

66 78450-01  
SPECIFICATION FOR KEYBOARD MODULE

Luxor part number: 19 40099-11 -- -19

SCOPE:

This document specifies a keyboard module consisting of keys, switches and decoding circuitry assembled to a single unit.

NATIONAL VERSIONS:

The keyboard is manufactured in 9 different national versions.

Converting one keyboard version to another can be done by replacing a number of keytops and a code converting PROM.

KEYBOARD LAYOUT:

The keys are arranged as in appendix 1.  
The keytop surface is sculptured.

KEYTOPS:

Colour of keytops :

Brown red with black legends for keys number: 20, 33, 34, 35, 36, 40, 41, 54, 58, 59, 76, 77, 89, 90.  
White with black legends for all other keys.

Following keys has LED-indicators :

ALT	key number 19
CAPS LOCK	key number 41
INS	key number 93

Keytops are sculptured low profile.

Following keytops has key springs of 0.765 N nominal : 1-20, 33, 34, 35, 36, 54, 76, 90.

All other key springs 0.46 N - nominal.

Seven of the keytops have screen-printed legends on the side towards the operator. Screen-printed legends has the same colour as legend on the upper side.

Keytops nr 1 - 15 has transparent cover.

Keytop nr 54 is marked with a nibble.

Keytops nr 63 and 66 deep mould.

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Screen-printed legends : appendix 3

## KEYCODES:

Keycodes are specified in sheets 6 - 8.

The keyboard software contains a Swedish set of keycode.

The cursor-key ( nr 72 ) can provide sixteen different codes,  
two for each direction.

The keyboard shall, after receiveing a code byte from the host, generate an unique code for each key. This UP/DOWN -mode will send a code when the key is pressed. When it's released again it send's the same code + 80H. No autorepeat is generated in this mode.

## HOST COMPUTER CONNECTOR :

Pin-header connector, 2.54 mm spacing, 90 deg. angle backwards, 12 poles.

Pin	Function	
1	+12V DC	
2	+12V DC	
3	Ground	
4	Ground	
5	Key pin	
6	NC	
7	Serial data transmit.	TTL level
8	Baudrate clock	"
9	Serial data receive.	"
10	Reset , active low	"
11	Strobe, key down, active low.	"
12	NC	

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## STANDARD MOUSE INTERFACE CONNECTOR (DB15S):

Pin	Function
1	5V/50mA
2	XA
3	XB
4	YA
5	YB
6	Left button
7	Mid button
8	Right button
9-13	NC
14	Mouse indikator , active low when Mouse connected.
15	Ground

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## STRAPPING AREA:

The keyboard has a strapping area for customer use, consisting of drilled holes for a 8-pin DIF-socket with 4 strips connected across it. Cutting the strips enables special functions in the keyboard. The strips are on the soldering side of the PC-board.

One is for disabling the processor maskprogram.

One is for enabling the code converting FROM.

Two are for selecting one of the four different areas in the code converting FROM.

## RESET SWITCH:

The keyboard has a reset switch which affects keyboard reset and pin 10 in Host computer connector.

## ELECTRICAL DATA:

- Power supply: +12V DC +1V-2V, max 800 mA incl. options.
- N key rollover.
- Communication: 8 bit serial code full duplex.
- Transmission rate: ~~300 Baud (or 4000 Baud when mouse is connected)~~ *2800 baud*
- Two stop-bits at transmitting, one stop-bit at receiving.
- Baudrate clock output, 16 X baudrate. TTL level positive logic.
- Autorepeat 60ms period, 500ms delay. (Except for keys nr. 16, 17, 18, 19, 35).
- The keyboard transmits the code corresponding to depressed key/keys.
- On-board loudspeaker capable of producing an SPL at 1 m of at least 70 dBA.
- Circuitry for driving the on-board loudspeaker. The loudspeaker is controlled by the keyboard processor.
- Eight 3 mm LED's which can be turned on/off individually.
- The keyboard is able to produce an AC alarm signal and acoustical feedback signal (click) with 2 different durations.
- The alarm signal and the acoustical feedback signal has a frequency in the region 1 - 2 kHz. Duration of the alarm signal is 300 ms. Duration of the short click is 5 ms, and the long click 20 ms.
- Watchdog circuitry.
- The keyboard is always able to receive a character from the host computer. The meaning of a received control character is as follows:

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0000 0111 makes the keyboard produce an alarm signal on the  
loadspeaker.  
0000 0001 disables the alarm function.  
1000 0001 enables the alarm function.  
0000 0010 disables the short click acoust. feedback.  
1000 0010 enables the short click.  
0000 0100 disables the long click.  
1000 0100 enable the long click.  
0000 0101 disables auto repeat  
1000 0101 enables auto repeat  
1000 0110 forces the keyboard to UP/DOWN - mode  
0000 0110 forces the keyboard to ASCII - mode (Normal)  
0000 1000 makes the CAPS LOCK key function normally.  
1000 1000 forces the keyboard to CAPS LOCK mode.  
0000 1001 makes the INS key function normally.  
1000 1001 forces the keyboard to INS mode.  
0000 1010 makes the ALT key function normally.  
1000 1010 forces the keyboard to ALT mode.  
0001 1000 keyboard answer by sending an identification code  
to hostcomputer.  
0011 1001 write data to Mouse position counter registers  
0011 1010 write data to Mouse prescale registers  
0011 1011 write data to Mouse limit registers  
0011 1100 read data from Mouse  
0011 1110 read data from Mouse (Auto enable command)  
0011 1111 auto read command from Mouse is disabled  
0000 0000 set bit 0 output latch  
1000 0000 reset bit 0 output latch  
0001 0000 set bit 1 output latch  
1001 0000 reset bit 1 output latch  
0010 0000 set bit 2 output latch  
1010 0000 reset bit 2 output latch  
0011 0000 set bit 3 output latch  
1011 0000 reset bit 3 output latch  
0100 0000 set bit 4 output latch  
1100 0000 reset bit 4 output latch  
0101 0000 set bit 5 output latch  
1101 0000 reset bit 5 output latch  
0110 0000 set bit 6 output latch  
1110 0000 reset bit 6 output latch  
0111 0000 set bit 7 output latch  
1111 0000 reset bit 7 output latch

After power-up or reset the alarm , the short click , auto-  
repeat is enabled, and CAPS LOCK , INS and ALT functions  
normally.

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## IDENTIFICATION CODE:

When host computer request identification , the keyboard answers by sending seven bytes as an identifications code.

Byte 1	0001 1011	ESC
Byte 2	001X XXXX	National version appendix 4
Byte 3	001X XXXX	Keyboard type appendix 4
Byte 4	0010 XXXX	LED's high group 4 - 7 1 = Turned on
Byte 5	0010 XXXX	LED's low group 0 - 3 1 = Turned on
Byte 6	0010 OXXX	INS, ALT, CAPS LOCK 1 = Turned on
Byte 7	0010 0000	Spare byte

## OPTIONS:

-a PROM containing the keyboard processor software, so that a general purpose processor can be used instead of a mask-programmed.

## ENVIRONMENTAL CONDITIONS:

Operating temperature: +5 to +55 degrees C.  
Storage temperature: -40 to +60 degrees C.  
Humidity: 10% to 95% non condensing.

## ALTITUDE:

Operating: -300 m to 2400 m  
Non-operating: -300 m to 3600 m

## VIBRATION (along each of 3 orthogonal axes):

Operating: 0.10 mm double amplitude 5 to 50 Hz; 50 50 to 500 Hz  
Shipping (in original cartons): 10 mm double amplitude 2 to 10 Hz  
50 10 to 50 Hz

## SHOCK (in either direction along each of 3 orthogonal axes):

Operating: 10 G peak 1/2 sinusoid: 10 mS duration  
Non-operating: 100 G peak 1/2 sinusoid: 10 mS duration

KEYSWITCH RELIABILITY: >100 Million MCBF

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## KEYCODES, Swedish version.

KEY NR.	UNSHIFT HEX	SHIFT HEX	CONTROL HEX	CONTROL -SHIFT HEX	UP/DOWN HEX	CAPS LOCK AFFECTS CODE
1	C0	D0	E0	F0	58	
2	C1	D1	E1	F1	59	
3	C2	D2	E2	F2	5A	
4	C3	D3	E3	F3	5B	
5	C4	D4	E4	F4	5C	
6	C5	D5	E5	F5	5D	
7	C6	D6	E6	F6	5E	
8	C7	D7	E7	F7	5F	
9	C8	D8	E8	F8	68	
10	C9	D9	E9	F9	69	
11	CA	DA	EA	FA	6A	
12	CB	DB	EB	FB	6B	
13	CC	DC	EC	FC	6C	
14	CD	DD	ED	FD	6D	
15	CE	DE	EE	FE	6E	
16	80				6F	
17	81				10	
18	82				13	
19	83				15	
20	1B				16	
21	31	21	31	21	41	
22	32	22	32	22	40	
23	33	23	33	23	39	
24	34	24	34	24	38	
25	35	25	35	25	31	
26	36	26	36	26	30	
27	37	2F	37	2F	29	
28	38	28	38	28	28	
29	39	29	39	29	21	
30	30	3D	30	3D	20	
31	2B	3F	2B	3F	19	
32	60	40	00	00	18	
33	08				14	
34	09				17	
35	84				02	
36	7F				03	
37	37				50	
38	38				51	
39	39				48	
40	1B				49	
41	CTRL key				05	
42	71	51	11	11	42	YES
43	77	57	17	17	43	YES
44	65	45	05	05	3A	YES
45	72	52	12	12	3D	YES
46	74	54	14	14	32	YES
47	79	59	19	19	33	YES
48	75	55	15	15	2A	YES
49	69	49	09	09	2B	YES
50	6F	4F	0F	1F	29	YES

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KEY NR.	KEYCODES, Swedish version.						CAPS LOCK AFFECTS CODE
	UNSHIFT HEX	SHIFT HEX	CONTROL HEX	CONTROL -SHIFT HEX	UP/DOWN HEX		
51	70	50	10	10	23	YES	
52	70	50	10	10	1A	YES	
53	7E	5E	1E	1E	08	YES	
54	0D				12		
55	34				52		
56	35				53		
57	36				4A		
58	2D				4B		
59	CAPS LOCK key						
60	61	41	01	01	44	YES	
61	73	53	13	13	45	YES	
62	64	44	04	04	3C	YES	
63	66	46	06	06	3D	YES	
64	67	47	07	07	34	YES	
65	68	48	08	08	35	YES	
66	6A	4A	0A	0A	2C	YES	
67	6B	4B	0B	0B	2D	YES	
68	6C	4C	0C	0C	24	YES	
69	7C	5C	1C	1C	25	YES	
70	7B	5B	1B	1B	1C	YES	
71	27	2A	27	2A	1D		
72							
73	31				54		
74	32				55		
75	33				4C		
76	0D				4D		
77	SHIFT key						
78	3C	3E	7F	7F	11		
79	7A	5A	1A	1A	46	YES	
80	7B	5B	1B	1B	47	YES	
81	63	43	03	03	3E	YES	
82	76	56	16	16	3F	YES	
83	62	42	02	02	36	YES	
84	6E	4E	0E	1E	37	YES	
85	6D	4D	0D	1D	2E	YES	
86	2C	3B	2C	3B	2F		
87	2E	3A	2E	3A	26		
88	2D	5F	2D	5F	27		
89	SHIFT key						
90	0A				06		
91	30				57		
92	2E				56		
93	89				4F		
94	20				1E		
95	88				1F		
					4E		



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KEY NR.	DIRECTION	UNSHIFT HEX	SHIFT HEX	CONTROL HEX	CONTROL -SHIFT HEX	UP/DOWN HEX
72	Up	A1	B1	A1	B1	60
	Down	A3	B3	A3	B3	61
	Left	AC	BC	AC	BC	62
	Right	A4	B4	A4	B4	63
	Up-Left	AD	BD	AD	BD	64
	Up-Right	A5	B5	A5	B5	65
	Down-Left	AF	BF	AF	BF	66
	Down-Right	A7	B7	A7	B7	67

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MOUSE SUPPORT:

The keyboard decodes pulses from the mouse and keeps track of the position of the Mouse. The following applies to both x- and y- directions. The steps from the mouse are counted by a prescale register. When the scale factor is reached , the value of an increment register is added to / subtracted from the position register. When the mouse goes beyond a limit , the position register stops there until the mouse changes direction. Coding: All registers are 12 bit long. When they are transferred in either direction , they are divided in 2 bytes each with an offset of 20H. Each byte then have a value from 20H to 5FH. High byte is always sent first. Decode jitter must be filtered. Even button status must have an offset of 20H.

Register:	Initial value (hex):
x-position	000
y-position	000
x-min	000
x-max	FFF
y-min	000
y-max	FFF
x-scale	001
y-scale	001
x-increment	001
y-increment	001

Setting registers: (registers are given high byte first)

Position:

0011 1001, x-pos hi, x-pos low, y-pos hi, y-pos low (5 bytes)

Scale & increment:

0011 1010, x-scale hi, x-scale low, y-scale hi, y-scale low, x-increment hi, xincrement low, y-increment hi, y-increment low (9 bytes)

Limits:

0011 1011, x-min hi, x-min low, x-max hi, x-max low, y-min hi, y-min low, y-max hi, y-max low (9 bytes)

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## Reading mouse:

There are two ways of reading the Mouse.

- When the byte 0011 1100 is sent to the keyboard , it responds only once with:

1001 0000, x-pos hi, x-pos low, y-pos hi, y-pos low,  
button status (6 bytes)

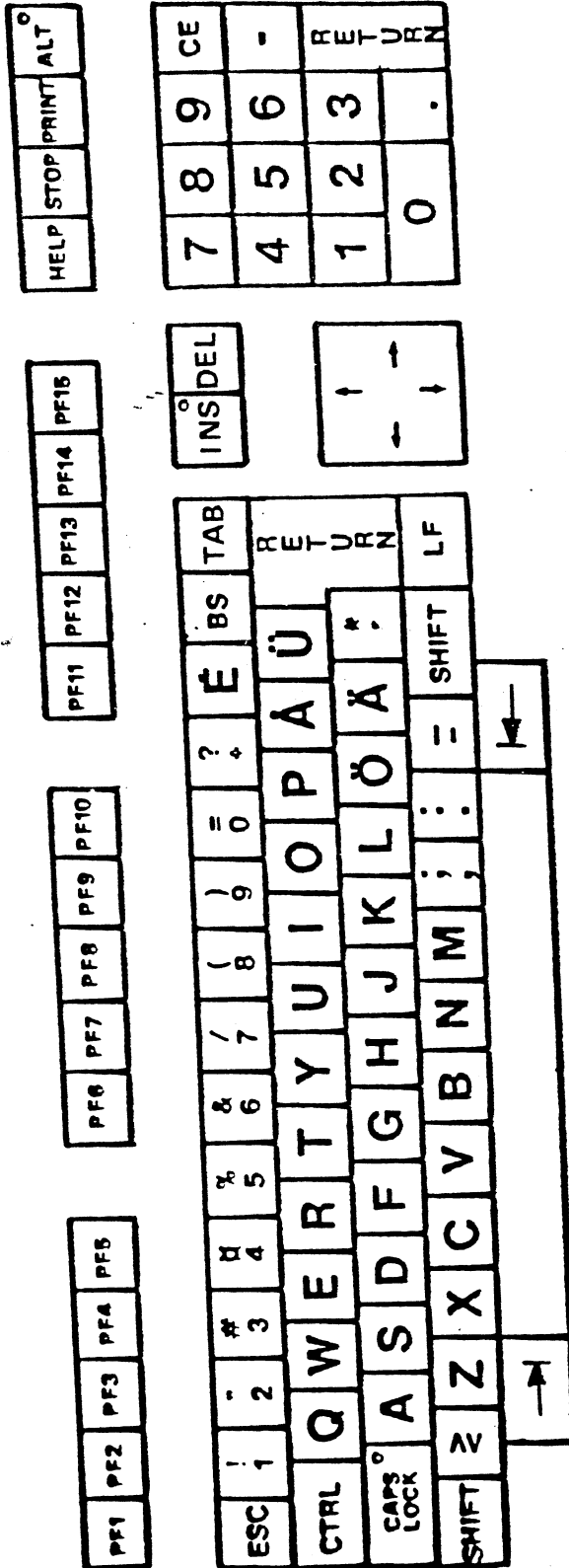
No keyboard key is allowed to break this sequence.

- When the byte 0011 1110 is sent to the keyboard , it responds :

1001 0001, x-pos hi, x-pos low, y-pos hi, y-pos low,  
(5 bytes) and  
1001 0010, button status (2 bytes).

After this first sequence, register contents and button status is sent only when their value is changed. Register contents and button status can be sent separately. After each sequence (6 bytes or 3 bytes) the keyboard is able to send a keycode.

To stop this auto read command, 0011 1111 is sent to the keyboard.



Appendix 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
41	42	43	44	45	46	47	48	49	50	51	52	53	54	72				55	56	57	58
59	60	61	62	63	64	65	66	67	68	69	70	71	73					74	75	76	
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91				92			
93													94								

### APPENDIX 3

Screen-printed legends are as follows. Key numbering refer to Appendix 2.

<u>Key_nr</u>	<u>Legend</u>
23	£
24	\$
32	'@
52	}]
53	~^
69	\
70	{ [

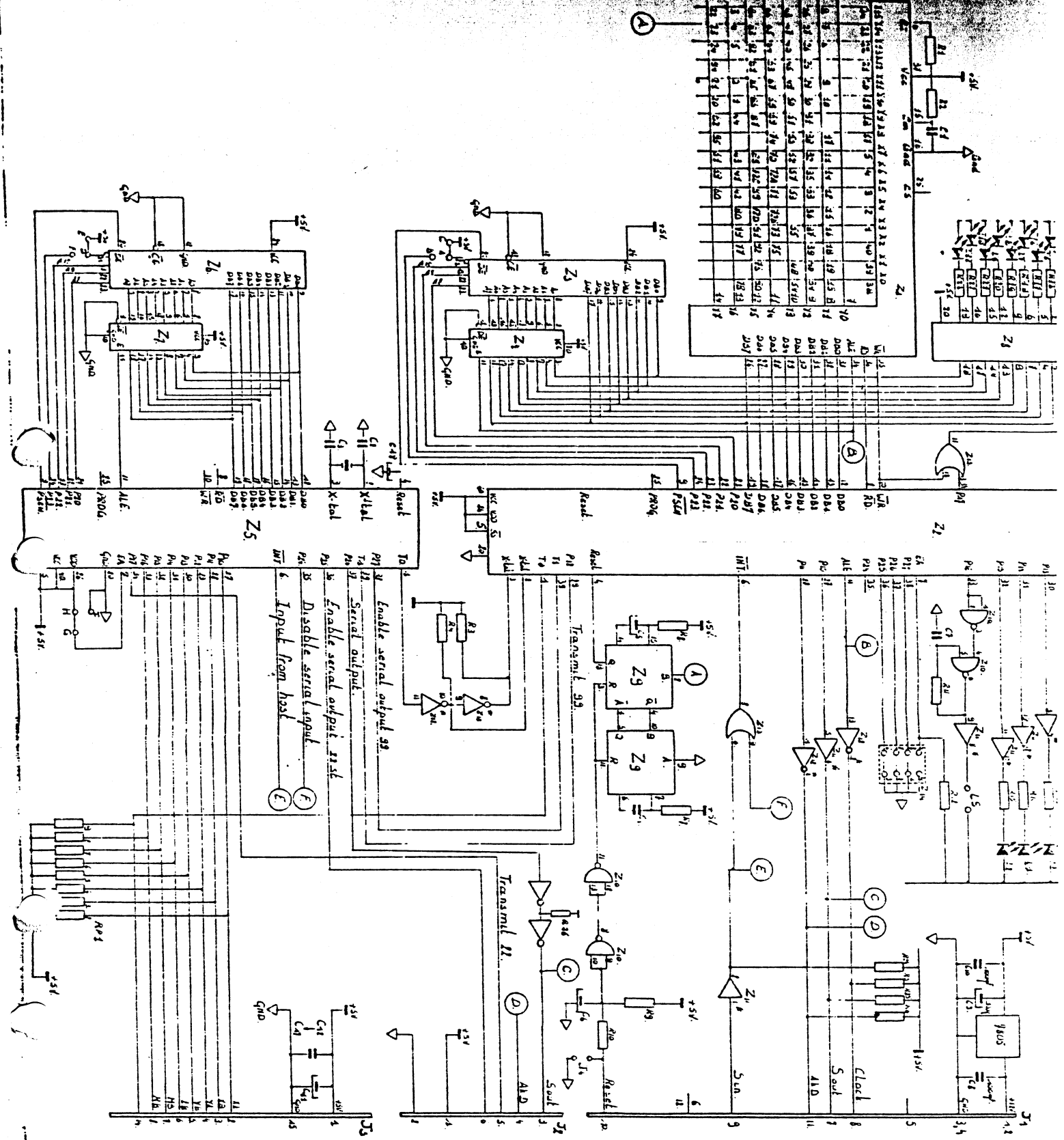
## APPENDIX 4

### Identification code

<u>Byte 2</u>	National version
0010 0001	S
0010 0010	N
0010 0011	DK
0010 0100	USA
0010 0101	GB
0010 0100	ES
0010 0111	FR
0010 1000	D
0010 1001	IS -

<u>Byte 3</u>	Keyboard type
Bit 7654 3210	
001X X001	ABC 55
001X X010	ABC 77
001X X011	ABC 99
	<u>Mode select</u>
001X 1XXX	UP/DOWN-mode
001X 0XXX	Normal mode
	<u>Mouse indicator</u>
0011 XXXX	Mouse connected
0010 XXXX	No mouse



**GENERAL INSTRUMENT**

CAC 5937 A12.

LUXOR

PC.B: 105 45-6-4-2.

Computer Products Division  
C P Clear Instrumentation NV