
Hohner-Service

Schematics

D 200

HOHNER

A WORLD OF MUSIC

SYMPHONY - D 200

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Selftest - Program D200

- 1.) Cancel all presets (Bass, General, Organ, Upper)
- 2.) Place rhythm pattern selector tab in the position for Slow Rock (Upper)
- 3.) Depress Slow Rock 12/8 button
- 4.) At this time no other tab or button should be depressed.
- 5.) Set metronome counter to 198
- 6.) Depress any upper preset button for approximately 10 seconds.
- 7.) To proceed on to the next test the "+" metronome switch should be depressed momentarily.

Note: If there is a fault the letter "E" will appear with a number "xx" in the following spaces.

Test A: Testing Percussion

The LCD display indicates "Rhythm"

The 27 (16) rhythm instruments will play one after the other. Adjust volume with the footswell on the rhythm volume control.

Test B: Filter test

The LCD display indicates "Channel"

You will hear about all 8 channels the same tone one after another. Because the filters are different, you will hear different tones.

It is possible to adjust the sound intensity with the footswell and the corresponding volume controls. Not all channels have volume control. (ex.organ)

Test C: Interrupt test

The LCD display indicates "Interrupt". There are no sounds with this test. The system is checking the 10mS Interrupt and the rhythm interrupt.

Test D: PROM-check

The LCD display indicates "PROM". There are no sounds with this test. The system is checking certain Prom's. At the same time the D/A-Converter on the board "Filter with DAC" is switched on maximum Voltage (5V).

Test E: RAM-check

The LCD display indicates "RAM and MEG". The system is checking 3 RAM IC's and the RAM of the MEG circuit after another.

Test F: MIDI-test

The LCD display indicates "UART". The system is checking the UART-IC on the MIDI Interface.

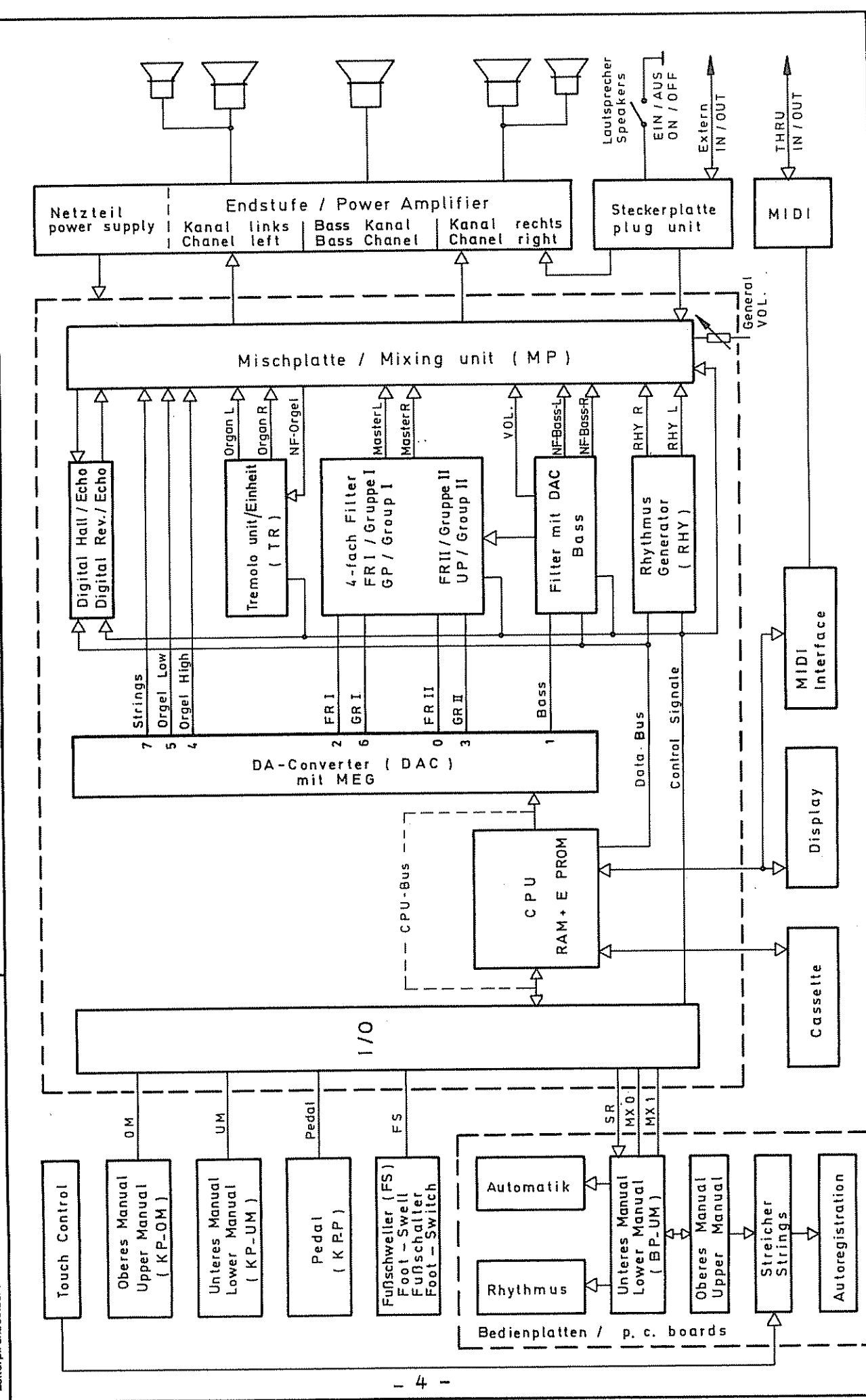
8.) To return to normal organ mode depress the tempo "-" button.

9.) During any of the tests, the voicing controls lights will be turned on and off in a sequential pattern. This allows for a visual check to assure that all control lights operate.

Indication of faults

LCD Display	Fault Number	Description of fault	Defect circuit
	0		PROM 1
	1		PROM 2
PROM	2	Fault in the check sum on the CPU - board	PROM 3
	3		Prom 4
	4		PROM 5
	5		PROM 6
	6)		
)		(
RAM	7)	Fault in the CPU-RAM-Memory	(RAM 2
)		(
	9)		(RAM 3
MEG	15	Fault in the MEG-RAM	MEG
INTERRUPT	11	Fault in the 10mS Interrupt	
	10	Fault in the rhythm Interrupt	
UART	30	Fault in the MIDI Interface	

Bestell-Nr. **6 - 400.960 - 1001**
 Leiterpl. bestückt:
 Leiterpl. unbestückt:



Änderungen vorbehalten

Tag	Name, Kurz-Ze.	Änd. Mitteilung
Bearb.	Tag	Tag
Geprüft	Name, Kurz-Ze.	

Albert Martz, Stuttgart P. 1530

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Bestell-Nr.

Leiterpl. bestückt: 6-400.450-30

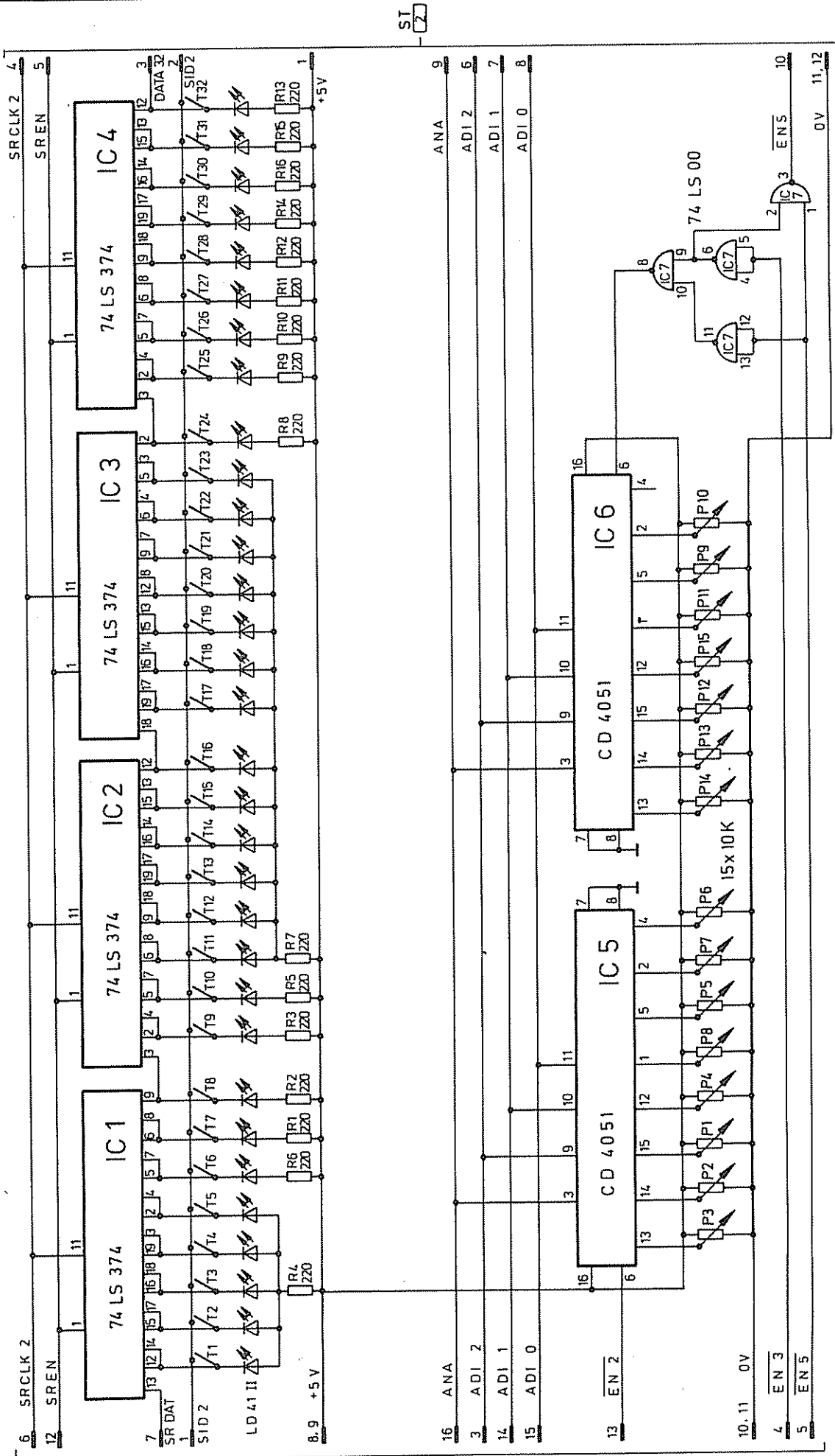
Leiterpl. unbestückt: 6-400.450-3001

Bedienplatte oberes Manual (BP-OM)
p.c. board upper manual

MATTH. HOHNER AG
7218 Trostingen

Benennung:

for Type: SYMPHONIE D 200



ST 1 5 1

ST 2

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Geprüft	Tag	Name, Kurz-Ze.	

Änderungen vorbehalten

Bestell-Nr.

Leiterpl. bestückt: 6 - 400.450 - 30

Leiterpl. unbestückt: 6 - 400.450 - 3001

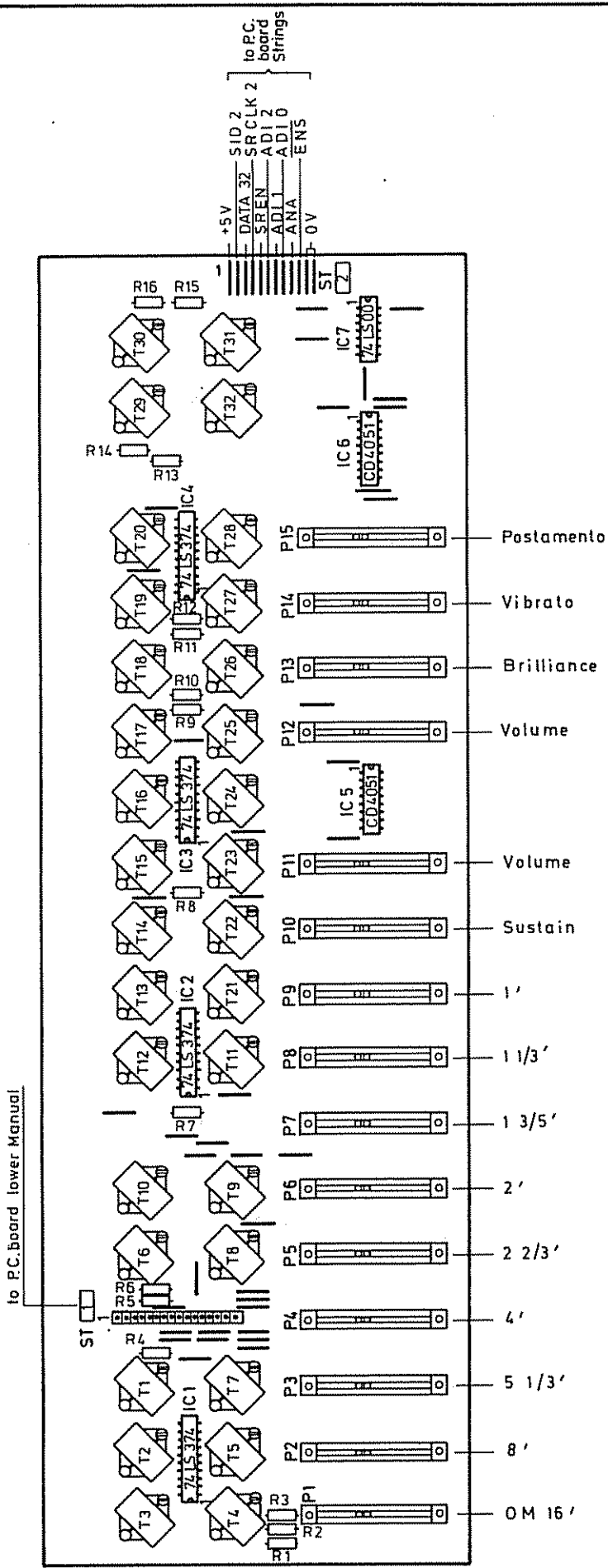
Bedienplatte oberes Manual (BP-OM)

p.c. board upper manual

MATTH. HOHNER AG
7218 Trooslingen

Benennung:

für Type: SYMPHONIE D 200



- T 1 = Theater
- T 2 = Jazz II
- T 3 = Jazz I
- T 4 = Church
- T 5 = Tutti
- T 6 = Perc. 4'
- T 7 = Ensemble
- T 8 = Perc. Loud
- T 9 = Perc. Mono
- T 10 = Perc. 2 2/3'
- T 11 = Wah - Guitar
- T 12 = Trombone
- T 13 = Trumpet
- T 14 = Jazz Flute
- T 15 = Sax
- T 16 = Clarinet
- T 17 = Panflute
- T 18 = Whistle
- T 19 = Singing Voice
- T 20 = Synth
- T 21 = Jazz Guitar
- T 22 = Hawaiian Guitar
- T 23 = Violin
- T 24 = Touch Control
- T 25 = Touch Vibrato
- T 26 = Mono I
- T 27 = Mono II
- T 28 = Parlamento
- T 29 = Hohnerchord Fluten
- T 30 = Upper Presets
- T 31 = Duet
- T 32 = Open

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Geprüft			Tag
			Name, Kurz-Ze.

Änderungen vorbehalten

Bestell-Nr.

6-400.450-40

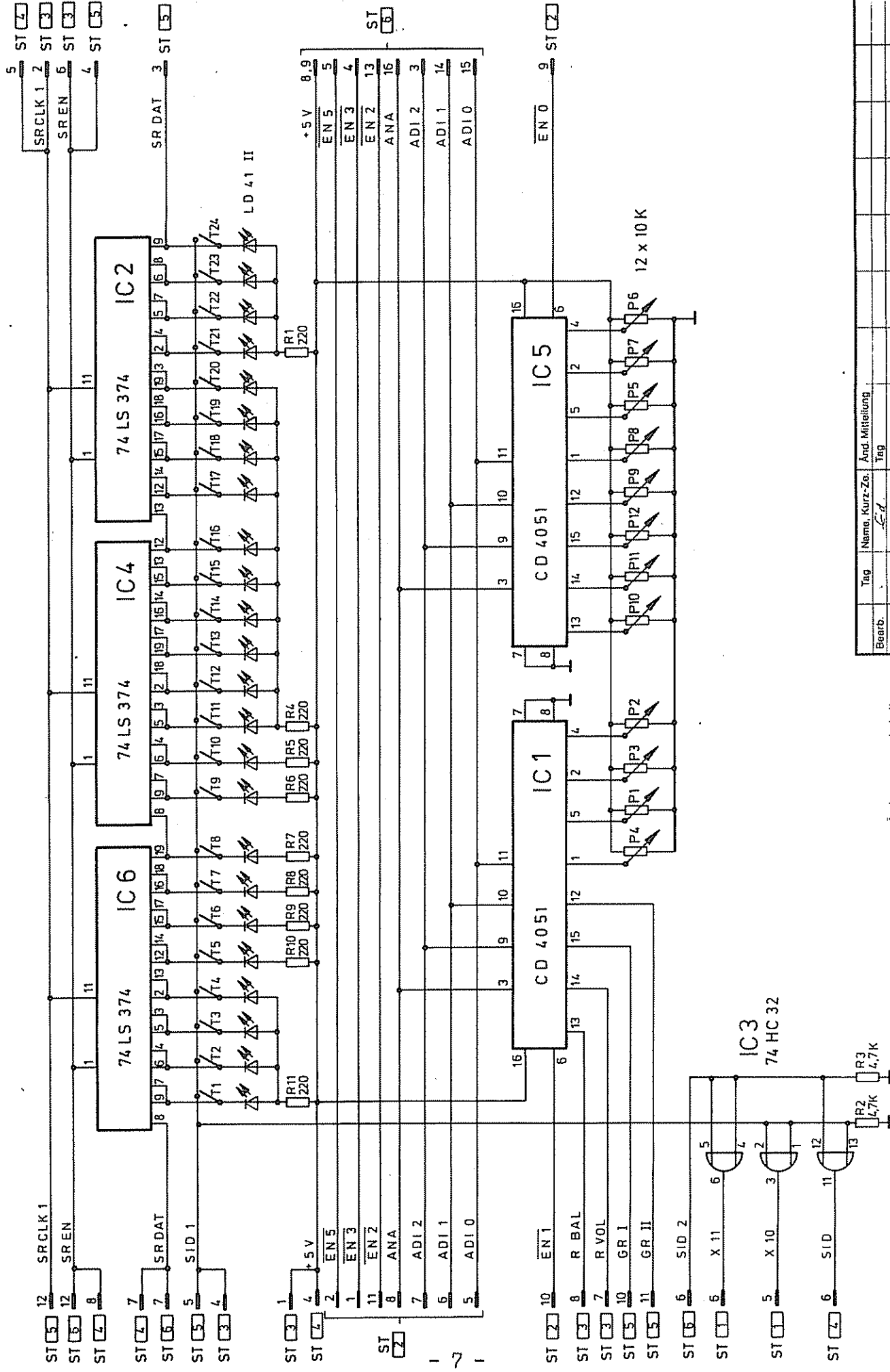
Bedienplatte unteres Manual (BP-UM)
p. c. board lower manual

MATTH. KOHNER AG
7218 Trossingen

Benennung:

for Type: SYMPHONIE D 200

Letterpl. unbestückt: 6-400.450-4001



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Bearb.	Tag	Tag
Geprüft	Name, Kurz-Ze.	

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Bestell-Nr.

6-400.450-40

Leiterpl. bestückt:

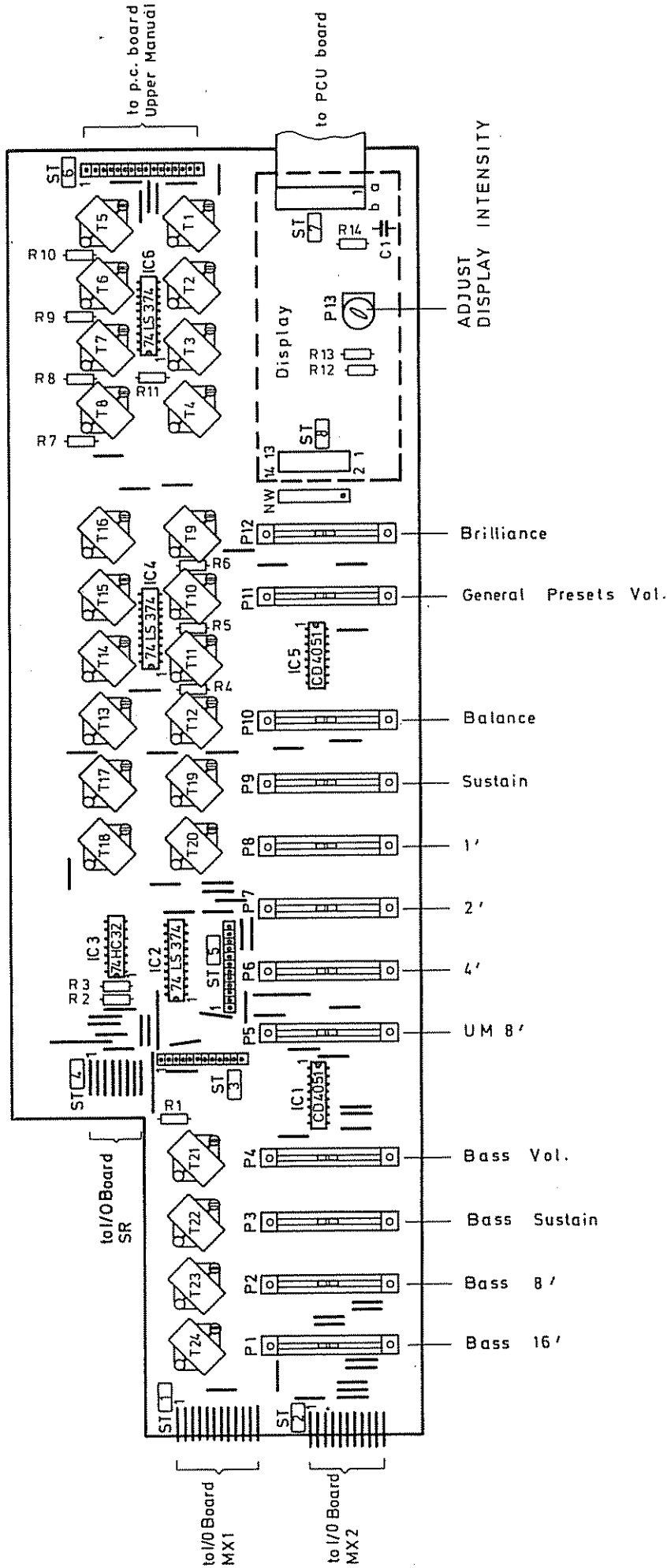
Leiterpl. unbestückt: 6-400.450-4001

Bedienplatte unteres Manual (BP-UM)
p.c. board lower manual

MATTEL HÖRNER AG
7218 Troostungen

Benennung:

für Type: SYMPHONIE D 200



- T1 = Cassette 4
- T2 = Cassette 3
- T3 = Cassette 2
- T4 = Cassette 1
- T5 = Impr. General Pres.
- T6 = Upper Presets
- T7 = Flutes
- T8 = Ensemble
- T9 = to Lower
- T10 = Sustain
- T11 = Brass 8'
- T12 = Brass 16'
- T13 = Honky Tonk
- T14 = Harpsi Chord
- T15 = Clavinet
- T16 = Banjo
- T17 = Electric Piano
- T18 = Piano
- T19 = Accordion
- T20 = Vibes
- T21 = Tuba
- T22 = Synthe Bass
- T23 = Bass Guitar
- T24 = String Bass

- P10 = Balance
- P9 = Sustain
- P8 = 1'
- P7 = 2'
- P6 = 4'
- P5 = UM 8'
- P4 = Bass Vol.
- P3 = Bass Sustain
- P2 = Bass 8'
- P1 = Bass 16'
- P12 = Brilliance
- P11 = General Presets Vol.

ADJUST DISPLAY INTENSITY

Änderungen vorbehalten

Bearb.	Tag	Name, Kurz-Ze.	Änd. Mitteilung
Gepfält	Tag	Name, Kurz-Ze.	Tag

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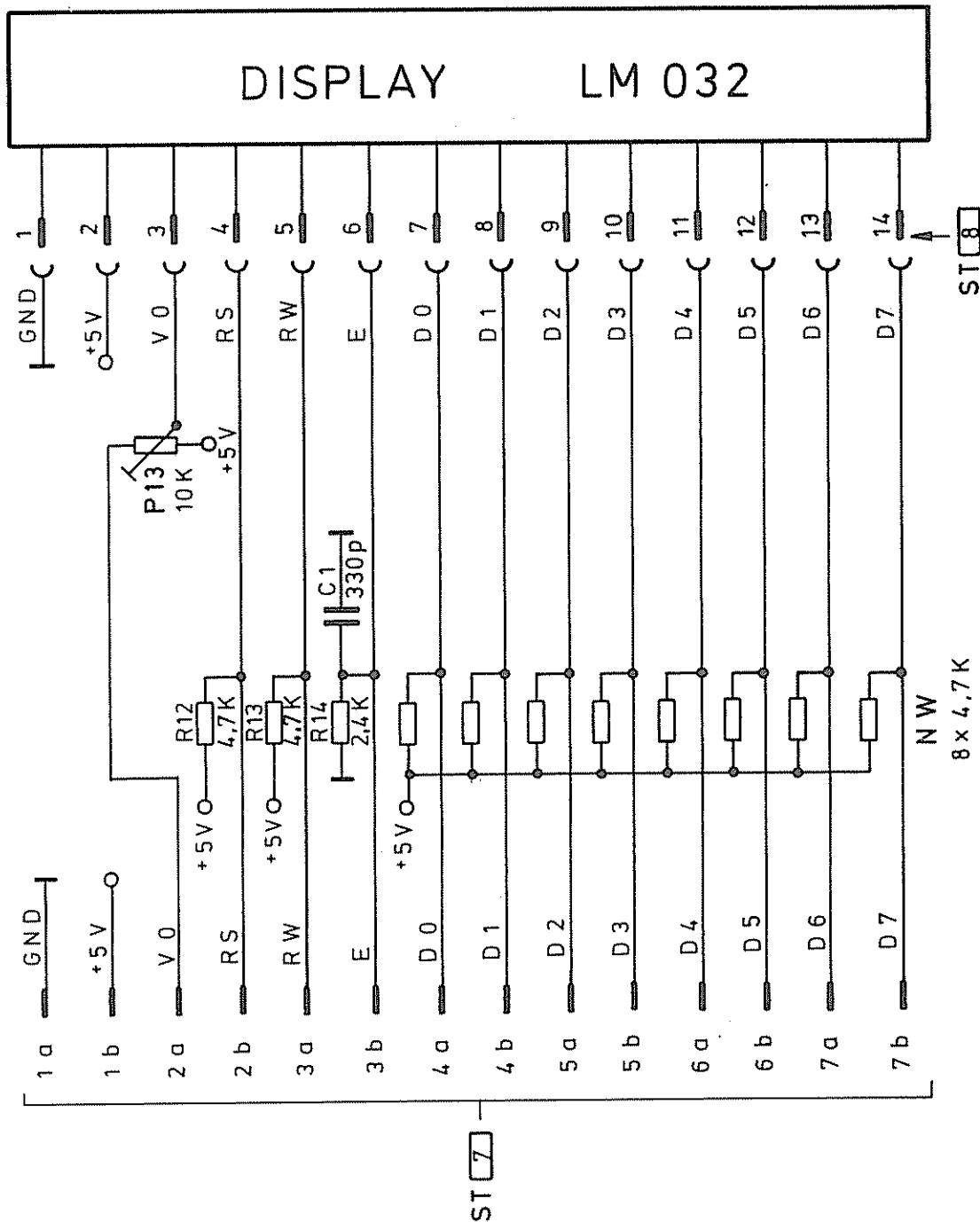
Bedienplatte unteres Manual (BP-UM)
 p.c.board lower manual

für Type: **SYMPHONIE D 200**

Bestell-Nr.

Leiterpl.
 bestückt: **6-400.450-40**

Leiterpl.
 unbestückt: **6-400.450-4001**



Änderungen vorbehalten

	Tag	Name, Kurz-Ze.	Änd. Mitteilung						
Bearb.			Tag						
Geprüft			Name, Kurz-Ze.						

Bestell-Nr.

Letterpl. bestückt: 6-400.450-60

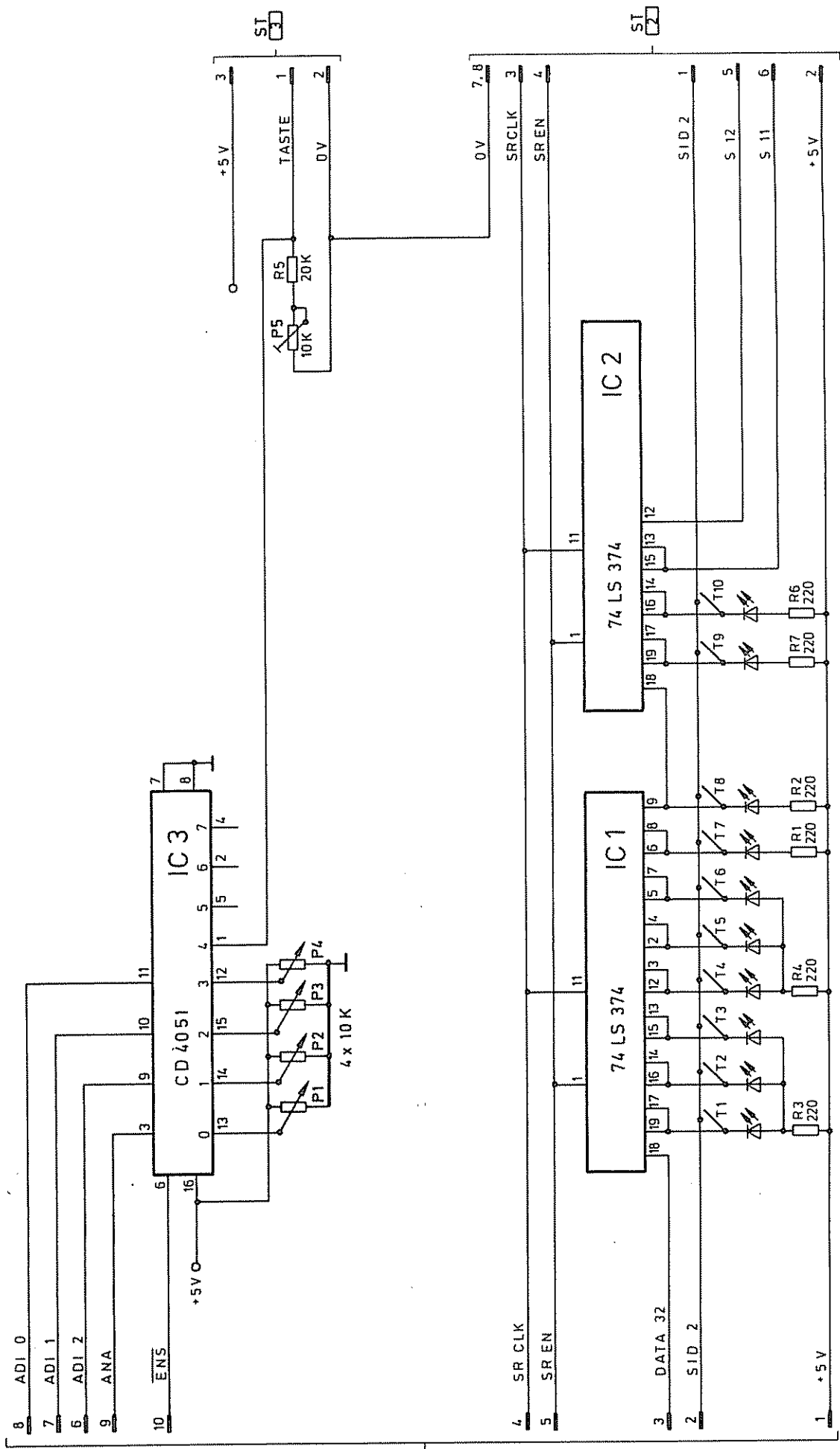
Letterpl. unbestückt: 6-400.450-6001

Bedienplatte Streicher (BP-STR)
p. c. board strings

MATTH. HOHNER AG
7218 Troisvingen

Benennung:

für Type: SYMPHONIE D 200



Bearb.	Tag	Name, Kurz-Ze.	And. Mitteilung
Geprüft	Tag	Name, Kurz-Ze.	

Anderungen vorbehalten

Bestell-Nr.

Leiterpl. bestückt: 6 - 400 450 - 60

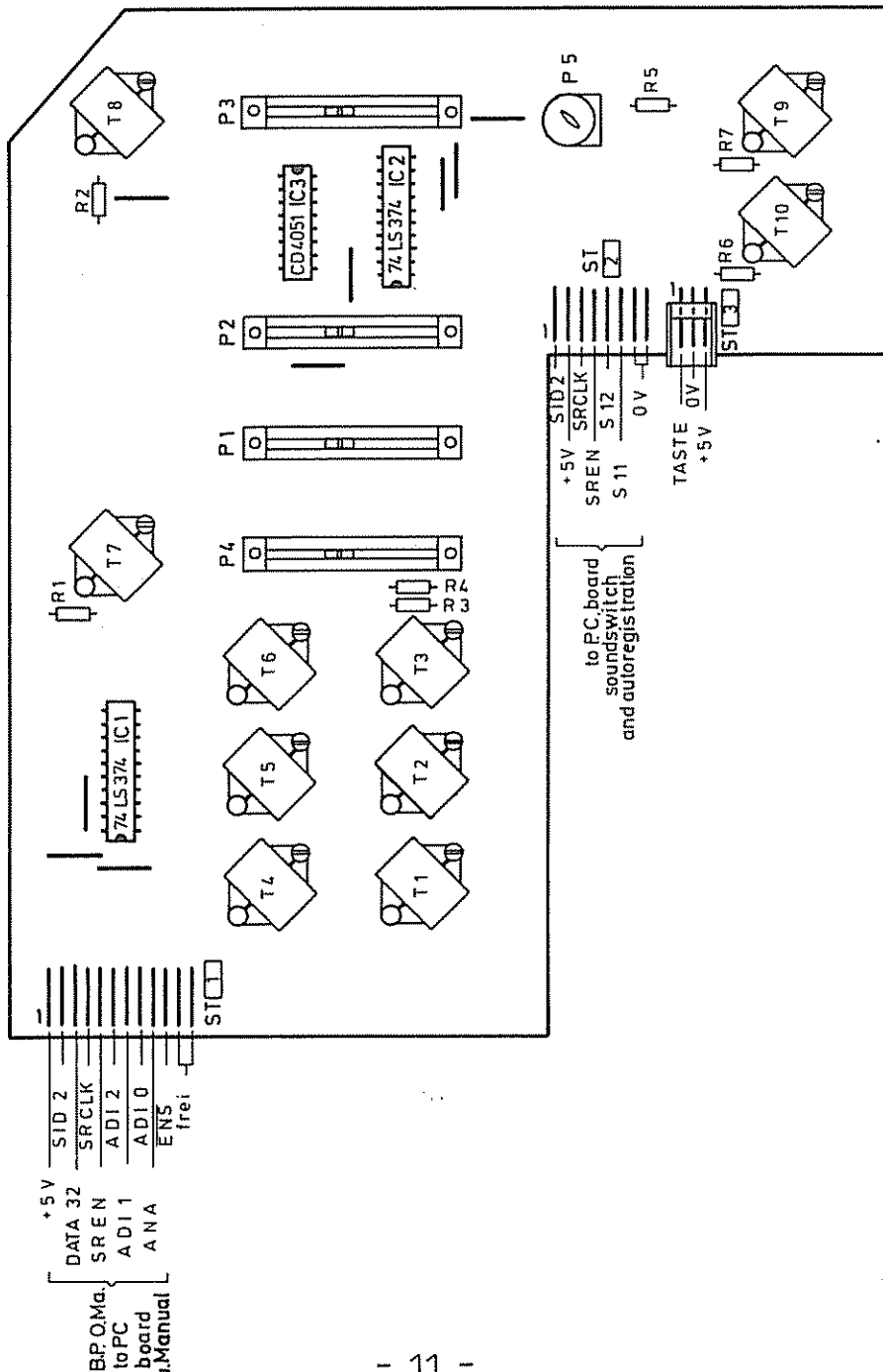
Leiterpl. unbestückt: 6 - 400. 450 - 6001

Bedienplatte Streicher (BP -STR)
p. c. board strings

MATTH. HOHNER AG
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Benennung:

für Type: SYMPHONIE D 200



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	← 'x'	Tag
		Name, Kurz-Ze.

Änderungen vorbehalten

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7218 Trossingen

Benennung:

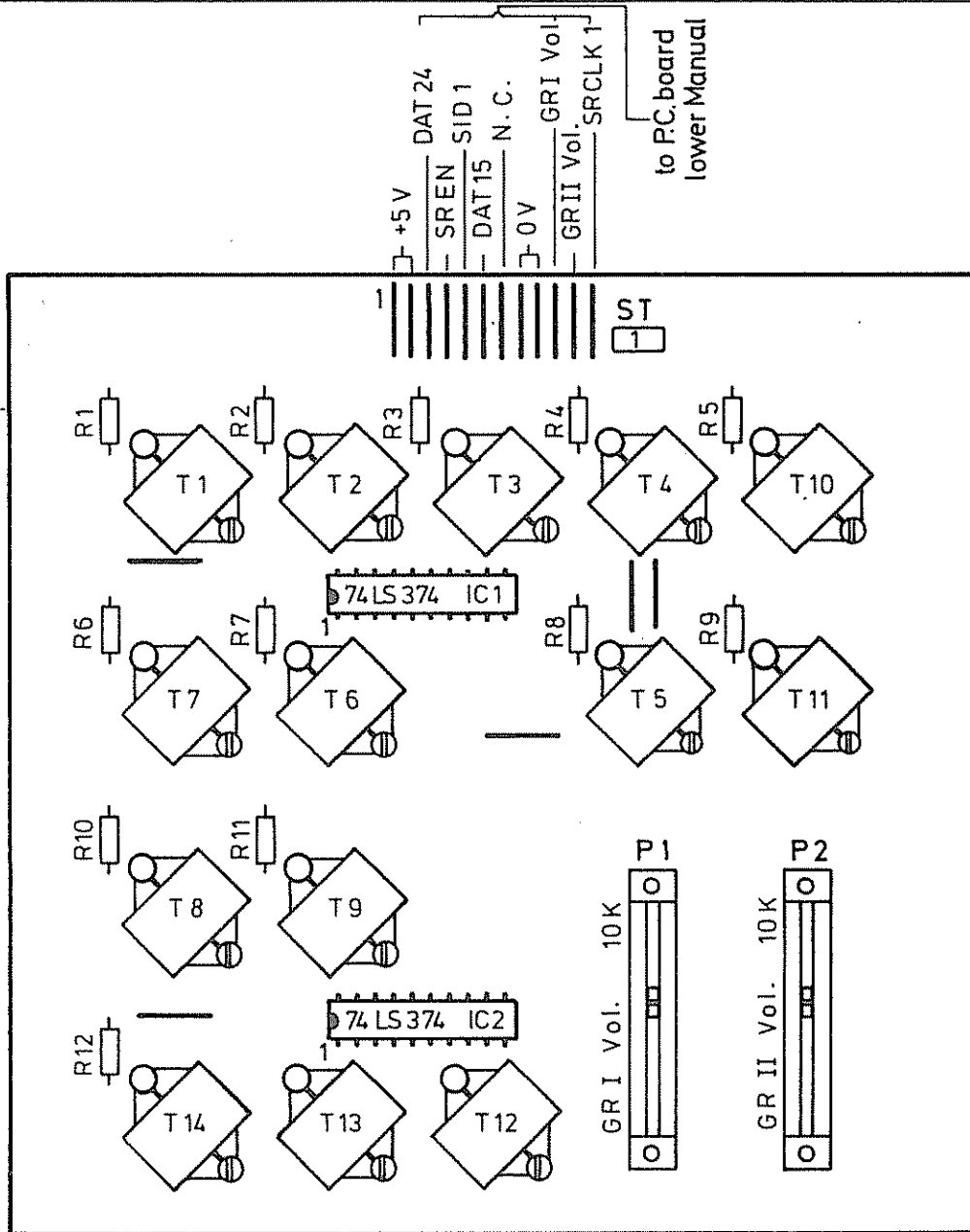
Bedienplatte - Automatik (BP-AUT)
p.c.board automatic

für Type: SYMPHONIE D 200

Bestell-Nr.

Leiterpl. bestückt: 6-400.450 - 20

Leiterpl. unbestückt: 6 - 400.450 - 2001



- | | |
|--------------------|-------------------------------|
| T 1 = One Finger | T 8 = Standard |
| T 2 = Key Start | T 9 = Arrangeur |
| T 3 = L. M. Memory | T 10 = Group I + II Key Start |
| T 4 = Arpeggio | T 11 = Group II |
| T 5 = Group I | T 12 = Break 16 Bar |
| T 6 = Strings | T 13 = Break 8 Bar |
| T 7 = Bass | T 14 = Break 4 Bar |

Änderungen vorbehalten

- 13 -

Tag	Name, Kurz-Ze.	Änd. Mitteilung						
Bearb.	G.d.	Tag						
Geprüft		Name, Kurz-Ze.						

Bestell-Nr.

Leiterpl. bestückt: 6 - 400.450 - 50

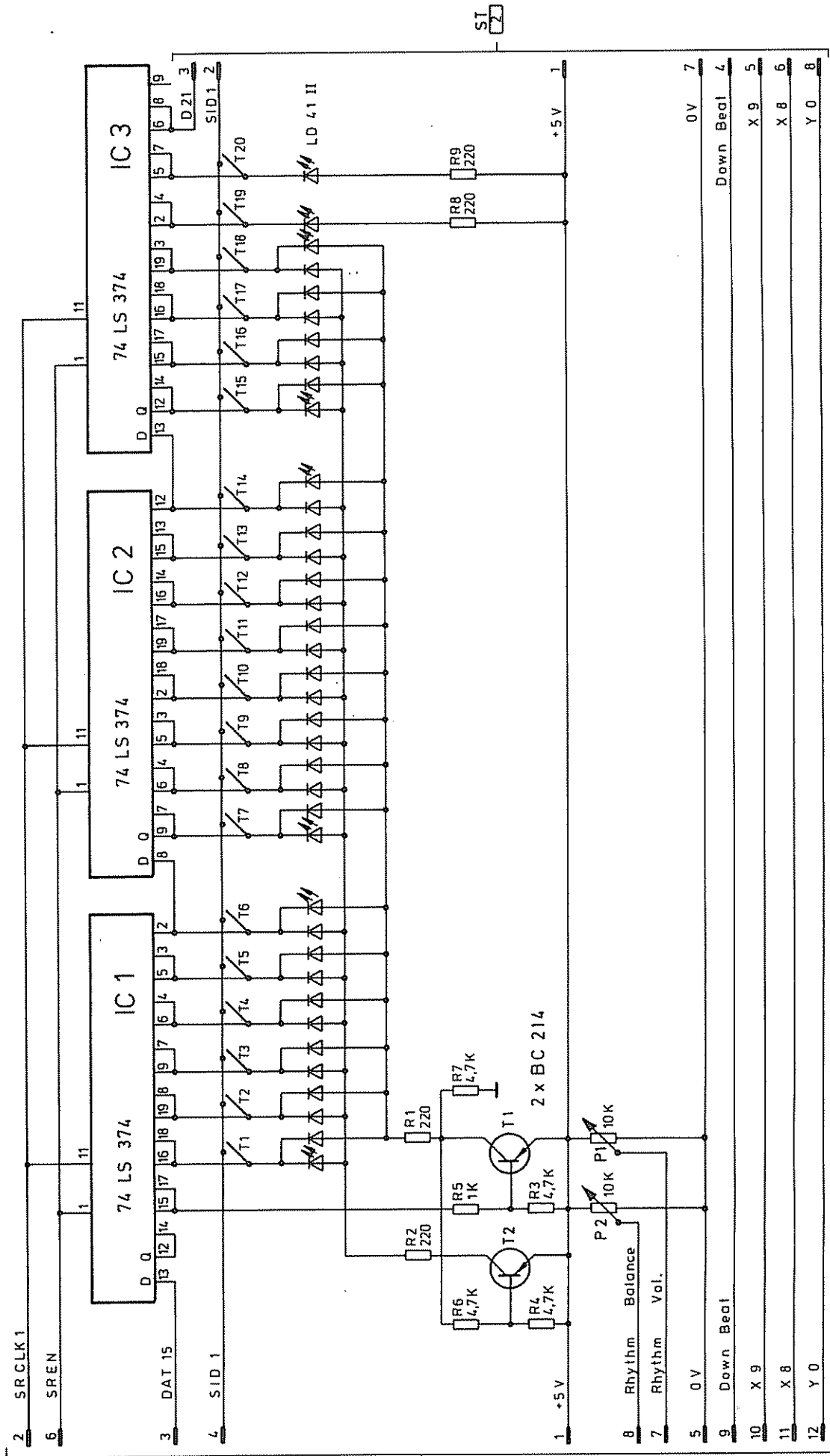
Leiterpl. unbestückt: 6 - 400.450 - 5001

Bedienplatte Rhythmus (BP RH)
p. c. board rhythm

MATH. HÖHNER AG
7218 Trossingen

Benennung:

für Type: SYMPHONIE D 200



Änderungen vorbehalten

Tag	Name, Kurz-Ze.	Änd. Mitteilung
		Tag
		Name, Kurz-Ze.

Down Beal	4
X 9	5
X 8	6
Y 0	8

Bestell-Nr.

Leiterpl. bestückt: 6 - 400.450 - 50

Leiterpl. unbestückt: 6 - 400.450 - 5001

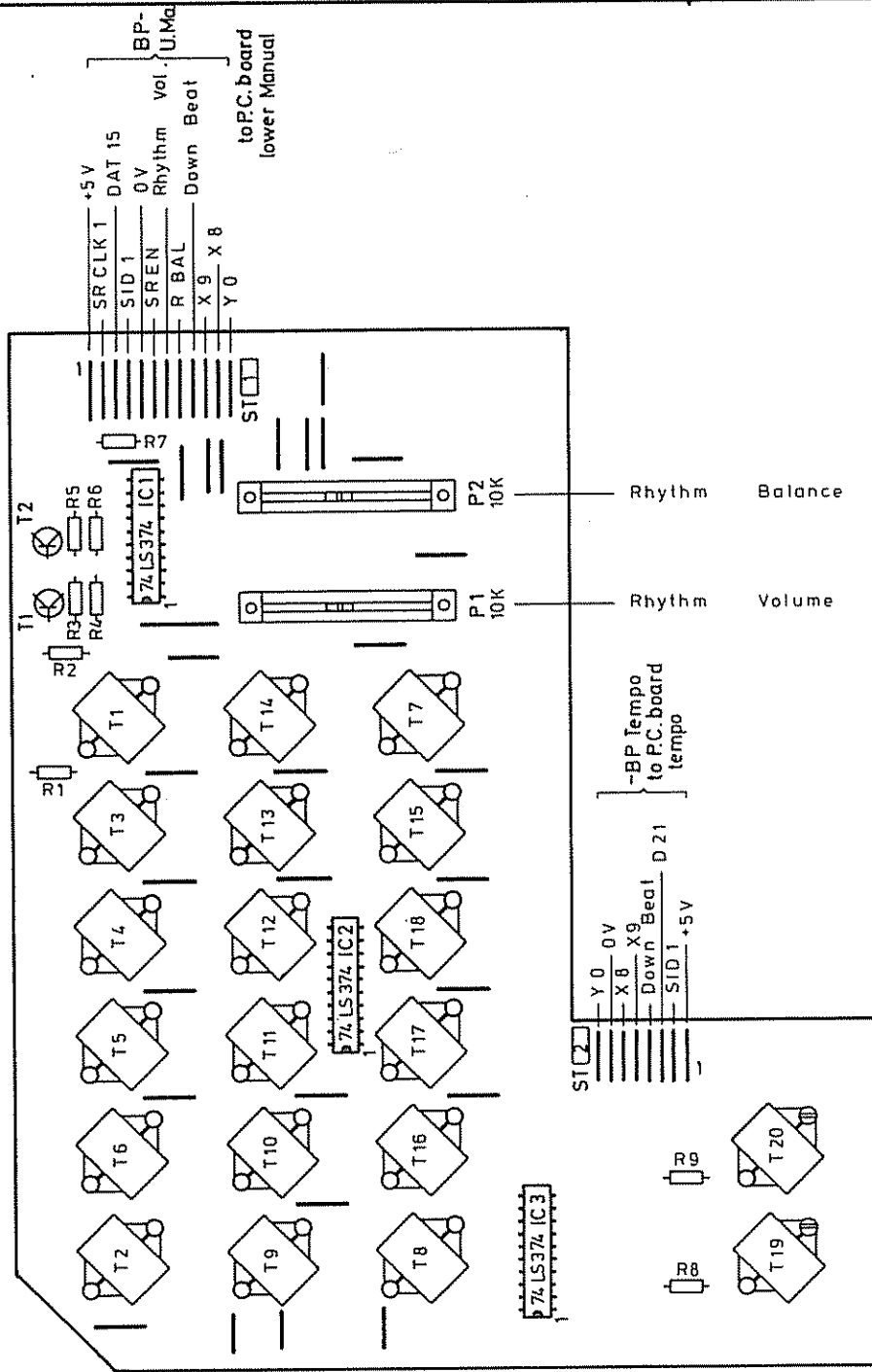
Bedienplatte Rhythmus (BP RH)
p. c. board rhythm.

MATTH. HOMMER AG
7218 Troelangen

Benennung:

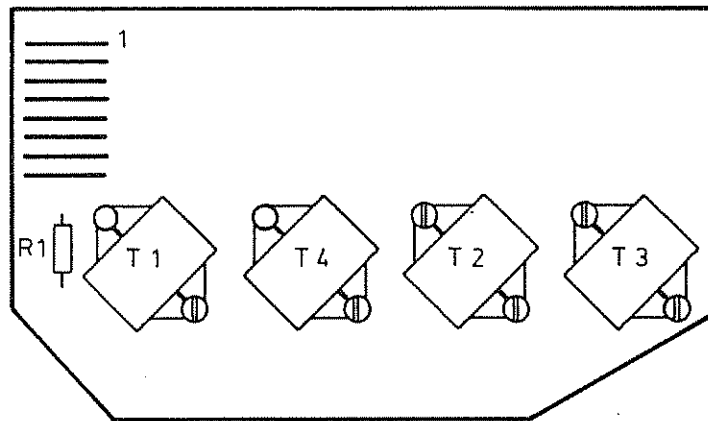
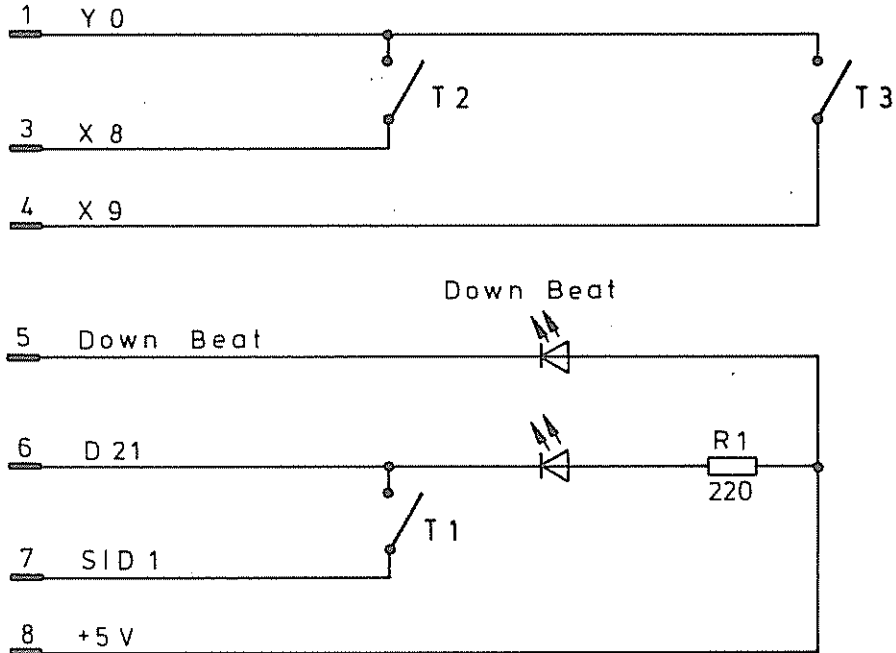
für Type: SYMPHONIE D 200

- T 1 = Dixie / Quick - Step
- T 2 = Samba I / Samba II
- T 3 = Mambo / Reggae
- T 4 = Bossa Nova / Lat. Rock
- T 5 = Tango I / Tango II
- T 6 = Rhumba / Cha Cha
- T 7 = Baroque / Jazz 5/4
- T 8 = Rock 12/8 / Rock 4/4
- T 9 = Swing I / Swing II
- T 10 = Foxtrott I / Foxtrott II
- T 11 = Waltz I / Waltz II
- T 12 = Jazz Waltz / Polka
- T 13 = March 2/4 / March 6/8
- T 14 = Country I / Country
- T 15 = Funk / Ragtime
- T 16 = Disco I / Disco II
- T 17 = Rock I / Rock II
- T 18 = Shuffle / Boogie
- T 19 = Chorus
- T 20 = Tremolo



Änderungen vorbehalten

Bearb. Geprüft	Name, Kurz-Ze. Tag	Änd. Mitteilung Tag



- T 1 = Manual
- T 2 = Tempo (-)
- T 3 = Tempo (+)
- T 4 = Down Beat

Tag	Name, Kurz-Ze.	Änd. Mitteilung							
Bearb.	E.d.	Tag							
Geprüft		Name, Kurz-Ze.							

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Benennung:

Bedienplatte - Klangschalter
p.c. board - Soundswitch

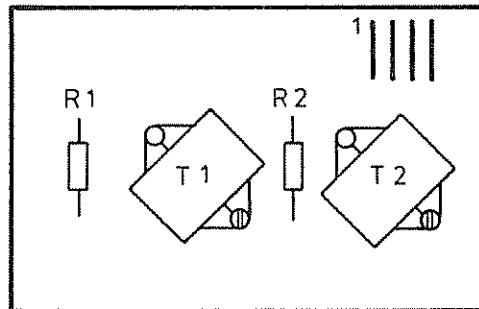
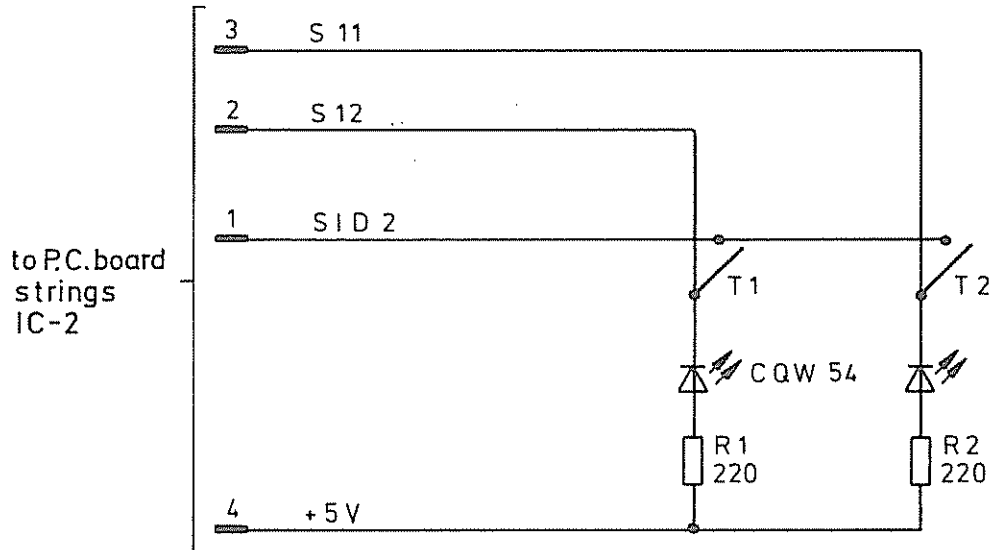
für Type: SYMPHONIE D 200

Bestell-Nr.

Leiterpl.
bestückt: 6-400.450-85

Leiterpl.
unbestückt: 6-400.450-8501

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T 1 = Loudness

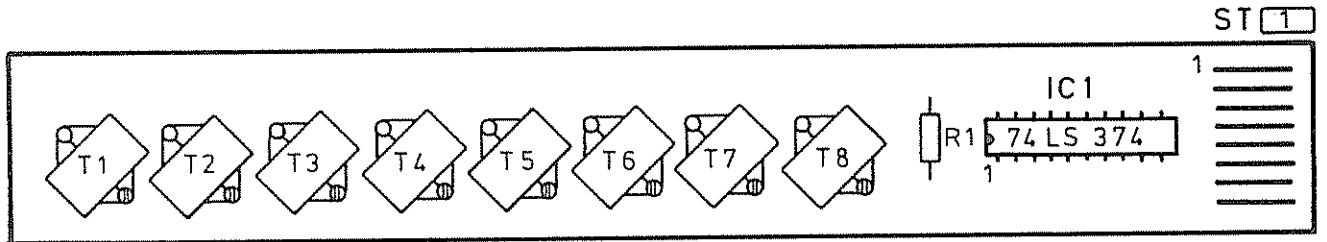
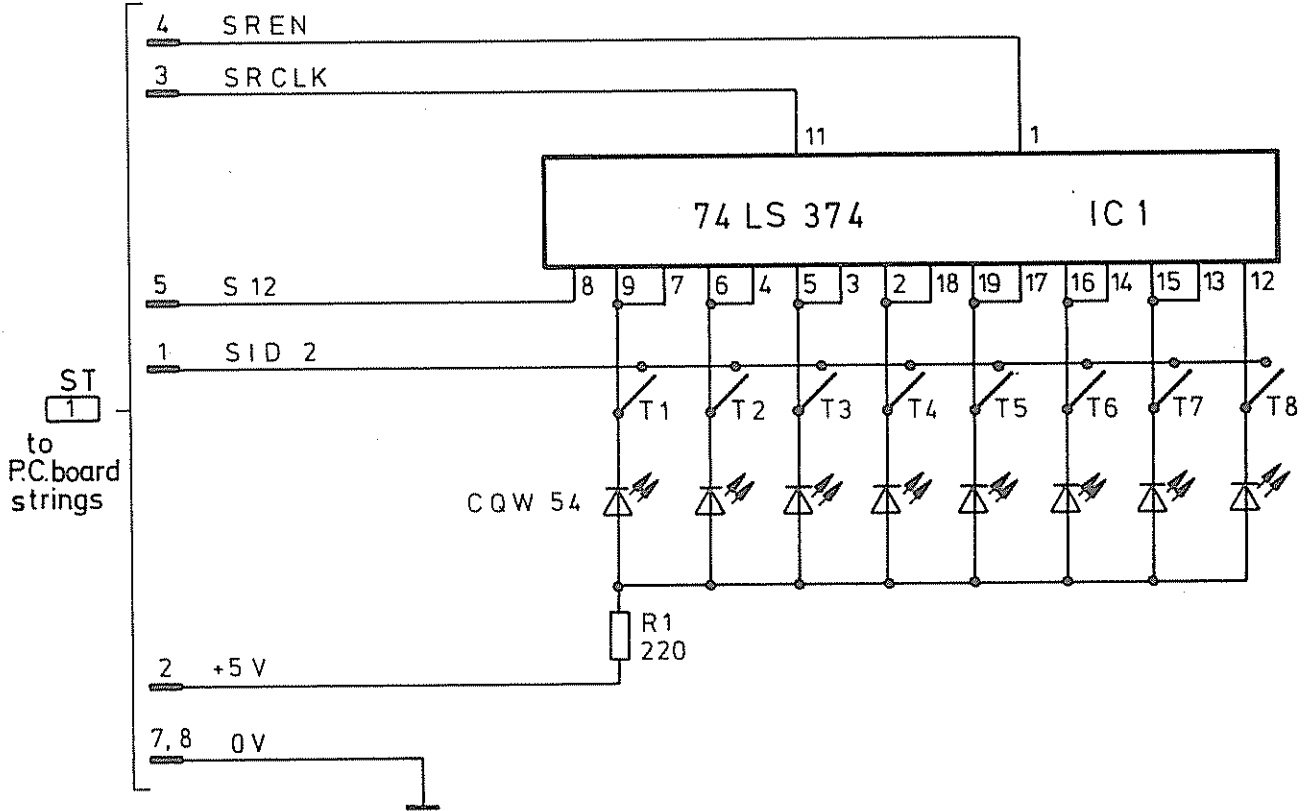
T 2 = Stereo - Wide

Änderungen vorbehalten

- 17 -

	Tag	Name, Kurz-Ze.	Änd. Mitteilung						
Bearb.		E. d.	Tag						
Geprüft			Name, Kurz-Ze.						

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T 1 — T 8 = Autoregistration 1 bis Autoregistration 8

Änderungen vorbehalten

- 18 -

	Tag	Name, Kurz-Ze.	Änd. Mitteilung					
Bearb.		<i>Cid</i>	Tag					
Geprüft			Name, Kurz-Ze.					

Bestell-Nr.

Leiterpl. bestückt: 6 - 400. 450 - 75

Leiterpl. unbestückt: 6 - 400. 450 - 7501

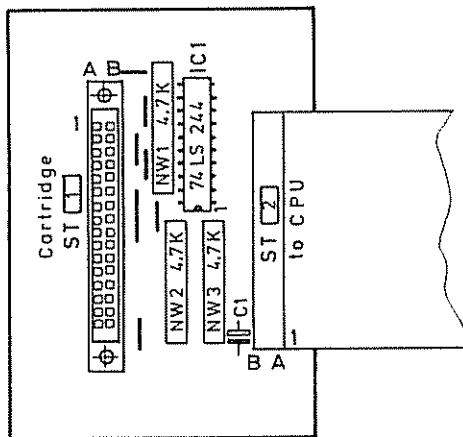
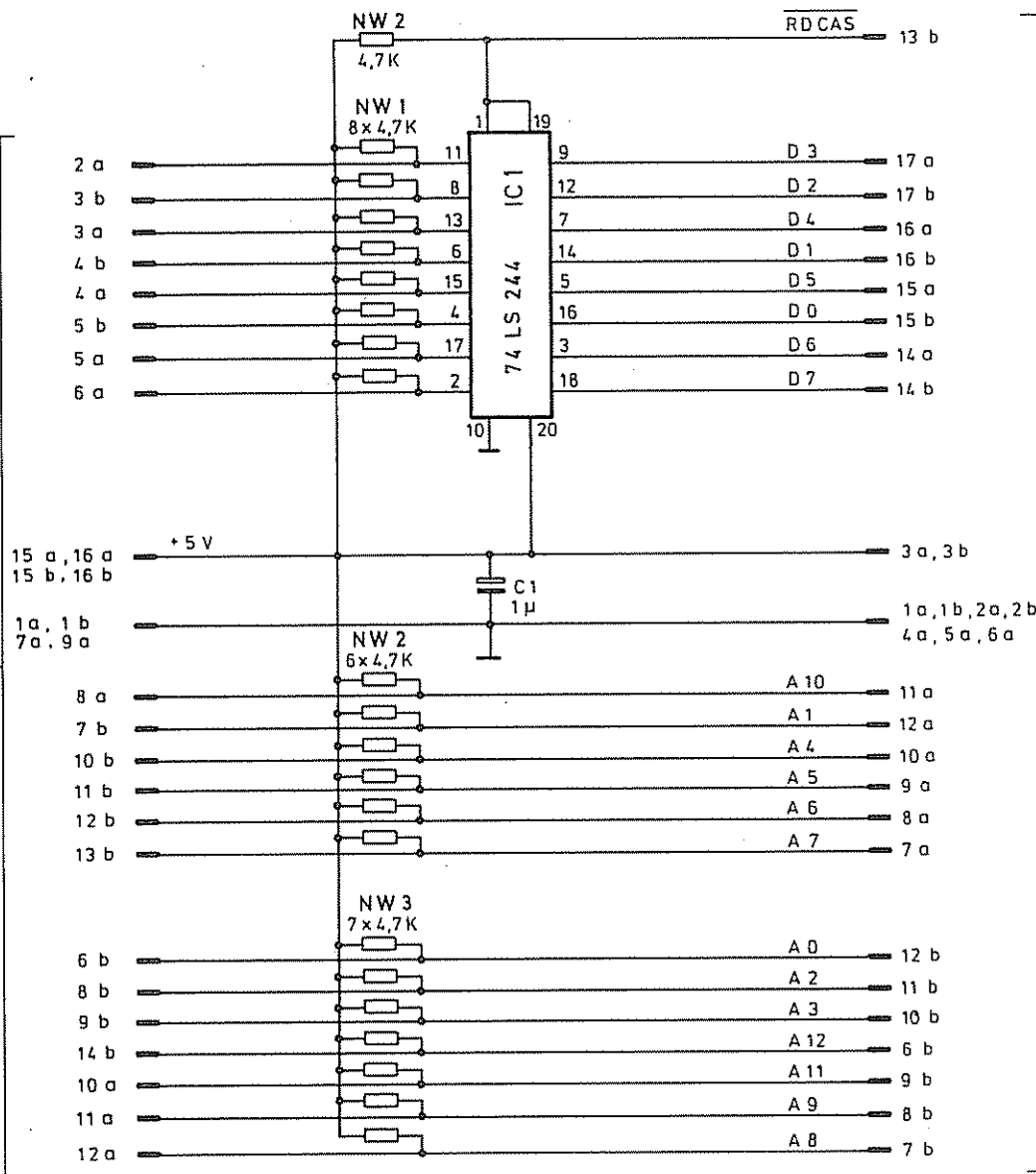
Cassettenaufnahme (C A)
Cartridge

MATTH. HOHNER AG
7218 Trossingen

Benennung:

für Type: **SYMPHONIE D 200**

ST 1
Cartridge



Tag	Name, Kurz-Ze.	And. Mitteilung
		Tag
		Name, Kurz-Ze.

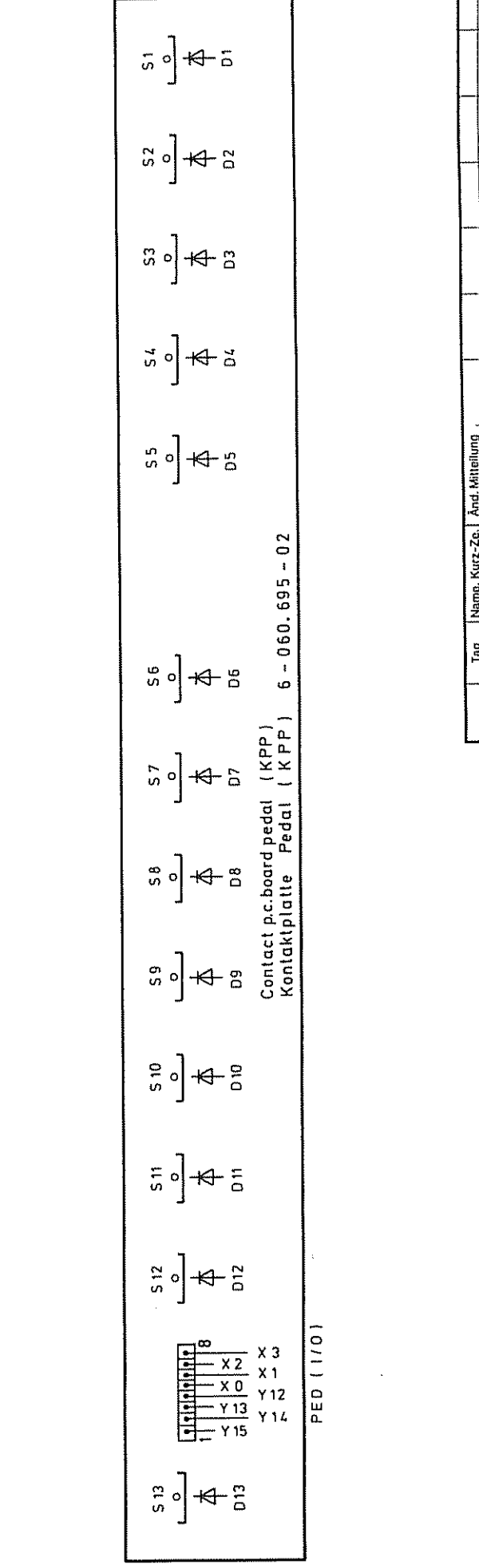
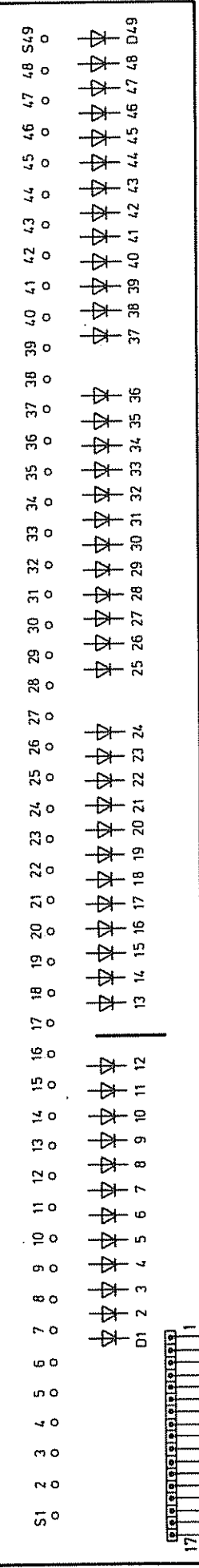
Änderungen vorbehalten

Bestell-Nr. 6-062.230-10 / 6-060.695-02
 Leiterpl. bestückt: 6-062.230-10 / 6-060.695-0201
 Leiterpl. unbestückt:

Kontaktplatte und Pedal (KPOM, KPUM, KPP)
 contact p.c. board, pedal

Benennung: D200/D180
 für Type: SYMPHONIE D98 / GP98

Contact p.c.board upper and lower manual (KPOM, KPUM)
 Kontaktplatte oberes u. unteres Manual (KPOM, KPUM)



I/O - Board

Scanning philosophy:

Two types of scannings are used depending upon the type of contact.

-Tabs-4steps drawbars-keyboards-pedalboard=MATRIX scanning
-Switches with LED = Serial scanning

Matrix scanning:

The matrix scanning uses the 1960 concept of diode-array memory, well known to those familiar with DTL logic.

The micro-processor "sees" a diode array memory, the fuses being replaced by the contacts.

The memory format is 16 words of 16 bits (see matrix organisation).

The word decoding is done like any memory by a decoder (IC-10/11) connected to the address lines. The decoder will select one word from the matrix (Y 0 to Y 15).

The corresponding word data (X₇ to X₀) is read by the CPU. As the CPU is a 8 bit machine, two read operations are necessary: RDMO, and RDMI 1. The signals are generated from IC-B2-74LS138.

As the matrix goes to different parts of the organ several connectors are needed for matrix connexion. Please refer to I/O connectors for X, Y connector layout.

The matrix organisation sheet is very useful to find a hardware fault in the matrix area. As a fault usually occurs on a single X or Y wire, the matrix organisation allows to know very quickly which wire is defect.

For example, if all notes of the upper keyboard upper octave are playing together, this results in a x 3 matrix line shorted to ground or IC A 10 (74C244) defect.

For example, if all E notes are not playing, check if strings 16' and lower manual volume work. If not, this results in a cut on Y4 of a defect IC C 10/11 (74154).

Note: Scanning is difficult to observe with a scope as the scanning scheme is not straight forward: Y₀-Y₁₅.

1 - Switches with LED - Serial scanning

An exclusive scanning scheme is used which combines switch detection and LED display (patent applied for).

The scanning is under microprocessor control using signals SRDAT, SRCLK 1, SREN, provided by addressable latch A3.

The switch status is sent to microprocessor by signal SID.

2 - LED display cycle

SREN is low thus enabling the shift registers 374 (see P.C. board upper manual or P.C. lower manual).

The display pattern is shifted using SRCLK 1 to shift SRDAT into the shift registers.

Once the display pattern is shifted, no further shift will occur until switch actuation.

3 - Switch scanning

At regular time intervals, SREN is brought high for a short time.

All the 374 outputs will be tristate, all LED will extinguish.

SID is tested. If zero, this means no switch is ON. If one, SRCLK 1 is clocked, then SREN is brought low.

This sets all 374 outputs to 1.

SRDAT is set to zero and SRCLK 1 is clocked until SID is zero. The count of SRCLK 1 pulses gives the number of the actuated switch. The operation then resumes to normal display.

The switches with LED serial scanning are completely under program control through addressable latch IC A3.

4 - Rhythm interrupt, tempo display

The rhythm interrupt uses a 12 bits counter (B4-B5-B6) which reloads to a value stored on a 12 bit register (A6-A7) when a carry occurs. The value stored on the 12 bit register by the microcomputer sets the rhythm interrupt frequency.

The tempo display is completely under program control.

The program shifts a serial word representing the seven segments pattern by means of SRDAT (data) and SRCLK 2 (clock).

5 - Miscellaneous controls

Circuit C 5 allows for various controls (under program control).

GEON - (General on)	General squelch
TREMOLO ON/OFF	Self explanatory
GRI - Hall	Allows to connect reverb to Group I
FRI - Hall	Allows to connect reverb to general presets
GR II - L/R	Determines output channel for Group II

Strings ON/OFF - Strings squelch

Chorus/Tremolo - Self explanatory

Circuit B1 is used as follows to generate clock pulses under program control to load various data.

WRRYO, WRRYI	- Load rhythm data (refer to rhythm board)
WRDAC	- Load filter data (refer to bass filter board)
WRFI1 to WRFI 5	- Control the various filter
IC B2	- Generates I/O control signals

- 6 - Scanning of the slider switches for flutes, sustain, strings, volume, vibrato, portamento, basspedal.

The conditions of the different slider switches must converted in digital informations for the microprocessor.

One of the slider switches will selected with the address signals ADI - 0-2 and EN 0-4 about the multiplexer on the p.c.board.

The different voltages are connected with the signal ANA to the A/D-Converter (A8). This converter generates digital informations for the microprocessor.

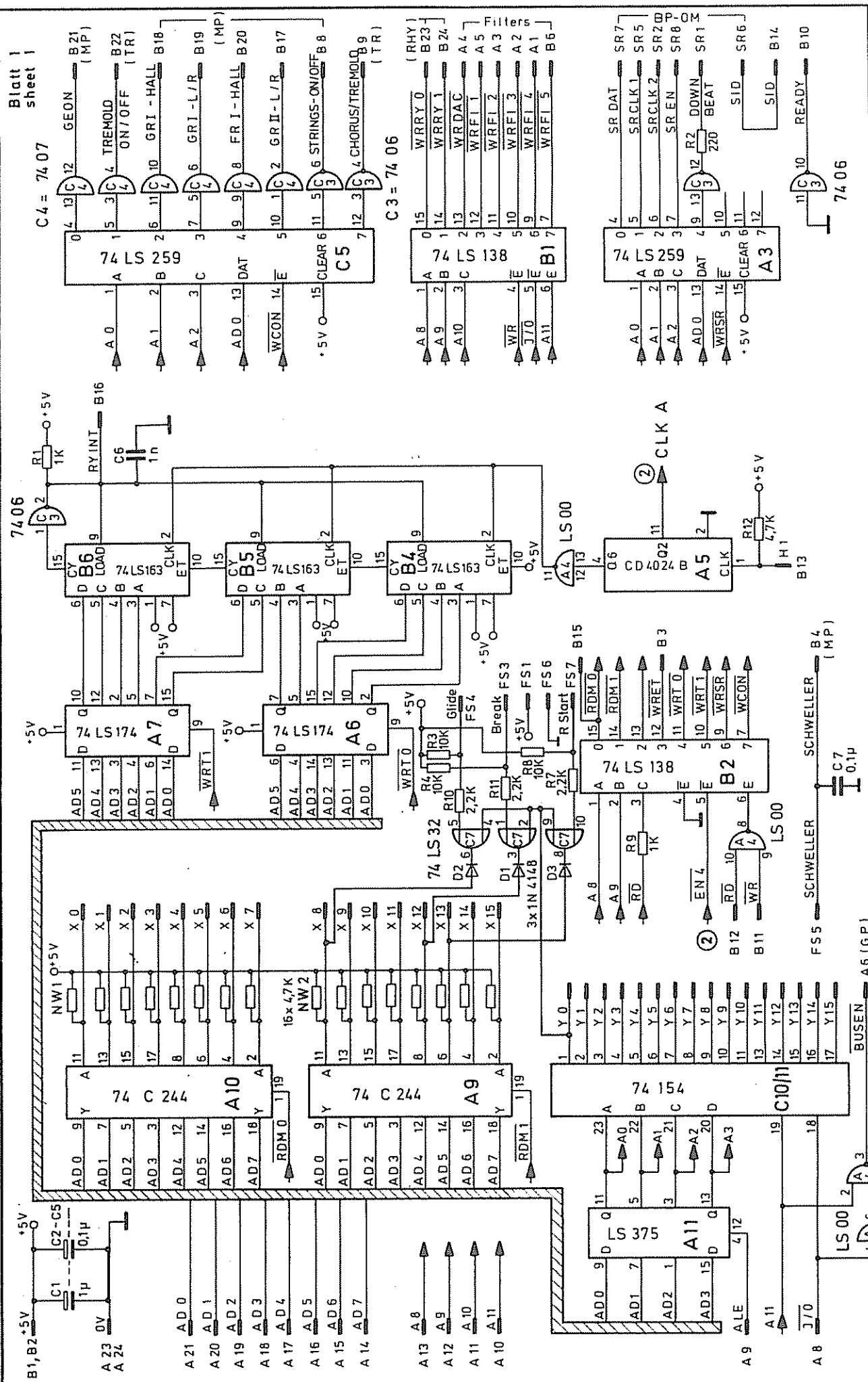
Bestell-Nr. 6-063.420-31 (GP98/D180)
 Lieferpl. bestückt: 6-400.420-31 (D200)
 Lieferpl. unbestückt: 6-063.420-3101

I/O Platte (I/O)

MATTH. KOHNER AG
 7218 Troseingen

Benennung: GP98 / D180 / D200

Blatt 1
 sheet 1



Tag	Name, Kurz-Ze.	Änd. Mitteilung	6-063.420-31
Geprüft		Tag	27.10.83
Änderungen vorbehalten		Name, Kurz-Ze.	GP98
		Geprüft	

Bestell-Nr.

6-063.420-31 (GP98 / D180)

Leiterpl. bestückt: 6-400.420-31 (D200)

Leiterpl. unbestückt: 6-063.420-3101

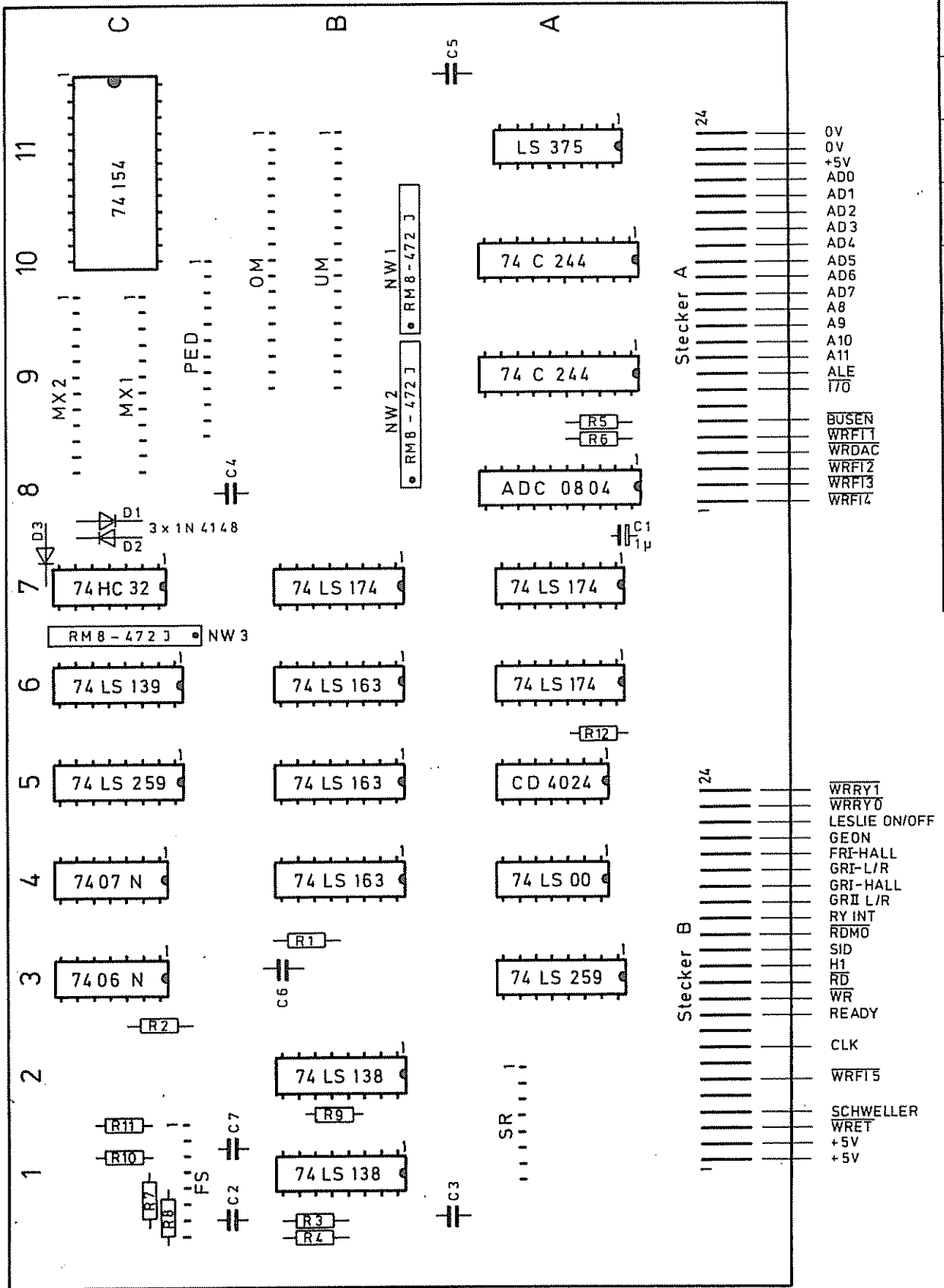
I/O Platte (I/O)

MATH. HOHNER AG

7218 Troesingen

Benennung:

für Type: GP 98 / D180 / D 200



Tag	Name, Kurz-Ze.	Änd. Mittellung	6-063/47	6-063/67
Bearb.	-C.r.	Tag	27. 10. 83	12. 7. 84
Geprüft	Name, Kurz-Ze.	-C.r.		

Änderungen vorbehalten

Input / Output connectors on I/O board D200

PIN	UM	OM	PED	MX 1	MX 2	SR	FS
1	Y 0	Y 0	Y 15	Y 3	EN 3	D-BEAT	+ 5 V
2	Y 1	Y 1	Y 14	Y 2	EN 4	SRCLK 2	0 V
3	Y 2	Y 2	Y 13	Y 0	-	0 V	Break
4	Y 3	Y 3	Y 12	Y 1	-	+ 5 V	GLIDE
5	Y 4	Y 4	Y 0	Y 10	ADIO	SRCLK 1	Footswell
6	Y 5	Y 5	X 1	X 11	ADI1	SID	
7	Y 6	Y 6	X 2	X 8	ADI2	SRDAT	Rhy-Start
8	Y 7	Y 7	X 3	X 9	ANA	SREN	
9	Y 8	Y 8	X 4	X 14	ENO		
10	Y 9	Y 9	X 5	X 15	EN 1		
11	Y 10	Y 10	X 6	X 12	EN 2		
12	Y 11	Y 11	X 7	X 13	AGND1		
13	X 4	X 0					
14	X 5	X 1					
15	X 6	X 2					
16	X 7	X 3					
17	Y 15	Y 15					

Matrix organisation D200

MATRIXBELEGUNG D200

X7	X6	X5	X4	X3	X2	X1	X0	Xy
C4	C3	C2	C1	C4	C3	C2	C1	Y0
CIS4			CIS1	CIS4			CIS1	Y1
D4			D1	D4			D1	Y2
DIS4			DIS1	DIS4			DIS1	Y3
E4	UNTERES MANUAL		E1	E4	OBERES MANUAL		E1	Y4
F4	LOWER MANUAL		F1	F4	UPPER MANUAL		F1	Y5
FIS4			FIS1	FIS4			FIS1	Y6
G4			G1	G4			G1	Y7
GIS4			GIS1	GIS4			GIS1	Y8
A4			A1	A4			A1	Y9
B4			B1	B4			B1	Y10
H4	H3	H2	H1	H4	H3	H2	H1	Y11
--	--	--	--	DIS	D	CIS	C	Y12
--	--	--	--	G	PEDAL FIS	F	E	Y13
--	--	--	--	H	B	A	GIS	Y14
C5	--	--	--	C5	--	--	C1	Y15

CPU board

This board comprises

Microcomputer unit (8085)
EPROM max. 88K
Bus and control signals drivers
Clock generator
10 ms real time interrupt
Watch dog timer

Clock generator:

The CPU clock is generated on chip 8085 by means of the X-Tal 6,144Mc.

The clock frequency is divided by 3 (IC-D4) to provide the main system clock H1.

H1 is about 480 ns period with a high time of 320 ns and a low time of 160 ns.

H1 controls the sound generation for periodic sounds and rhythm.

10 MS real time interrupt:

This interrupt is used by the program to generate the various sound envelopes (attacks, sustains) also the vibratos and portamentos.

On half one-shot A-3 is used on the RST 6,5 interrupt input. The one-shot is triggered by program via I/O board (WRET).

Watch dog timer:

This device is used in case of erratic transient or undetected software fault which may cause the program to enter an endless loop or halt condition. Then a trap interrupt will occur which will reinitialize the organ.

IC - C-5 is used to generate the TRAP-Interrupt.

The one-shot is of the retriggerable type, i-e under normal operating conditions, pin 12 will always be at low level, as RDMO will be present.

RDMO is the read matrix switch signal indicating that scanning is in progress (see I/O).

Bestell-Nr.

6-400.420-32

Leiterpl. bestückt:

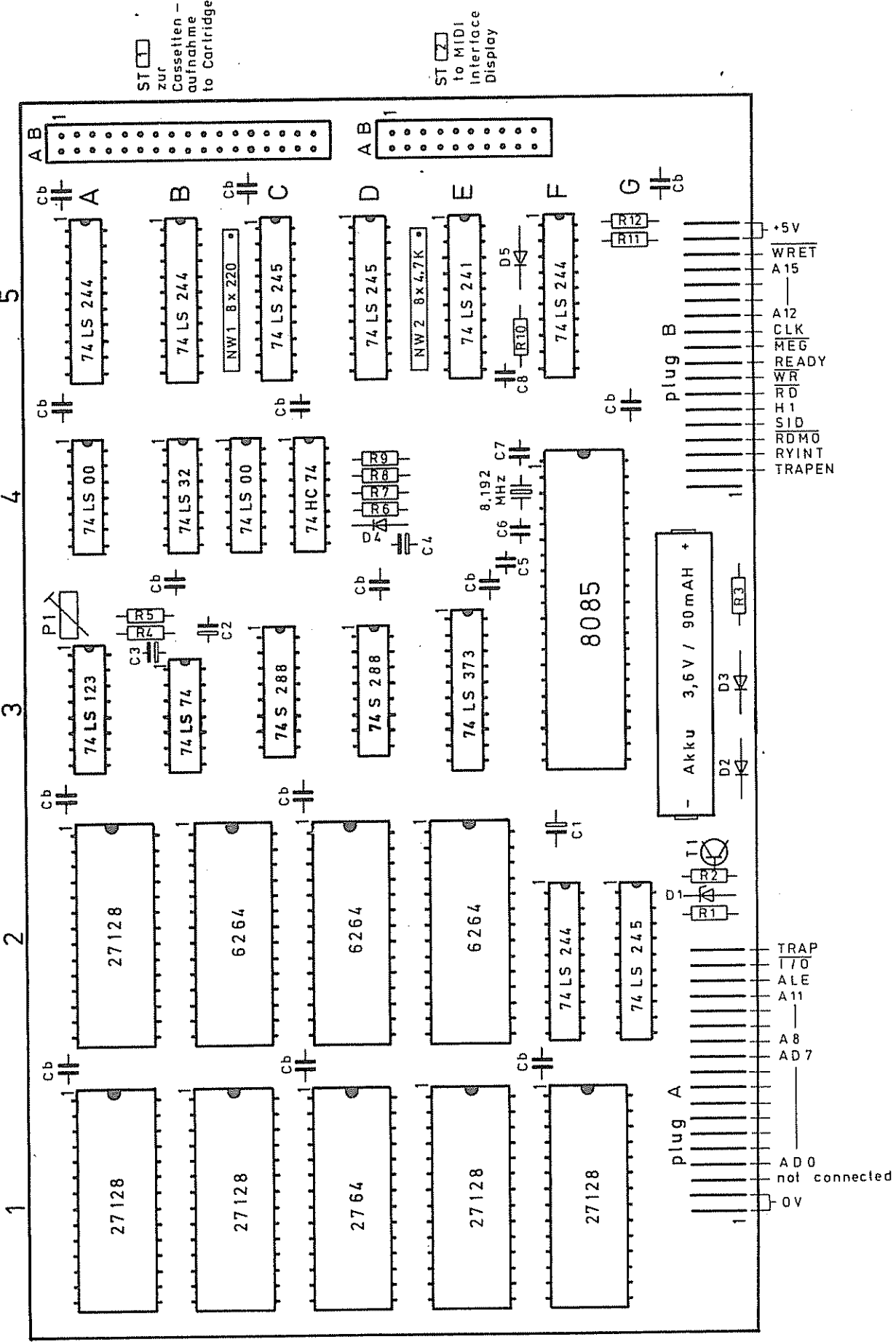
Leiterpl. unbestückt: 6-400.420-3201

CPU 16K

MATTH. HOHNER AG
7216 Troaringen

Benennung:

für Type: SYMPHONIE D 200



ST zur
Cassetten-
aufnahme
to Cartridge

ST to MIDI
Interface
Display

Tag	Nam.	Kurz-Ze.	Änd.	Mitteilung
Bearb.				
Geprüft				
			Tag	
			Name, Kurz-Ze.	

Änderungen vorbehalten

Albert Metz, Stuttgart P. 150

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DAC + MEG board

The MEG - IC includes a 32 - voices digital Synthesizer which is under the control of the microprocessor. Each of the 32 Synthesizer voices is able to produce up to 8 octave related signals.

The microprocessor controls the MEG - IC with the multiplexed signals AD₀-AD₇. The signal AWA 0-7 includes time multiplexed waveform addresses and amplitude values. If the WALE signal Logic "1", this means that waveform addresses during logic "0" that amplitude values will transmitted.

The WALE signal loads the address to IC - 17 - 74LS373 and generates with the signals WA8-WA11 the address of a waveform. It is possible to address 16 different waveforms. With the next positive slope of the signal H2 will transmitted the contents of the waveform address, the amplitude values and the output select information to the registers IC-19 and IC-4. These informations get transmitted to the D/A-Converter. The signal LDAC is necessary to start the D/A cycle.

The main clock signal for the MEG-IC is generated with L1 and C121 and an internal clock generator on the chip. The tuning of the organ can be adjusted with L2 (see adjustment procedure).

For the control of the MEG-IC 4 fourther control signals

are necessary:	RD	--	"Read Dates"	}	=	from the CPU
	WR	--	"Write Dates"			
	ALE	--	"Address Latch enable")			
	MEG	--	"MEG-enable - IC-F4-74LS244			

The function of the D/A-Converter is the same like the function of the D/A-Converter board.

D/A Converter DAC

This board receives sample information from the sound generator board SG and converts them into polyphonic audio signals.

The board is divided in two parts.

- Wave from memory
- D to A conversion

1 - Wave form memory

It comprises 2 k bytes of RAM waveform memory which is loaded by the microcomputer and 2 k bytes of EPROM waveform memory.

Each waveform type is 256 bytes long, the waveform being further splitted into octaves, i.e. 128 samples for octave 1, 64 samples for octave 2, etc. ... until 2 samples for octave 7.

The phase information received by IC 25 is combined with the octave received by IC 13 to elaborate 8 bits of waveform address AW_0 to AW_7 .

The contents of waveform memory are waveform amplitude variations (DA_0 to DA_7) which are transmitted to DAC via pipeline register IC 4.

Amplitude and output select are transmitted to DAC via respective pipeline registers IC 26 and IC 27 (resp. IC 14).

2 - D to A Conversion

The DA conversion receives amplitude information AMPL, waveform information DA, output select (channel) information OS and a sampling signal GATE.

For each GATE signal, an output sample is produced with following fomula.

$$V_{(OS) t+1} = V_{(OS) t} + V_0 \text{AMPL.DA}$$

$V_{(OS) t+1}$ being the voltage after the GATE signal on the selected output OS.

$V_{(OS) t}$ being the voltage before the GATE signal on the selected output OS.

V_0 being a constant.

To do this, AMPL is converted to analog by IC-15 and the corresponding analog current is fed to analog multiplier IC-14, DA is converted to analog by IC 5 and the corresponding analog currents are fed to analog multiplier IC-14.

IC-14 is a two quadrant analog multiplier followed by an amplifier giving the results VOAMPL DA which is fed to input of analog multiplexer IC 8 (pin 3).

Depending on the OS value, the previous signal is switched to the corresponding channel integrator thus achieving the required function.

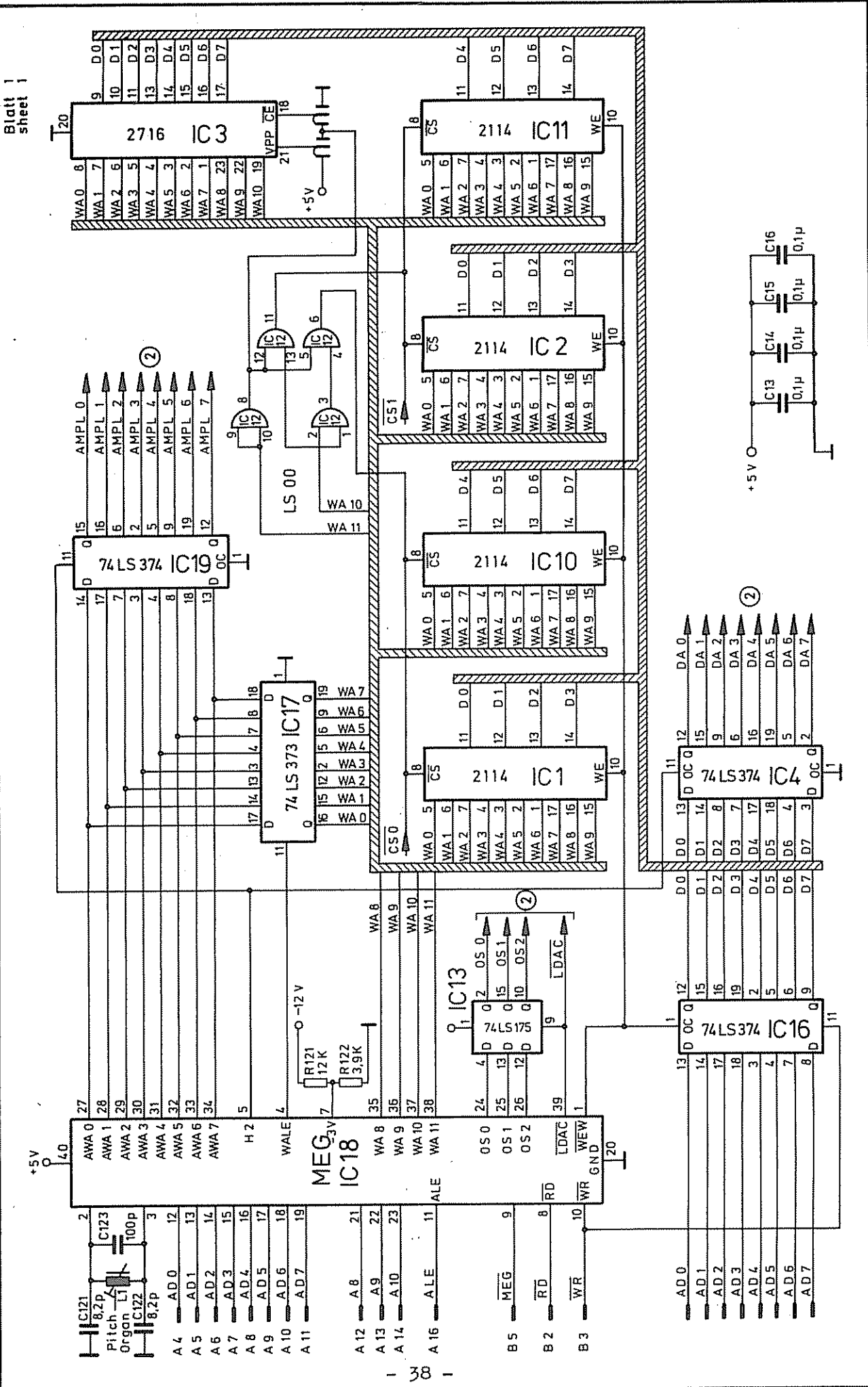
Bestell-Nr. 6-068.421-40
 Leiterpl. beauftragt: 6-068.421-4001
 Leiterpl. unbestückt: 6-068.421-4001

Benennung: **MATTH. KOHNER AG**
 7218 Troellegen

DA - Converter (DAC)
 mit MEG

D200/GP98
 für Type: SYMPHONIE D96 / D94

Blatt 1
 sheet 1



Tag	Name, Kurz-Ze.	Änd. Mitteilung	6-068/31
Bearb.	← d. →	5-10-83	20.2.84
Geprüft	← d. →		

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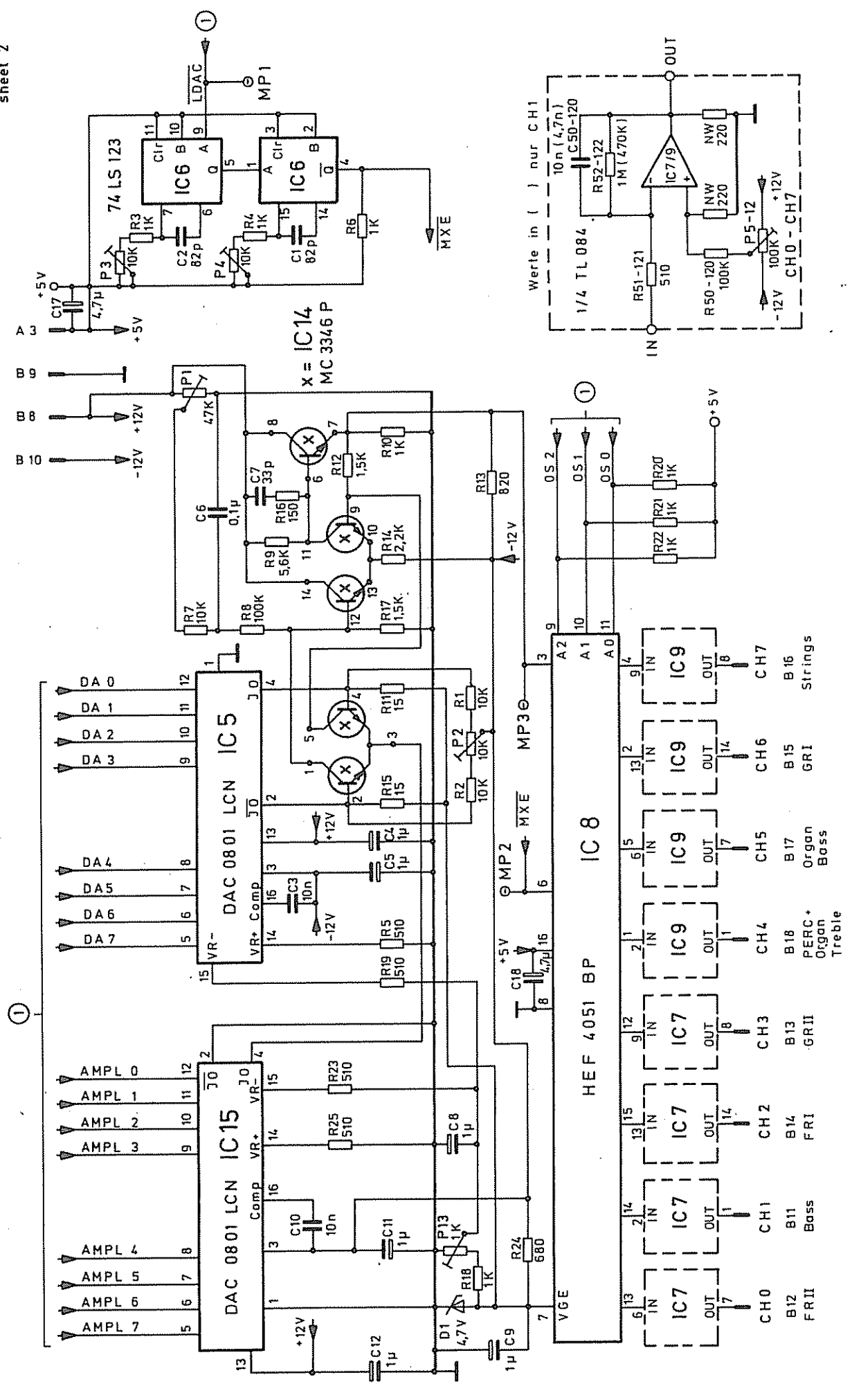
Geprüft: Albert Meitz, Stuttgart P. 1520

Bestell-Nr. **6-068.421-40**
 Letterpl. bestückt: **6-068.421-4001**
 Letterpl. unbestückt: **6-068.421-4001**

Benennung: **DA-Converter (DAC) mit MEG**

MATTL KOHNER AG
 7218 Troeningen

D200/GP98
 für Type: **SYMPHONIE D96/D94**
 Blatt 2
 sheet 2



Tag	Name, Kurz-Ze.	Änd. Mitteilung
5.10.83	20.2.84	6-068/31
Geprüft	Name, Kurz-Ze.	5.10.83
Bearb.	Geprüft	5.10.83

Änderungen vorbehalten
 RUDOLF RIBB Albert Markt, Stuttgart P. 1530

Bestell-Nr. 6-068.421-40
 Leiterpl. bestückt: 6-068.421-4001
 Leiterpl. unbestückt: 6-068.421-4001

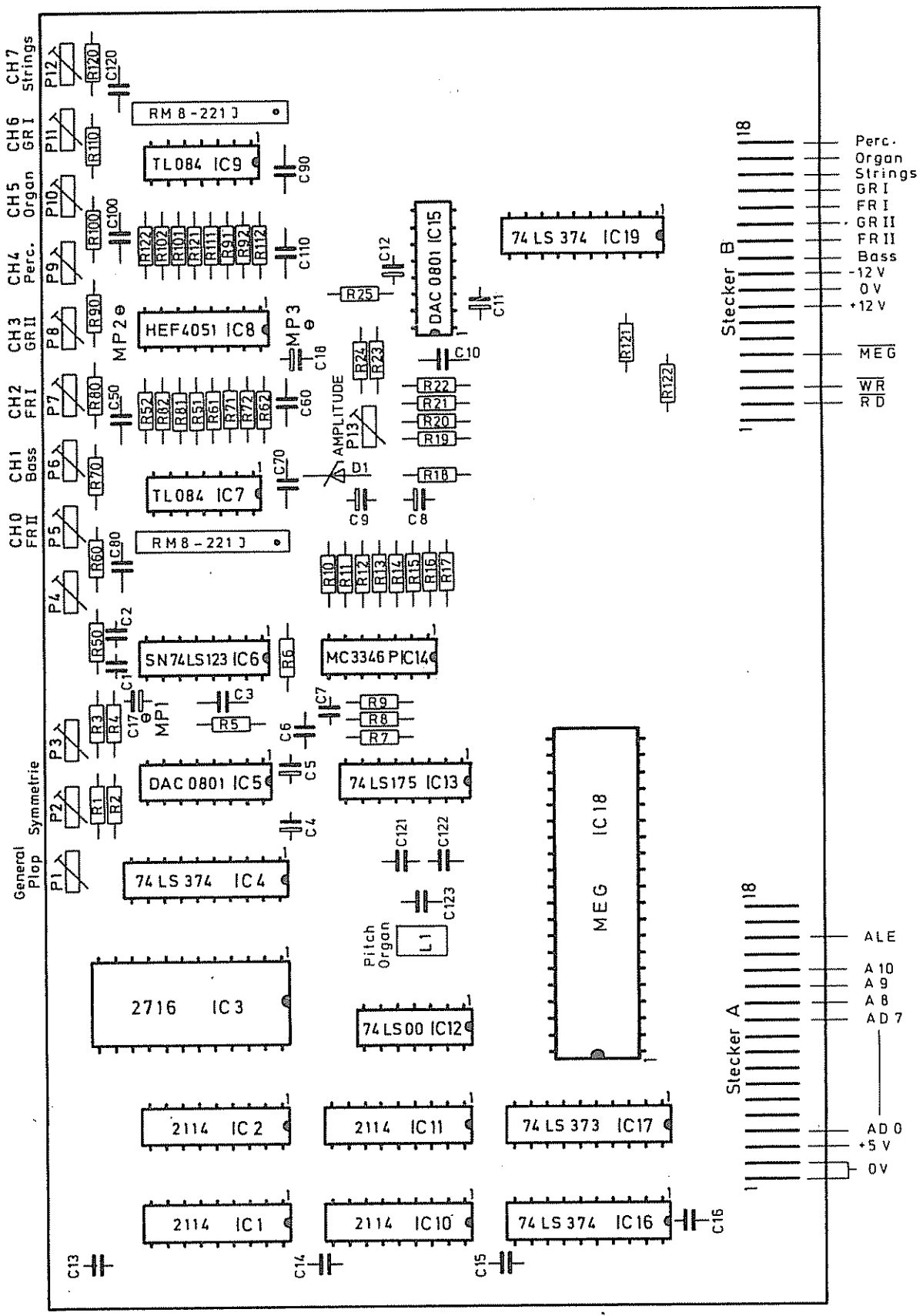
DA - Converter (DAC)
 mit MEG

MATTH. HÖHNER AG
 7218 Troaringen

D 200 / GP98
 D96 / D94

Benennung:

für Type: SYMPHONIE



Tag	Name, Kurz-Ze.	And. Mitteilung	6-063/44	6-068/31
Bearb.	C. X.	Tag	5-10-83	20.2.80
Gepr./ll		Name, Kurz-Ze.	C.d.	

Änderungen vorbehalten

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Filter with DAC board:

The filter with DAC board is divided in two parts.

- a) D/A-Conversion of digital voltage values (DP 0-7).
- b) integrated bass filter (IC-3-CEM 3391).

1.) D/A-Conversion:

The filter is controlled from the microprozessor with 8 control voltages. Only one D/A-Converter is used for the different values to control the sample and hold circuits which are necessary to control the bass-filter. IC-10 receives the dates from the microprozessor together with the write signal WRDAC. The information will converted in an analog voltage which can vary from 0-5V (IC-2-DAC 0801). The result of this conversion is called "DAC-signal".

The register IC-11-74LS175 receives the channel information (0-7) controlled from the microprozessor and from the signal WRFI-1.

IC-6-CD4051 switches the DAC-signal to the corresponding channel.

C20 - C27 store the D/A voltage for the bass filter. The microprozessor controls cyclic all channels and gives analog values in the memory capacitors. These values are constant for a type of bass instruments, they are updated only upon registration change or upon instruments change in the arrangeur.

D/A-Converter adjustment:

- select test program "P" (see testprogram operation)
- adjust P2 for +5V at pin 6 of IC-7.

2.) Integrated bass filter:

The sound of the bass group is generated with a programmable integrated filter circuit IC-3-CEM 3391. The envelope generator of this circuit is controlled with the single analog voltage values from the memory capacitors C20 - C27. The result are different envelopes dependent from the registration of the bass group.

The VCF center frequency is adjustable with P1. The transistor T2 generates the trigger signal for the filter circuit. The pass band and the envelope of the filter circuit is controlled with control voltages (C20 - C27).

Volume control:

IC-13 and IC-15 generates control voltages which are under programm control. These voltages are used for the VCA's on the mixing unit which are necessary to control the volumes of the other channels.

Benennung:

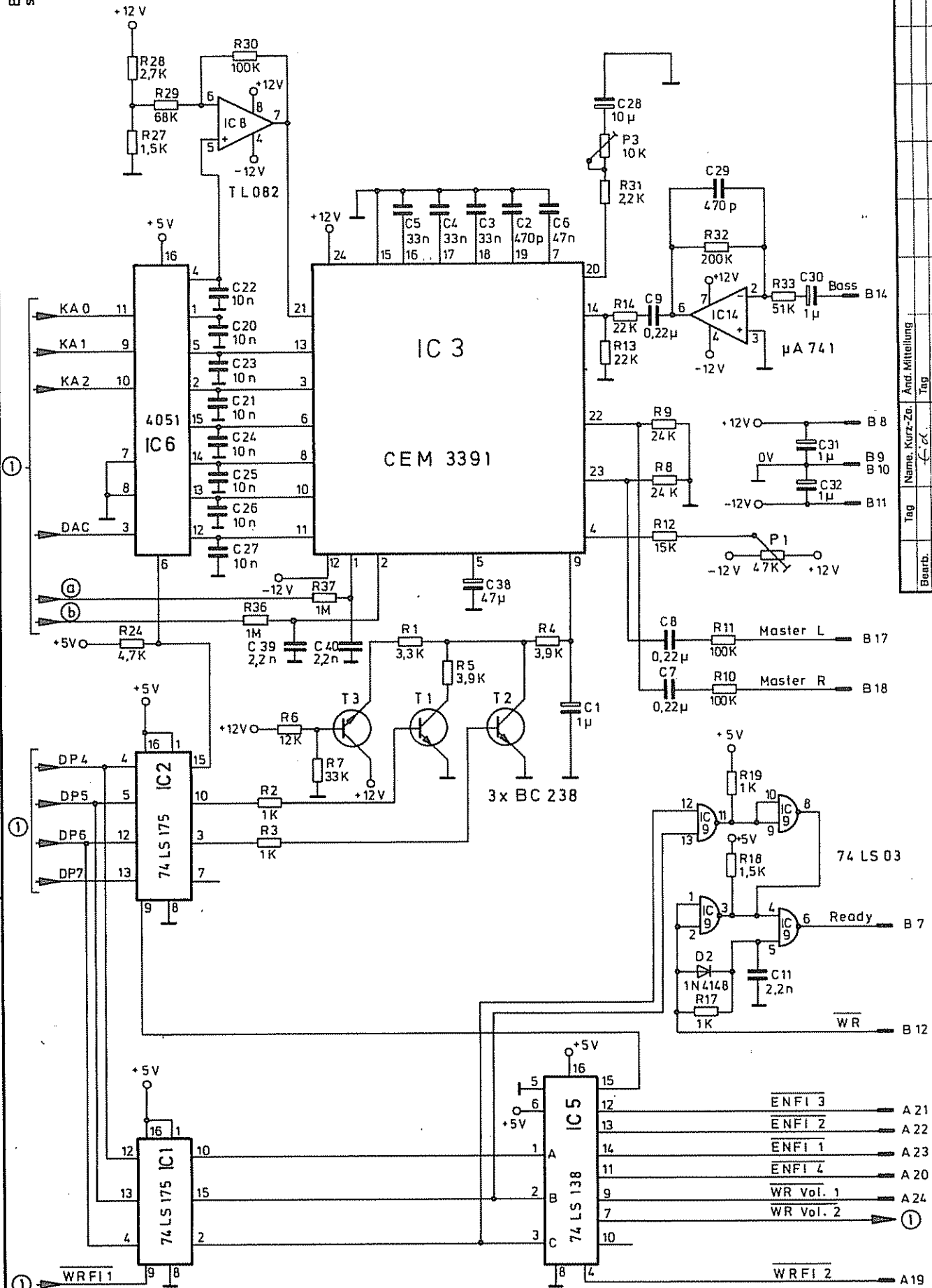
MATTH. HOHNER AG
7218 Trossingen

Filter mit DAC
Filter with DAC

Bestell-Nr. 6-400.420-63
Leiterpl. bestückt: 6-400.420-6301
Leiterpl. unbestückt: 6-400.420-6301

Blatt 2
sheet 2

Benennung: SYMPHONIE D 200



Tag	Name, Kurz-Ze.	And. Mitteilung	Tag	Name, Kurz-Ze.

Anderungen vorbehalten

mu... Albert Matz, Stuttgart P. 1530

Bestell-Nr.

Leiterpl. bestückt: 6 - 400.420 - 63

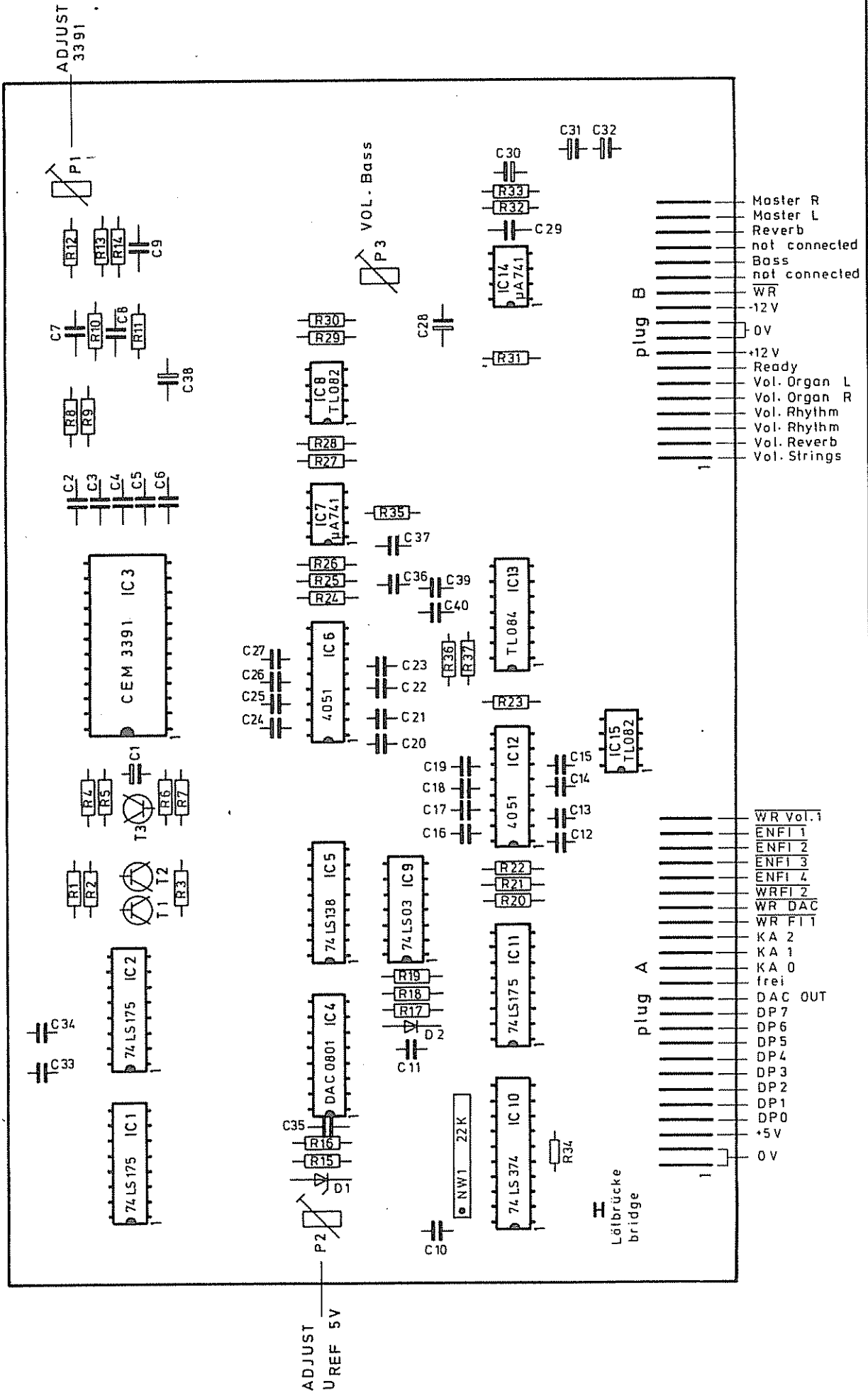
Leiterpl. unbestückt: 6 - 400.420 - 6301

Filter mit DAC
Filter with DAC

MATTH. HÖRNER AG
7210 Troaringen

Benennung:

für Type: SYMPHONIE D 200



Änderungen vorbehalten

Tag	Name, Kurz-Ze.	Änd.-Mitteilung
Boarb.		Tag
Gepfrit		Name, Kurz-Ze.

4-Times filter board:

These board includes the following functions:

- a) Filter for: Group 1, Group 2, FR1, FR11.
- b) Digital control for the envelopes of the filter IC's - CEM3391.
- c) Reverb assignments for the different groups.
- d) Mixing of the different groups on two main channels Left and Right.

The sound of the different groups is generated with four programable integrated filter circuits CEM3391. This circuit includes one envelope generator which is digital controlled about the inputs pin 3,6,8,10,11. The trigger function for the different filters is realized with an analog signal at pin 9. The pass band is limited with external components. The VCF center frequency and the volume of the filters is adjustable with the trimming potentiometers P1.1-P4.1.

Reverb assignments are done by IC-6-4016.

The reverb for the groups is adjustable with P1.2-P4.2.

Bestell-Nr.

Lieferpl. bestückt: 6-400.420-61

Lieferpl. unbestückt: 6-400.420-6101

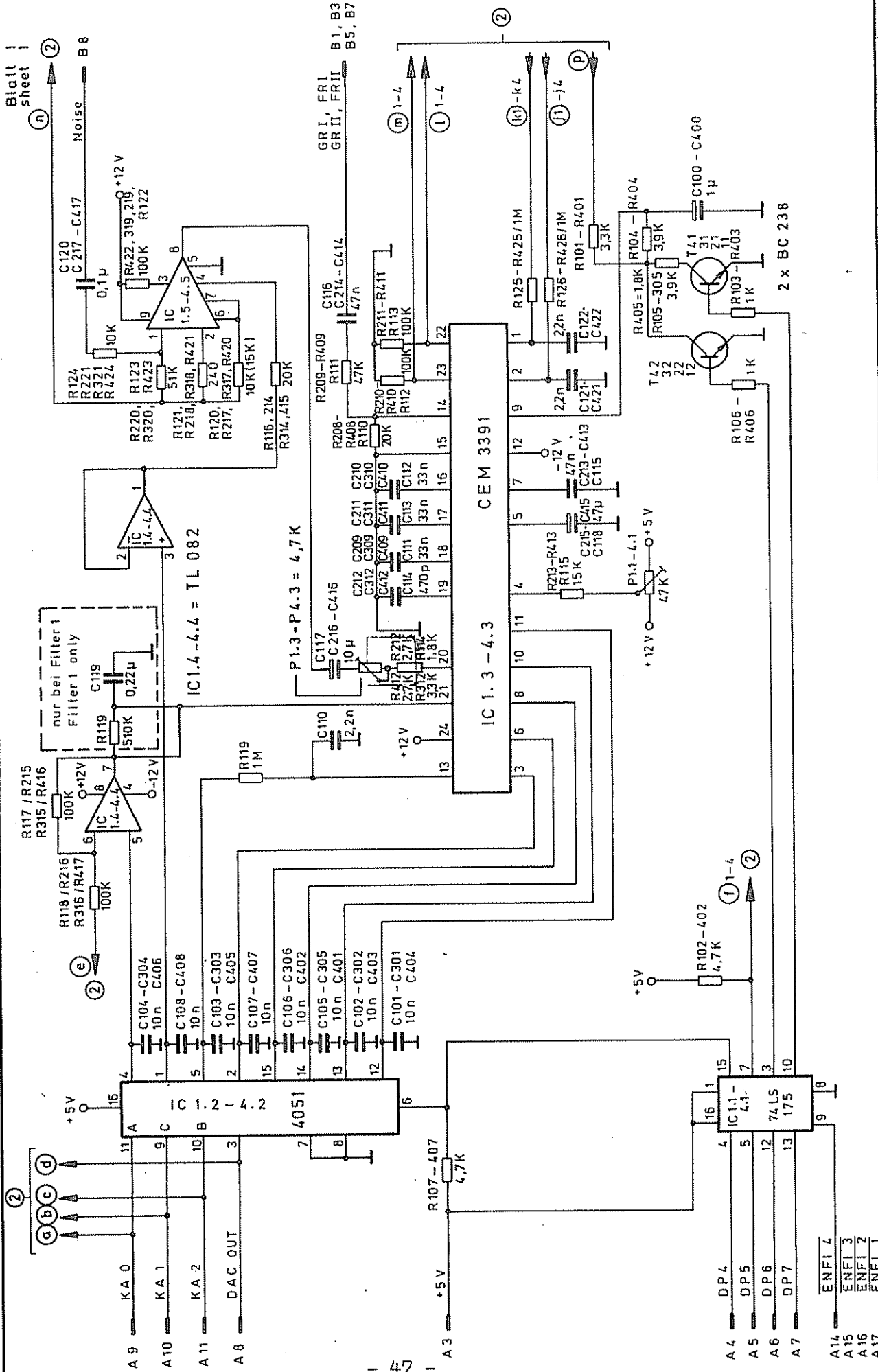
4-fach Filter
4-times Filter board

MATTH. WOHNER AG
7218 Troesingen

Benennung:

für Type: SYMPHONIE D 200

Blatt 1
sheet 1



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Änderungen vorbehalten

Tag	Name, Kurz-Ze.	Änd. Mitteilung

Tag	Name, Kurz-Ze.	Änd. Mitteilung

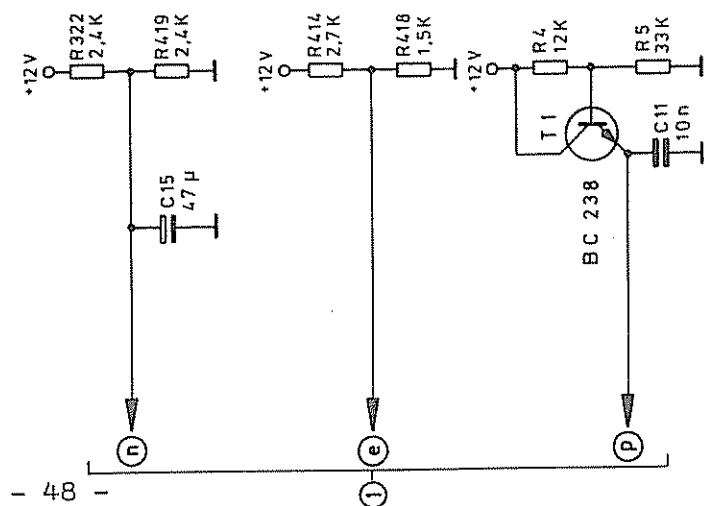
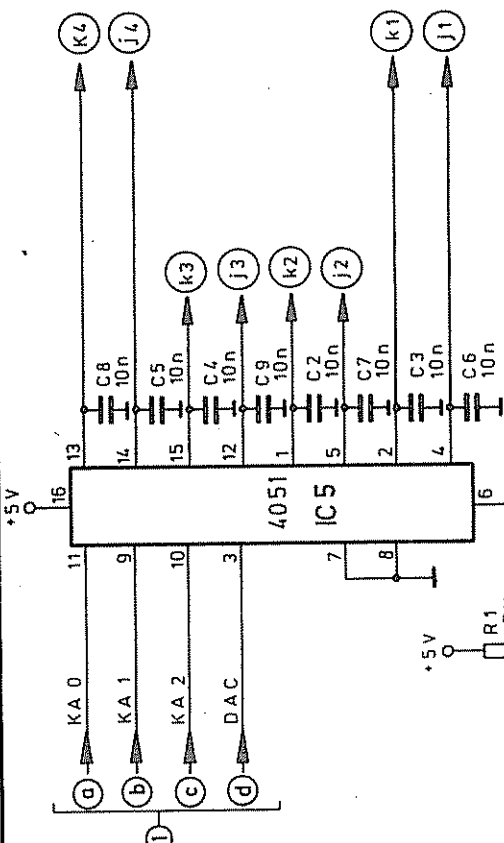
Name, Kurz-Ze.
Tag
Name, Kurz-Ze.

Dr. Albert Hertz, Stuttgart P. 1530

Bestell-Nr.

6-400.420-61

Leiterpl. bestückt: 6-400.420-6101



Benennung:

MATH. HÖHNER AG
7218 Troaringen

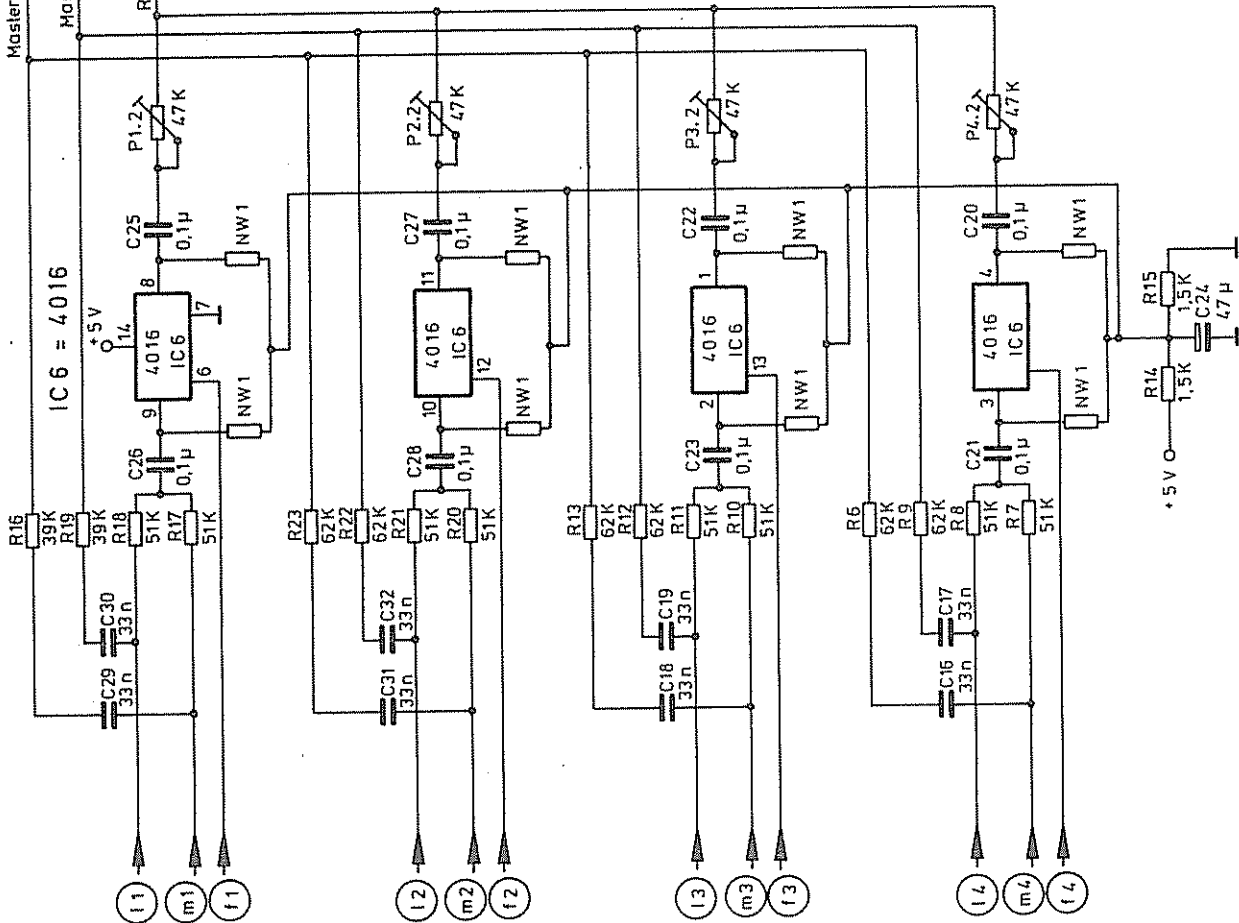
für Type: SYMPHONIE D 200

Blatt 2
Sheet 2

Master L B 17

Master R B 18

Reverb B 16



Tag	Name, Kurz-Ze.	Änd. Mitteilung
Bearb.		Tag
Geprüft		Name, Kurz-Ze.

Änderungen vorbehalten

Rhythm generator board

This board generates 27 different rhythm instruments sounds on 2 channels - (RYL, RYR) -

The sound generation is fully digital and uses live recorded sounds.

Principle

The sound is generated at a = 22 K c/s sampling rate with a 6 channel time multiplex scheme. Each channel time is further divided in 16 micro-program steps.

The sounds are stored permanently into 48 k bytes of EPROM memory in straight 8 bits binary coding. This EPROM memory also contains special codes allowing to jump to a given memory address (loops like ROLL) or to stop the sound output at the end of a sound.

The digital to analog conversion uses an 8 bit DA converter (IC-B2) followed by an analog multiplexer and sample and hold circuitry. Another DA-converter is used for the volume control of the respective instruments (IC-B1).

The 6 channels are mixed to give 2 channels whose amplitude is controlled by VCA D6.

A noise generator D7 (for panflute) is also included.

Adjustments:

None

Test:

See test program operation.

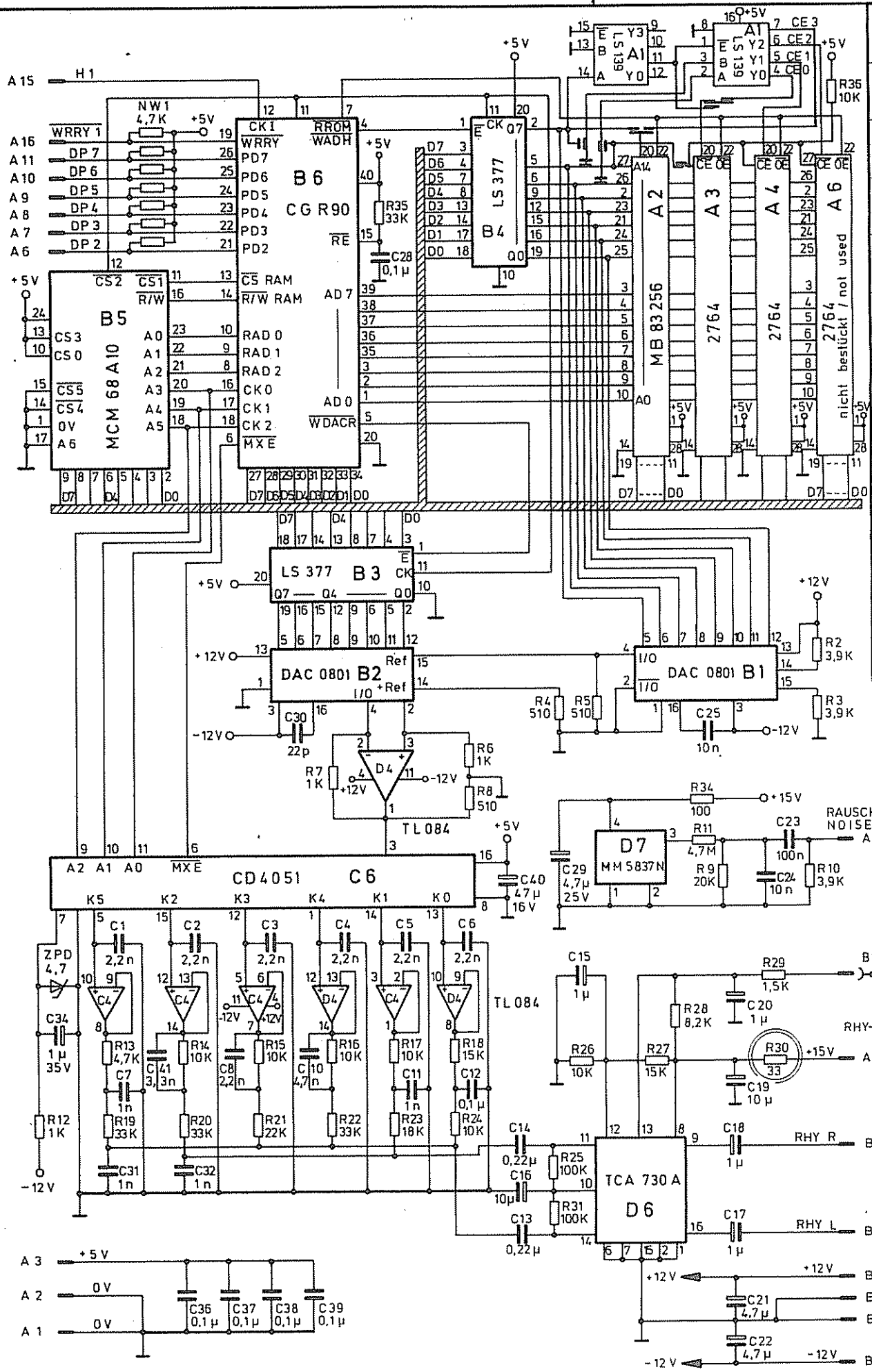
Benennung:

GP98
für Type: SYMPHONIE D 200

MATTH. HOMNER AG
7218 Troaringen

Rhythmus (RHY)
Rhythm unit

Bestell-Nr.
Lalterpl. bestückt: 6 - 400.420 - 66
Lalterpl. unbestückt: 6 - 400.420 - 6601



Tag	Name, Kurz-Ze.	Änd.	Mittlung
Bearb.	Geprüft		
	Name, Kurz-Ze.		
	Tag		

Änd. - ungen vorbehalten

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11010000 Albert Merz, Stuttgart P 1500

Bestell-Nr.

6 - 400.420 - 66

Leiterpl. bestückt:

Leiterpl. unbestückt: 6 - 400.420 - 6601

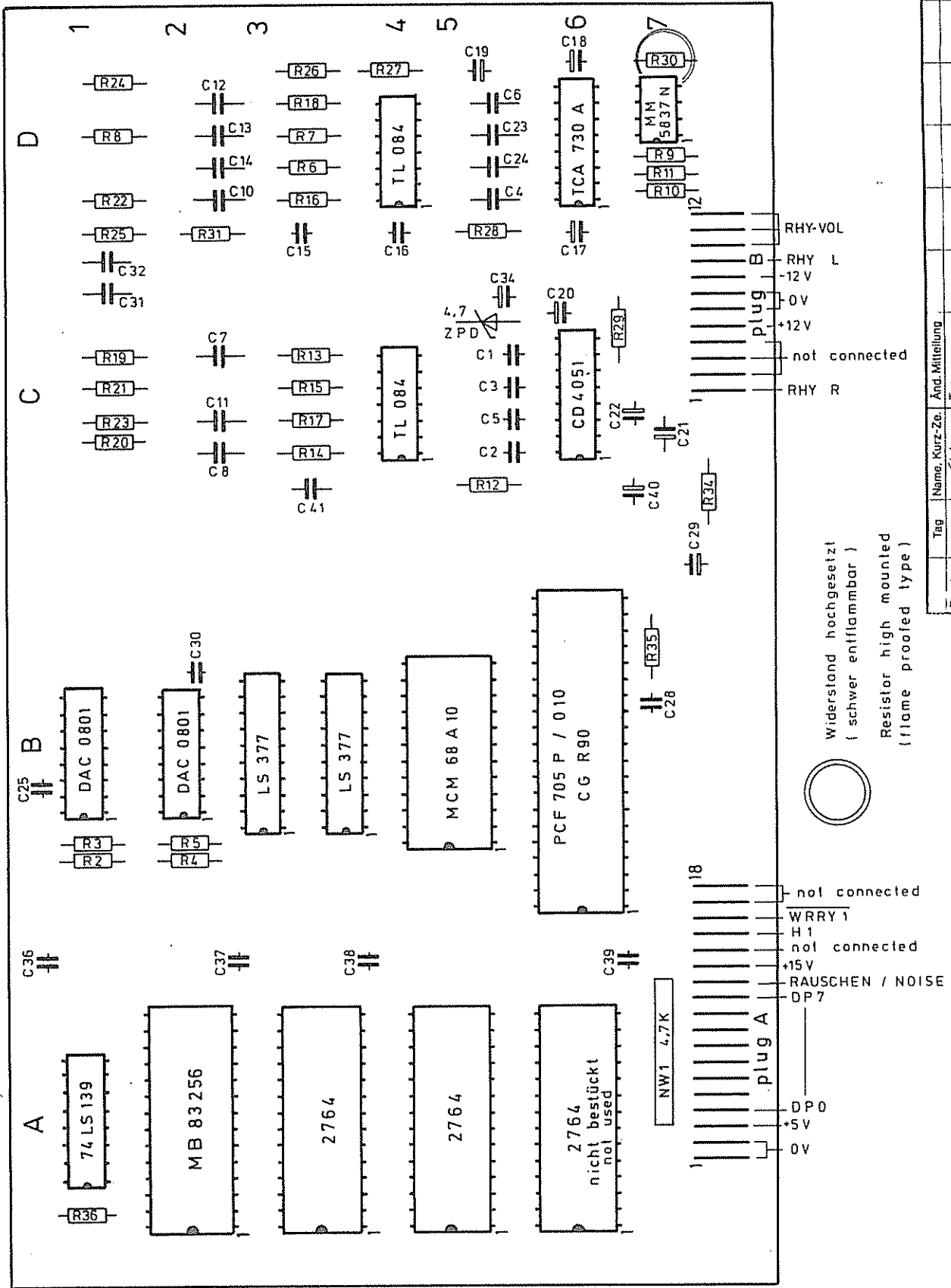
Rhythmus (RHY)
Rhythm unit

MATTH. HÖHNER AG
7218 Trossingen

Benennung:

GP98

für Type: SYMPHONIE D 200



Widerstand hochgesetzt
(schwer entflammbar)
Resistor high mounted
(flame proofed type)

Tag	Name, Kurz-Ze.	Änd. Mitteilung
Bearb.		Tag
Geprüft		Name, Kurz-Ze.

Änderungen vorbehalten

Electronic Reverb:

The NF-signal is fed to the low-pass filter with a cutoff frequency of 8Kc (IC-F7-TL084) and then to the sample and hold amplifier IC-G2-LF398. A comparator IC-G1-LM311 compare the current of the sample and hold amplifier with the output current of the D/A converter PCM53-pin 21. The result is fed about IC-D5-74LS04 to the SAR register D1 and D2.

SAR is the abridgment for Successive Aproximation Register. The corresponding dates are fed after the A/D conversion to the D/A converter and to the microprozessor. The microprozessor has a 16-Bit configuration and read the dates if the signal \overline{RAD} goes to lower values at the circuits C1 and B1. The signal \overline{RAD} has a reset function for D3 and D4 and starts the A/D conversion.

If the microprozessor reads dates into the register C3 and B3, it is necessary to lock the register B2 and C2-74LS244 with the signal SH. IC-PCM53 is used as a 16-Bit D/A converter.

The signal WDA starts the D/A cycle. With the 16-Bit-databus DA 0-15 the microprozessor transmit the dates to the D/A converter. The result is a analogsignal at pin21. IC-G3-TL084 is used as a current-voltage-converter and controls the two analog switches IC-E4-4053 in the multiplex mode.

The control signals for the left/right assignments of the output channels are generated with IC-E6-74HC74.

IC-F5 and IC-G3/F3 are used as a low-pass filter and boost the reverb or echo signal on the desired value.

Bestell-Nr.

6-400.420-75

Letterpl. bestückt:

Letterpl. unbestückt: 6-400.420-7501

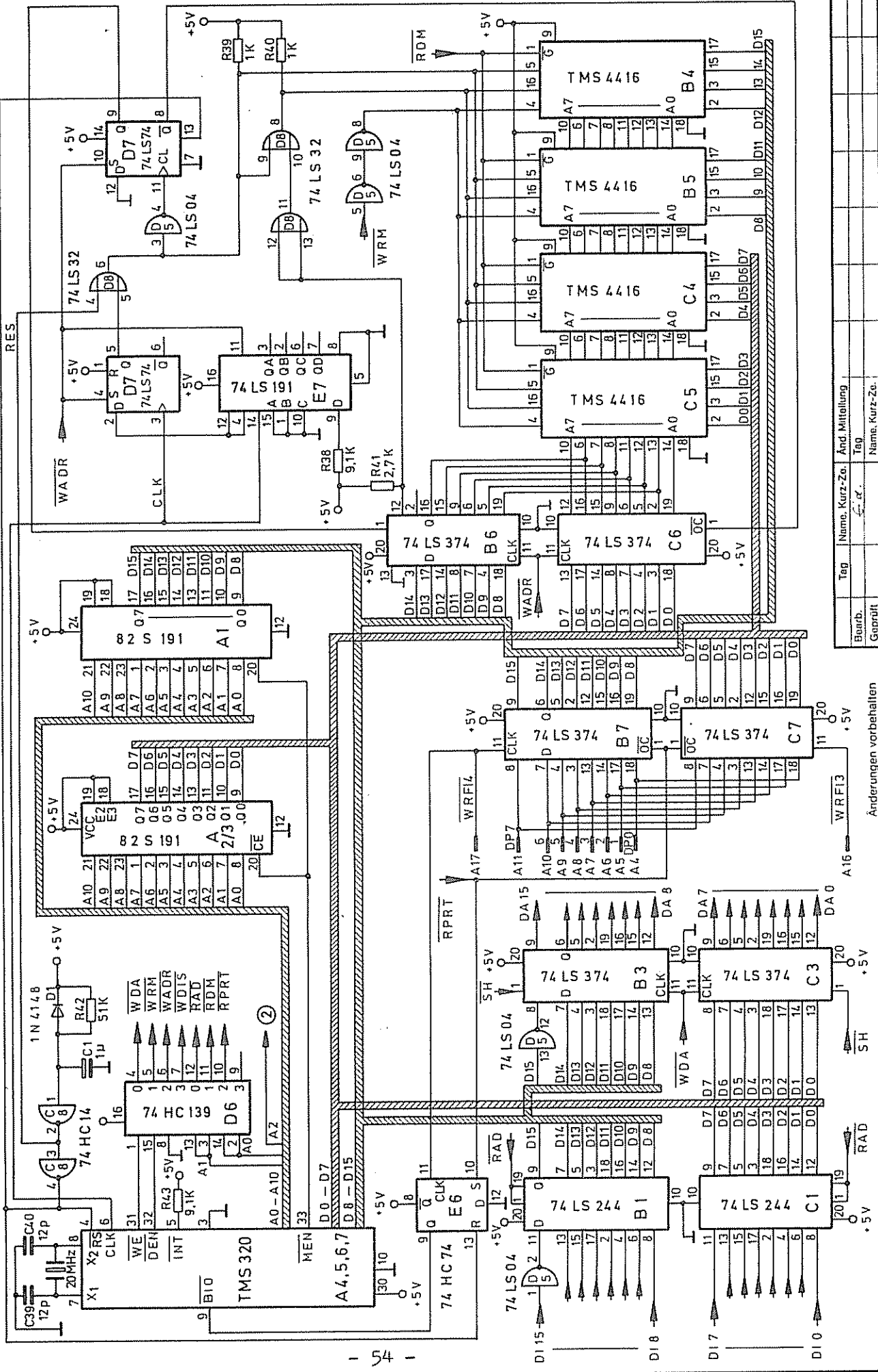
Elektronik Hall (E H)
Electronic Reverb

WATH. NONNER AG
7216 Trooslingen

Benennung:

für Type: SYMPHONIE D 200

Blatt 1
sheet 1



Beurh.	Tag	Name, Kurz-Zu.	Änd. Mittellung	Tag	Name, Kurz-Zu.

Änderungen vorbehalten

Mixing Unit:

This board includes following functions:

- a) Equalizer for the channel organ left/right.
- b) Treble/Bass control for the master channels left/right.
- c) Loudness circuit
- d) Stereo-wide control
- e) Footswell VCA
- f) Volume control for the channels organ left/right, rhythm left/right, reverb left/right and the strings.
- g) Squelch circuit for the master channels left/right (noisegate).
- h) Mixing of the different channels in two master channels left/right.

All of the NF-Inputs except the strings are fed in stereo. Each organ channel (L/R) has a separate bass/treble control. VCA's of the type 2024 are used for the volume control of the different channels which are controlled with the control voltages from the filter with DAC board. The stereo output of the 4-times filter board (Master L/R) is fed to the master amplifier IC-4-4558.

IC-1-TDA4292 includes a voltage controlled Bass/Treble equalizer for the outputs of the mixing unit. The squelch signal is generated from T1-BC238 which control IC-3 (Pin 3,14) to realize the effect of a noisegate. If any note is played the noisegate will be open. The bass and the strings are fed to both master channels.

Bestell-Nr.

Leiterpl. bestückt: 6-400.420-52

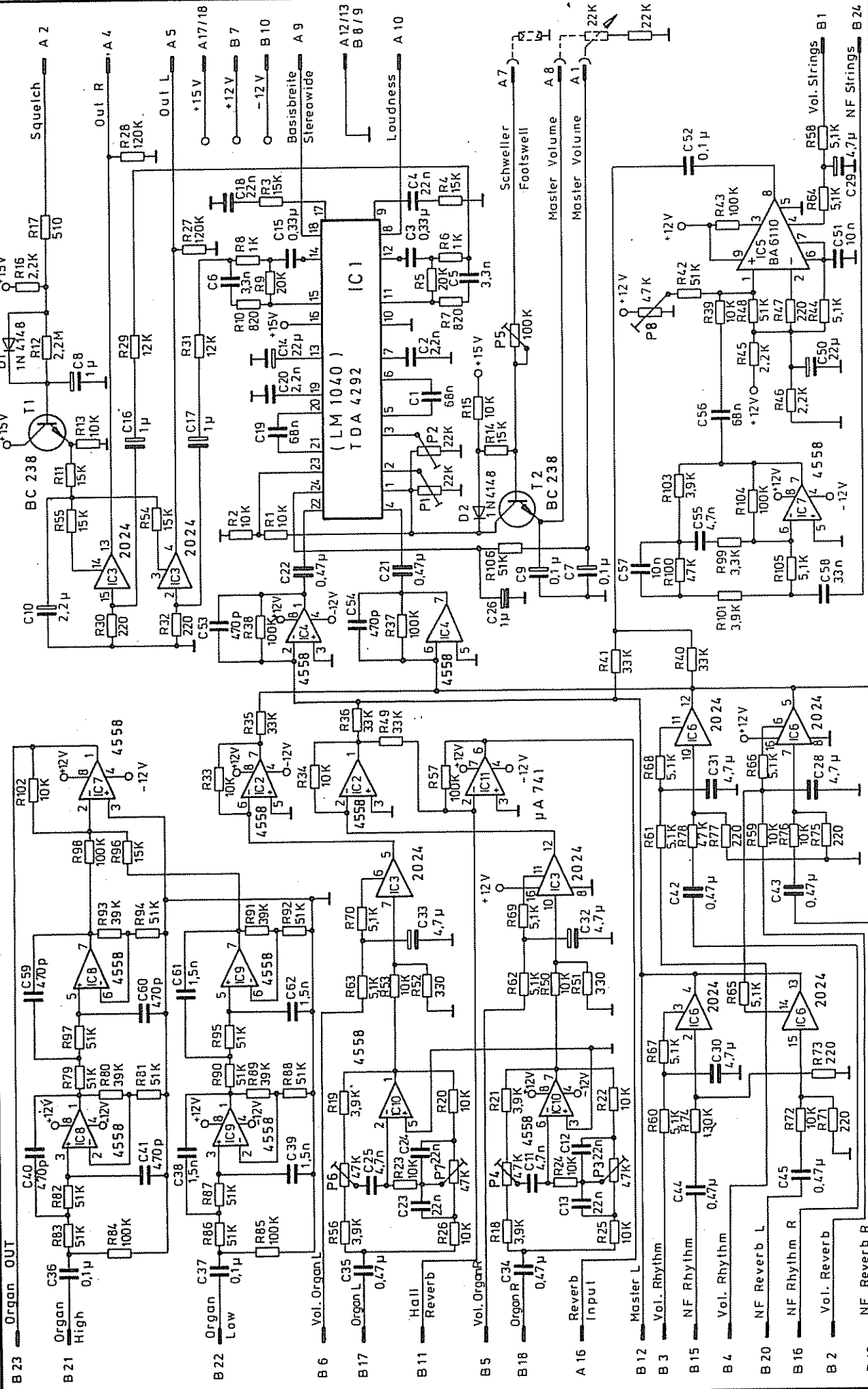
Leiterpl. unbestückt: 6-400.420-5201

Mischplatte (MP)
mixing unit

MATTH. HOHNER AG
7218 Troaringen

Benennung:

für Type: SYMPHONIE D 200



Tag	Name, Kurz-Ze.	Art, Mittelung
		Tag
Beauf.		Name, Kurz-Ze.
Geprüft		

Änderungen vorbehalten

MIDI (Musical Instrument Digital Interface)

1.) General:

The MIDI sockets enable the connection of the HOHNER D200 to other electronic musical instruments and home computers, equipped with MIDI. It offers a wide variety of applications. The D200 can for example be used to compose and store your own pieces, or as a music box for your next party. The applications reach as far as a programmable rhythm unit and automatic accompaniment for your synthesizer.

2.) MIDI Specifications:

- a) After switching on, the D200 is in the Standard Mode, "MIDI Mode 1" i.e. Omni on, Poly).

This means: The D200 sends all played notes via MIDI channel 1 (CH₁) and plays notes received on channels CH₁ - CH₁₆. If the arrangeur is switched on the timing clock (F8 Hex) is operational. The arrangeur can also be controlled through external clocks provided that the D200 has received the control signal "Start" or "Break" or the MIDI start signal (FA Hex), via the MIDI connection.

In case your instrument or home computer has no start signal for the arrangeur, (only clock), you can make the arrangeur accessible through a trick. Connect sockets MIDI IN and MIDI OUT on the D200 with the MIDI lead. Then press start or break and the D200 switches to external MIDI rhythm. Now disconnect the lead from MIDI OUT and connect it to the MIDI OUT of your home computer. The arrangeur tempo is now in sync with your home computer and is only controllable through the computer.

Please note:

Tempo + and - are no longer operable.

Should you wish to return to internal Arrangeur tempo, the D200 has to receive the "Start" signal via the MIDI IN, or the D200 has to be switched off and on again.

- b) Via MIDI IN, the D200 can be changed to "MIDI Mode 3" (Omni off, Poly). You can then program one of the 16 channels as a melody channel and another one as a rhythm channel. MIDI information on the remaining 14 channels are then ignored. Both channels can be controlled by the home computer at the same time. The transmitted data (MIDI OUT) is the same as in standard mode (MIDI Mode 1).

The correspondence of notes to the rhythm instruments for the rhythm channel are as follows:

The low C on the lower manual has the number 36 - etc.

<u>Note</u>	<u>Key Number</u>	<u>Rhythm Instrument</u>
C	36	Bass Drum
C sharp	37	Rim Shot
D, E	38,40	Snare Drum
D sharp	39	Hand Clap
F, G	41,43	Tom 1
F sharp, G sharp	42,44	Close Hi-Hat
A, B	45,47	Tom 2
A sharp	46	Open Hi-Hat
C sharp, D sharp	49,51	Ride Cymbal
F sharp	54	Tambourine
G sharp	56	Cowbell
A sharp	58	Maracas

The switch information is sent every time a switch is operated, and when received has the same effect as if the switch had been used on the instrument.

The system exclusive information is used to store registrations (autoregistration, sound presets), in the computer.

Exception: If the control signal for Start or Break is received, the instrument is switched to external Arrangeur rhythm.

c) Mode Change (System exclusive)

1111 0000

0010 0100 Hohner Identification No.(24.H)

0001 0001 Command No. (11H)

0000 aaaa Melody Channel No.(0 .. FH)

0000 bbbb Rhythm Channel No.(0 .. FH) aaaa ≠ bbbb

1111 0111

Change from MIDI Mode 1 (Omni on, Poly) to MIDI Mode 3 (Omni off, Poly).

After receiving this MIDI code, only the notes received on channel aaaa are played. The notes received on channel bbbb are played as rhythm instruments. See table page 29. It is advisable to choose different channels for melody and rhythm.

To revert the D200 to MIDI Mode 1 you have to switch off the instrument.

d) External Arrangeur clock:

1111 1000 -----24 times per quarter note (crotchet)

This information is only decoded if the arrangeur has been switched to external clock through either the Start or Break signal, or the Beat Start signal.

e) External Arrangeur Start

1111 1010 Has the same effect as pressing "Start" if in MIDI Mode 1. In MIDI Mode 3 this command is ignored, to avoid conflicts in the rhythm channel.

3. Data

a) Note off 80 H -----Note off, channel 1
 Okkkk-----Key number
 40 H-----Key release speed

b) Note on 90 H-----Note on, channel 1
 Okkk kkkk-----Key number
 40 H-----Key release speed

Okkk kkkk keynumber (36 - 96)

Sending in both modes (MIDI Mode 1 and Mode 3)
on CH 1.

c) Switch information (See data receive)

d) Arrangeur clock: F 8 Hex is sent when arrangeur
 is switched on.

Please note:

Since the D200 can only play 6 of 12 possible rhythm instruments at the same time, the following combinations are not possible:

1. Hi-Hat open + Hi-Hat closed
2. Ride cymbal + Tambourine
3. Snare drum + Rim Shot
4. Tom 1 + Tom 2
5. Cowbell + Hand Claps

Since these combinations are in practice never or hardly ever used a restriction in musical expression is not noticeable.

3.) Technical Information

Numbers with a suffix H or Hex are Hexadecimal.

4.) Valid Data:

All MIDI codes not listed are invalid and will always be ignored by the D200.

a) Note off:

1000 nnnn
0kkk kkkk
0xxx xxxx

b) Note on:

1001 nnnn
0kkk kkkk
0xxx xxxx

These are ignored in MIDI Mode 3 if nnnn = Rhythm channel.

kkk kkkk = key number

lowest note: C = 36

highest note: C''''=96

x = variable

Channel no. nnnn is ignored in MIDI Mode 1. If MIDI Mode 3 nnnn is the number for the rhythm channel, the rhythm instrument listed in table page 29 is played. A note off command is not necessary.

b) Switch information (System exclusive information)

1111 0000

0010 0000 -----Hohner Identification No.(24H)

0001 0000 -----Command No. (10 H)

0aaa aaaa -----Switch No.

0bbb bbbb -----Switch position (0 = Off, 1 = On)
1111 0111

Note:

If a data transmission to the UART IC-1-6850 is finished before the NOTE-OFF Information was reading, it is possible that the instrument generates constant notes.

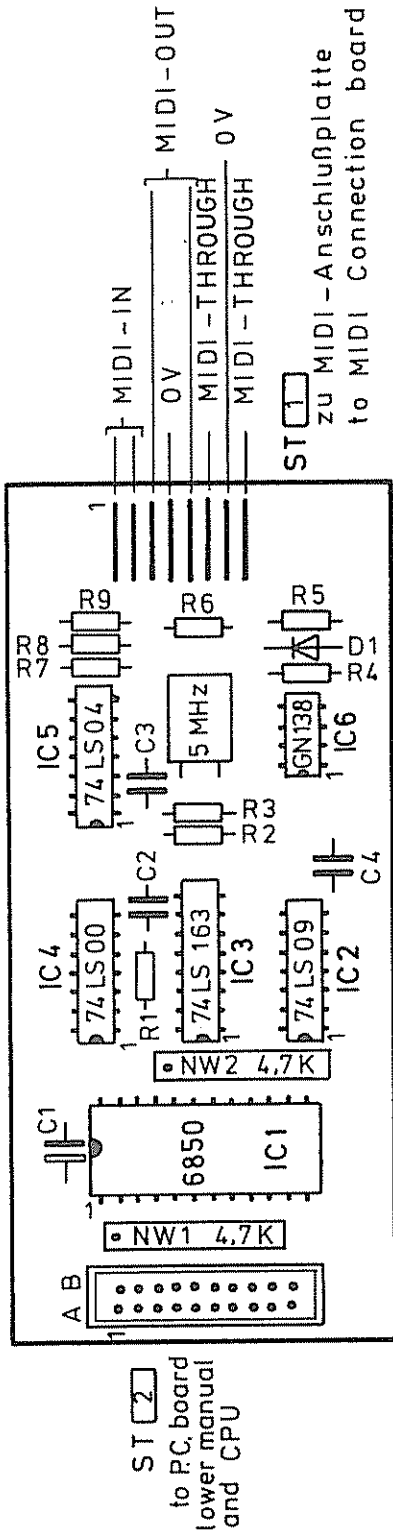
The player can erase this notes if he switch off and on the instrument or if he press the corresponding note.

The UART - IC is an integrated transmitter and receiver for digital informations which is clocked with an external X-Tal oszillator.

The clock frequency is 31,25Kc and is measurable at pin 3 or 4 of the UART. If one information is identified, the IC-1-6850-pin7 sends one interrupt (RXRDY) to the CPU.

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M. HOHNER AG 7218 Trossingen	Benennung:	MIDI Interface	Bestell-Nr.
	für Type:	SYMPHONIE D 200	Leiterpl. bestückt: 6-400.430-10
			Leiterpl. unbestückt: 6-400.430-1001



Änderungen vorbehalten

Tag	Name, Kurz-Ze.	Änd. Mitteilung						
Bearb.	<i>fid.</i>	Tag						
Geprüft		Name, Kurz-Ze.						

Tremolo unit:

This board allows rotating speaker simulation at slow and fast speed with slow to fast and fast to slow smooth transients.

Analog delay lines (BBD) are used to simulate the DOPPLER effect and VCA's to simulate the amplitude variations.

1-Description

IC1 and IC2 are mounted as a low frequency oscillator giving triangle waves (IC2 pin 1). This oscillator is stopped when flute animation is OFF. The tremolo speed can be adjusted by changing the value of R6.

Diodes D 1 to D 4 will provide a "near to sinus" waveform at IC3 (pin 1) and the same with a phase shift of 180° at IC3 (pin 7).

This sinus waveform are used to amplitude modulate the signals on respective channels (IC6, IC7) and to frequency modulate respective oscillators (IC 12, IC 13) which are clock oscillators for the BBD circuits.

IC5 is a pre-emphasis filter

IC10 is a de-emphasis filter

Bestell-Nr.

Leiterpl. bestückt: 6 - 062.420 - 53

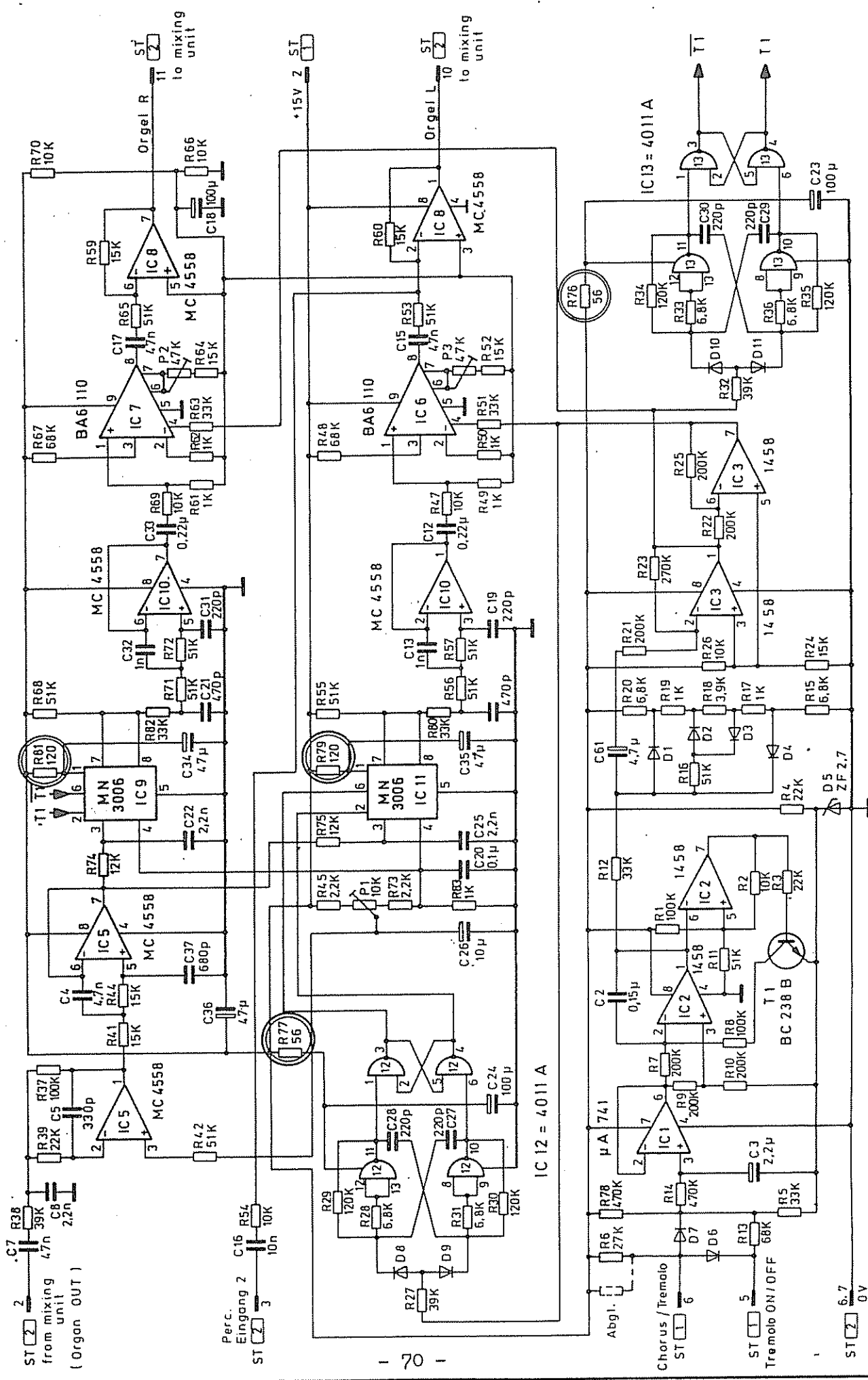
Leiterpl. unbestückt: 6 - 062.420 - 5301

Tremolo unit (TR)

MATTHI HOHMER AG
7218 Trossingen

Benennung:

D94 / D93
für Type: SYMPHONIE
D98 / D96



Alle Dioden = 1N 4148
all diodes = 1N 4148

Änderungen vorbehalten

Tag	Name, Kurz-Ze.	Änd. Mittelung	6-062/5016-062/121
Erarb.		18.11.82	29.2.84 11.12.84
Geprüft			

Bestell-Nr.

Leiterpl. bestückt: 6-062.420-53

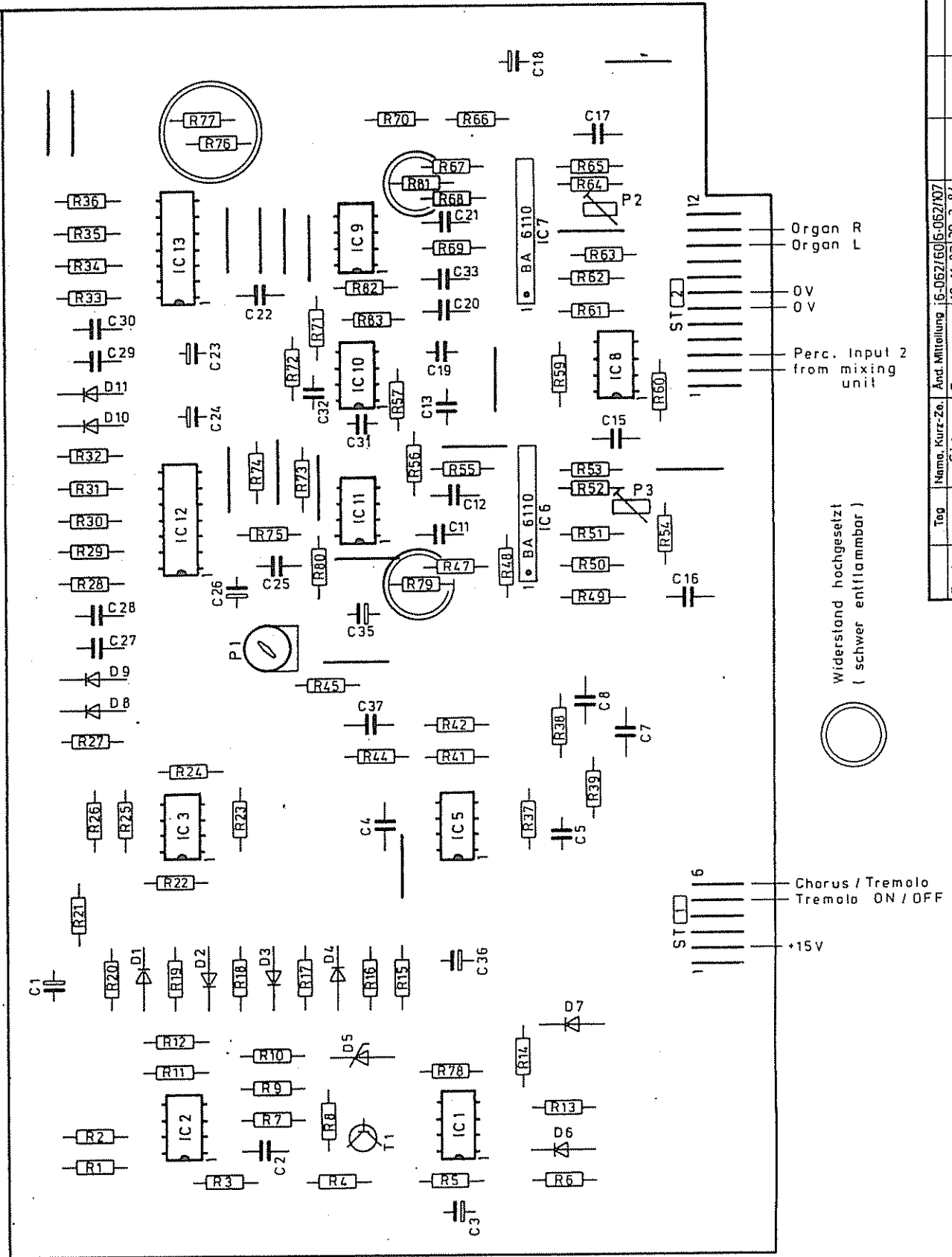
Leiterpl. unbestückt: 6-062.420-5301

Tremolo unit (TR)

MATTA HÖRNER AG
7218 Trossingen

Benennung:

D94 / D93
D98 / D96
für Type: SYMPHONIE



Tag	Name, Kurz-Ze.	Änd. Mittellung	16-062/605-062/107
Boarb.	← d.	Tag	18.11.02, 29.2.04
Geprüf.		Name, Kurz-Ze.	← d.

Änderungen vorbehalten

Power Supply and Power Amplifier board:

Power Supply:

All DC-voltages for the system are generated on this board together with a switch ON delay circuit with the relais 1 and 2. The time delay is realized with the transistors T1 - T7. T3 and T4 control the output of the bass amplifier IC-5. If a DC-voltage at this output is identificated, the transistors T1-T4 switch off the relais and protect the bass speaker.

Power Amplifier:

Three seperate amplifiers are used:

two Hybrid power amplifiers STK082 for the main channels left and right and one bass power amplifier STK086. The two channel NF-Signal is fed from the mixing unit to the master amplifier IC-1-4558. One low-pass filter with IC-2-4558 fed the bass signal to the bass amplifier.

IC-4-LM377 is used as a Headphone amplifier.

Bestell-Nr.

Letterpl. bestückt: 6 - 400. 710 - 10

Letterpl. unbestückt: 6 - 400. 710 - 1101

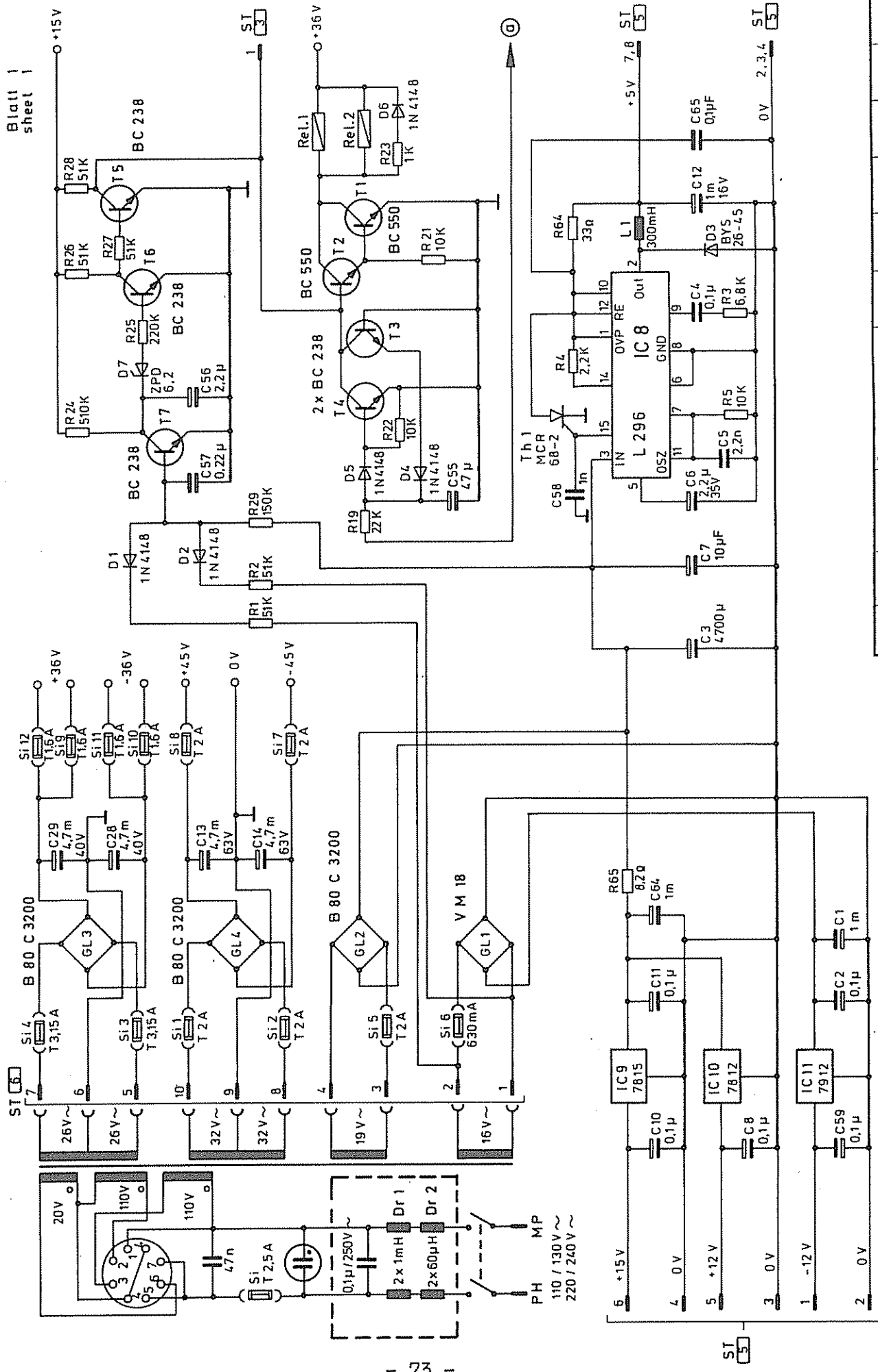
Netzteil + Endstufe (NT-ES)
power supply + power amplifier

MATTH. HÖHNER AG
7218 Trossingen

Benennung:

für Type: **SYMPHONIE D 200**

Blatt 1
sheet 1



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Bearb.	Tag	Name, Kurz-Ze.	Änd. Mitteilung
Geprüft	Tag	Name, Kurz-Ze.	

Änderungen vorbehalten

Bestell-Nr.

Leiterpl. bestückt: 6-400.710-10

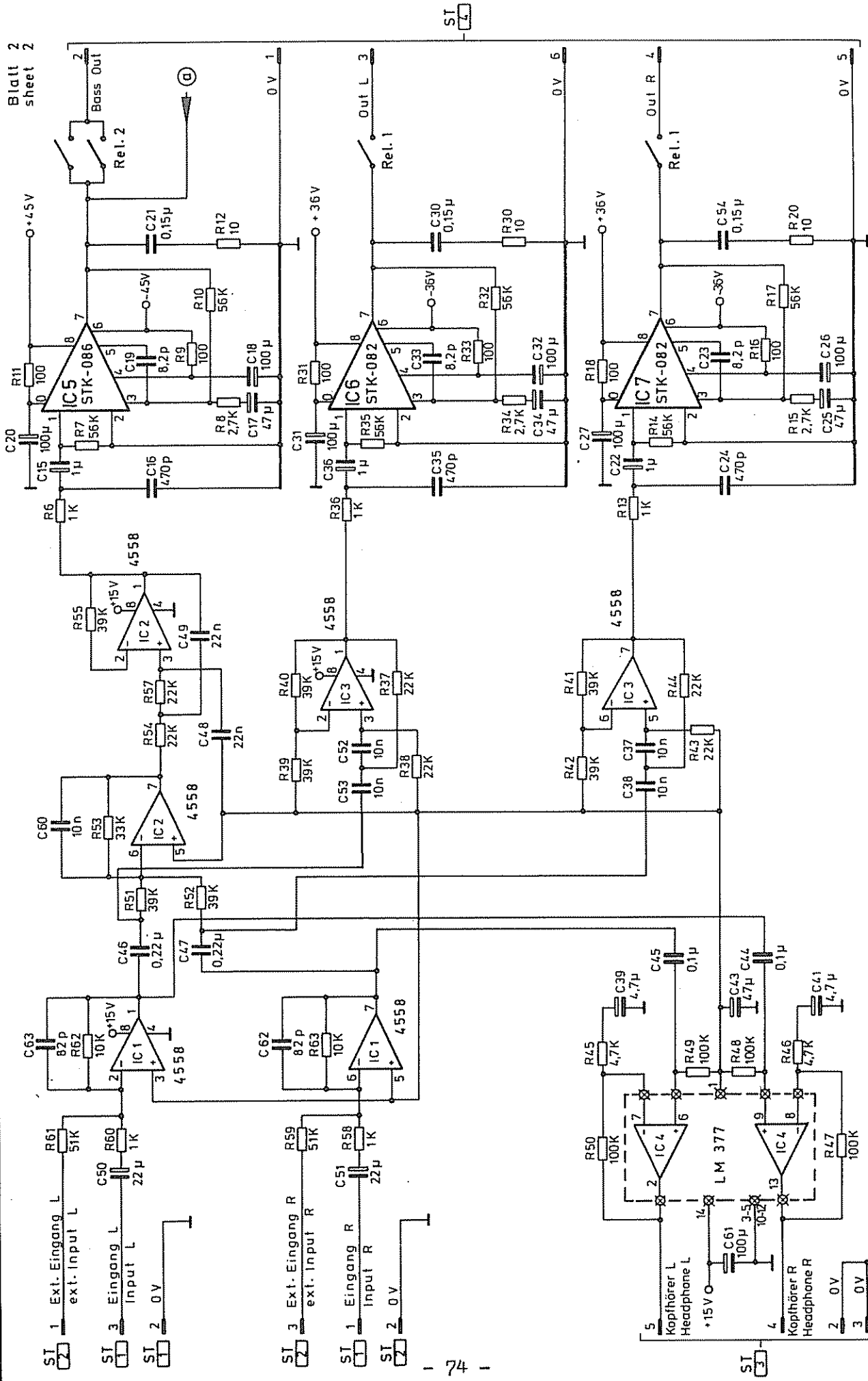
Leiterpl. unbestückt: 6-400.710-1101

Netzteil + Endstufe (NT-ES)
power supply + power amplifier

MATTH. HOHNER AG
7218 Trossingen

Benennung:

für Type: SYMPHONIE D 200



Blatt 2
sheet 2

Tag	Name, Kurz-Ze.	Änd. Mitteilung
Bearb.		Tag
Geprüft		Name, Kurz-Ze.

Änderungen vorbehalten

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Bestell-Nr.

6 - 400. 710 - 10

Leiterpl. bestückt:

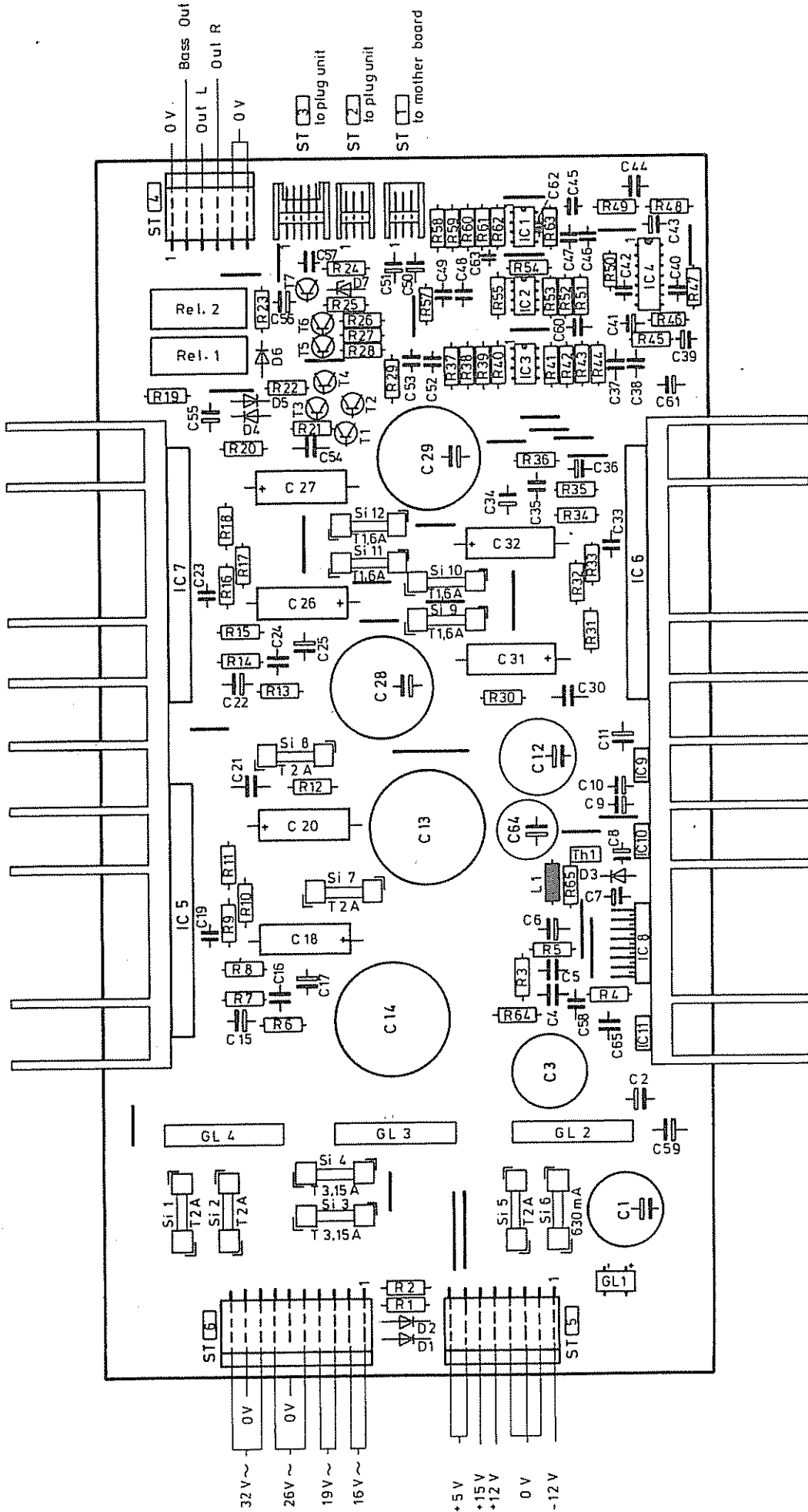
6 - 400. 710 - 1101

Netzteil + Endstufe (NT-ES)
power supply + power amplifier

MATTH. HOHNER AG
7218 Troaringen

Benennung:

für Type: SYMPHONIE D 200



Änderungen vorbehalten

Boarb.	Tag	Name, Kurz-Ze.
Geprüft	Tag	Name, Kurz-Ze.
	And. Mitteilung	

Bestell-Nr.

620855

Lieferpl. bestückt:

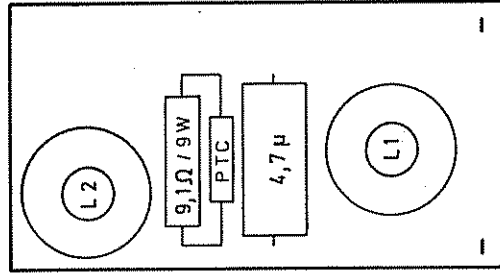
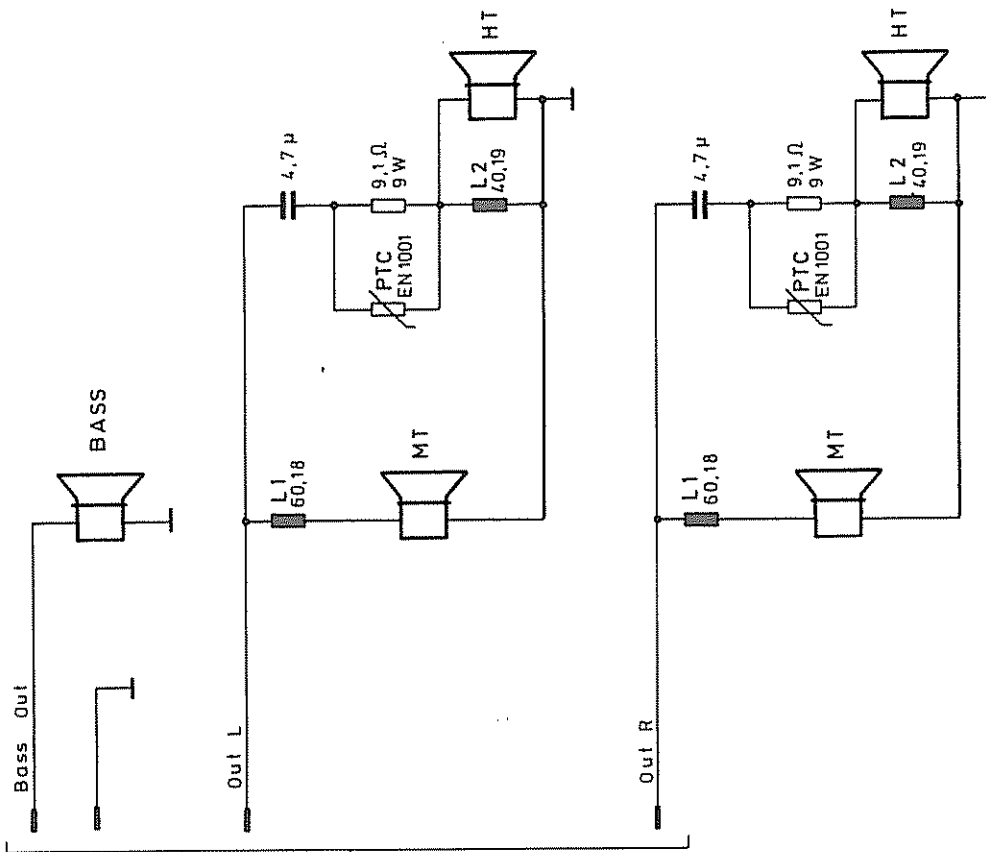
Lieferpl. unbestückt:

Frequenzweiche FW - MH 200
Frequency network

MATTH. HOHNER AG
7218 Troesingen

Benennung:

für Type: SYMPHONIE D 200



Von Endstufe ST []
from power amplifier

Änderungen vorbehalten.

Bearb.	Tag	Name, Kurz-Ze.	Änd. Mitteilung Tag	Name, Kurz-Ze.
Geprüft				

Bestell-Nr.

Leiterpl. bestückt: 6 - 400. 710 - 22

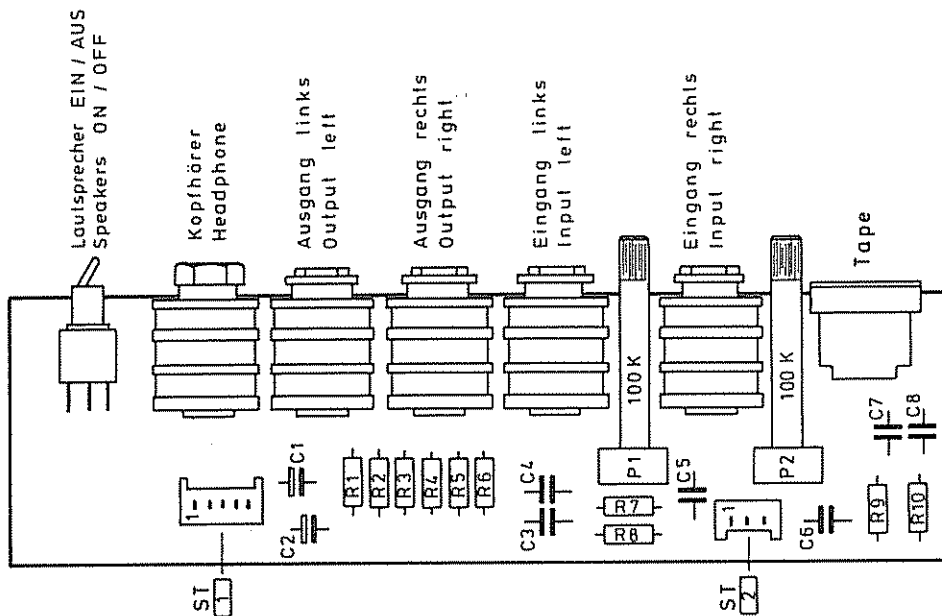
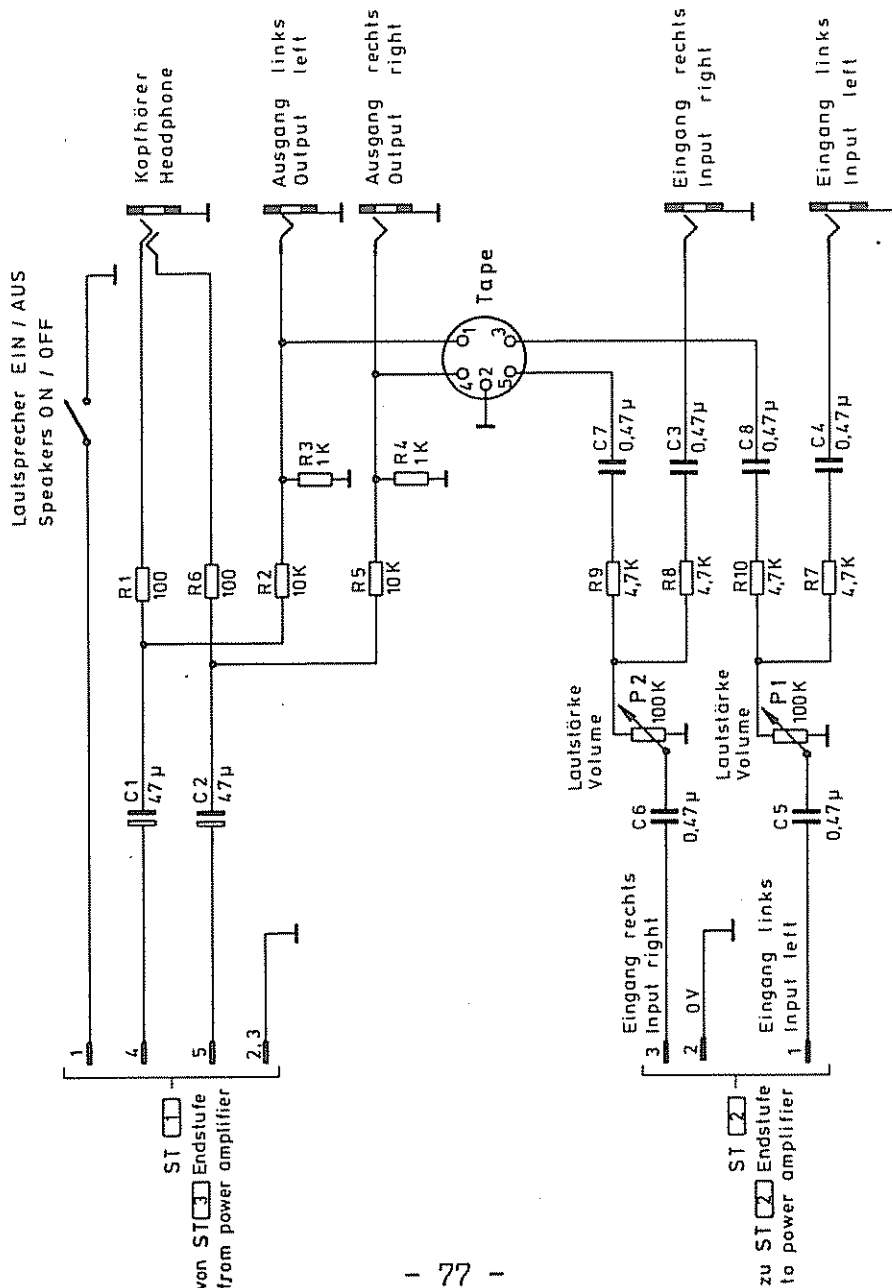
Leiterpl. unbestückt: 6 - 400. 710 - 2201

Steckerplatte / plug unit (STP)

MATTH. HÖHNER AG
7218 Troisdorf

Benennung:

für Type: SYMPHONIE D 200



Änderungen vorbehalten

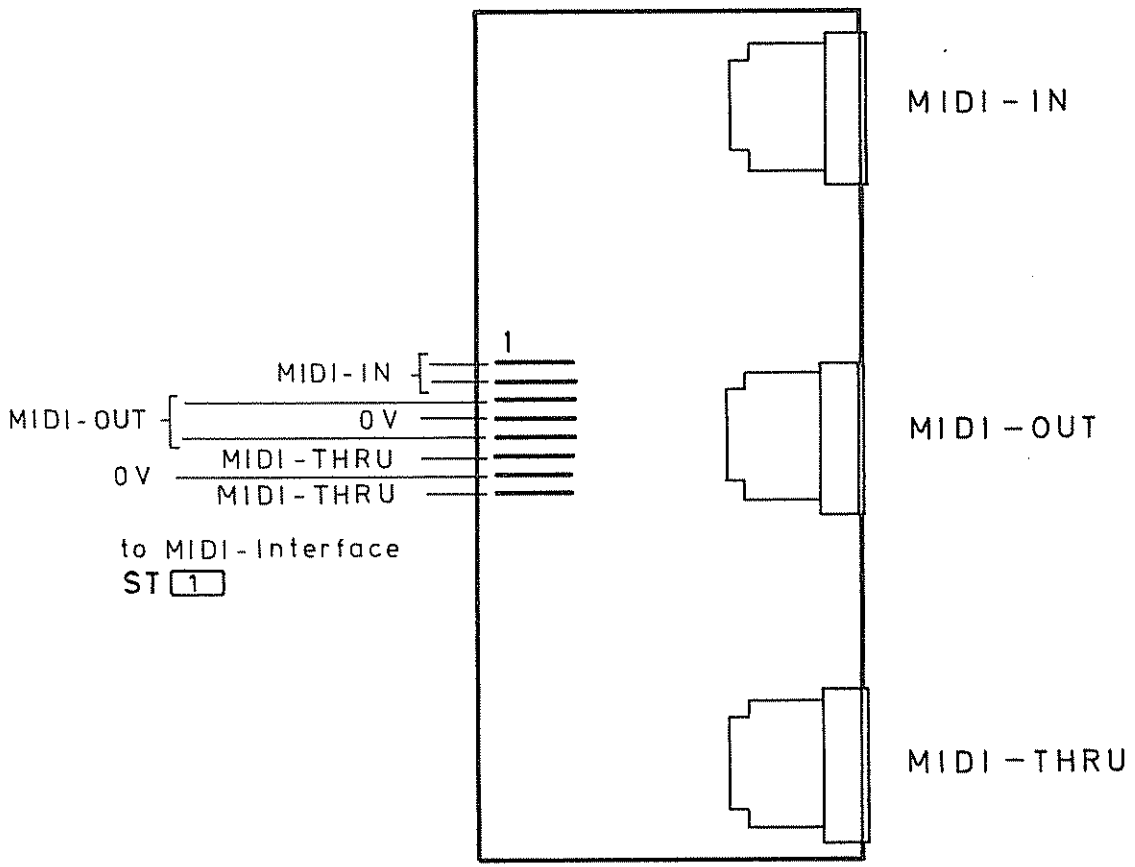
Bearb.	Tag	Name, Kurz-Ze.	Änd. Mitteilung
Geprüft			Tag
			Name, Kurz-Ze.

M. HOHNER AG
7218 Trossingen

Benennung: **MIDI Anschlußplatte**
Connection board
für Type: **SYMPHONIE D 200**

Bestell-Nr.
Leiterpl. bestückt: **6-400.430-20**
Leiterpl. unbestückt: **6-400.430-2001**

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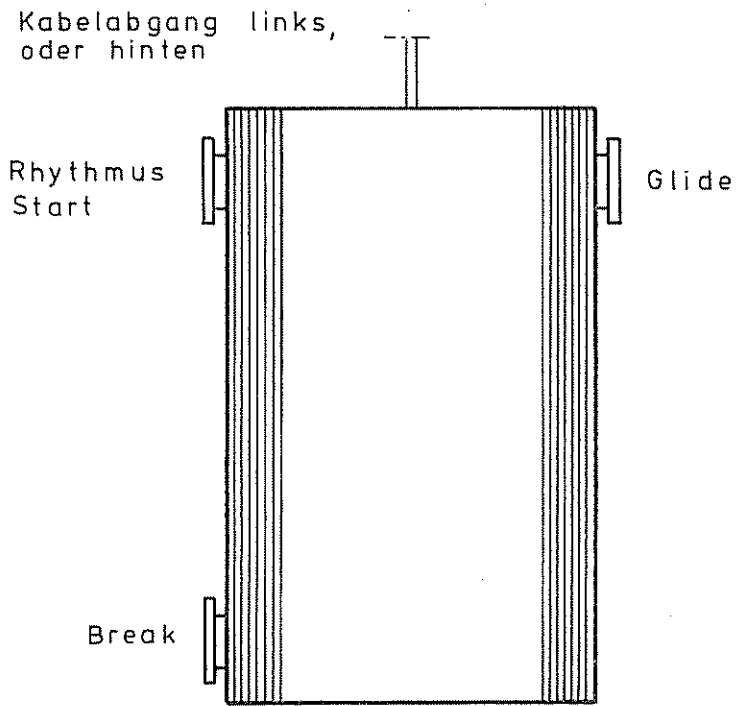
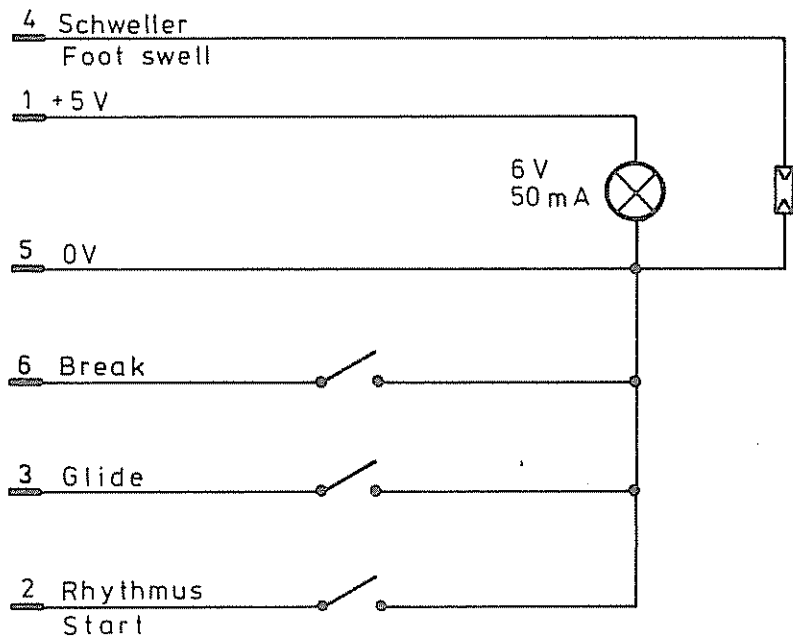


Änderungen vorbehalten

Tag	Name, Kurz-Ze.	Änd. Mitteilung						
Bearb.	Ed.	Tag						
Geprüft		Name, Kurz-Ze.						

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M. HÖHNER AG 7218 Trossingen	Benennung: Fußschweller (FS) foot swell	Bestell-Nr. Leiterpl. bestückt: 6-400.670-10 Leiterpl. unbestückt:
	für Type: SYMPHONIE D 200	



Änderungen vorbehalten

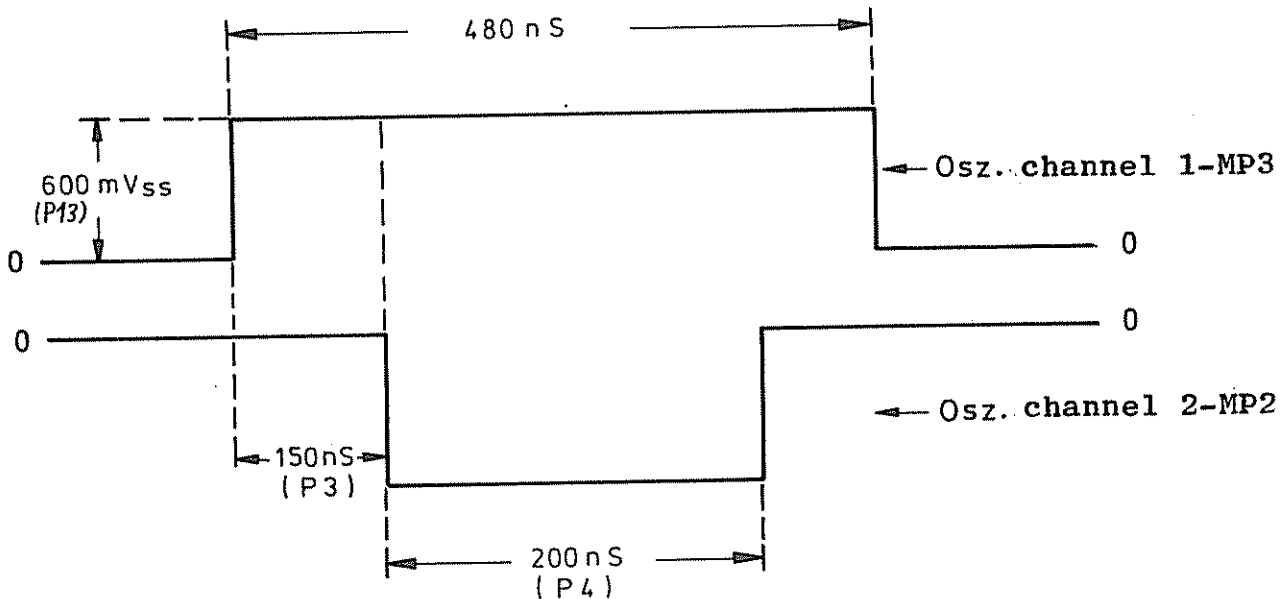
Tag	Name, Kurz-Ze.	Änd. Mitteilung							
Bearb.	Gu	Tag							
Geprüft		Name, Kurz-Ze.							

Adjustment procedure D200

- 1.) CPU-16K:
 - Adjustment of the 10mS Interrupt
 - Test point IC-A3-pin 4
 - Adjustment with P1 of the 10mS repetition rate
 - Checking with the oscilloscope

- 2.) DAC+MEG:
 - Tuning adjustment
 - Play 1 note "A" (middle octave)
 - Adjust L1 for the frequency of 440Hz
 - Checking with pitch controller device

 - Adjustment of P3 and P4 (timing diagram DAC)
 - Adjustment of P13 (DAC-Volume)
 - Checking with a 2-channel oscilloscope
 - Connect scope channel 1 with test point MP3
 - Connect scope channel 2 with test point MP2
 - Registration 2'flute on the upper manual
 - Play the note C in the upper octave
 - Adjust P3, P4 and P13 for the following diagram



- Adjustment of P1 (General Blop)
- Registration piano - FR1
- Play the note C in the middle octave on the upper manual
- The adjustment of P1 is finished if you hear no Blop noise at the end of the decay time.

- Adjustment of P2 (Symmetry)
- Registration trumpet-FR2
- Play the note C in the middle octave on the upper manual
- The adjustment of P2 is finished if you hear no Blop noise at the beginning of the note.

- Adjustment of P5 - P12 (final Blop adjustments)
- P5 - P12 give a final adjustment for the symmetry near zero amplitudes for the individual channels.
- List of registrations and settings used to adjust presets should be inactivated, e.g.
- P5, Hawaiian guitar - FR2
- P6, Bass 8' with sustain
- P7, Piano - FR1
- P8, Swing1, Arrangeur group 2, Keystart, press the note H in the lower manual for a short time.
- P9, Percussion 4' and 2²/₃'
- P10, Flutes 16', 8', 4', 2', 1' with Sustain, (Upper manual)
- P11, Barock, Arrangeur group 1, Keystart, press the note H in the lower manual for a short time.
- P12, Strings 2
- The adjustments are finished if you hear no Blop noise at the end of a decay time

Note: It is necessary before you make adjustments on the DA board to switch ON the instrument for a time of 15 - 20 min.

- 3.) Filter with DAC: - Test program "P" (PROM-check)
- Test point IC-7-pin6
 - Adjust P2 for +5V

 - Adjustment of P1 (VCF-Center frequency)
 - Adjust P1 for 0,95V (measured at the slider of P1)
 - Finally it is necessary to check the sound of the bass presets.

 - Adjustment of P3 (Bass-Volume)
 - Adjust P3 for the desired volume

4.) 4-Times filter board:

- Adjustment of P1.1-P4.1 (VCF-Center frequency)
- All voltages are measured at the sliders of the trimming potentiometers.
- P 1.1 - +1,5V
- P 2.1 - -2,7V
- P 3.1 - -4,4V
- P 4.1 - +0,5V

- Finally it is necessary to check the sound of the different groups (FR1, FR2, GR1, GR2).

- The reverb of the groups is adjustable with P1.2-P4.2

- Adjustment of P1.3-P4.3 (Volum of the groups)
- P1.3, Volume FR2
- P2.3, Volume GR2
- P3.3, Volume FR1
- P4.3, Volume GR1
- Adjust P1.3 - P4.3 for the desired volume.

5.) Mixing unit: -Adjustment of P1 (Treble), P2 (Bass)
 -Adjust P1 for + 4V at IC-1-TDA4292-pin1
 -Adjust P2 for + 4V at IC-1-TDA4292-pin3

-Adjustment of P3, P4, P6, P7
 (Bass-Treble equalizer)

-With this adjustment it is possible to correct the sound of the organ channel left/right. Each channel has a separate Bass/Treble control.

-Adjustment of P5 (initial volume for the footswell)

- Set the footswell in the min.position
- Set the Master Vol.in the max position
- Adjust P5 to the desired initial volume

-Adjustment of P8 (Offset)

- Registration Strings 2 - upper manual
- Play 3 notes on the upper manual
- Adjust P8 that you hear no distortions.

- 6.) Tremolo unit:
- Adjustment of P1
 - Registration all flutes on the upper manual
 - Play 8 notes on the upper manual
 - The adjustment is finished if you hear no distortions.

IC - Parts List D200

<u>Type</u>	<u>Material-No.:</u>
RC 4558 PS	0-617.691
MC 1458 P	0-617.692
CD 4051 B	0-617.737
CD 4011 AE	0-617.720
CD 4016 AE	0-617.693
BA 6110	0-617.773
MN 3006	0-617.775
SN 74154N	0-617.012
SN 7406N	0-617.031
SN 7407N	0-617.075
SN 74 LS 00	0-617.076
CD 4024 AE	0-617.601
SN 74 LS 32N	0-617.672
SN 74 LS 04N	0-617.547
SN 74 LS 174N	0-617.695
SN 74 LS 175N	0-617.717
SN 74 LS 259N	0-617.711
SN 74 LS 09N	0-617.670
SN 74 LS 138N	0-617.724
SN 74 HC 139	0-617.806
SN 74 LS 245N	0-617.761
SN 74 HC 163	0-617.807
SN 74 LS 163N	0-617.725
SN 74 LS 375N	0-617.729
SN 74 LS 139N	0-617.758
SN 74 C 244N	0-617.776
SN 74 LS 377N	0-617.730
ADC 0804 LCN	0-617.778
SN 74 HC 32	0-617.787
SN 74 LS 74N	0-617.665
SN 74 HC 14	0-617.786
SN 74 LS 123N	0-617.668
SN 74 HC 04	0-617.781

<u>Type</u>	<u>Material-No.:</u>
SN 74 LS 373N	0-617.728
SN 74 LS 374N	0-617.715
SN 74 HC 74	0-617.785
SN 74 LS 03N	0-617.662
SN 74 LS 241	0-617.794
SN 74 LS 191N	0-617.760
RAM HM 6264 LP-15	0-617.793
8085 A-2	0-617.829
PROM TBP 18S 030	6-400.420-3210/0
PROM TBP 28S 86AN	6-400.420-7503/0
P 2114	0-617.733
TL 084 CN	0-617.738
TL 082 BCN	0-617.742
DAC 0801 LCN	0-617.739
HEF 4051 BP	0-617.756
MC 3346 P	0-617.757
μA 741 CV	0-617.609
TDA 4292	0-617.782
SSM 2024	0-617.811
3391	0-617.791
TCA 730	0-617.718
MM 5837N	0-617.752
MCM 68A 10P	0-617.770
MB 83 256-116	6-068.420-6603/0
CGR90	6-068.420-6604/0
LM 311	0-617.744
CD 4053 B	0-617.774
LF 398N	0-617.798
TMS 4416	0-617.800
TMS 32010 IDL	0-617.801
RM 53	0-617.802

<u>Type</u>	<u>Material-No.:</u>
DM 2502	0-617.804
DM 2503	0-617.805
6N 138	0-617.810
6850 AC/A	0-617.826
LM 377N	0-617.599
7812	0-617.604
78 M 15	0-617.605
7912	0-617.700
STK 086	0-617.764
STK 082	0-617.808
L 296	0-617.809

Material List D200

<u>Material description:</u>	<u>Material-No.:</u>
Mother board	6-400.420-1000/0
I/O-board	6-400.420-3100/0
CPU - 16K	6-400.420-3200/0
DAC + MEG	6-400.420-4000/0
Mixing unit	6-400.420-5200/0
Additional board for the mixing unit	6-400.420-5299/9
4-times Filter board	6-400.420-6100/0
Filter with DAC	6-400.420-6300/0
Rhythm generator	6-400.420-6600/0
Electronic reverb	6-400.420-7500/0
MIDI Interface	6-400.430-1000/0
Cartridge	6-400.450-7500/0
Power Supply + Power Amplifier	6-400.710-1000/0
Tremolo unit	6-062.420-5300/0
P.C.board automatic	6-400.451-2000/0
P.C.board upper manual	6-400.451-3000/0
P.C.board lower manual	6-400.451-4000/0
LCD-display LM 1032	0-617.250
P.C.board rhythm	6-400.451-5000/0
P.C.board strings	6-400.451-6000/0
P.C.board tempo	6.400.451-7000/0
P.C.board autoregistration	6-400.451-8000/0
P.C.board soundswitch	6-400.451-8500/0
MIDI Connection board	6-400.430-2000/0
Plug unit	6-400.710-1101/0
Upper key block left, coulored	6-400.340-1101/0
Lower key block right, coulored	6-400.240-0002/0

Material description:Material-No.:

Fuse holder	0-604.404
Voltage selector	0-605.302
Power switch, orange	0-605.667
Power switch, black	0-605.668
Frequency network FW-MH 200	0-620.855
Tweeter 8 Ohm	0-622.573
Bass speaker PM 380/62	0-622.577
Midrange speaker 8 Ohm	0-622.581
Knob	0-622.882
Pedal	6-060.695-1000/0
Power line filter	6-062.710-0300/0
	6-400.110-0700/0
Lamp 5V 115mA	0-607.528
Lighting-tube	6-400.110-5401/0
Lighting unit of illumination	6-400.110-5400/0
Accumulator 3,6V 190 MAH Type 3N100	0-609.066
Key - lower part	6-400.451-2003/0
Key red	6-400.451-9021/0
Key yellow	6-400.451-9022/0
Key green	6-400.451-9023/0
Key dark-grey	6-400.451-9024/0
Key light-grey	6-400.451-9025/0
Key white	6-400.451-9026/0
Key blue	6-400.451-9028/0
Knob black	6-400.450-9002/0

Material description:

Material-No.:

Power transformer	0-620.551
Slider potentiometer 10K Ohm lin.	0-611.952
Trimming potentiometer 22K Ohm	0-611.677
Trimming potentiometer 10K Ohm	0-611.647
Trimming potentiometer 1K Ohm lin.	0-611.577
Trimming potentiometer 47K Ohm lin.	0-611.726
Trimming potentiometer 100K Ohm lin.	0-611.753
Trimming potentiometer 100K Ohm pos.log.	0-611.751
LED - CQW 54	0-617.249
LED - yellow D3	0-617.251
Relais	0-623.015
Diode-jack	0-606.250
3-pin-stereo jack	0-606.254
2-pin-jack	0-606.259

G L O S S A R Y

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A 0-15	ADDRESS BUS
AD 0-7	Mux Address + Data Bus
ADI 0-2	Address line for the multiplexer
ALE	Address Latch Enable
AMP	Amplitude
ANA	Analog Input from the register
AW	Address Memory waveform
BUSEN	Bus enable
CKI	Clock next I
CLAMP	Clear Amplitude
CLK	Clock 320 n S
CLKA	Clock A/D-Converter
CYN	Carry next I
CPU	CPU-Cycle
CSADC	Chip Select A/D-Converter
DACOUT	Filters
DIFF	Difference
END2	Enable Register Multiplexer
ENL	Enable Latch
ERT	Enable Register Time
FR	Preset
GEON	General ON/OFF
GR	Group
I/O	Input/Output
KA	Channel Selection
LN	Load next I
LDAC	
H1, H2	Clock 480 n S
MEG	MEG enable
MXE	Multiplexer enable
N 0-2	Octave information
OS	OUTPUT Select
P-ON	Power ON
RD	Read Data
RDM	Read Matrix
RDP	Read Phase
RYINT	Rhythm Interrupt
RYL	Rhythm Channel left
RYR	Rhythm Channel right

SID	Serial Input Data
SMX	Select Multiplexer
SRCLK	Shift Register Clock
SRDAT	Shift Register Data
SREN	Shift Register Enable
SG	Soundgenerator
T	Time Divider Ratio
TRAP	Non Maskable Interrupt
TRAPEN	Trap enable
WCON	Write Control Signal
WF	Waveform
WEW	Write Waveform
WR	Write Data
WRDAC	Write Digital-Analog Data
WRFD	Write Filter-Data
WRET	Write return
WRRY	Write Rhythm-Data
WRS	Write Shift-Register
WRT	Write Rhythm Time
X, Y	Matrix Bus