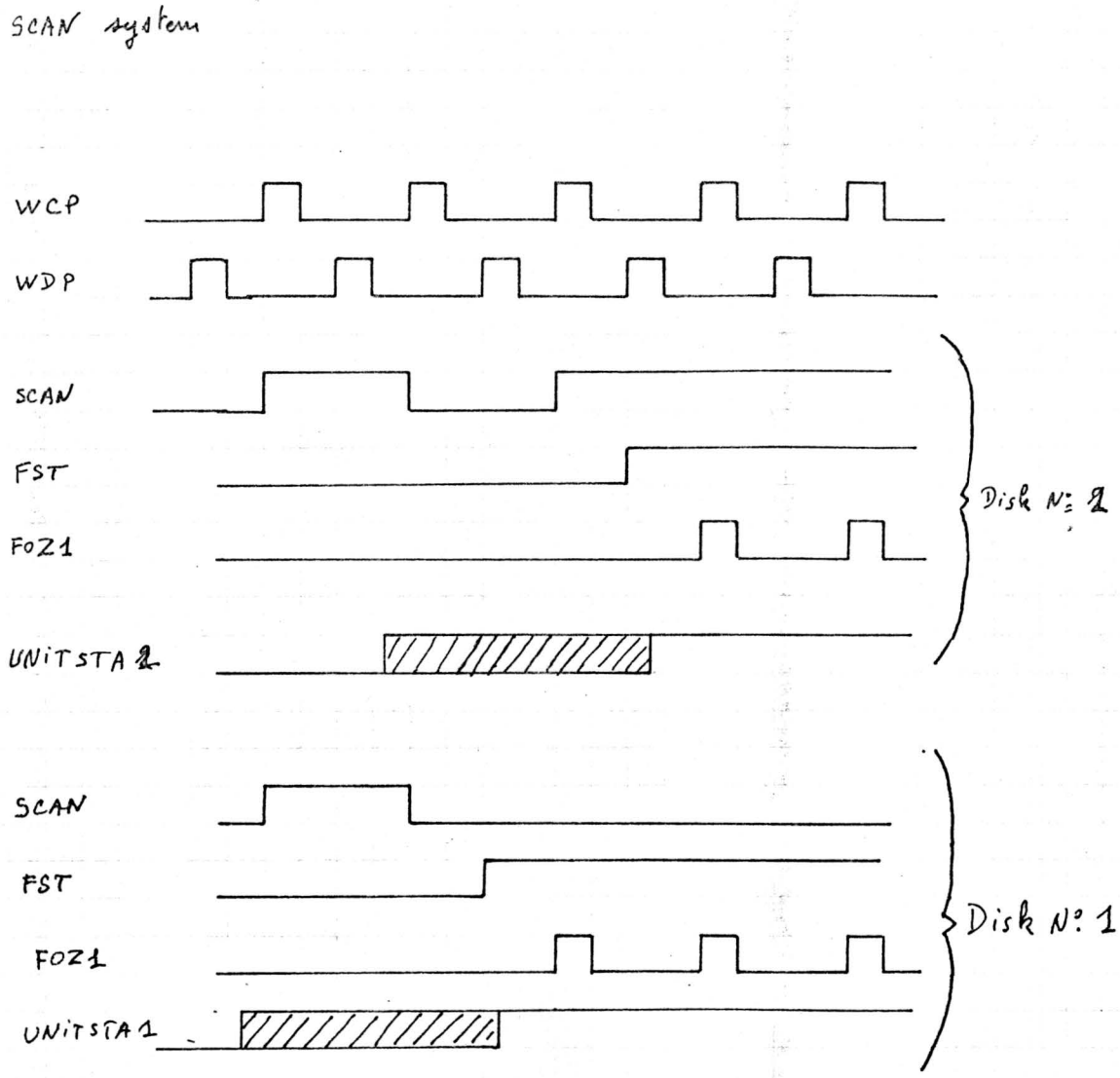




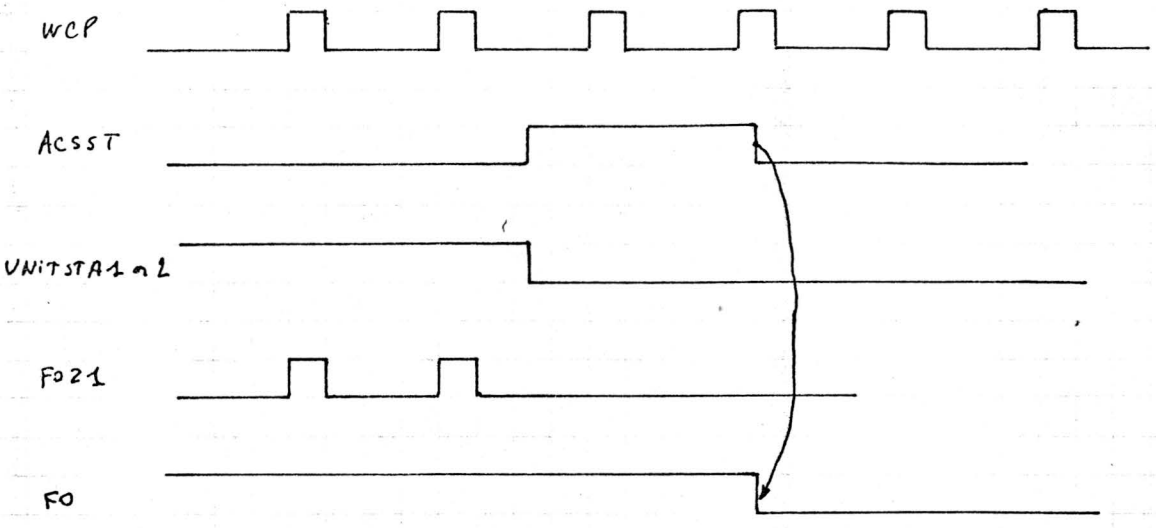
Supersedes doc. nr.
L
S.A. PHILIPS INDUSTRIELLE ET COMMERCIALE - CTI
FONTENAY-AUX-ROSES
Date
Page 7
J. BUNISSET
F. DENJEAN
M. DUBREUX
Documentnumber
L
Ditribution



6.4.2 - Scanning Sequences



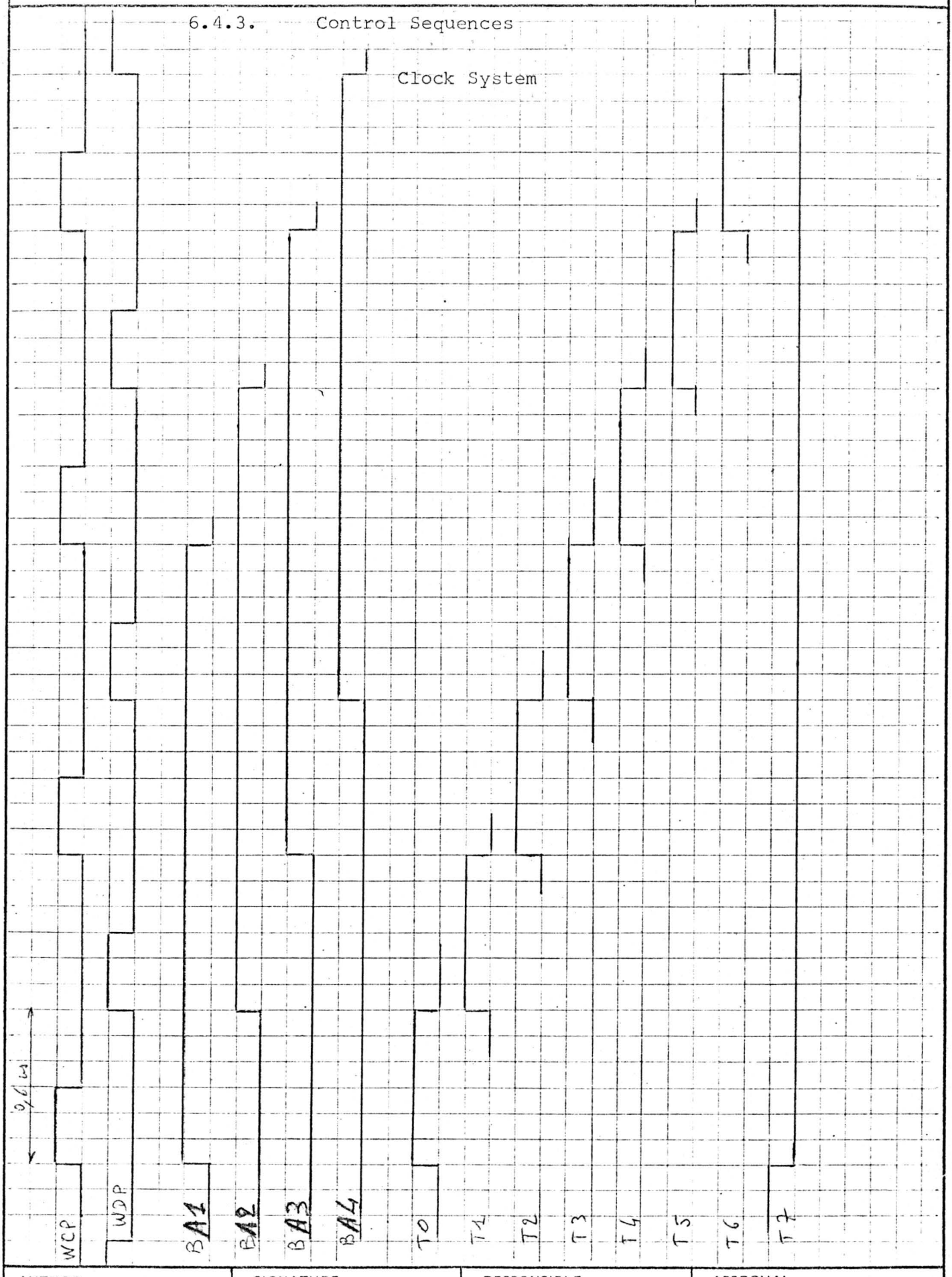
STATUS EXCHANGE from SCANNING



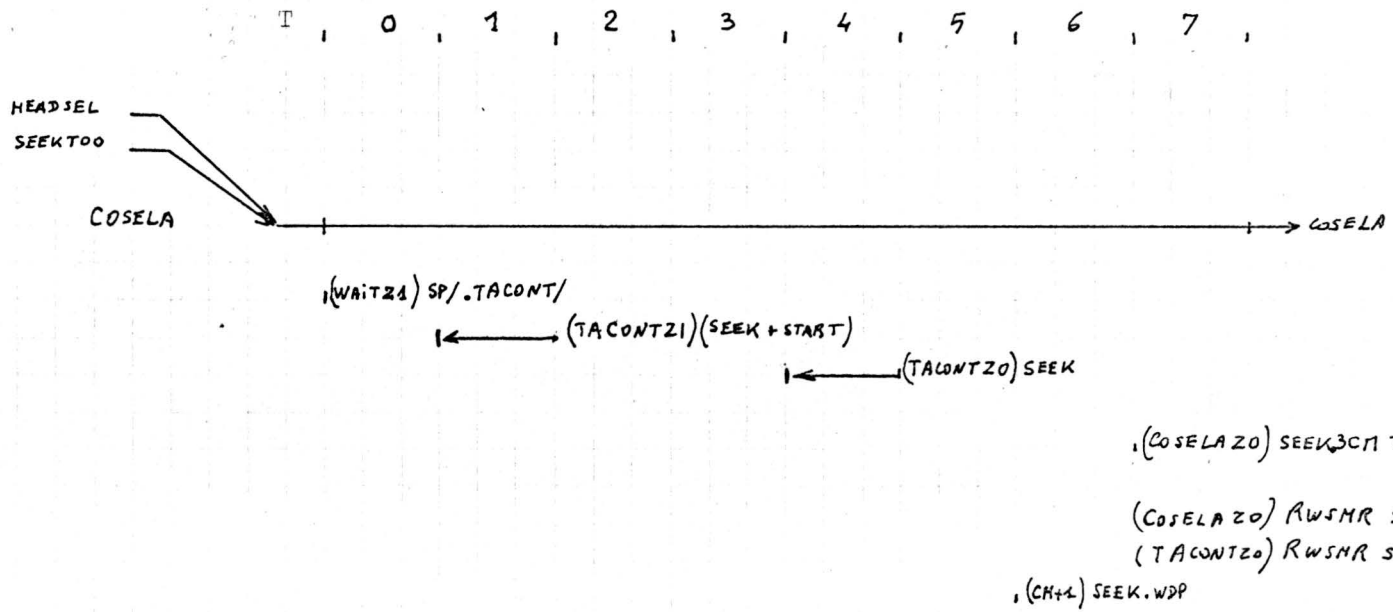
J. BUNISSET F. DENJEAN M. DUBREUX

6.4.3. Control Sequences

Clock System



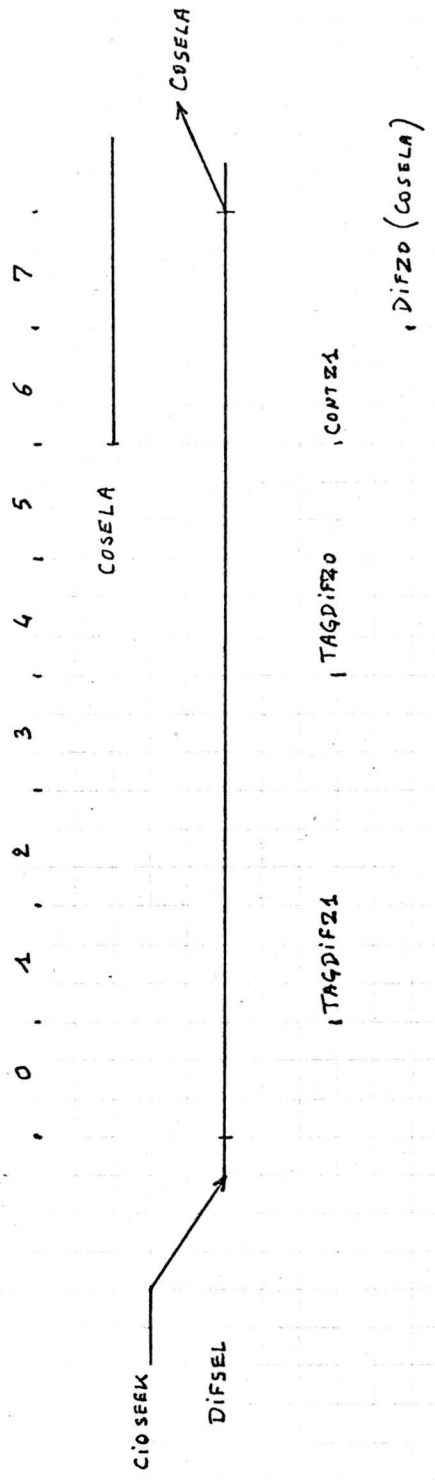
Control Sequences

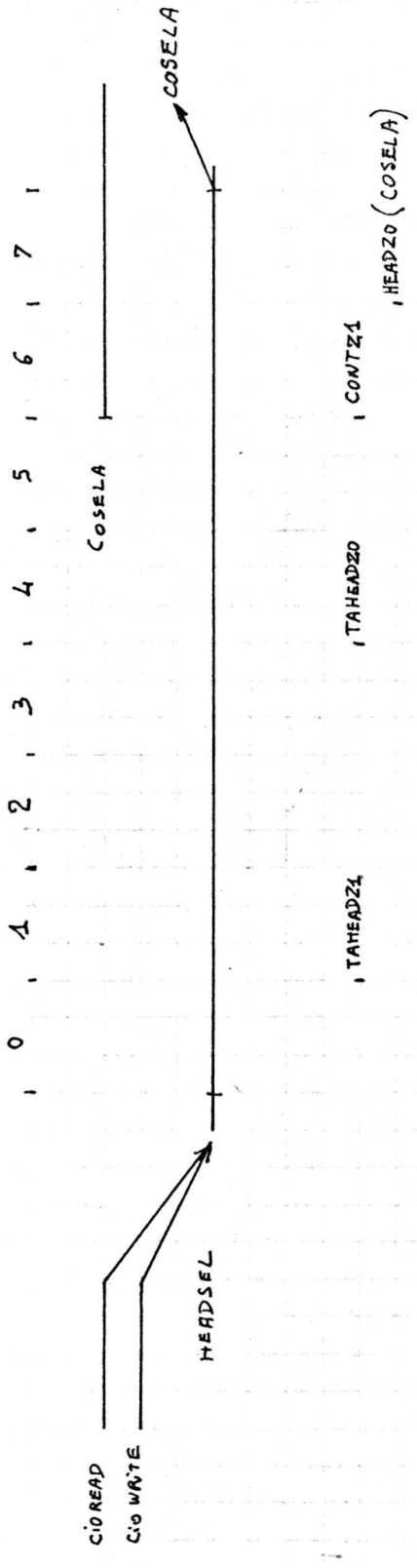


RWSMR = Read write sequensor master clear.
CONTSEL = COSELA SEEK + TACONT SEEK/
TAGCONT = TACONT SEEK + COSELA SEEK/
SP: Sector pulse
SEEK = SEEK1 SELA + SEEK0 SELA/
*No other condition

J. BUNISSET
F. DENJEAN
M. DUBREUX

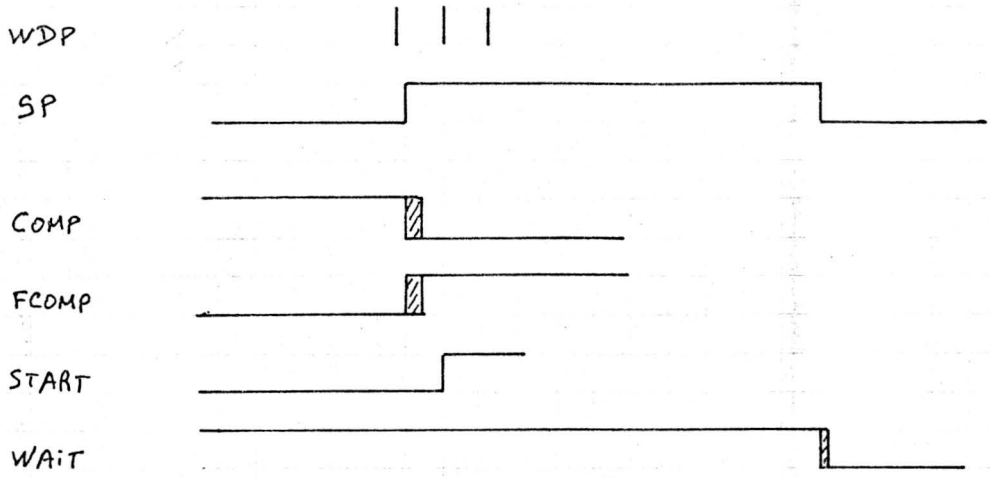
Supersedes doc. nr.
L
S.A. PHILIPS INDUSTRIELLE ET COMMERCIALE - CTI
FONTENAY-AUX-ROSES
Date
Page 9
Documentnumber
L
Ditribution
S.I.P. 15 371
8211 227 00930





6-L-6

READ or WRITE START system



START Z0 = FCOMP/

FCOMPD = COMP WAIT

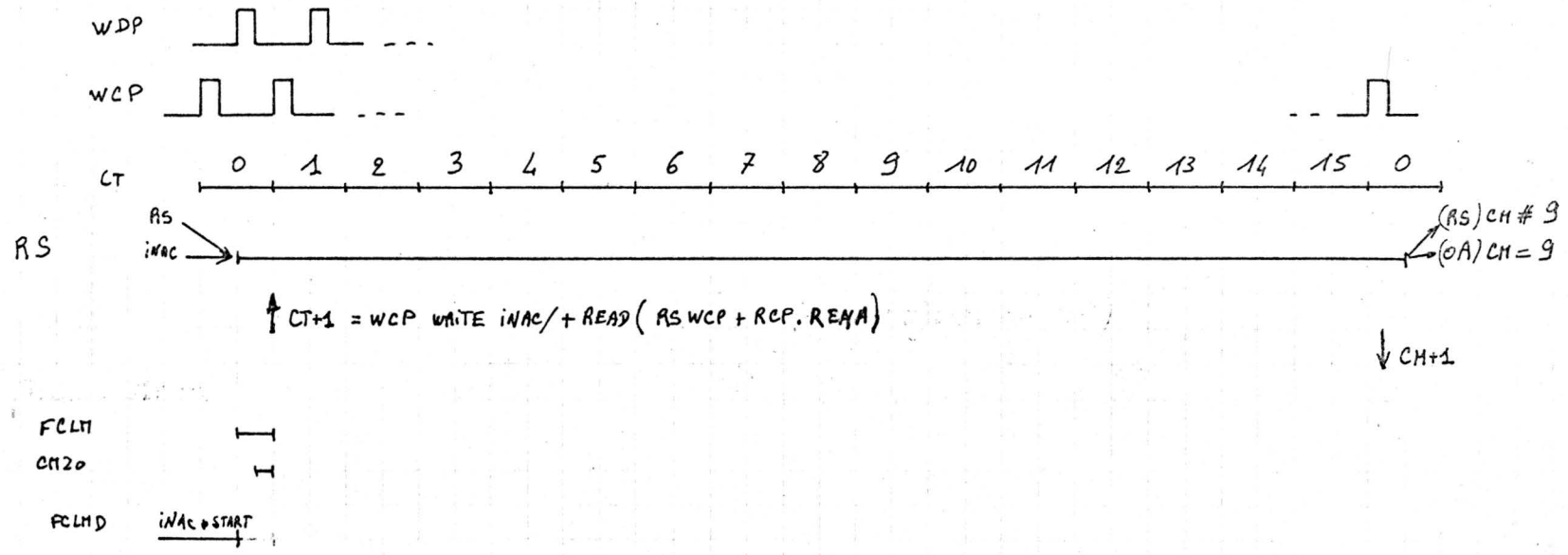
FCOMPC = SP

START Z1 = FCOMP WDP SP

WAITZ0 = START SP/

SP = SP1 SELA/+ SP2 SELA

SP1, SP2 = sector pulses
SELA: counting disck selection
COMP = Sector counter equal sector address



RENA = Read enable f.f.
CH = word counter
CT : bit counter
CT+1 : plus 1 on bit counter
CH+1 : plus 1 on word counter
RS : synchronisation research in read mode
OA : mes area
INAC : Read or Write sequencer inactive state

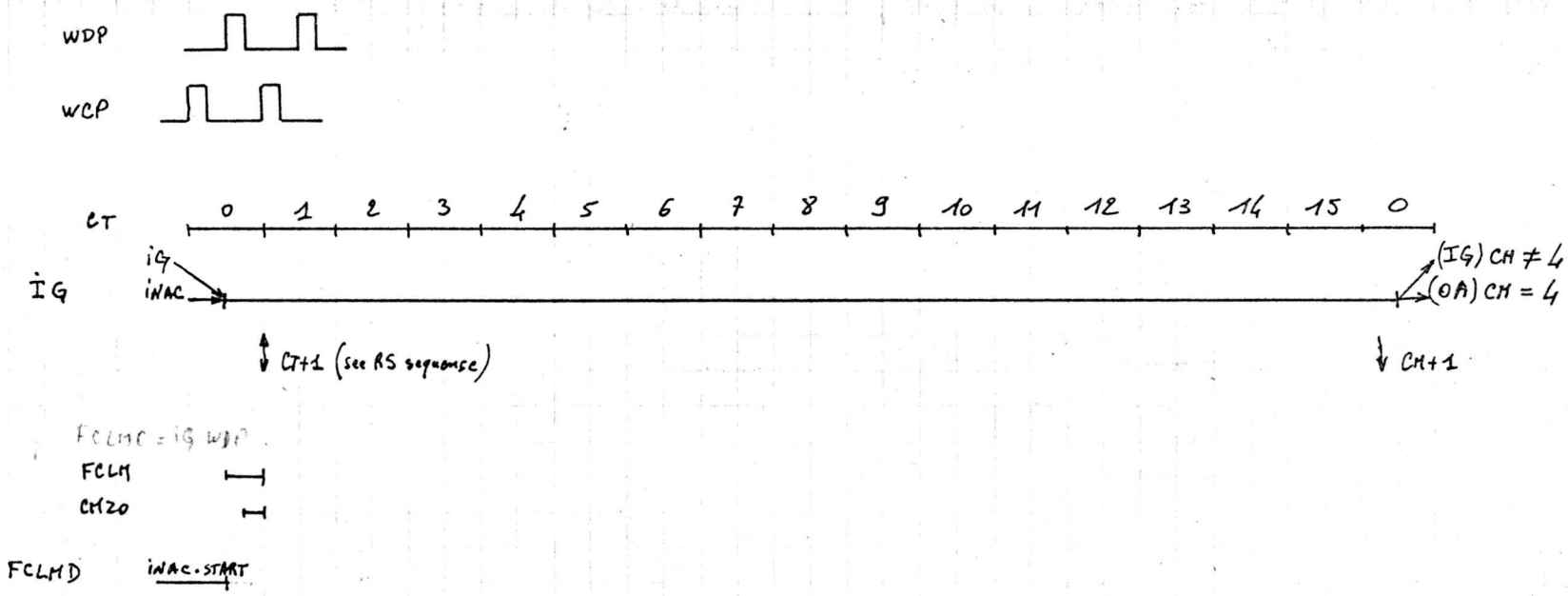
J. BUNISET F. DENJEAN M. DUBREUX

Supersedes doc. nr.
L
S.A. PHILIPS INDUSTRIELLE ET COMMERCIALE - CTI
FONTENAY-AUX-ROSES
Date 13.4.72
Page

Documentnumber
L
Ditribution

S.I.P. 15 371
8211 227 00930

SAB ELEMENT : MOVING HEAD DISC X1210
Baseline 3 : ELEMENT DESIGN SPECIFICATIONS
Type of Page : C - FUNCTIONAL DESIGN



FCLM20 = WCP RENA/ + RCP RENA
FCLMC = CT0 (WDP RENA/ + RDP RENA)
iG = initial gap in write mode

Supersedes doc. nr.

L

S.A. PHILIPS INDUSTRIELLE ET COMMERCIALE - CTI
FONTENAY-AUX-ROSES

Date
Page 44 • 72

J. BUNISSET

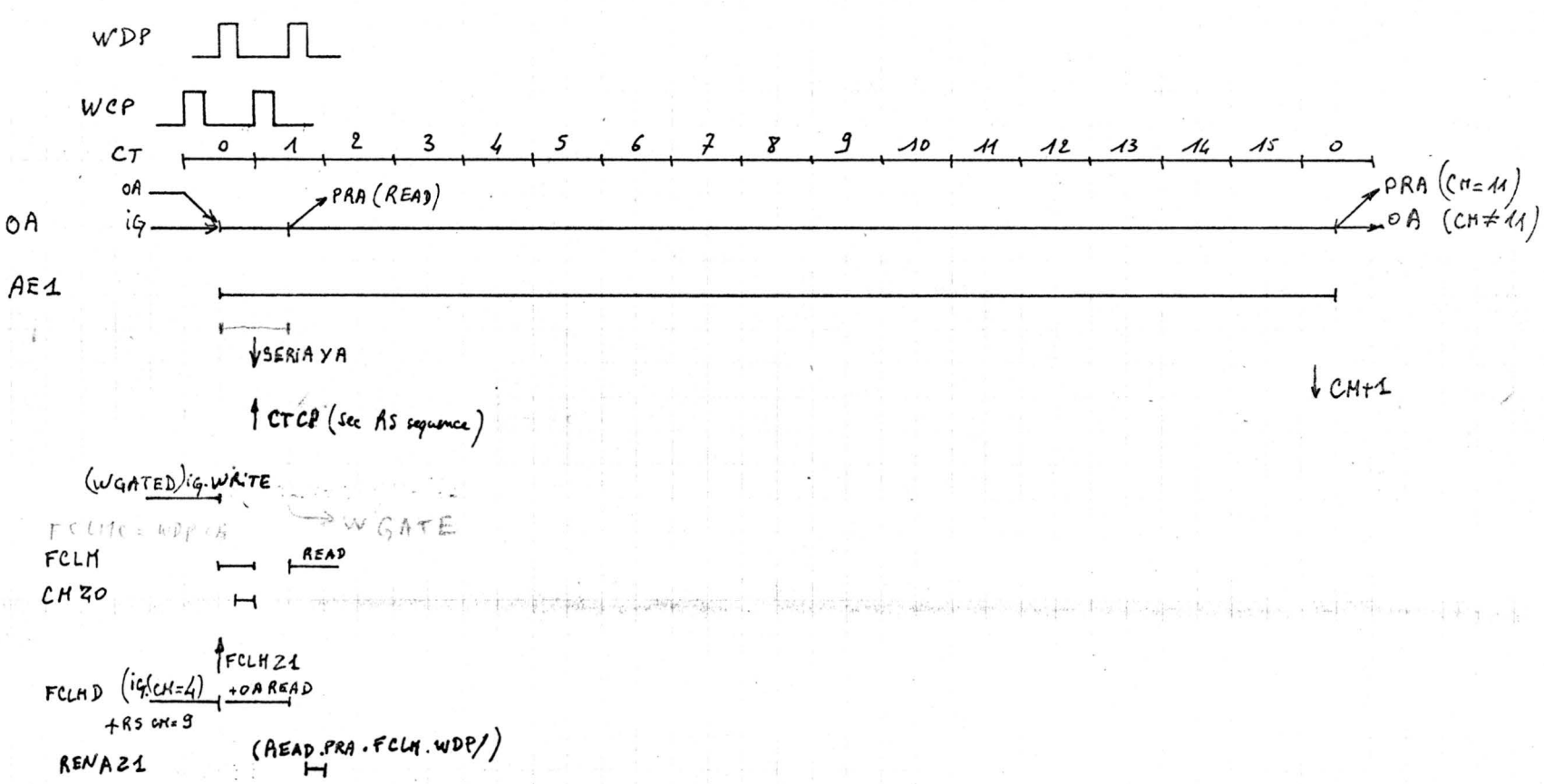
F. DENJEAN

N. DUBREUX

Ditribution

Documentnumber

L

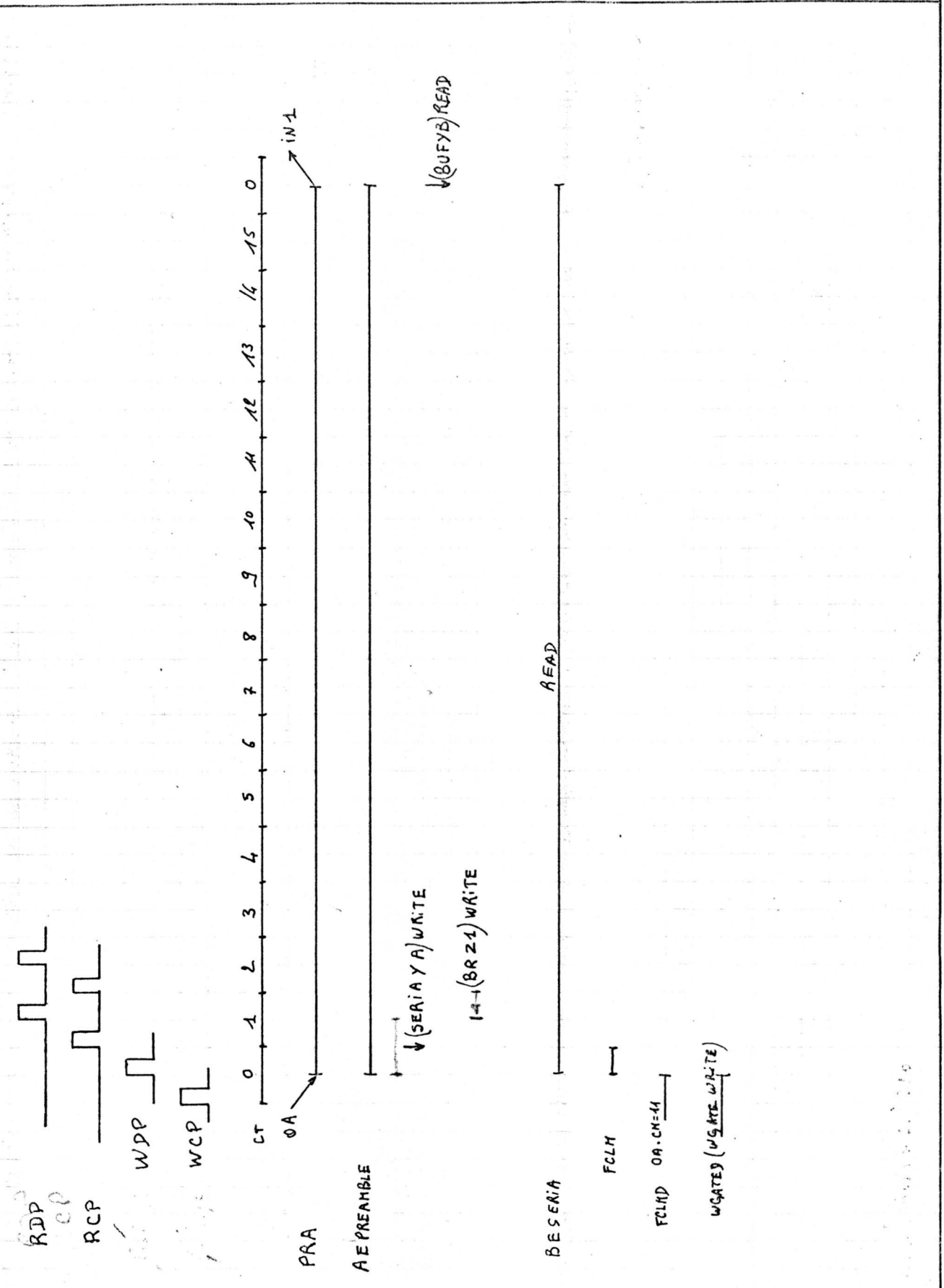


RENA20 = iNAC WCP
CH Z0 = FCLM WDP
FCLM = clear M ff.

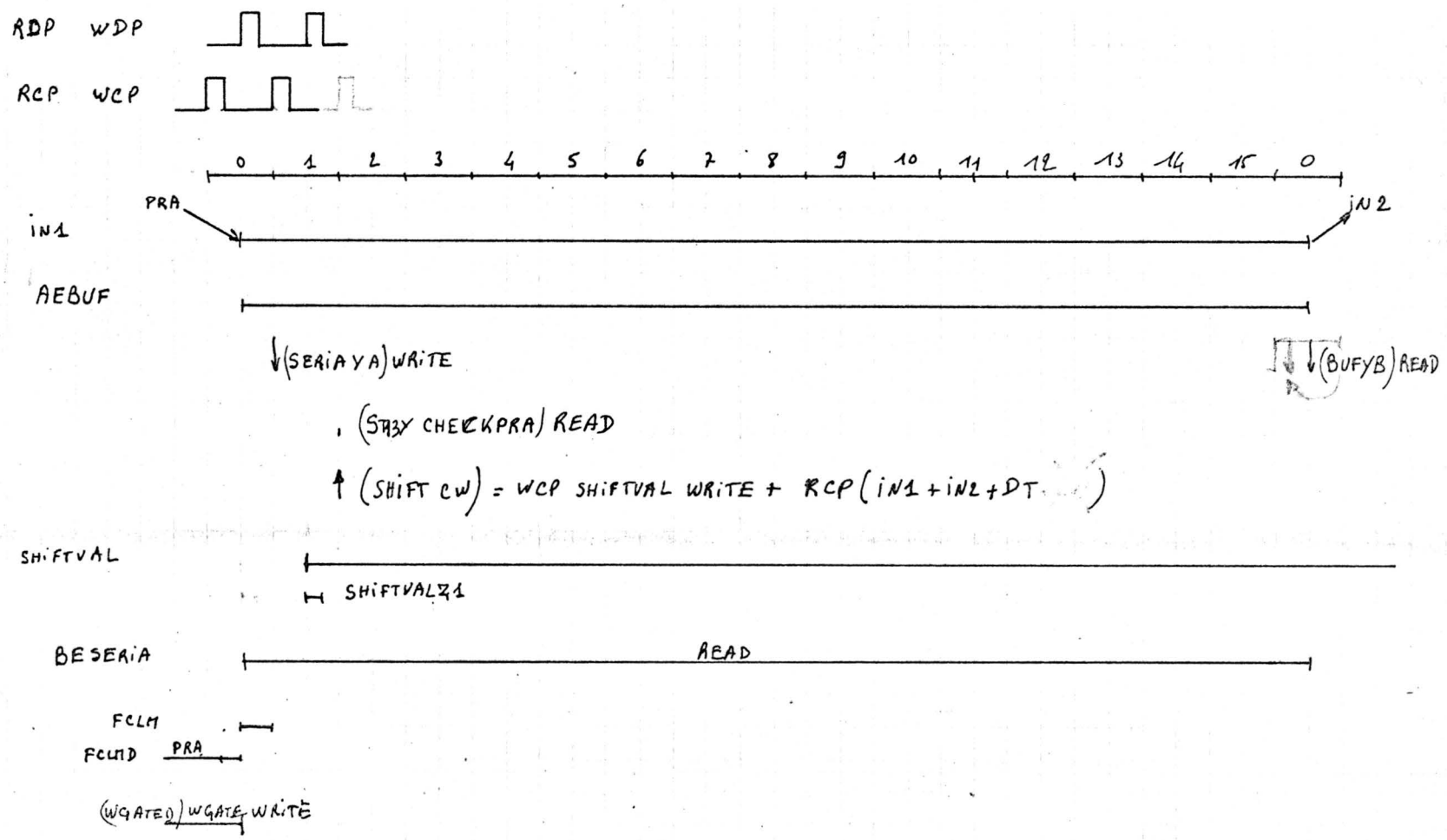
J. EUNISSET
F. DENJEAN
M. DUBREUX

Supersedes doc. nr.
L
S.A. PHILIPS INDUSTRIELLE ET COMMERCIALE - CTI
FONTENAY-AUX-ROSES
Date
Page 15
Ditribution
Documentnumber
L

S.I.P. 15 371
8211 227 00930

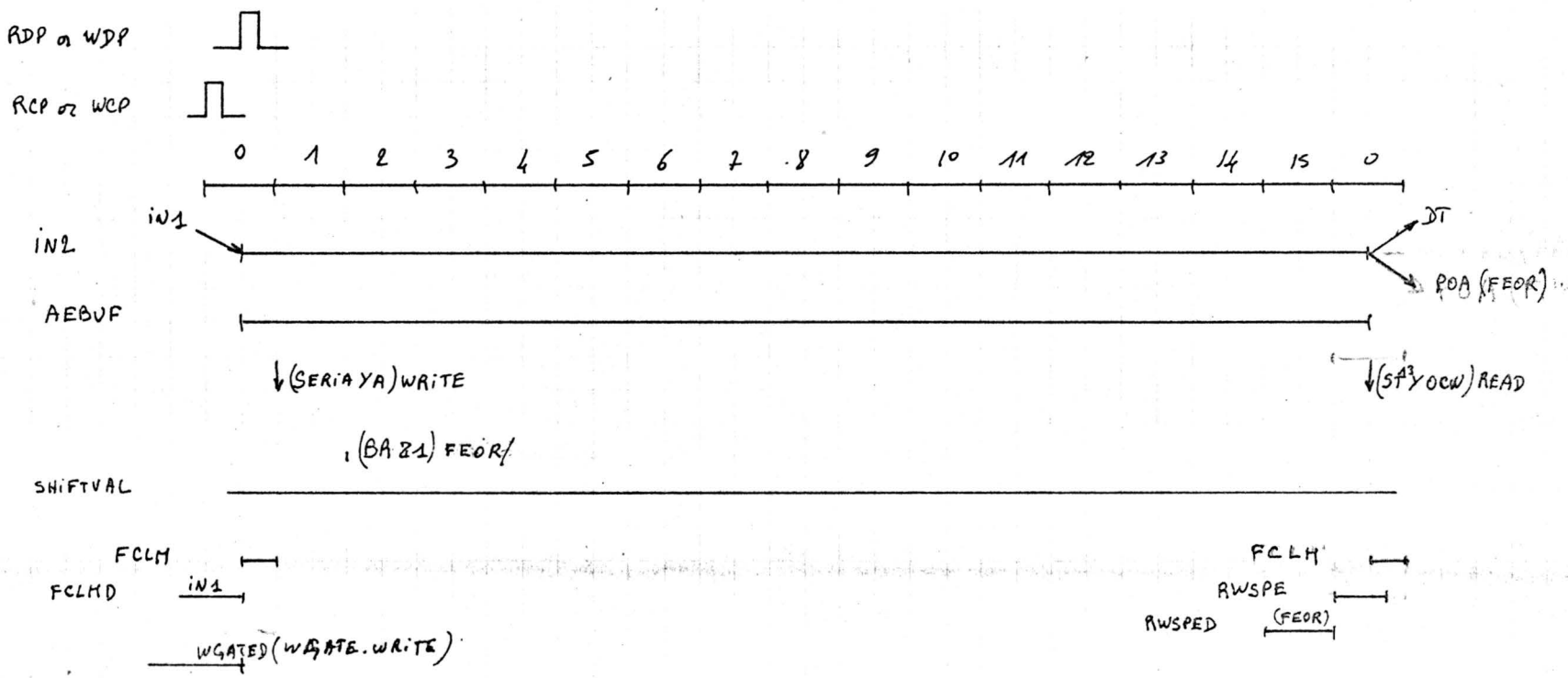


J. BUNISSET F. DENJEAN M. DUBREUX



J. BUNISSET
F. DENJEAN
M. DUBREUX

Supersedes doc. nr.
L
S.A. PHILIPS INDUSTRIELLE ET COMMERCIALE - CTI
FONTENAY-AUX-ROSES
Date
Page 17
Ditribution
Document number
L
S.I.P. 15 371
8211 227 00930



OCW = CW equal 0

J. BUISSET
P. DENJEAN
M. DUBREUX

Supersedes doc. nr.

L

S.A. PHILIPS INDUSTRIELLE ET COMMERCIALE - CTI
FONTENAY-AUX-ROSES

Date
Page 13

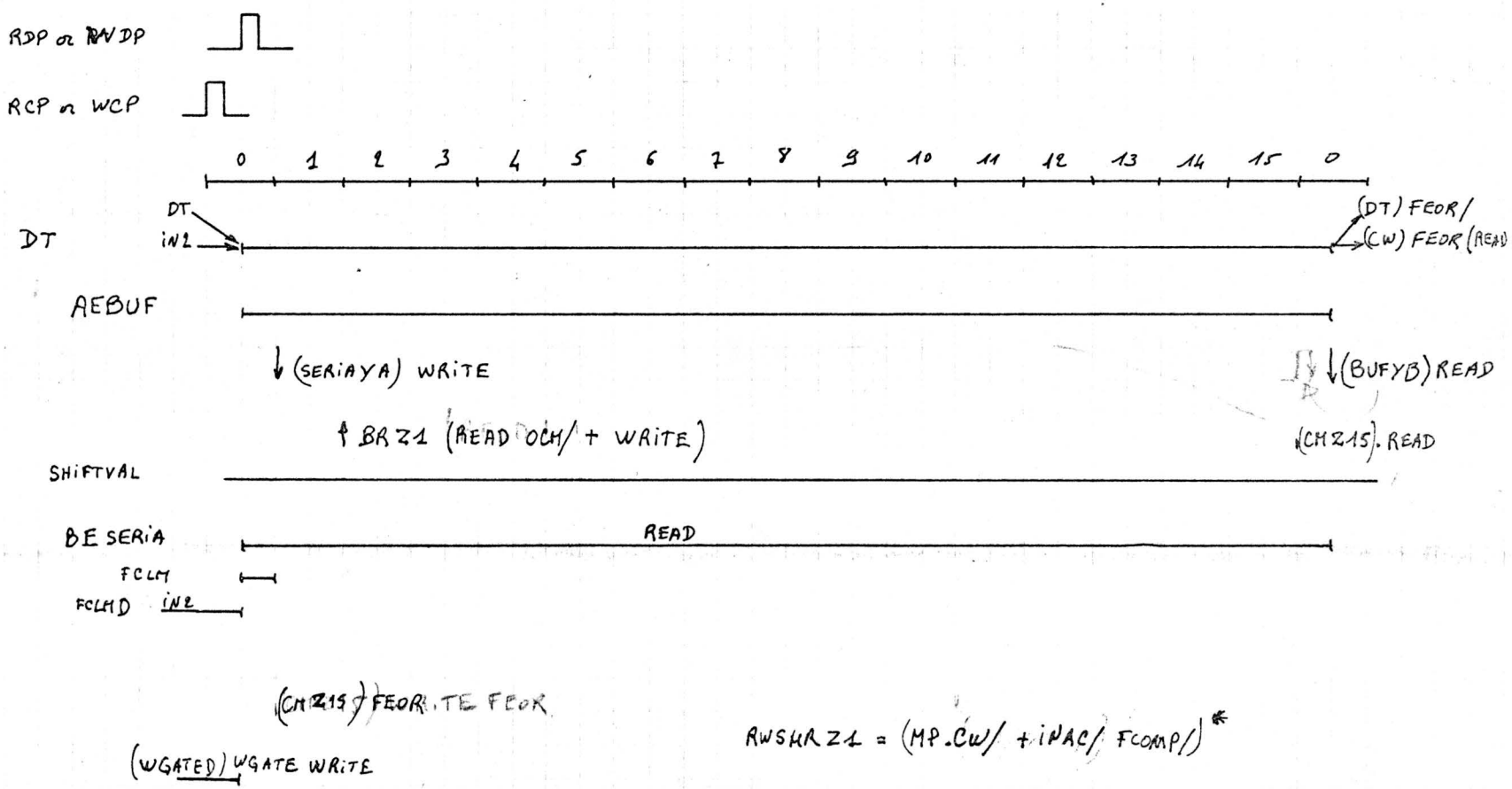
Documentnumber

L

Ditribution

S.I.P. 15 371

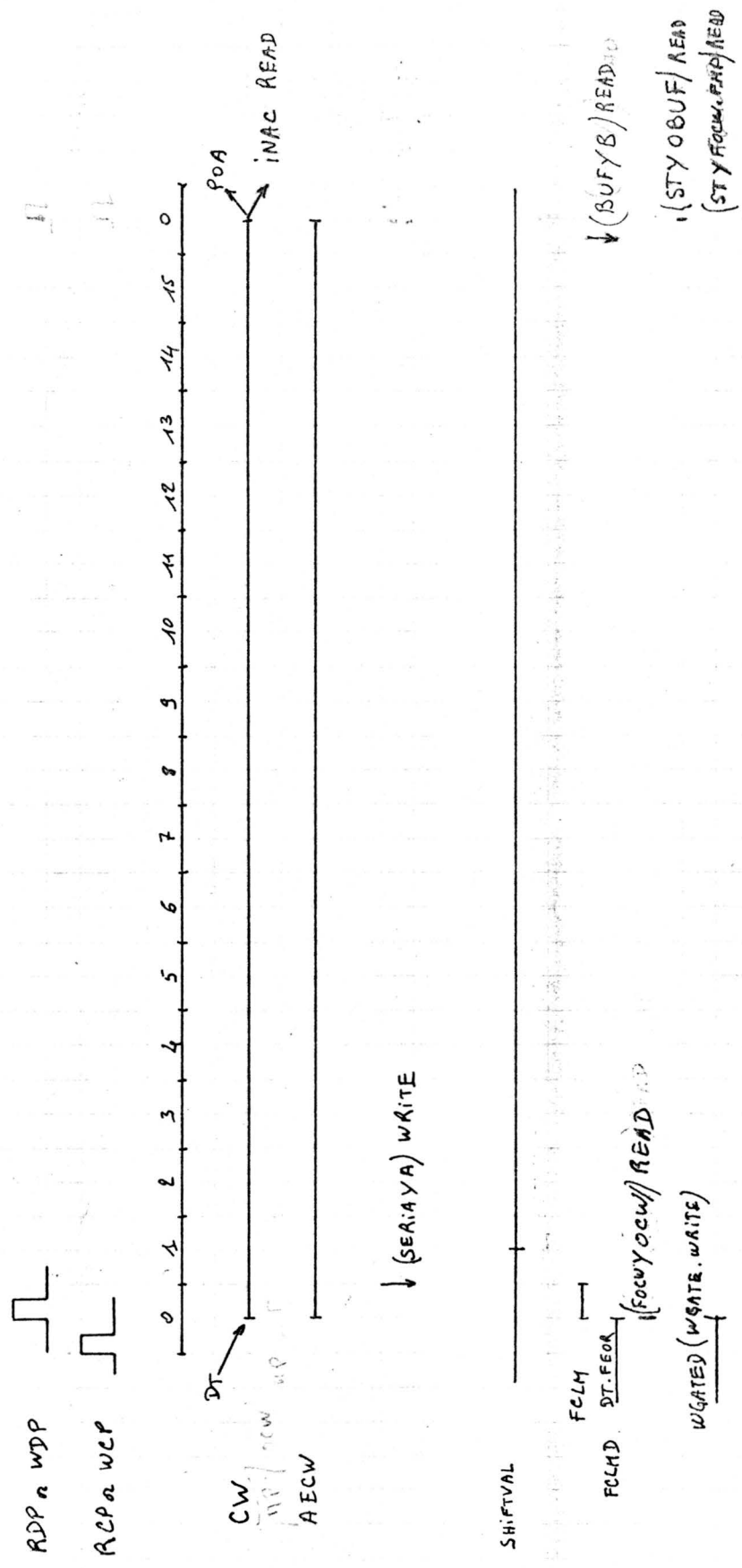
8211 227 00930



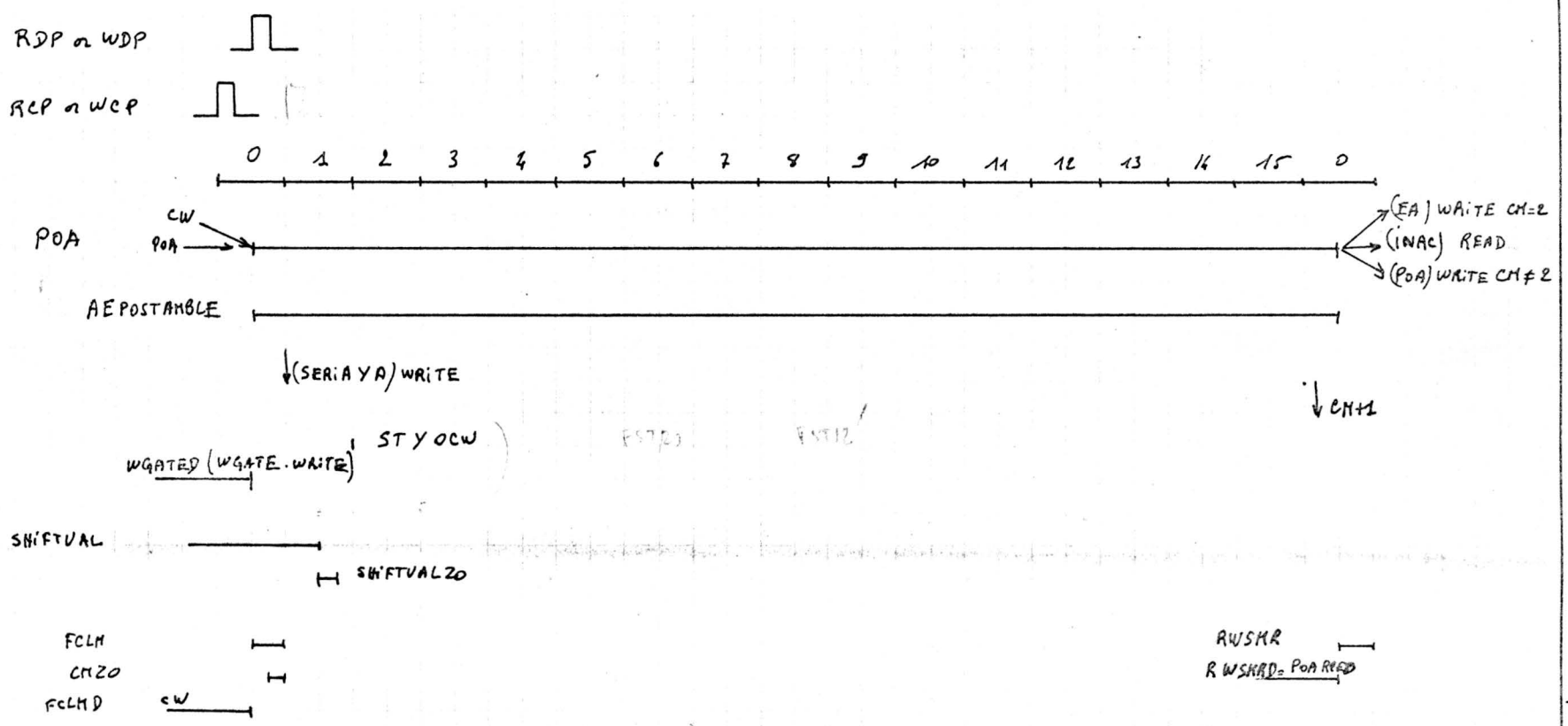
* No others conditions

J. BUNISSET
F. DENJEAN
M. DUBREUX

Supersedes doc. nr.
L
S.A. PHILIPS INDUSTRIELLE ET COMMERCIALE - CTI
FONTENAY-AUX-ROSES
Date
Page 19
Documentnumber
L
Ditribution
S.I.P. 15 371
8211 227 00930



J. BUNISSET F. DENJEAN M. DUBREUX

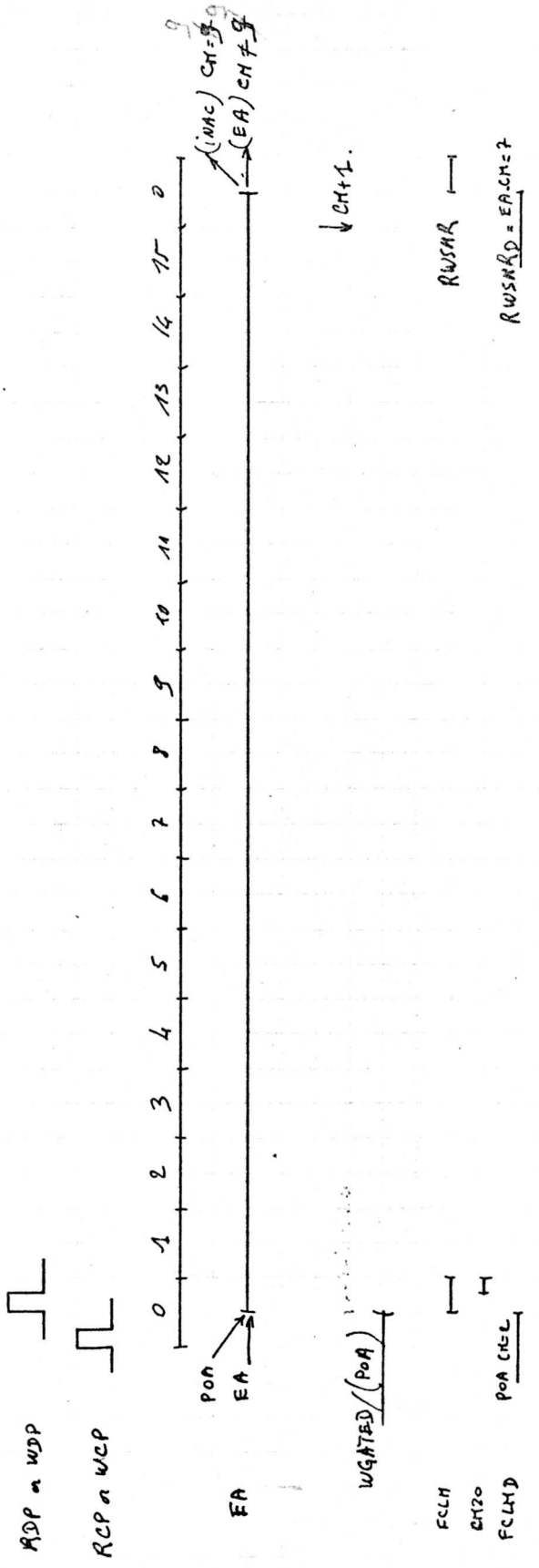


RWSMR20 = ACSST + MCL
RWSMRC = CTO (WDP RENA/ + RDP RENA)
RWSMR = read write sequencer Master clear

J. BUNISSET
F. DENJEAN
M. DUBREUX

Supersedes doc. nr.
L
S.A. PHILIPS INDUSTRIELLE ET COMMERCIALE - CTI
FONTENAY-AUX-ROSES
Date
Page 21
Documentnumber
L
Ditribution

S.I.P. 15 371
8211 227 00930



J. BUNISSET F. DENJEAN M. DUBREUX