G. BENTSEN

HARDWARE MANUAL
NORD 1

Div.

TABLE OF CONTENTS

TITLE	CARD NO.	DRWG. NO.
CARD POSITIONS IN CPU NO. 29		
CARD POSITIONS IN CPU NO. 35		
ONE BIT OF DATA-REGISTER		2B11
NORD 90 CARDS IN NORD-1		2B01
90N04		
BUS MEMORY	101	2A01
REGISTER I	102	2A02
ARITHMETIC	103	2A03
INTERRUPT REGISTERS	106	2A06
REGISTER II	108	2A08
REGISTER CONTROL	109	2A09
PANEL BUFFER	110	2A10
ARITHMETIC CONTROL	115	2A15
I/O CONTROL	120/II	2A20/II
ASSEMBLER	122	2A22
CYCLE COUNTER	123	2A23
COUNTER CONTROL	124	2A24
SHIFT COUNTER	125	2A25
SHIFT CONTROL	126	2A26
CONTROL FLIP-FLOPS	127	2A27
PROTECTION CHECK	128	2A28
ADDRESSING CONTROL	130	2A30
ADDRESSING CONTROL	131	2A31
INTERRUPT CONTROL	132	2A32
BIT INSTRUCTION	133	2A33
FLOATING CONTROL	134	2A34
FLOATING CONTROL	135	2A35
FLOATING CONTROL	136	2A36
FLOATING CONTROL	137	2A37

TITLE	CARD NO.	DRWG. NO.
LAMP REGISTER	140	2A40
PROTECTION	141	2A41
REGISTER TRANSFER	146	2A46
REGISTER	150	2A50
TIME COUNTER	151	2A51
TELETYPE CONTROL	157	2A57
MEMORY BUFFER	158/II	2A58/II
MEMORY OR	159	2A59
SIMPLEX CONTROL	160	2A60
I/O OUTPUT AND CLOCK	163	2A63
READER BUFFER	164	2A64
I/O INPUT	165	2A65
I/O OUTPUT	166	2A66
CHANNEL INTERFACE	168	2A68
CAMBRIDGE CONTROL	169	2A69
DUPLEX BUFFER	170	2A70
PUNCH BUFFER	179	2A79
I/O OUTPUT	184	2A84
LINE DRIVER/RECEIVER	185	2A85
I/O DATA BOARD	186	2A86
I/O INPUT	187	2A87
INTERFACE BUFFER/CABLE	189	2A89
CABLE CARD	190	2A90
I/O EXPANDER	191	2A91
MEMORY BUFFER DRIVER	194	2A94

--ooOoo--

CARD POSITIONS IN CPU NO. 29

CARD NO.	POS.
90N40.1	D07
90N40.2	D06
101.1	C25
101.2	C21
101.3	C17
101.4	C13
102.1	C23
102.2	C19
102.3	C15
102.4	C11
103.1	C24
103.2	C20
103.3	C16
103.4	C12
106.1	C06
106.2	C05
108.1	C22
108.2	C18
108.3	C14
108.4	C10
109.1	D08

CARD NO.	POS.
110.1	C32
113.1	D27
115.1	D10
120.1	D19
122.1	D18
123.1	D02
124.1	D03
125.1	D01
126.1	D11
127.1	D04
128.1	C02
130.1	D09
131.1	D05
132.1	C04
133.1	D17
134.1	D12
135.1	D13
136.1	D14
137.1	D15
140.1	C08
140.2	C07

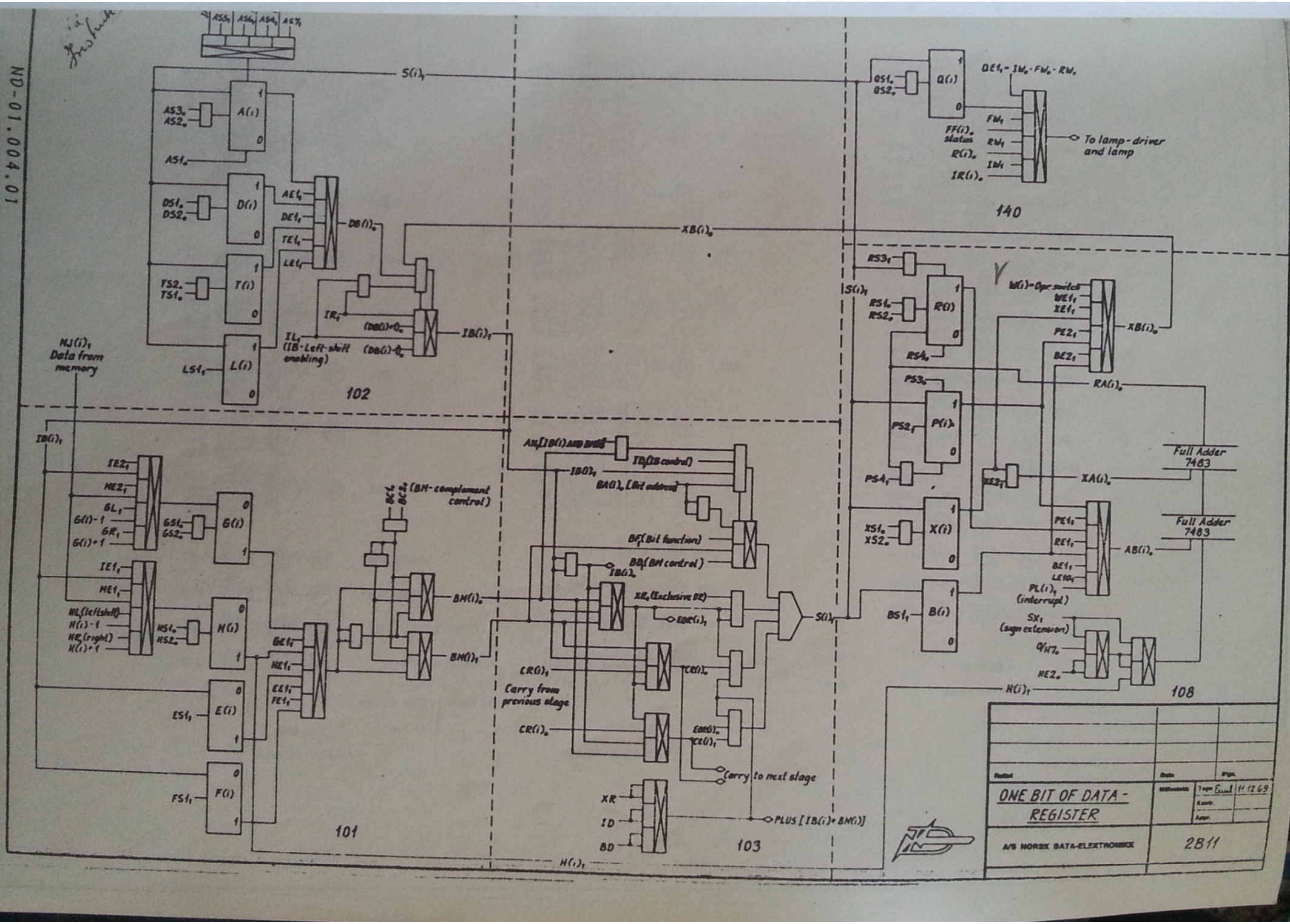
CARD NO.	POS.
141.1	C03
*145.1	D28
146.1	D16
150.1	C09
151.1	C01
158.1	C29
158.2	C28
158.3	C27
158.4	C26
159.1	C30
160.1	D26
160.2	D31
160.3	D29
163.1	D20
164.1	D25
165.1	D23
165.2	D24
166.1	D21
166.2	D22
170.1	D30
*179.1	D28

*: In pos. D28 is either 145.1 or 179.1

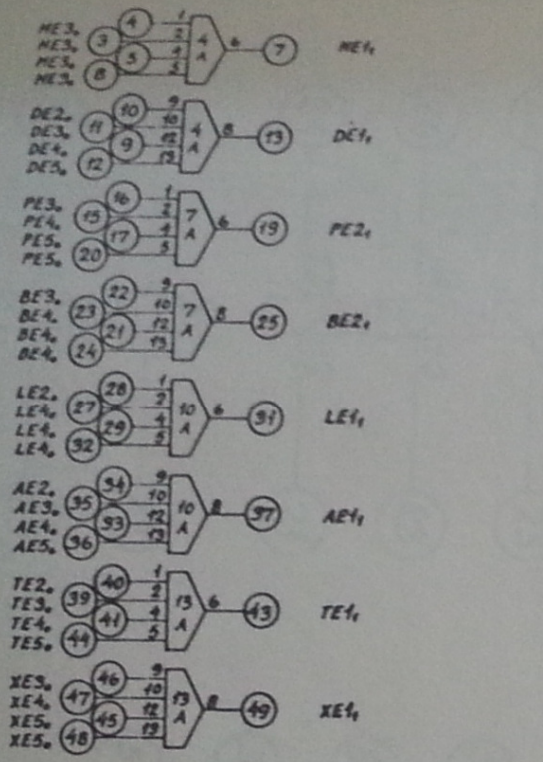
CARD POSITIONS IN CPU NO. 35

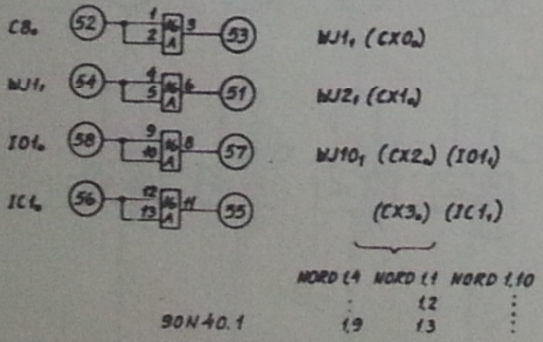
CARD NO.	POS.	CARD NO.	POS.	CARD NO.	POS.
90N40.1	D07	115.1	D10	150.1	C09
90N40.2	D06	120.1	D19	151.1	C01
101.1	C25	122.1	D18	157.1	D27
101.2	C21	123.1	D02	158/II.1	C29
101.3	C17	124.1	D03	158/II.2	C28
101.4	C13	125.1	D01	158/II.3	C27
102.1	C23	126.1	D11	158/II.4	C26
102.2	C19	127.1	D04	159.1	C30
102.3	C15	128.1	C02	160.1	D26
102.4	C11	130.1	D09	160.3	D29
103.1	C24	131.1	D05	163.1	D20
103.2	C20	132.1	C04	164.1	D25
103.3	C16	133.1	D17	165.1	D23
103.4	C12	134.1	D12	165.2	D24
106.1	C06	135.1	D13	166.1	D21
106.2	C05	136.1	D14	166.2	D22
108.1	C22	137.1	D15	169.1	C31
108.2	C18	140.1	C08	170.1	D30
108.3	C14	140.2	C07	179.1	D28
108.4	C10	141.1	C03	190.1	D31
109.1	D08	146.1	D16	190.2	D32
110.1	C32				

ND-01.004.01


AS5 AS6 AS4 AS7
S(i)1
A(i)
AS3o AS2o
AS1o
D(i)
DS1o DS2o
T(i)
TS2o TS1o
L(i)
LS1o
AE1 DE1 TE1 LE1
DB(i)o
IR1
IL1 (IB-Left-shift enabling)
(DB(i))=0o
(DB(i))-0o
IB(i)1
102
MJ(i)1 Data from memory
IB(i)1
IE21 NE21 GL1 G(i)-1 GR1 G(i)+1
GS1o GS2o
G(i)
IE11 NE11 HL(leftshift) H(i)-1 HR(right) H(i)+1
HS1o HS2o
H(i)
ES1o
E(i)
FS1o
F(i)
BE1 NE1 EE1 FE1
BC1 BC2 (BM-complement control)
BH(i)o
BH(i)1
101
AN1 [IB(i) AND BM]
IB1 (IB control)
IB(i)o
BA(i)o (Bit address)
BF1 (Bit function)
BB1 (BM control)
IB(i)o
XR1 (Exclusive OR)
EOE(i)1
S(i)1
CR(i)o
EOE(i)o
CE(i)1
(carry to next stage)
Carry from previous stage
XR
ID
BD
PLUS [IB(i)+BM(i)]
103
H(i)1
XB(i)o
OS1o OS2o
Q(i)
QE1 = IWo · FWo · RWo
FW1 RW1 IW1
FF(i)o status
R(i)o
IR(i)o
To lamp-driver and lamp
140
RS31
RS1o RS2o
R(i)
RS4o
PS31 PS21 PS41
P(i)
XS1o XS2o
X(i)
BS11
B(i)
WE11 XE11 PE21 BE21
W(i)=Opr.switch
XB(i)o
RA(i)o
XA(i)o
PE11 RE11 BE11 LE10 PL(i)1 (interrupt)
AB(i)o
SX1 (sign extension)
Q(H7)o
NE2o
Full Adder 7483
Full Adder 7483
108
ONE BIT OF DATA - REGISTER
A/S NORSK DATA-ELEKTRONIKK
2811
Tegn. Emil 11 12 69
Kontr.
Appr.

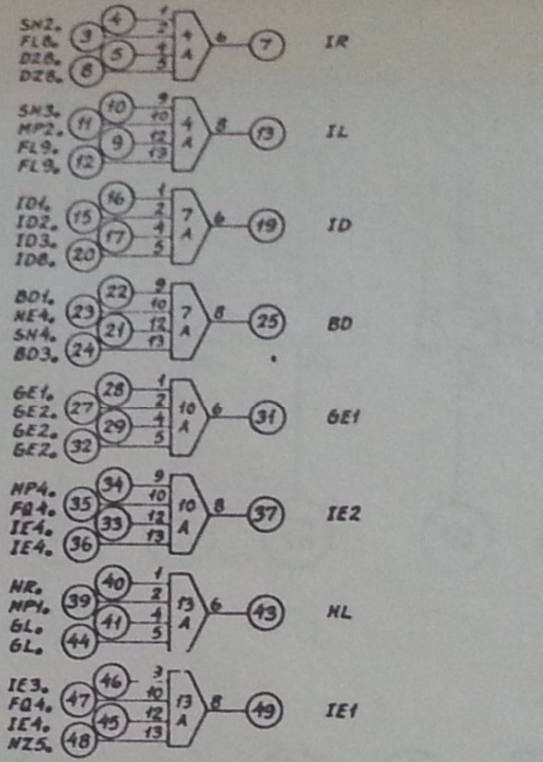
ND-01.004.01

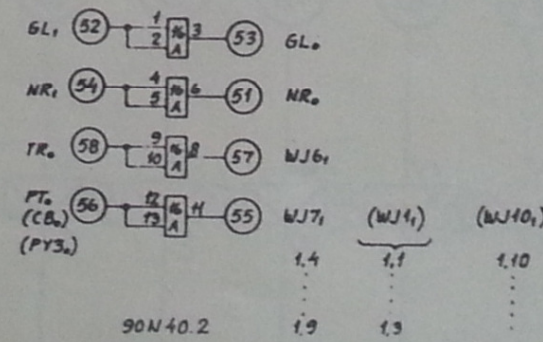




90N40.1

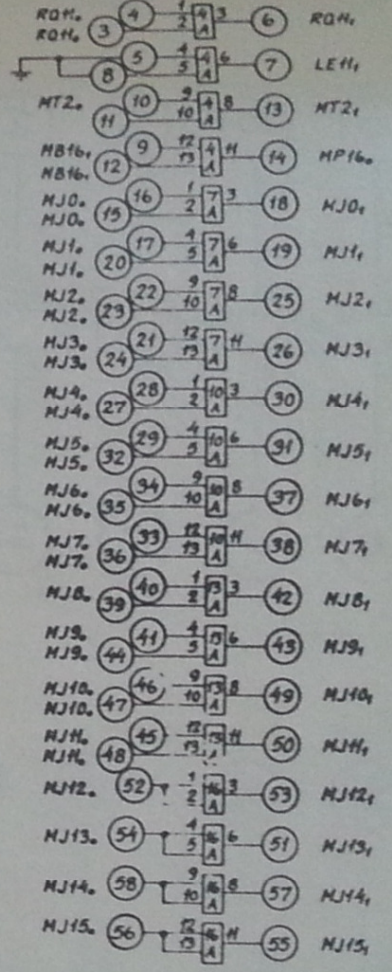
REGISTER ENABLING





90N40.2

REGISTER ENABLING

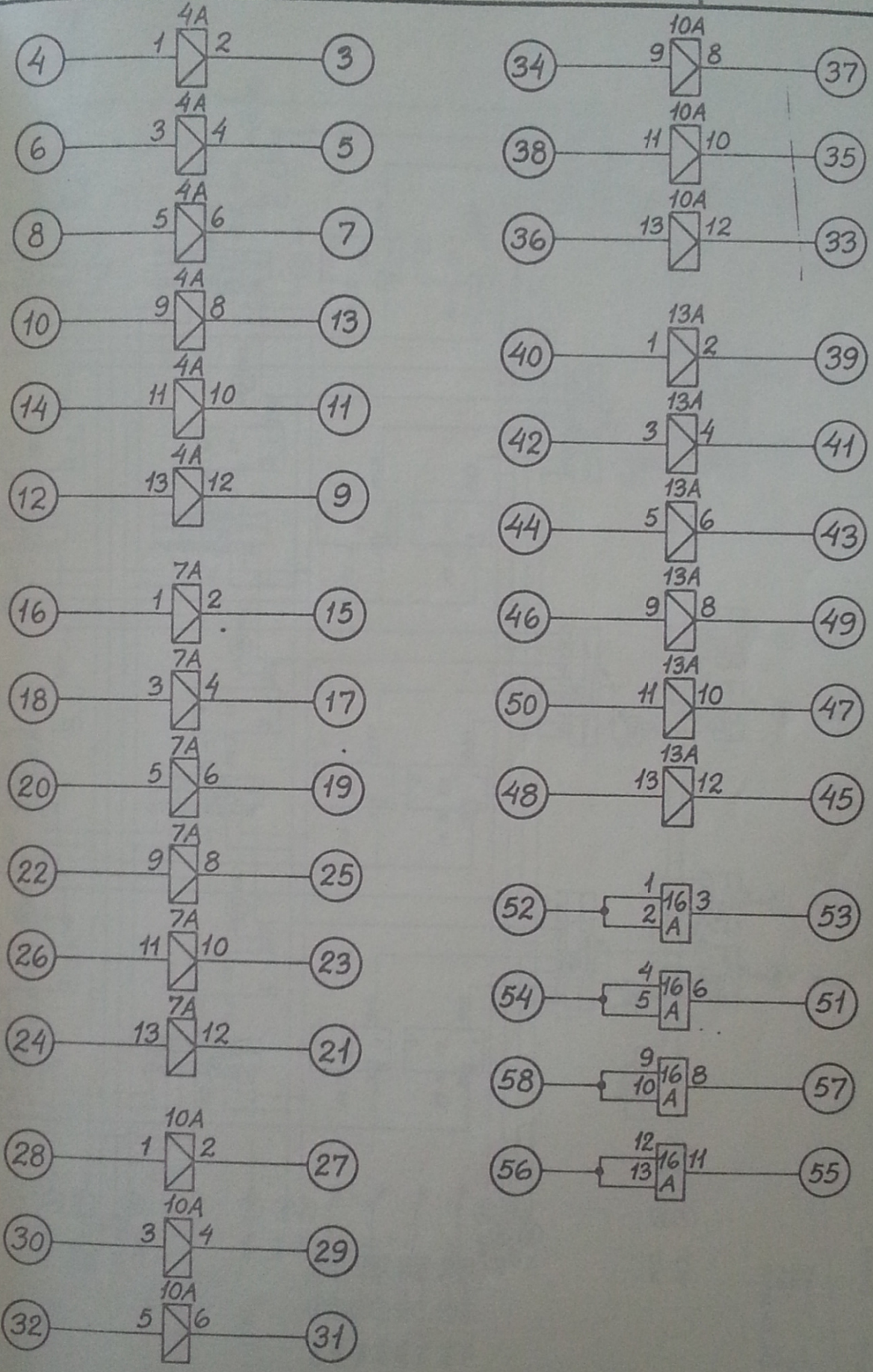


90N00.3

DATA INVERTER

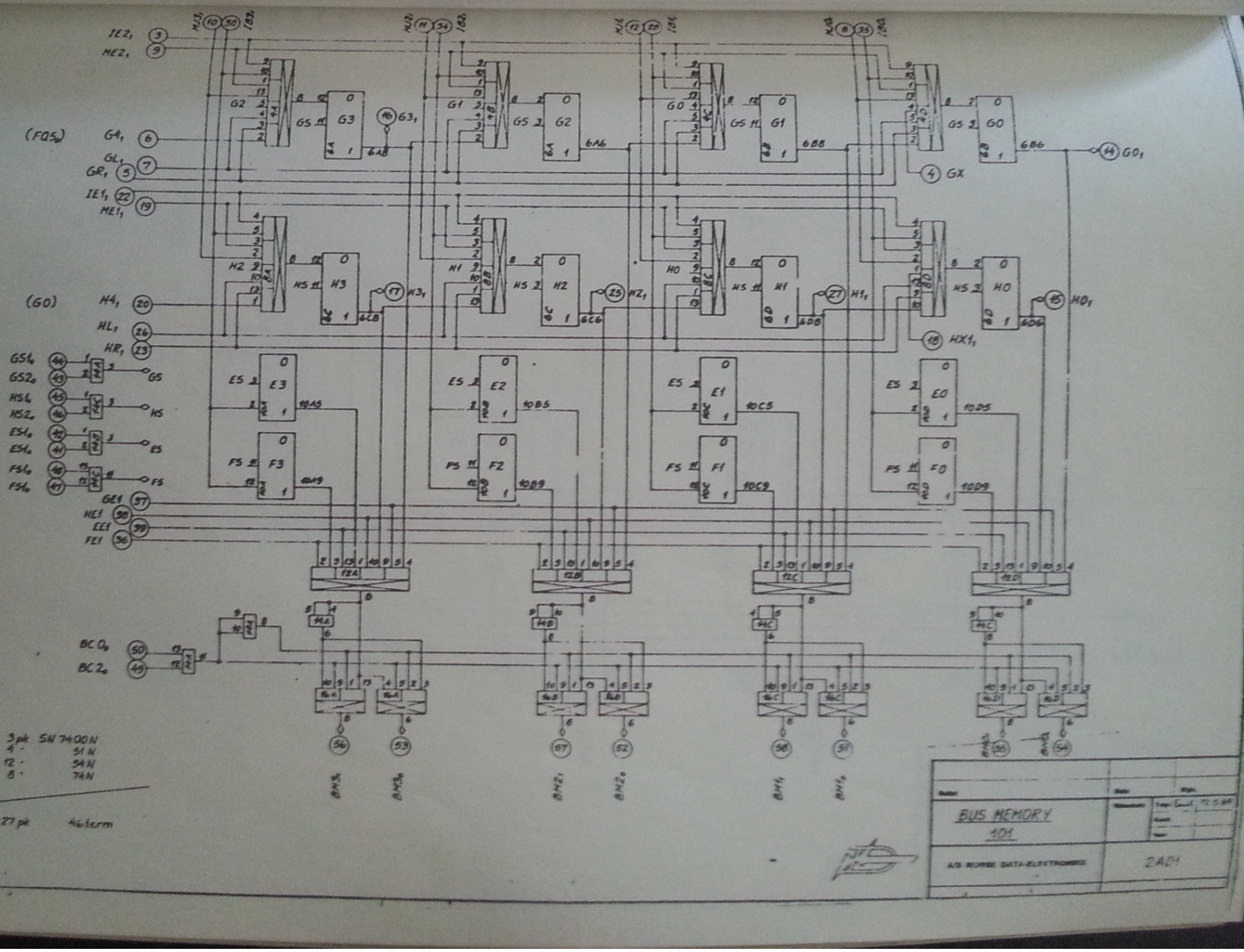
Rettet	Dato	Sign.
NORD 90 CARDS IN NORD-1	Dokumentnr.	Tegnet Kontr. Godkj.
A/S NORSK DATA-ELEKTRONIKK	2801	

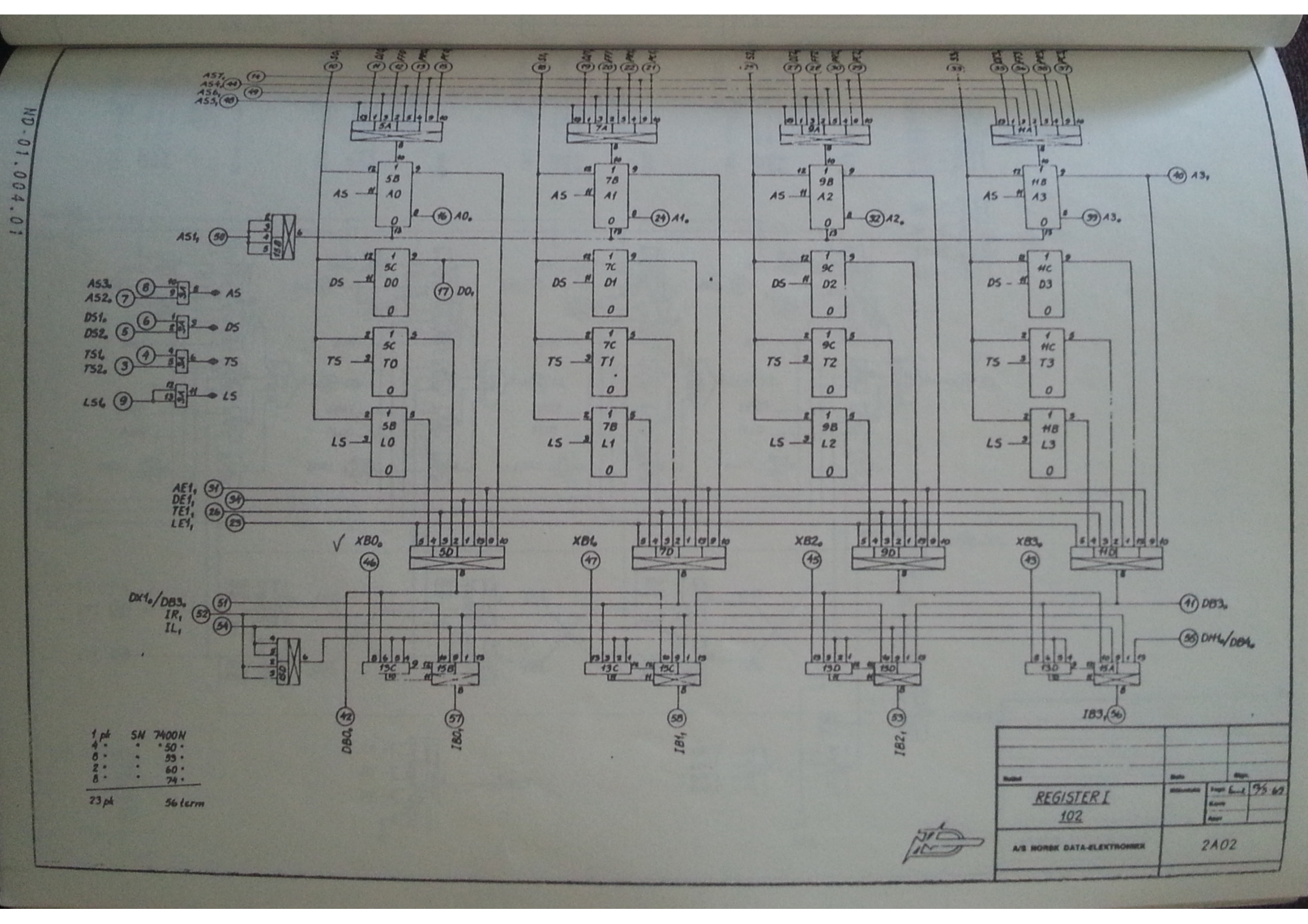
A/S NORSK DATA-ELEKTRONIKK	Title: 90N04	Drawing no.



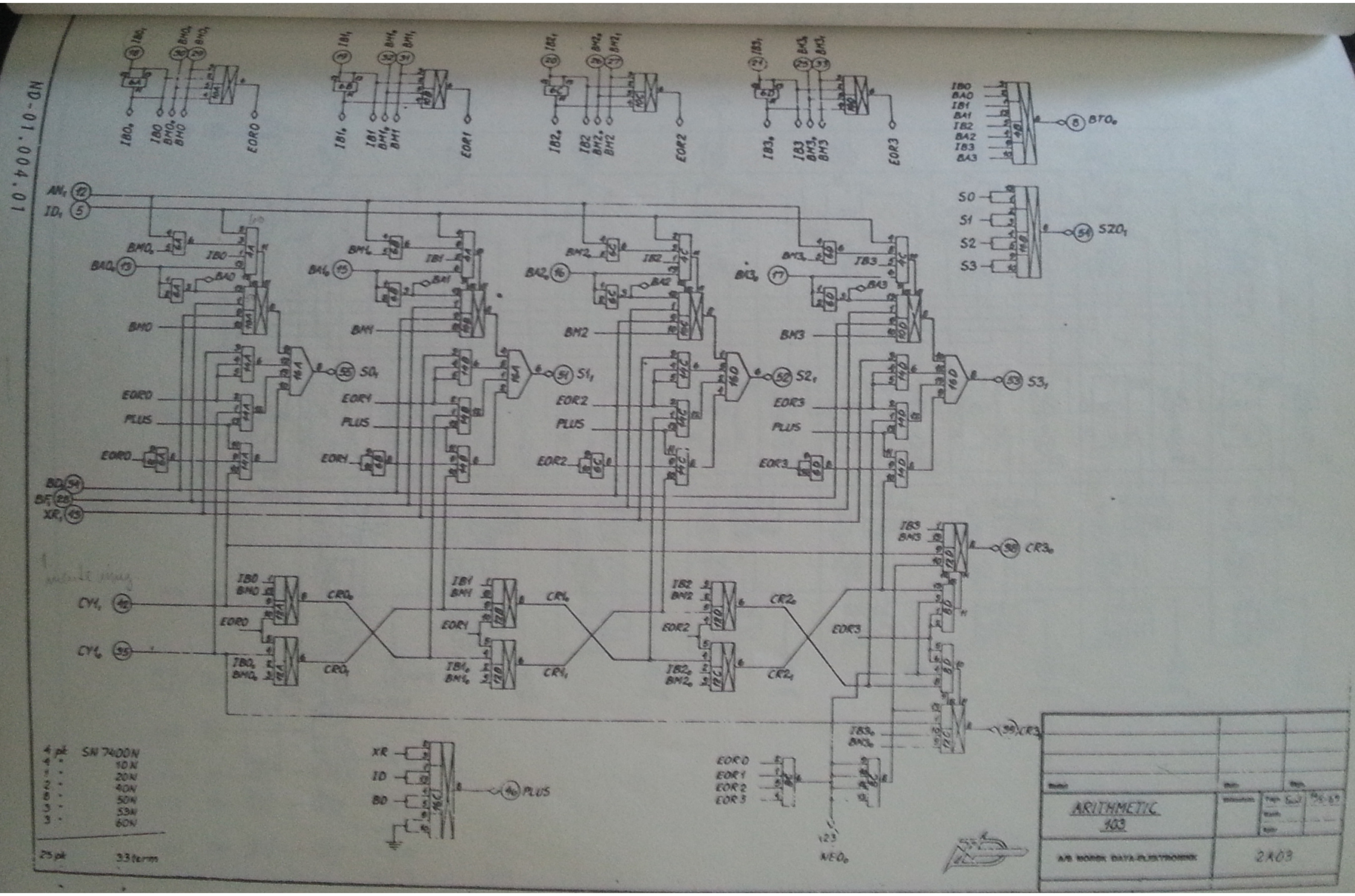
DRAWN BY	Remarks	Replacement for	Date
APPROVED BY	ND-01.004.01		
DATE		Replaced by	Date

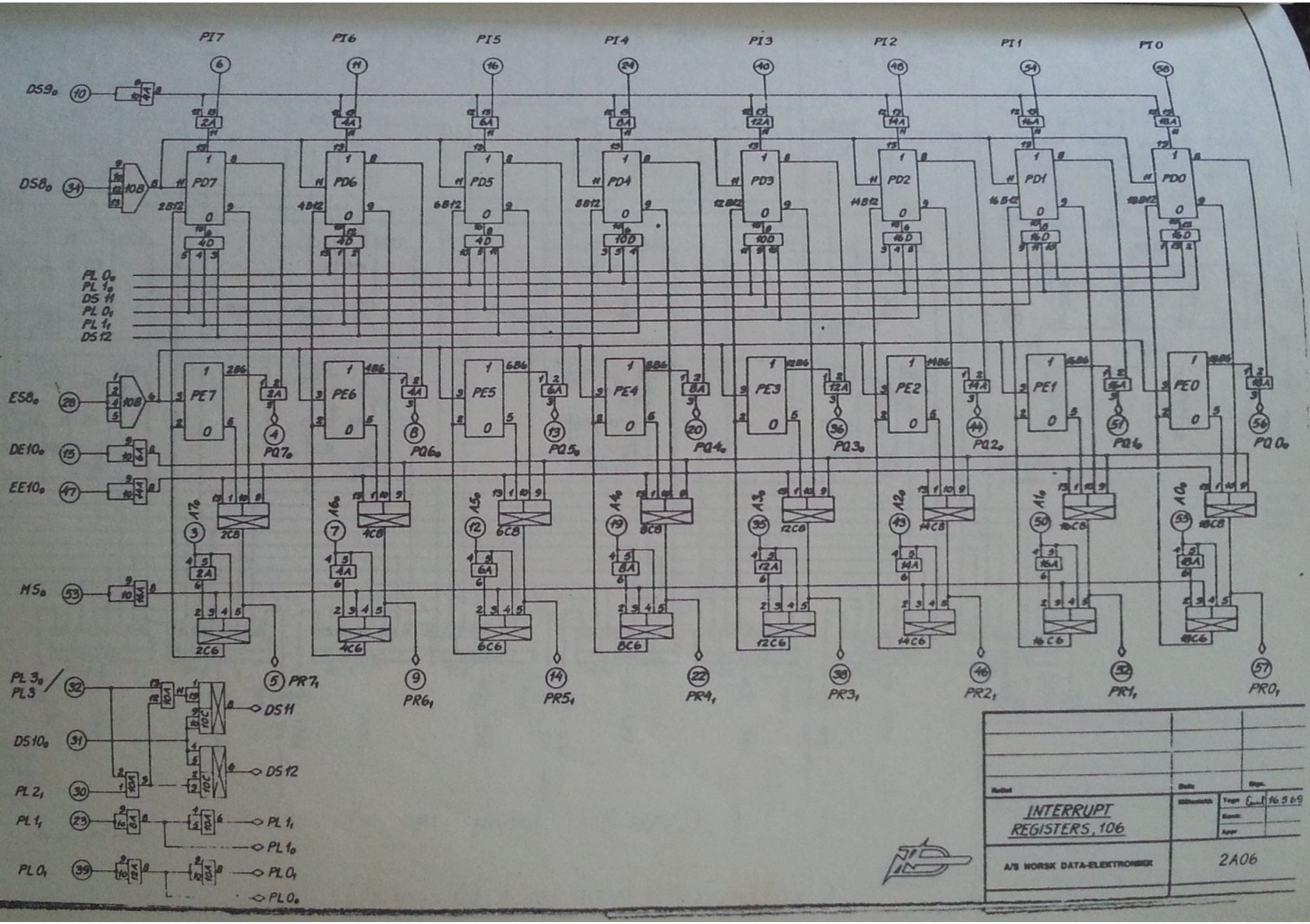
ND-01.004.01


IE2₁
ME2₁
G4₁
GL₁
GR₁
IE1₁
ME1₁
H4₁
HL₁
HR₁
GS4₀
GS2₀
HS4₀
HS2₀
ES1₀
ES1₀
FS1₀
FS1₀
GE1
HE1
EE1
FE1
BC0₀
BC2₀
(FQ5₀)
(GO)
G3
G2
G1
G0
H3
H2
H1
H0
E3
E2
E1
E0
F3
F2
F1
F0
GX
HX1₁
GO₁
HO₁
G3₁
H3₁
H2₁
H1₁
BH3₁
BH3₀
BH2₁
BH2₀
BH1₁
BH1₀
3 pk SN 7400 N
4 · 51 N
12 · 54 N
8 · 74 N
27 pk 46 term
BUS MEMORY
101
A/S NORSK DATA-ELEKTRONIKK
2A01

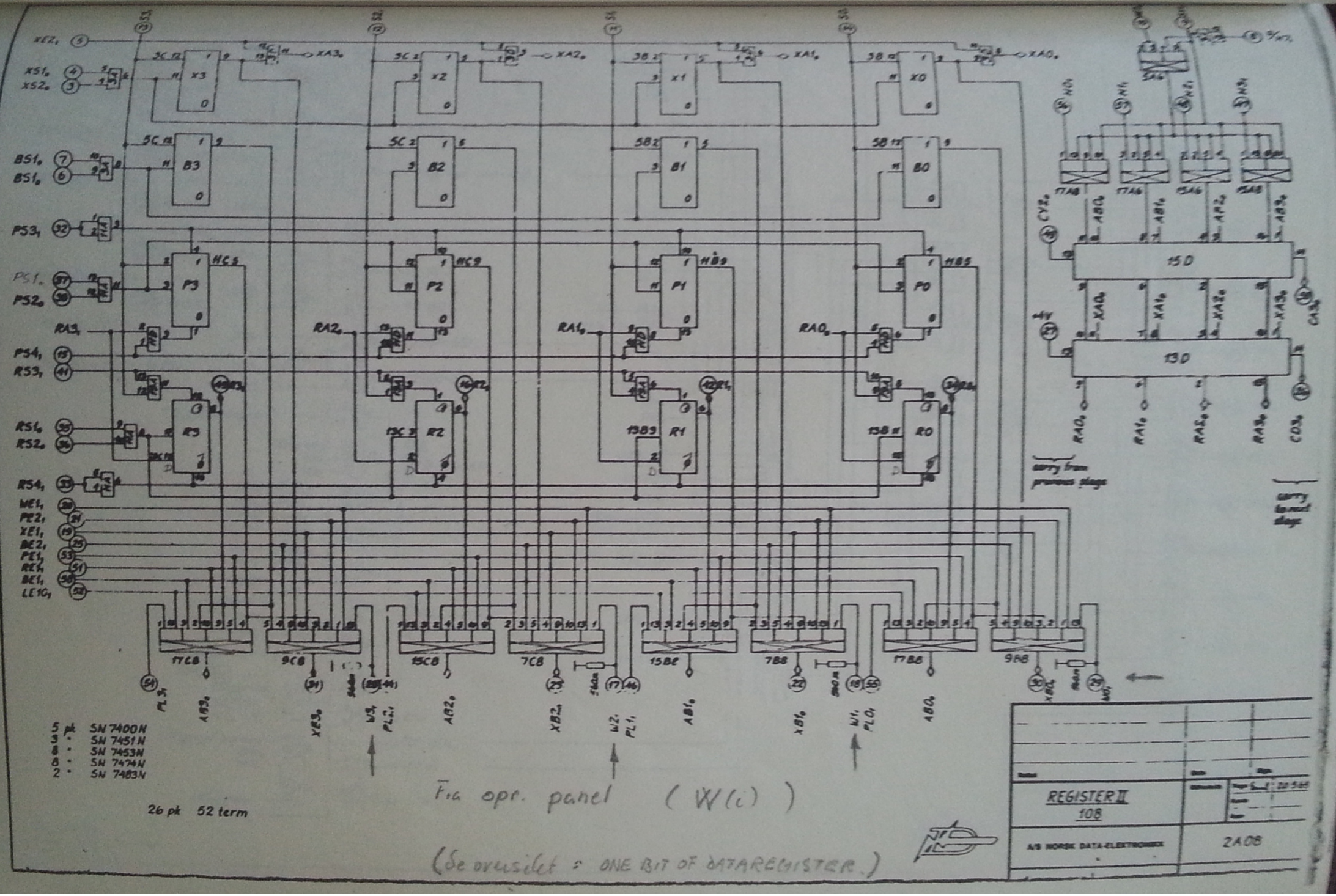

ND-01.004.01
REGISTER I
102
A/S NORSK DATA-ELEKTRONIKK
2A02
1 pk SN 7400N
4 • • 50 •
6 • • 55 •
2 • • 60 •
8 • • 74 •
23 pk 56 term

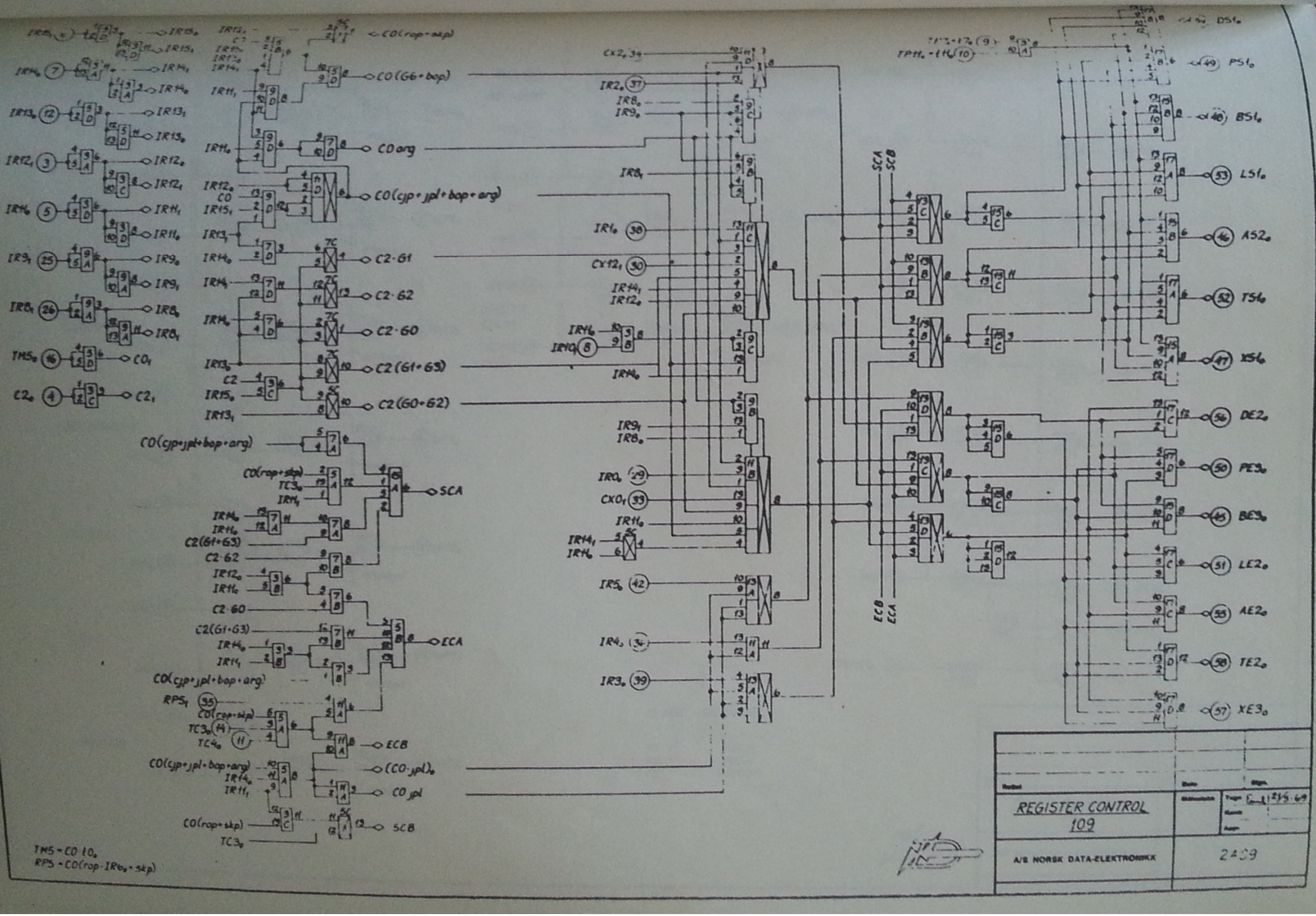
ND-01.004.01


ARITHMETIC
103
2K03
PLUS
EOR0
EOR1
EOR2
EOR3
XR
ID
BD
SN 7400N
10N
20N
40N
50N
53N
60N
25 pk
33 term

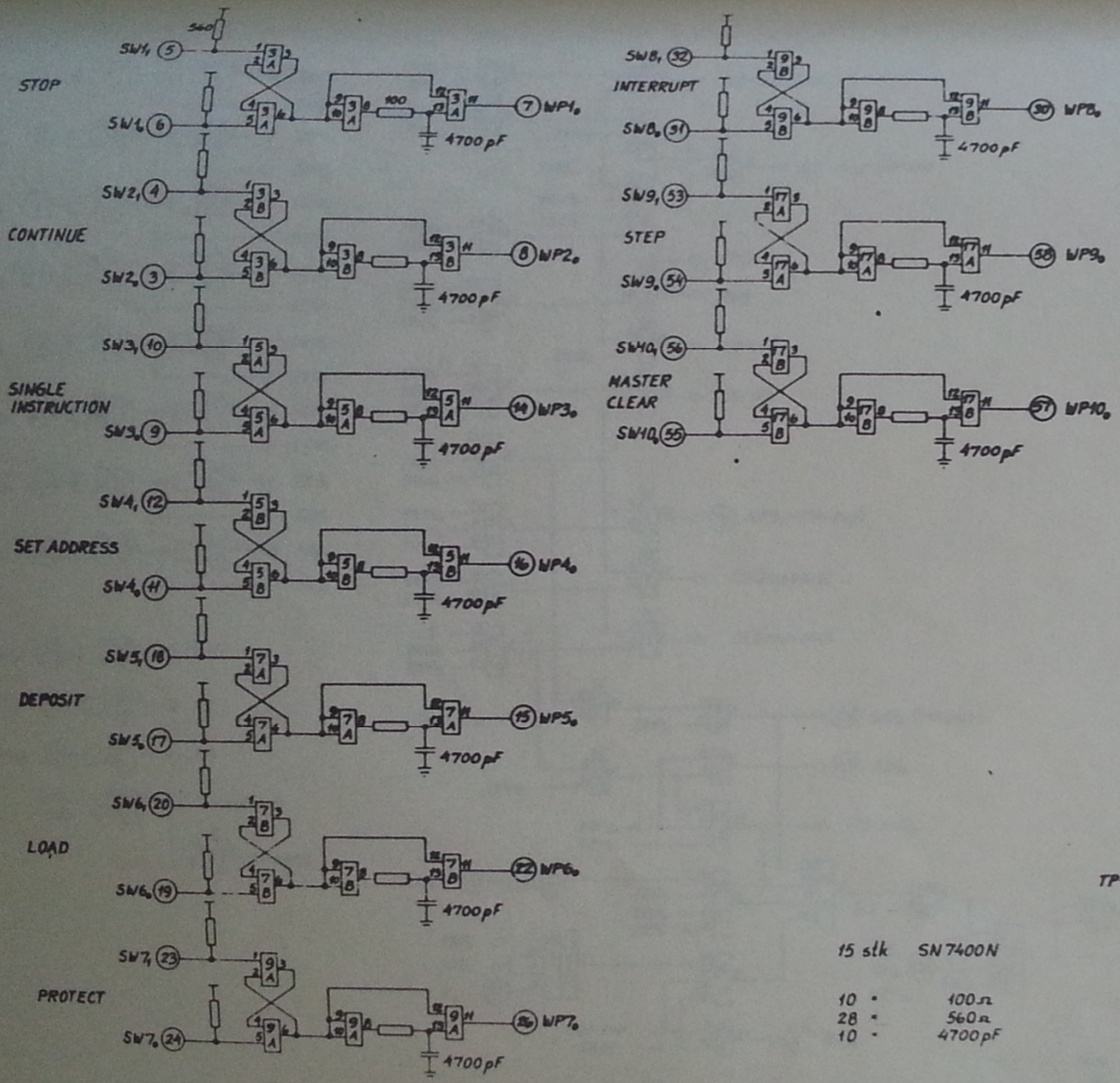

PI7
PI6
PI5
PI4
PI3
PI2
PI1
PI0
DS9₀
DS8₀
PL 0₀
PL 1₀
DS 11
PL 0₁
PL 1₁
DS 12
ES8₀
DE10₀
EE10₀
MS₀
PL 3₀ / PL3
PL 2₁
PL 1₁
PL 0₁
DS11
DS10₀
DS12
PL 1₁
PL 1₀
PL 0₁
PL 0₀
PD7
PD6
PD5
PD4
PD3
PD2
PD1
PD0
PE7
PE6
PE5
PE4
PE3
PE2
PE1
PE0
PQ7₀
PQ6₀
PQ5₀
PQ4₀
PQ3₀
PQ2₀
PQ1₀
PQ0₀
PR7₁
PR6₁
PR5₁
PR4₁
PR3₁
PR2₁
PR1₁
PR0₁
INTERRUPT REGISTERS, 106
A/S NORSK DATA-ELEKTRONIKK
2A06

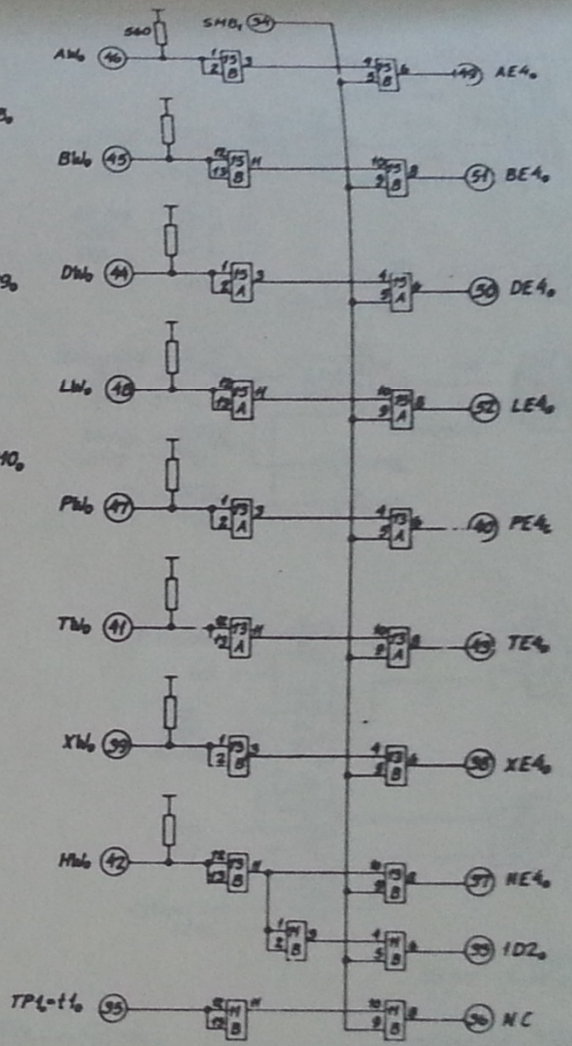
ND-01.004.01


ND-01.004.01
XE2₁
XS1₀
XS2₀
BS1₀
BS1₁
PS3₁
PS1₀
PS2₀
RA3₁
PS4₁
RS3₁
RS1₀
RS2₀
RS4₁
WE1₁
PE2₁
XE1₁
BE2₁
PE1₁
RE1₁
BE1₁
LE10₁
XA3₀
XA2₀
XA1₀
XA0₀
RA2₀
RA1₀
RA0₀
CY2₀
15D
13D
RA0₀
RA1₀
RA2₀
RA3₀
CO3₀
carry from previous stage
carry to next stage
5 pk SN 7400N
3 " SN 7451N
8 " SN 7453N
8 " SN 7474N
2 " SN 7483N
26 pk 52 term
Fra opr. panel (W(i))
(Se oversikt : ONE BIT OF DATAREGISTER.)
REGISTER II
108
A/S NORSK DATA-ELEKTRONIKK
2A08


ND-01.004.01
REGISTER CONTROL
109
A/S NORSK DATA-ELEKTRONIKK
2409
TM5 = CO·10₀
RPS = CO(rop·IR6₀·skp)
SCA
SCB
ECA
ECB
CO(G6·bop)
CO org
CO(cjp·jpl·bop·arg)
C2·G1
C2·G2
C2·G0
C2(G1·G3)
C2(G0·G2)
CO jpl
SCB
PS1₀
BS1₀
LS1₀
AS2₀
TS1₀
XS1₀
DE2₀
PE3₀
BE3₀
LE2₀
AE2₀
TE2₀
XE3₀

ND-01.004.01





15 stk SN7400N

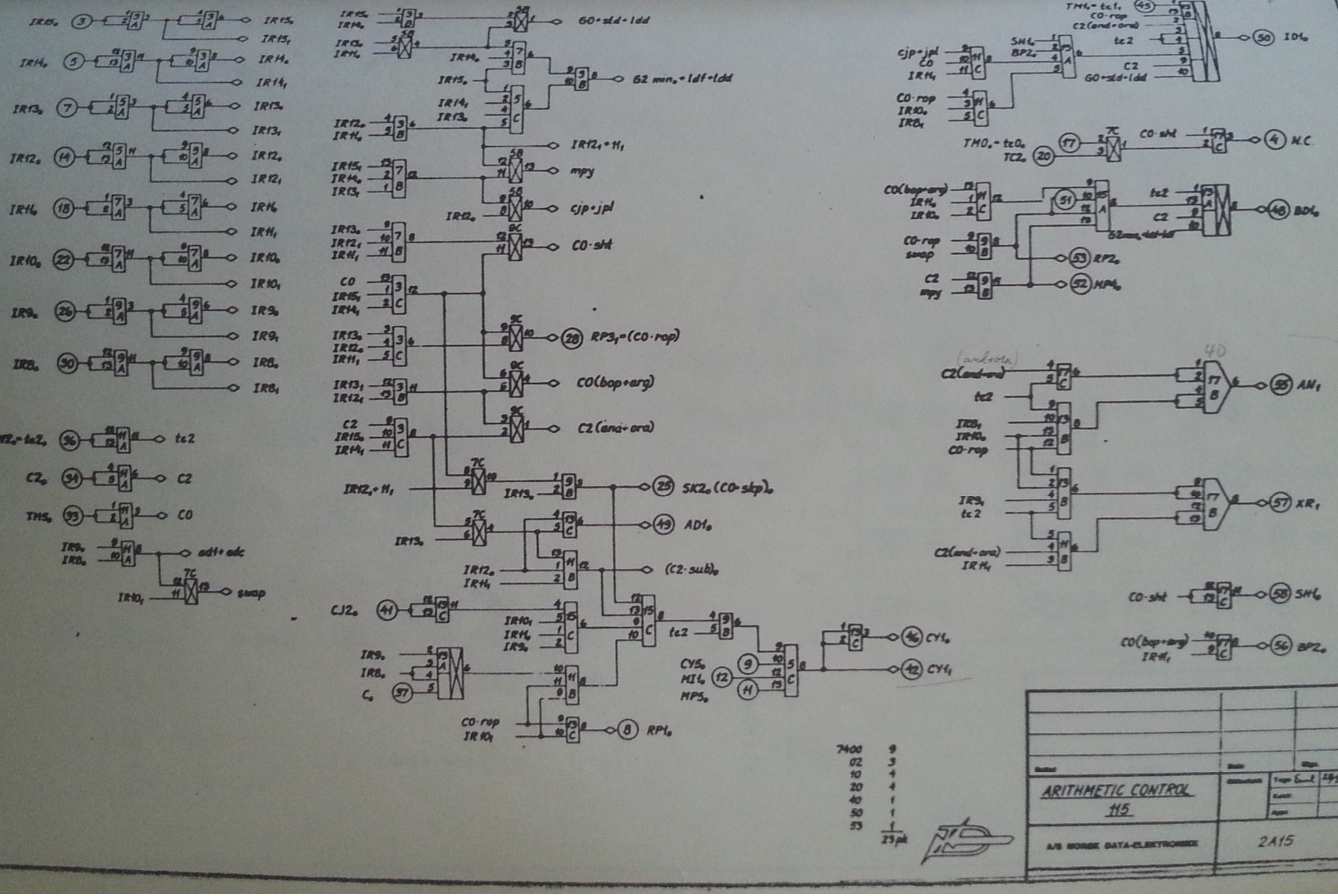
10 • 100 Ω
28 • 560 Ω
10 • 4700 pF

PANEL BUFFER
110

A/S NORSK DATA-ELEKTRONIKK

2A10

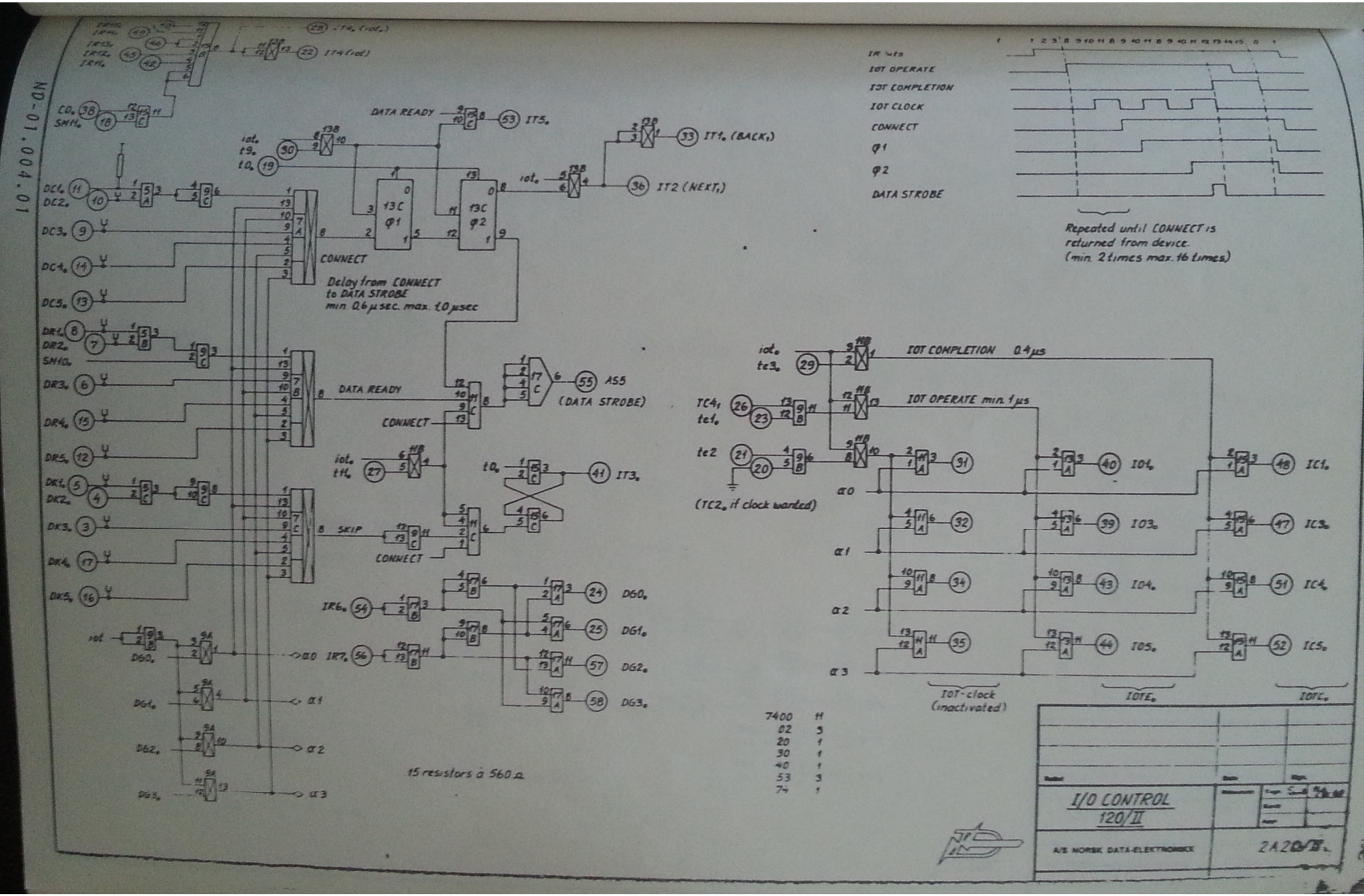
ND-01.004.01

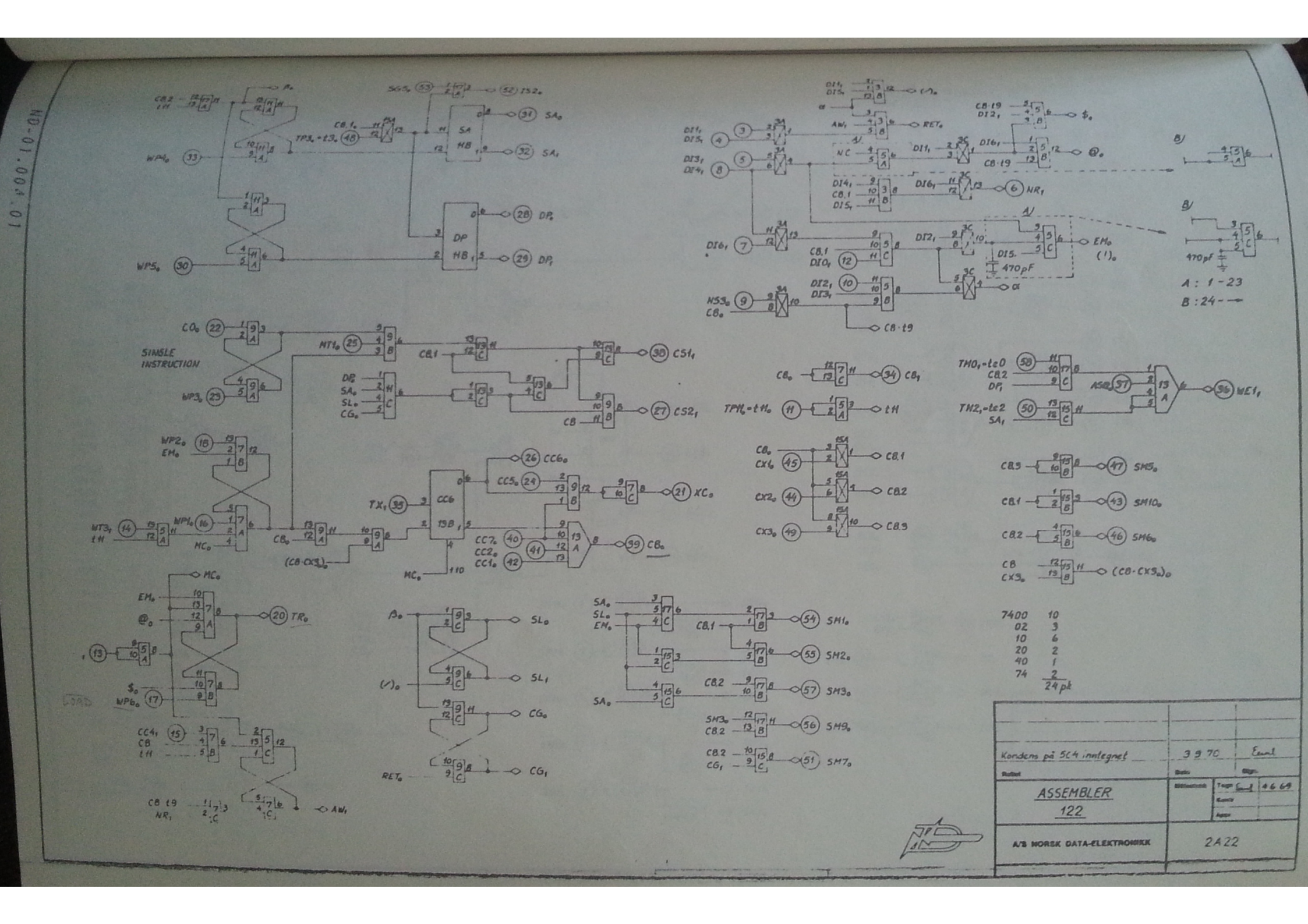


7400	9
02	3
10	4
20	4
40	1
50	1
53	1
	23 pk

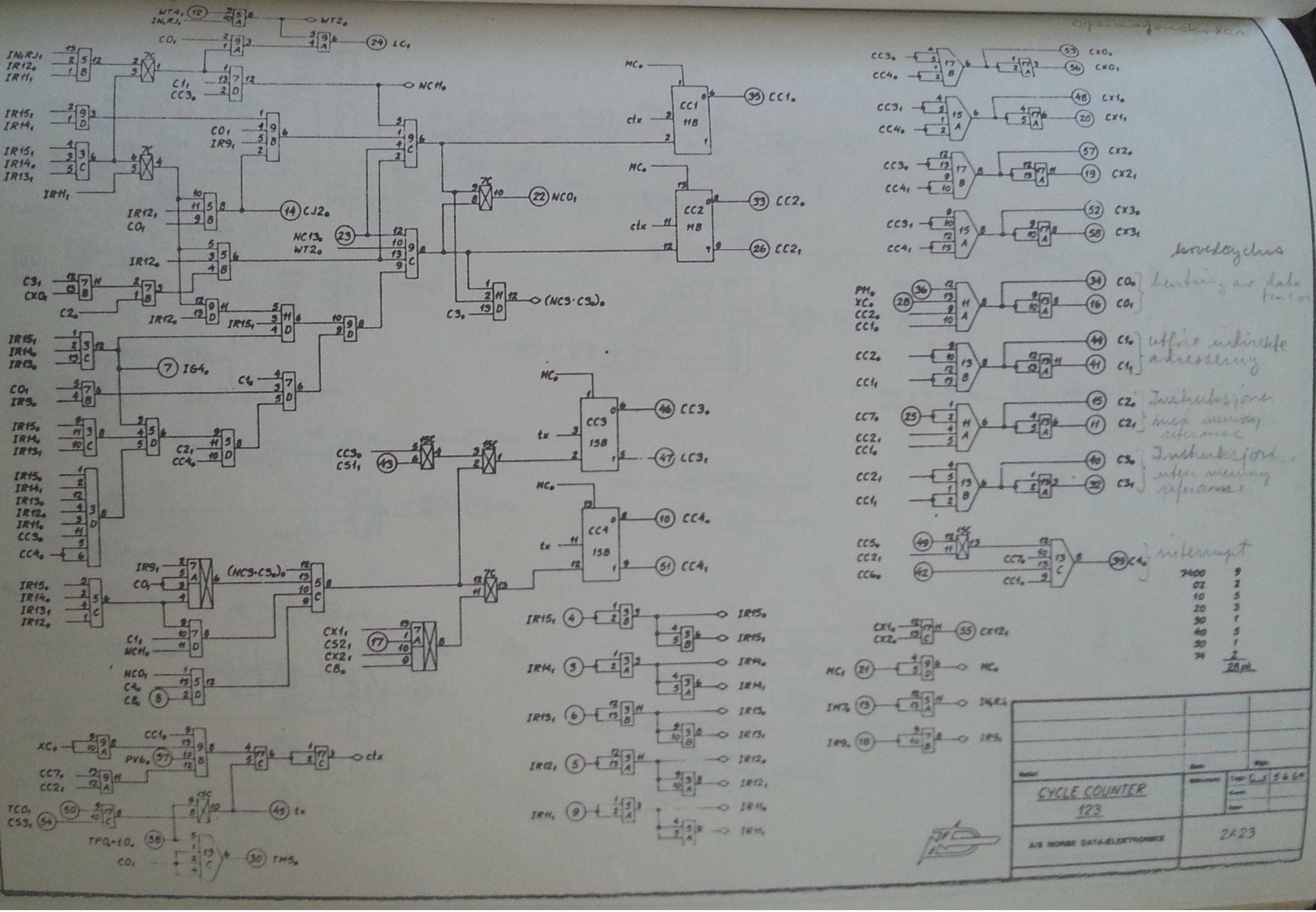
Drawn	Date	Sign.	
ARITHMETIC CONTROL 115	Construction	Type C_1	245 69
		Check	
		Appr.	
A/S NORSK DATA-ELEKTRONIKK	2A15		

ND-01.004.01

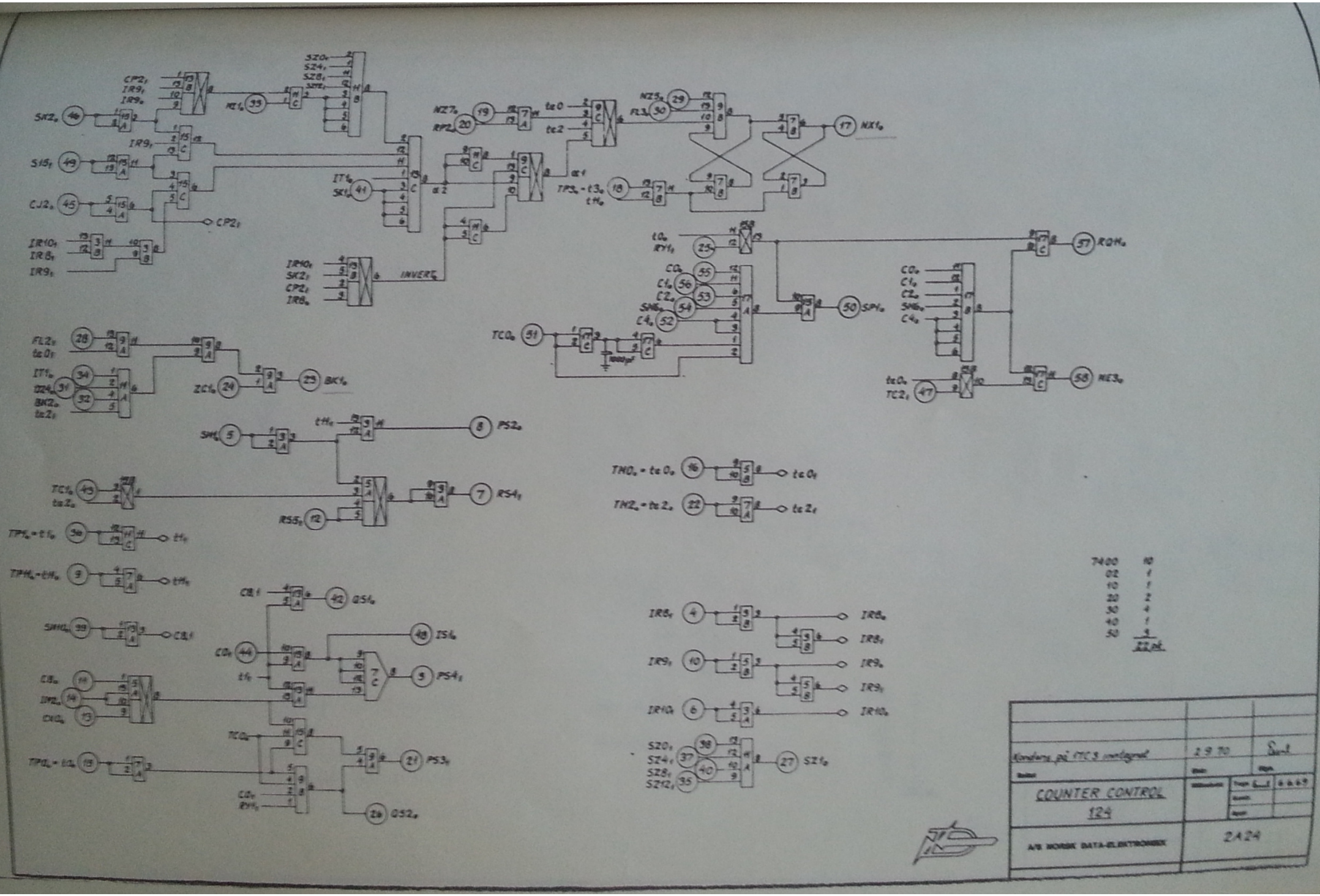

IR 4
IR 5
IR 6
IR 7
IR 14
CO.
SMK.
IT4. (iot.)
IT4 (iot)
DATA READY
IT5.
iot.
t9.
t0.
IT1. (BACK.)
IT2 (NEXT.)
DC1.
DC2.
DC3.
DC4.
DC5.
CONNECT
Delay from CONNECT to DATA STROBE min. 0.6 µsec. max. 1.0 µsec
DR1.
DR2.
SMK.
DR3.
DR4.
DR5.
DATA READY
AS5
(DATA STROBE)
CONNECT
t11.
IT3.
DK1.
DK2.
DK3.
DK4.
DK5.
SKIP
CONNECT
IR6.
IR7.
DG0.
DG1.
DG2.
DG3.
15 resistors à 560 Ω
IR bits
IOT OPERATE
IOT COMPLETION
IOT CLOCK
CONNECT
φ1
φ2
DATA STROBE
Repeated until CONNECT is returned from device. (min. 2 times max. 16 times)
te3.
IOT COMPLETION 0.4 µs
TC4.
te1.
IOT OPERATE min. 1 µs
te2
(TC2. if clock wanted)
α0
α1
α2
α3
IO1.
IO3.
IO4.
IO5.
IC1.
IC3.
IC4.
IC5.
IOT-clock (inactivated)
IOTE.
IOTC.
7400 H
02 5
20 1
30 1
40 1
53 3
74 1
I/O CONTROL
120/II
A/S NORSK DATA-ELEKTRONIKK
2A20/II.


SINGLE INSTRUCTION
LOAD
ASSEMBLER
122
A/S NORSK DATA-ELEKTRONIKK
2A22
Kondens på SC4 innlegget
3 9 70
A : 1 - 23
B : 24 - →
470pF
7400 10
02 3
10 6
20 2
40 1
74 2
24 pk

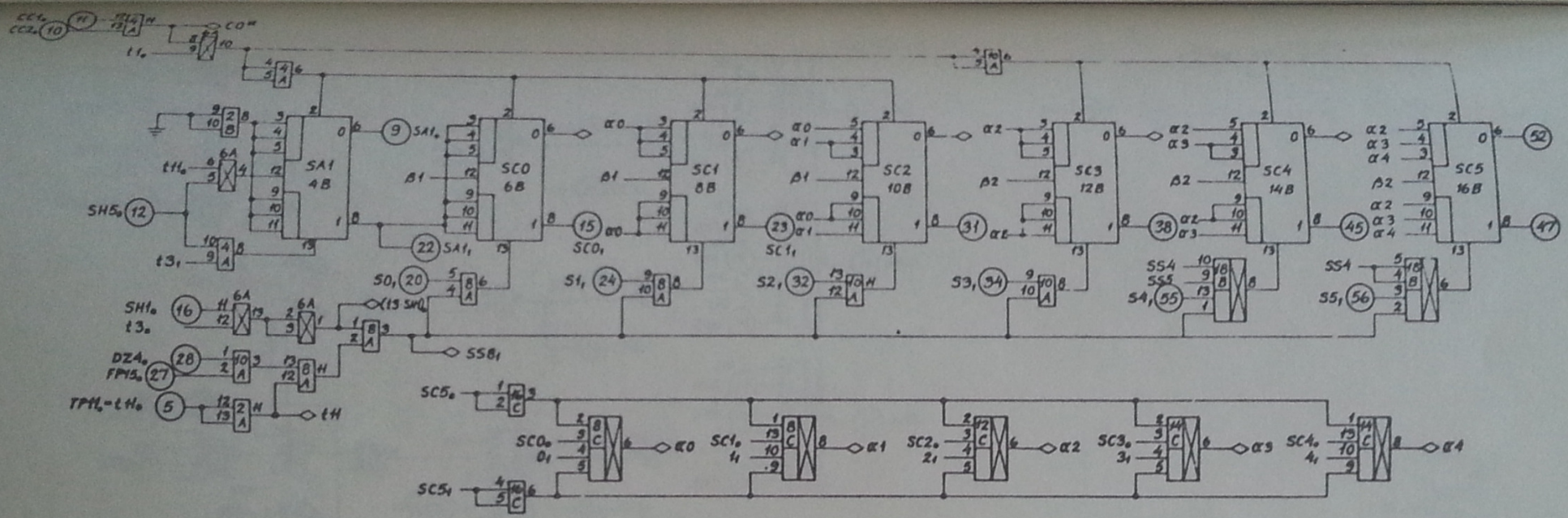
ND-01.004.01

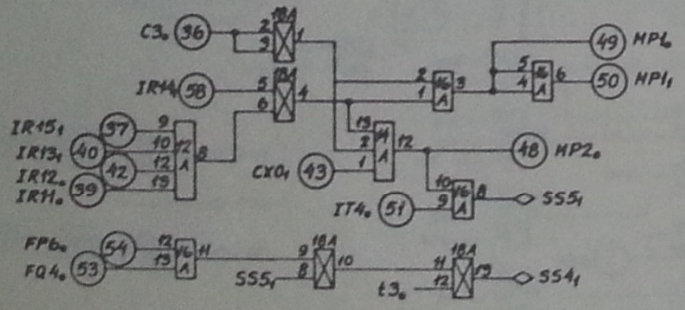

CYCLE COUNTER
123
A/S NORSK DATA-ELEKTRONIKK
2A23
CC1
11B
CC2
11B
CC3
15B
CC4
15B
7400 9
02 2
10 5
20 3
30 1
40 5
50 1
74 2
28 pk.

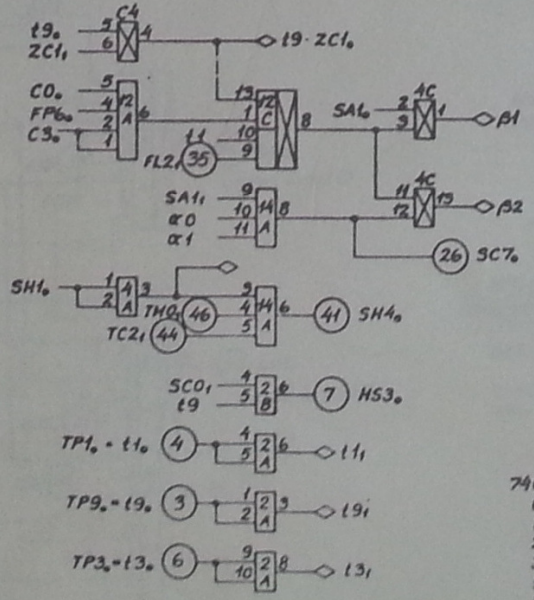
ND-01.004.01

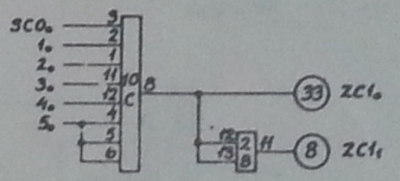


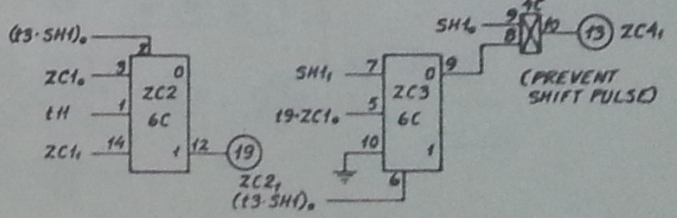
ND-01.004.01











16V32 → SC $SS4_1 = t3[(CO+C8)iot + C3,0 \cdot mpy + SS6]$

16 → SC $SS5_1 = (CO+C8)iot + C3,0 \cdot mpy$

32 → SC $SS6_1 = CX2\,(C2(fmu+fdv)+C3(fad+fsb))$

S → SC $SS8_1 = CO \cdot dnz + C2,0\,(fad+fsb)$

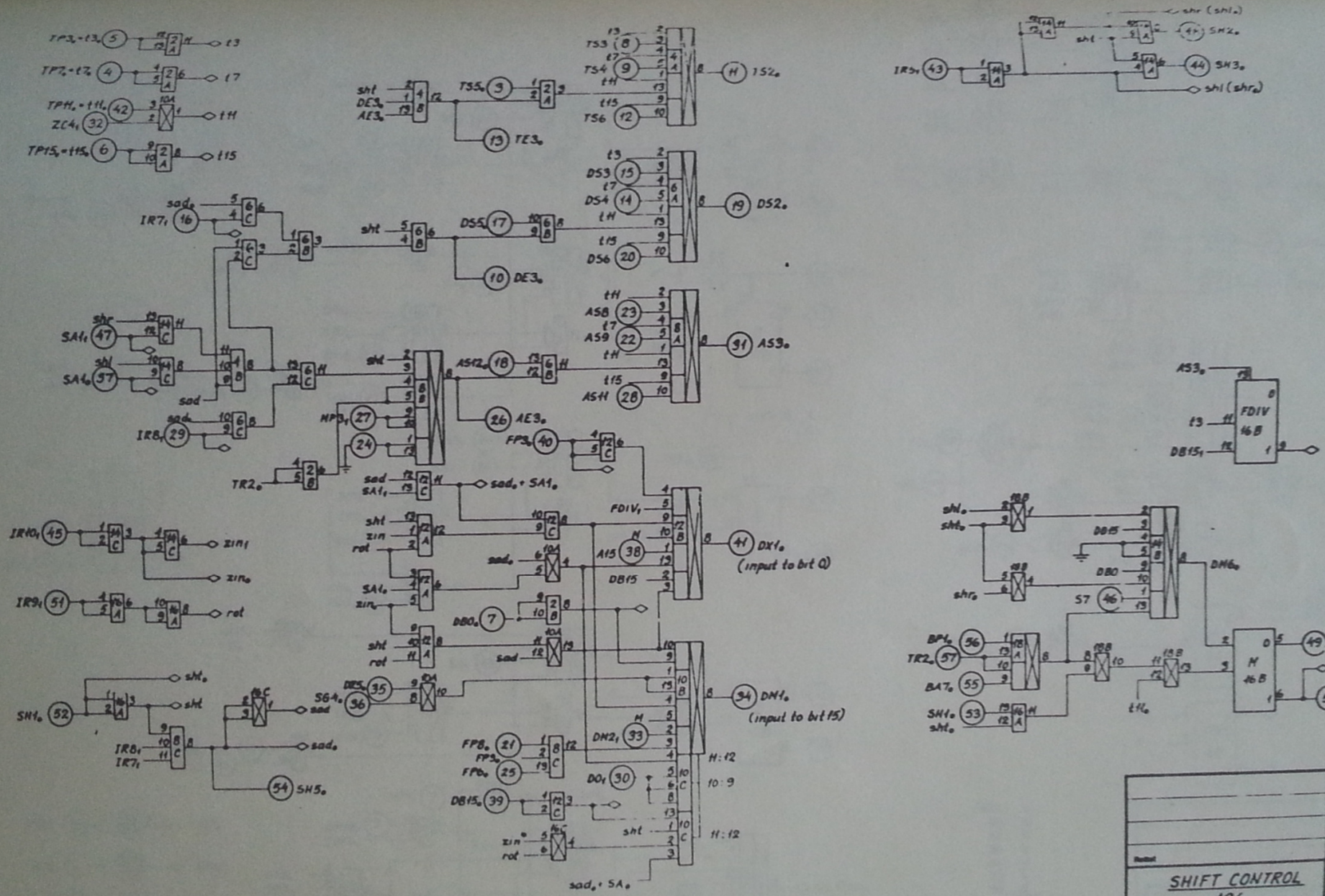
count SC $FL2_1 = C3,3(fad+fsb)\,SG1(G15 - CF1)_0$

$SH1 = CO \cdot sht$

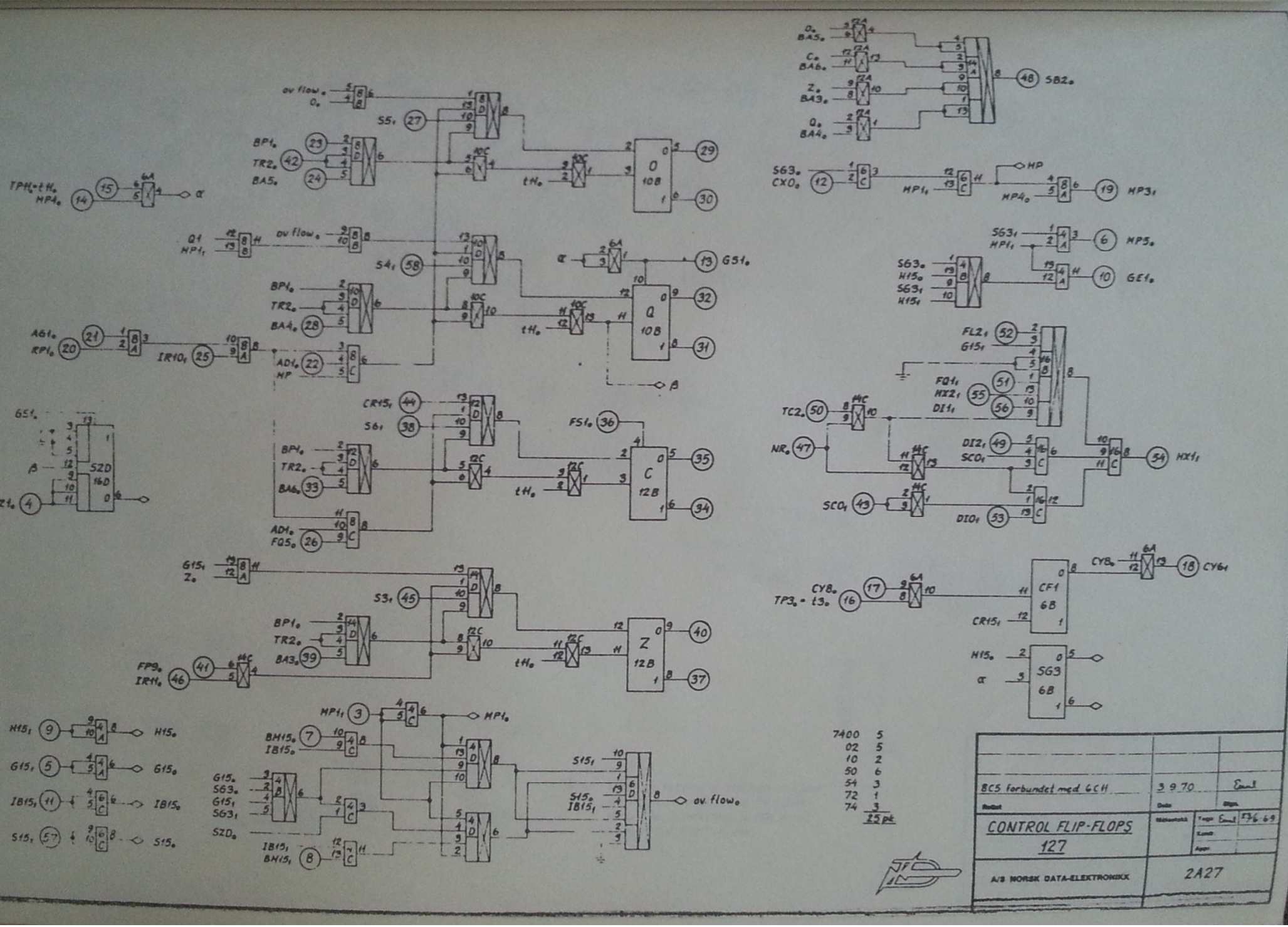
7400	7
02	3
10	1
20	1
30	1
50	4
72	7
73	1
25 pk.	

SHIFT COUNTER 125	Tegn. Godkj. 19/6 69
A/S NORSK DATA-ELEKTRONIKK	2A25

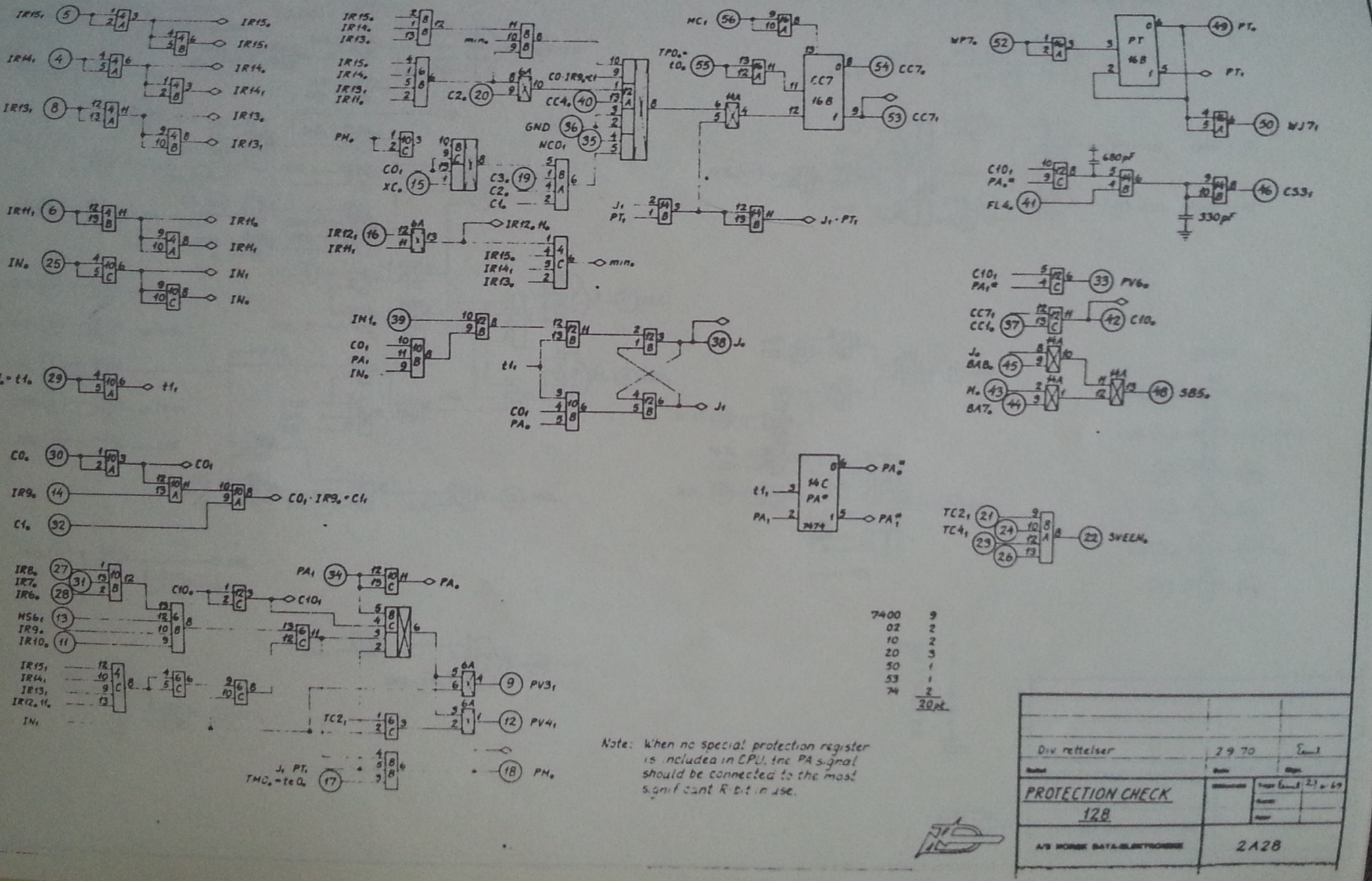
ND-01.004.01


SHIFT CONTROL
126
A/S NORSK DATA-ELEKTRONIKK
2A26
FDIV
46 B
M
46 B

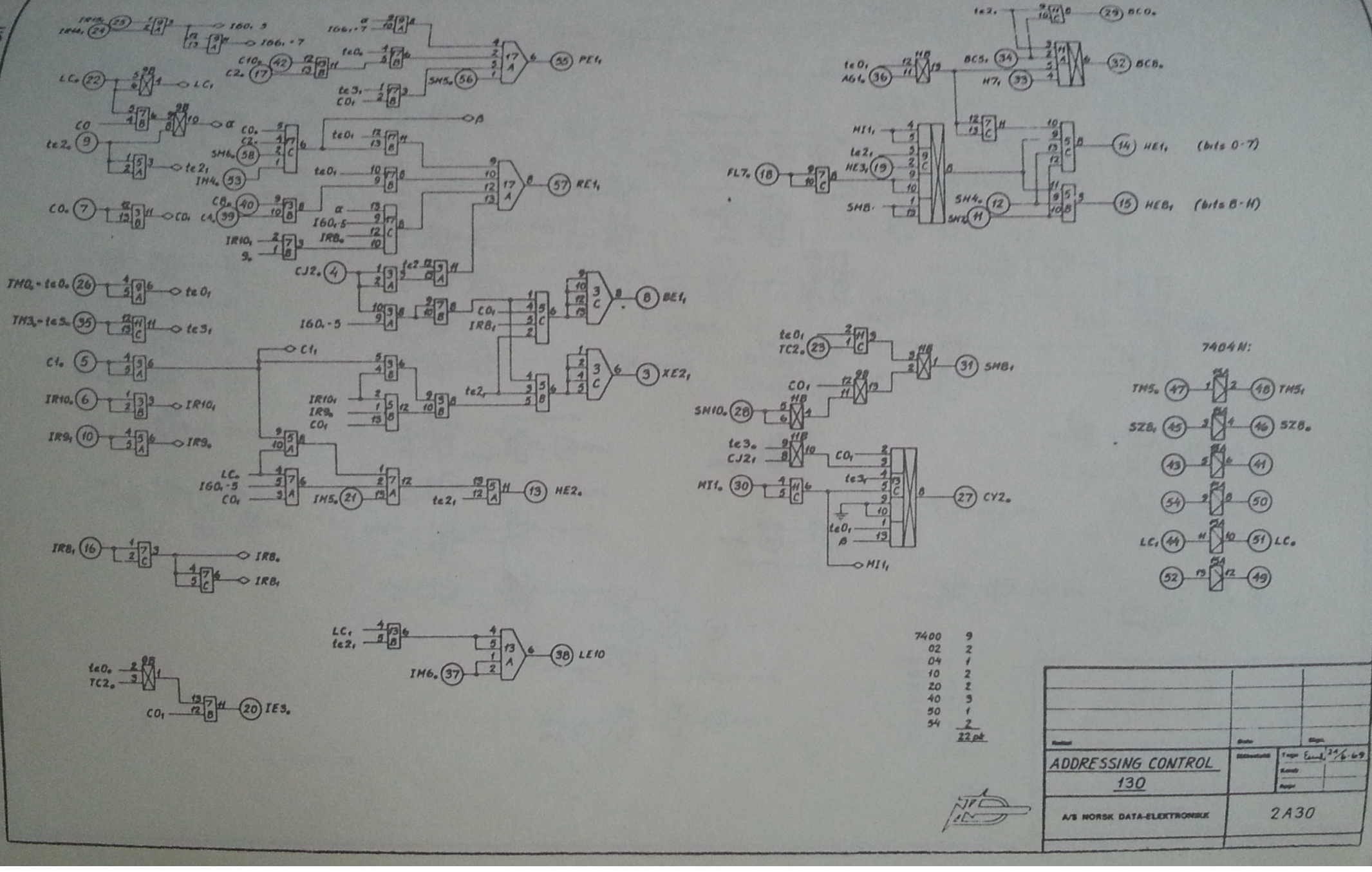
ND-01.004.01

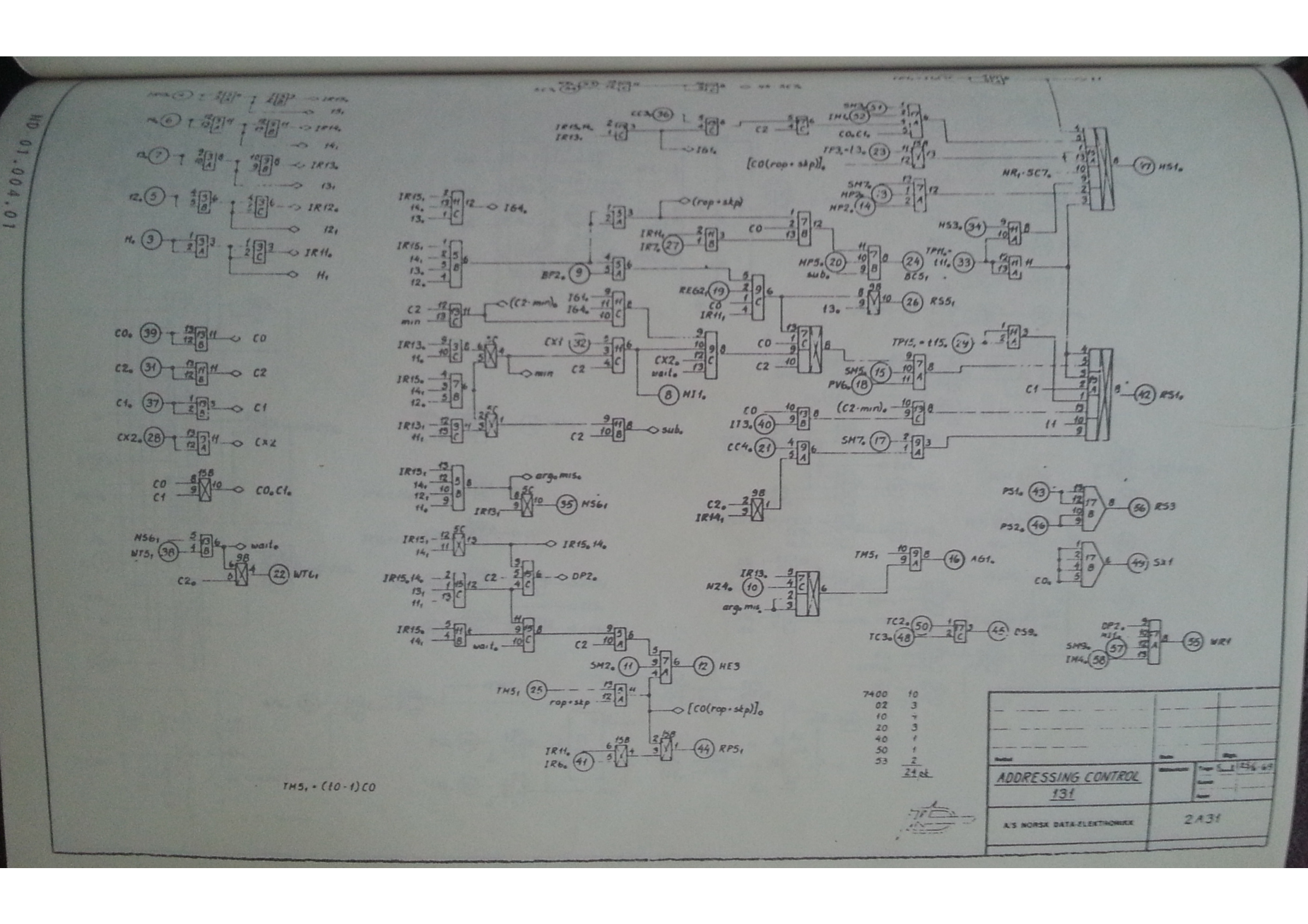

CONTROL FLIP-FLOPS
127
BCS forbundet med GCH
3 9 70
A/S NORSK DATA-ELEKTRONIKK
2A27
7400 5
02 5
10 2
50 6
54 3
72 1
74 3
25 pk

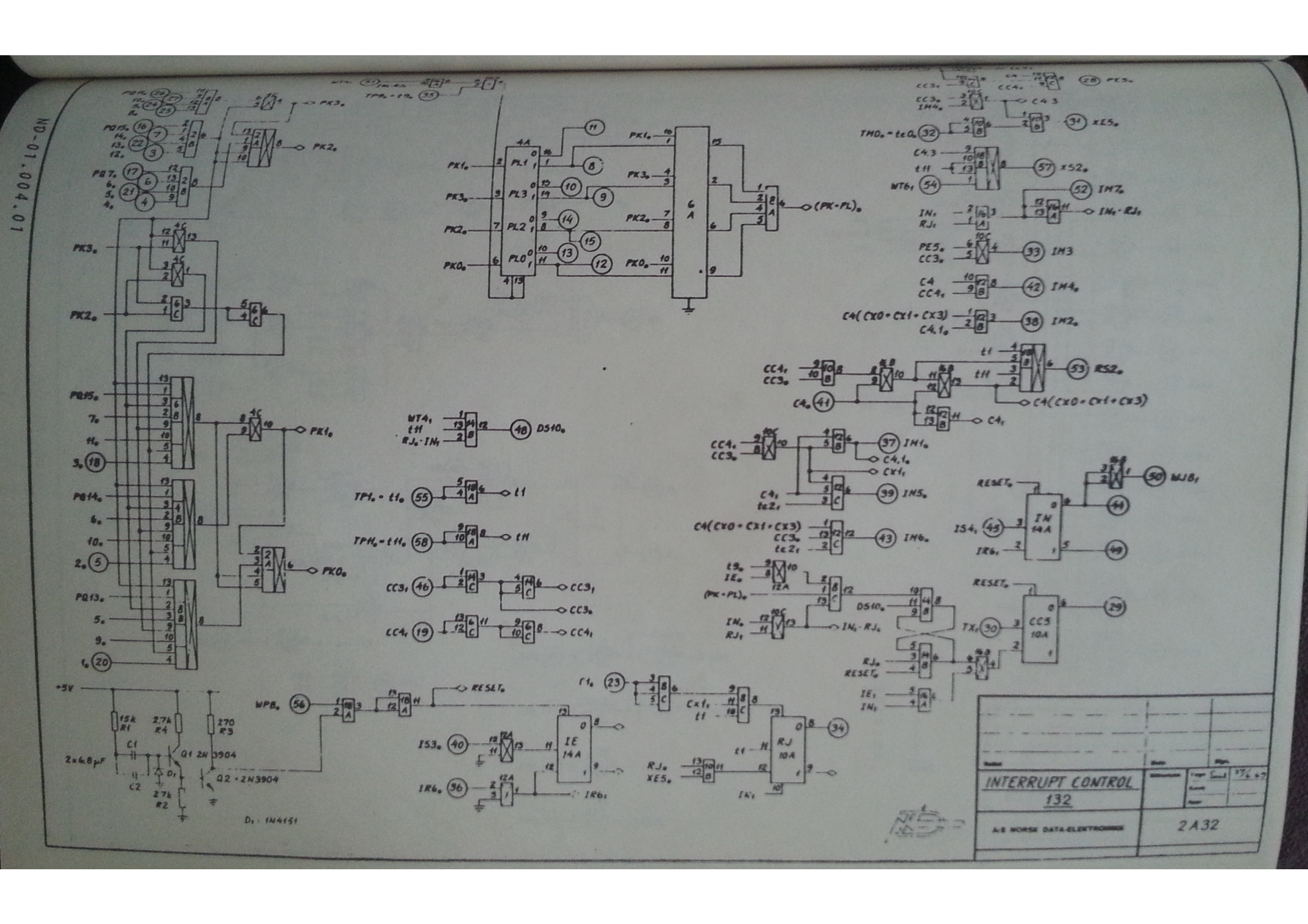
ND-01.004.01

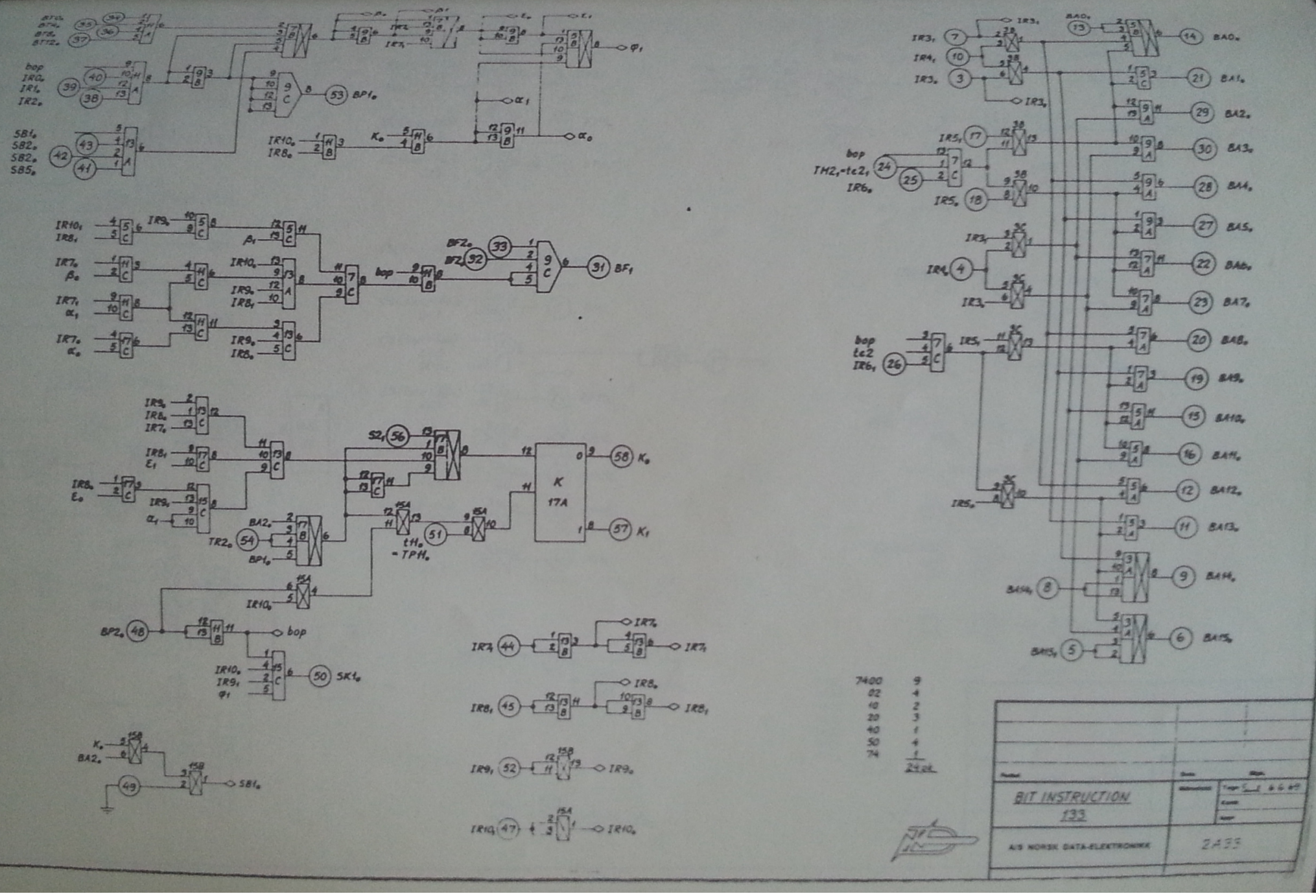

IR15₀
IR14₀
IR13₀
IR12₀ IR11₀
IR10₀
IR9₀
IR8₀
IR7₀
IR6₀
IN₀
TP1₀ · t1₀
C0₀
PH₀
PA₀
MC₁
TP0₀ · t0₀
WP7₀
C10₀
PA₀''
FL4₀
J₀
BA8₀
H₀
BA7₀
TC2₁
TC4₁
680pF
330pF
CC7
16B
PT
16B
7474
14C
PA''
7400 9
02 2
10 2
20 3
50 1
53 1
74 2
20pt
Note: When no special protection register is includea in CPU, the PA signal should be connected to the most significant R bit in use.
Div rettelser
2 9 70
PROTECTION CHECK
128
A/S NORSK DATA-ELEKTRONIKK
2A28

ND-01.004.01

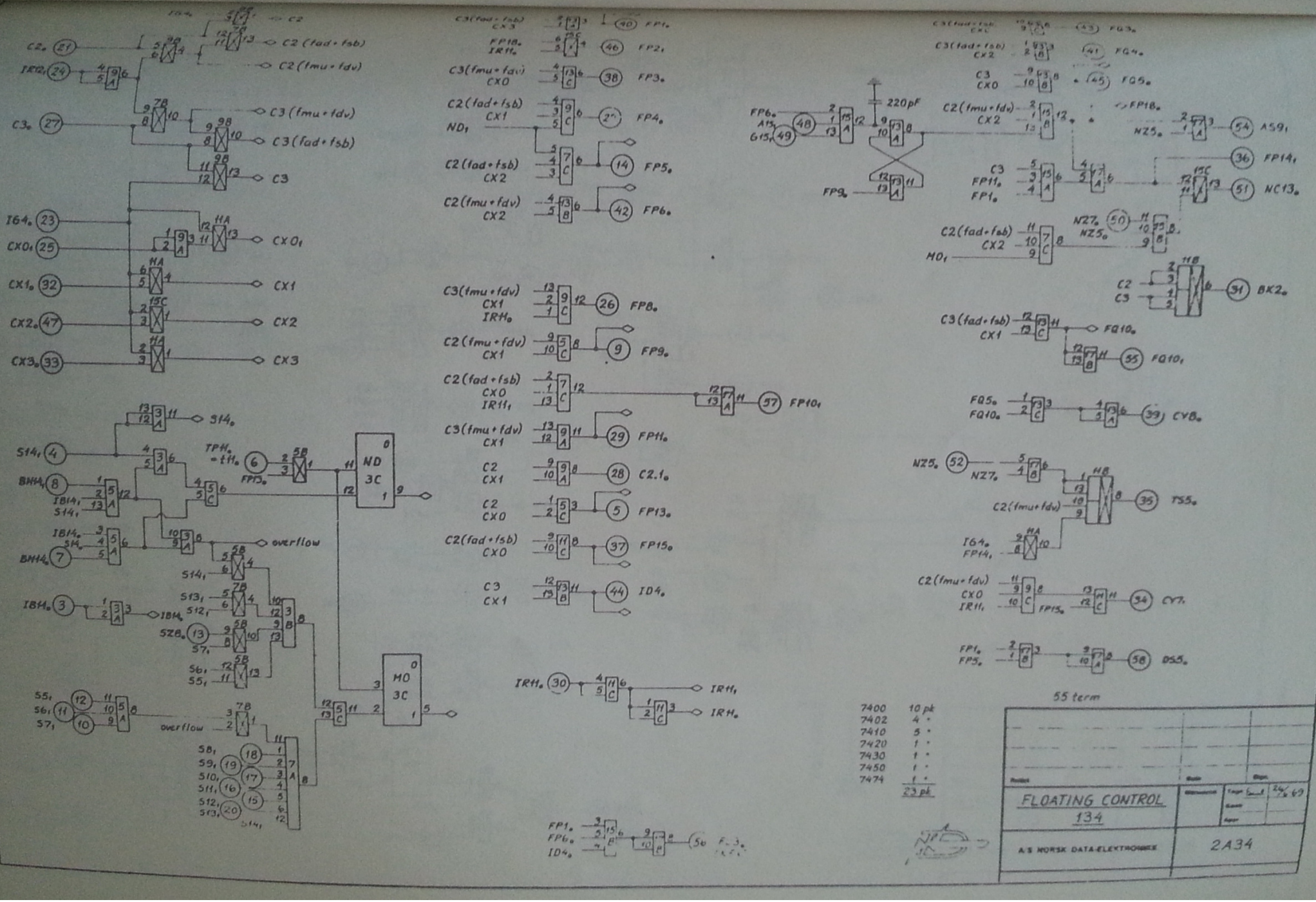

ADDRESSING CONTROL
130
A/S NORSK DATA-ELEKTRONIKK
2A30
7404 N:
7400 9
02 2
04 1
10 2
20 2
40 3
50 1
54 2
22 pk

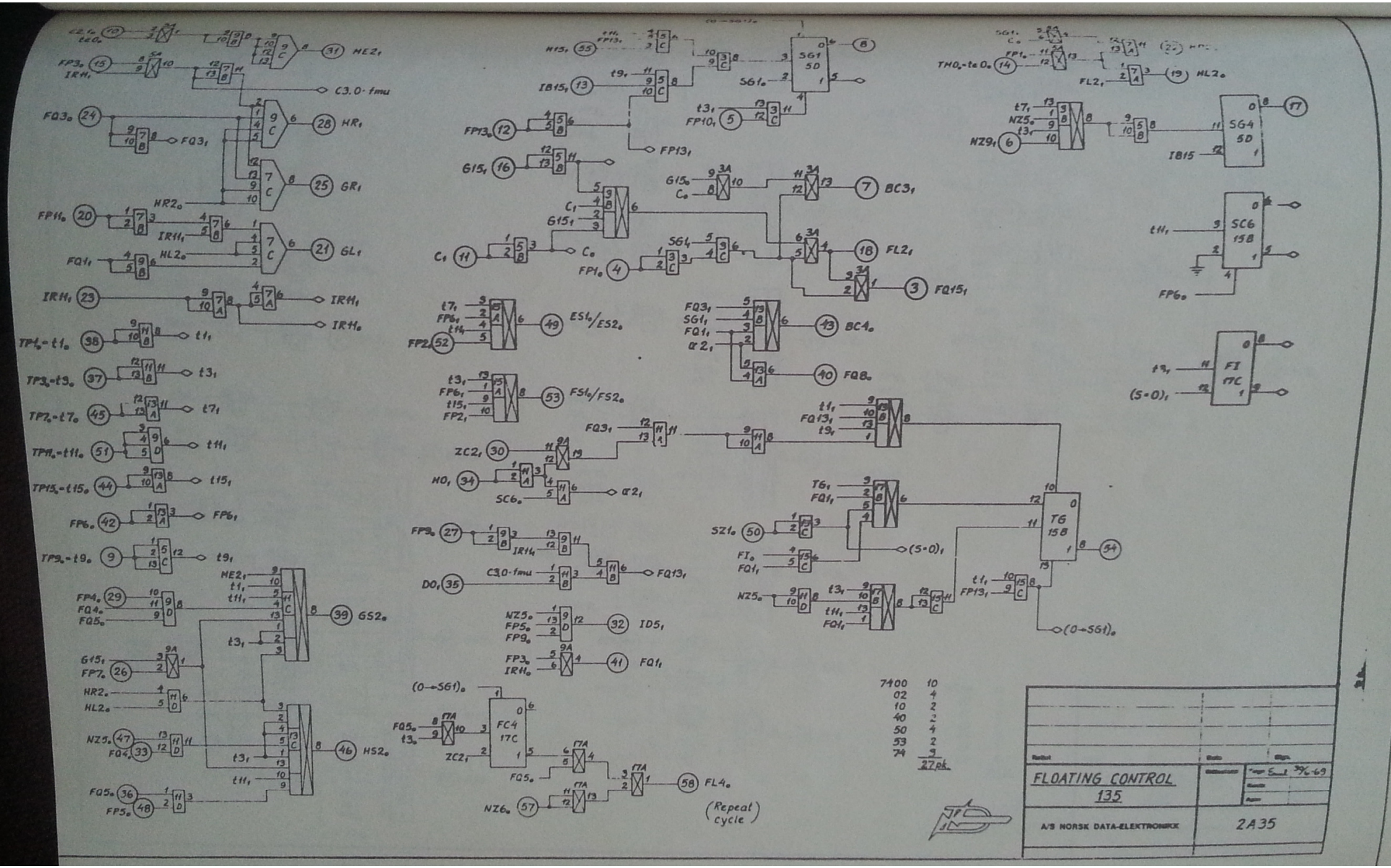

ADDRESSING CONTROL
131
A/S NORSK DATA-ELEKTRONIKK
2A31
TH5₁ = (t0-1)CO
7400 10
02 3
10 7
20 3
40 1
50 1
53 2
24 ck

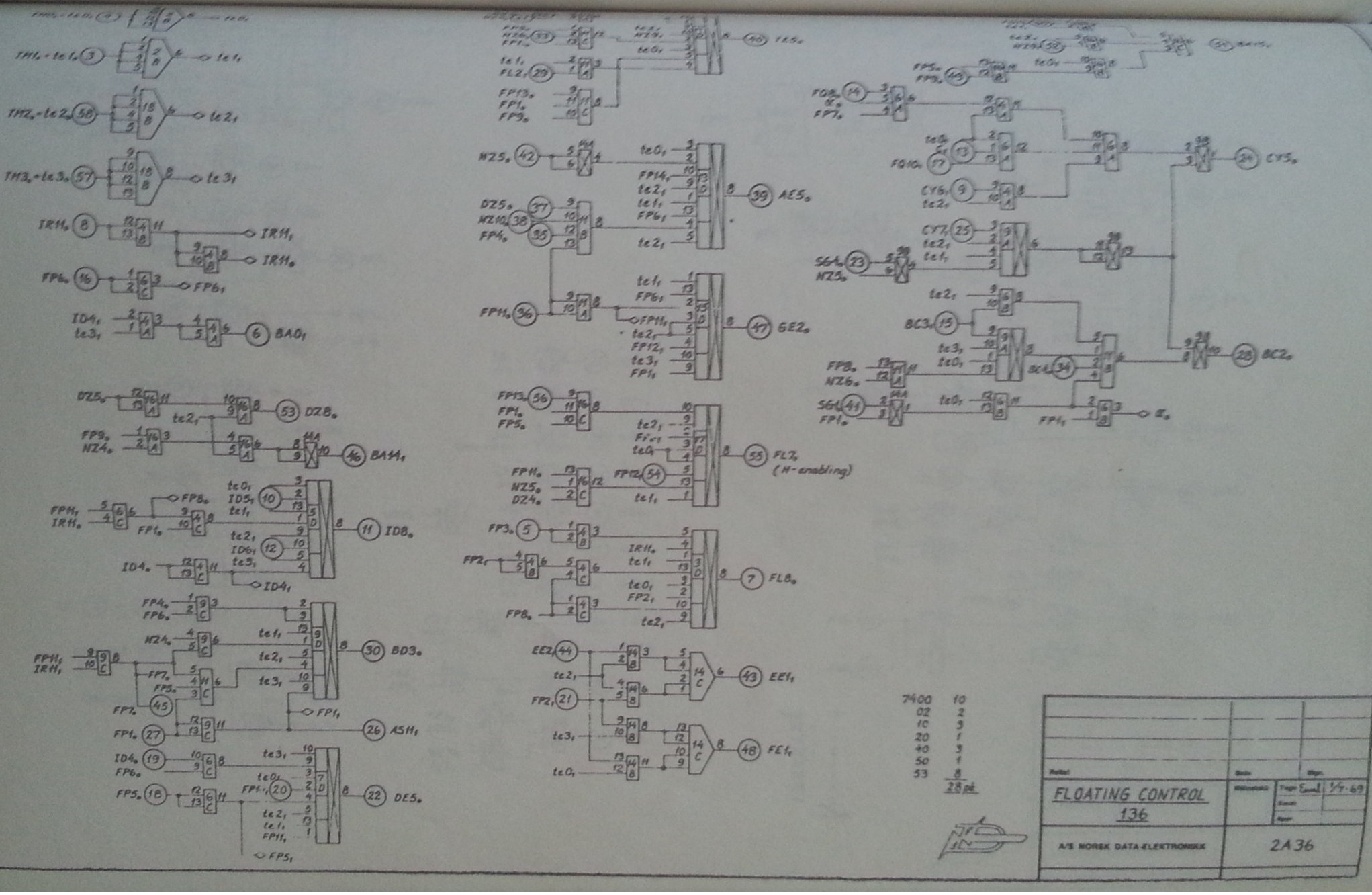

INTERRUPT CONTROL
132
A/S NORSK DATA-ELEKTRONIKK
2A32
D1 : IN4151


BIT INSTRUCTION
133
A/S NORSK DATA-ELEKTRONIKK
ND-01.004.01
7400 9
02 4
10 2
20 3
40 1
50 4
74 1
24 pk.

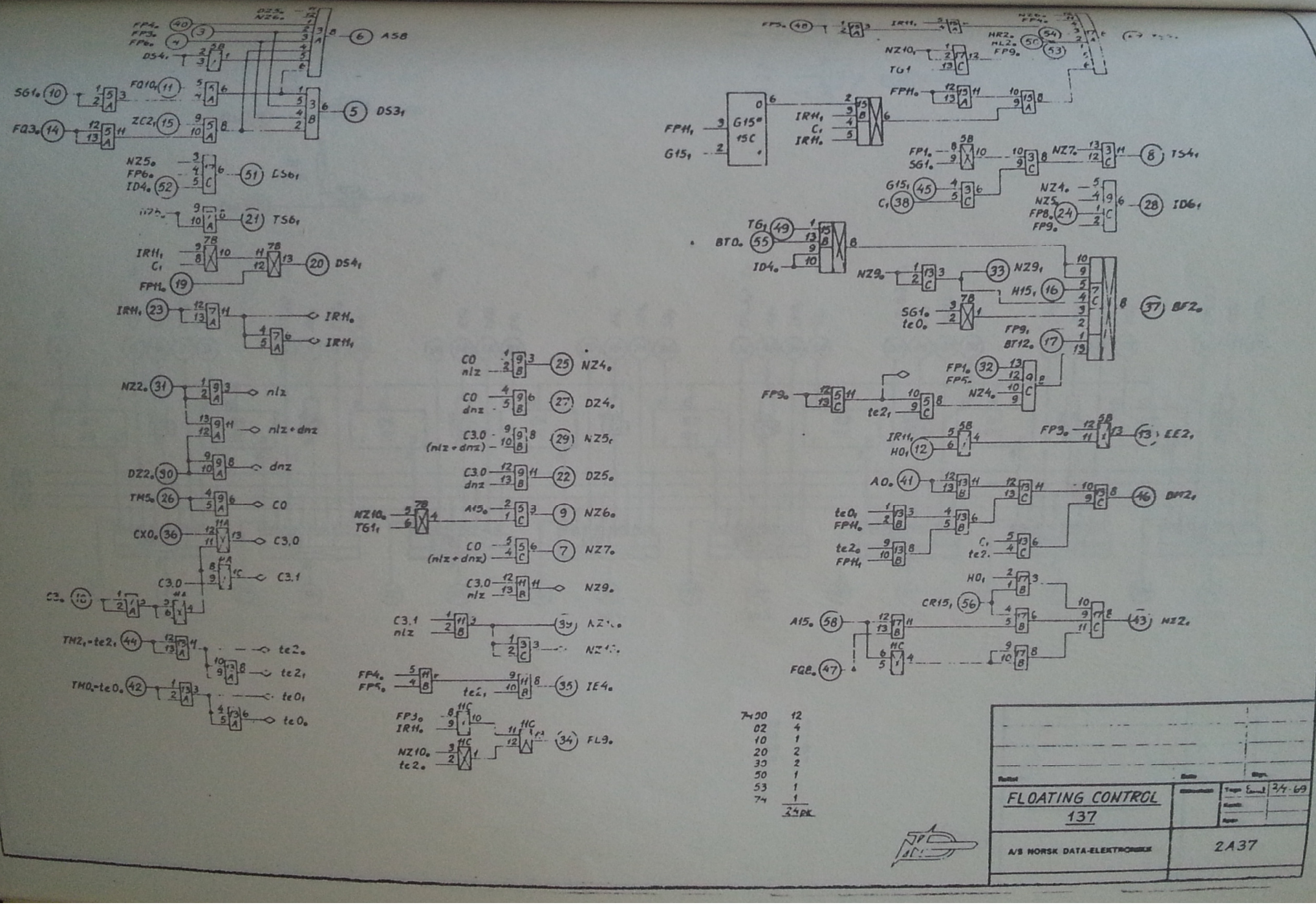
ND-01.004.01


C2
C2 (fad+fsb)
C2 (fmu+fdv)
C3 (fmu+fdv)
C3 (fad+fsb)
C3
CX0
CX1
CX2
CX3
overflow
ND 3C
MD 3C
FP1
FP2
FP3
FP4
FP5
FP6
FP8
FP9
FP10
FP11
FP13
FP15
ID4
IR11
IRH
FQ3
FQ4
FQ5
FQ10
CY8
TS5
CY7
DS5
BX2
AS9
NC13
220pF
55 term
FLOATING CONTROL
134
A/S NORSK DATA-ELEKTRONIKK
2A34

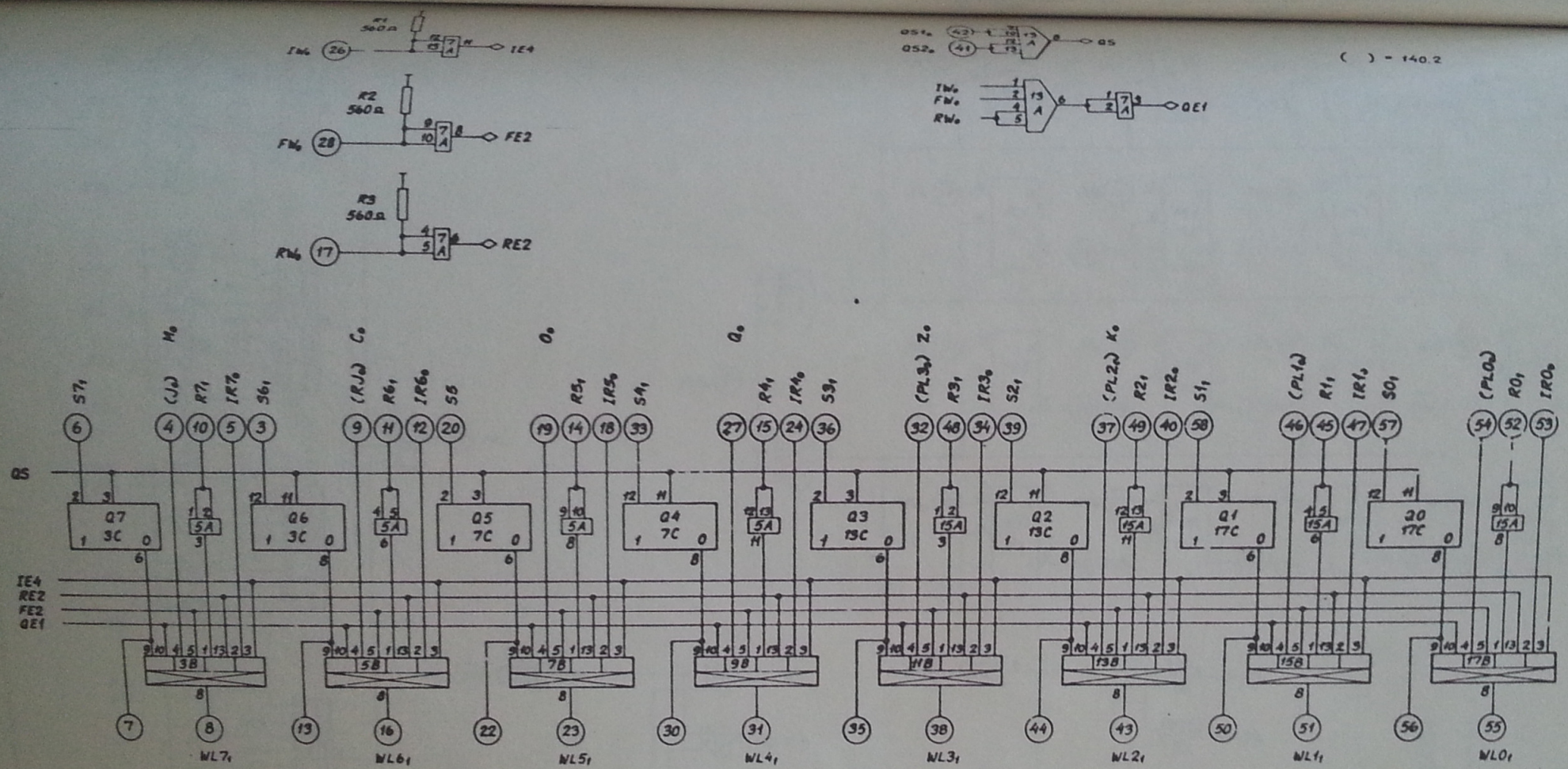

FLOATING CONTROL
135
A/S NORSK DATA-ELEKTRONIKK
2A35
7400 10
02 4
10 2
40 2
50 4
53 2
74 3
27pk.
(Repeat cycle)


FLOATING CONTROL
136
A/S NORSK DATA-ELEKTRONIKK
2A36
7400 10
02 2
10 3
20 1
40 3
50 1
53 8
28 pk
NO-01.004.01

ND-01 009 01



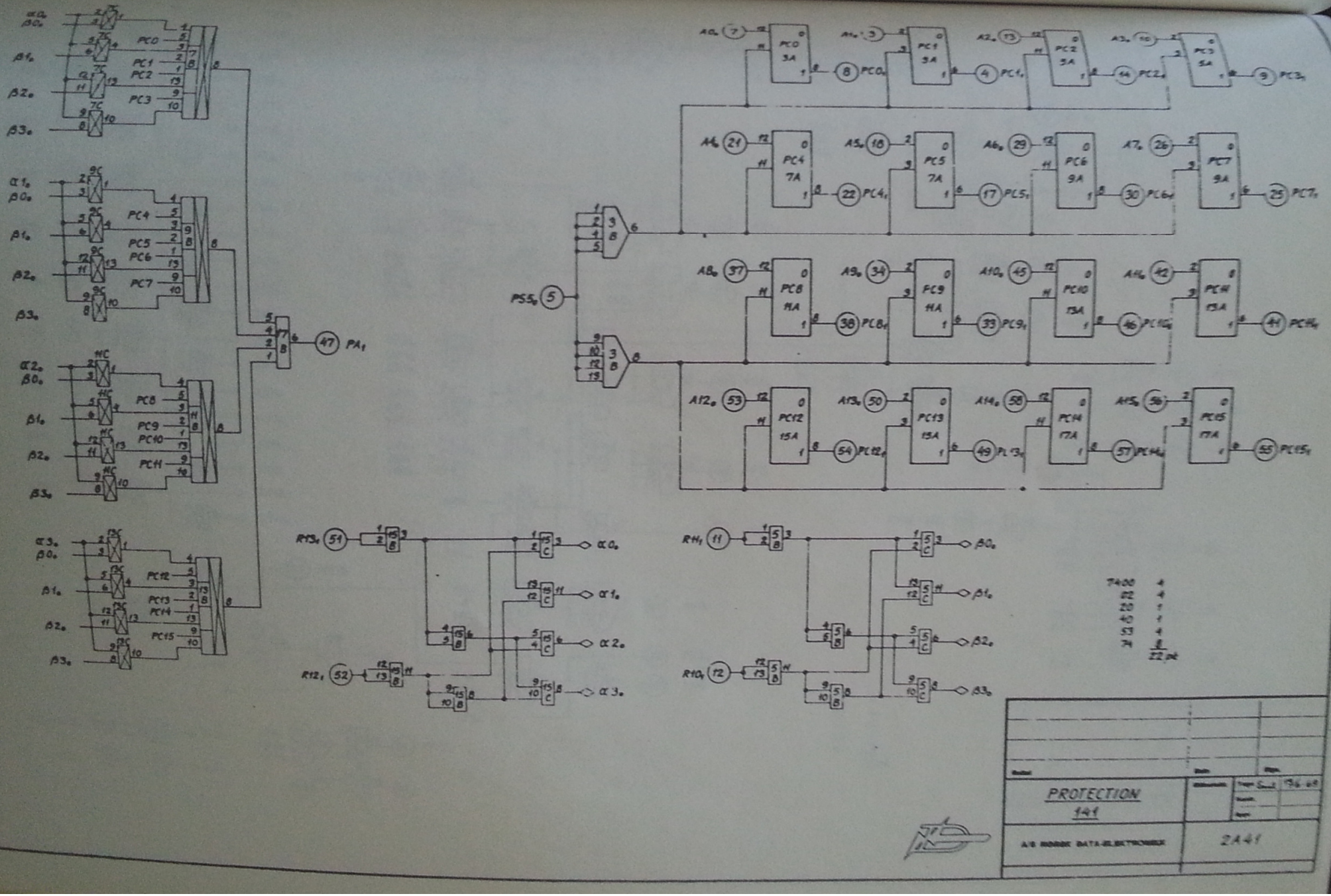
ND-01.004.01

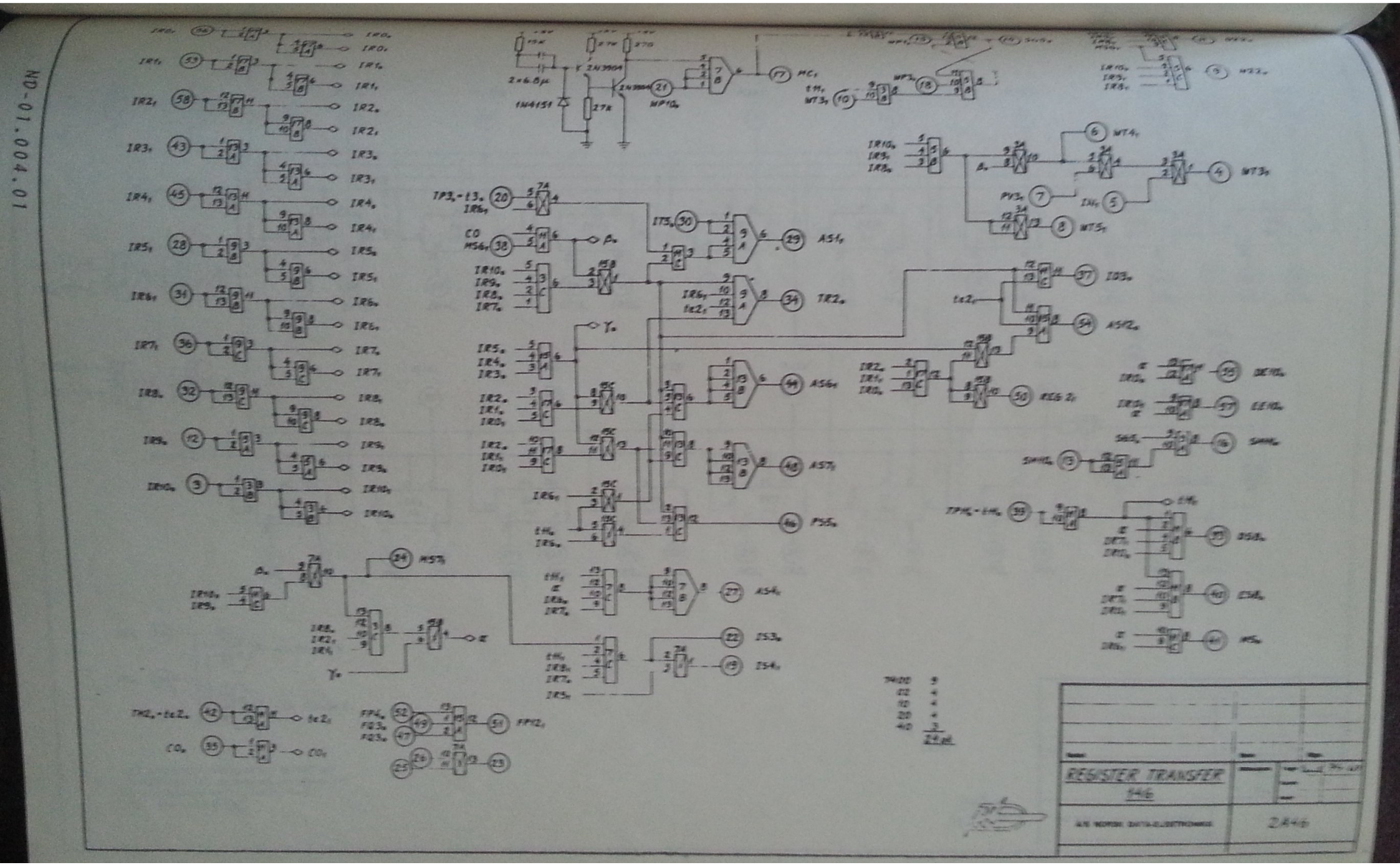


7400	3
40	1
54	8
74	4

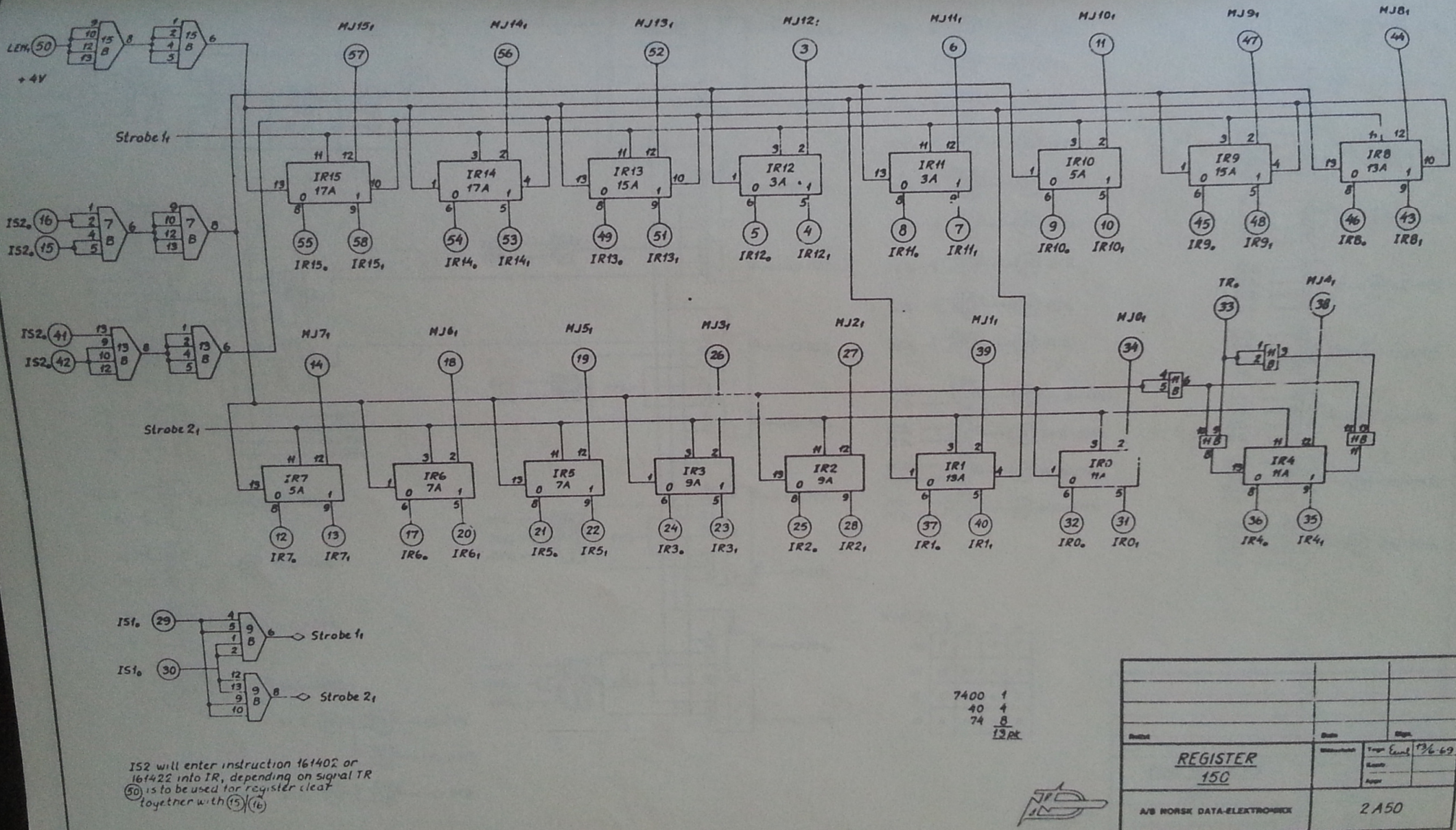
Godkjent	Dato	Sign.
LAMP REGISTER 140	Målestokk	Tegn. Sjøvik 12 6 69
		Kontr.
		Appr.
A/S NORSK DATA-ELEKTRONIKK	2A40	

ND-01.004.01

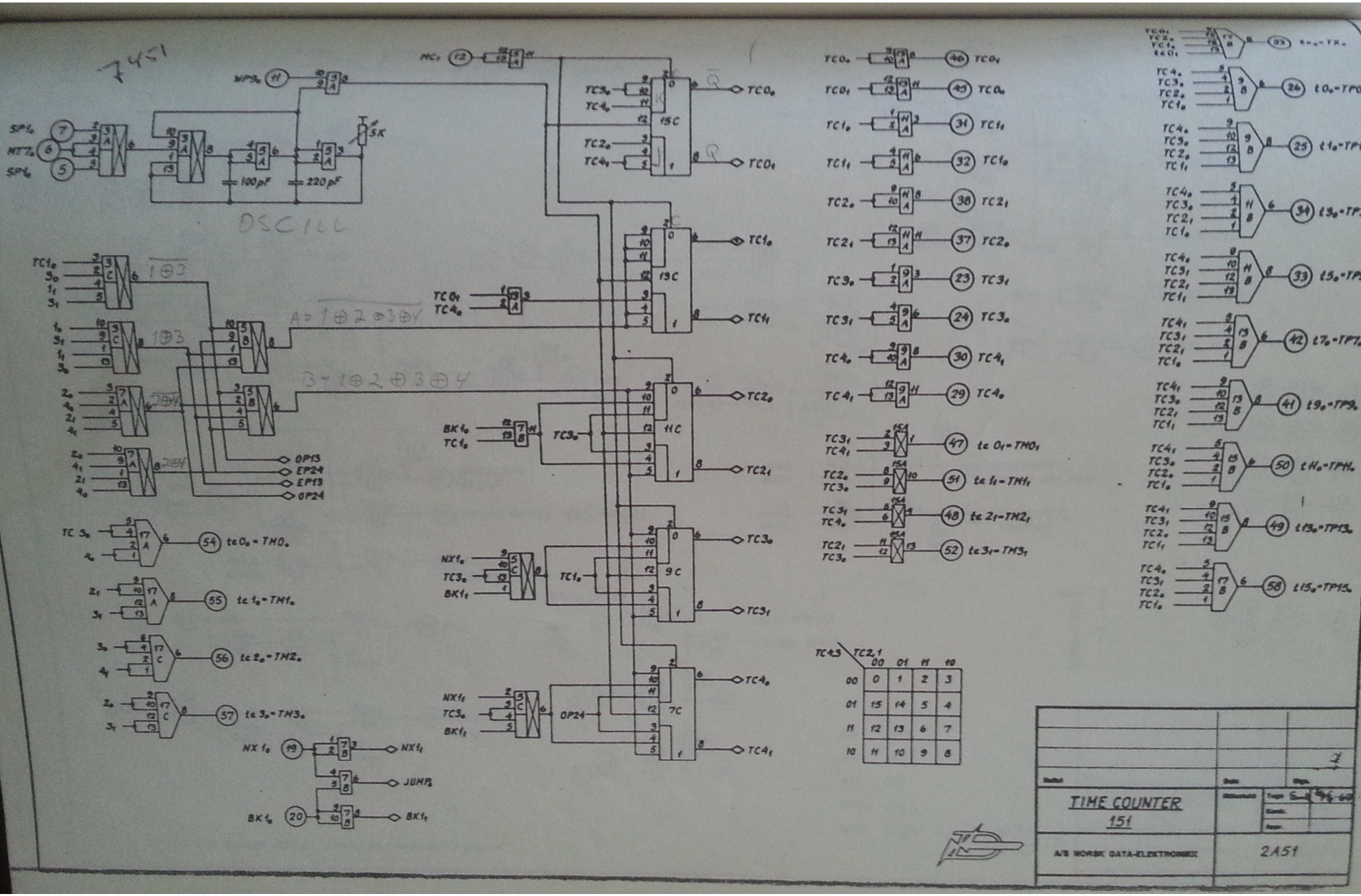

PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
PC8
PC9
PC10
PC11
PC12
PC13
PC14
PC15
PA1
PS5
R13
R12
R11
R10
T400
PROTECTION
141
A/S NORSK DATA-ELEKTRONIKK
2A41


ND-01-004-01
REGISTER TRANSFER
2846

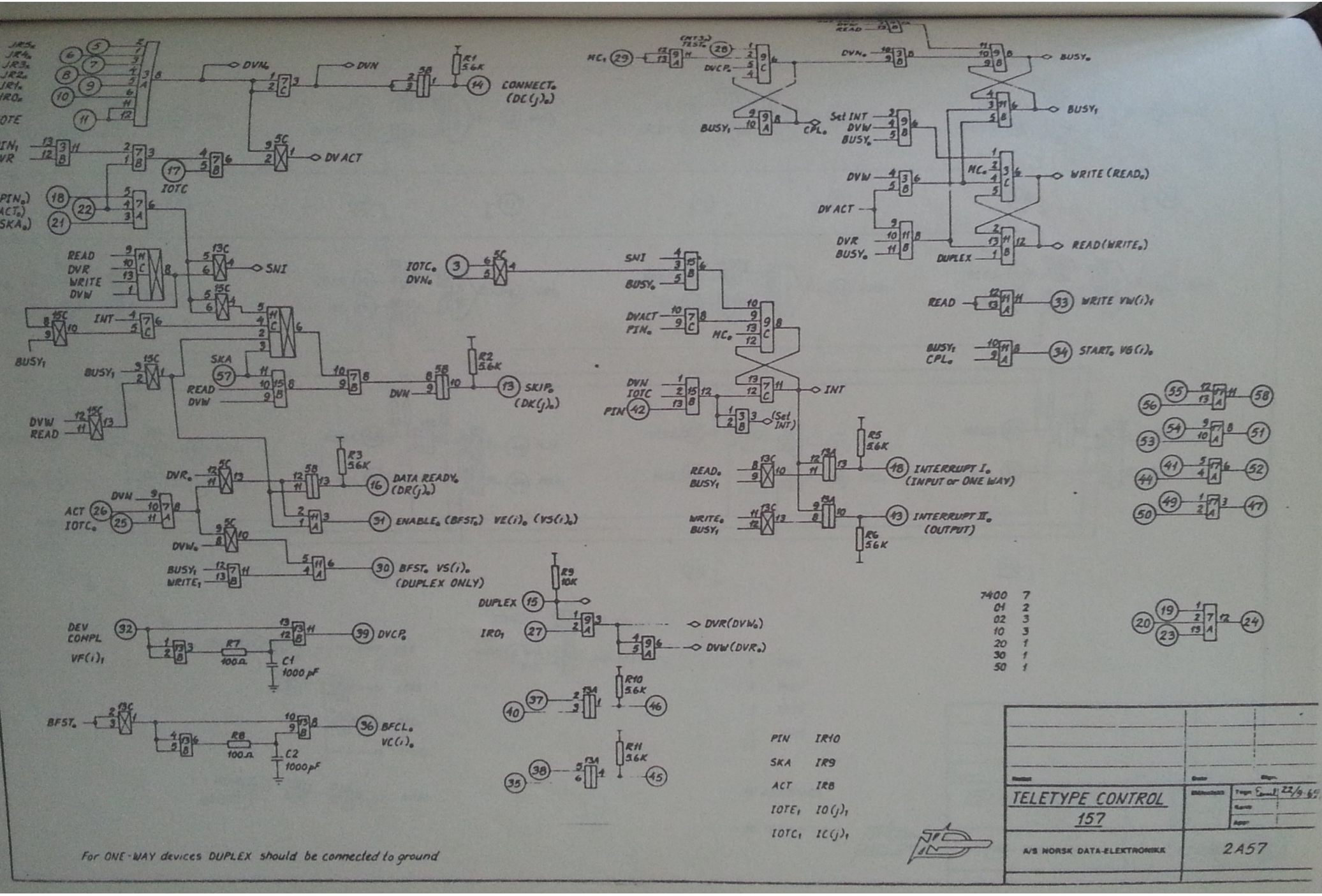
ND-01.004.01


LEN
50
+4V
Strobe 1
Strobe 2
IS2₀
16
IS2₁
15
IS2₀
41
IS2₁
42
IS1₀
29
IS1₁
30
MJ15₁
MJ14₁
MJ13₁
MJ12₁
MJ11₁
MJ10₁
MJ9₁
MJ8₁
MJ7₁
MJ6₁
MJ5₁
MJ3₁
MJ2₁
MJ1₁
MJ0₁
MJ4₁
TR₀
IR15 17A
IR14 17A
IR13 15A
IR12 3A
IR11 3A
IR10 5A
IR9 15A
IR8 13A
IR7 5A
IR6 7A
IR5 7A
IR3 9A
IR2 9A
IR1 13A
IR0 HA
IR4 HA
HB
IS2 will enter instruction 161402 or 161422 into IR, depending on signal TR
50 is to be used for register clear together with 15 16
7400 1
40 4
74 8
13 pk
REGISTER
150
A/S NORSK DATA-ELEKTRONIKK
2A50
13/6-69

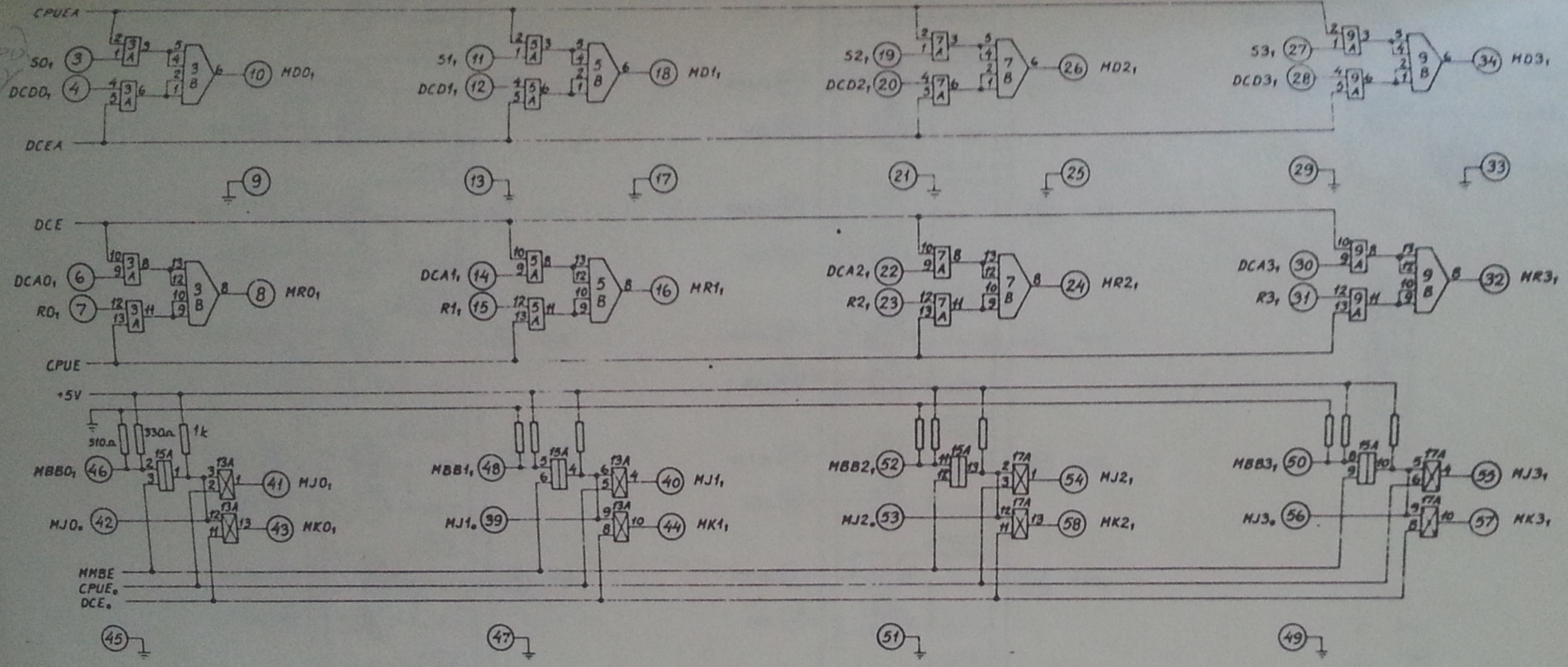
ND-01.004.01

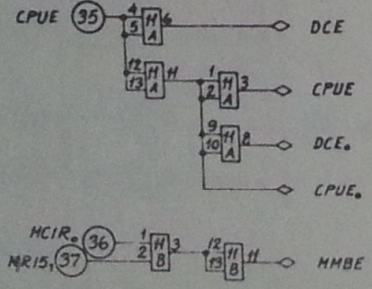

OSCILL
100pF
220pF
5K
MC1
MP1
SP1
NT1
SP0
TC0
TC1
TC2
TC3
15C
13C
11C
9C
7C
OP13
EP24
EP13
OP24
NX1
BK1
JUMP
TIME COUNTER
151
A/S NORSK DATA-ELEKTRONIKK
2A51

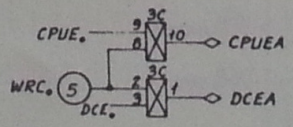
ND-01.004.01


JR5₀
JR4₀
JR3₀
JR2₀
JR1₀
JR0₀
IOTE
DVN₀
DVN
R1 5.6K
CONNECT₀ (DC(j)₀)
PIN₁
DVR
DV ACT
IOTC
JR10₀ (PIN₀)
JR8₀ (ACT₀)
JR9₀ (SKA₀)
READ
DVR
WRITE
DVW
SNI
INT
BUSY₁
SKA
R2 5.6K
SKIP₀ (DK(j)₀)
DVW
READ
DVR₀
R3 5.6K
DATA READY₀ (DR(j)₀)
DVN
ACT
IOTC₀
ENABLE₀ (BFST₀) VE(i)₀ (VS(i)₀)
DVW₀
BUSY₁
WRITE₁
BFST₀ VS(i)₀ (DUPLEX ONLY)
DEV COMPL
VF(i)₁
R7 100Ω
C1 1000 pF
BFST₀
R8 100Ω
C2 1000 pF
BFCL₀ VC(i)₀
IOTC₀
DVN₀
SNI
BUSY₀
DVACT
PIN₀
MC₀
INT
PIN
(Set INT)
READ₀
BUSY₁
R5 5.6K
INTERRUPT I₀ (INPUT or ONE WAY)
WRITE₀
BUSY₁
R6 5.6K
INTERRUPT II₀ (OUTPUT)
DUPLEX
IRQ₁
R9 10K
DVR(DVW₀)
DVW(DVR₀)
R10 5.6K
R11 5.6K
MC₀
DVN₀
BUSY₀
DVCP₀
BUSY₁
CPL₀
Set INT
DVW
BUSY₀
DVW
DV ACT
DVR
BUSY₀
MC₀
WRITE (READ₀)
READ (WRITE₀)
DUPLEX
READ
WRITE VW(i)₁
BUSY₁
CPL₀
START₀ VS(i)₀
7400 7
01 2
02 3
10 3
20 1
30 1
50 1
PIN IR10
SKA IR9
ACT IR8
IOTE₁ IO(j)₁
IOTC₁ IC(j)₁
For ONE-WAY devices DUPLEX should be connected to ground
TELETYPE CONTROL
157
A/S NORSK DATA-ELEKTRONIKK
2A57

ND-01.004.01







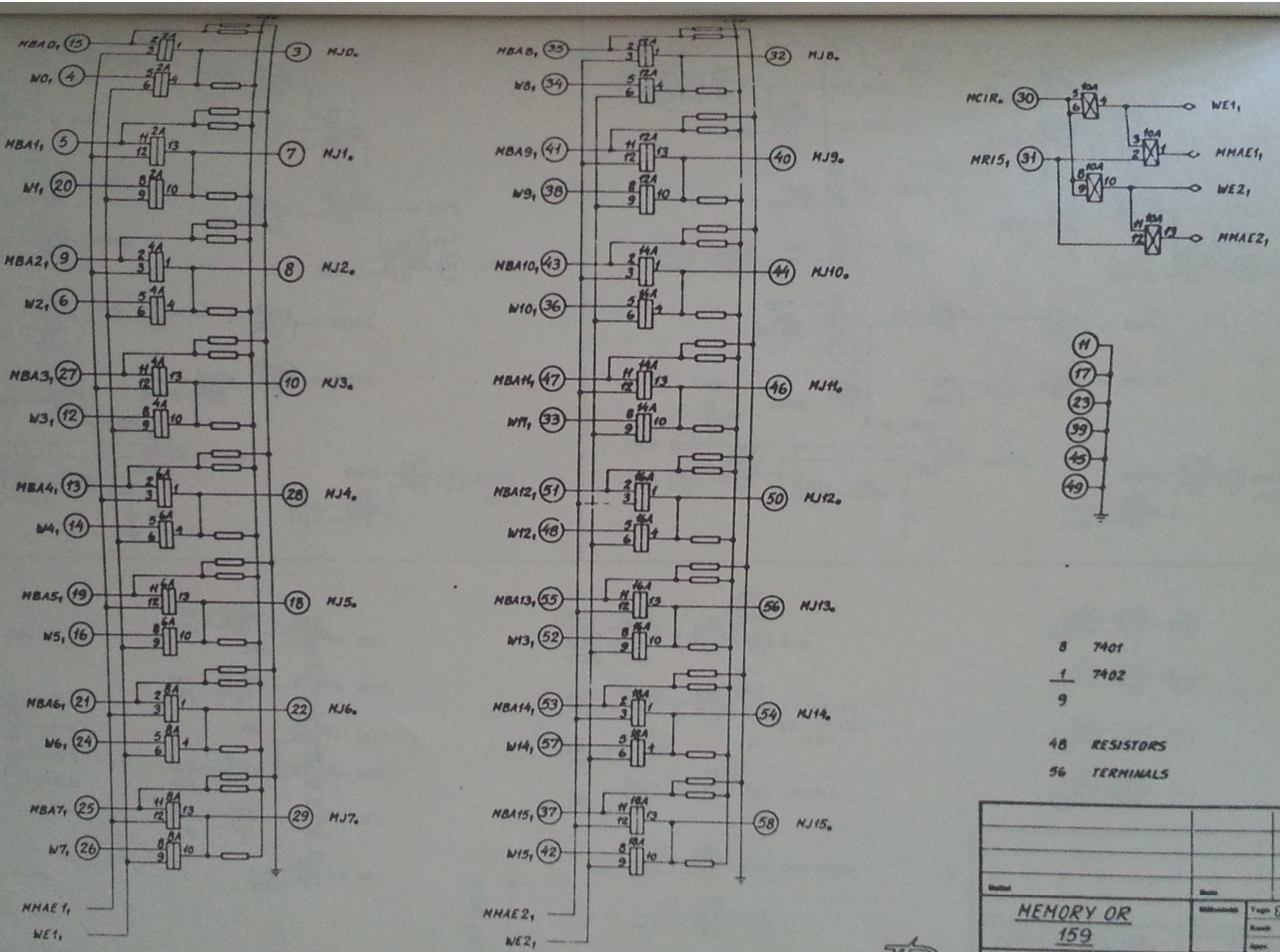
6	7400
1	7401
3	7402
4	7440
14	

12 RESISTORS

55 TERMINALS

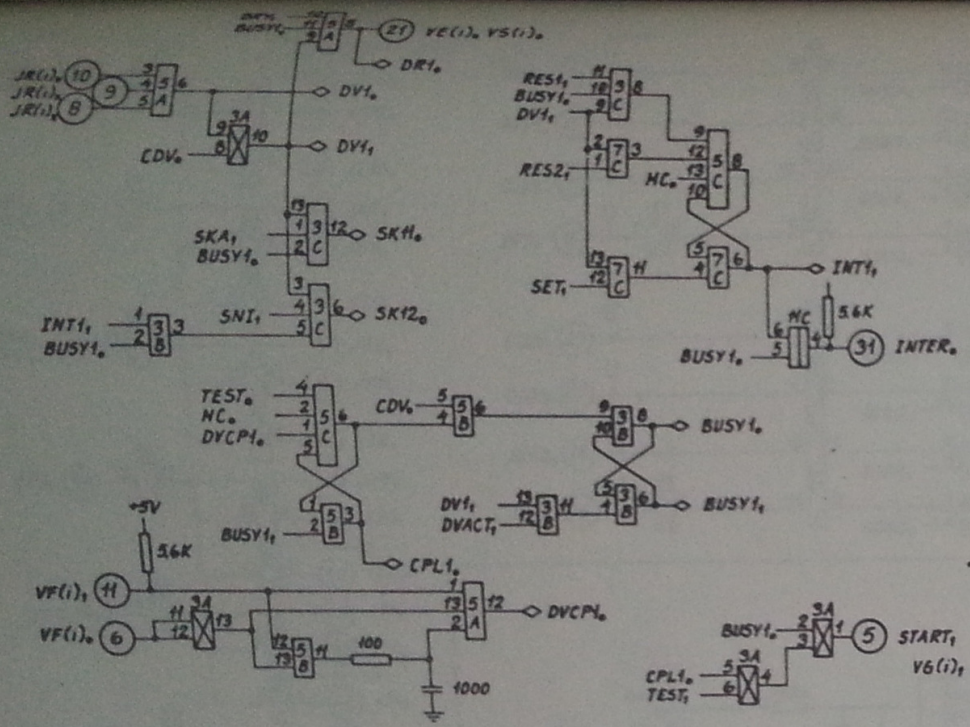
MEMORY BUFFER 158/II		26.5.70
A/S NORSK DATA-ELEKTRONIKK		2A58

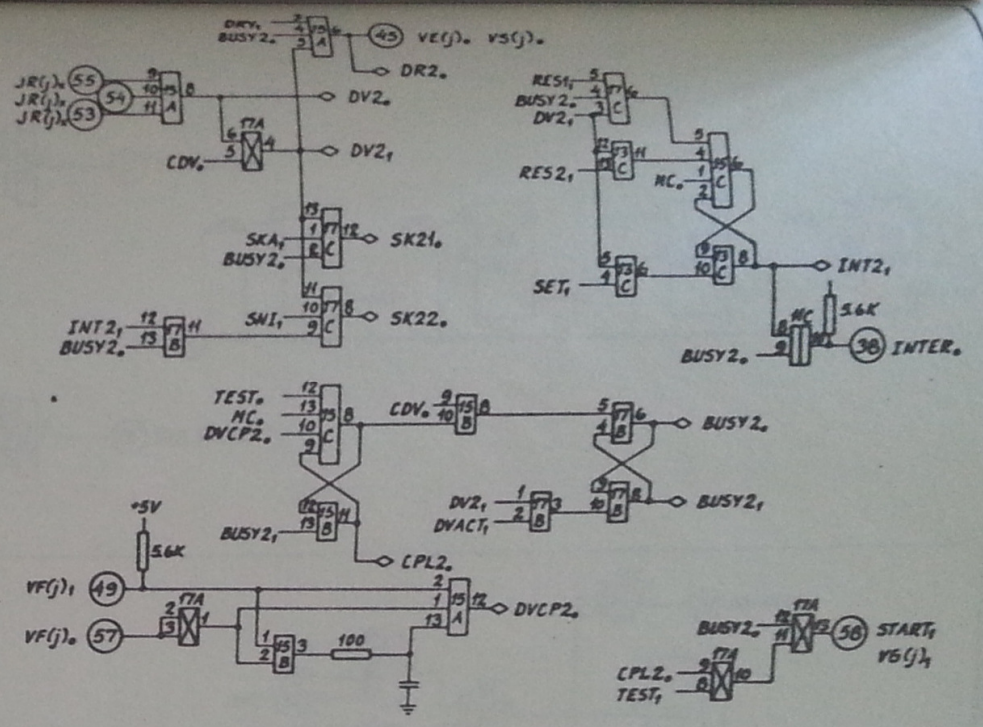
ND-01.004.01

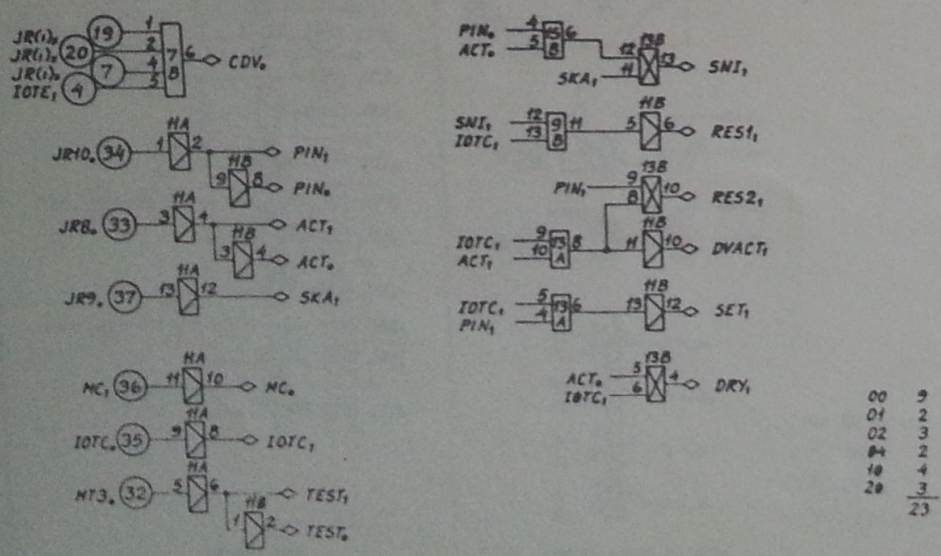


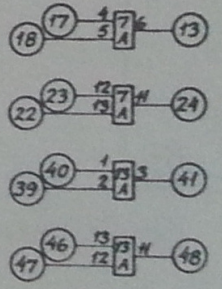
8	7401
1	7402
9	
48	RESISTORS
56	TERMINALS

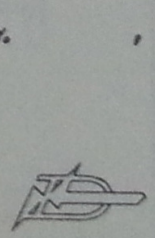
MEMORY OR 159		23.4.69
A/S NORSK DATA-ELEKTRONIKK		2A59



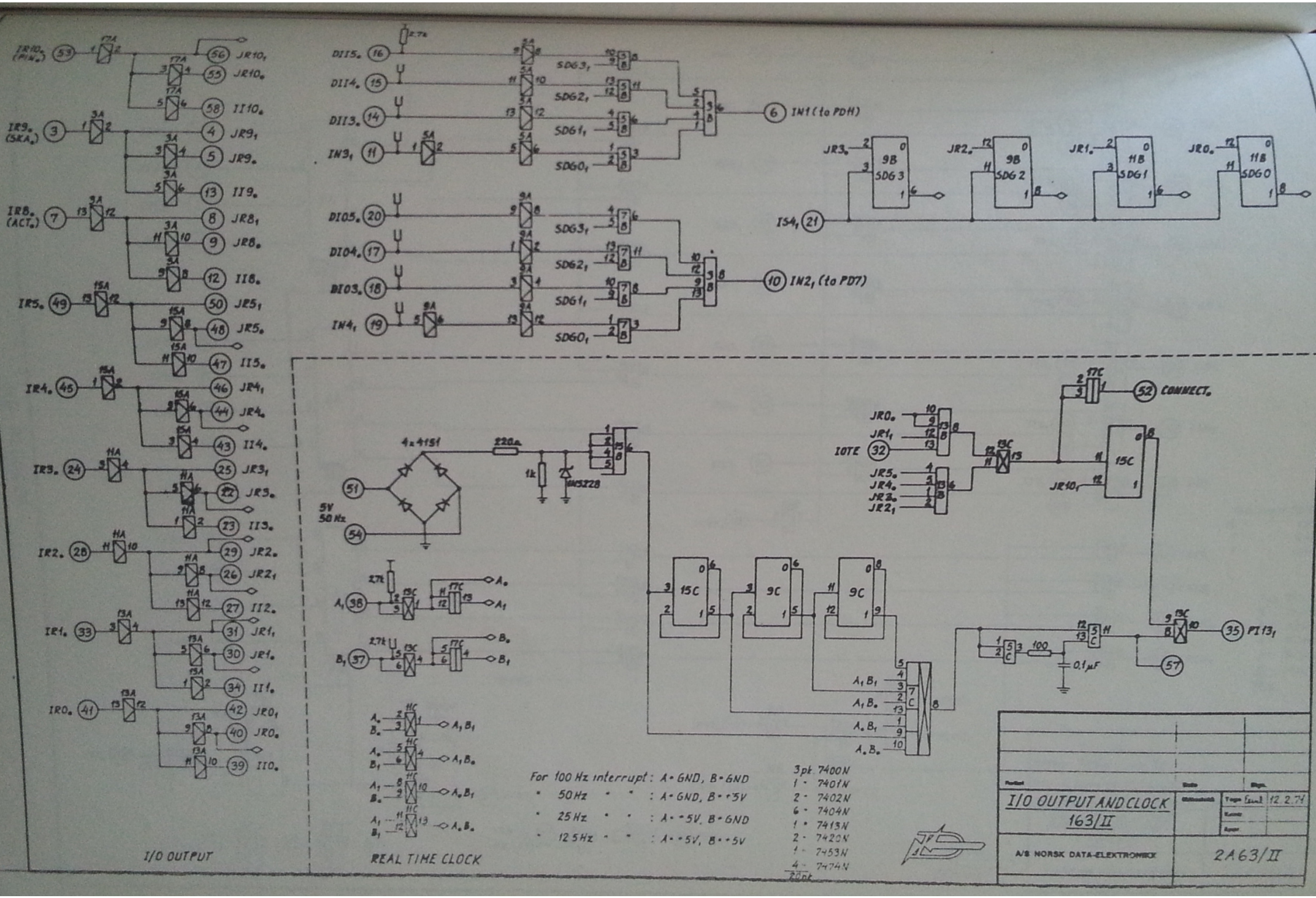


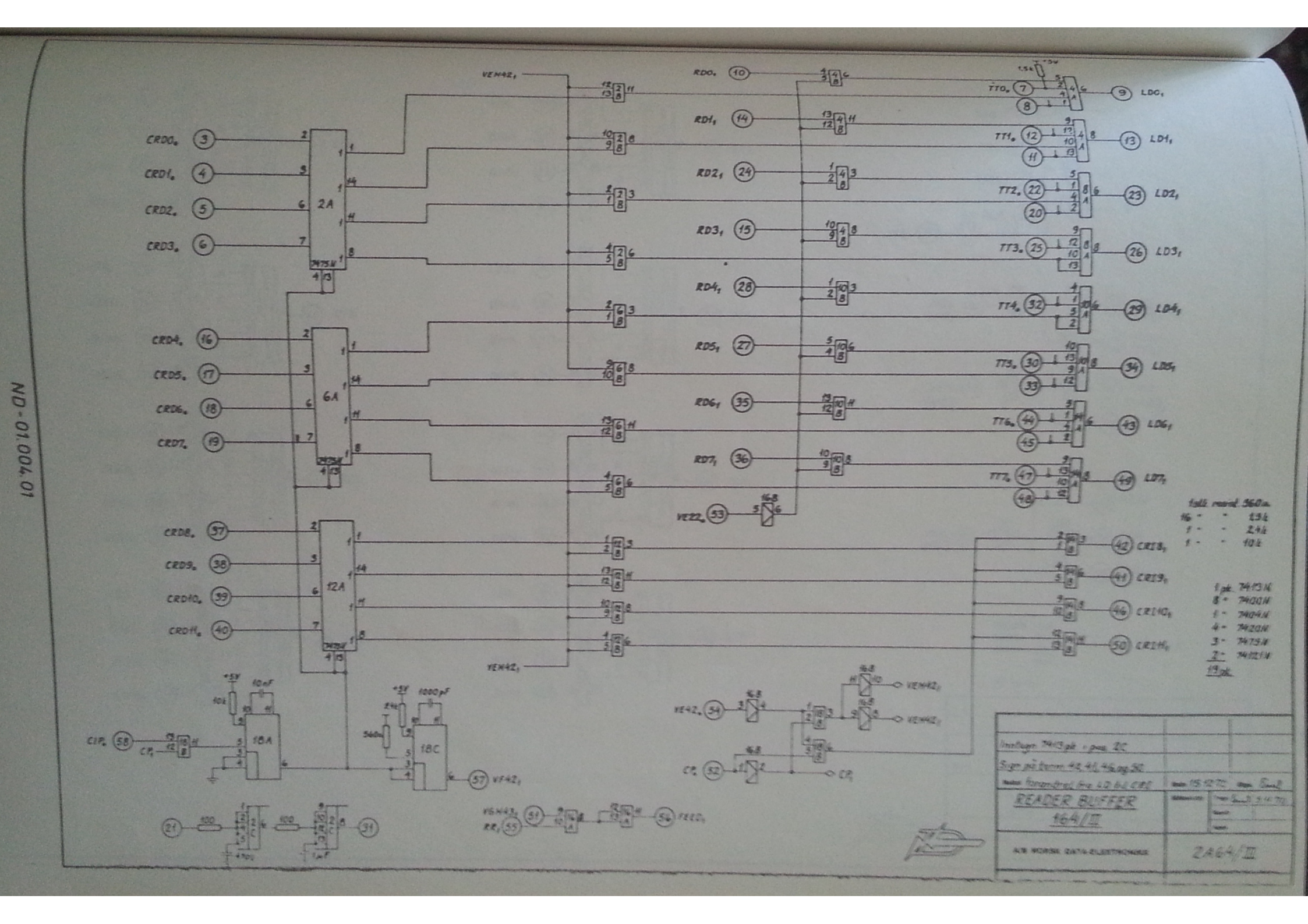




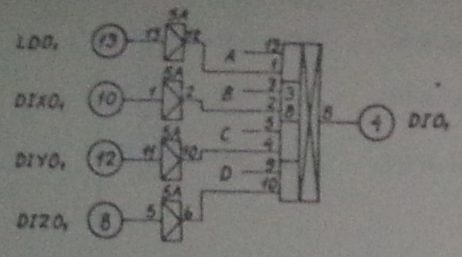


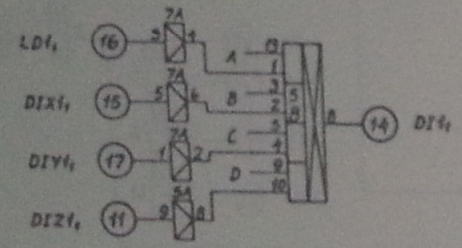
Rettet	Dato	Sign.	
SIMPLEX CONTROL 160	Utarbeidet	Prosj. nr. 23/10-69	
		Konstr.	
		Kontr.	
A/S NORSK DATA-ELEKTRONIKK		2A60	

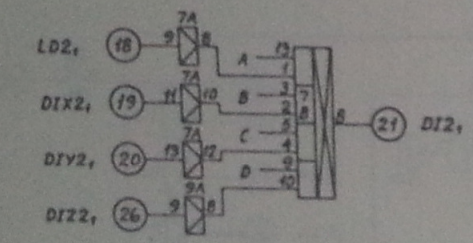

IR10. (PIN.)
IR9. (SKA.)
IR8. (ACT.)
IR5.
IR4.
IR3.
IR2.
IR1.
IR0.
JR10,
JR10.
II10.
JR9,
JR9.
II9.
JR8,
JR8.
II8.
JR5,
JR5.
II5.
JR4,
JR4.
II4.
JR3,
JR3.
II3.
JR2.
JR2,
II2.
JR1,
JR1.
II1.
JR0,
JR0.
II0.
I/O OUTPUT
DII5.
DII4.
DII3.
IN3,
DIO5.
DIO4.
DIO3.
IN4,
SDG3,
SDG2,
SDG1,
SDG0,
IN1 (to PDH)
IN2, (to PD7)
IS4,
JR3.
JR2.
JR1.
JR0.
9B SDG3
9B SDG2
11B SDG1
11B SDG0
4x4151
220Ω
1k
1N5228
5V 50 Hz
2.7k
A,
B,
A.
B.
REAL TIME CLOCK
IOTE
JR0.
JR1,
JR5.
JR4.
JR3.
JR2,
JR10,
15C
9C
CONNECT.
100
0.1 µF
FI 13,
A,B,
A,B.
A.B,
A.B.
For 100 Hz interrupt: A=GND, B=GND
" 50 Hz " " : A=GND, B=+5V
" 25 Hz " " : A=+5V, B=GND
" 12.5 Hz " " : A=+5V, B=+5V
3pk. 7400N
1 - 7401N
2 - 7402N
6 - 7404N
1 - 7413N
2 - 7420N
1 - 7453N
4 - 7474N
20pk.
I/O OUTPUT AND CLOCK
163/II
A/S NORSK DATA-ELEKTRONIKK
2A63/II
12.2.74
ND-01.004.01

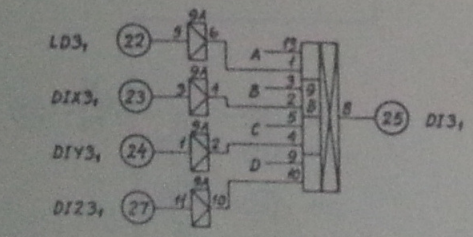

ND-01004.01
CRD0, 3
CRD1, 4
CRD2, 5
CRD3, 6
2A
CRD4, 16
CRD5, 17
CRD6, 18
CRD7, 19
6A
CRD8, 57
CRD9, 38
CRD10, 39
CRD11, 40
12A
VEN42,
RD0, 10
RD1, 14
RD2, 24
RD3, 15
RD4, 28
RD5, 27
RD6, 35
RD7, 36
VE22, 53
TT0, 7
TT1, 12
TT2, 22
TT3, 25
TT4, 32
TT5, 30
TT6, 44
TT7, 47
LD0, 9
LD1, 13
LD2, 23
LD3, 26
LD4, 29
LD5, 34
LD6, 43
LD7, 49
CRI8, 42
CRI9, 41
CRI10, 46
CRI11, 50
CIP, 58
CP, 52
VE42, 54
18A
18C
VF42, 57
VEN43, 51
RR, 55
FEED, 56
21
31
100
1000pF
10nF
10k
540
1,5k
16,8
1 stk. motst. 560Ω
16 - - 1,3k
1 - - 2,4k
1 - - 10k
1 pk. 7413 N
8 - 7400 N
1 - 7404 N
4 - 7420 N
3 - 7475 N
2 - 7412 N
19 pk.
Innlagt 7413 pk i pos. 2C
Sign på term. 42, 41, 46 og 50
READER BUFFER
164/III
ZA64/III

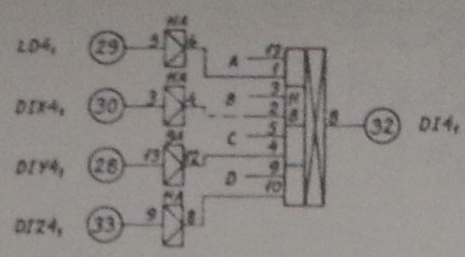
ND-01.004.01

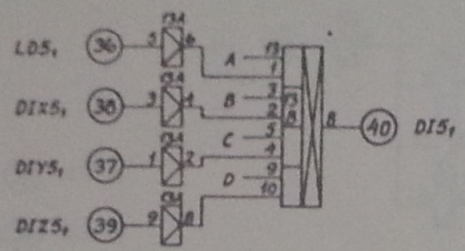


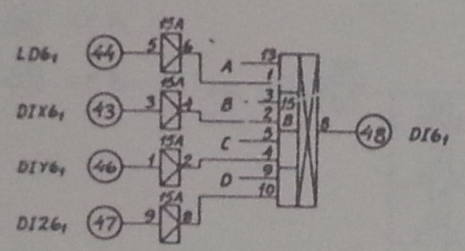


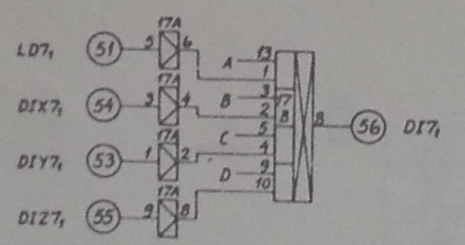


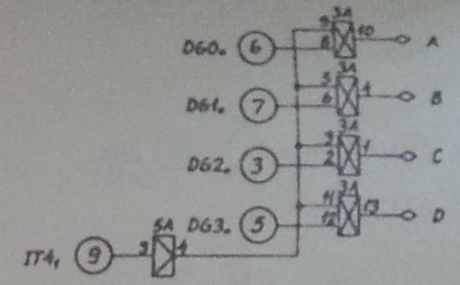


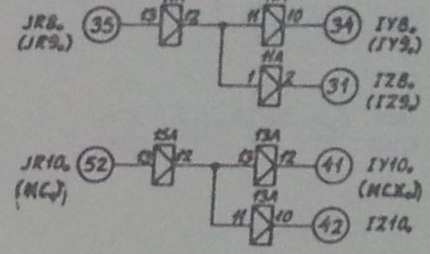


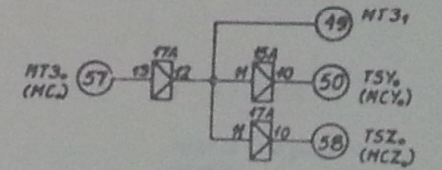












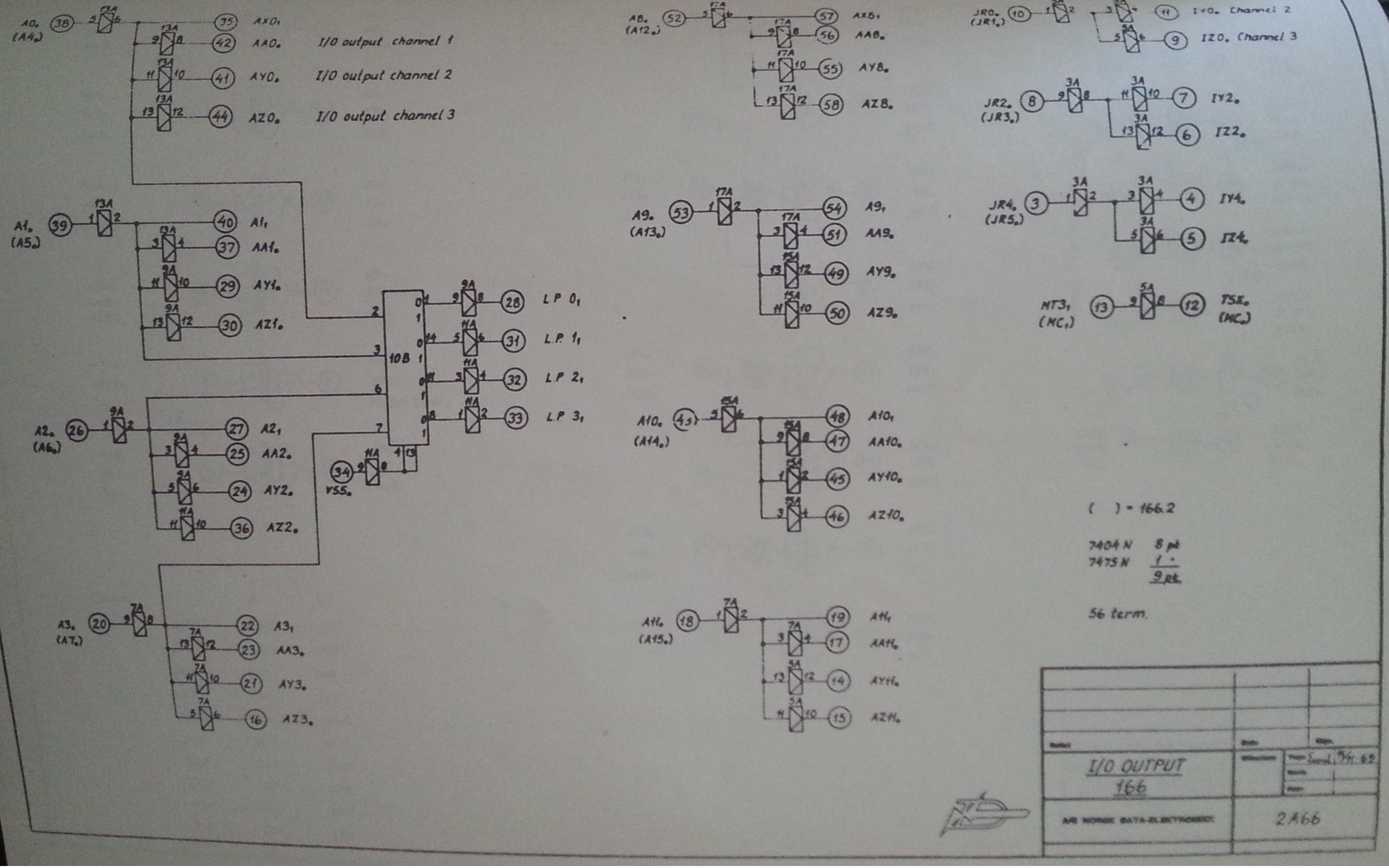
7402N 1pk
7404N 7 "
7453N 8 "
16pk

( ) = 165.2

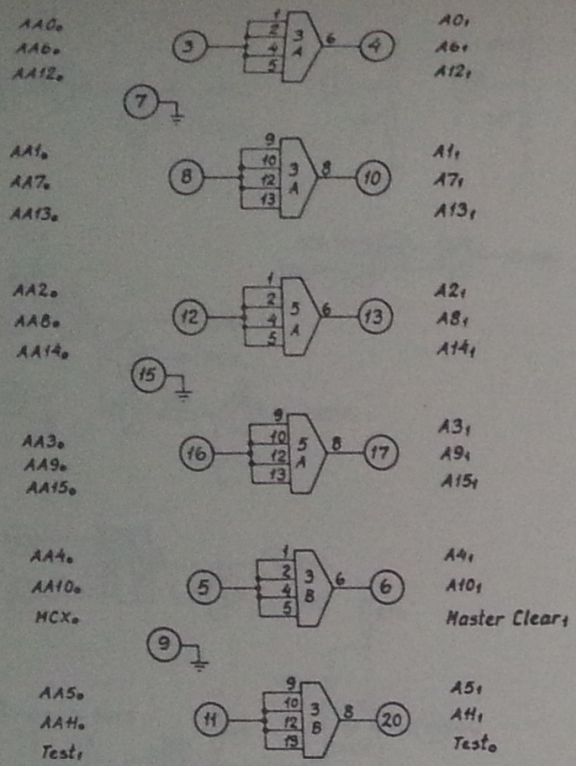
55 term

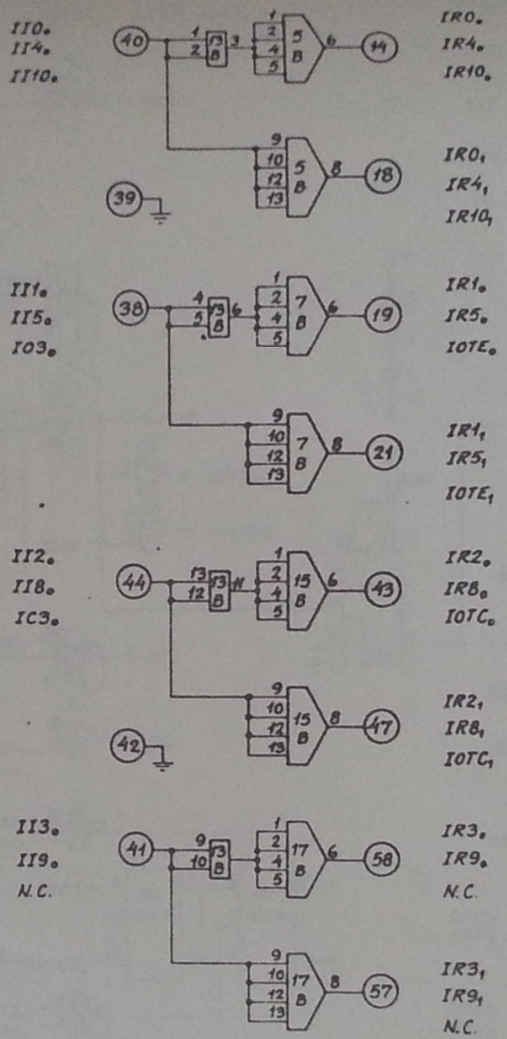
Rettet	Dato	Sign.
I/O INPUT 165	Tegn. [illegible]	15/M 69
A/S NORSK DATA-ELEKTRONIKK	2A65	

ND-01.004.01


A0. (A4.)
AX0.
AA0.
AY0.
AZ0.
I/O output channel 1
I/O output channel 2
I/O output channel 3
A1. (A5.)
A1.
AA1.
AY1.
AZ1.
A2. (A6.)
A2.
AA2.
AY2.
AZ2.
A3. (A7.)
A3.
AA3.
AY3.
AZ3.
10B
VSS.
LP 0.
LP 1.
LP 2.
LP 3.
A8. (A12.)
AX8.
AA8.
AY8.
AZ8.
A9. (A13.)
A9.
AA9.
AY9.
AZ9.
A10. (A14.)
A10.
AA10.
AY10.
AZ10.
A11. (A15.)
A11.
AA11.
AY11.
AZ11.
JR0. (JR1.)
IV0. Channel 2
IZ0. Channel 3
JR2. (JR3.)
IY2.
IZ2.
JR4. (JR5.)
IY4.
IZ4.
MT3. (MC.)
TSX. (MC.)
( ) = 166.2
7404 N 8 pt
7475 N 1 pt
9 pt.
56 term.
I/O OUTPUT
166
A/S NORSK DATA-ELEKTRONIKK
2A66

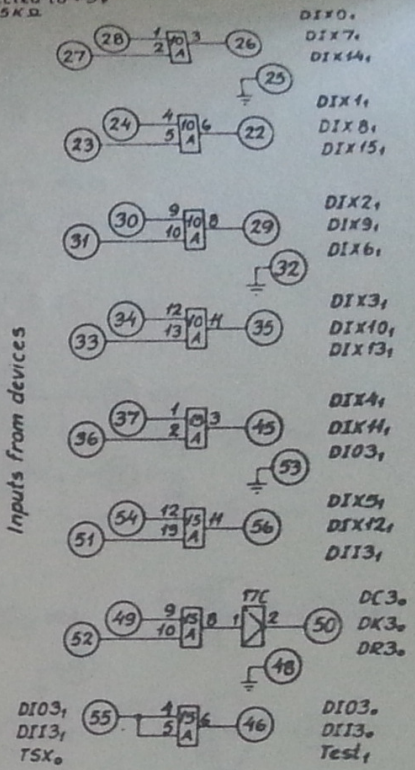
ND-01.004.01





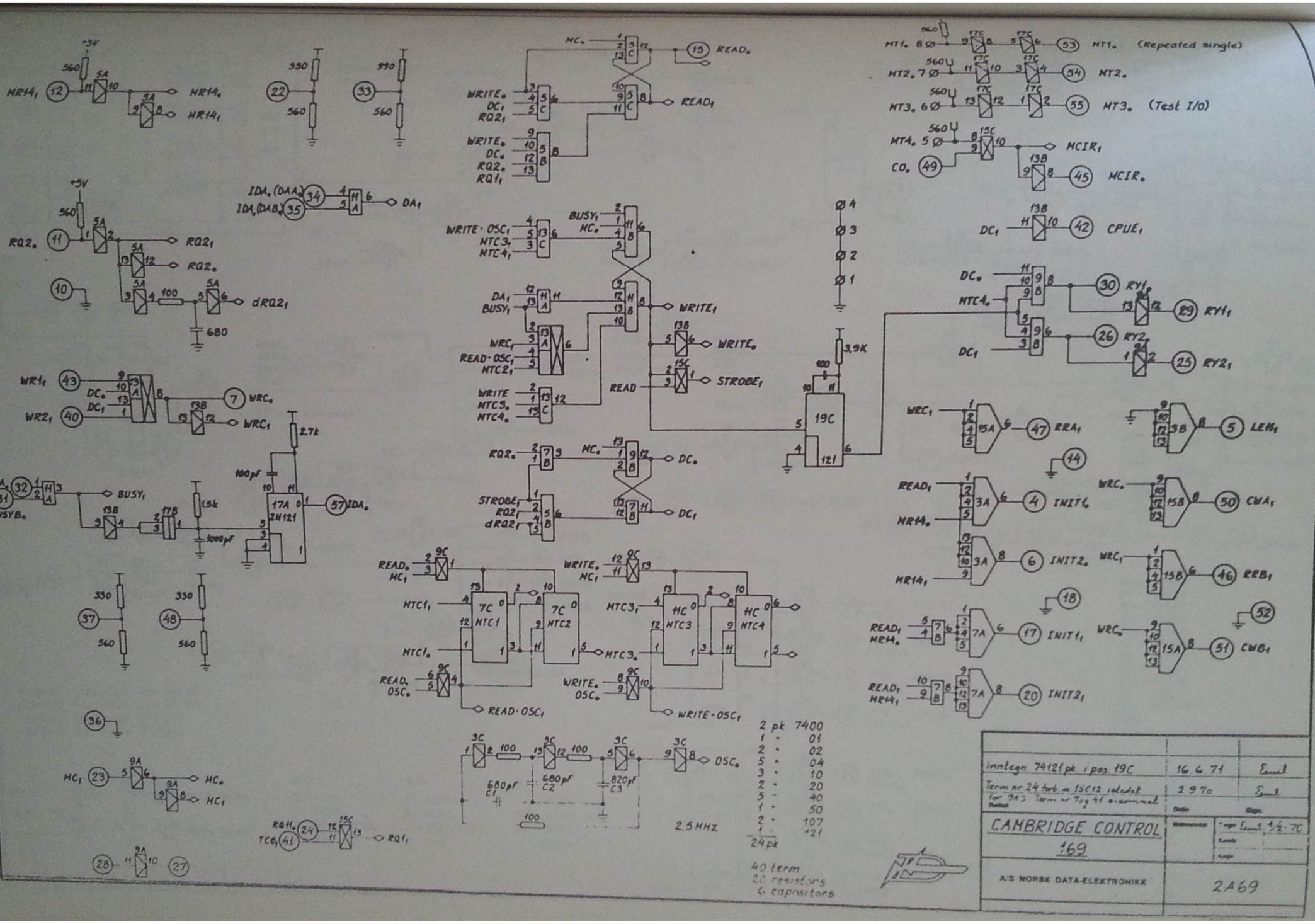
All device inputs connected to +5V via 1.5KΩ

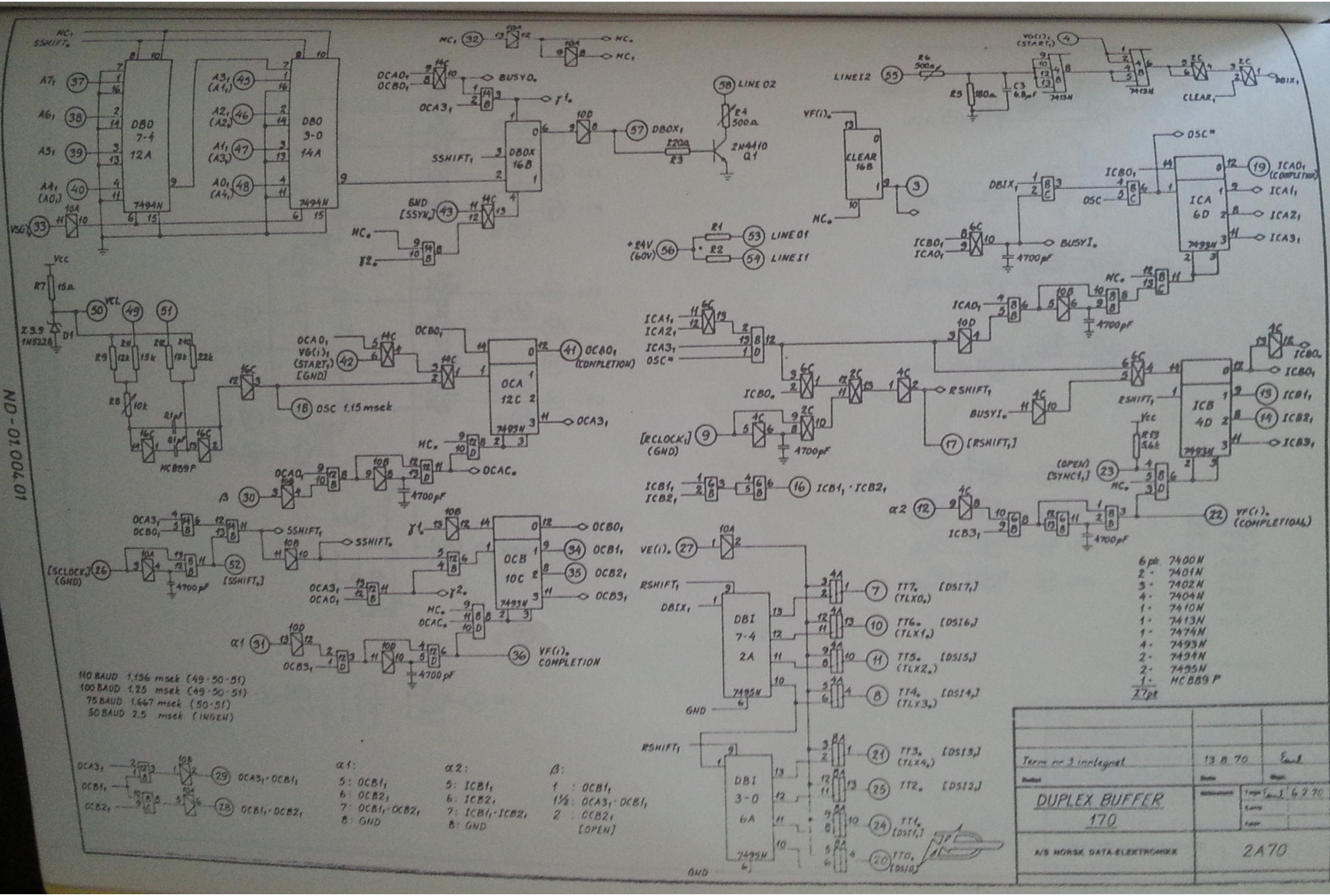
Inputs from devices



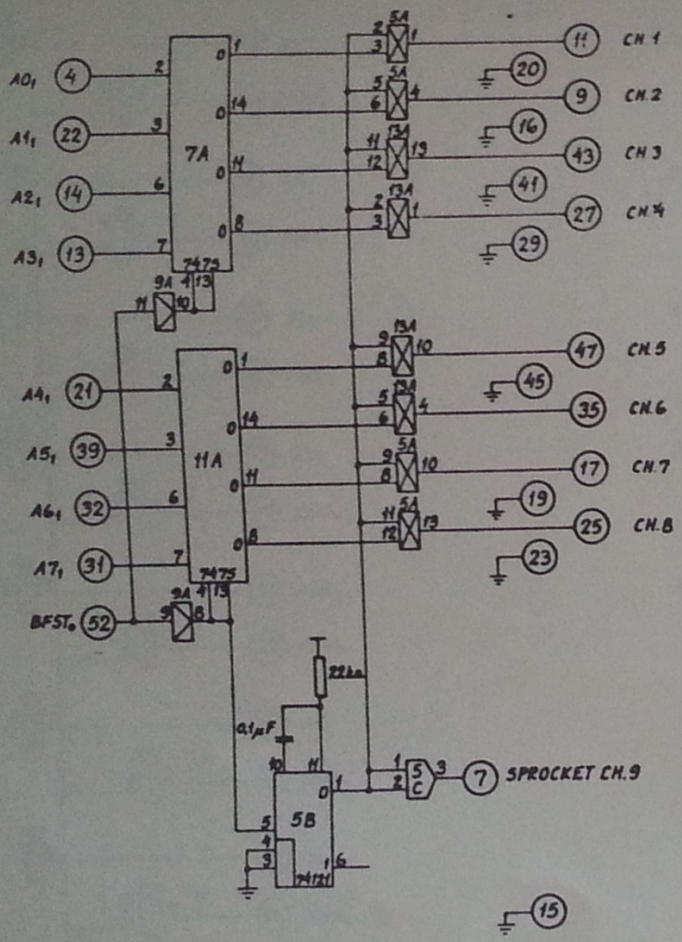
Channel	1	2	3
	AA(i)	AY(i)	AZ(i)
	II(i)	IY(i)	IZ(i)
	IO3	IO4	IO5
	IC3	IC4	IC5
	DIX(i)	DIY(i)	DIZ(i)
	DC3	DC4	DC5
	DK3	DK4	DK5
	DR3	DR4	DR5
	MCX	MCY	MCZ
	TSX	TSY	TSZ

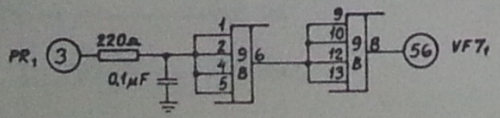
Rettelser i forb med forandring av [illegible]	4 2 70	Eml
Rettet	Dato	Sign.
CHANNEL INTERFACE 168	Tegn. Eml 14.69	
A/S NORSK DATA-ELEKTRONIKK	2A68	


ND-01.004.01
+5V
560
5A
HR14₁
HR14₀
330
560
22
33
RQ2₀
RQ2₁
dRQ2₁
100
680
IDA₀ (DAA)
IDA₁ (DAB)
DA₁
WR1₁
WR2₁
DC₀
DC₁
WRC₀
WRC₁
2.7k
100pF
1.5k
1000pF
BUSYA₀
BUSYB₀
BUSY₁
17A
2N121
IDA₀
WRITE₀
DC₁
RQ2₁
READ₀
READ₁
WRITE·OSC₁
NTC3₁
NTC4₁
BUSY₁
NC₀
WRITE₁
WRC₁
READ·OSC₁
NTC2₁
STROBE₁
READ
NTC3₀
NTC4₀
RQ2₀
NC₀
DC₀
STROBE₁
dRQ2₁
19C
3.9K
121
Ø4
Ø3
Ø2
Ø1
HT1₀ (Repeated single)
HT2₀
HT3₀ (Test I/O)
HT4₀
CO₀
MCIR₁
MCIR₀
DC₁
CPUE₁
DC₀
NTC4₀
DC₁
RY1₀
RY1₁
RY2₀
RY2₁
WRC₁
RRA₁
LEN₁
READ₁
HR14₀
HR14₁
INIT1₀
INIT2₀
WRC₀
CWA₁
RRB₁
CWB₁
READ₁
HR14₀
READ₁
HR14₁
INIT1₁
INIT2₁
READ₀
NC₁
WRITE₀
NC₁
NTC1₁
NTC1₀
NTC3₁
NTC3₀
READ₀
OSC₀
WRITE₀
OSC₀
READ·OSC₁
WRITE·OSC₁
7C NTC1
7C NTC2
HC NTC3
HC NTC4
330
560
37
48
36
NC₁
NC₀
NC₁
28
27
RQH₀
TC0₁
RQ1₁
680pF C1
680pF C2
820pF C3
100
2.5 MHz
OSC₀
2 pk 7400
1 · 01
2 · 02
5 · 04
3 · 10
2 · 20
5 · 40
1 · 50
2 · 107
1 · 121
24 pk
40 term
20 resistors
6 capacitors
Inntegn 7412 1pk i pos 19C
16 6 71
Term nr 24 byttet m 15C12 ideelt
2 9 70
Tor 9A3 Term nr 7 og 11 overmatet
CAMBRIDGE CONTROL
169
A/S NORSK DATA-ELEKTRONIKK
2A69

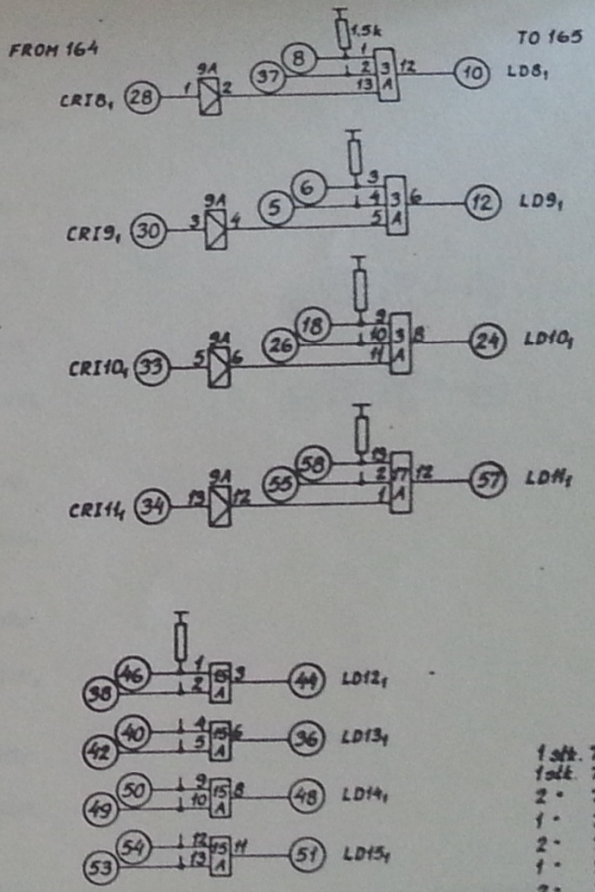

10 700 10 - ON
DUPLEX BUFFER
170
A/S NORSK DATA-ELEKTRONIKK
2A70
13 8 70
Term or 3 inslegnet
DBO 7-4 12A
DBO 3-0 14A
DBOX 16B
OCA 12C
OCB 10C
ICA 6D
ICB 4D
CLEAR 16B
DBI 7-4 2A
DBI 3-0 6A
MC889P
110 BAUD 1,136 msek (49-50-51)
100 BAUD 1,25 msek (49-50-51)
75 BAUD 1,667 msek (50-51)
50 BAUD 2,5 msek (INGEN)
α1: 5: OCB1, 6: OCB2, 7: OCB1·OCB2, 8: GND
α2: 5: ICB1, 6: ICB2, 7: ICB1·ICB2, 8: GND
β: 1: OCB1, 1½: OCA3·OCB1, 2: OCB2 [OPEN]
6 pk 7400N
2 - 7401N
3 - 7402N
4 - 7404N
1 - 7410N
1 - 7413N
1 - 7474N
4 - 7493N
2 - 7494N
2 - 7495N
1 - MC889P
27pk

ND-01.004.01





SPARES FOR INPUT TO A-REG. ON I/O CHANNEL 0

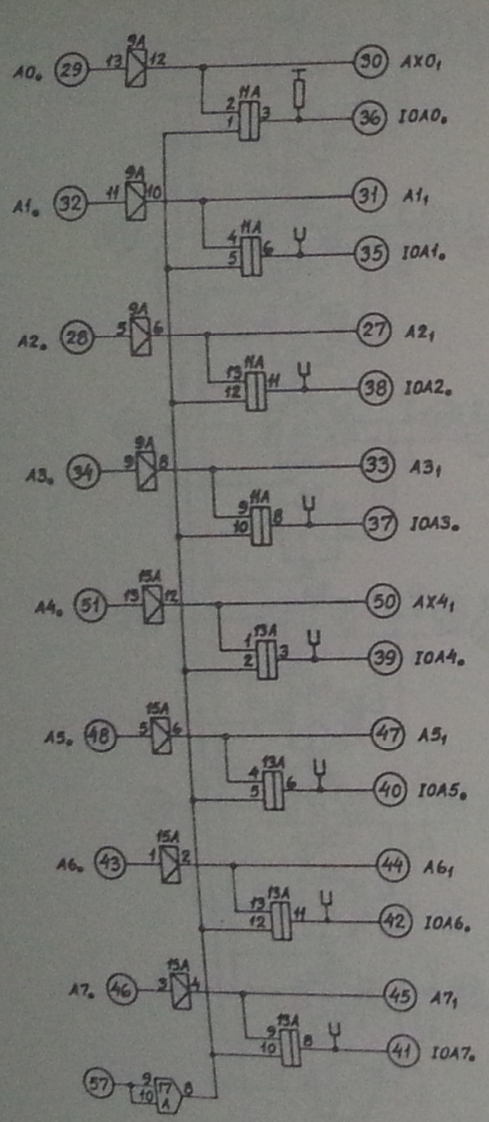


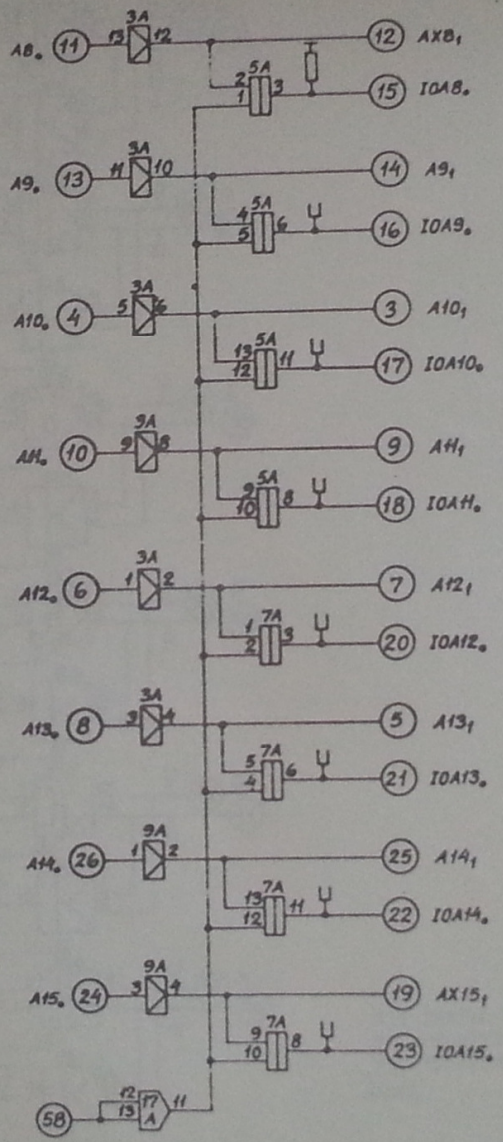
1 stk.	7437N
1 stk.	7400N
2 -	7402N
1 -	7404N
2 -	7410N
1 -	7413N
2 -	7475N
1 -	74121N
11 stk	

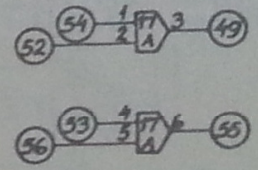
56 terminaler

Innlegn 7437 pk. i pos. 5C	29 6 71	Sund
Sign på term nr 28, 30, 33 og 34		
forandret fra LD11/CRI	13.12.70	Sund
PUNCH BUFFER 179		4.9.70
A/S NORSK DATA-ELEKTRONIKK	2A79	

ND-10.004.01





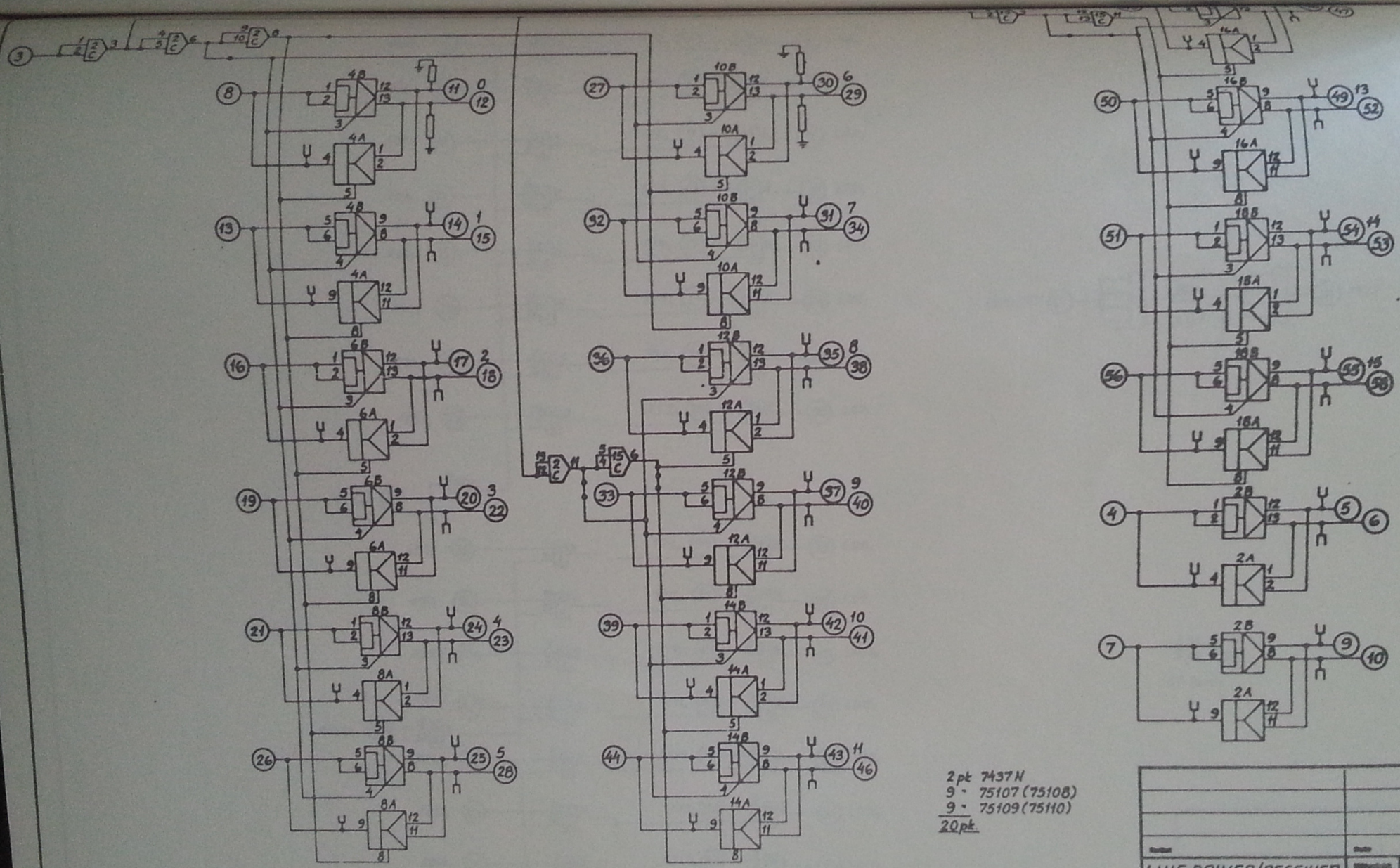


4 pk. 7403N
3 " 7404N
1 " 7437N
8 pk.

Div sign forandr fra AA t.l IOA	12.11.70	Eml
Term nr på 3A 13 & 12 og 5A H & 10 forandr	10.11.70	Eml
Rettet	Dato	Sign.

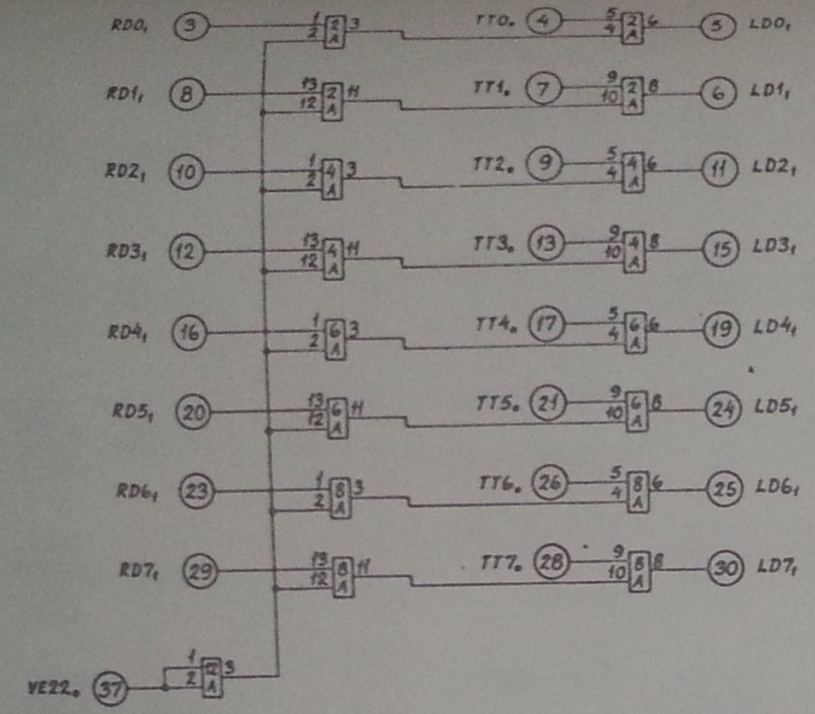
I/O OUTPUT 184	Målestokk:	Tegn. Eml 23.10.70 Kontr. Godkj.
A/S NORSK DATA-ELEKTRONIKK	2A84	

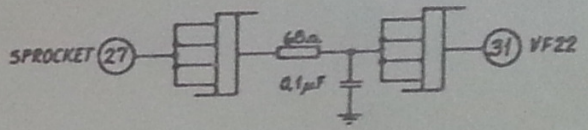
ND-01.004.01



2pk 7437N
9 - 75107 (75108)
9 - 75109 (75110)
20pk

Rettet	Dato	Sign.
LINE DRIVER/RECEIVER 185	Tegnet Ellen	27 10 70
	Kontr.	
	Godkj.	
A/S NORSK DATA-ELEKTRONIKK	2A85	



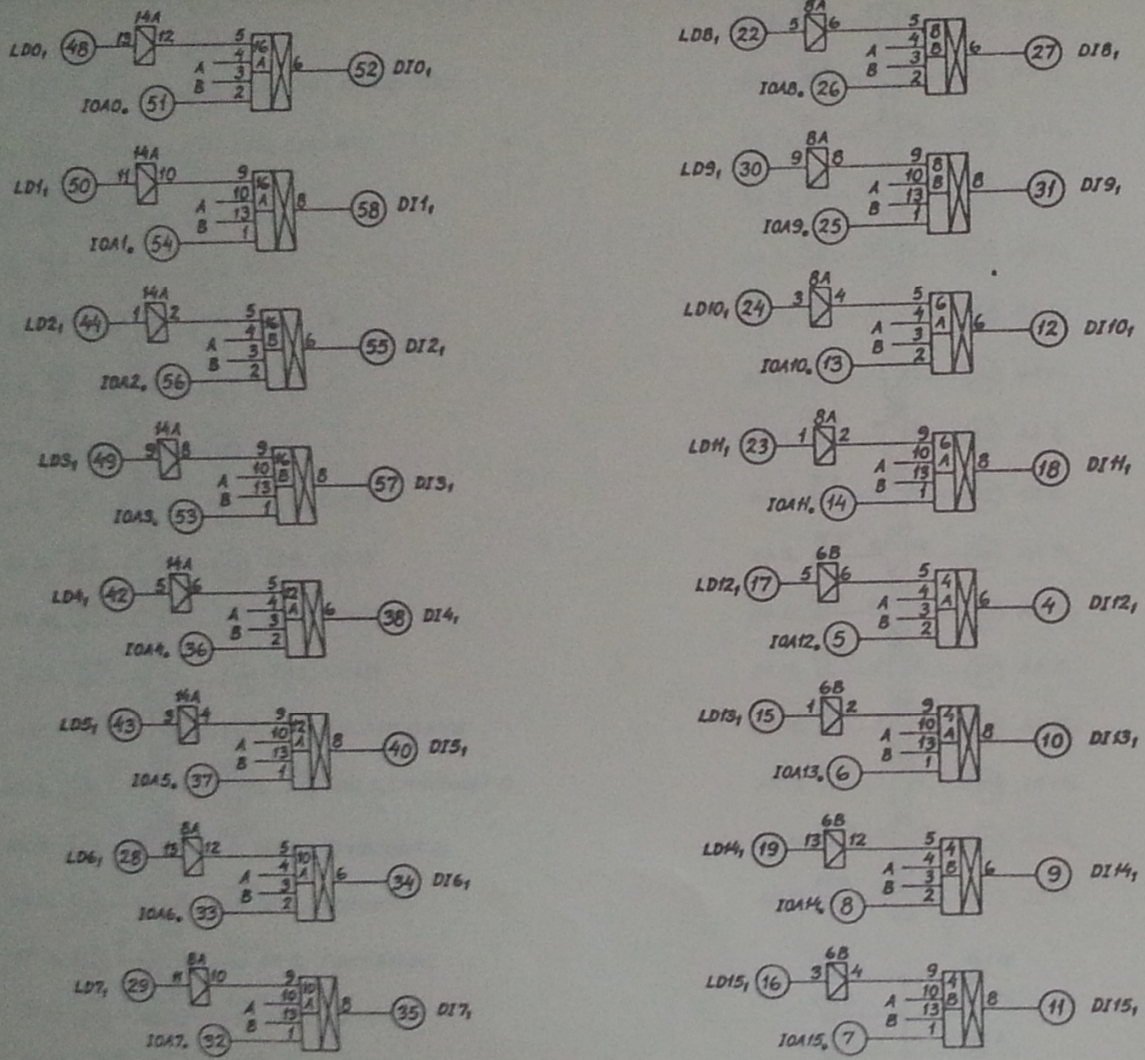


1 pk. 7413
9 pk. 7400

53 term.

Påført sign navn og 1stk 7413pk	5.6.71	Eml
I/O DATA BOARD 186		
A/S NORSK DATA-ELEKTRONIKK	2A86	

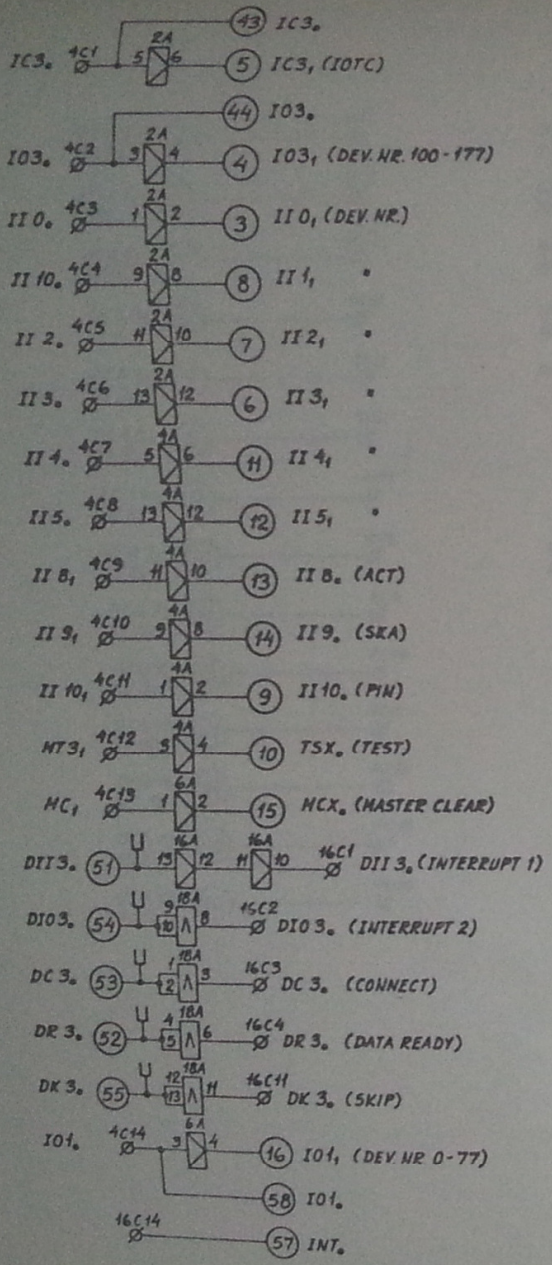
ND-01007.01

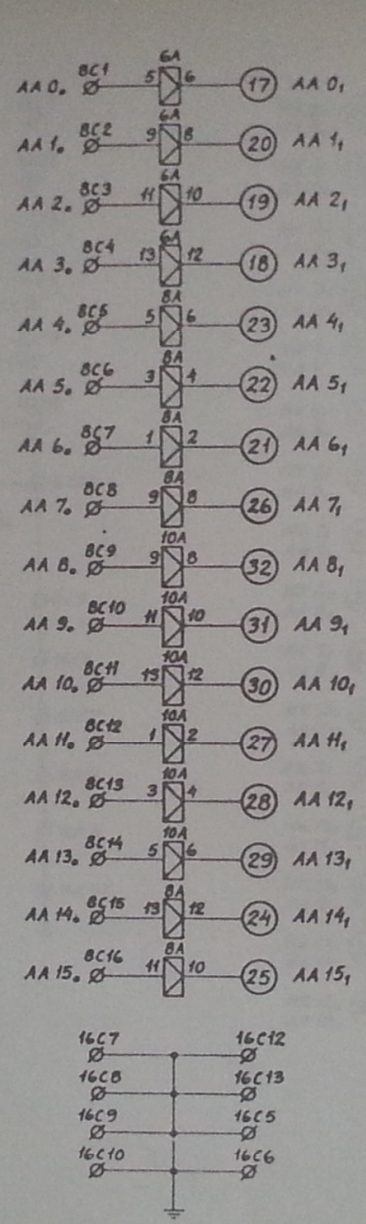


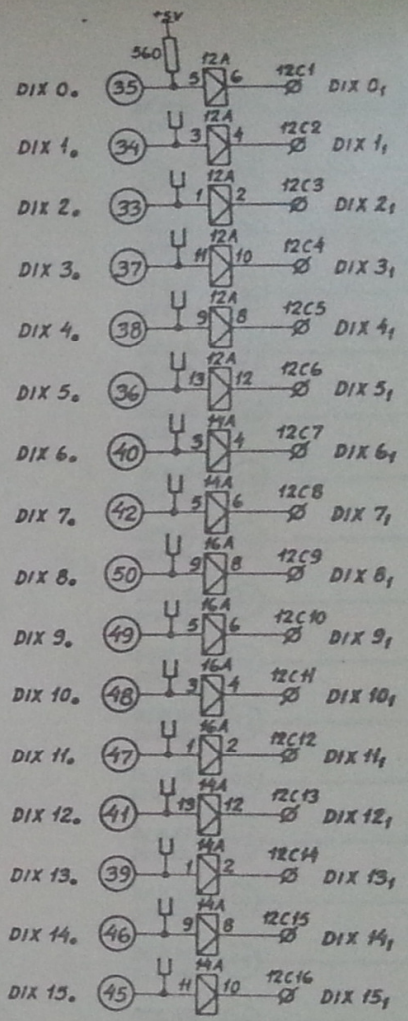
1 pk. 7400
1 · 7402
3 · 7404
8 · 7451
13 pk.

I/O INPUT 187		4 11 70
A/S NORSK DATA-ELEKTRONIKK		2A87

NO-01 004 01







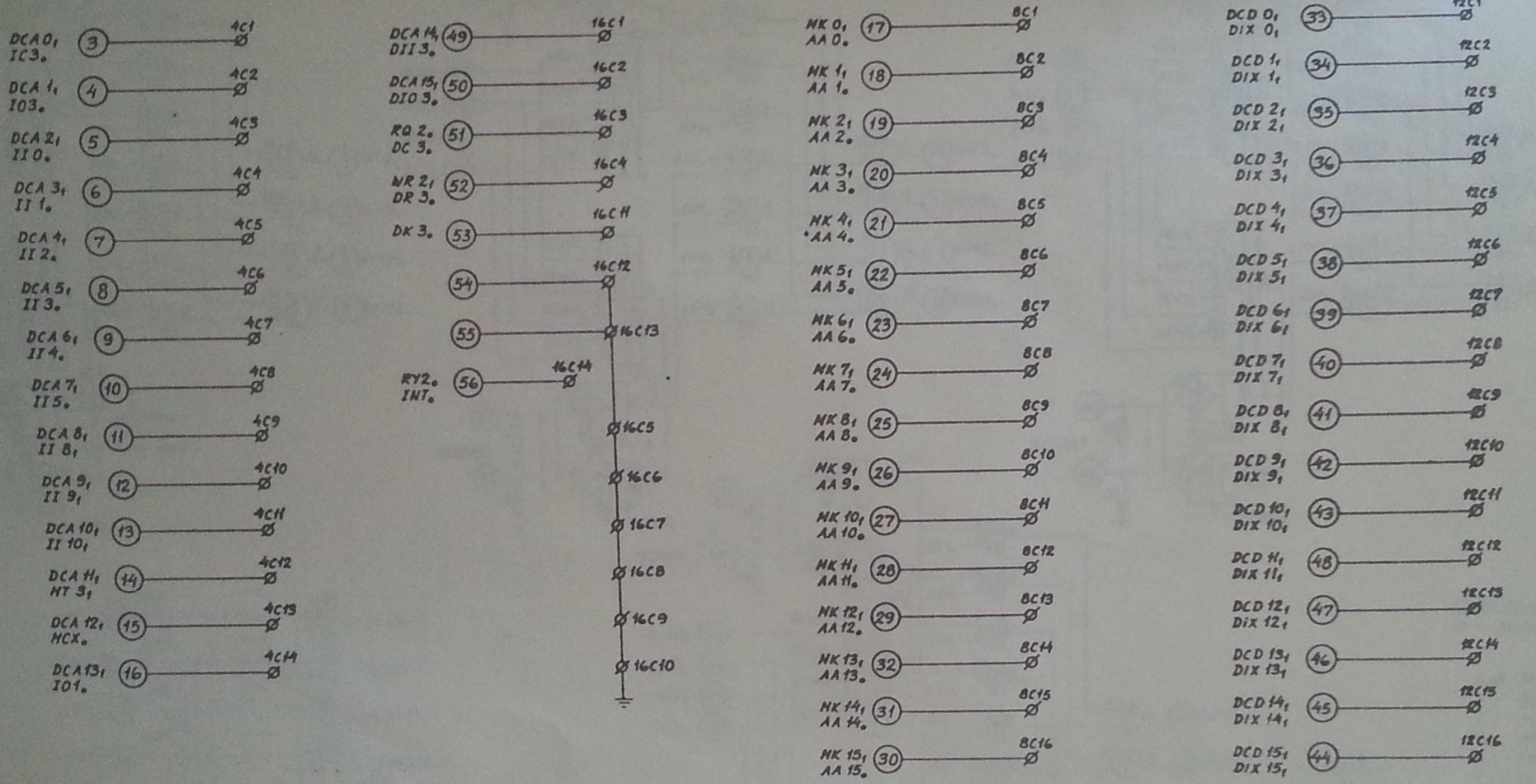
8 pk. 7404N
1 " 7408N

2 pk 14 pins sockets
2 " 16 " "

55 term.

Rettet	Dato	Sign.
INTERFACE BUFFER/CABLE	Tegn. 5.1 2017	
189	Kontr.	
	Appr.	
A/S NORSK DATA-ELEKTRONIKK	2A89	

ND-01.004.01



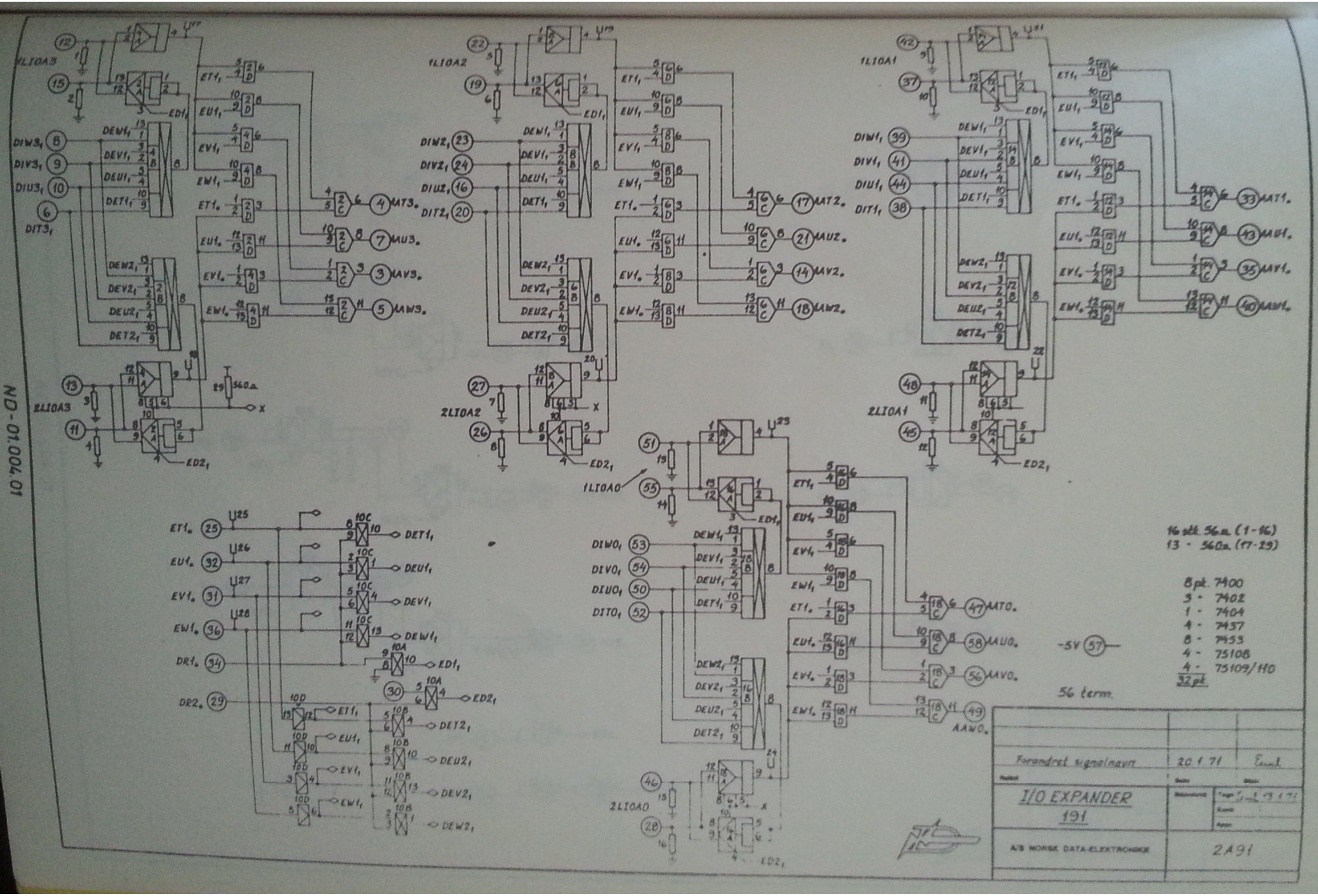
2 x 14 pins sockets

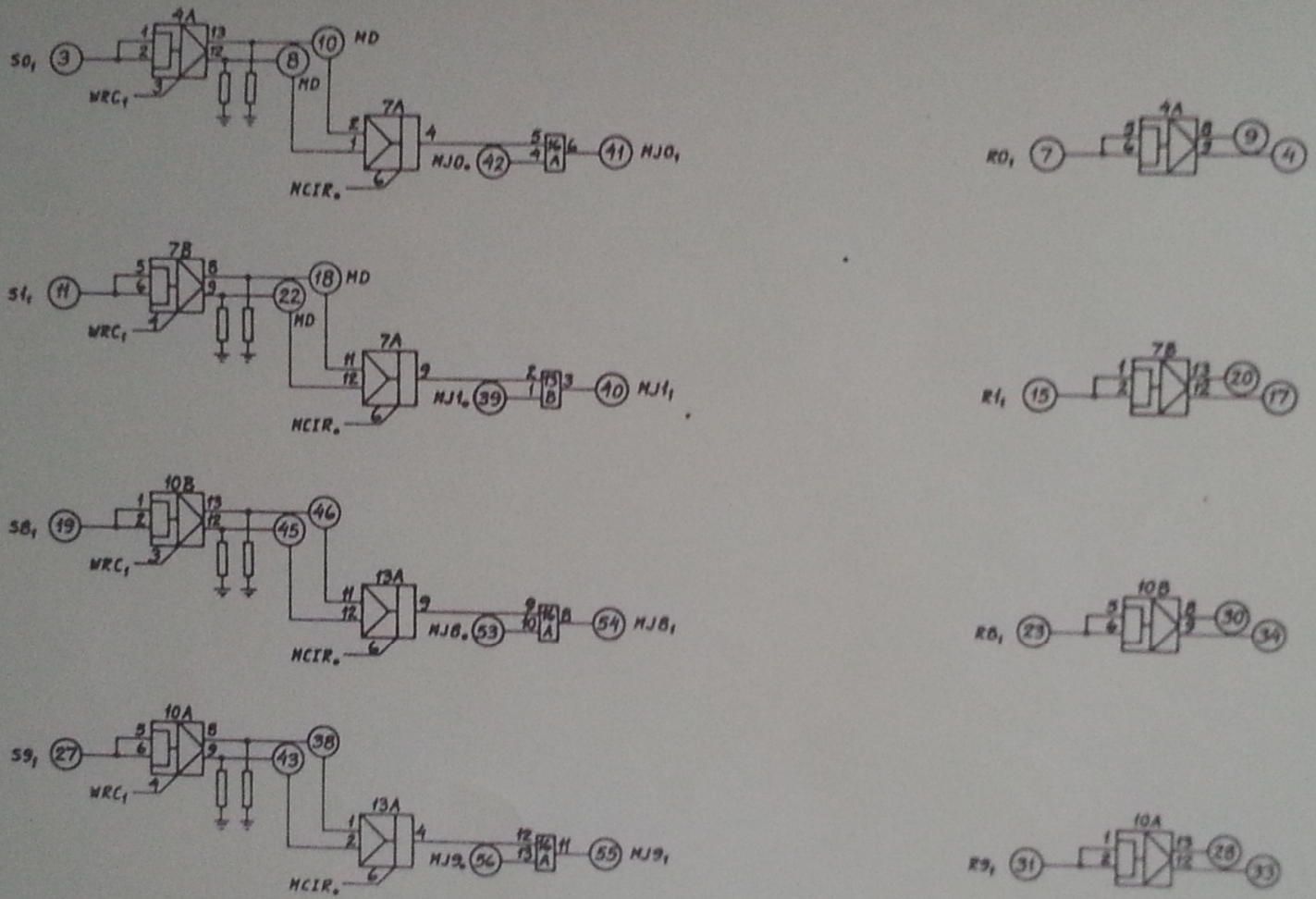
2 x 16 " "

54 term.

Modifikasjon	Dato	Sign.
CABLE CARD 190	Tegn. Emil	20.1.71
	Kontr.	
	Godkj.	
A/S NORSK DATA-ELEKTRONIKK	2A90	

ND-01.004.01


ND-01004.01
1LIOA3
1LIOA2
1LIOA1
1LIOA0
2LIOA3
2LIOA2
2LIOA1
2LIOA0
DIW3,
DIV3,
DIU3,
DIT3,
DIW2,
DIV2,
DIU2,
DIT2,
DIW1,
DIV1,
DIU1,
DIT1,
DIW0,
DIV0,
DIU0,
DIT0,
DEW1,
DEV1,
DEU1,
DET1,
DEW2,
DEV2,
DEU2,
DET2,
ET1,
EU1,
EV1,
EW1,
ET1.
EU1.
EV1.
EW1.
ED1,
ED2,
DR1.
DR2.
560Ω
X
-5V
AAT3.
AAU3.
AAV3.
AAW3.
AAT2.
AAU2.
AAV2.
AAW2.
AAT1.
AAU1.
AAV1.
AAW1.
AAT0.
AAU0.
AAV0.
AAW0.
16 stk. 56Ω (1-16)
13 - 560Ω (17-29)
8 pk. 7400
3 - 7402
1 - 7404
4 - 7437
8 - 7453
4 - 75108
4 - 75109/110
32 pk
56 term.
Forandret signalnavn
20 1 71
I/O EXPANDER
191
A/S NORSK DATA-ELEKTRONIKK
2A91



ND-01.004.01

MEMORY BUFFER
DRIVER 194

2A94