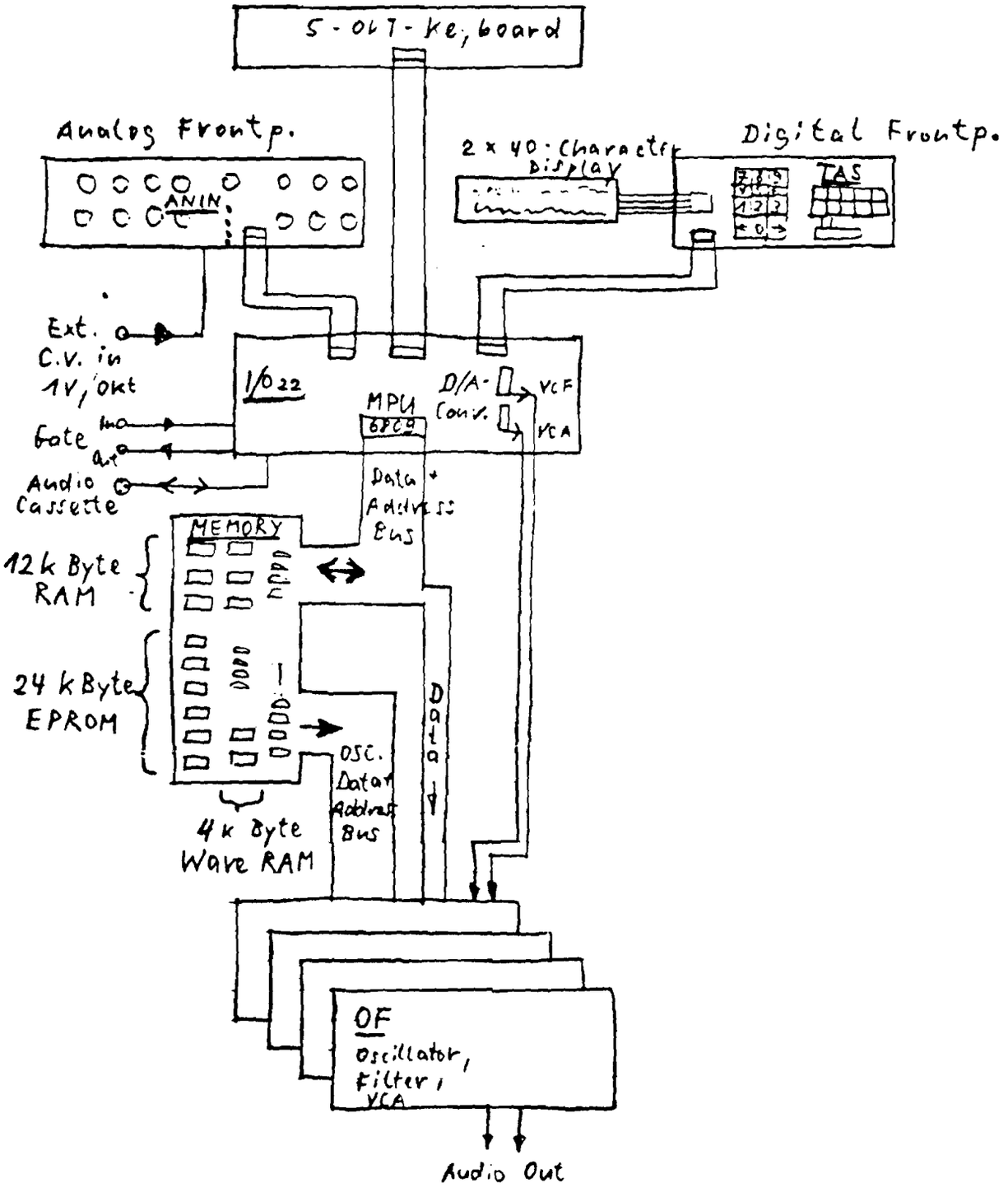
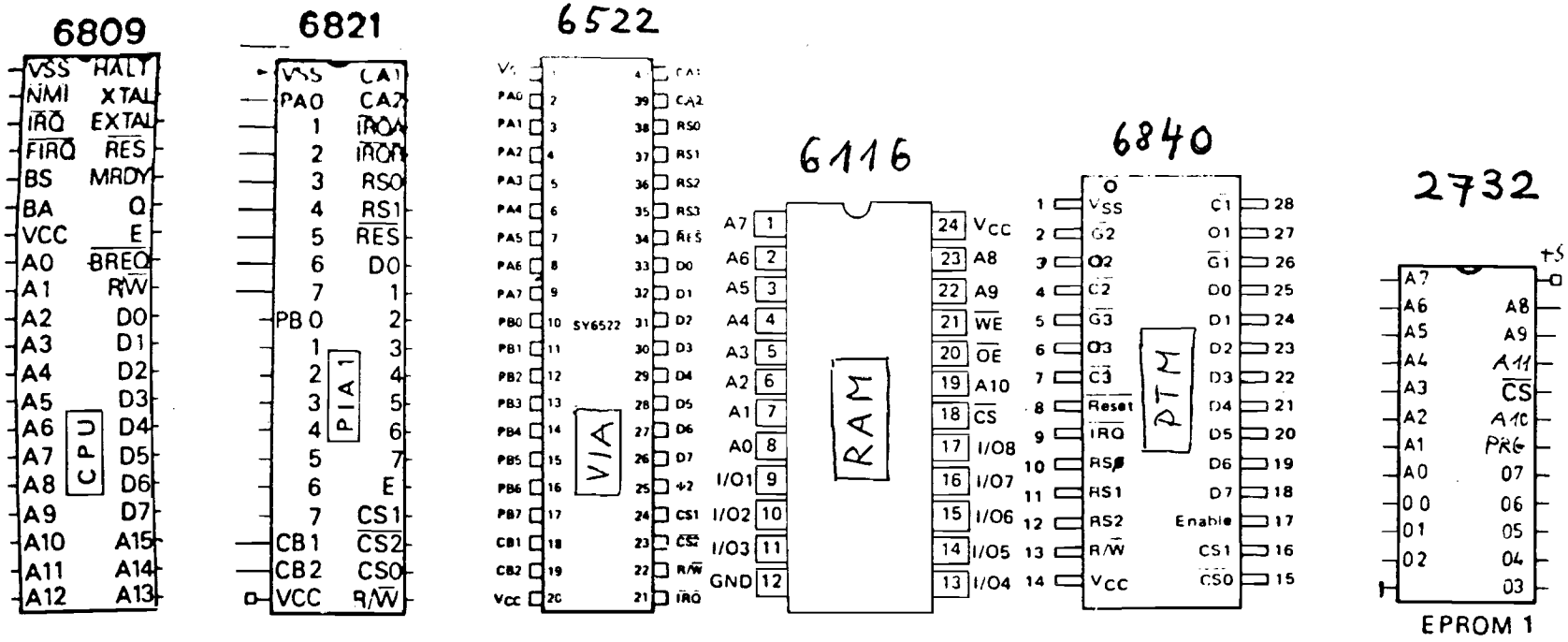
SERVICE - MANUAL

Wave 2 Block-Diagramm

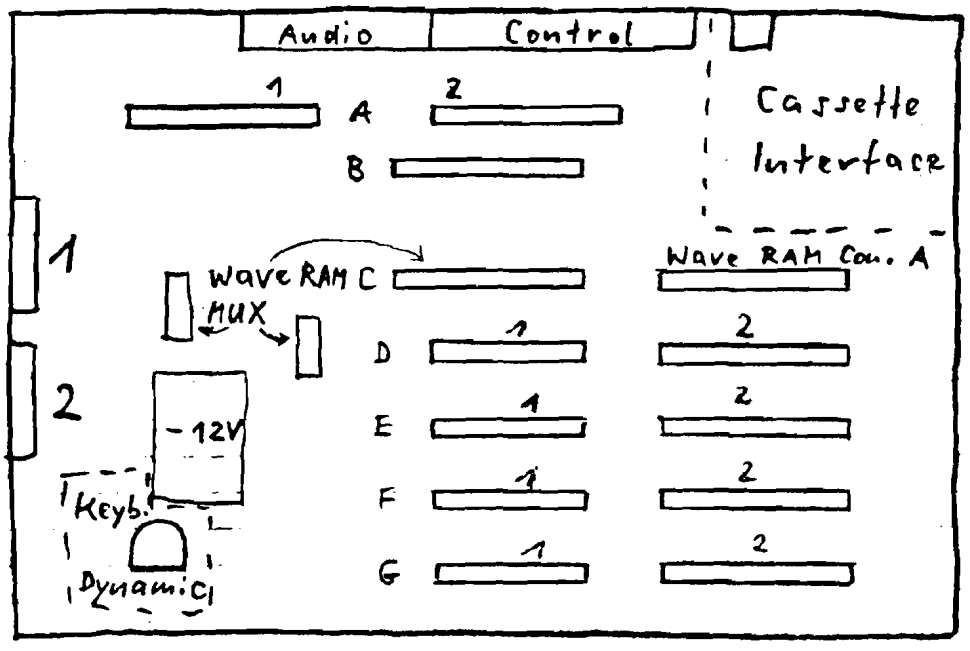
SYNTHESIZER



WAVE 2 Microprocessor Parts



PCB: "MB" Wave 2



A = PCB: "I/O" contains :micro processor, peripheral IC's
D/A Converters

B = test-connector

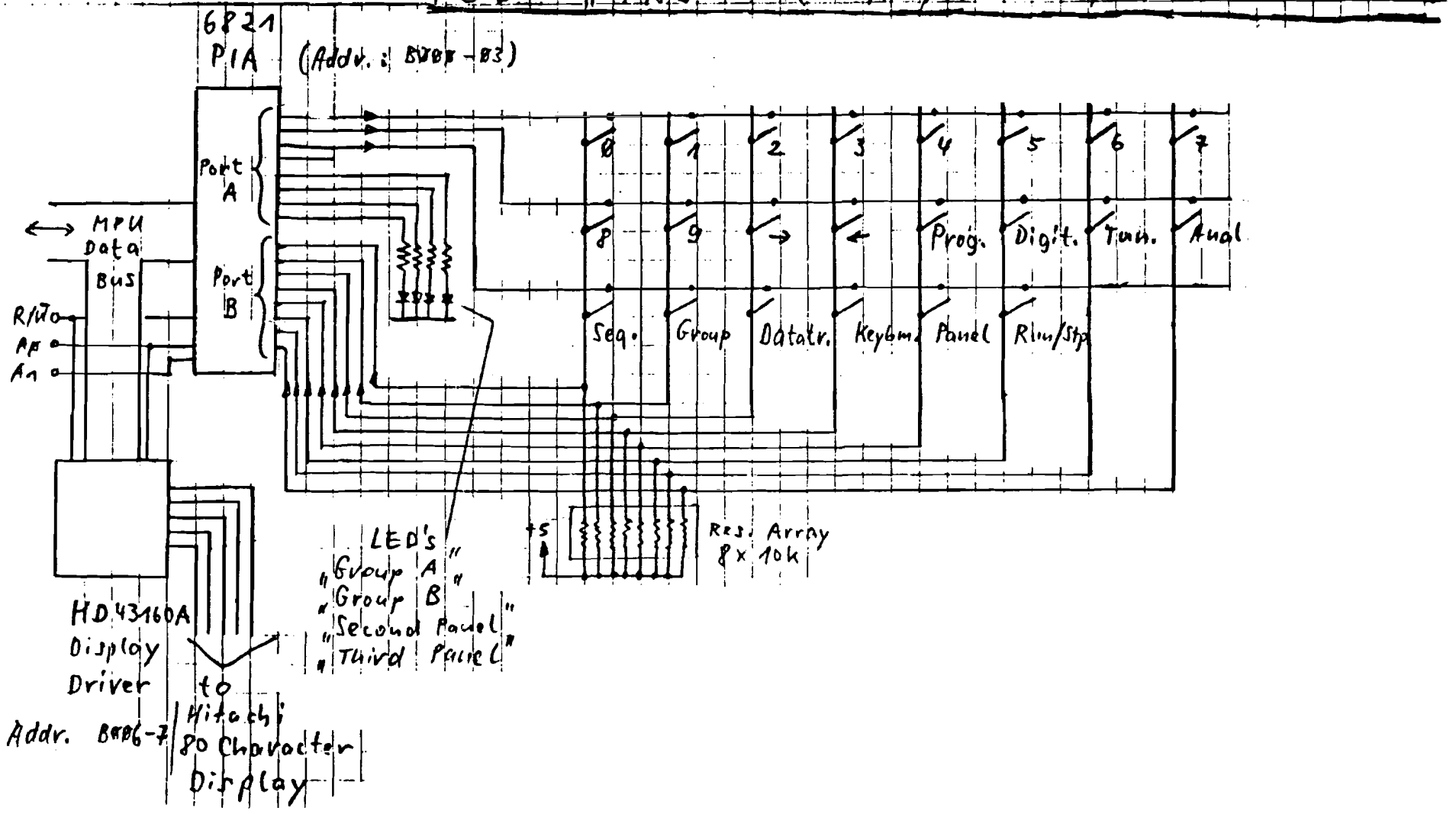
C = PCB: "MEMORY" contains : ROM, RAM Sound-RAM

D,E,F,G = Four identical PCB's: "OF" contains: 2 VCF, 2 VCA
CV-processors

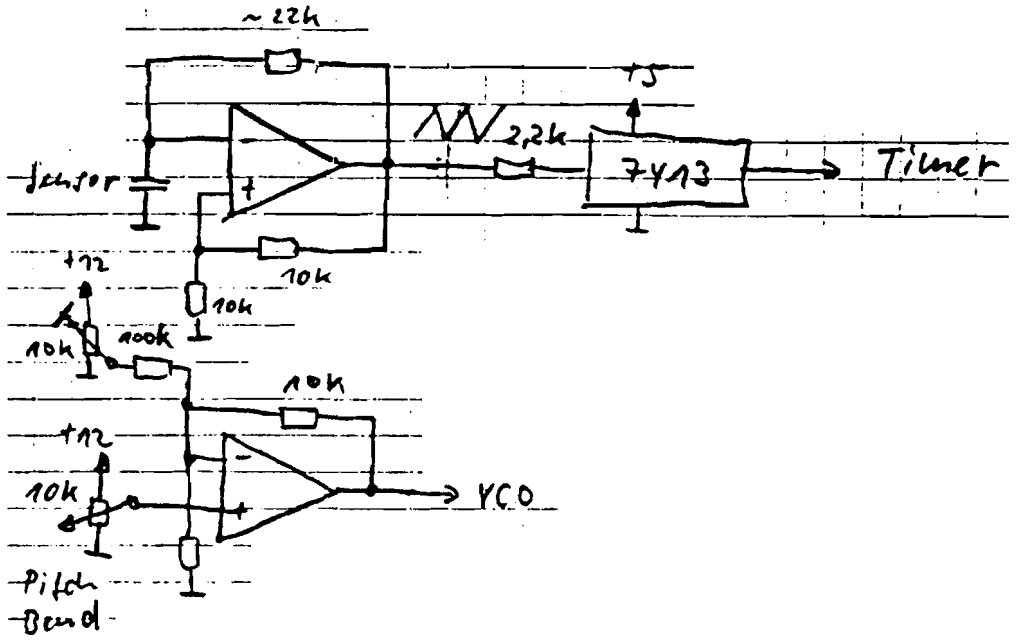
(1)

WAVE 2

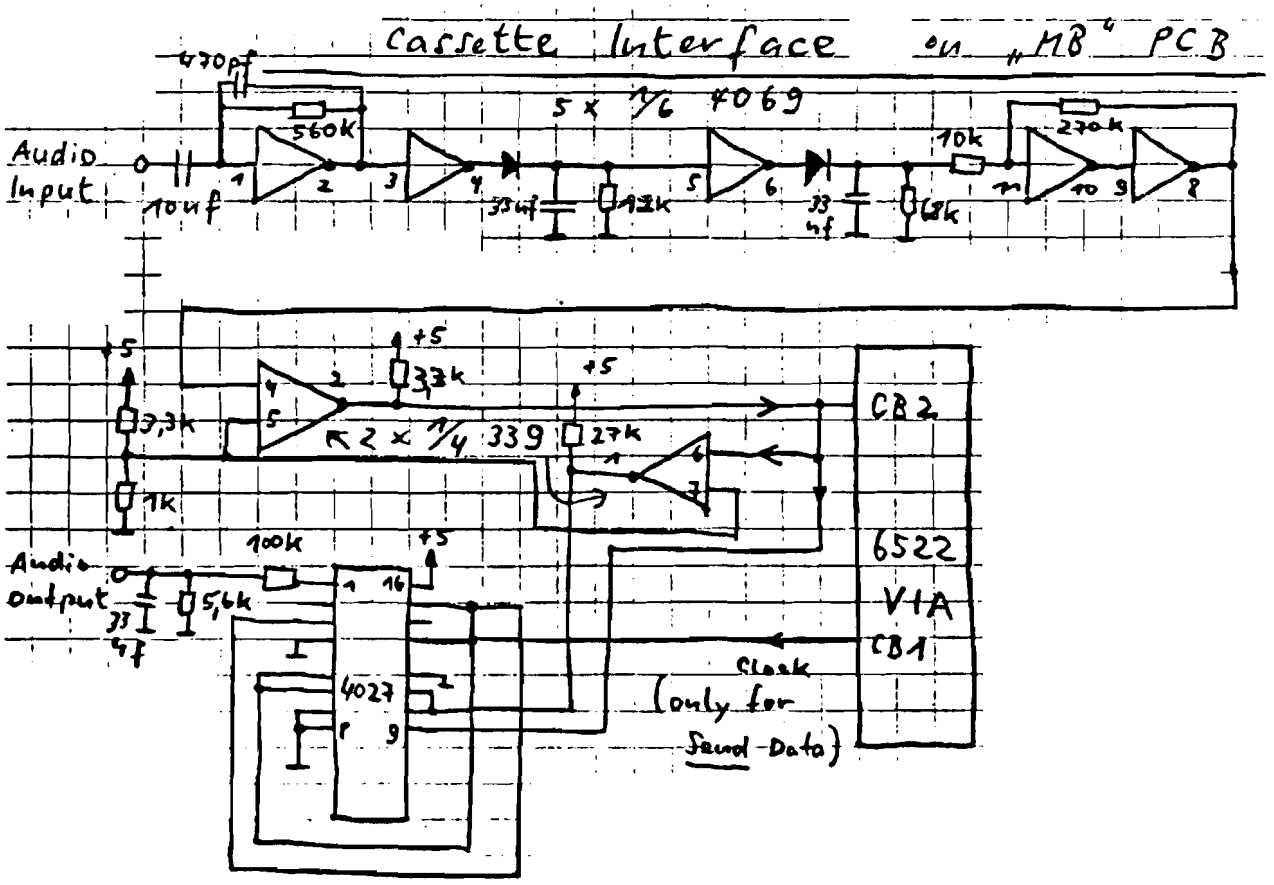
PCB: "TAS" (Display-Driver, Push-Button-driver)



Wave 2 — Keyboard dynamik / Pitch Bend on „MB" PCB

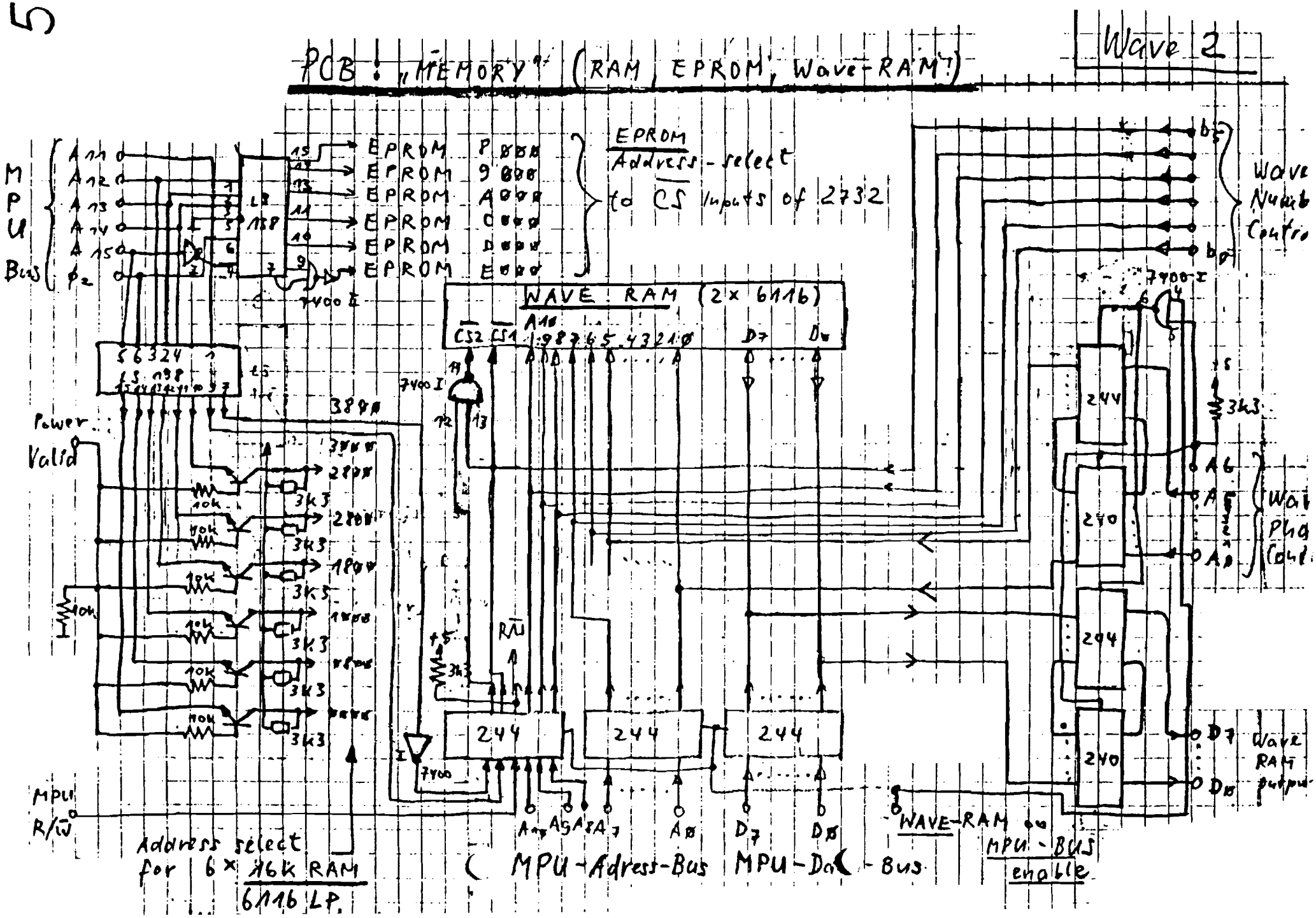


Cassette Interface on „MB" PCB

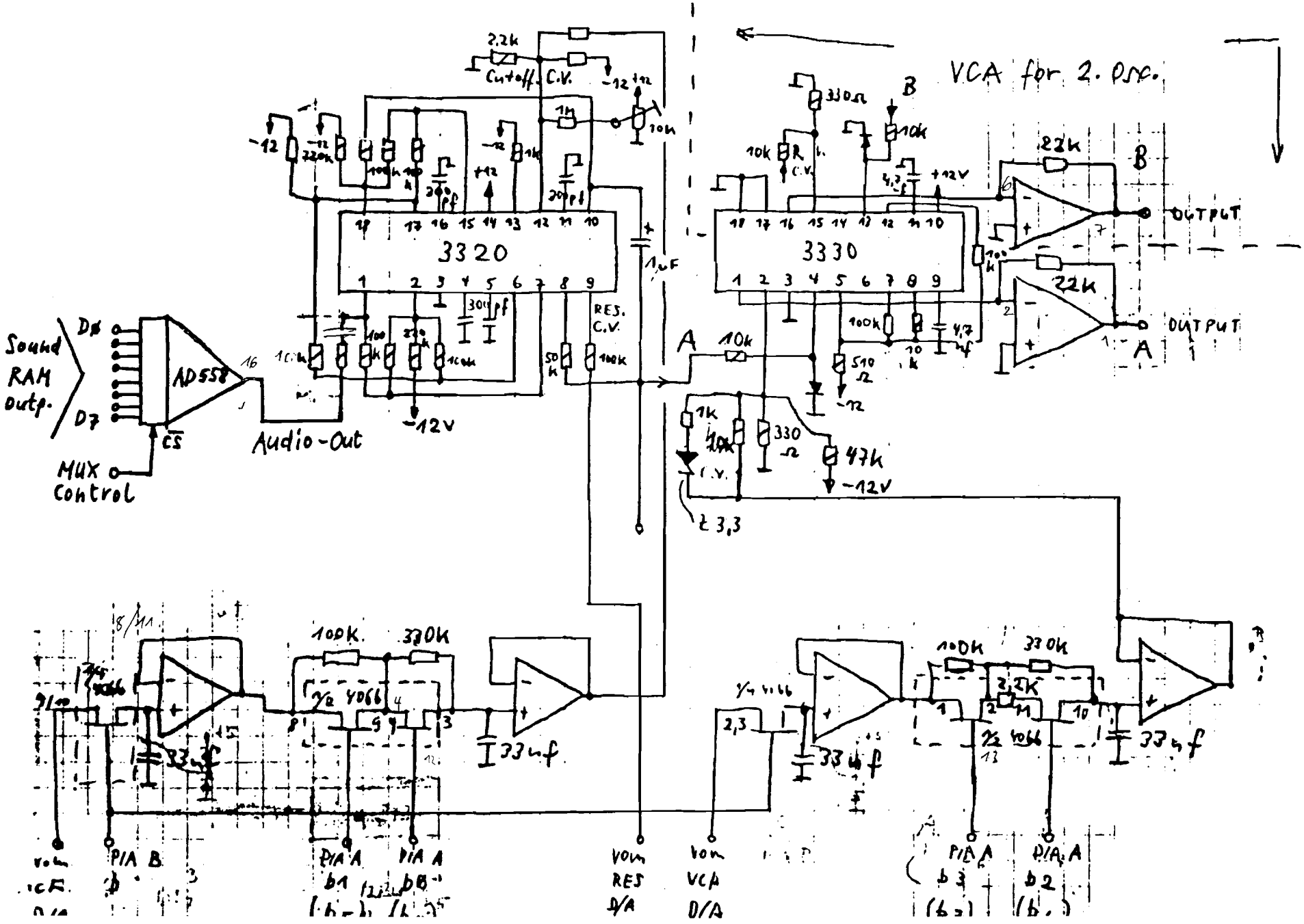


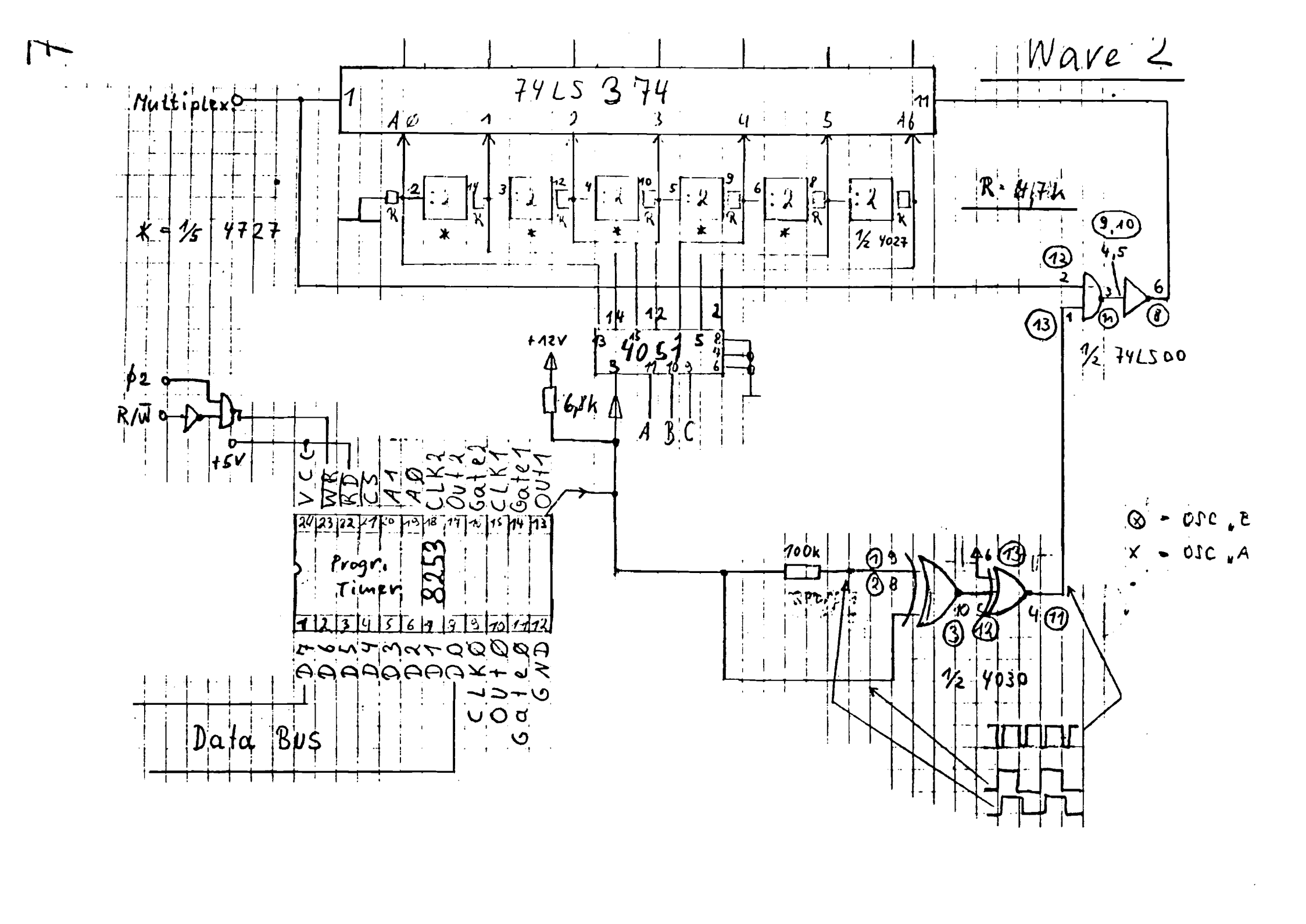
PCB 1 „MEMORY" (RAM, EPROM, Wave-RAM)

Wave 2



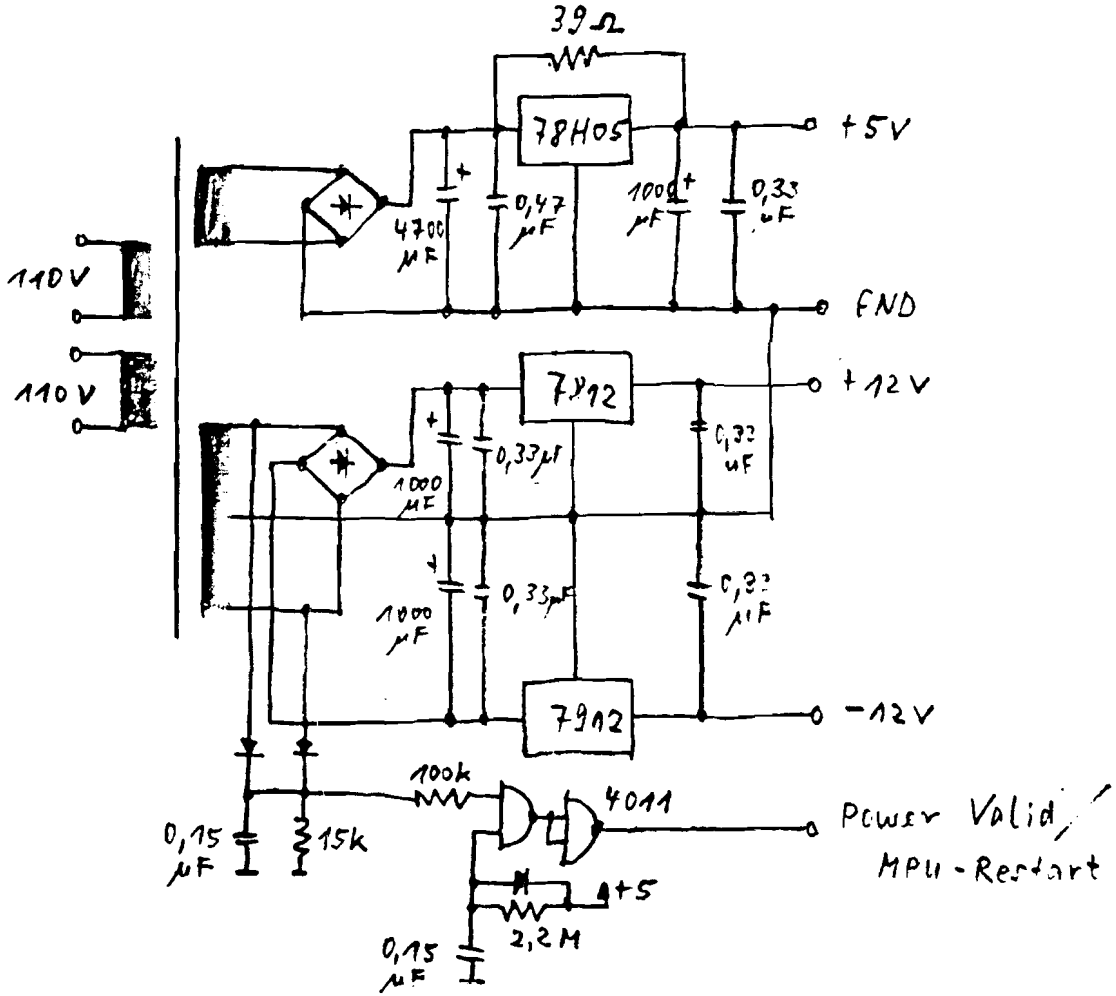
WAVE2 - Generator - Audio




Wave 2
74LS374
Multiplex
* = 1/5 4727
R = 4,7k
1/2 4027
9,10
4,5
1/2 74LS00
4051
+12V
6,8k
A B C
φ2
R/W
+5V
VCC WR RD CS A1 A0 CLK2 Out2 Gate2 CLK1 Gate1 Out1
Progr. Timer 8253
D7 D6 D5 D4 D3 D2 D1 D0 CLK Out Gate GND
Data Bus
100k
1/2 4030
⊗ = OSC „B"
X = OSC „A"

Power Supply

Wave 2



"MB" Connectors :1 and 2 (9 pol. Stocko) WAVE 2

Connect.1: 1: plus 5V
2: GND
3: GND
4: AC for plus/minus 12V
5: AC for plus/minus 12V
6: N.C.
7: CH2 for Volume Poti
8: CH1 for Volume Poti
9: GND for Volume Poti

Connect.2: 1: plus 12V Pitch Bend
2: Schleifer Pitch Bend
3: GND Pitch Bend
4: N.C.
5: minus 5V Display
6: GND Display
7: plus 5V Display
8: KB-Sensor Keyboard-Dynamic
9: GND Keyboard-Dynamic

PCB: "I/O" Connector A2 Wave 2

Connector A2:	1:A0	MPU-Adress-Bus
	2:A1	" "
	3:A2	" "
	4:A3	" "
	5:A4	" "
	6:A5	" "
	7:A6	" "
	8:A7	" "
	9:A8	" "
	10:A9	" "
	11:A10	" "
	12:A11	" "
	13:A12	" "
	14:A13	" "
	15:A14	" "
	16:A15	" "
	17:D0	MPU-Data-Bus
	18:D1	" "
	19:D2	" "
	20:D3	" "
	21:D4	" "
	22:D5	" "
	23:D6	" "
	24:D7	" "
	25:FIRQ.	
	26:IRQ	
	27:o2	MPU-System Clock
	28:Reset	
	29:R/W	
	30:plus 5V	
	31:GND	

PCB: "I/O" Connector A1 Wave 2

Connector A1:
1:plus 12V
2:plus 12V
3:GND
4:GND
5:minus 12V
6:minus 12V
7:Address-Preselect
8:Address-Preselect
9:Address-Preselect
10:Cas.Interface Clock-Out
11:Dynamic-Sensor-Frequency
12:Sound-RAM-Control 1
13:Sound-RAM-Control 2
14:Resonance CV A
15:Resonance CV B
16:Pitchbender Voltage
17:VCF D/A Converter Output
18:VCA D/A Converter Output
19:HF Oscillator Output "f0"
20:N.C.
21:N.C.
22:N.C.
23:Extern CV-Input
24:N.C.
25:N.C.
26:GND External Input
27:Cas. Interface Data I/O
28:Trigger-Output
29:Sustain-Switch
30:Extern Trigger-Input
31:GND External Input

PCB "OF" Connectors 2 and 1 WAVE 2

Connect.2 :
1:Osc.fase = Ton-RAM Osc.adress
2:Osc.fase = " "
3:Osc.fase = " "
4:Osc.fase = " "
5:Osc.fase = " "
6:Osc.fase = " "
7:Osc.fase = " "
8:Osc.fase = " "
9:Osc.PWN = " "
10:Osc.PWN = " "
11:Osc.PWN = " "
12:Osc.PWN = " "
13:Osc.PWN = " "
14:Osc.PWN = " "
15:PWN Enable Oscillator B
16:PWN Enable Oscillator A
17:Audio-Output
18:Sound-RAM Data-Outputs
19: " "
20: " "
21: " "
22: " "
23: " "
24: " "
25: " "
26:Audio-Output
27:plus 12V
28:minus 12V
29:Timer-Enable
30:plus 5V
31:GND OV

Connect.1:
1:Resonance A CV
2:Resonance B CV
3:HF-Oscillator output "fO"
4:MPU-Bus A1
5:MPU-Bus A0
6:VCF CV
7:VCA CV
8:Multiplexer Controll B
9:Multiplexer Controll A
10:MPU-Bus D0
11:MPU-Bus D1
12:MPU-Bus D2
13:MPU-Bus D3
14:MPU-Bus D4
15:MPU-Bus D5
16:MPU-Bus D6
17:MPU-Bus D7
18:Timer-Enable
19:MPU-System Clock
20:PIA-Enable
21:MPU-R/W

PCB:"RAM" Connector A WAVE 2

Connector A:
1:A0 Oscillator Phase-Control
2:A1 " " "
3:A2 " " "
4:A3 " " "
5:A4 " " "
6:A5 " " "
7:A6 " " "
8:N.C.
9:W0 Wave-Number-Control
10:W1 " " "
11:W2 " " "
12:W3 " " "
13:W4 " " "
14:W5 " " "
15: N.C.
16: N.C.
17: N.C.
18:D0 Oscillator Waveform Data
19:D1 " " "
20:D2 " " "
21:D3 " " "
22:D4 " " "
23:D5 " " "
24:D6 " " "
25:D7 " " "
26: N.C.
27: Multiplexer Enable/Disable
28: Wave-RAM-Enable/Disable
29: N.C.
30:plus 5V
31:GND

PPG-WAVE 2 Tuning Instructions

Tuning the Oscillators

The PPG-WAVE 2 has totatly digital Soundgenerators which need no tuning. Only the top Oscillator (on the PC-Board: "I/O" which is the processor Board) can be tuned. This can be done by the trimmpot on the left side of the PC-Board. If the range of this trimmer is not big enought, the tuning can be done by adjusting the pitch-wheel. Take care that the programm you use for the tuning process has normal tuning in the tuning display (all voices = 0 in the micro tuning).

Adjusting the filters

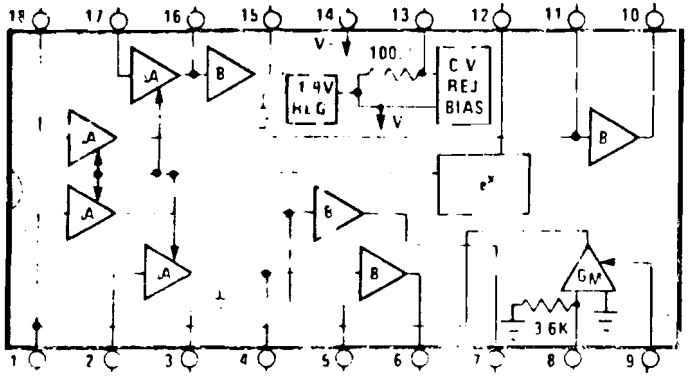
The PPG-WAVE 2 containes eight VCF; one for each voice. The cutoff-frequency can be tuned with the trimmers on the voice-cards (PC-Board: "OF").
For the following tuning process it is required that the WAVE 2 is tuned to A=440 Hz.
Do the tuning process as follows:

1. select programm 20 of the original PPG presets don´t play on the keyboard
2. set the keyboard-mode to 0
3. select the digital display by pressing the knob: "DIGITAL"
4. set the parameter "KF" to 4
5. turn the filter cutoff knob to the 0-position
6. turn the filter envelope attanuator to the 0-position
7. turn the emphasis knob to the full-position
8. press the highest "C-key" on the keyboard and adjust the filter of the first voice so, that the resonance frequency is same as the fundamental frequency of the tone. Do the adjustment with the left trimmer of the voice-card which is near the "MEMORY" PC-Board.
9. Press again the highest "C" key and adjust the filter of the second voice with the trimmer on the right side of the same board.
10. Go on with the same process trough all voices.

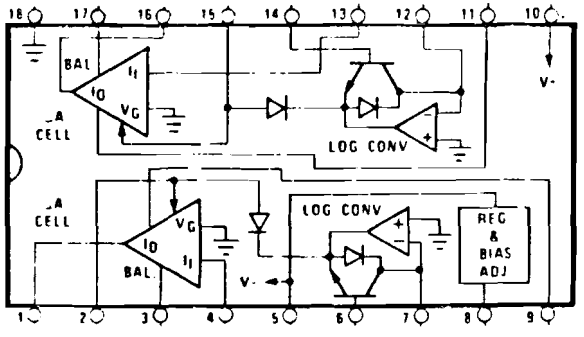
Hamburg, Aug. 1981

14 WAVE 2 Analog I/O

3320 VCF

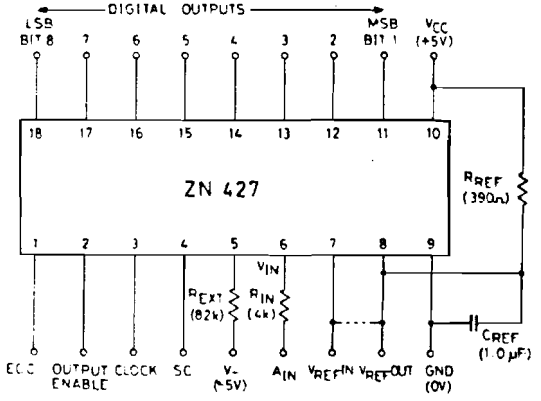


3330 Dual VCA

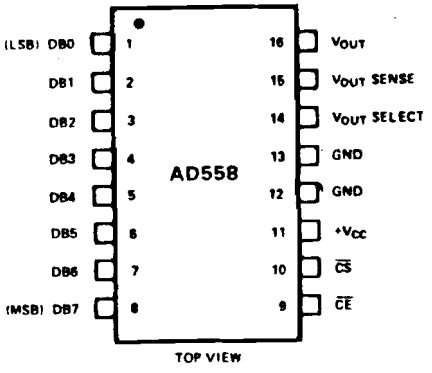


A/D-Converter

ZN427



D/A-Converter + Data Latch



Parts List

PPG SYNTHESIZER

Printed Circuit Board I/O 2/2 (Input/Output)

Modell: Wave 2

Date: 3.3.81

Ref.	schema		Description	Comment
IC		1	SN74LS04	Inverters
IC		2	SN74LS138	Decoder
IC		3	SN74LS42	Decoder
IC		4	MC6809	* Microprocessor (MPU)
IC		5	MC6821	Peripheral Interface (PIA)
IC		6	6522	* " (VIA)
IC		7	MC6840	Programmable Timer (PTM)
IC		8	MC6821	(PIA)
IC		9	MC6821	(PIA)
IC	1	0	ZN427	* A/D - Converter (ADC)
IC	1	1	CD4024	Counter
IC	1	2	MC1458	Dual - Op - Amp
IC	1	3	DAC0807	D/A - Converter (DAC)
IC	1	4	DAC0807	"
IC	1	5	DAC0807	"
IC	1	6	DAC0807	"
IC	1	7	MC1458	Dual - Op - Amp
IC	1	8	SN74LS42	Decoder
IC	1	9	SN74LS221	One - Shot (Tap - Freq. - Osc)
IC	2	0	SN74LS138	Decoder
R1	2	1	8 x 33K	Resistor - Array
R2	2	2	8 x 10K	Resistor - Array
R3	2	3	8 x 10K	Resistor - Array
R4	2	4		Resistor - Array (Vitrohm)
	2	5	Sockel 16 pol	
	2	6	Sockel 16 pol	
	2	7	Sockel 16 pol	
	2	8	Sockel 16 pol	
	2	9	Sockel 18 pol	
	3	0	Sockel 20 pol	
	3	1	Sockel 20 pol	

* gekennzeichnet: Sockel