Sailor

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INSTRUCTION BOOK
FOR
P.R.O.M. PROGRAMMER
SAILOR H233

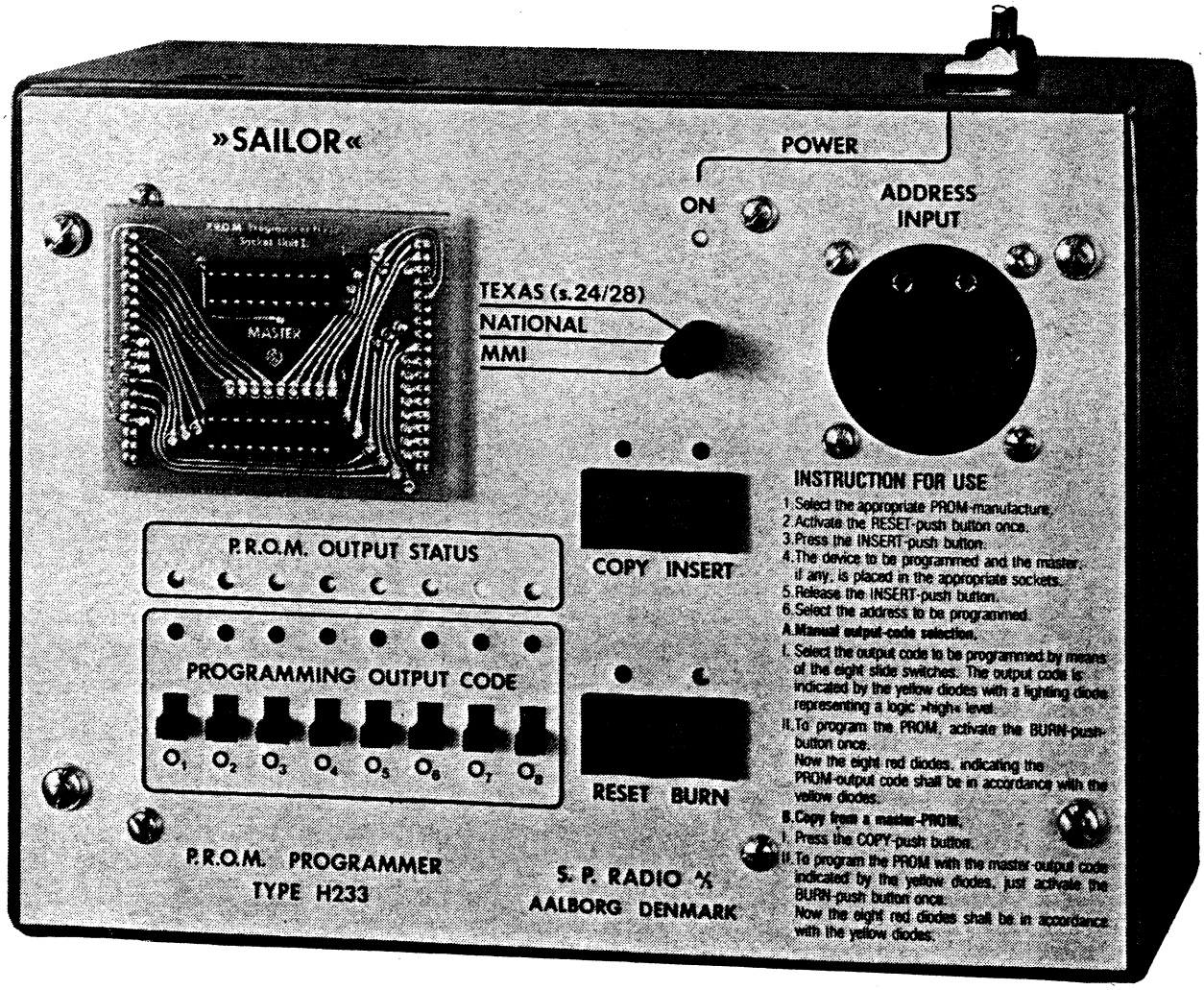
A/S S. P. RADIO · AALBORG · DENMARK

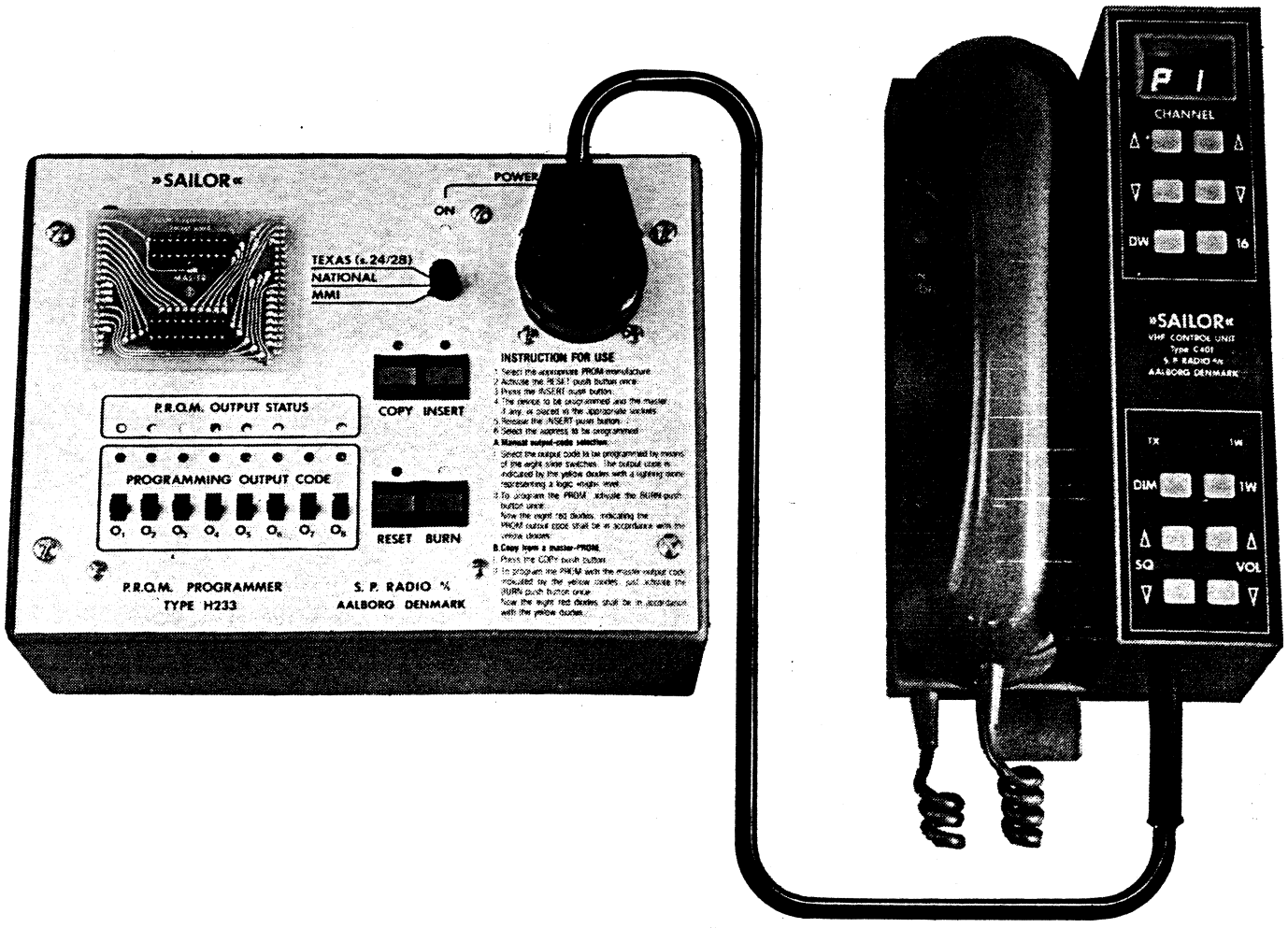
GENERAL DESCRIPTION

SAILOR P.R.O.M. Programmer H233 is able to programme the PROM's for the VHF RT145/RT146 and exciter S1304.

When new channel is to be programmed in the VHF RT145/RT146 a SAILOR VHF control unit is being used to set up the address in the PROM.

When transmitting channels is to be opened in the exciter S1304 an address input unit H237 is being used to set up the address in the PROM.




»SAILOR«
POWER
ON
TEXAS (s.24/28)
NATIONAL
MMI
P.R.O.M. OUTPUT STATUS
COPY INSERT
PROGRAMMING OUTPUT CODE
RESET BURN
INSTRUCTION FOR USE
P.R.O.M. PROGRAMMER
TYPE H233
S. P. RADIO %
AALBORG DENMARK
P 1
CHANNEL
DW
16
»SAILOR«
VHF CONTROL UNIT
Type C401
S. P. RADIO %
AALBORG DENMARK
TX
1W
DIM
1W
SQ
VOL

Notice the section with "Frequency code table and Programming example" in instruction book for VHF RT145.

If you want to make a "Private" channel in "P1" your control unit C40X must be set for this channel and so on.

PROGRAMMING OF FUNCTION PROM.

In the table below is listed the types of private channels which are possible, and the associated codes which have to be programmed in the function PROM at the appropriate channel address.

Type	Receiver (Rx) "Simplex"/"Duplex"	Normal/ Special Tx	TX-Blocked	Full power/ Reduced power	PROM output code	
					Binary	HEX
					0_1 0_8	
A	"Simplex"	Normal	No	Full power	1 1 1 0 1 1 1 1	F7
B	"Simplex"	Normal	No	Reduced power	1 1 1 0 1 1 0 1	B7
C	"Duplex"	Normal	No	Full power	1 1 1 0 1 1 1 0	77
D	"Duplex"	Normal	No	Reduced power	1 1 1 0 1 1 0 0	37
E	"Simplex"	Normal	Yes	Reduced power	1 1 1 0 0 1 1 1	E7
F	"Duplex"	Normal	Yes	Reduced power	1 1 1 0 0 1 1 0	67
G	"Simplex"	Special	No	Full power	1 1 1 0 1 0 1 1	D7
H	"Simplex"	Special	No	Reduced power	1 1 1 0 1 0 0 1	97
I	"Duplex"	Special	No	Full power	1 1 1 0 1 0 1 0	57
J	"Duplex"	Special	No	Reduced power	1 1 1 0 1 0 0 0	17

The private channels can be selected in the following frequency ranges:

Receiver (Rx)	"Simplex" operation	155,000 MHz $\leq f_{RX} \leq$ 158,600 MHz
	"Semi-Duplex" operation	159,600 MHz $\leq f_{RX} \leq$ 163,200 MHz
Transmitter (Tx)	Normal	155,000 MHz $\leq f_{TX} \leq$ 158,600 MHz
	Special	159,600 MHz $\leq f_{TX} \leq$ 163,200 MHz

FREQUENCY CODE TABLE

In the table below is listed the frequency output codes for the divider, which must be programmed into the CHANNEL PROM at the appropriate addresses for the private channels. (The possible address codes are found in the address table).

Frequency MHz	FREQUENCY CODE BINARY-CODED O_1 O_8	HEX-CODED
155,000	1 0 1 0 1 0 1 1	D5
155,025	0 0 1 0 1 0 1 1	D4
155,050	1 1 0 0 1 0 1 1	D3
155,075	0 1 0 0 1 0 1 1	D2
155,100	1 0 0 0 1 0 1 1	D1
155,125	0 0 0 0 1 0 1 1	D0
155,150	1 1 1 1 0 0 1 1	CF
155,175	0 1 1 1 0 0 1 1	CE
155,200	1 0 1 1 0 0 1 1	CD
155,225	0 0 1 1 0 0 1 1	CC
155,250	1 1 0 1 0 0 1 1	CB
155,275	0 1 0 1 0 0 1 1	CA
155,300	1 0 0 1 0 0 1 1	C9
155,325	0 0 0 1 0 0 1 1	C8
155,350	1 1 1 0 0 0 1 1	C7
155,375	0 1 1 0 0 0 1 1	C6
155,400	1 0 1 0 0 0 1 1	C5
155,425	0 0 1 0 0 0 1 1	C4
155,450	1 1 0 0 0 0 1 1	C3
155,475	0 1 0 0 0 0 1 1	C2
155,500	1 0 0 0 0 0 1 1	C1
155,525	0 0 0 0 0 0 1 1	C0
155,550	1 1 1 1 1 1 0 1	BF
155,575	0 1 1 1 1 1 0 1	BE
155,600	1 0 1 1 1 1 0 1	BD
155,625	0 0 1 1 1 1 0 1	BC
155,650	1 1 0 1 1 1 0 1	BB
155,675	0 1 0 1 1 1 0 1	BA
155,700	1 0 0 1 1 1 0 1	B9
155,725	0 0 0 1 1 1 0 1	B8
155,750	1 1 1 0 1 1 0 1	B7
155,775	0 1 1 0 1 1 0 1	B6
155,800	1 0 1 0 1 1 0 1	B5
155,825	0 0 1 0 1 1 0 1	B4
155,850	1 1 0 0 1 1 0 1	B3

Frequency MHz	FREQUENCY CODE BINARY-CODED O_1 O_8	HEX-CODED
155,875	0 1 0 0 1 1 0 1	B2
155,900	1 0 0 0 1 1 0 1	B1
155,925	0 0 0 0 1 1 0 1	B0
155,950	1 1 1 1 0 1 0 1	AF
155,975	0 1 1 1 0 1 0 1	AE
156,000	1 0 1 1 0 1 0 1	AD
156,025	0 0 1 1 0 1 0 1	AC
156,050	1 1 0 1 0 1 0 1	AB
156,075	0 1 0 1 0 1 0 1	AA
156,100	1 0 0 1 0 1 0 1	A9
156,125	0 0 0 1 0 1 0 1	A8
156,150	1 1 1 0 0 1 0 1	A7
156,175	0 1 1 0 0 1 0 1	A6
156,200	1 0 1 0 0 1 0 1	A5
156,225	0 0 1 0 0 1 0 1	A4
156,250	1 1 0 0 0 1 0 1	A3
156,275	0 1 0 0 0 1 0 1	A2
156,300	1 0 0 0 0 1 0 1	A1
156,325	0 0 0 0 0 1 0 1	A0
156,350	1 1 1 1 1 0 0 1	9F
156,375	0 1 1 1 1 0 0 1	9E
156,400	1 0 1 1 1 0 0 1	9D
156,425	0 0 1 1 1 0 0 1	9C
156,450	1 1 0 1 1 0 0 1	9B
156,475	0 1 0 1 1 0 0 1	9A
156,500	1 0 0 1 1 0 0 1	99
156,525	0 0 0 1 1 0 0 1	98
156,550	1 1 1 0 1 0 0 1	97
156,575	0 1 1 0 1 0 0 1	96
156,600	1 0 1 0 1 0 0 1	95
156,625	0 0 1 0 1 0 0 1	94
156,650	1 1 0 0 1 0 0 1	93
156,675	0 1 0 0 1 0 0 1	92
156,700	1 0 0 0 1 0 0 1	91
156,725	0 0 0 0 1 0 0 1	90

Frequency MHz	FREQUENCY CODE	
	BINARY-CODED	HEX-CODED
	O_1 O_8	
156,750	1 1 1 1 0 0 0 1	8F
156,775	0 1 1 1 0 0 0 1	8E
156,800	1 0 1 1 0 0 0 1	8D
156,825	0 0 1 1 0 0 0 1	8C
156,850	1 1 0 1 0 0 0 1	8B
156,875	0 1 0 1 0 0 0 1	8A
156,900	1 0 0 1 0 0 0 1	89
156,925	0 0 0 1 0 0 0 1	88
156,950	1 1 1 0 0 0 0 1	87
156,975	0 1 1 0 0 0 0 1	86
157,000	1 0 1 0 0 0 0 1	85
157,025	0 0 1 0 0 0 0 1	84
157,050	1 1 0 0 0 0 0 1	83
157,075	0 1 0 0 0 0 0 1	82
157,100	1 0 0 0 0 0 0 1	81
157,125	0 0 0 0 0 0 0 1	80
157,150	1 1 1 1 1 1 1 0	7F
157,175	0 1 1 1 1 1 1 0	7E
157,200	1 0 1 1 1 1 1 0	7D
157,225	0 0 1 1 1 1 1 0	7C
157,250	1 1 0 1 1 1 1 0	7B
157,275	0 1 0 1 1 1 1 0	7A
157,300	1 0 0 1 1 1 1 0	79
157,325	0 0 0 1 1 1 1 0	78
157,350	1 1 1 0 1 1 1 0	77
157,375	0 1 1 0 1 1 1 0	76
157,400	1 0 1 0 1 1 1 0	75
157,425	0 0 1 0 1 1 1 0	74
157,450	1 1 0 0 1 1 1 0	73
157,475	0 1 0 0 1 1 1 0	72
157,500	1 0 0 0 1 1 1 0	71
157,525	0 0 0 0 1 1 1 0	70
157,550	1 1 1 1 0 1 1 0	6F
157,575	0 1 1 1 0 1 1 0	6E
157,600	1 0 1 1 0 1 1 0	6D
157,625	0 0 1 1 0 1 1 0	6C
157,650	1 1 0 1 0 1 1 0	6B
157,675	0 1 0 1 0 1 1 0	6A

Frequency MHz	FREQUENCY CODE	
	BINARY-CODED	HEX-CODED
	O_1 O_8	
157,700	1 0 0 1 0 1 1 0	69
157,725	0 0 0 1 0 1 1 0	68
157,750	1 1 1 0 0 1 1 0	67
157,775	0 1 1 0 0 1 1 0	66
157,800	1 0 1 0 0 1 1 0	65
157,825	0 0 1 0 0 1 1 0	64
157,850	1 1 0 0 0 1 1 0	63
157,875	0 1 0 0 0 1 1 0	62
157,900	1 0 0 0 0 1 1 0	61
157,925	0 0 0 0 0 1 1 0	60
157,950	1 1 1 1 1 0 1 0	5F
157,975	0 1 1 1 1 0 1 0	5E
158,000	1 0 1 1 1 0 1 0	5D
158,025	0 0 1 1 1 0 1 0	5C
158,050	1 1 0 1 1 0 1 0	5B
158,075	0 1 0 1 1 0 1 0	5A
158,100	1 0 0 1 1 0 1 0	59
158,125	0 0 0 1 1 0 1 0	58
158,150	1 1 1 0 1 0 1 0	57
158,175	0 1 1 0 1 0 1 0	56
158,200	1 0 1 0 1 0 1 0	55
158,225	0 0 1 0 1 0 1 0	54
158,250	1 1 0 0 1 0 1 0	53
158,275	0 1 0 0 1 0 1 0	52
158,300	1 0 0 0 1 0 1 0	51
158,325	0 0 0 0 1 0 1 0	50
158,350	1 1 1 1 0 0 1 0	4F
158,375	0 1 1 1 0 0 1 0	4E
158,400	1 0 1 1 0 0 1 0	4D
158,425	0 0 1 1 0 0 1 0	4C
158,450	1 1 0 1 0 0 1 0	4B
158,475	0 1 0 1 0 0 1 0	4A
158,500	1 0 0 1 0 0 1 0	49
158,525	0 0 0 1 0 0 1 0	48
158,550	1 1 1 0 0 0 1 0	47
158,575	0 1 1 0 0 0 1 0	46
158,600	1 0 1 0 0 0 1 0	45

The above listed frequency codes shall always be used.
If the receiving frequency has to be in the frequency range 159,600 - 163,200 MHz (f_{listed} + 4,6 MHz), the channel has to be programmed as a semi-duplex channel in the FUNCTION PROM IC203.

Programming example:

A. Private simplex channel in P2 with full transmitter power at the frequency 155,875 MHz.

The channel address code is found in the ADDRESS TABLE:

		A_7						A_0	
ADDRESS FOR P2:	In international mode	1	0	0	1	1	1	0	1 (9D)
	In U.S.A.-mode	0	0	0	1	1	1	0	1 (1D)

The frequency code is found in the table:

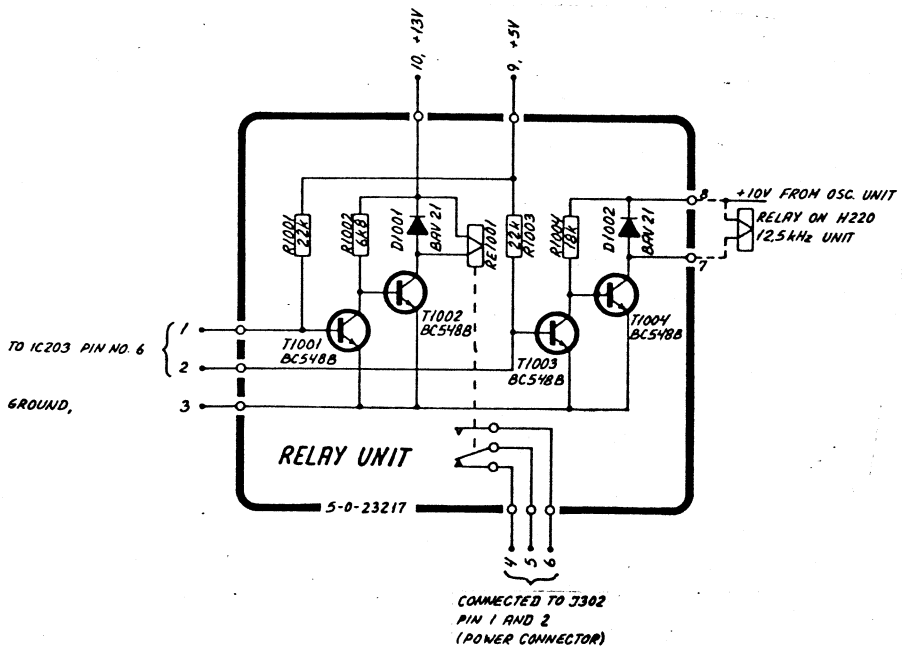
	O_1						O_8	
155,875 MHz is coded as	0	1	0	0	1	1	0	1 (B2)

Now the two addresses for P2 (A_7 1 0 0 1 1 1 0 1 and A_7 0 0 0 1 1 1 0 1) is programmed with the output code (O_1 0 1 0 0 1 1 0 1) in the CHANNEL PROM IC204.

The private channel type is identified in the table PROGRAMMING of FUNCTION PROM, here type A.

The corresponding PROM-output code (O_1 1 1 1 0 1 1 1 1) is programmed into the FUNCTION PROM IC203 in the two addresses for P2 (A_7 1 0 0 1 1 1 0 1 and A_7 0 0 0 1 1 1 0 1).

As a special feature the FUNCTION PROM IC203 can be programmed in such a way that one or more channels can be provided with a logical low output level. This information could e.g. be used to control a relay contact (e.g. for blocking of auxiliary receivers).
All the possible codes programmed into the FUNCTION PROM IC203 in channels where RX/TX is not blocked will be of the type O_1 1 1 1 0 X X X X or in the hex-coded EX. If a channel has to provide a logic low level for external control purposes, it must be programmed as an 0 as the least significant bit in the output code, so that output codes on such channels will be of the type O_1 0 1 1 0 X X X X or in hex-code 6X, which means that O_1 (pin no.6) on IC203 will be low when the appropriate channel is selected.
For external control purposes the following circuit is recommended.



For external control purposes through the power connector J302

The relay contact will be activated when the output O_1 on pin No. 6 IC203 goes low.

PROGRAMMING OF S1304 FREQUENCIES

To open a transmitting frequency in the exciter S1304 it is necessary to program the PROM's IC2512, IC2510 and IC2508 placed in the exciter.
The PROM's are preprogrammed with a set of frequencies, but not all the prom addresses are used. The not used addresses can be programmed when it is wanted to open a new transmitting frequency.

PROM IC2512 is programmed with the 10 MHz and 1 MHz frequency information in BCD code.

PROM IC2510 is programmed with the 100 kHz and 10 kHz frequency information in BCD code.

PROM IC2508 is programmed with the 1 kHz and 100 Hz frequency information in BCD code.

To program a new frequency into the PROM's the PROM PROGRAMMER SAILOR H233 together with the address input unit SAILOR H237 can be used.

PROGRAMMING EXAMPLE S1304:

1. Select the appropriate PROM-manufactor on the PROM PROGRAMMER H233.
2. Activate the RESET button on the PROM PROGRAMMER H233 once.
3. Press the INSERT push button on the PROM PROGRAMMER H233.
4. The PROM to be programmed is placed in the appropriate socket.
   Start the programming procedure with IC2508.
5. Release the INSERT-push button.
6. Change the address input from the ADDRESS UNIT H237 until a not used address is found. All the red diodes will be alight.
7. Select the output code to be programmed by means of the eight slide switches. The output code is indicated by the yellow diodes with a lighting diode representing a logic >> high << level.

   IC2508: address set up 9A
   wanted frequency 7.5 kHz

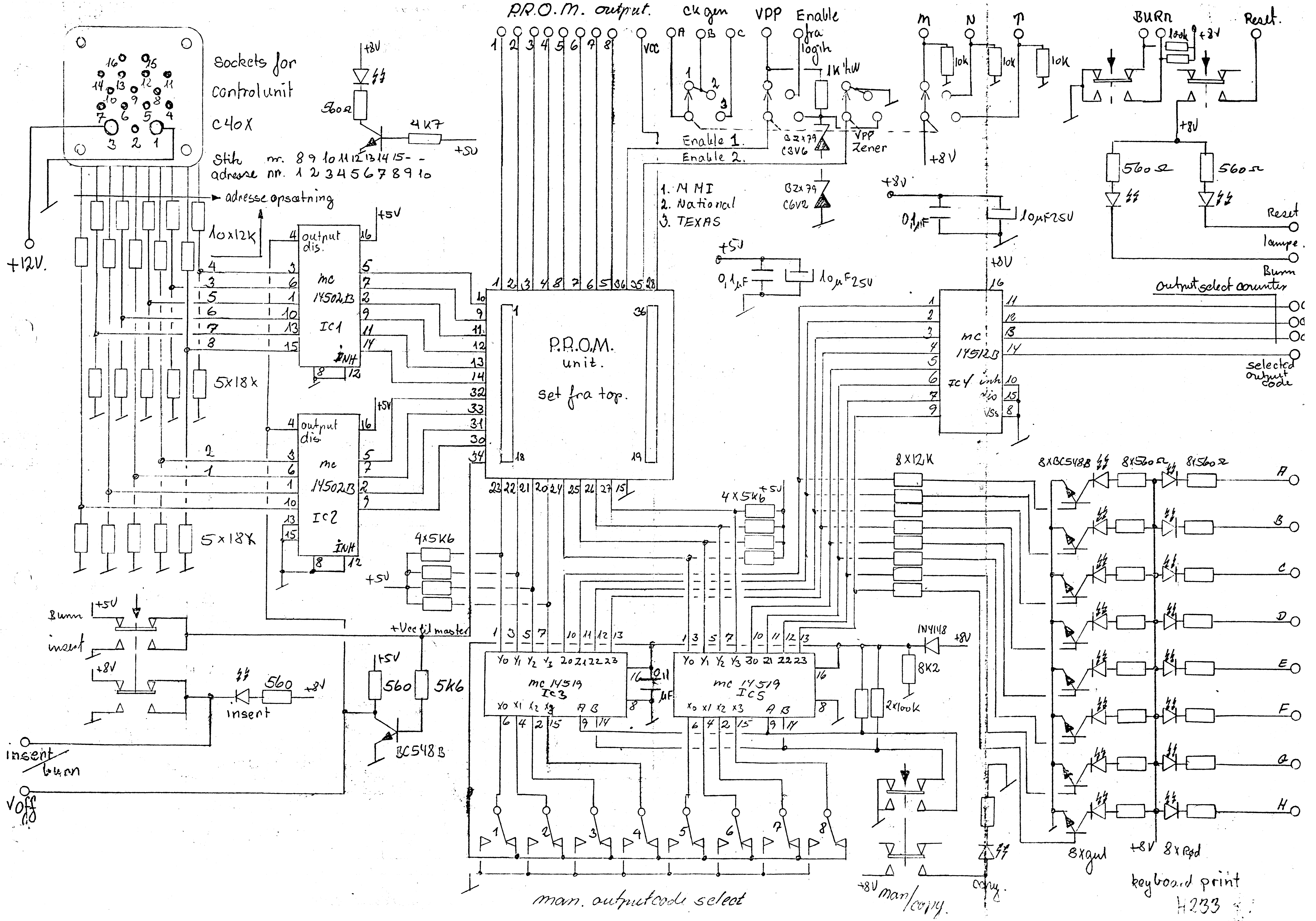
	O_1	O_2	O_3	O_4	O_5	O_6	O_7	O_8
BCD:	1	0	1	0	1	1	1	0

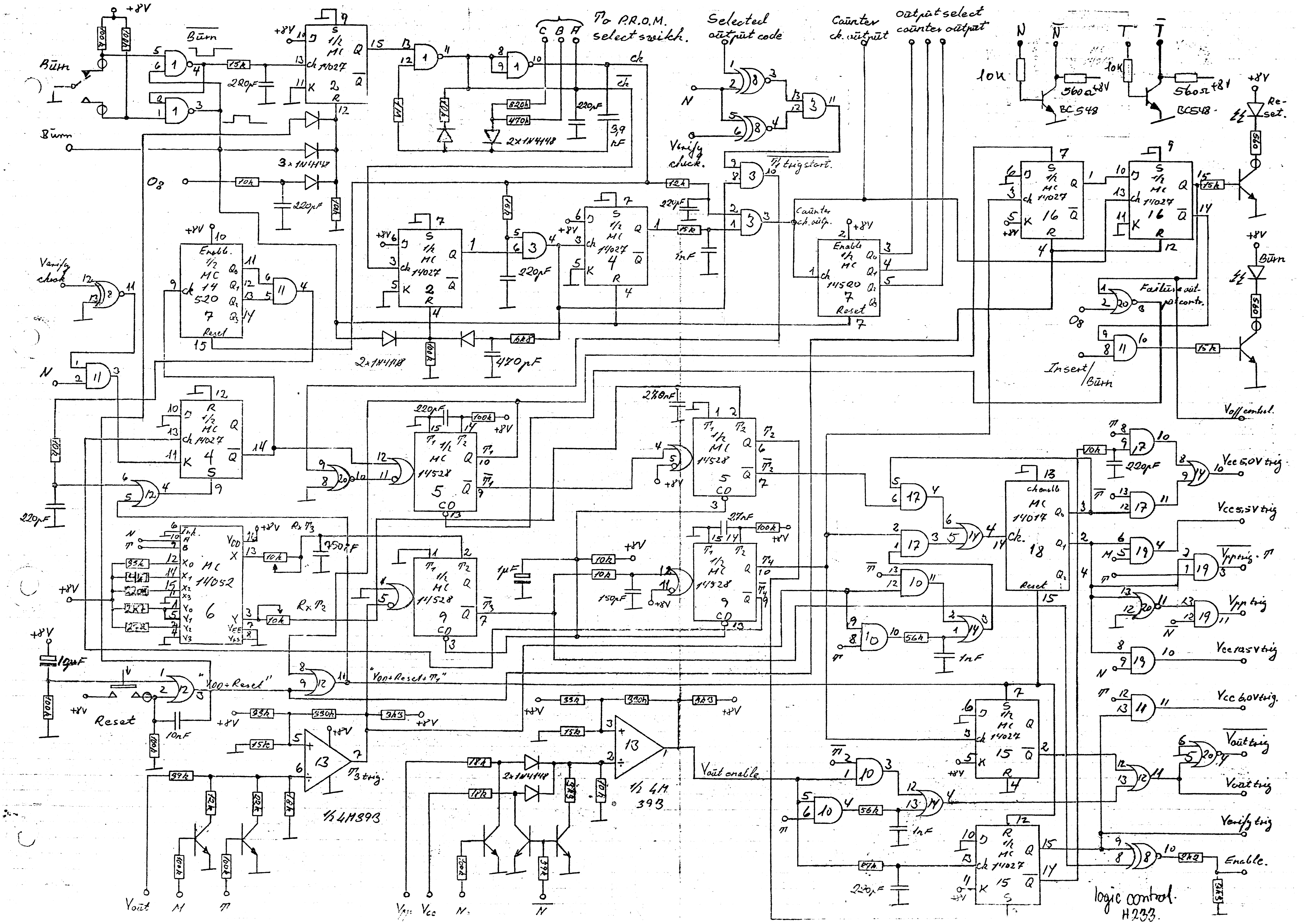
8. Activate the BURN-push button on H233.
9. The red and yellow diodes shall now show the same code.
10. Change IC2508 by IC2510.
11. Set up the wanted frequency code and push the BURN button.
12. Change IC2510 by IC2512.
13. Set up the wanted frequency code and push the BURN button.
14. Replace the PROM's in the exciter and control, by setting up the programmed frequency on the display, that the yellow diode ILLEGAL FREQUENCY on the front plate is not alight.

If more frequencies are to be programmed, start at point 1. of this procedure for every new frequency.

CONVERTION TABLE (decimal to BCD).

Decimal	BCD			
	0_1	0_2	0_3	0_4
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0
8	0	0	0	1
9	1	0	0	1


P.R.O.M. output.
Ck gen
VPP
Enable fra logik
M
N
T
BURN
Reset.
Sockets for controlunit C40X
Stift nr. 8 9 10 11 12 13 14 15 - -
adresse nr. 1 2 3 4 5 6 7 8 9 10
adresse opsætning
10x12K
+12V.
5x18K
5x18K
mc 14502B IC1
mc 14502B IC2
output dis.
INH
P.R.O.M. unit. set fra top.
Enable 1.
Enable 2.
1. MMI
2. National
3. TEXAS
BZX79 C3V6
BZX79 C6V2
VPP Zener
1K 1/2W
10k
0,1μF
10μF 25V
mc 14512B IC4
output select counter
selected output code
8X12K
4x5K6
8xBC548B
8x560Ω
8x560Ω
A
B
C
D
E
F
G
H
8xgul
8xRød
keyboard print
H233
mc 14519 IC3
mc 14519 IC5
+Vcc til master
Burn
insert
560
5K6
BC548B
insert/burn
Voff
IN4148
8K2
2x100K
man. outputcode select
man/copy
copy.
+5V
+8V
Reset
lampe.
Burn



logic control. H233

Verify output number

A B C D E F G H

8 x BC548B

8 x 8k9

8 x 1N4148

8 x 470

BC 328-25

290

7k0

7k0

BC548B

BC548B

10k

10k

BC548B

+8V

Vcc

Verify trig.

$\overline{\text{Vpptrig}}$ • ⊓

$\overline{\text{Voattrig}}$

8 x 1N4148

P.R.O.M output pin number.

1 2 3 4 5 6 7 8

2 x MC14611B

MC 14017B

ck enable

Reset

Counter clock output

Büsn

O8

8 x BC547B

8 x 5k6

2 x mc14081B

2 x MC14081B

8 x BD138

8 x 1k0

8 x 1k5

8 x BC547B

8 x 5k6

MC 14512

inh

Dis

Verify check output select counter

Vout

Output Print H233

110V/220V~.

160mA.T

315mA.T

+35V

2KBP-05

0,1µF

2200µF 50V

110V

220V

1,6A.T

+15V

2KBP-05

0,1µF

2200µF 40V

TD4353.

+5V

+8V

+12V

mc78 05C

mc78 08C

mc78 12C

0,47µF

0,47µF

0,47µF

+15V.

VCC.

VCC trig

5,0V

5,5V

6,0V

10,5V

VCC forsyning

BD139

0,8Ω 1/2W

+15V.

mc 1723C

IC2

22K

2,2nF

22K

27K

120pF

BC548B

10K

56K

BC548B

33K

BC548B

1nF

22K

BC548B

470pF

6K8

BC548B

1nF

1nF

100K

100K

100K

100K

1N4148

100K

VPP forsyning

1.2Ω/2W

BD138

+35V

82Ω

mc 1723C

IC1

47K

10K

120pF

BC548B

100K

BC548B

470 PF

+8V

470

BC548B

8K2

0,47µF

100Ω 1/2W

BD139

150nF

BC338 -25

15K

100K

Vout forsyning

BD139

BZX79 C5V1

470Ω

BC558B

2K7

BC548B

22nF

3,6nF

1N4148

BC548B

BC548B

10nF

12K

4K7

12K

100K

5K6

4K7

BC548B

120pF

10K

10K

BC548B

47K

VPP fra

Vout fra

N

VPP.

Voff

Vout

T

M

Power supply.

P.R.O.M. Programmer

H233.