WURLITZER

C E

RAINBOW

WURLITZER TOWER

CD2 - CDM12
F91 / I84

FIELD SERVICE MANUAL

Table of contents

Warning

Although the beam emitted by the laser diodes is nearly invisible, it may cause severe damage to the human eye. Use an infrared indicator to check the laser beam.

CLASS 1
LASER PRODUCT

3122 110 03429

Caution

The CD mechanism and many ICs are extremely susceptible to electrostatic discharges. The photo diodes and the laser diode are more sensitive to discharges than MOS ICs. Careless handling may immediately destroy components or can drastically reduce life expectancy of these components so that it will lead to failure after several weeks or even months of use.

Before you touch the Player, discharge your hands and tools by touching a grounded metal part of the jukebox, such as the amplifier or the mechanism chassis. Make sure that you are connected via a wrist wrap with resistance to the same potential as the chassis of the jukebox. Keep parts and tools at the same potential.

If you remove the player in case of repair or for transport, short the harness with a short circuit plug.

When repairing, observe all valid safety rules. Do not change the original condition of the jukebox. Use original spare parts only.

ESD

This manual belongs to machines equipped with program versiones 4.08 (or higher).

Subject to alterations.

1.1. Unlocking
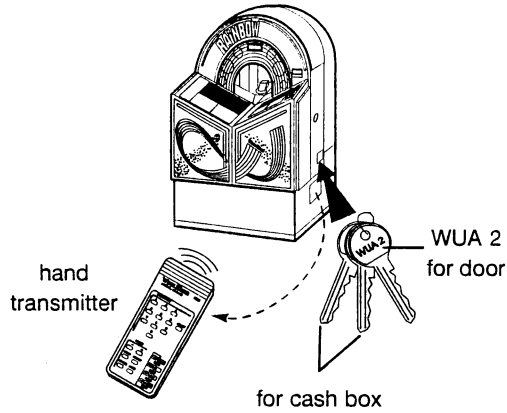
The key is stored in the coin return cup in the RH cabinet wall. The key WUA 2 unlocks the cabinet by turning the key clockwise. The lock is spring loaded, press slightly against the door, this allows to turn the key easily. The two other keys with 5 digit number codes unlock the cash box at the bottom of the RH cabinet wall. Inside of this box the hand transmitter is located if an infrared remote control had been installed.

hand transmitter

WUA 2 for door

for cash box

1.2. Removal of shipping guards
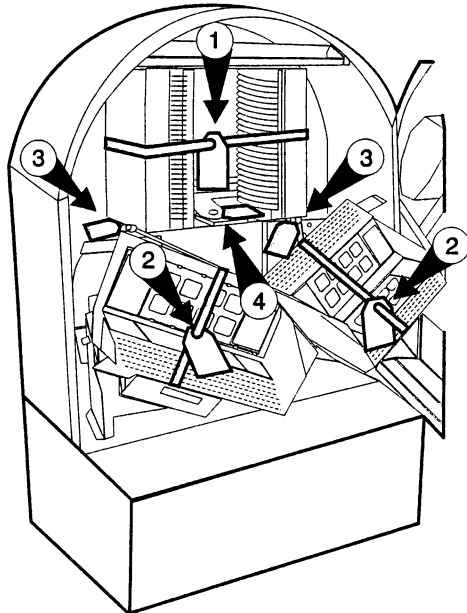
1. Remove elastic band from the magazine cabinet.

2. Remove elastic band from the motor page systems.

3. Loosen both wing nuts on RH and LH underside of the magazine cabinet until fully extended.

4. Remove CD lens cover.

   Remove shipping guard of bill validator if installed (is also marked with an indication plate).

☑ **IMPORTANT**

Save the removed shipping guards. You may need them should you decide to move your machine to another location.

1.3. Verification of power voltage

☑ **IMPORTANT**

Make sure that power outlet is grounded properly.

The jukebox can be delivered with two different amplifiers F91 and I84. You can check and modify the power setting on the power transformer of both amplifiers. It is described in the according chapter 'amplifier F91' and 'amplifier I84'.

1.4. Power on
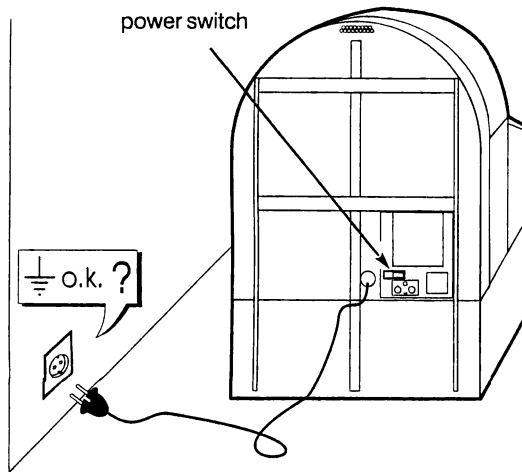
Insert the power plug. Set the power switch on the rear side of the jukebox to on. The illumination will light. The selection sledge starts an initialisation run and the counting of the disc compartments can be watched in the display. If all compartments are recognized the display shows "6 1 6 1" for short time. After all the sledge stops in its home position. The digital display shows the most played track. If the box is brandnew and the selection memory empty the display shows "0 0 0 0".

1.5. Position of CD's in magazines
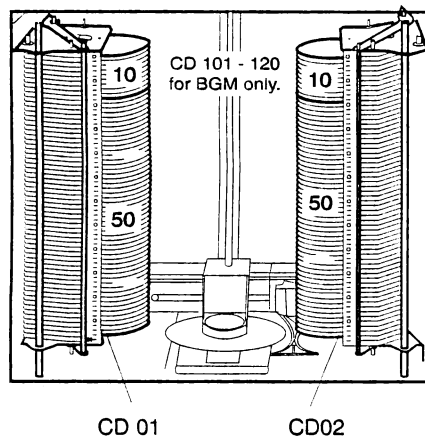
Up to 120 CDs can be inserted in total. The left magazine contains all CD's with odd compartment numbers (01, 03, 05 ...), the right one contains all even numbers (02, 04, 06 ...). But only 100 CDs can be selected in normal operation. (CD-no. 01 to CD no. (1)00). The CD's number 101 - 120 you can use only for Back Ground Music.
You have to update the 'number of CD's in the magazines' in service level 1 button 5 if you insert a lower number of CD's than 100 (factory pre setting).

1.6. Remove magazines
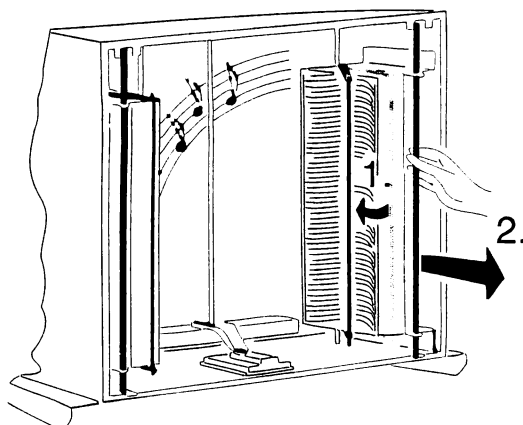
You can pull out the magazines separately. By pushing the latch bar (1) inwards the magazine released. At the same time the CD's are locked into place. Pull the handle bar (2) to remove the magazine completely.
When you insert the magazine the latch bar clicks into place and releases the CD's.

latch bar   handle bar
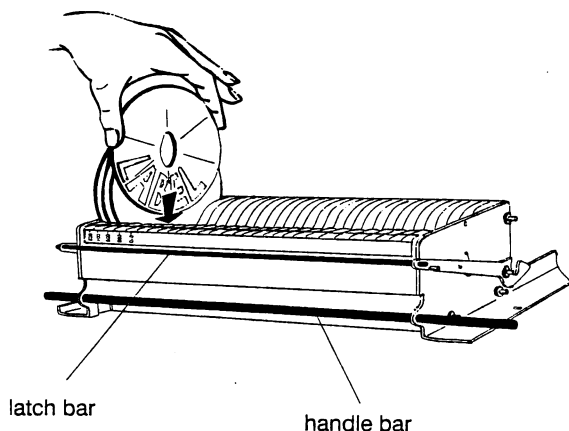
☑ **IMPORTANT**

Always push the magazine into its frame until the latch bar clicks into place properly!

You can lay the magazine on its back side. Note, that the left magazine contains all CD's with odd numbers, the right one all with even numbers. Insert the CD's starting with the compartment 01, in the LH magazine then insert the second CD into compartment 02 which belongs to the RH one etc.. The CD label has to face upwards.

Note:

In theory it is possible to use only one magazine. In this case the empty one has to be removed and the jukebox needs to be switched off and on once. After the initialisation run all selections belonging to the missing magazine are disabled. If e.g. the RH magazine is missing, all even selections are disabled. If the such a selection is made the digital display will flash.

1.7. Programming number of CD's in magazines

level 1	button 5

Selection & Credit Computer

Service   button LT
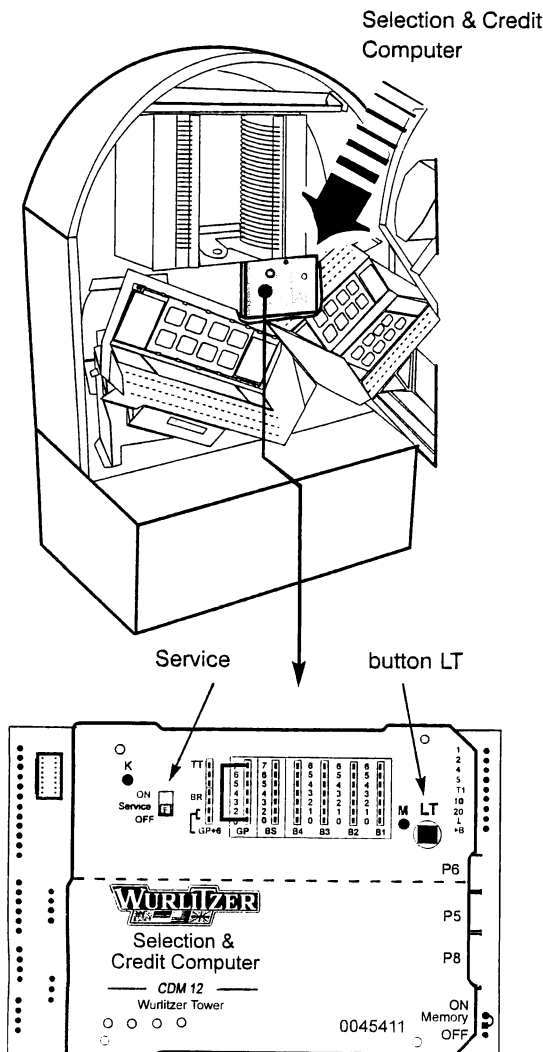
You have to update the 'number of CD's in the magazines' if you insert a lower number of CD's than 100 (factory pre setting) or after a change of the number of inserted CD's .

At the rear wall inside of the jukebox cabinet the so-called Selection & Credit Computer is situated. Some units are equipped with a metal cover. But the switch "SERVICE" and the button "LT" are accessible through holes.

To program the number of inserted CD's (service level 1):

1. Set the slide switch 'SERVICE' at the SCC-unit to ON.
2. Press 'LT' button.
3. Press selection button R -hold down- and press selection button 0 then release both buttons.
4. Press selection button 1. Service level 1 is reached. Display is: 1_ _ _.
5. To check the curent setting press button 5, the display shows e.g. 50 or 00.
6. To reprogram press selection button 5 -hold down- and press selection button R. Enter the desired number of CD's with two digits (enter 00 for 100 CD's).

To check the new settings, press button 5 again.

Exit the serviceprogram:

1. Set the slide switch 'SERVICE' at the SCC unit to OFF.
2. Press 'LT' button.

The changer starts an initialisation run. After this the jukebox is ready to operate.

2.1. Price settings

If other combinations are required, refer to the examples shown in chap. 2.6.

Usually the prices are preset by the factory according the denomination label. In the "Unipack" version no play prices are pre-set. To set the play prices do the following steps:
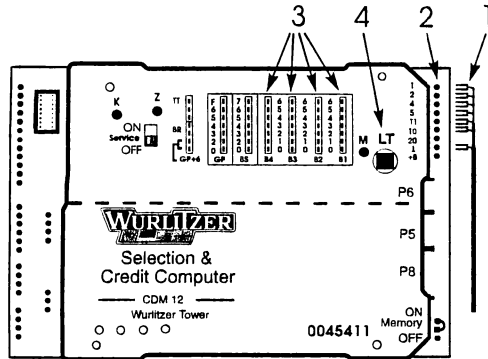
1. Switch on the jukebox.
2. Coin output plugs (1) should be set according an separate attached instruction by connecting to the pin row (2) on the SCC unit. Pay attention to wiring colors (ref. to chap. 2.4).
3. Set the attached jumpers in B1 to B4 according to the number of the desired additional bonus plays. (3) (ref. to chap. 2.2)
4. Press „LT" button once (4) to accept the new bonus setting.

2.2. Examples
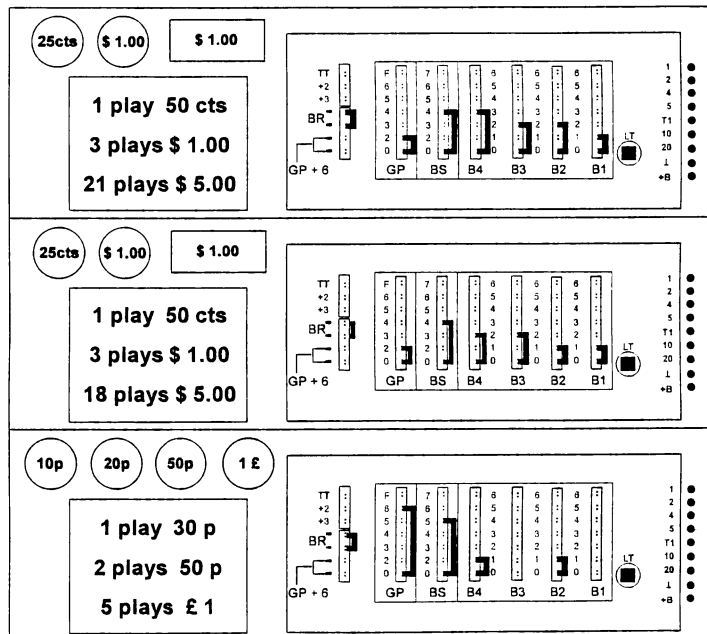
2.3. Free play programming
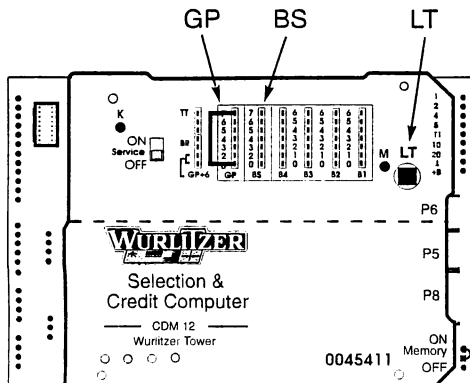
Set a jumper from 0 to F (free play) in the row GP on the SCC unit.
Press 'LT' button.
Now **one track** is selectable without coin insertion.
In between **two to six plays** are selectable by setting an additionally jumper in the row 'BS' (*Bonus-Stufe, Bonus Step*) from 0 to 2 or from 0 to 6.
Up to **47 tracks** are pre-selectable by setting a jumper in this row 'BS' from 0 to 7.

2.4. Color codes of coin inputs
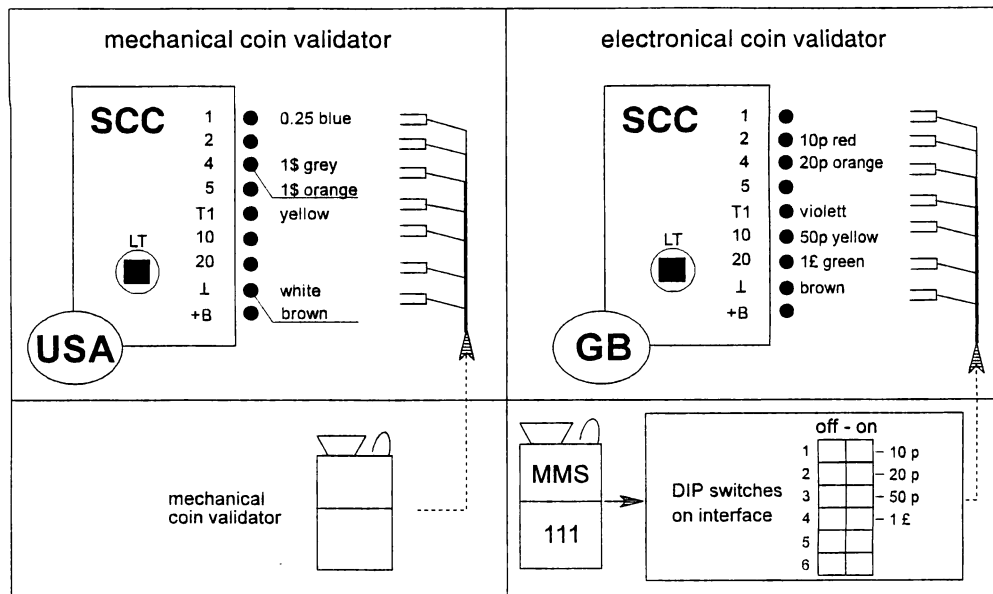
2.5. Test credit
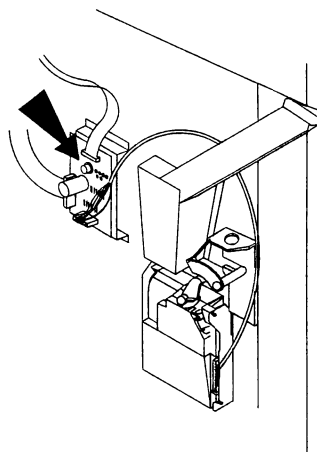
Position of the test credit button in jukeboxes with an electronic coin validator.

For repair and test purposes it is possible to give test credits. These credits will not be stored in the internal cash counter. At each pressing of the test credit button one credit will be given and also displayed in the digital display.

If an electronic coin validator is installed the test credit button is situated on the coin validator interface board. In jukeboxes with mechanical coin validator the test credit button is mounted over the return lever inside. The test credit input is marked on the SCC unit as T1.
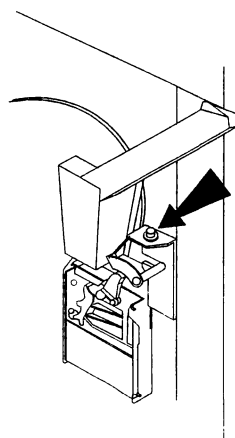
Not used test credits can be erased by pressing the button 'LT' on the SCC unit.

Position of the test credit button in jukeboxes with an mechanical coin validator.

2.6. The bonus jumper system how it works

Statement: At the right hand side of the SCC unit are located the so-called coin inputs designated by the numbers 1,2....10,20. These inputs are used to set a monetary value to the „basic unit" the computer uses to figure credits. If no bonus jumpers are inserted and input 1 is shorted to ground by a coin validator the SCC gives one credit. This corresponds to a basic unit and will be called as one input pulse in the following description. In most applications one input pulse agrees to the lowest coin value. The terminals 2 to 20 give corresponding to their number 2 to 20 input pulses per coin insertion.

If no jumpers are inserted each input pulse switches the SCC unit to the next bonus step B1 - B4. This is first of all without result because no jumpers are set in the columns B1 to B4.
If there are jumpers set in B1 to B4 additional credits will be given corresponding to the reached bonus step and the jumper setting in this step.

Example: B1 is set from 0 to 3: By reaching the first bonus step (after one input pulse) one basic credit is given + 3 credits from the bonus step B1 = 4 credits will be displayed

If the same jumper is set in B2 and the next input pulse reaches the SCC unit, it will switch to the next bonus step B2 and the credits given before the basic credit from the input pulse and the three credits from B2 will be added 4 + 1 + 3 = 8 credits. This is repeated until B4 is reached.

If the jumper BR is set the SCC unit it will stay in step B4 until the next selection is made. At each input pulse the basic credit of this pulse and the bonus credits from step B4 will be given. If BR is not set the SCC will jump back to step B1 when B4 is overflowed.

A jumper in BS causes the computer not stepping at each input pulse to a new bonus step but moreover when two or up to seven input pulses have reached it. For example, if a jumper in BS is set from 0 to 4 the bonus step B1 will first be reached after 4 input pulses. B2 will be reached after the next 4 pulses.

A jumper in GP means that the computer will not give a basic credit at each input pulse, but will only give a basic credit after the programmed number of credits in GP. Example: GP: 0 -> 4 = 4 input pulses give one credit. This system is needed to enable the machine to deal with as smaller coins as a nickel and to be able to interface with foreign coin systems.

The table below gives an example for the following jumper setting:

BR = no Bonus Reset (B4 repeat)

BS = Bonus Step

GP = Basic Price
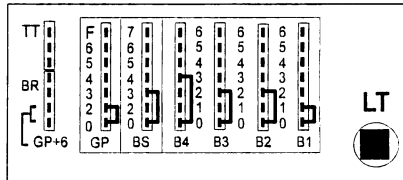
pulse	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
plays from GP	-	1	-	1	-	1	-	1	-	1	-
from bonus step			B1			B2			B3		
plays B1...B4			1			2			2		
total plays	-	1	2	3	3	6	6	7	9	10	10

pulse	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
plays from GP	1	-	1	-	1	-	1	-	1	-	1
from bonus step	B4			B1			B2			B3	
plays B1...B4	3			1			2			2	
total plays	14	14	15	16	17	17	20	20	21	23	24

The table on the opposite page can be used as a copy template for your own calculations.

Price settings:

TT :
+2 :
+3 :
BR :
GP+6

Connector pins: 1, 2, 4, 5, T1 test credit, 10, 20, ⊥ GND, +B +35 V!

LT

GP F 6 5 4 3 2 0
BS 7 6 5 4 3 2 0
B4 6 5 4 3 2 1 0
B3 6 5 4 3 2 1 0
B2 6 5 4 3 2 1 0
B1
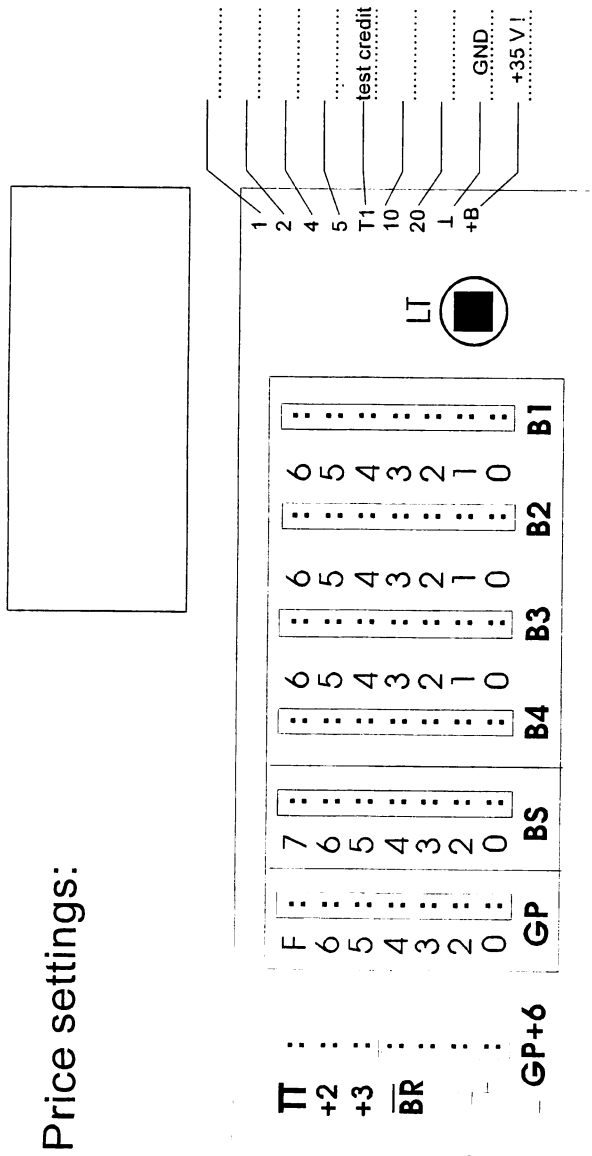
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.
pulse																									
inserted money																									
plays from GP:																									
from bonus step																									
plays B1...B4																									
total plays																									

2.7. Track selection
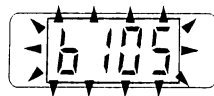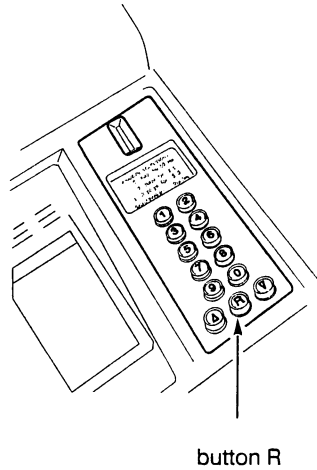
button R

If credit exists or free play is set you can select tracks by means of the buttons 0 - 9 of the keyboard.

First enter the number of the CD with two digits, then the track with two digits too (track numbers higher than 35 will not be accepted).

Example: CD 2, track 9: Enter 0 - 2 - 0 - 9.
(Exeption: CD 100 = 00.)

You can delete wrong entered numbers up to the third digit by means of the button R (Reset). But after having entered the fourth digit the jukebox stores and executes a selection also made by mistake. By pressing the button R the available credit will be displayed for a few seconds.

After entering the fourth digit of a selection the jukebox starts to search and play the selected CD immediately. If the display flashes the entered selection was not valid. Check:

● if credit is available or
● if the selection is higher then the programmed number of CD's in magazines

If you select a higher track number as available on a CD. The jukebox overcounts the tracks and stats at the beginning. Example:
CD 03 contains 17 tracks. But selected track is 0 - 3 - 1 - 9.
The jukebox plays track 02 of CD 03.

2.8. Selecting, displaying and programming of the top tunes

As example we use the US price settings
50 cts 1 play, 1$ 3 plays, 5$ 21plays :
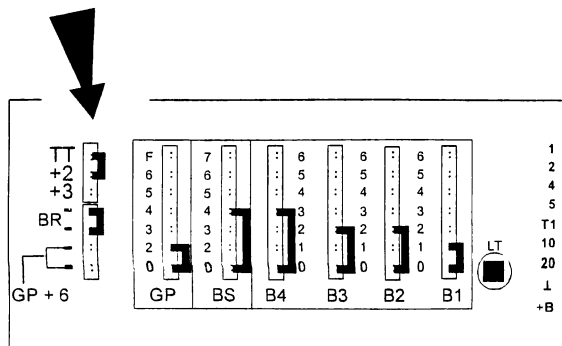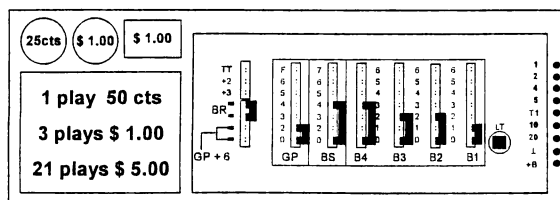
You can select the most played tracks (top tunes) by selecting 9999 in the normal operation mode. Condition is that the 2nd bonus step (B2) of the jukebox is reached by coin insertion. The total number of played tracks depends on the bonus price settings of the first two bonus levels (B1 and B2, ref also to chap. 2.6). Additional to this setting the jukebox plays one track more.

After having reached the bonus level 2 the SCC unit gives 7 credits (4 basic crdits total + 1 bonus credit from B1 + 2 basic credits from B2 = 7 credits total). If you select the top tunes with 9999 the jukebox plays one track more (= 8 tracks).

If you set an additional jumper from TT (Top Tunes) of the SCC unit to +2 the jukebox plays two additional tracks (in our example 9 tracks).

If you set a jumper from TT to +3 the jukebox plays 3 additional tracks (in our example 10 tracks).

To find out what tracks will be played after selecting 9999 you can display the single tracks by entering 9998. At first the most played track will be displayed. Than you have to enter 9998 again and so the jukebox shows the second most playd track etc. To display the tracks the SCC unit needs about 2-3 sec for calculation. If the display starts to flash press the selection button R once.
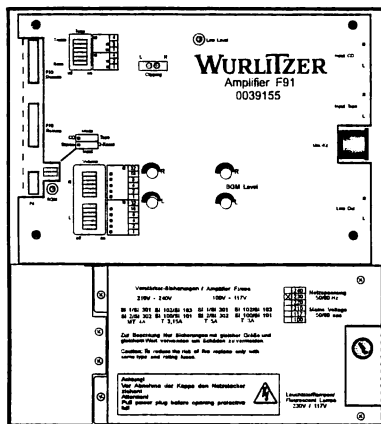
The amplifier F91 is the version with higher power output (2 x 170 W rms.). Equipped with protection and watch dog functions described below. The BGM adapter (to attenuate the volume in BGM mode) is integrated. The volume of CD's with different recording levels is kept constant automatically.
In 2-channel mode it is possible to control both channels with the IR-remote control. The total output power of the F91 can be used fully only with external speakers.
You can also make selections with the optional infrared remote control.

3.1. Verification of power voltage

⚠ CAUTION

Always remove power plug before opening transformer cover plate. Never attempt any intervention to these parts unless qualified.
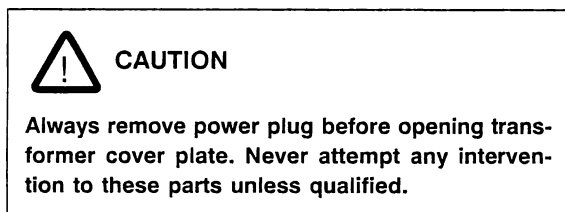
The power voltage setting is on the cover plate of the F91 transformer. Machines for USA are set to 117 V. Jukeboxes „UNI-Pack" are shipped in 230 V setting. This is marked on the machine label on the rear wall. If the voltage setting is not clear the transformer cover plate has to be removed.
The main fuse (T3,15 A, res. T8 A for 117V) is located near the RH. side of the cover plate.

Loosen the four screws to remove
the cover plate (small arrows).
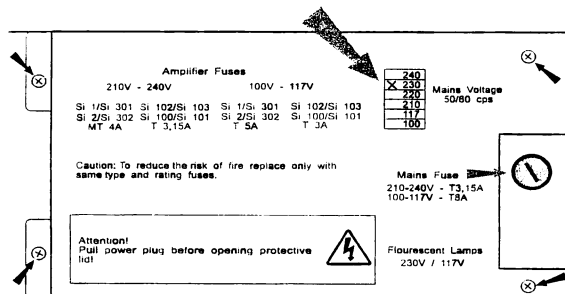
The position of the two plug connectors on the transformer terminals 1 to 9 (primary side) indicates the current voltage setting. The following combinations are possible:

240V = 1 - 9
230V = 1 - 8
220V = 2 - 9
210V = 2 - 8
117V = 1 - 6
100V = 2 - 6

to amplifier

from mains

to flourescent lamps
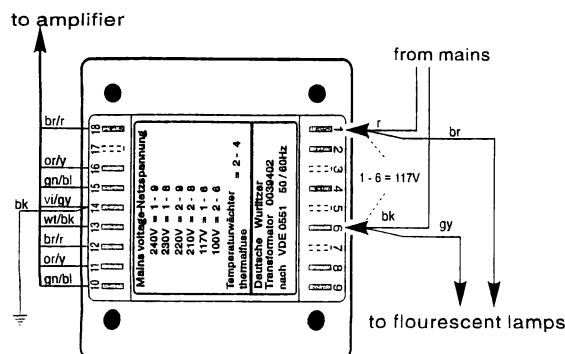
Never connect the fluorescent supply to other contacts .

If you intend to change the power voltage for a higher voltage (e.g. from 117V to 230V) it is better to use a subtransformer for the flourescent lamps or change the ballast according to the used voltage (e.g. for 230V).

The power consumption in standby is approx. 190W. With max. volume it is approx. 546W.

3.2. Position of fuses and plug connectors on the power stage

⚠️ **CAUTION**

A voltage of approx. +60V res. - 60V applies to the fuse terminals also a certain time after power off. Change the fuses with caution !
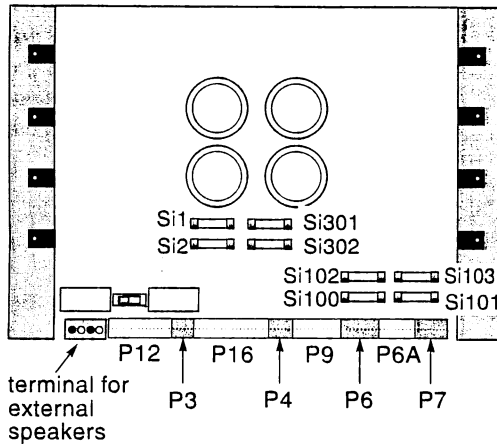
Usually the jukeboxes are fitted with fuses of DIN 41571 (5x20 mm) slow blow or medium blow. Slow blow fuses of DIN standard bear the letter T (T = "Träge") e.g. T 4/250 means T = slow blow, 4 amps, 250 V maximum operating voltage. Which fuses have to fit in where is printed on the power transformer cover. Fast blow fuses (F = Flink) are unsuitable for the jukebox.
The fuse holder on the amplifier P.C.B. are capable to hold also fuses of 6x32 mm size.

Position of the plug connectors:
P12 - jukebox speakers
P 3 - bubble tubes
P16 - power transformer
P 4 - CD sub transformer, CD player
P 9 - mechanism, Selection and Credit Computer
P 6 - option, coin interface
P6A - option
P 7 - service

Fuse	Failure
Main fuse T 3,15,res. T8 A for 110/117 V.	No illumination, machine completely dead.
Fuse **Si1: T4A (T5A)** +70V= L.H. channel power stage	No sound in the L.H. channel. Speaker relay is not energized. According green LED does not light.
Fuse **Si2: T4A (T5A)** -70V= L.H. channel power stage	
Fuse **Si301: T4A (T5A)** +70V= R.H. ch. power stage	No sound in the R.H. channel. Speaker relay is not energized. According green LED does not light.
Fuse **Si302: T4A (T5A)** -70V= R.H. ch. power stage	
Fuse **Si100: T3,15A (T3A)** supply -30 V=	The jukebox operates normal. The CD2 mechanism does not use this voltage.
Fuse **Si101: T3,15A (T3A)** supply +30 V=	No initialisation run after power ON. All displays light. No function.
Fuse **Si102: T3,15A (T3A)** supply +12 V=	SCC unit dead - **digital display dark** (except red LED M still lighting up on coin insertion). The LED's K and Z on the SCC unit are **dark**. No initialisation run after power ON.
Fuse **Si103: T3,15A (T3A)** supply 30V ~	The **digital digit** on the CD-control **is dark**. Power supply for CD player and control unit is interrupted. Credit circuit via LED M is interrupted. If credits are still in memory or free play is programmed, a CD will placed on turntable but is not spinning. After about one minute the CD is taken back.. If no credits in memory, no CD will be taken to turntable, the display is flashing.

3.3. The first power ON

Low Level LED

MUTE - LED
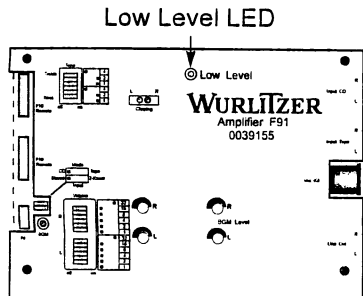
The mains switch is located at the rear side of the amplifier. It is reachable at the rear cabinet side of the jukebox. In position 'I' jukebox and amplifier are switched on. The amplifier is now in STANDBY MODE:

The yellow **'Low Level LED'** lights.
The 'Low Level' circuit detects low music parts and pauses. It effects the AVC circuit not to raise the audio level in music pauses. So disturbing noises will not be heard. This LED may light for short times during play.
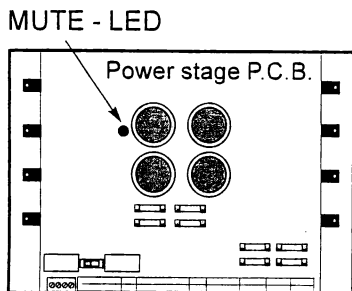
The yellow **'Mute LED'** lights (on the power amp board, only visible after lifting up the pre amp board). It indicates that the amplifier is muted.

To avoid power on and other noises, the amplifier output will be switched on only during play.

3.4. Volume and sound control

CANCEL button
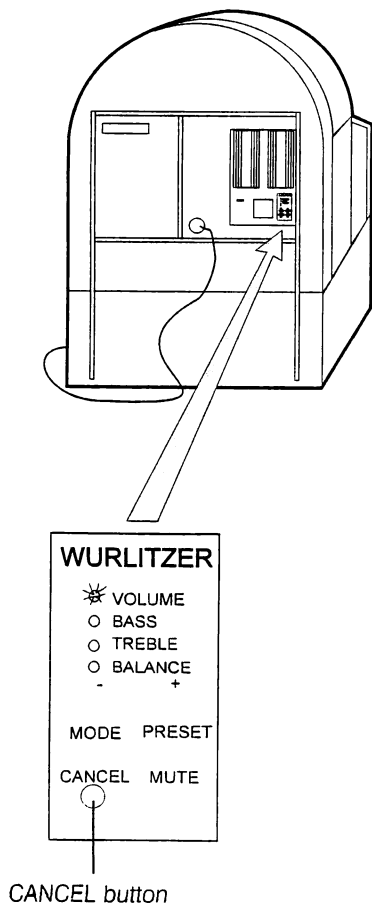
With the control terminal at the rear side of the jukebox the volume, treble, bass and balance can be controlled.

This unit can be taken out and be used as a wired remote control. If required its 10-line ribbon cable may be extended with any kind of wire. The voltage of the control wire is 5V DC.

As an option it is possible to connect two wired remote controls in parallel or one wired remote control together with one infrared remote control The control mode is displayed with 4 LED's. The mode can be changed by using the 'MODE' button to control volume, bass, treble and balance:

> ⚠ **CAUTION**
>
> **Depending of the adjusted volume of the jukebox *loudness levels* more than 70 dB can be reached.**

After power up or if no button has been pressed for approx. 5 sec or after the button PRESET has been pressed, the terminal stays in the mode "VOLUME". The LED "VOLUME" lights. In this mode you can control the volume by means of the buttons '+' and '-'.

One LED each displays the other corresponding modes all reacheable by pressing the 'MODE' button. With the buttons + and - treble, bass or balance can be controlled.

The meaning of the buttons...

VOLUME:
> Volume LED lights.
> + button increases volume
> - button decreases volume.

● BASS:
> Press 'MODE' button once.
> Bass LED lights.
> + button increases bass volume
> - button decreases bass volume.

● TREBLE:
> Press 'MODE' button twice.
> Treble LED lights.
> + button increases treble volume
> - button decreases treble volume.

● BALANCE
> Press 'MODE' button 3 times.
> Balance LED lights.
> + button increases right hand channel volume and decreases left hand channel volume
> - button decreases right hand channel volume and increases left hand channel volume.

● MODE:
> Switches to the next operating mode. After about 5 seconds without operating any buttons, 'VOLUME' mode is resumed.

● PRESET:
> Volume, bass, treble, and balance are set to the preset according DIP switch setting. Actual mode is set to 'Volume' (ref. to chapt. 3.5).

● CANCEL:
> Rejects a playing track. If album play is selected the next track will be played.

● MUTE:
> As long as this button is activated, the amplifier output is muted.

actual mode

+/- VOLUME — LED Volume lights
Press MODE button once
+/- BASS — LED Bass lights
Press MODE button once
+/- TREBLE — LED Treble lights
Press MODE button once
+/- BALANCE — LED Balance lights
Press MODE button once

> ⚠ **CAUTION**
>
> **After power off all adjustments are reset to dip switch settings. For permanent adjustment e.g. treble, bass use the dip switches (ref. to chapt. 3.5).**

3.5. Pre-settings for volume, bass and treble

After power on of the jukebox or after pressing the button 'preset' the levels of volume, bass and treble will be set to basic values. These values can be set with different binary DIP switch combinations. The switches are located on the amplifier pre amp board. You can find the recommended settings on the amplifier cover.

1. Tone preset DIP switches
2. Two red clipping LEDs
3. Low level LED, yellow

14. Remote control terminals

13. Mode selector stereo / 2-channel

12. Input selector CD / tape

11. BGM active indicator LED yellow

10. Volume preset DIP switches

WURLITZER
Amplifier F91
0039155

4. CD input terminals
5. tape / magn. pick up input terminals
6. mike kit socket
7. line output terminals

9. Gain pre pots

8. BGM level pots

3.5.1. Pre-settings for volume

You can set the basic values for volume in 63 steps (to 2dB) from no up to maximum volume.

At the amplifier front side, opening "Volume", you can find 6 so called DIP-switches for each channel. These switches have different values (1, 2 ... to 32). If you add all the values of the switches in position "ON" you will get the value for the set volume. Consequently the switches 32 and 16 allow a more coarse adjustment the others a fine.

The recommended factory settings are printed on the amplifier cover (32).

If you change the DIP-switch settings while the jukebox is operating remember that the new settings will only take effect after having pressed the button 'PRESET' at the control terminal or on IR remote.
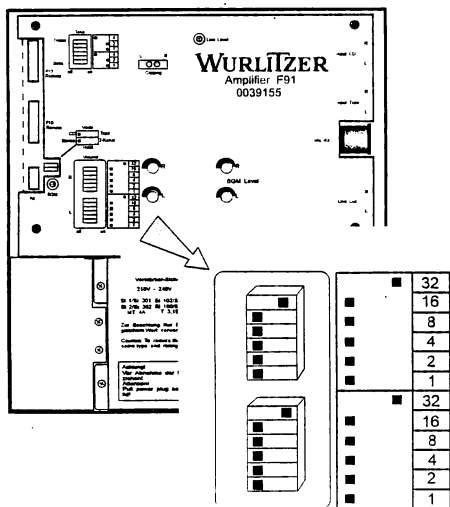
DIP switches for volume
pre settings

⚠ **CAUTION**

If all switches are in position OFF no volume, if all switches are in position ON, the maximum volume appears at power on !

Table of possible DIP switch settings for volume:

Preset volume level   100%

0% _____

value	0	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	55	56	57	58	59	60	61	62	63
32																																	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
16																	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●																	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
8									●	●	●	●	●	●	●	●									●	●	●	●	●	●	●	●									●	●	●	●	●	●	●	●									●	●	●	●	●	●	●	●
4					●	●	●	●					●	●	●	●					●	●	●	●					●	●	●	●					●	●	●	●					●	●	●	●					●	●	●	●					●	●	●	●
2			●	●			●	●			●	●			●	●			●	●			●	●			●	●			●	●			●	●			●	●			●	●			●	●			●	●			●	●			●	●			●	●
1		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●

low   ● - switch position ON   high
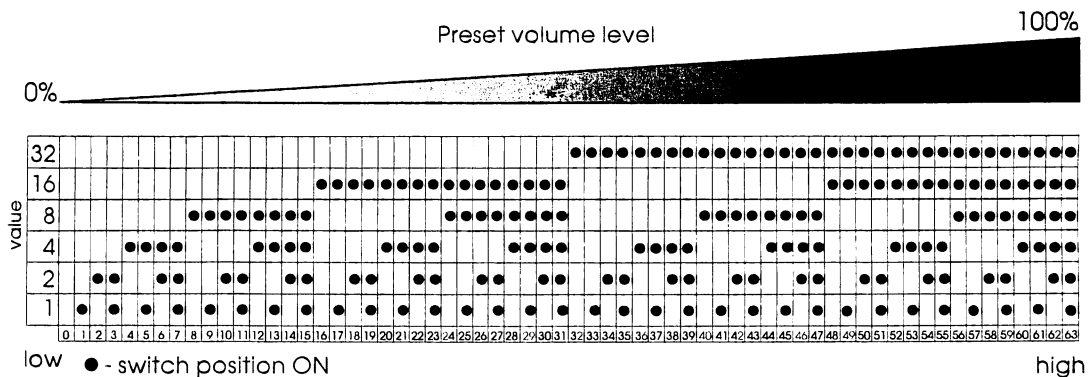
3.5.2. Pre-settings for bass and treble

DIP switches

recommended settings

tone

treble

bass

off   on

	4
■	
■	2
■	1
■	4
■	2
■	1
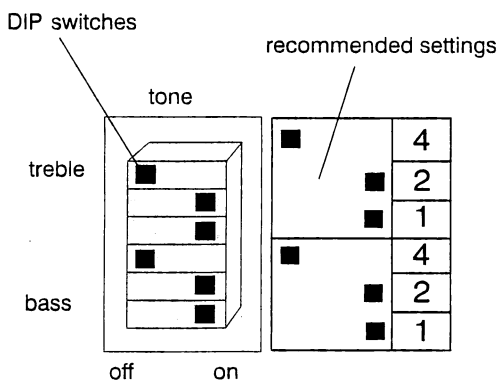
Like-wise the values for bass and treble can be set. However for both channels together.

Preset bass or treble level

-9dB   0dB   +12dB

linear

min. treble / bass   max. treble / bass
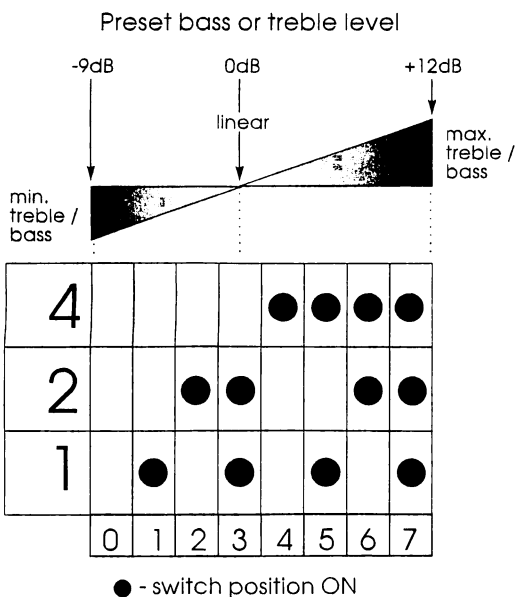
Three DIP-switches with the values 1, 2, 4 are provided for each bass and treble. You can choose 7 different steps (to 3dB) from minimum (-9dB) to maximum (+12dB). Adding all switches set to "ON" gets the set value.

value	0	1	2	3	4	5	6	7
4					●	●	●	●
2			●	●			●	●
1		●		●		●		●

● - switch position ON

The 0dB - 'linear' position of these switches is printed as recommended factory settings on the amplifier cover.
If you change the DIP-switch settings while the jukebox is operating remember that the new settings will only take effect after having pressed the button 'PRESET' at the control terminal or after a power off and on of the box.

Table of possible DIP switch settings for sound:

3.6. External speaker operation
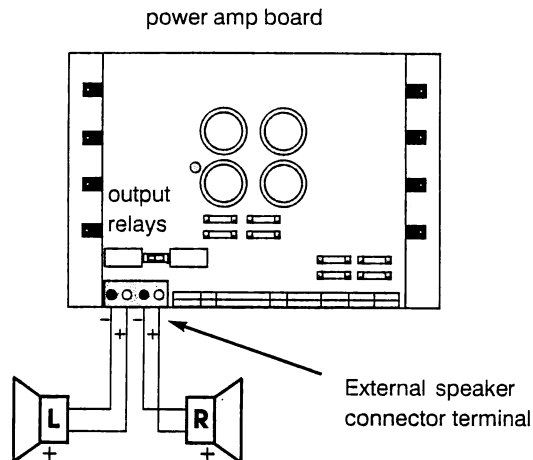
To attain a good sound of the jukebox, take care when adding external speakers. Pay attention to of the following requirements:

The minimum impedance of 4Ω per channel must not be exceeded. Therefore, in stereo mode the minimum impedance of an external speaker is 8Ω per channel. In 2-channel mode 4Ω per channel.
The power output of each channel at a load of 4W is 170 W, i.e. the min. power consumption of a 8Ω speaker set in stereo mode has to be 100 Watts. In 2-channel mode it is min. 170 Watts.
All speakers must be connected with the correct polarity.

To reach the terminals for external speakers on the power amp board first loosen the nuts (spanner caliber 7mm) on the amplifier sides and tip up the amplifier cover (including the pre amp board).

External speakers may be operated as desired in the mode STEREO or 2-CHANNEL .

In **STEREO** mode the stereophonic reproduction survives, for example to improve the stereophonic sound in the same room.

In **2-CHANNEL** mode it is possible to control the volume of the external speakers independent to the internal speakers of the jukebox. It allows to reproduce the sound in a second room with different volume. The sound reproduction in this mode is only monophonic.
In 2-CHANNEL mode the volume of the internal speakers can be controlled in the mode 'VOLUME' and the volume of the external speakers in the mode 'BALANCE' .The according pre-set volume can be set separately.

power amp board

output relays

External speaker connector terminal

3.6.1.Connecting external speakers in operating mode STEREO

For normal operation the jukebox is set to the STEREO mode. Both amplifier switches, the mode switch and the slide switch S1 on the power amplifier board are set to position STEREO.

mode switch

position stereo

2-channel / stereo slide switch S1

Examples:

Connection of one 8Ω external speaker per channel

External speakers

2-channel/
stereo
slide switch

2 x 4 Ω speaker joined in series

External speakers

2-channel /
stereo
slide switch

2 x 8 Ω speaker joined in series

External speakers

2-channel /
stereo
slide switch
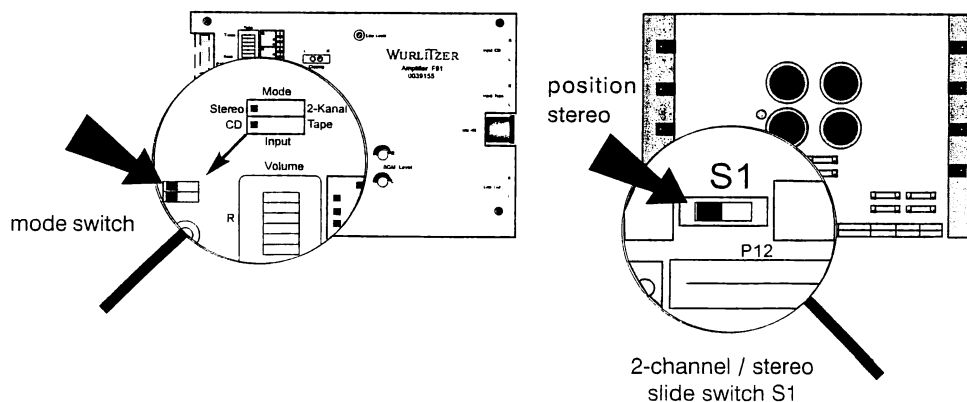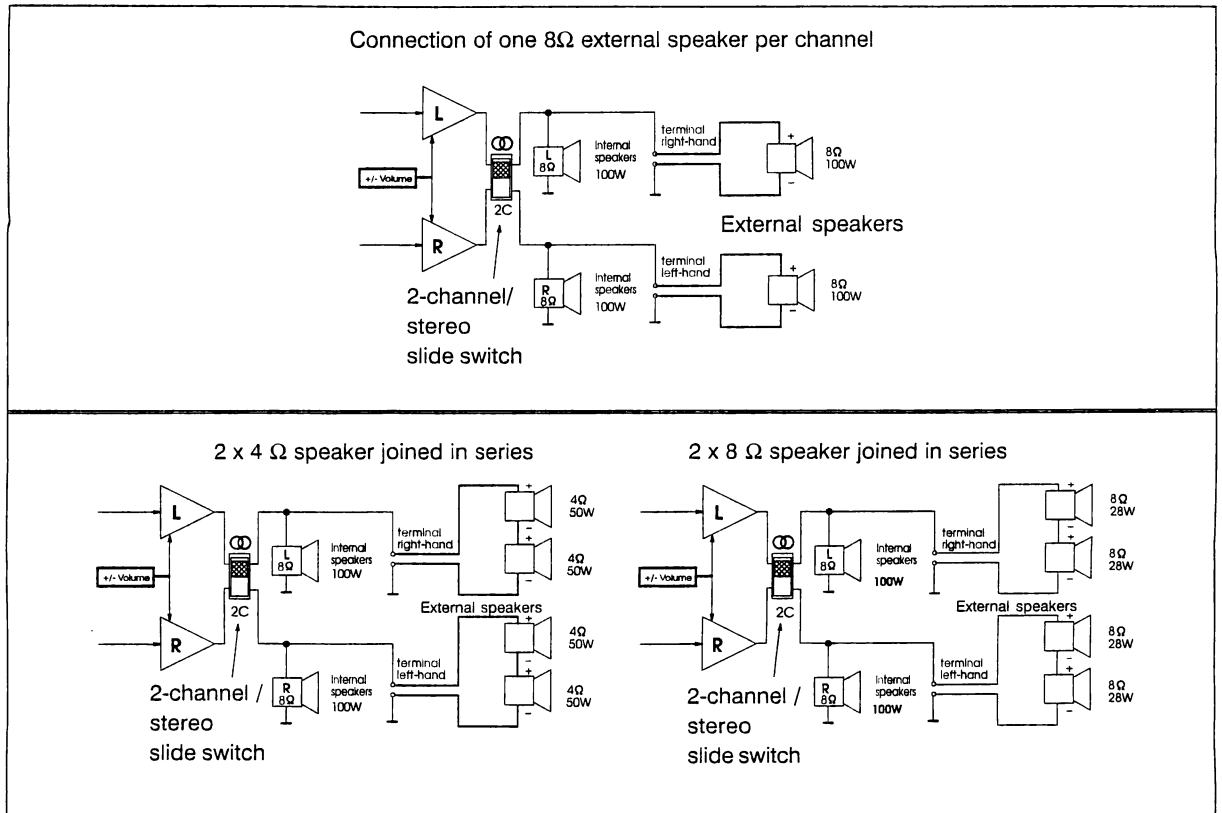
3.6.2. Connecting external speakers in operating mode 2-CHANNEL
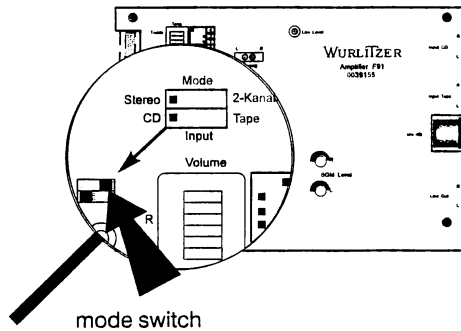
mode switch

For 2-CHANNEL operation both amplifier switches, the mode switch and the slide switch S1 at the power amplifier board are set to position 2-CHANNEL.

2-channel / stereo
slide switch S1
position 2-channel

S1

P12

20

Examples:

Connection of one external speaker

Two 8 Ω external speakers joined in parallel

Two 8 Ω external speakers joined in series
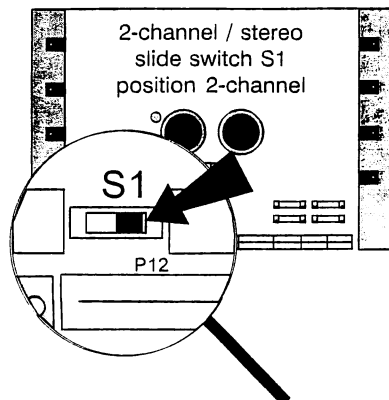
Two 4 Ω external speakers joined in series
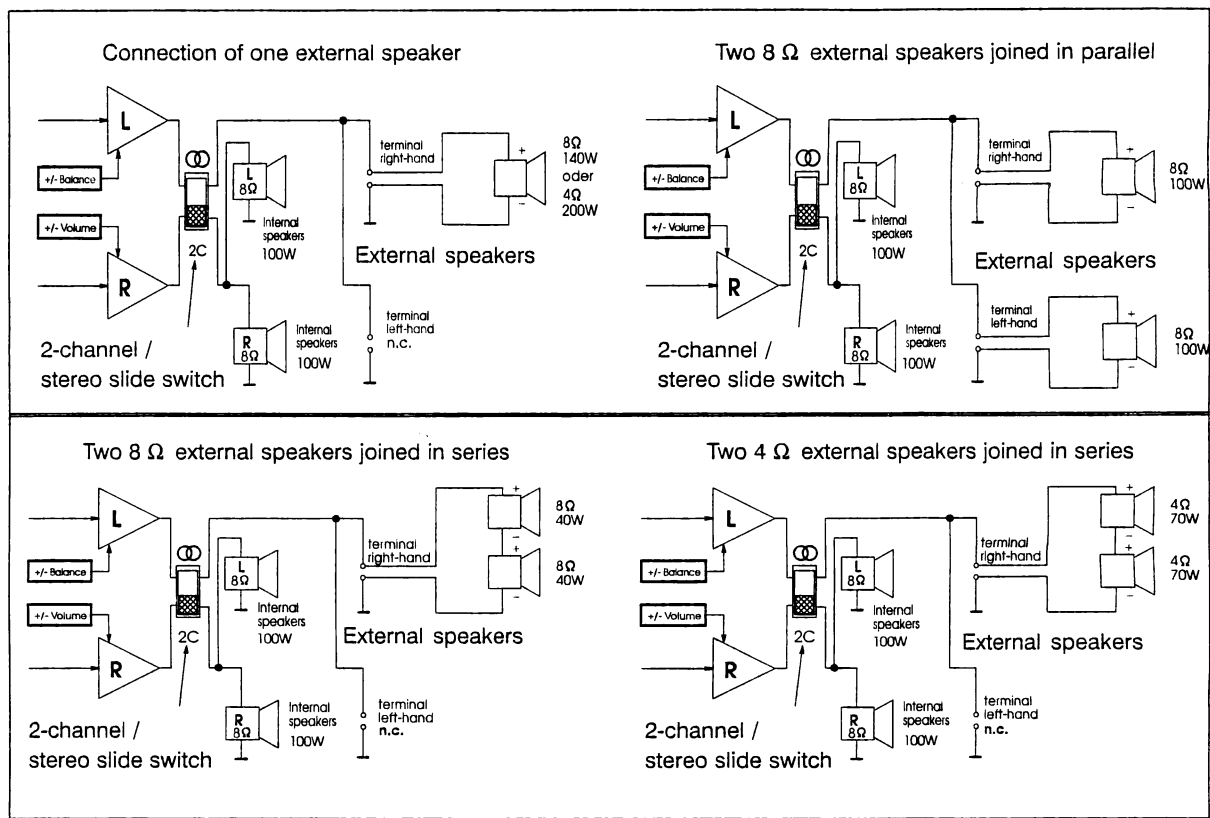
3.7. BGM mode - volume attenuation

BGM-LED
(yellow)

BGM trim pots
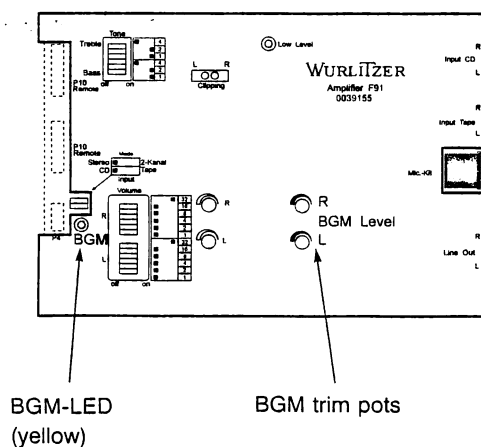
In the BGM (**B**ack **G**round **M**usic) mode the reproduction loudness will be reduced by a certain factor.
This function is controlled by the signal „BGM" pin 1 plug brown from the SCC unit. The active BGM mode is displayed with a yellow LED near plug P4. In this mode the volume attenuation from normal sound is adjustable by two BGM trim pots in the middle of the pre amplifier board.

3.8. Automatic volume control (AVC) and clipping stage

gain pots
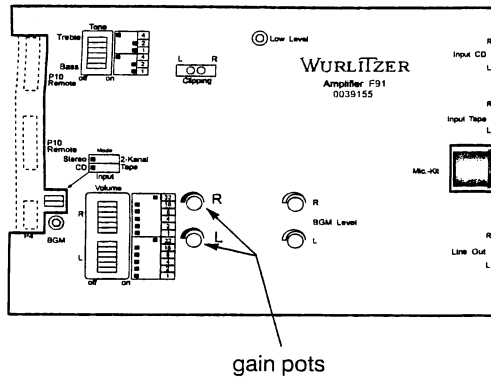
The AVC sets CDs with different volume levels to an equal level. The level of CDs with a high level will be reduced, the level of low leveled CDs will be increased. This control works rather slow to save the dynamic range of the track.

The pre amp gain pots are situated between the volume pre-set switches and the BGM level trim pots. These two pots are factory pre set should **not** be adjusted.

3.9. Overdrive protection
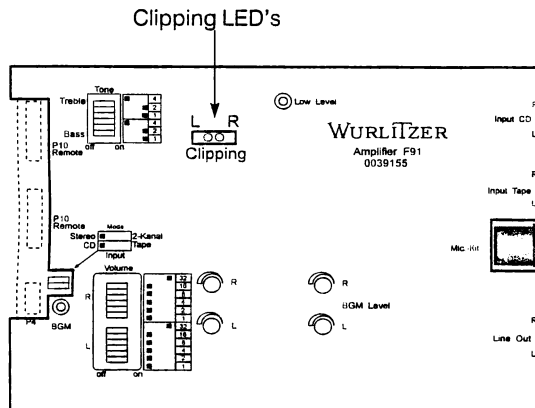
Clipping LED's

In case of an overdriven power amp one or both red clipping LED's will light. The clipping circuit will have an effect on the AVC circuit and the volume will be reduced. Occasional lightning of the clipping LED's during a loud performance is normal. Continuously lightning of one or both LED's indicates an overdriven channel and distortion can be heard. It is recommended to reduce the volume.

Also additional speakers with an impedance lower than 8Ω (in STEREO mode) may cause an overload and the LED's will light.

3.10. Overload protection

Relay check
LED's (green)
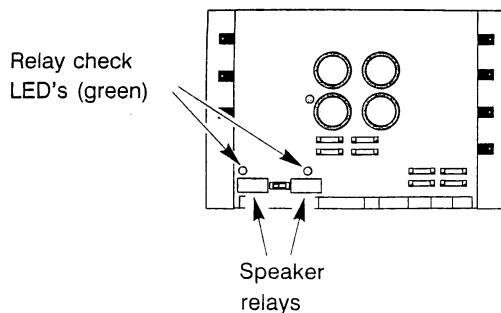
Speaker
relays

The power amplifier is provided with an overload protection circuit.

During a played CD two green LED's indicate that the speaker output relays are energized. If one of these LED's is dark during play and no sound appears an overload of the power amp stage has occurred, which is for example caused by a short circuit in the connection wires of any external speakers.

An additional internal watchdog circuit checks that the audio signal contains no DC Voltages, no high frequencies and no too high treble levels. It also indicates that the load limitation cut off has been reached. If only one test is not successful the relays will be switched off.

3.11. Tape input
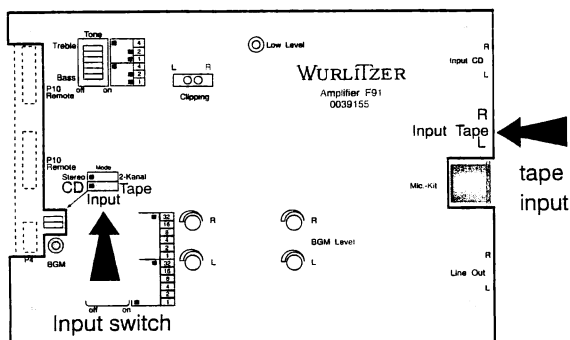
Additional to the CD input a tape input with a higher input sensivity is provided. As an option this input stage may be wired as a correcting network to work with a magnetic pick up (RIAA). Set the 'input' DIP switch to tape position to select the tape input.

3.12. 70V - output transformer (0043157)

If external speakers with any other impedance than 8 Ω are to be connected or to work with 70V systems, we recommend to use the output transformer. Speakers between 2 Ω and 16 Ω could be connected additionally.

If external speakers are to be connected pay attention to the following hints:

1. To avoid an interruption of all speakers by the overload protection circuit or a decrease of volume by the clipping stage, the total power outlet of the amplifier should not be exceeded (ref. to chap. 3.10 page 22).

2. All speakers must be connected with the correct polarity.

3. To work each external speaker with the desired volume level, pay attention to the respective efficiency, impedance and load limit.

4. To avoid cable losses on long speaker lines (more than 60 feet) and low impedance's, 70Volt-systems should be used as much as possible.

5. If speakers with low impedance's (2Ω, 4Ω) are used, each speaker should have its own line with sufficient cross-section.

6. When an output transformer is used **no** speakers should be connected to the terminals for external speakers on the power amplifier board P4A.

7. Note: The 2 - channel - option can not be used in connection with an output transformer without modifying the pre amp board.

8. The output transformer 40038, for the amplifier I84, must not be used for amplifier F91.

The switches 'volume internal speakers'
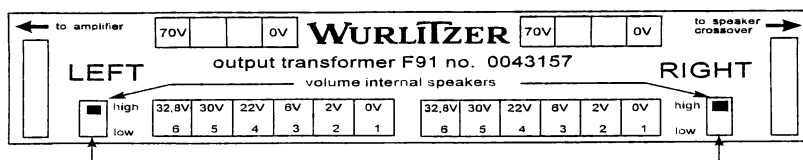
switches for internal speakers
L.H. channel

switches for internal speakers
R.H. channel

The internal speakers can be worked with reduced volume level. The switches for this function are situated on the connection board. In position HIGH the power consumption of the internal speakers is approx. 100 Watts, in position LOW approx. 30 Watts

Hints of connectable speaker loads

The maximum power output per channel is 170 Watts (rms). Depending on the position of the switches 'internal volume' a power rate of maximum 70 W (position HIGH) or 140 W (position LOW) per channel remains for external speakers.
The power consumption of external speakers could be higher (i.e. 200 W) than the maximum remaining power outlet of the amplifier.
If the power consumption of external speakers is lower (i.e. 10 W) than the maximum remaining power outlet of the amplifier, it can be adapted by means of the output transformer.

Determination of the connectable speaker power

The real power consumption of a speaker equals the square of the voltage applied to the speaker terminals divided through the speaker impedance ($P = U^2 / R$). The power values calculated in this way are shown in the table below. The volume level really delivered depends also on the speaker efficiency and varies from type to type, but it is possible to even out these differences in certain limits.

delivered maximum power in Watt if speakers with an impedance of xx Ω are connected						voltage applied to the terminals in V_{rms}	terminal number and polarity	
16Ω	12Ω	8Ω	6Ω	4Ω	2Ω		pos	neg
		0,5	0,7	1	2	2	2	1
	0,7	1	1,3	2	3,9	2,8	6	5
1	1,3	2	2,7	4	8	4	3	2
2,3	3	4,5	6	9	18	6	3	1
4	5,3	8	10,7	16	32	8	5	4
7,3	9,7	15	19	29	58	10,8	6	4
16	21	32	43	64	128	16	4	3
25	33	50	67	100	200	20	4	2
30	40	61	81	121	*	22	4	1
36	48	72	96	144	*	24	5	3
49	65	98	131	196	*	28	5	2
56	75	113	150	*	*	30	5	1
59	79	119	158	*	*	30,8	6	2
67	90	134	179	*	*	32,8	6	1

Note to the connection of external speakers:

1. If a high or a low amplifier outlet power for the external speakers is desired.
   - 140 Watts are available, if the switch 'internal volume' is in position LOW.
   - 70 Watts are available, if the switch 'internal volume' is in position HIGH.

2. The load of all external speakers has to be added.
   - If the total load of all speakers per channel is higher than the delivered amplifier outlet power, not all speakers may work with the maximum power.
   - If the total load of all speakers per channel is lower than the delivered amplifier outlet power, all speakers may work with the maximum power, a power reserve additionally.

3. For an efficient use of the speaker power the optimum impedance in conjunction with the output transformer connection possibilities has to be determined. (ref. to. connection example 3)

Connection example 1:
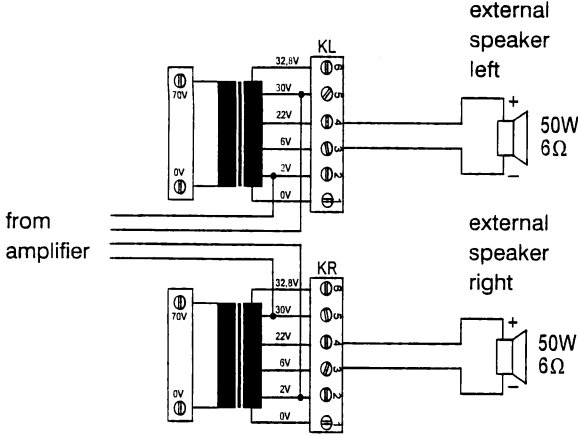
An external speaker of 50W 6Ω has to be connected per channel.

The load of 50W causes no amplifier overload. Possible connection combinations can be taken out of the row for 6Ω. For 50W all combinations up to 43W are possible. Lower power values also cause a lower volume level. To work with the maximum power the speaker have to be connected to the terminals 4 (+) and 3 (-).

Connection example 2:

Per channel should be connected:
one speaker 50W 4Ω.
one speaker 100W 2Ω.
one speaker 8W 12Ω.
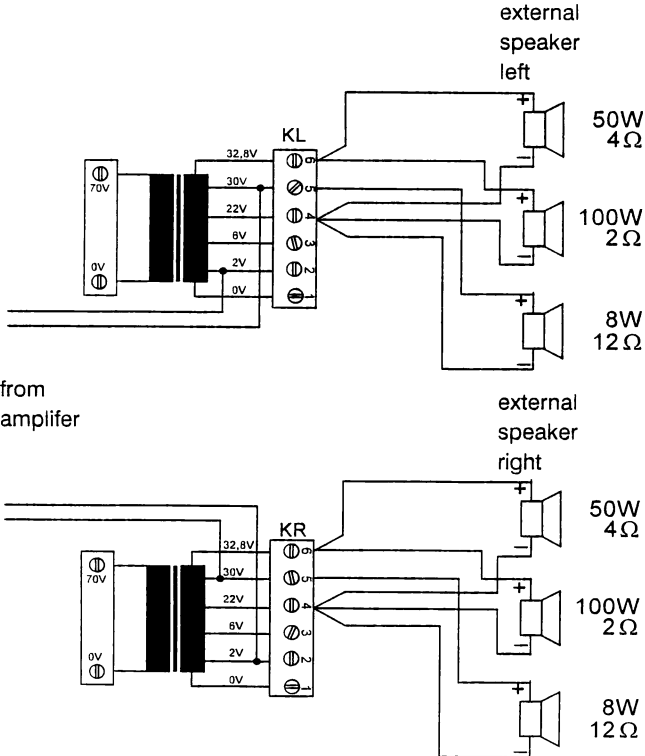
The total power rate is 158W, even in switch position LOW it is not possible to work with this high power. At first a look at the table :

1. Speaker 50W 4Ω (take out of row for 4Ω) can work with a maximum of 29W. The next higher value of 64W would cause an overload of the speaker!
2. Speaker 100W 2Ω (take out of row for 2Ω) can work with a maximum of 58W. The next higher value of 128W would cause an overload of the speaker!
3. Speaker 8W 12Ω (take out of row for 12Ω) can work with a maximum of 5,3W. The next higher value of 9,7W would cause an overload of the speaker!

The power needed from the amplifier is added: 29W + 58W + 5,3W = 92,3W. The amplifier is able to deliver this power assume that the switch 'volume internal speakers' is set to position LOW.

If the jukebox itself should work with a higher volume level compared to the external speakers (switch to position HIGH) the power consumption must be limited to 70 W. For example, by connecting the 100W 2Ω speaker to the terminals 5 and 4 for 32W (total.: 66,3W).

Connection example 3:

On closer examination of example 2 it is showing that the speakers used, are not work with their optimum power. The speaker 100W 2Ω can only work with 58W. For a more optimal use, the desired speaker power has to be included when the impedance will be selected. For example a 100W speaker with an impedance of 4Ω can work optimally with 100W at the terminals 4 and 2.

from amplifer

external speakers left

external speakers right
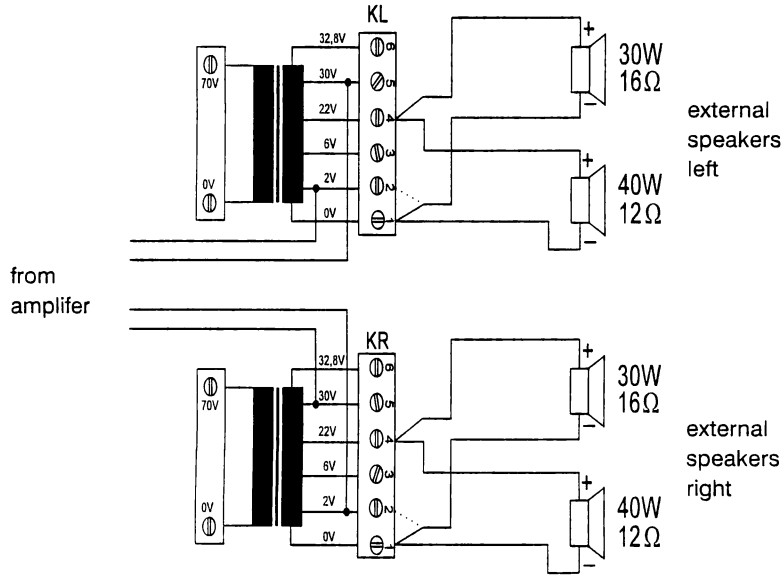
If an outlet power of 70W (switch position HIGH) should be used optimally, it can be effected by connecting one speaker 16Ω 30W to terminals 4 and 1 and one speaker 12Ω 40W terminals 4 and 1.

If you have the impression that the speaker 12Ω 40W is too loud it can be connected to the terminals 4 and 2. Due to that it will work only with maximum 33W, the sound would be reduced.

> ⚠️ **CAUTION**
>
> **If you have the impression that the speaker volume is too low it must not be connected to higher power levels as indicated. This will damage the speaker!**

Connection of 70V systems:

70V system

70V system

from amplifier

external speaker left

external speaker right
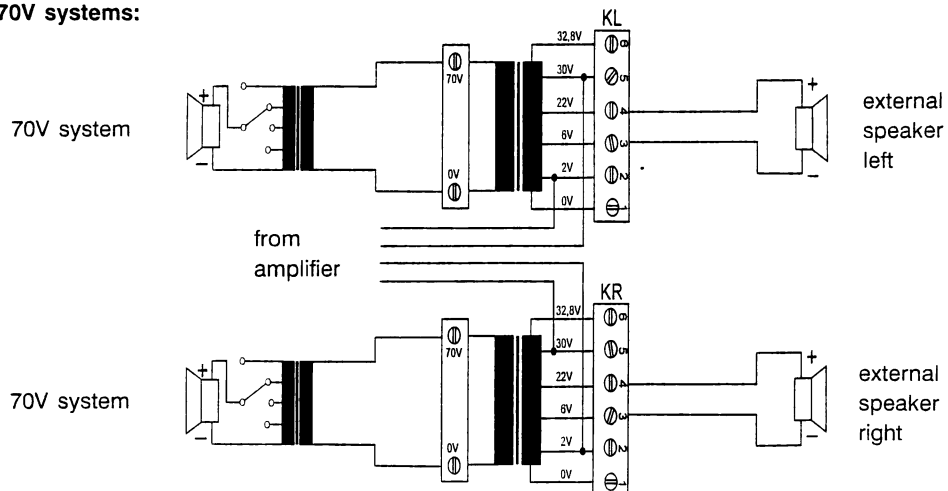
70V systems are intended for transmissions over long distances. They also have their own transformer in front of the speakers. The primary (input-)side of this transformer has to be connected in correct polarity with the 70V terminals of the Wurlitzer output transformer. It is not allowed to consume more power than the amplifier is able to supply (70W or 140W), minus the additional speakers eventually connected to the output transformer. At some 70V - systems the load is capable of variation.

4.1. Verification of power voltage

┌─────────────────────────────────────┐
│ ⚠ CAUTION   │
│   │
│ Some parts of the electrical circurity are connected │
│ to the power line (power transformer, flourescent │
│ tube, ballast and associated wiring). Never attempt │
│ any intervention to these parts unless qualified! │
│ Always remove power plug before opening plas- │
│ tic cover! │
└─────────────────────────────────────┘

Machines for USA are set to 117 V. Jukeboxes "UNI-Pack" are shipped in 230 V setting. This is marked on the machine label on the rear wall. Other machines with indication 100 - 240V on the label have a transparent cover on the power transformer so that the terminals 1 - 3 - 5 - 7 - 9 indicate the actual power voltage setting.
The following combinations are possible:

to amplifier   from mains

to fluorescent lamps
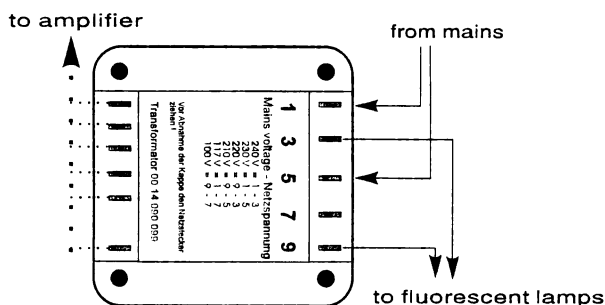
240 V = 1 and 3
230 V = 1 and 5
220 V = 9 and 3
210 V = 9 and 5
117 V = 1 and 7
100 V = 9 and 7

┌─────────────────────────────────────┐
│ ☑ IMPORTANT   │
│   │
│ The power supply for the fluorescent lamps is │
│ 230V. Always connect their wires to the pins 1 and │
│ 5 of the transformer. │
└─────────────────────────────────────┘

The power consumption in standby is approx. 190W. With max. volume it is approx. 250W.

4.2. Fuses. Which one controls what circuit?
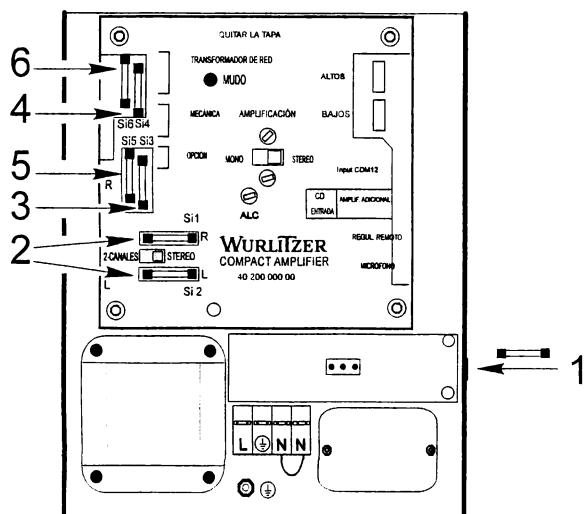
Usually the machines are fitted with fuses of DIN 41571 (5x20 mm) slow blow. Slow blow fuses of DIN standard bear the letter T (T = "Träge"), hence T 3,15 is the proper type to be used. All fuses in the amplifier are rated T 3,15 250V.
The open holders of the LT fuses are capable to hold either 5x20 mm fuses of DIN 41571 standard or fuses of 6x30 mm size. Fast and medium blow fuses are unsuitable for the machine.

Only exceptions are countries with 110/117 V supply where a fast blow fuse of 6,3 Amps (F 6,3 of 6x30 mm size) is used for the primary main fuse.

Fuse	Failure
01. **Power**fuse: T 3,15 ; for 110/117 V: F6,3A.	No illumination, jukebox completely dead.
02. Fuses **Si1** and **Si2**: Speaker fuses	**No sound** on LH channel (Si1) or RH channel (Si2); the reason for a blown fuse here might be a shorted power transistor.
03. Fuse **Si3**: supply -30 V to ground	Green LED on the amplifier does not light. After power on the jukebox does not initialize itself. After some seconds the fuse Si4 blows too. No function. In some cases the display shows the code 254 - total error.
04. Fuse **Si4**: supply +30 V to ground	Amplifier is muted, even though the red LED (mute) is off. After power on the jukebox does not initialize itself. No function.
05. Fuse **Si5**: supply +12 V=	SCC unit dead - digital **display dark** (except red LED M still lighting up on coin insertion). The LED's K and Z are **dark** too. After power on the jukebox does not initialize itself.
06. Fuse **Si6**: supply 30V ~	The **one figure display** on the CD controller **is dark**. The power supply for the CD controller and the player is interrupted. Credit circuit via LED M is interrupted. If credits still exist or free play is set a CD will be placed on the turntable but does not spin. After approx. 1 min. the CD will be taken back. If no credit exist no CD's will be placed on the turntable, the display flashes.

4.3. Volume control
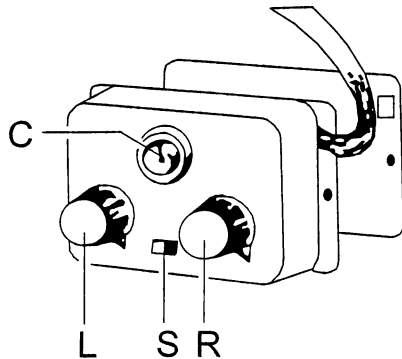
The volume control of the amplifier, accessible from the rear of the jukebox, is a separate unit and is connected to the amplifier via a DIN 45322 plug. This unit can be screwed off and may be used as a remote control. Its 5-line ribbon cable may be extended as required with any kind of wire. The voltage of the control wires is 5V DC. The control has two volume knobs. One for the left hand channel (L) and one for the right hand channel (R). In mode 'stereo' (switch S in position stereo) only the left knob is effective. In position '2 Kanal' (two channel) of the slide switch both channels are controllable separately (balance likewise).

An internal automatic volume controller decreases the volume level of CDs recorded too loudly to a defined output level, so that an equal volume level is reached. The ALC pot is pre-set from the factory. In left position of the adjustment pot the ALC does not operate. The separate 'Cancel' button (C) allows to reject a playing track.

4.4. Treble and bass controls

The treble and the bass controls at the top RH-side of the amplifier may be set to any position to suit local acoustic requirements. The Mono-Stereo Switch may also be set to either position, however, it must be set to 'Stereo' if a stereophonic reproduction is desired.
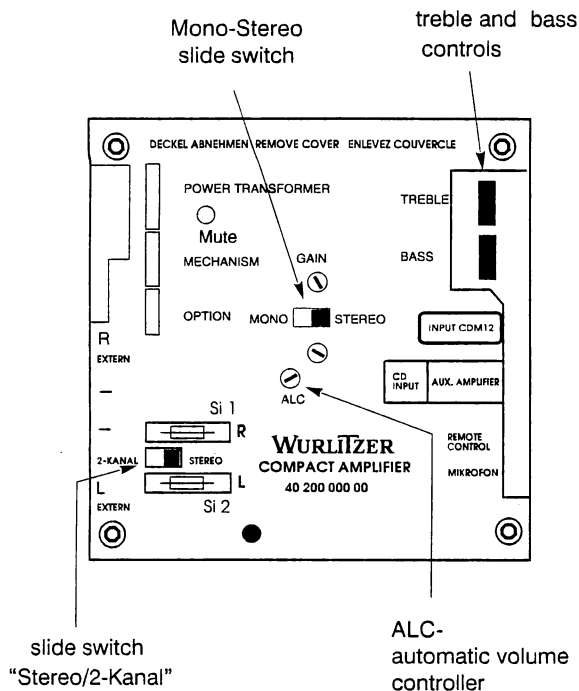
4.5. Slide switch "Stereo/2-Kanal"

In common operating mode the slide switch "Stereo/2-Kanal"is in position "Stereo". In position "2-Kanal" the cabinet speakers of the jukebox are switched to the left amplifier channel. Both sockets for the external speakers are switched to the right amplifier channel.
If the slide switch of the volume control unit is switched to "2-Kanal" a separate control of both cabinet speakers and external speakers (e.g. in another room) is possible (left knob for inside, right one for outside).
The slide switch "Mono-Stereo" has to be set to mode "Mono".

4.6. Maximum amplifier load and external speakers of I84

The amplifier may not be loaded with more than 4 Ω per channel (less Ohms means more load!). If the amplifier is operating in 2-Channel mode, the speakers are all loaded to the left hand channel. The impedance of all external speakers per channel in "Stereo" mode should not be less than 8 Ω, because the cabinet speakers represent a load of already 8 Ω per channel.
If the amplifier is operating in 2-Channel mode, the speakers are all loaded to the left hand channel. The right channel (now switched to the sockets "R-Extern" and "L-Extern") now may be loaded with a minimum of 4Ω.

The output to a 4 Ω load is 70 Watts sinus power at 1 % distortion, to 12Ω it is about 24 Watts, to 24 Ω it is about 12 Watts. That means, that e.g., a 12Ω speaker connected to the external channel at Dual Channel operation must be a type of at least 24 Watts, otherwise the speaker is in danger of destruction at higher volumes. Note that speaker groups like in hi-fi boxes may have, at certain frequencies, impedances much lower than their rating.
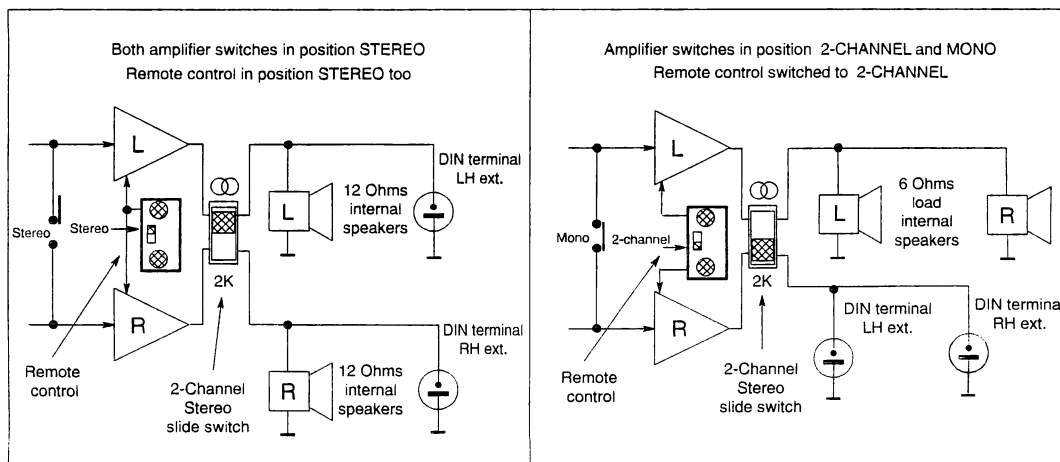
4.7. Connection of external speakers

⚠ **CAUTION**

In "Stereo" mode do not connect a single speaker with less than 8 Ω to the amplifier!

Additional speakers may be connected via two speaker DIN plugs to the amplifier.
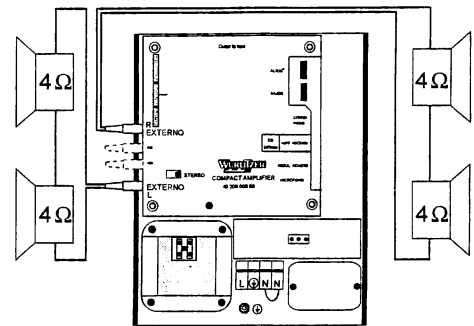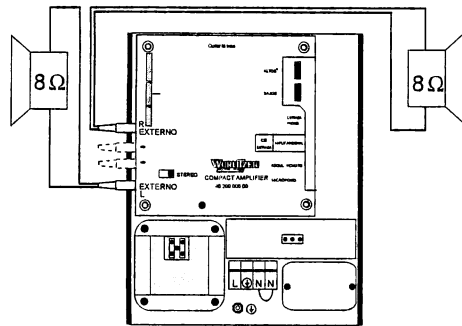
Two speakers of 4 Ω connected
in series also represent a total
impedance of 8 Ω.

4.8. 70 V output transformer (part no. 0006926)

If you want to connect external speakers with an impedance of less than 8Ω or want to hanle with 70 V systems on long distances an output transformer is deliverable. So you also can connect speakers with impedances between 1Ω and 12Ω additionally:

Jukebox in normal operation mode

Slide switch 'SERVICE' to ON and press LT button once.

Slide switch 'SERVICE' to OFF and press LT button once.

Start of serviceprogram display of program version

Press button R -hold down- and press button 0, then...

(0)─(1)─(2)─(3)─(4)─(5)─(6)─(7)─(8)─(9)─(R) selection buttons

1 Statistics

...press button 1 to reach service level 1.

Flops Display: 1. CD no. 2. plays	Top hits Display: 1. CD no. 2. plays	Cash box contents printer start button 2 + R	total number of plays	Display test program version	CDs in magazines 01 - 99	memory bad CDs	reserved	Box ID 8digits	sel. memory reset Albumsel.	to level 1 + button 0: enter new level

2 Time, Bonus, Playstimulator

...press button 2 to reach service level 2.

Time HH:MM	Day Month DD:MM	Year Weekday YY:WW	tracks per CD	disabled tracks CD:TT	reserved	Happy Hour time	Happy Hour price	Play stimulator start stop	Play stimulator Interval	to level 2 + button 0: enter new level

3 Back Ground Music, BGM

...press button 3 to reach service level 3.

BGM times weekday 0 Sunday	BGM times weekday 1 Monday	BGM times weekday 2 Tuesday	BGM times weekday 3 Wednesday	BGM times weekday 4 Thursday	BGM times weekday 5 Friday	BGM times weekday 6 Saturday	BGM no. of CD's, Interval time	BGM start position options	reserved '712'	to level 3 + button 0: enter new level

4 CD2 mechanism tests

...press button 4 to reach service level 4.

CD to turntable	Selection sledge in steps downwards	Selection sledge in steps upwards	Get CD from LH change to level 5	Get CD from RH change to level 5	Test prg. single step ON NEXT	Test prg. single step OFF	Gates test VH.V.HV LL.L.LL LL.C.RR	CD2 errors	Test programs button 9 + no. of prg.	to level 4 + button 0: enter new level

5 CD player tests

...press button 5 to reach service level 5.

NEXT track	reserved	reserved	STOP and back to level 4	reserved	STOP	START	reserved	reserved	PREVIOUS TRACK	to level 5 + button 0: enter new level

(0)─(1)─(2)─(3)─(4)─(5)─(6)─(7)─(8)─(9)─(R)

Programming: Press according button - hold down - and press selection button R , release both buttons and enter the new value.

TO CLEAR CREDITS PRESS LT BUTTON w/service off

6. Jukebox programming

Additional features like Playstimulator, BGM time and Happy Hour time are programmable. These features are programmable in the service mode of the SCC unit.

6.1. Calling service programs

1. Service to ON
2. Press LT button
3. Display shows: 408

Press LT button

Service level 1

Statistics   display: 1

Press LT button

Service level 2

Time setting,
Bonus,Playstimul.   Display: 2

Press LT button

Service level 3

Back ground
music (BGM)   Display: 3

Press LT button

Service level 4

Test functiones
CD2 mechanism   Display: 4

Press LT button

Service level 5

Test functiones
CDM12 player   Display: 5

Press LT button

Hint:
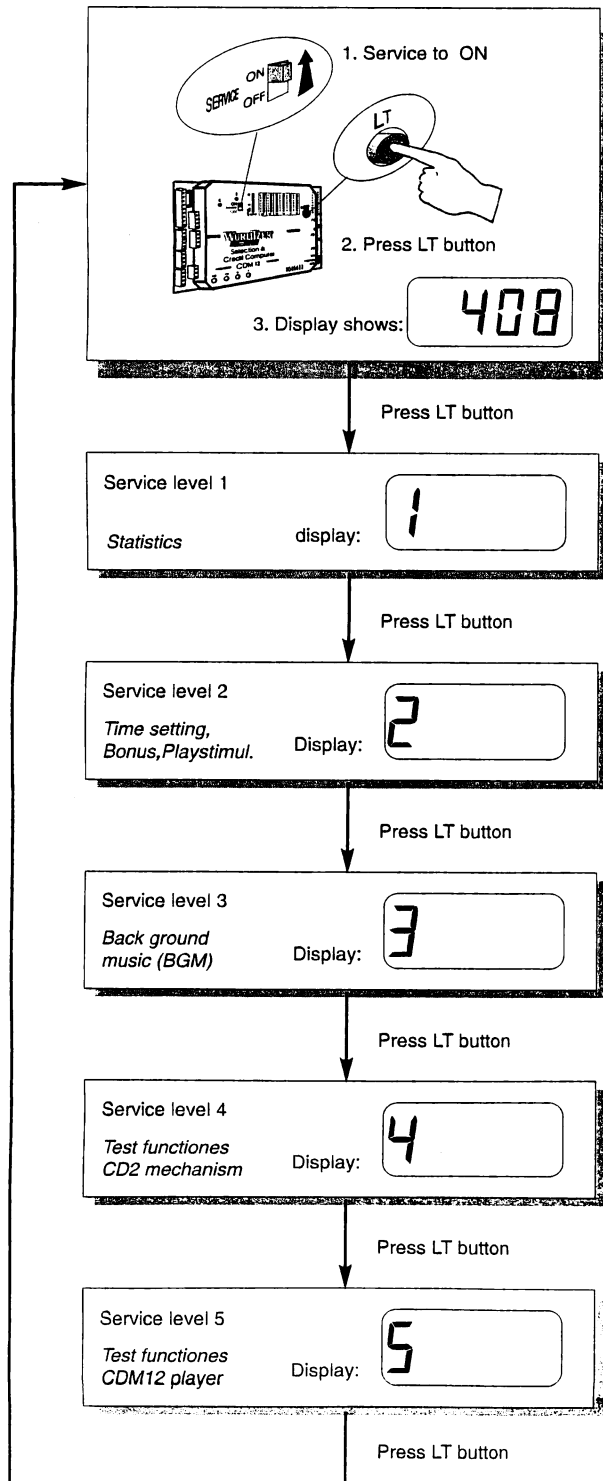To keep the data stored when power is off the plug "Memory" must be set to "ON" position on the SCC unit, otherwise all programmed data in service levels are reset when power is interrupted.

Calling service programs:
Set slide switch "Service" from position OFF to ON, then press the LT button. After an initialization run the display will show the actual jukebox (SCC) program version (e.g.: in the display 4.08) and gives a message whether the magazines are installed properly.

408 ────── no magazines missing

ℸ408 ────── RH magazine missing

ℂ408 ────── LH magazine missing

ᵁ408 ────── both magazines missing

Calling service levels:
By pressing the LT button. The display shows the actual service level number in the LH digit. Each option can be called by pressing the according selection button.

Calling a certain service level (recommended method):
Press selection button R - hold down - and press selection button 0. Release both buttons. The display is dark.
Enter the number of the desired service level.

Exit:
Set the slide switch 'SERVICE' to OFF and press the LT button once.

6.2. Programming of the time functions

Level 2	

It is necessary to program the time, date and weekday once or at least to control these settings. Only then the jukebox can switch on and off the playstimulator or the Back Ground Music at the desired time. It is useful to program time, date and weekday in a single pass.

How to call service program, level 2:

1. Set the slide switch 'SERVICE' at the SCC-unit to ON.
2. Press 'LT' button.
3. Press selection button R -hold down- and press selection button 0 then release both buttons.
4. Press selection button 2. Service level 2 is reached. Display is: 2_ _ _.

6.2.1.Clock setting

Level 2	Button 0

Press selection button 0 . The display shows the current time e.g.:

minutes

hours
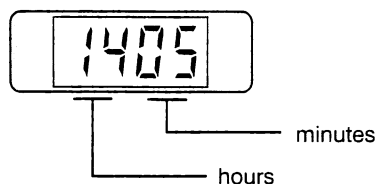
If the displayed time is not correct:
Press selection button 0 -hold down- and press selection button R. Release both buttons. Enter the right time with four digits.

6.2.2.Set date

Level 2	Button 1

Press selection button 1 . The display shows the current date e.g. Dec 10th:

month

day

If the displayed date is not correct:
Press selection button 1 -hold down- and press selection button R. Release both buttons. Enter the right date with four digits.

6.2.3.Set year and weekday

Level 2	Button 2

To display the year and the weekday press selection button 2: The display shows e.g.:

weekday

year

The weekdays are assigned to numbers as shown.

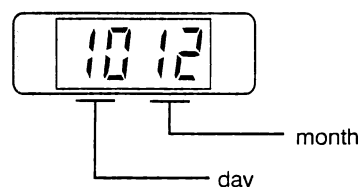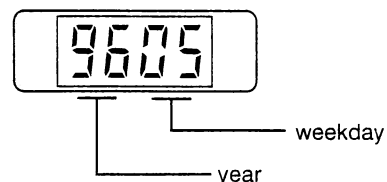0 = Sunday
1 = Monday
2 = Tuesday
3 = Wednesday
4 = Thursday
5 = Friday
6 = Saturday

To program press selection button 0 -hold down- and press selection button R. Release both buttons. Enter the right year with two digits, then enter a 0 followed by the number of the weekday.

6.3. Programming of the Playstimulator (random selections without coin insertion)

In service level 1 button 5 (ref. to chap. 1.7., page 7) the actual number of CD's in the magazines is registered. If the playstimulator is programmed the jukebox plays random tracks of these CDs. Exeption: CDs declared as BGM CDs (ref. to chapt. 6.4., page 36) will not be used! The time between the last track played by inserted money and the first random track of the playstimulator is programmable from 1 up to 98 min. This time is also the repeat time between two random plays.

The volume is the same as in normal operation. If a selection is made the paystimulator will be interrupted immediately and remains after having played the selected tracks.
The playstimulator only works if Back Ground Music is not active at the same time and if the time is programmed correctly. You can set the jukebox in an easy way to continuous play mode without any additional time progamming.
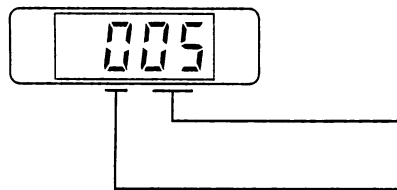
6.3.1. Repeat time programming

IMPORTANT

Make shure that all time functions programmed correctly. Update if necessary.

Example:

 Continuously playing of random tracks.

 CONTINUOUS PLAY switch

 no random plays

 Continuous random plays, however in conjunction with start and stop time.

 After a played random track the jukebox waits about 5 minutes before it starts the next one. Random tracks will only be played in the time between start and stop time. The programming of this 'time window' is described as follows.

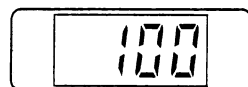| Level 2	Button 9

1. Set the slide switch 'SERVICE' at the SCC unit to ON.
2. Press 'LT' button. Display shows e.g.: _ 4 0 8 (408 or higher = SCC program version)
3. Press selection button R -hold down- and press selection button 0 then release both buttons. The display is dark.
4. Press selection button 2. Service level 2 is reached. Display is: 2_ _ _.

Press selection button 9. The display shows three digits.

Repeat time is set to 5 minutes.

This digit enables or disables the CONTINUOUS PLAY MODE, random tracks one after another.
0 = CONTINUOUS PLAY OFF,
1 = CONTINUOUS PLAY ON

Playstimulator operating modes:
- You can set the jukebox in an easy way to CONTINUOUS PLAY MODE by programming the digit CONTINUOUS PLAY to '1'. An additional progamming of the clock and the start and stop time is not necessary.

- By means of an optional installed switch you can also switch the box to CONTINUOUS PLAY MODE without any need of entering the service program. Part number of this switch is 0034410. It has to be connected to P8 of the SCC unit.

- A more precise programming in conjunction with the internal clock and the start, stop and repeat time is posssible if the digit CONTINUOUS PLAY is set to '0'. A correct programming of all these items is necessary.

To program press selection button 9 -hold down- and press selection button R. Release both buttons. Now enter the digit for CONTINUOUS PLAY and the REPEAT TIME with three digits.

To check the settings:
Press button 9 again.

6.3.2. Programming start and stop time

Level 2	Button 8

If start and stop time is programmed the jukebox only plays random tracks in this time period.

Press selection button 8. The display shows at first a flashing 1. This means 'start time'.

Then the time will be displayed, here 14.05 o' clock (2.05 p.m.).
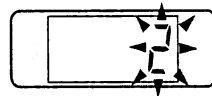
Press selection button 8 once again. The display shows now a flashing 2. This means 'stop time'.
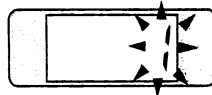
Then the time will be displayed, here 18.30 o' clock (6.30 p.m.).

To reprogram press selection button 8 - hold - and press selection button R. Release both buttons. The digital display goes dark. Enter the start and stop time with eight digits.
Example: The jukebox should play random tracks from 09.00 in the morning to17.00 in the afternoon.
Enter:

0 - 9 - 0 - 0 - 1 - 7 - 0 - 0
————————————————— stop time
—————————————————————— start time
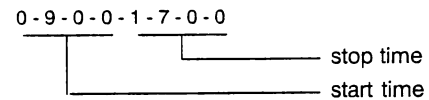
Then press selection button R.
The display shows 2 _ _ _ .

To check the start time:
Press selection button 8.
To check the stop time:
Press selection button 8 again.

☑ **IMPORTANT**

You can not program the Playstimulator over 24.00 o'clock (e.g. 23.00 to 2.00 o'clock) !

If the Playstimulator does not work:

Check if:
- the clock is set correctly ?
- start and stop time is programmed?
- repeat time is set correctly (not 0)?
- BGM play mode is disabled (ref. to next chapter).
- credits are still in memory.

Example:
5 CD's reserved for BGM
repeat time 10 min.

Exit the serviceprogram:

1. Set the slide switch 'SERVICE' at the SCC unit to OFF.
2. Press 'LT' button.
The changer starts an initialisation run. After this the jukebox is ready to operate.

6.4. Back Ground Music

Amplifier F91
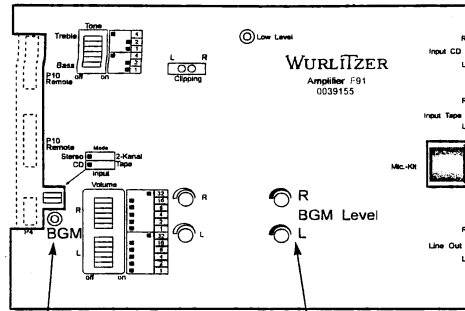
BGM light emitting diode (yellow), indicates whether BGM is active.

pots to reduce the BGM volume

If BGM is programmed and activated a random track from the CDs declared for BGM will be played. The time between the last selected played track and the first BGM track is programmable between 1 and 98 minutes. This time is also the repeat time between two BGM tracks.
The volume by BGM reproduction is reduced compared to the common volume. It is adjustable with the two BGM pots (RH channel / LH channel)on the amplifier (F91) res. with the pots on the BGM level adapter (I84). BGM mode is active when the LED on the amplifier (F91) or on the level adapter lights (I84). The source of the BGM control signal is the SCC unit plug brown (X6), pin 1. Once the BGM mode is activated, then it is not possible to operate the Playstimulator.
If a selection is made by means of coin insertion the track being played will be interrupted immediately. Two intervals can be programmed for each weekday.

Amplifier I84

BGM light emitting diode (red), indicates whether BGM is active.
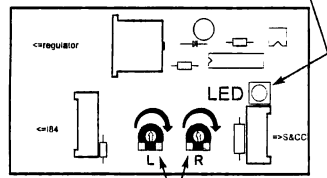
pots to reduce the BGM volume

To enable BGM (service program, level 3) :

1. Set the slide switch 'SERVICE' at the SCC-unit to ON.
2. Press 'LT' button.
3. Press selection button R -hold down- and press selection button 0 than release both buttons.
4. Press selection button 3. Service level 3 is reached. Display is: 3_ _ _.

6.4.1.Number of BGM CD's and BGM repeat time
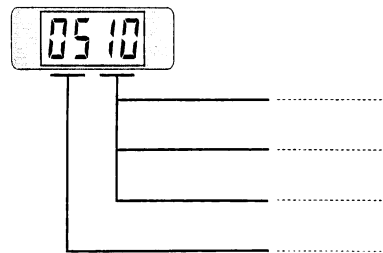
Example:
5 CD's reserved for BGM
repeat time 10 min.

Press selection button 7 the diplay shows e.g.:

repeat time between the single BGM tracks (10 min.)

BGM-continuous play = 99

BGM OFF = 00

number of BGM CD's; disabled for playstimulator!
(The position of the first BGM CD will be programmed in the next step; ref to sec. 6.4.2)

To program press selection button 7 -hold down- and press selection button R. Release both buttons. The display goes dark. Enter the number of CD's and the repeat time by means of the selection buttons with 8 digits.

6.4.2.Start position for BGM CD's and configuration

| Level 3 | Button 8 |
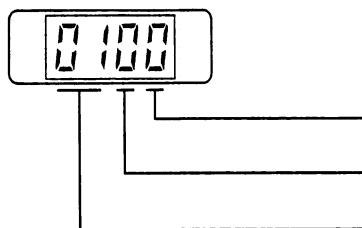
Press button 8. The start position of the BGM CDs is displayed in the left two digits. The RH digit indicates the actual BGM mode.

BGM mode

not used, always 0

start position of BGM CD's

You can determine the digit for the BGM mode as follows:

BGM mode	selection
You want to select BGM CDs by coin insertion too:	yes -> 0; no -> 1
You want that the jukebox plays BGM-CDs also if credit still exists:	yes -> 2; no -> 0
BGM start position over 100:	yes -> 4; no -> 0

Select the desired features and add the according code numbers. Enter the sum of the code numbers as the mode digit.

Example:
BGM-CD's not selectable by coininsertion . . . = 1

BGM-CD's should not be played at still existing credits . . . . = 0

BGM start position over 100 . . . . = 4

Mode number . . . . = 5

To **program** press selection button 8 - hold - and press selection button R. The digital display goes dark. Enter start position followed by a '0' and the BGM mode digit with 4 digits!

☑ **IMPORTANT**

If a wall box is connected the BGM selection option must be set to 0 (yes).

After entering this data the SCC unit calculates the BGM end position itself. For loading of BGM discs the end position can be calculated as follows:

end position = start position + number of BGM-CDs - 1.

6.4.3. BGM time zones at different weekdays

Level 3	Buttons 0-6

You can program each weekday differently with two intervals per day. The following steps are the same for the buttons 1 to 6 in service level 3 according the table for weekdays.

1. Press button 0, the display shows flashing:

0 (LH) = Sunday
1 means start time one

then the time will be displayed, here 9.00 o'clock

2. Press selection button 0 again, the display shows flashing:
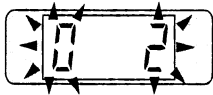
0 (LH) = Sunday
2 means stop time one

then the time will be displayed, here 12.30 o'clock

3. Press selection button 0 again, the display shows flashing:

0 (LH) = Sunday
3 means start time two

then the time will be displayed, here 20.00 o'clock

4. Press selection button 0 again, the display shows flashing:

0 (LH) = Sunday
4 means stop time two
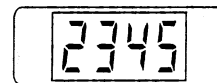
then the time will be displayed, here 23.45 o'clock

Table of weekdays:

0 = Sunday	4 = Thursday
1 = Monday	5 = Friday
2 = Tuesday	6 = Saturday
3 = Wednesday	

To program press selection button 0 (or button 1 - 6 depending on the weekday to be programmed). The digital display goes dark. Enter the two time zones in four blocks containing four digits per block one after another (16 digits).

Meaning of the digits to be entered in the example.

```
      1           2           3           4
 0 - 9 - 3 - 0  1 - 1 - 4 - 5  1 - 7 - 0 - 0  1 - 9 - 5 - 5
```

start time 1

stop time 1

start time 2

stop time 2
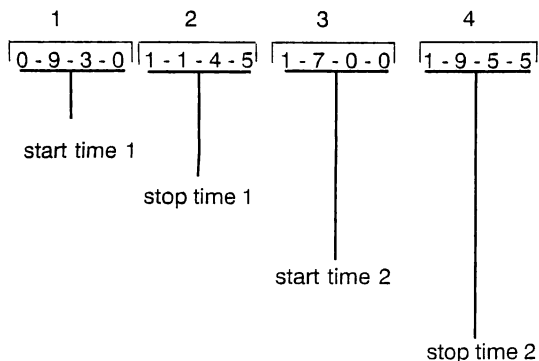
Examples:
The jukebox should play BGM on Tuesday from 9.30 to 11.45 and from 17.00 to 19.55. To program press selection button 2 - hold - and press selection button R. The digital display goes dark. Then enter 0-9-3-0-1-1-4-5-1-7-0-0-1-9-5-5.

If the jukebox should play BGM on Wednesday from 17.00 to 19.55 only, then program on selection button 3 as described: 1-7-0-0-1-9-5-5-0-0-0-0-0-0-0-0 . The second time zone has to be filled with zeros. Also this programming is possible:
0-0-0-0-0-0-0-0-1-7-0-0-1-9-5-5.

Repeat this procedure until all weekdays are programmed (selection buttons 0 to 6).

6.5. Happy hour pricing (additional bonus plays)

During the 'Happy hour' time additional bonus plays can be given. Happy hour time zone and number of additional bonus plays have to be programmed before.

6.5.1.Programming of the happy hour start and stop time

Level 2	Button 6

1. Set the slide switch 'SERVICE' at the SCC unit to ON.
2. Press 'LT' button. Display shows e.g.: _ 4 0 8 (408 or higher = SCC program version)
3. Press selection button R -hold down- and press selection button 0 than release both buttons. The display is dark.
4. Press selection button 2. Service level 2 is reached. Display is: 2_ _ _.

5. Press selection button 6. The display shows flashing:
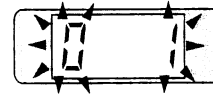
1 means start time

then the start time will be displayed with four digits e.g.: 9.00 o' clock

6. Press selection button 6 again. The display shows flashing:

2 means stop time

then the stop time will be displayed with four digits e.g.: 12.30 o' clock

7. To reprogram press selection button 6 - hold - and press selection button R. The digital display goes dark. Enter the 'Happy hour' start and stop time with 8 digits. After complete entry the digital display is dark.
Example: "Happy Hour" should operate from 09.05 to 11.00 o'clock.
Enter 8 figures: 0 - 9 - 0 - 5 - 1 - 1 - 0 - 0 .

8. To check the settings: Repeat the steps 5 and 6 .

6.5.2.Programming of the additional bonus plays

Level 2	Button 7
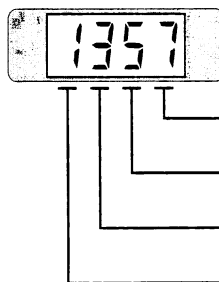
1. Press selection button 7. The display shows e.g.:

7 additional plays at bonus level 1 (B1).

5 additional plays at bonus level 2 (B2).

3 additional plays at bonus level 3 (B3).

1 additional play at bonus level 4 (B4).

2. To reprogram press selection button 7 - hold - and press selection button R. The digital display goes dark. Enter the new happy hour pricing with 4 digits.

3. To check the new setting, press selection button 7 again.

4. To exit the service program set the slide switch 'SERVICE' to OFF and press button LT on the SCC unit.

6.6. Number of tracks played successively on the same disc

| Level 2 | Button 3 |

The display shows the maximum number of tracks played successivly from the same disc if more tracks had been selected. Preset value = 04 tracks, i.e. after four tracks from this CD it will be taken back to the magazine, and the next CD stored in the selection memory will be played.

To call the service program (level 2):

1. Set the slide switch 'SERVICE' at the SCC unit to ON.
2. Press 'LT' button. Display shows e.g.: _ 4 0 8 (408 or higher = SCC program version)
3. Press selection button R -hold down- and press selection button 0 than release both buttons. The display is dark.
4. Press selection button 2. Service level 2 is reached. Display is: 2_ _ _.
5. Press selection button 3 the display shows e.g.:

04 is factory pre setting for number of tracks played successivly on the same disc.

If selections still exist for the previous CD they will be played later. This option to limit the tracks played from one CD is more useful for operators. For individual use this value can be set up to 99.
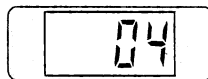
6. To program press selection button 3 - hold - and press selection button R. The digital display goes dark. Enter the desired setting by means of the selection buttons with two digits.

   If you set this value to 01 all selections will be played in selection order.

7. To check the settings: Press selection button 3 again.

8. To **exit the service program** set the slide switch 'SERVICE' at the SCC unit to OFF and press the 'LT' button once. The changer starts an initialisation run. After this the jukebox is ready to operate.

6.7. Selective disabling of tracks

| Level 2 | Button 4 |

You can disable up to maxinmum 25 different tracks of different CD's. If somebody selects a disabled track the digital display flashes. This shows that this track is not selectable. Note a special peculiarity at playstimulator or BGM operation. The random procedure always selects tracks out of a number of 25. If the random selected

track exeeds the number of tracks on the CD the procedure starts to count from the beginnung of the CD. Result is, if you want to disable e.g. track 8 on a CD with 17 tracks you also have to disable track 23 on this disc even if it does not really exist.

To disable tracks (service program level 2):

1. Set the slide switch 'SERVICE' at the SCC-unit to ON.
2. Press 'LT' button.
3. Press selection button R -hold down- and press selection button 0 than release both buttons.
4. Press selection button 2. Service level 2 is reached. Display is: 2_ _ _.
5. Press selection button 4 the display shows e.g.:

— track number
— CD number

Each operation of selection button 4 indicates the next disabled track, maximum 25 tracks.
After having reached the last disabled track, the first one is indicated again. If the display shows 0000 after the first button operation no track is disabled.

6. **To program:** Press selection button 4 - hold - and press selection button R. The digital display goes dark

7. Enter at first the number of the CD to disable followed by the track (total four digits).
8. To disable the next CD/track, press selection button 4 as often as display shows 0 0 0 0 .
9. Press selection button 4 again - hold - and press selection button R. The digital display goes dark. Then enter CD and track to disable. Continue programming for the next track with step 8.

10. To check the diabled tracks: Press selection button 4 again (up to 25 times, at 25 disabled tracks).

11. To **exit the service program** set the slide switch 'SERVICE' at the SCC unit to OFF and press the LT button.

To enable a disabled track:
When a track is indicated, press button 4 - hold - and press selection button R and enter first the number of the CD followed by 0 0.

To enable all disabled tracks:
Press selection button 4 -hold down- and press selection button R. Then enter 0 0 0 0 (4 times 0).

6.8. Location or Identification number

| Level 1	Button 8

A location or identification number of 8 figures can be programmed as a customer or individual machine number.

To enter the number (Service program, level 1):

1. Set the slide switch 'SERVICE' at the SCC-unit to ON.
2. Press 'LT' button.
3. Press selection button R -hold down- and press selection button 0 than release both buttons.
4. Press selection button 1. Service level 1 is reached. Display is: 1_ _ _.

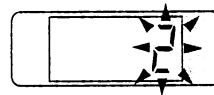5. Press selection button 8, the display shows flashing:
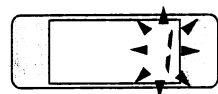
1 means higher digits
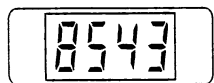
Then the four higher digits will be displayed with 4 figures.

6. Press selection button 8 again, the display shows flashing:

2 means lower digits

Then the four lower digits will be displayed with 4 figures.

In this case the Id number is 8 5431 049.

7. To reprogram press selection button 8 - hold - and press selection button R. The digital display goes dark. Then enter the complete number with 8 digits.

8. To check the settings: Press selection button 8 again.

9. To **exit the service program** set the slide switch 'SERVICE' at the SCC unit to OFF and press the LT button.

6.9. Album selection and memory reset by power off

Level 1	Button 9

By setting the corresponding digit to 0 or 1 these options are available.
***Album selection** is possible by entering the disc number followed by 0 0 (track 0 0). All tracks on the CD are played, starting with the first track. An album is only selectable by coin insertion, if credits of the 4th bonus level have been obtained or in free play modus (link in row GP from 0 to F on the SCC unit) of the jukebox.*

***Memory reset** feature will cancel remaining credits and selections by power off of the jukebox.*
This option prevents the jukebox playing pre-selected tracks from the day before. (The jukebox was switched off in the night, not playing all the selected tracks.)

To alter the settings (Service program, level 1):

1. Set the slide switch 'SERVICE' at the SCC-unit to ON.
2. Press 'LT' button.
3. Press selection button R -hold down- and press selection button 0 then release both buttons.
4. Press selection button 1. Service level 1 is reached. Display is: 1_ _ _.
5. Press selection button 9, the display shows e.g.:

6. To alter the settings press selection button 9 - hold - and press selection button R. The digital display goes dark. Then enter the desired setting with two figures.

7. To check the settings: Press selection button 9 again.

8. To **exit the service program** set the slide switch 'SERVICE' at the SCC unit to OFF and press the LT button.
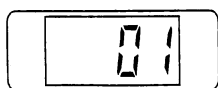
digit for albumplay; 1 = ON, 0 = OFF

digit for memory reset by power off; 1 = ON, 0 = OFF

7. Data retrieval
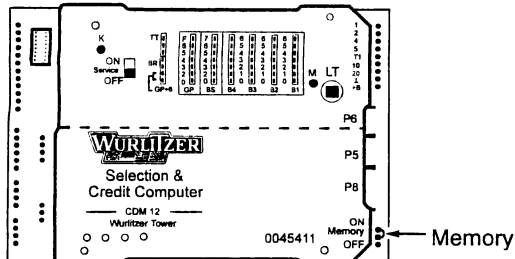
 — Memory

The data retrieval memory keeps only data if the plug 'MEMORY' is always in the position ON (on the RH. side of the SCC unit).

7.1. Operator data

You can retrieve the statistical data for operators in the service program level 1 over the display or with a printer.

1. Set the slide switch 'SERVICE' at the SCC-unit to ON.
2. Press 'LT' button.
3. Press selection button R -hold down- and press selection button 0 then release both buttons.
4. Press selection button 1. Service level 1 is reached. Display is: 1_ _ _.

7.1.1. Retrieval of least popular discs (flops)

Level 1	Button 0

1. Press selection button 0 once.
   At first the least played CD is shown. The last two digits are simply a code confirming the least played status. The display counter flashed alternately the disc number and then the number of plays e.g.:
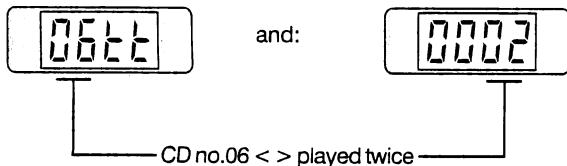
If the counter shows 0 0 0 0, this means the disc had not been played. Press selection button 0 to continue the process for the second least played disc, and so on. At first the CD with the lowest number of plays will be displayed, with the next operation of selection button 0 the CD with the second lowest number of plays etc. If the calculation needs a little longer a '1' scrolls starting from RH. digit over the display.

 and:

— CD no.06 < > played twice —

2. To cancel the procedure press selection button R.

7.1.2. Top Tunes

Level 1	Button 1

1. Press selection button 1 once.
   The display counter flashes alternately the number of the most played CD and then the number of plays. For example:
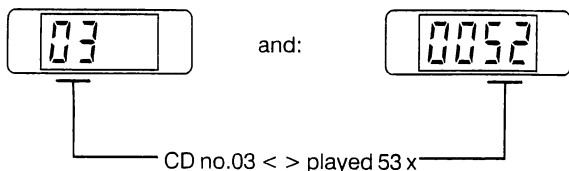
Only 63 selections per CD can be stored in memory. So if a CD have been played more than 60 times all the other values will be decreased by 1. Then the displayed values are only relative.

Press selection button 1 to continue the process for the second most played CD, and so on.

The most frequently played track will also be displayed as HIT OF THE HOUSE in common operation.

 and:

— CD no.03 < > played 53 x —

7.1.3.Cash box contents

Level 1	Button 2

1. Press selection button 2 once. Digital display shows the cash box contents in basic units; basic units being the value of the lowest coin value.

2. To cancel the procedure press selection button R.

7.1.4.Total number of plays

Level 1	Button 3

1. Press selection button 3 once. Display shows the total number of plays since last reset (maximum 9999).

2. To cancel the procedure press selection button R.

7.1.5.CLEAR ALL counters (reset to 0 0 0 0)

Level 1	Button 3 + Reset

R.H. magazine
L.H. magazine
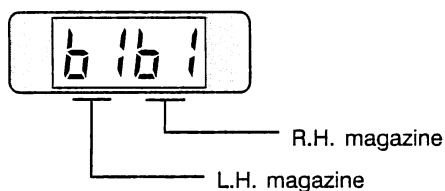
1. Press selection button 3 - hold - and press selection button R (reset).
   The counters belonging to the buttons 0 to 3 (least popular disc, most popular disc, cash box and total plays) are cleared and reset to 0 0 0 0.

   After leaving the service program the jukebox initializes itself, during this procedure the compartments in the magazines will be counted. At the end of the initialization the display should show 6161 for a short time. If lower numbers are displayed not all compartments have been detected correctly. The sequence of top discs is for the time being 01, 02, 03, 04 etc.

2. To exit the service program first set service switch to OFF and then press the LT button.

7.1.6.Memory of not playable CDs

Level 1	Button 6

Careful handling of the CDs does not completely exclude that CDs may be damaged in different ways. Possibly the player would interrupt this CD at each selection. The SCC provides a watch dog function which finds and memorizes these difficult to play.
The SCC unit can store the numbers of up to six not playable CDs. Once a CD is registered every new try will be counted. So it is possible to find out bad discs and change these for new ones.

1. Press selection button 6, the display shows flashing:
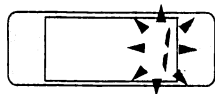
1 means first defektive CD

than e.g.:
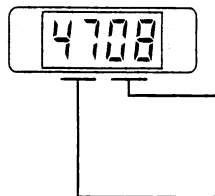
NUMBER of times the
CD was not playable or
interrupted

CD number

2. Press selection button 6 to display the next not playable CD, etc. After displaying the 6th not playable CD and pressing selection button six the display starts with the first one again.

3. To CLEAR this memory press selection button 6 - hold - and press selection button R.

4. To exit the service program, first set service switch to OFF and then press LT button.

7.1.7. Statistic print-outs

Level 1	Button 2 + Reset

For data retrieval a printer can be connected to a receptacle located in a wire loom underneath the SCC unit:

③ Service: ON

④ LT: press once

capacitor

printer adapter cable
0005631

spare roller
0035787

printer (NRI)
00011715
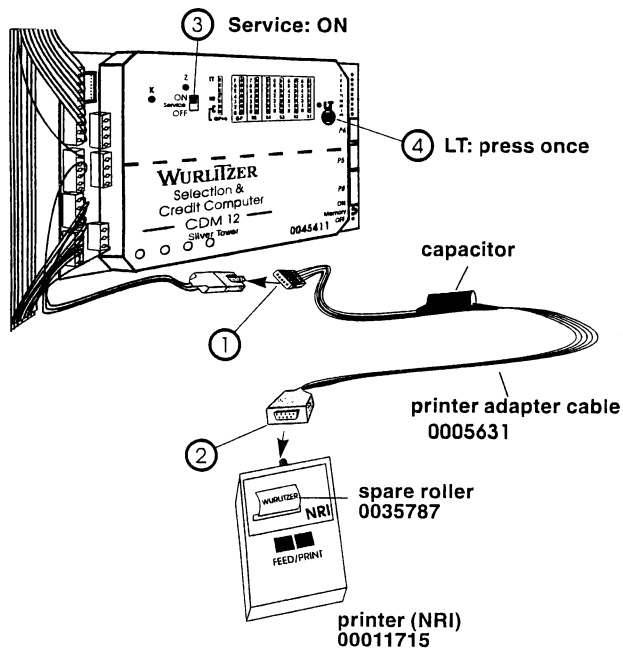
1. Connect printer adapter cable (Part No. 0005631) with receptacle underneath the SCC unit.
2. Connect printer (part no. 0011715) with the printer adapter cable.
3. Enter the service program by setting the service switch to ON position.
4. Press LT button on the SCC unit. Display may show i.e.: _408 = SCC program version, may be higher too
5. Press selection button R -hold down- and press selection button 0. The display is dark.
6. To reach service level 1, press selection button 1. Display shows 1 _ _ _.
7. Press selection button 2 - hold - and press button R, the print-out starts.

The following information will be reported:

```
============
  WURLITZER
COMPACT-DISK
  JUKE-BOX
S+C-COMPUTER
============
PREV.DATE:          Date and time of the previous print out
22.04.96
09:11
ACTUAL DATE:        Date and time of current print out
29.05.96
09:43
PRINT:   0001       No. of print out
IDENT:
     00000000        Identification number (service level 1, selection button 8)


--SETTINGS--
============
CDBOX: 04.08        Program version number
BOX TYPE:120        max. number of CD's in magazines
BONUS-1 : +1
BONUS-2 : +1        Jumper setting
BONUS-3 : +1        on the SCC unit
BONUS-4 : +2
BONUS-STEP:5        row BS
CREDITSTEP:2        row GP
BONUS- RESET        jumper BR
DISCS   : 86        Programmed number of CDs in carrier (service level 1, selection button 5)
MINUTES : 01        Programmed repeat time for playstimulator.


-STATISTICS-
============
CASH :   0401       Total income in basic units since last reset..
PLAYS:   0132       Total plays since last Reset.
TOTAL:000401        Total income, not resetable.
CHECK:   2272       Safety number.


-TOP-DISKS--
============
CD :01 =0017
CD :12 =0008        Shows all discs in carrier (max.100);
CD :30 =0007        and the number of plays.
CD :10 =0006        Top disc is shown at first, least popular disc or
CD :20 =0005        non·played discs are shown at last.
CD :00 =0000
       :
CD :50 =0000
       :
CD :99 =0000
```

To leave the service program, first set service switch to OFF and then press LT.

7.2. Service data

Level 4	Button 8

Special data for the jukebox service are displayed in service level 4 button 8. By pressing the button 8 several times you can call up the contents of up to 18 different storage locations stored in the below explained statistical values. This data is useful to assess the condition of the jukebox and its mechanism.

1. Set the slide switch 'SERVICE' at the SCC-unit to ON.
2. Press 'LT' button.
3. Press selection button R -hold down- and press selection button 0 then release both buttons.
4. Press selection button 4. Service level 4 is reached. Display is: 4_ _ _.

7.2.1. Retrieval of the last occured mechanism faults

The SCC unit stores up to 9 of the last occurred mechanism error codes (procedure step codes) If more errors occur the eldest codes will be deleted.

1. Press selection button 8, display shows flashing:
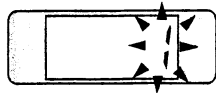
1 = 1st error code

then e.g.:

1st error code is always 000 (memory check).

2. Press selection button 8 again, display shows flashing:

2 = last occured error code

then e.g.:
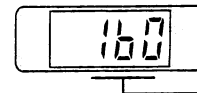
Error 160: Error when reaching the vertical take out position.

3. Press selection button 8 once more to display the next error code etc. After displaying the 10th code, special values will be displayed (ref to the following chapters).
4. DELETE this data: Press selection button 8 - hold - and press button R.
5. Exit: Press button R.

Procedure step codes for 'CD to turntable':

in rest	in action	meaning
32	160	selection sledge reachs the vertical 'take out position'
33	161	open gripper (before taking a CD)
34	162	move gripper into magazine
35	163	close gripper (get a CD)
36	164	get a CD from magazine an move to the vertical transport level (LH or RH side).
37	165	reach the CD player - move sledge to player unit.
38	166	move gripper to the horizontal player position.
39	167	move sledge with CD to the player.
40	168	open gripper (release CD)
41	169	move gripper out of player range.
42	170	fix the CD with the pressure disc.
43		CD on player, end of procedure.

Procedure step codes for 'CD to magazine':

in rest	in action	meaning
16	144	get vertical sledge position over the player
17	145	move gripper horizontal to take the CD.
18	146	close gripper.
19	147	lift CD.
20	148	move to vertical transport level.
21	149	move sledge to magazine return position.
22	150	move gripper with CD into magazine.
23	151	open gripper.
24	152	move gripper out of magazine.
25	153	move sledge to 0-position.
26		CD is taken back, end of procedure.

7.2.2. Counter for complete mechanism cycles

After the end of each replacing procedure the counter will be incremented. This information given in the steps 11 and 12 of service level 4 button 8 will be displayed with 8 figures. Because of a only four digit display, this value will be displayed in two parts the 4 higher and the 4 lower digits. To display the complete value:

1. Press selection button 8 as often as, display shows flashing:
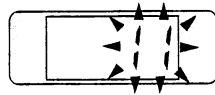
   11 = next displayed value is the high part of the mechanism counter
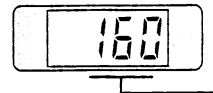
   then e.g.:

   value, means 1 600 000

2. Press selection button 8 again, display shows flashing:

   12 = next displayed value is the low part of the mechanism counter

   then e.g.:

   value, means 3 467

In this example the machine has placed and replaced the CD's 1603467 times.

7.2.3. Counter for total number of mechanism faults

Each mechanism error will be counted. This information given in the steps 13 and 14 of service level 4 button 8 will be displayed with 8 figures too. To display the complete value:

1. Press selection button 8 as often as, display shows flashing:

13 = next displayed value is the high part of the error counter

then e.g.:

value

2. Press selection button 8 again, display shows flashing:

14 = next displayed value is the low part of the error counter

then e.g.:

value

In this example 250 errors have occurred.

7.2.4. Counter for total number of power up's

Each power up will be counted. This information given in the steps 15 and 16 of service level 4 button 8 will be displayed with 8 figures too. To display the complete value:

1. Press selection button 8 as often as, display shows flashing:

15 = next displayed value is the high part of the power up counter

then e.g.:

value

2. Press selection button 8 again, display shows flashing:

16 = next displayed value is the low part of the power up counter

then e.g.:

value

In this example the power was switched on 10023 times.

7.2.5. Counter for total operating time

The operating time displayed in the steps 17 and 18 of service level 4 button 8 will be displayed in minutes with 8 figures too. To retrieve the complete value:

1. Press selection button 8 as often as, display shows flashing:
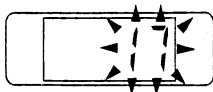
17 = next displayed value is the high part of the operating time counter

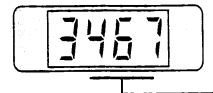then e.g.:

value

2. Press selection button 8 again, display shows flashing:

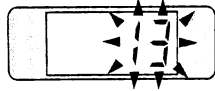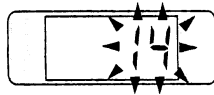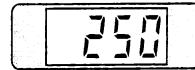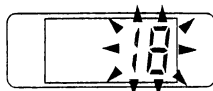18 = next displayed value is the low part of the operating time counter

then e.g.:
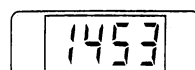
value

In this example the total operating time is 241453 minutes. (approx. 4024 h).

The function tests are divided in 3 groups. Display test (level 1), mechanism tests (level 4) and player tests (level 5).

8.1. Digital display test / EPROM-version

Level 1	Button 4
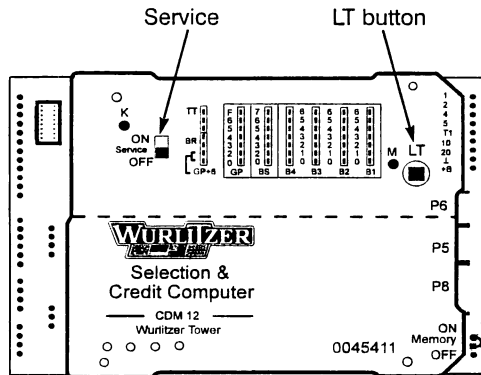
1. Set the slide switch 'SERVICE' at the SCC unit to ON.
2. Press 'LT' button. Display shows e.g.: _ 4 0 8
   (408 or higher = SCC program version)
3. Press selection button R -hold down- and press selection button 0 than release both buttons. The display is dark.
4. Press selection button 1. Service level 1 is reached. Display is: 1_ _ _.
5. Press selection button 4.
   All segments counting 0 to 9 are displayed, then the program version number (EPROM version).
6. To cancel the procedure press selection button R.

8.2. Mechanism single step tests

Service level 4 includes all functions to check the CD-2 mechanism. Single step and continuous tests can be made.

1. Set the slide switch 'SERVICE' at the SCC unit to ON.
2. Press 'LT' button. Display shows e.g.: _ 4 0 8
   (408 or higher = SCC program version)
3. Press selection button R -hold down- and press selection button 0 than release both buttons. The display is dark.
4. Press selection button 4. Service level 4 is reached. Display is: 4_ _ _.

8.2.1. Take CD to turntable

Level 4	Button 0

1. Press selection button 0 and enter the desired CD number.
   This function is not supported from program versions up to 4.08!

8.2.2. Step selection sledge upwards

Level 4	Button 2

1. Press selection button 2. The button has an auto repeat function.

   Each button operation makes the sledge move one step upwards and the display will be increased by 2. Last position is 120.

   If both magazines exist, the left one will be used as reference. If the L.H. magazine is missing the other one is used.

8.2.3. Step selection sledge downwards

Level 4	Button 1

1. Press selection button 1. This button has an auto re-peat function.

Display shows _ _ 0 0:
If the display is still 0 0, the selection sledge (german: AusWahlSchlitten - AWS) is located in its lowest posi-tion (basic position). So it is impossible to move it further down. It can only be moved if the sledge had been moved up with selection button 2 before. Then the display will also show a greater number as 0 0, e.g.: 22.

Display shows a number greater than 0 0, e.g.: _ _ 2 4
Each button operation makes the sledge move one step downwards and the display will be decreased by 2. Last position is 02.

8.2.4. Get a CD from LH magazine

Level 4	Button 3

> ⚠ **CAUTION**
>
> **After having taken the CD to the turntable the SCC automatically jumps to service level 5! You only can jump back to SL 4 by pressing the button 3 to run the procedure 'STOP and back to SL 4' .**

1. Press selection button 3. A CD is taken from the actual sledge position and placed to the turntable. The serv-ice program automatically jumps to service level 5.

8.2.5. Get a CD from RH magazine

Level 4	Button 4

> ⚠ **CAUTION**
>
> **After having taken the CD to the turntable the SCC automatically jumps to service level 5! You only can jump back to SL 4 by pressing the button 3 to run the procedure 'STOP and back to SL 4' .**

1. Press selection button 4. A CD is taken from the actual sledge position and placed to the turntable. The serv-ice program automatically jumps to service level 5.

8.3. Mechanism continuous tests

Level 4	Button 9

To locate certain faults occurring only from time to time it may be helpful to run continuous tests. During the tests described below, the display shows special procedure step codes. These codes are divided in rest and action codes (ref. to the table opposite).
If the machine stops at a certain point in conjunction with these codes you can determine the point of fault. In this case you should switch off the jukebox and try to find

the reasons of this fault. Then you have to take the selec-tion sledge in its home position by hand. Home position means: The position of the magnetic pressure disc is approx. 1 cm (1/2 ") over the player and the gripper motor stays on the RH side of the pressure disc holder. The LH edge of the gripper holder should align with the RH edge of the pressure disc holder. Then switch on the jukebox it initializes itself.

Test start:
1. Press selection button **9** -hold- and press button R. Release all buttons
2. **Press selection buttons 1 ,2 ,3 or 4, according the table 'continuous test procedures'.**
   The continuous test starts.

Test stop:
Press selection button **9**.

All continuous tests can be switched to single step mode while running:

Single step - ON: Press selection button **5**.
The just running step runs to its end. The machine waits.
Single step - NEXT: ress selection button **5** again. Only the next one step runs. Press button 5 again etc.

Single step - OFF: Press selection button **6**.

Continuous test procedures

Selection button 1	CD change test Remove all CD's and insert only the CD's no. 119 and 120!	The gripper takes the CD from compartment 119, takes it to the turntable and back to compartment 099! Now the gripper takes this CD to the turntable and back to compartment 079 e.t.c.. At the end the gripper takes the CD back to comp. 119. The the same procedure starts on the RH side with CD 120. If an error occurs the machine will stop displaying the corresponding error code.
Selection button 2	gripper test	The gripper opens and closes continuously.
Selection button 3	takes the CD no. 30 to and from turntable	
Selection button 4	takes the CD no. 29 to and from turntable	

Procedure step codes

in rest	in action	meanig	
16	144	get vertical sledge position over the player	*CD back to compartment*
17	145	move gripper horizontal to take the CD.	
18	146	close gripper.	
19	147	lift CD.	
20	148	move to vertical transport level.	
21	149	move sledge to magazine return position.	
22	150	move gripper with CD into magazine.	
23	151	open gripper.	
24	152	move gripper out of magazine.	
25	153	move sledge to 0-position.	
26		CD is taken back, end of procedure.	
32	160	selection sledge reachs the vertical 'take out position'	*'CD to turntable'*
33	161	open gripper (before taking a CD)	
34	162	move gripper into magazine	
35	163	close gripper (get a CD)	
36	164	get a CD from magazine an move to the vertical transport level (LH or RH side).	
37	165	reach the CD player - move sledge to player unit.	
38	166	move gripper to the horizontal player position.	
39	167	move sledge with CD to the player.	
40	168	open gripper (release CD)	
41	169	move gripper out of player range.	
42	170	fix the CD with the pressure disc.	
43		CD on player, end of procedure.	
48	176	attempt to move the selection sledge to the player	**to initialize**
49	177	initialize the magazines (count to 6161).	
50	178	move the sledge to the player, after initialization.	
80	208	close gripper	**gripper**
81	209	open gripper	
	112	check sum error in memory for CD2 mechanism (e.g. after 'battery off operation')	**errors**
	126	error while error was handled	
	254	total error, e.g. defective RAM or CPU...	

8.4. Light gate tests

Five light gates are used to position the selection sledge. These sensors scan certain rulers. The name of a light gate corresponds to the princpal ruler (in German: Lineal).

1. Vertical-Lineal-Left (VLL), vertical ruler LH side
2. Horizontal-Lineal-Left (HLL), horizontal ruler LH side
3. Vertical-Lineal-Centre (VLC), vertical ruler centre
4. Horizontal-Lineal-Right (HLR),horizontal ruler RH side
5. Vertical-Lineal-Right (VLR), vertical ruler LH sid

8.4.1.Light gate snapshot

| Level 4 | Button 7 |

To start the test: Press selection button **7**.

Example:

VLL open | HLL interrupted | HLR open | VLR open
VLC interrupted

RH digit is always 0
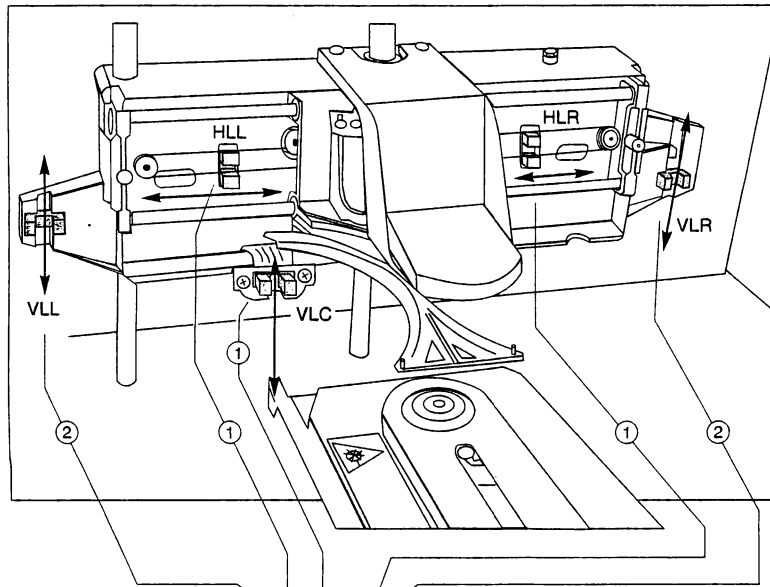
- By pressing selection button 7 a 'snapshot' of the actual gate state will be made. Then this state will be displayed in a coded form.

- An interrupted gate sends a '0' to the principal digit in the display.

- Two gates are combined in the second and fourth digit (from RH side) of the display.

- Both left and right gates (VLL, VLR) send a '2' if open to the corresponding digit, the others a '1'. This value adds itself.

- The RH digit is always 0.
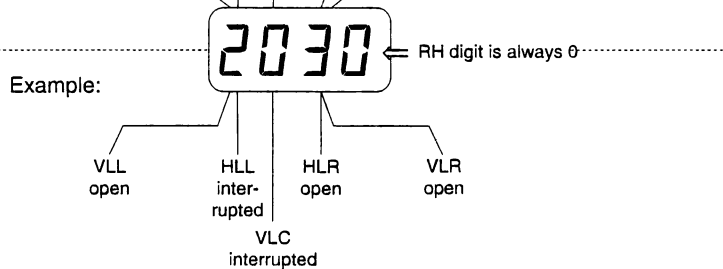
To exit the test: Press selection button R.

8.4.2.Light gate function test

| Level 4 | Button 9 |

With this test you can check each single light gate by a continuous test loop during operation. A "0" in the display represents an open gate, a "1" represents a closed one. The gate to be checked is connected by software to the interrupt request line INT1 which is used in normal operation. INT1 is always shown in the most RH digit of the display.
So do not worry that the left ruler VLL is displayed in the second digit from right.

Test start: Go to service level **4** press selection button **9** - hold - and press selection button **R** Release both buttons and press selection button **9** again. The display shows

INT 1
INT 2
c: means start address

52
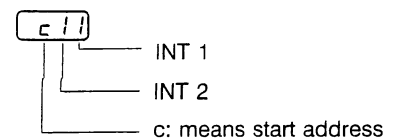
Now you can select different test procedures. Each procedure checks a certain function and the corresponding light gate. The procedures are numbered from 0 to 9 and can be selected with the selection buttons 1 (counts downwards) and 2 (counts upwards). The procedures 7, 8 and 9 have no function.

Depending on the selected test you can carry out special actions by means of the selection buttons 3 and 4. If you use the selection buttons 5 or 6 each action will be stopped at an occurring bright dark or dark bright change (auto edge stop) of the gate.

procedure select -

depending on the procedure: selection sledge **up, to RH side** or gripper **close**

like button 3,
but auto edge stop

procedure select +

depending on the procedure: selection sledge **down, to LH side** or gripper **open**

like button 4,
but auto edge stop

functions of the buttons

Meaning of the tests:
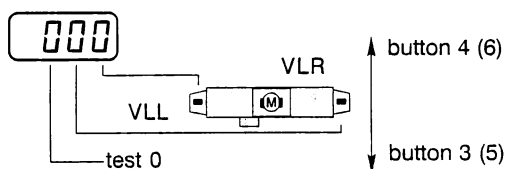
0 Test: VLL & VLR together. **VLL** is displayed in the **RH** digit (INT1), VLR in the second digit from RH (INT2). 1=gate is interrupted, 0=gate is open.
Button 3 (5) makes the selection sledge move downwards, button 4 (6) upwards.
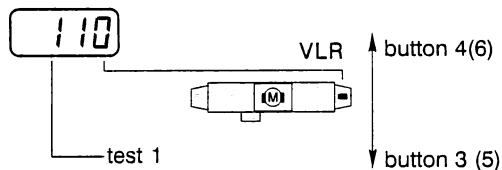
1 Test: VLR. State is displayed in the RH digit (INT1). 1=gate is interrupted, 0=gate is open.
Button 3 (5) makes the selection sledge move downwards, button 4 (6) upwards.
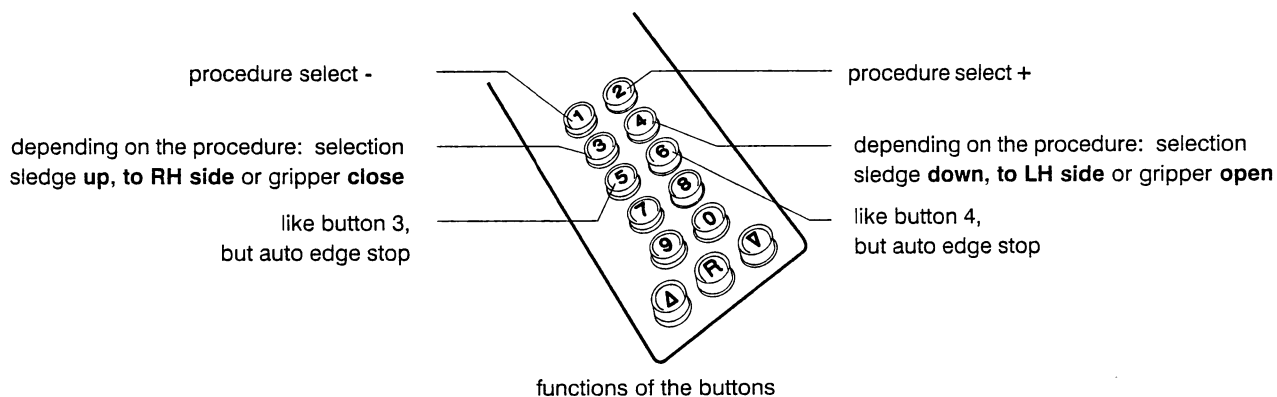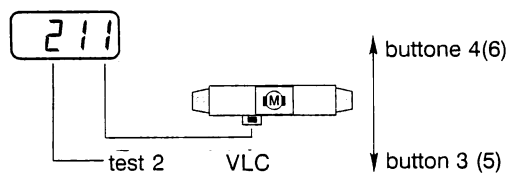
2 Test: VLC (Centre). State is displayed in the RH digit (INT1). 1=gate is interrupted, 0=gate is open.
Button 3 (5) makes the selection sledge move downwards, button 4 (6) upwards.
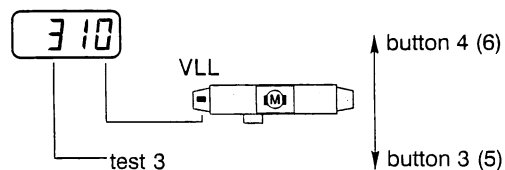
3 Test: VLL . State is displayed in the RH digit (INT1). 1=gate is interrupted, 0=gate is open.
Button 3 (5) makes the selection sledge move downwards, button 4 (6) upwards.

4 Test: VLL . State is displayed in the RH digit (INT1). 1=gate is interrupted, 0=gate is open. Button 3 (5) makes the gripper move to the LH side, button 4 (6) to the RH side.

5 1 1 button 3 (5)   button 4 (6)

HLL

test 5
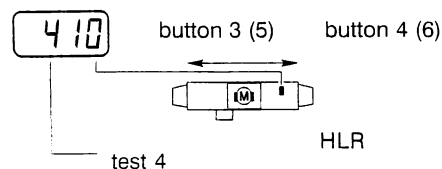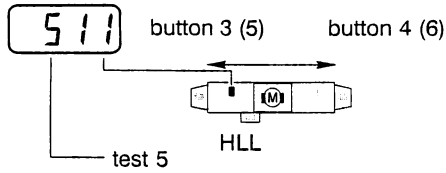
5 Test: HLL . State is displayed in the RH digit (INT1).
1=gate is interrupted, 0=gate is open. Button 3 (5)
makes the gripper move to the LH side, button 4 (6)
to the RH side.

b 1 1 gripper   button 3 (5) OPEN

test 6   button 4 (6) CLOSE
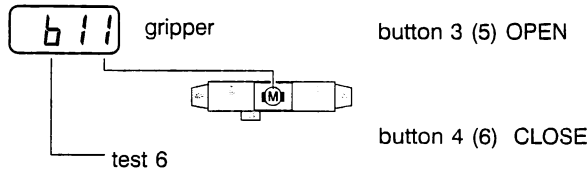
6 Test: Gripper. State is displayed in the RH digit (INT1).
1=gate is interrupted, 0=gate is open. Button 3 (5)
opens the gripper, button 4 (6) closes it.

8.5. CDM12 function tests

Level 5

*The following tests can be done in service level 5. In some
cases level 5 is reached automatically (ref. to chapt.8.2.4,
8.2.5., page 48), because these tests are parts of com-
plete test procedures.*

1. Set the slide switch 'SERVICE' at the SCC unit to ON.
2. Press 'LT' button. Display shows e.g.: _ 4 0 8
    (408 or higher = SCC program version)
3. Press selection button R -hold down- and press se-
    lection button 0 than release both buttons. The dis-
    play is dark.
4. Press selection button 5. Service level 5 is reached.
    Display is: 5_ _ _.

8.5.1.CD player check (START)

Level 5	Button 6

*Before starting this test a CD has to be placed on the
turntable (ref to chap. 8.2.4.). If no track had been se-
lected with the buttons 0 or 9 the complete CD will be
played.*

1. Press selection button 6, the CD will start to play be-
    ginning with the first track. The display shows at first:

then the current play time in sec.:

0 1

TRACK number

0008
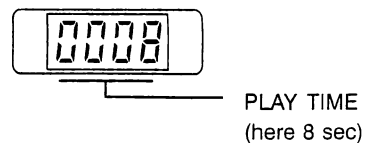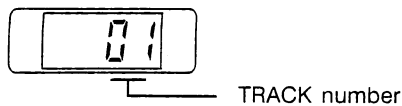
PLAY TIME
(here 8 sec)

⚠ **CAUTION**

**The displaying of the play time in this test is an
important indicator for the serial comunication
between the SCC unit and the CD controller!**

8.5.2.NEXT

Service level 5 has to be reached and a CD has to be placed on turntable (ref. to chap. 8.2.4 page 50).

1. Press selection button 0 (several times). The CD starts and the track number according to the number of key actuation will be played. Only this track will be played. The digital display shows at first e.g.:
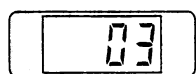
then the current play time in sec (e.g. 8 sec).

TRACK number

PLAYTIME of actual track

If selection button 0 is pressed again once the next track will be played or
if selection button 6 is pressed the remaining tracks of the CD will be played.

8.5.3. PREVIOUS

Service level 5 has to be reached and a CD has to be placed on turntable (ref. to chap. 8.2.4 page 50).

1. Press selection button **9** (several times too).

The player jumps to the previous track with each button actuation.
If track 1is reached it will be played continuously.
If button 6 is pressed in between, the remaining tracks of the CD will be played.

8.5.4.STOP

1. Press selection button **5**.
   CD stops playing. Display shows 5 _ _ _ (service level5).

8.5.5.STOP playing and go back to level 4

1. Press selection button **3**.
   CD stops playing. Display shows 4 _ _ _ (service level 4).

☑ **IMPORTANT**

To terminate all the tests to return to normal operation: Set slide switch 'SERVICE' on the SCC unit to OFF. Press 'LT' button also on the SCC unit.

9.1. Access to the player functions without S&CC unit

one figure
display

button 1 (mode)

button 2

button 3
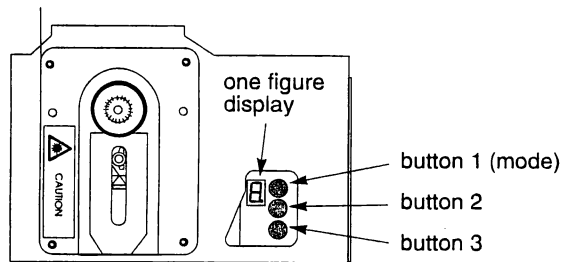
For a test the complete player unit CDM12 can be operated without S&CC unit.

The power supply from the installed amplifier, the sub-transformer and an amplifier with CD input for the audio signal is required.
A one digit digital display indicates the current operation mode and three command buttons are located on the player chassis.

moment of power ON

reset active

display dark for 1 sec

100ms pause

program
version number
Wurlitzer CD control unit
01.20

date of release
08.05.

CDM12 version
number 1.8

mode = 0

time
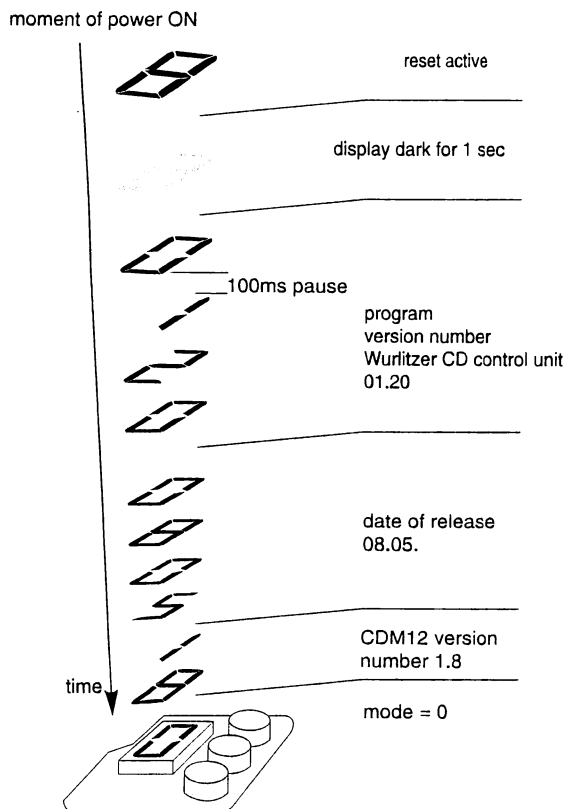
The one digit display is able to display more information.

To display two or more digits the information starts with a dark phase of approx. 1 sec. followed by the digits shown one after another with dark phase of 100 msec. between each digit. The most significant digit will be displayed at first.

After power on and after a general reset command (display shows "8"), the program version number of the Wurlitzer CD control unit will be displayed with four digits followed by the version number of the CDM12 servo processor with two digits.

If the player is in stand by and the three buttons on the player are pressed at the same time the above mentioned sequence will be displayed but without showing "8" for "reset active".
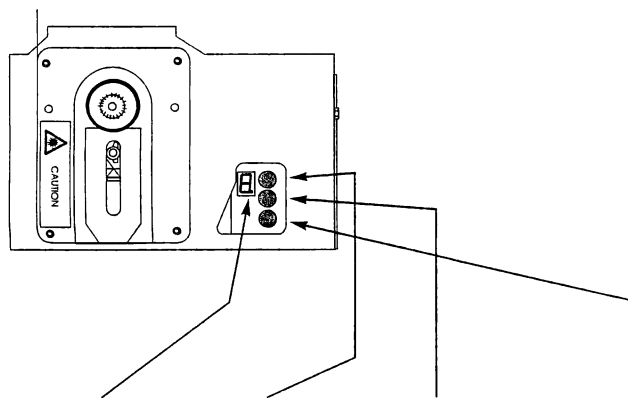
Test functions CDM 12

(Example: If mode display = 3 and
button 2 will be pressed, then pause
is switched on.)

mode display	button 1 (mode)	button 2	button 3	buttons 2 + 3 together
0	mode 1	start	stop	repeat CD
1	mode 2	next track	previous track	repeat track
2	mode 3	search forward	search backward	single, double speed.
3	mode 4	pause ON	pause OFF	
4	mode 5	volume +	volume -	mute
5	mode 0	track +1	track -1	play selected track (read TOC if necessary)

CDM 12 error codes:

Error code	Meaning
0	No error
2	Focus error or no disc
7	Subcode error, no valid subcode
8	TOC error
10	Radial error
12	Fatal sledge error
13	Turntable motor error
31	Search time out
32	Search binary error
33	Search index error
34	Search time error
40	Illegal command
41	Illegal value
42	Illegal time value
43	Communication error
44	Reserved
45	HF detector error
48	Emergency stop

If "repeat CD" had been selected with the buttons 2 + 3 in mode 0 the display will be "99". At each beginning of a new track it will be displayed with two digits.

If "repeat track" had been selected with the buttons 2 + 3 in mode 1 the actual played track will be displayed.

By pressing of two buttons at the same time additional values will be displayed:

Buttons 1+2: The last occurred error code will be displayed (ref. to error code table). This error code will be reset after this retrieval or after a CDM12 reset (e.g. the next power on).

Buttons 1+3: The actual playing track will be displayed.

Buttons 1+2+3:
a) No CD is playing: Program version and date of release..
b) CD is playing: Max. / min. track number will be displayed.

Remark:
If commands will be sent to the CDM12 player, the display will flash. During this time no commands given by the buttons will be accepted.

While the table of contents (TOC) is read an 8 flashes in the display. In this way, the necessary time to read the TOC can be prolonged. So bad CDs can be recognised and taken out.

9.2. Special test functions of the CDM12 player

Service program of CDM12 (mode 9)

With this service program different functions of the CDM12 player can be tested.

Start service program

90	Laser light OFF
91	Laser light ON
92	Focus OFF
93	Search focus
94	Turntable motor OFF
95	Turntable motor ON
96	Radial Servo OFF
97	Radial Servo ON
98	Sledge moves forward and backward.
99	Quit service program, back to mode 0.

Press button 2 to reach next step.

Press button 3 to reach previous step.

Mode 0
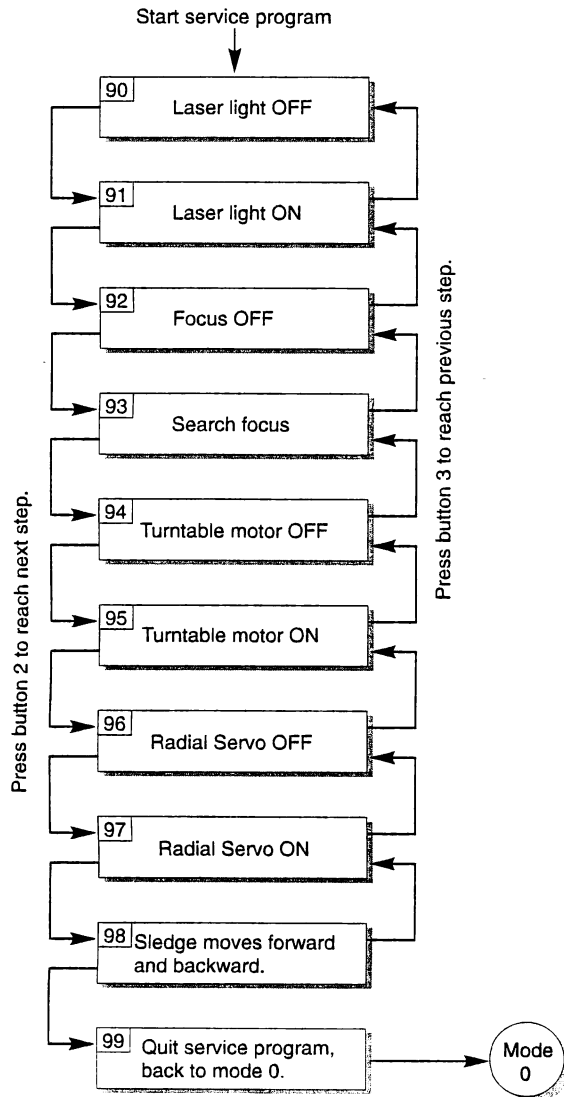
How to call:
Switch main power OFF. Press button 1 - hold down - and switch main power on. (Remark: "Power ON - OFF" can also be done by disconnecting the wire bk./gy. from pin 6 of the sub transformer.)

Function:
The Wurlitzer CD control unit steps into mode 9 and runs the tests 90 up to 99. Mode 9 will be displayed continuously. While changing the test step it will be displayed with two digits

Remarks:
Starting test step 94 a CD has to be placed on turntable.

The button 1...
has no function during this test.

The button 2...
switches to the next test step.

The button 3...
switches to the previous test step.

Quit:
Press button 2 while test 98 is running. Control unit steps over test 99 to mode 0 automatically.

next test step

previous test step
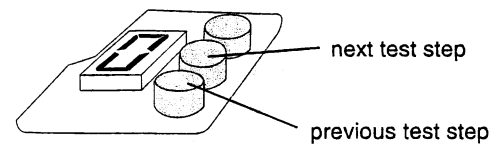
Test results:

Test 91: You can check the laserlight with an infrared indicator.

Test 93: With out a CD: laser lense moves up and down. If you put a CD on the turntable while the test runs the lens stops moving if it finds the focus point.

Test 95: The turntable motor must spin.

Test 98: The sledge moves itsself from inside to outside and back again. If this test is successful the speed of the disc must change to lower speed at the outside of the disc.

10.1. Continuous play switch (Part.-No. 0034410)
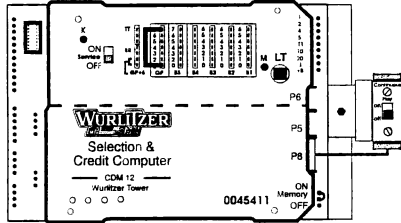
The continuous play switch has to be connected to P8 of the SCC unit. If it is set to "ON" the jukebox plays continuous random tracks. If a track is selected over the keyboard the continuous play will be interrupted immediately and remains after playing all the selected songs.

10.2. Infrared remote control for amplifier F91 (40435)
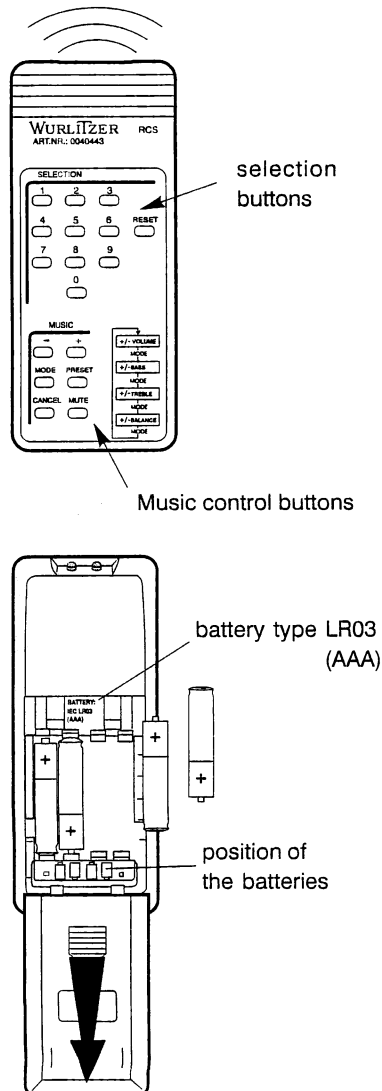
selection buttons

Music control buttons

battery type LR03 (AAA)

position of the batteries

If credit is given or free play is programmed a CD can be selected with the buttons 0 to 9 and R.

Double button functions as required in the service programmes (i.e. press button 5 -hold down- and press button R), are impossible. For this you only can use the keyboard of the jukebox.

The meaning of the music control buttons is according to the buttons on the control terminal on the rear side of the jukebox. (ref. to the prev. chapter)
The receiver eye of the infrared remote control is located above the digital display (behind the Wurlitzer logo of the front pane). Beam this point directly if possible.

The common control terminal can be connected further more. It can be mounted outside to display the actual mode.

Batteries will not be delivered. *Necessary* are 4 micro cells type LR03 (AAA).

To open the battery compartment move the cover like shown in the picture.

Needed battery type and position of the batteries in the hand transmitter are shown on the casing.

Part no. of the hand transmitter: 0040443.

10.3. Infrared remote controller for amplifier I84

As desired infrared remote controller can be installed from factory or can be delivered as conversion kit. If it is already installed you can find the hand transmitter in the cashbox.

10.3.1.Infrared remote control (part no. 0039075)

Screw out to open.

9 volt battery -
plug in and insert it.

6F22
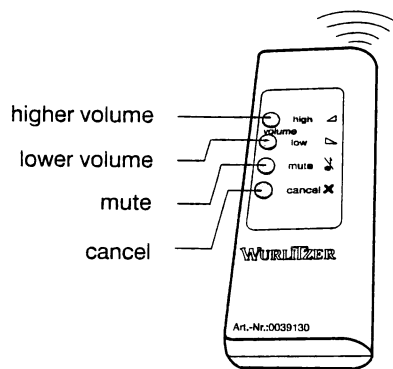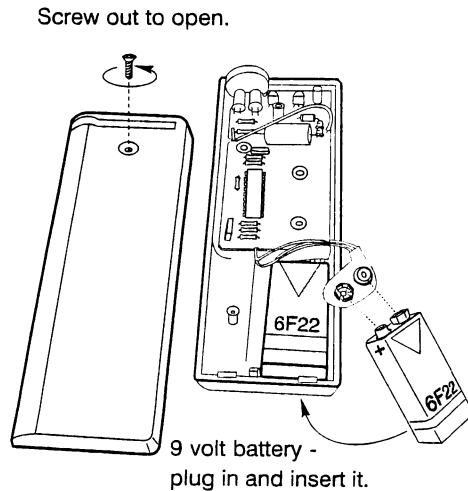
For operation insert a 9 volt battery into the hand transmitter (part no. 39130).Then in a range of approximately 45-60 ft you can control the following functions wireless:

Meanings of the buttons...

- HIGH:
  Increases the volume. Press the button more times in very small distances to step up the changing speed.
- LOW:
  Decrease the volume. Press the button more times in very small distances to step up the changing speed.
- MUTE:
  As long as this button is pressed the jukebox is muted.
- CANCEL:
  Cancels the playing track. If 'albumplay' is enabled the next track will be played.

higher volume — high △
lower volume — low ▷
mute — mute ✗
cancel — cancel ✗

WURLITZER

Art.-Nr.:0039130
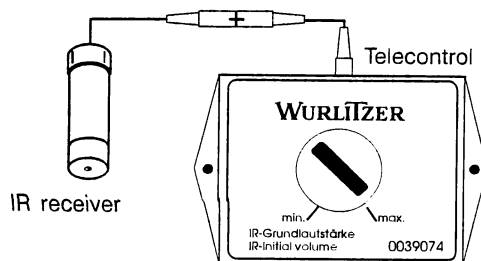
Pre-set volume setting

Inside of the jukebox the control unit for the infrared remote control „Telecontrol" is located. With the knob of this unit, a 16-position switch, you can select the pre-set volume the jukebox should start every time it is switched on.
The result of turning of this knob becomes audible only after the jukebox has been switched off for a time of some ten seconds.

Telecontrol

WURLITZER

IR receiver

min. max.
IR-Grundlautstärke
IR-Initial volume   0039074

10.3.2.Infrared remote volume and selection system (part no. 0047522)

Selection-buttons

Music control buttons

Option button
- Credit or
- Playstimu-
  lator On/Off

RESET

high △
volume
low ▷
mute ♪
cancel ✗

WURLITZER

SMD 41-0150
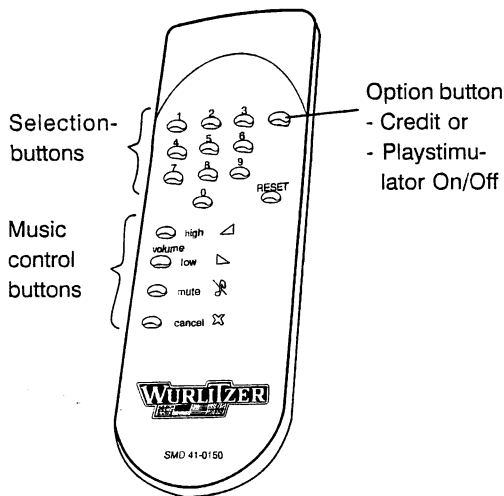
The meaning of the buttons...

• BUTTONS 0 - 9 and RESET
  If credit is given or free play is programmed a CD can be selected with the buttons 0 to 9 and R.

Double button functions as required in the service pro-grammes (i.e. press button 5 -hold down- and press but-ton R), are impossible. For this you only can use the keyboard of the jukebox.

• OPTION BUTTON:
  This button can be used either as credit button or to switch on and off the continuous play function.

• HIGH:
  Increases the volume.
• LOW:
  Decreases the volume.

The jukebox saves the actual volume if it is switched off.

• MUTE:
  The first button operation switches the sound off. The next operation switches it on e.t.c. ('Toggle-function').
• CANCEL:
  Cancels the playing track. If 'albumplay' is enabled the next track will be played.

Batteries will **not** be delivered.Two micro cells Typ LR03 (AAA) are needed.

Installing the continuous play option for the OPTION button:

• Insert the 5 pin plug of the "continuous play" cable into the jack marked "Option" on the infrared remote control box. Remove plug P8 of the RH side of the SCC unit and insert the 8 pin plug of the opposite end of the cable into jack P8. Insert P8 itself into the socket of the cable. If your machine is equipped with a con-tinuous play switch it can be connected in series. So insert at first the continuous play switch into the jack marked "P8" and than the plug of the cable into the bottom jack of the continuous play switch.

• Whenever the OPTION button is pressed the continu-ous play mode is started. Pressing the button again will turn off the continuous play feature. Whenever the power is interrupted to the jukebox, the continuous play feature is automatically turned off.

"continuous play" cable part no. 0050684

WURLITZER
Selection & Credit Computer
CDM 12
Wurlitzer Tower
0045411

br	1	ConPl
r	2	
or	3	
y	4	D 0
gn	5	D 1
bl	6	I 0
vi	7	GND
gr	8	+ 5V

	1	
	2	
	3	
bk	4	D 0
br	5	D 1
r	6	I 0
or	7	GND
y	8	+ 5V

P8

INFRARED REMOTE VOLUME AND SELECTION SYSTEM
FOR USE WITH WURLITZER
JUKEBOXES USING I-84 AMPLIFIER
LED - Function
red ... test
green ... option active

br	1	C
vi	2	E
or	3	JP
	4	
or	5	JP

option jack

"add credit" cable
part no. 50515

Installing the "add credit" option for the OPTION button:

- For this option a different option cable is used. This cable must be purchased separately (part no. 50515). Each time the OPTION button on the hand transmitter is pressed, the unit will add 1 credit to the jukebox.
- Insert the 5 pin plug into the jack marked "Option" on the infrared remote control box. At the top RH side of the SCC unit remove the plug inserted into the pin marked " ⊥ ". Insert the black plug from the white wire of the gray/white cable onto this now empty jack. Connect the black plug previously removed onto the free pin connected to the gray/white cable. Remove the black plug connected to the pin marked "T1". Connect the black plug on the gray/white cable to the pin marked "T1".

10.4. Microphone kit (part no. 0006953)

to amplifier
terminal
'microphone'

This unit enables the use of the jukebox as a paging system, when playing as well as during idling periods. If the paging microphone is switched on while the jukebox is playing, the music fades away or will be muted for this period. This kit is to be connected at the 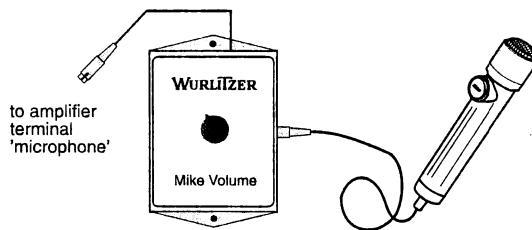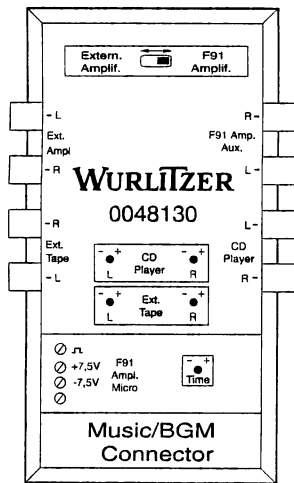microphone socket of the amplifier. The length of the cable between mike pre-amp and the jukebox is approx. 45 ft / 15 m.

10.5. BGM-Connector

This equipment offers two features:

1. The sound of an external source (300mV - 1V), e.g. radio or tape, will be reproduced over the speakers of the jukebox with reduced volume.
   A selection over the jukebox will mute this source, and it returns only after all selections have been played. (Time-lag can be adjusted).

2. Distribution of the sound from the jukebox to an existing background system (amplifier). The sound of this equipment is switched off as long as the jukebox is playing. The hook-up for this adapter is the same as the microphone.

   BGM connector for I84 (part no. 0035579)
   BGM connector for F91 (part no. 0048133)
   (part numbers for the different conversion kits))

10.6. Background-music level adapter (part no. 0031056)
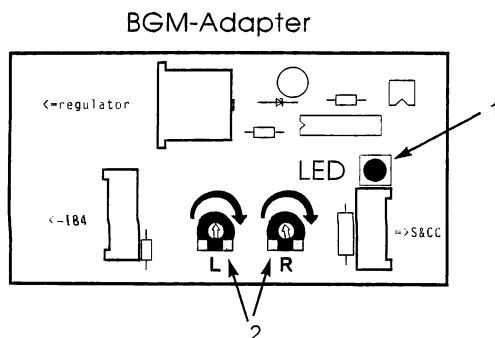
The BGM adapter is controlled by the SCC unit. It operates as soon as CDs are playing as declared for BGM. While BGM is active the red LED lights (1). The volume of a playing BGM-track will be reduced. The volume reduction from normal sound is adjustable by two pots (2) on this board. Nevertheless the resulting volume depends also on the basic volume of the jukebox.
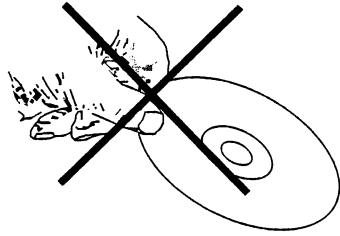
Dust, fingerprints or other dirt on the disc surface can cause skipping, jumping or sticking problems.
Because of this never touch the surface of a disc! However it is rather easy to remove nicotine, dust or fingerprints.

11.1. CD cleaning
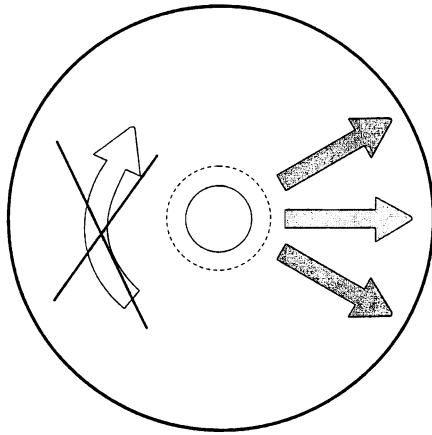
Nicotine, dust, fingerprints:
Dust can be removed with a lintfree soft cloth. If necessary, remove heavy dirt or fingerprints with a moistened soft cloth soaked in a solution of water and a detergent. Never use record cleaning sprays or anti static sprays! Furthermore, do not use other types of cleaners containing benzene, thinner or other solvents. These liquids will cause damage to the surface of discs. Move the cloth from the inside towards the outside and not in circular motion.

Removing scratches:
Use a soft cloth and a soft polish .

11.2. Laser lens cleaning
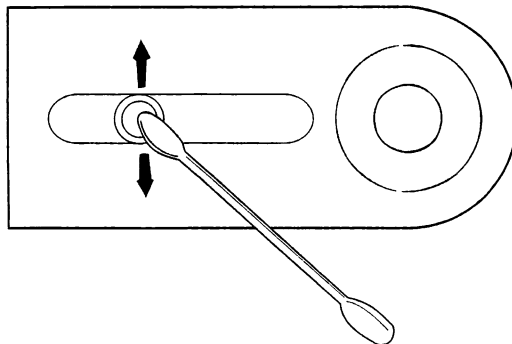
Smoke and dust soils the lens. It can be cleaned with a cue-tip soaked in a detergent (i.e. "B04" from KONICA). Place the tip on the lens and press down carefully.
Caution!
The whole laser unit is very sensitive!
- Move the cue-tip only in the direction shown in the picture (perp. to the sledge direction).
- Do not scratch the special treated surface of the lense.
- The cleaning solution must not run into the focus unit.
Keep away metal parts from the lens unit. A strong magnet is located underneath the lens. It attracts *also smallest* metal parts and can so block the complete unit.

12. Steps to solve mechanical problems

In case of a mechanical error the software tries to solve the problem itself. If this is not successful the mechanism switches itself off. Then the display shows an error code (ref. to chapt. 7.2.1. page 46). The jukebox is then out of order.

12.1. Treating simple errors

Switch the jukebox off and on several times.
(The software tries to solve the problem again.)
No success ? Step to chapter 12.2.

12.2. Treating simple errors by hand

1. Switch off the jukebox
2. Move the gripper by pressing against the motor as far as the CD can be taken out by hand.
3. Take the CD out of the gripper.
4. Insert the CD in the corresponding compartment.
5. Switch on the jukebox, it will be run automatically:
   - Error elimination
   - Initializing phase
   - jukebox ok.
6. No success ?
   Step to chapter 12.3.

12.3. Set the mechanism to '0' position

1. Power OFF!
2. Open the Jukebox.
3. Open the mechanism housing, replace any CD's that may have been dropped.
4. Move gripper to RH. 0-position.
   - Move, by pressing against the gripper motor, gripper holder of selection sledge so that LH. side of gripper holder aligns with RH. side of pressure disc holder.
   - If RH. position impossible:
     Move gripper to the LH. 0-position, so that right edge of gripper holder aligns with LH side pressure disc holder.
5. Remove the left magazine. (to reach the gear).
6. Free the selection sledge.
   - The sledge has to be at least 1,3 " (3 cm) over the housing bottom. Therefore move the sledge up and down by hand using the toothed belt wheel on the top LH. side of gear group.
7. Insert the left magazine.
8. Check the fixing of the magazines by hand.
9. Close the mechanism housing.
10. Set the slide switch 'SERVICE' on the SCC unit to ON.
11. Power ON.
12. Delete the stored data of the jukebox.
    - Press 'LT' button
    - Press 'LT' button again and hold it for at least 6 sec.
    Followed by:
    - an automatic orientation phase
    - an automatic initialization phase
    - the display of the program version
13. Programming
   - insert CD's if necessary
   - program number of inserted CD's in service level 1 button 5 as follows:
     - Press selection button R -hold down- and press selection button 0 than release both buttons.
     - Press selection button 1. Service level 1 is reached. Display is: 1_ _ _.
     - To reprogram press selection button 5 -hold down- and press selection button R. Enter the desired number of CD's with two digits. (exeption: 100 CD's = 00)
       - program options as desired
14. Switch to normal operation mode
   - Set the slide switch 'SERVICE' on the SCC unit to OFF.
   - Press 'LT' button on the SCC unit once.
15. Close the jukebox.

13. Declaration of conformity - Konformitätserklärung

Product Description:
Geräteart: Jukebox / Musikbox

Model No.:
Typenbezeichnung: Rainbow

Directives Complied With: **Angewandte EG-Richtlinien:**	73/23/EEC	Low Voltage Directive Niederspannungsrichtlinie
	89/336/EEC	EMC Directive Elektromagnetische Verträglichkeit
Standards Used: **Technische Vorschriften:**	EN 50081-1	Electromagnetic Compatibility Generic Emissions Requirements Elektromagnetische Verträglichkeit Fachgrundnorm Störaussendung
	EN 50082-1	Electromagnetic Compatibility Generic Immunity Requirements Elektromagnetische Verträglichkeit Fachgrundnorm Störfestigkeit
	EN 60335-1	Safety Of Household And Similar Electrical Appliances Sicherheit Elektrischer Geräte Für Den Hausgebrauch Und Ähnliche Zwecke
	EN 60335-75	Safety Of Household And Similar Electrical Appliances Sicherheit Elektrischer Geräte Für Den Hausgebrauch Und Ähnliche Zwecke
	EN 55022	Limits And Methods Of Measurement Of Radio Interference Characteristics Of Information Technology Equipment. Grenzwerte Und Meßverfahren Für Funkstörungen Von Informationstechnischen Einrichtungen

Signature
Unterschrift

Print Name
Gedruckter Name   Jürgen Obermeier

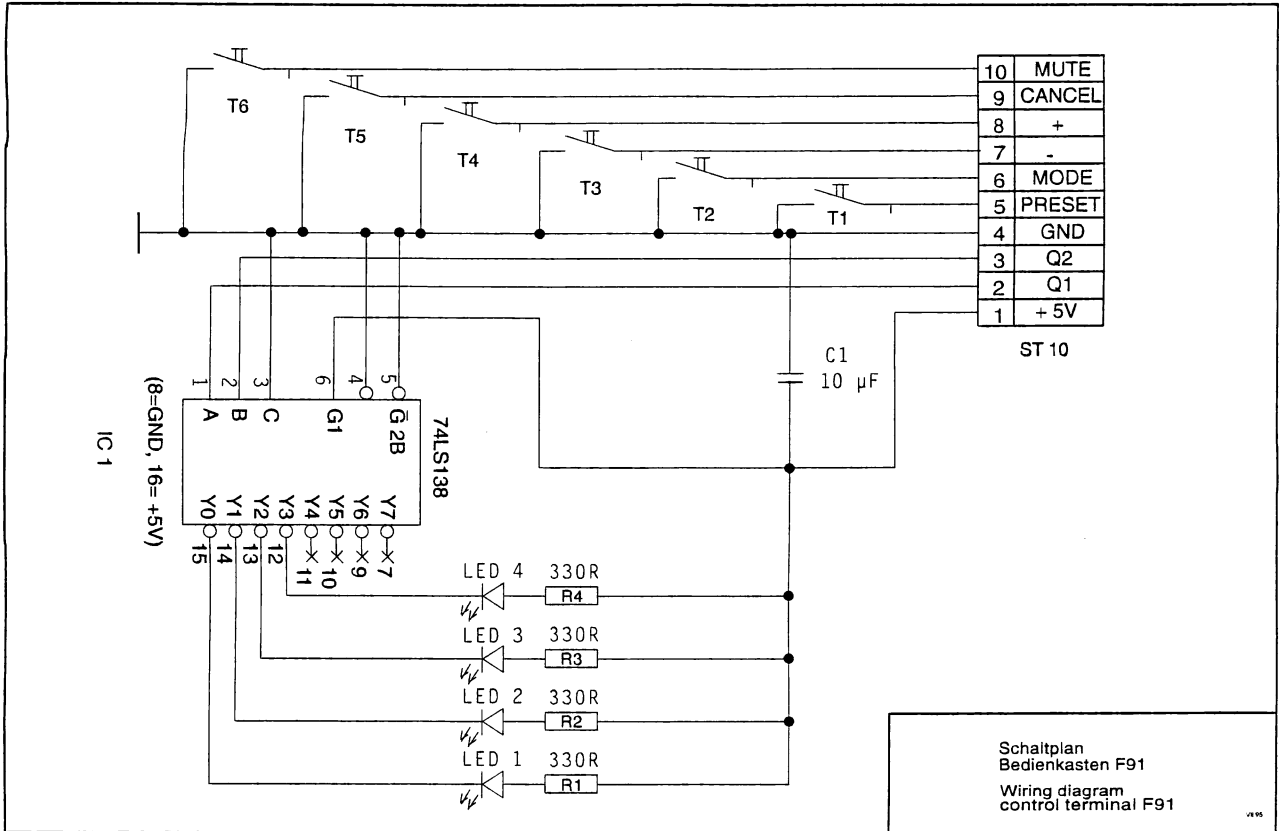**Position**
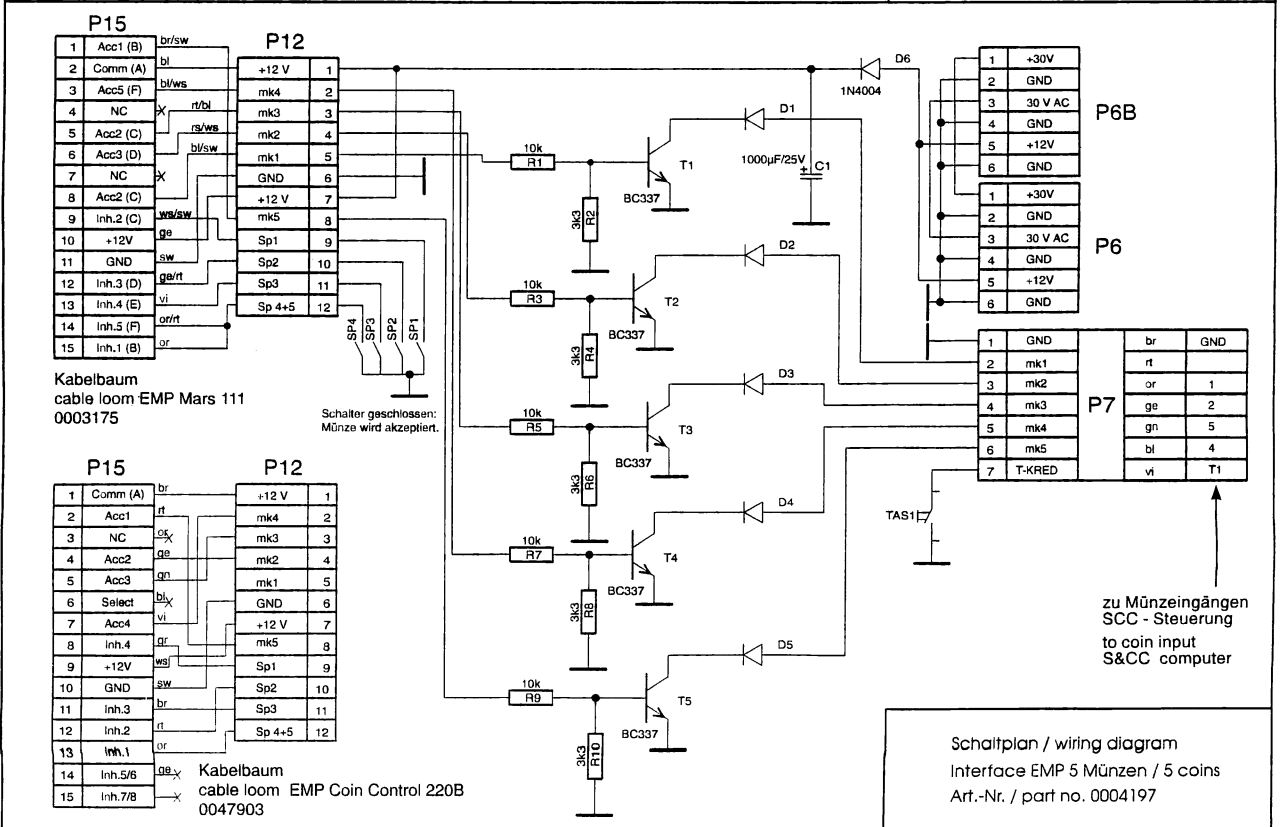**Position**   Chief Engineer / Technischer Leiter
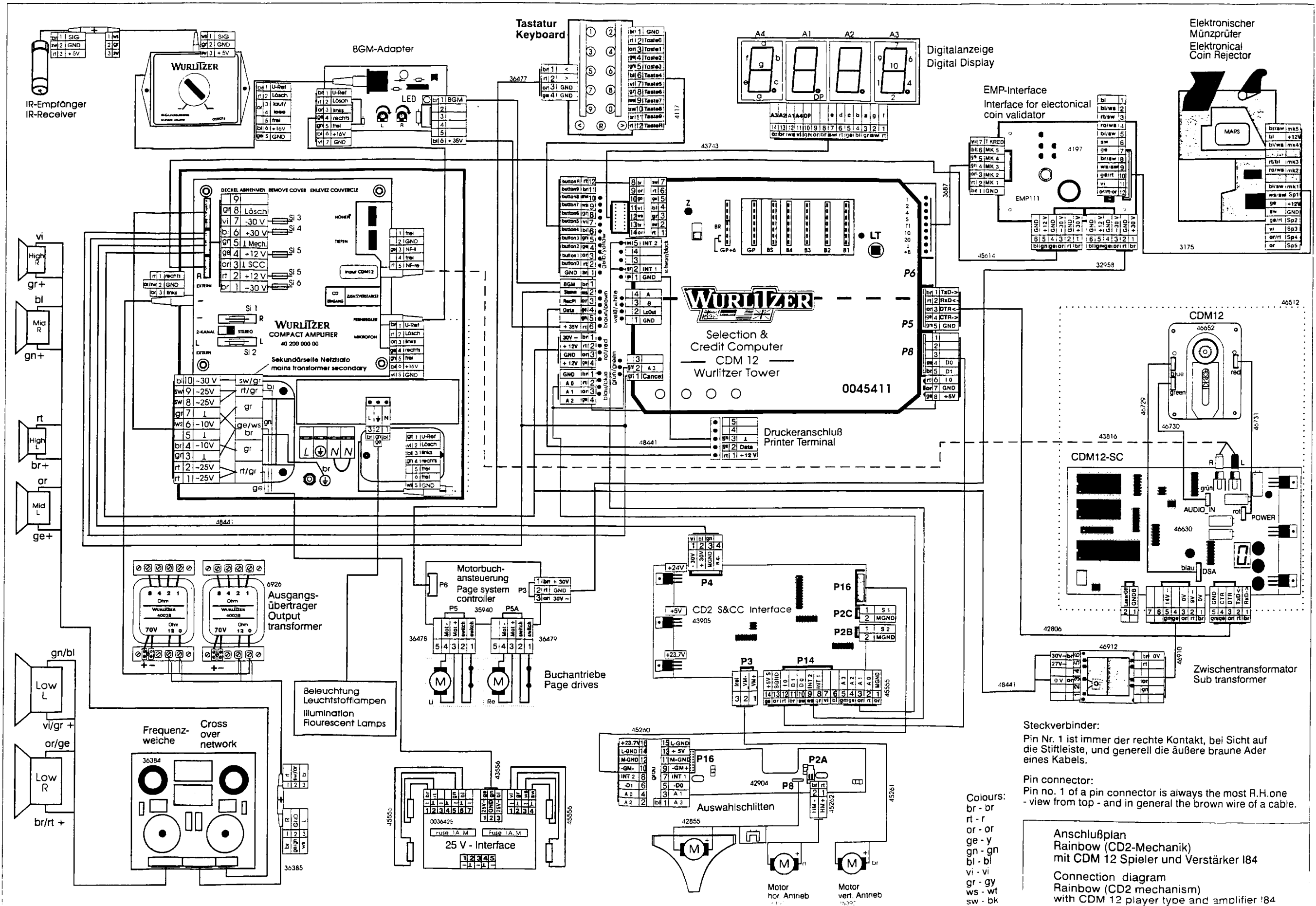
Date
Datum   8th December 1995 / 08. Dezember 1995

14. Wiring diagrams

10	MUTE
9	CANCEL
8	+
7	-
6	MODE
5	PRESET
4	GND
3	Q2
2	Q1
1	+ 5V

ST 10

T6 T5 T4 T3 T2 T1

C1
10 µF

IC 1

(8=GND, 16= +5V)

74LS138

A B C G1 Ḡ 2B
1 2 3 6 4 5

Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7
15 14 13 12 ×10 ×9 ×11 ×7

LED 4   330R   R4
LED 3   330R   R3
LED 2   330R   R2
LED 1   330R   R1

Schaltplan
Bedienkasten F91

Wiring diagram
control terminal F91

P15

1	Acc1 (B)	br/sw
2	Comm (A)	bl
3	Acc5 (F)	bl/ws
4	NC	X
5	Acc2 (C)	rt/bl
6	Acc3 (D)	rs/ws
7	NC	X bl/sw
8	Acc2 (C)	
9	Inh.2 (C)	ws/sw
10	+12V	ge
11	GND	sw
12	Inh.3 (D)	ge/rt
13	Inh.4 (E)	vi
14	Inh.5 (F)	or/rt
15	Inh.1 (B)	or

P12

+12 V	1
mk4	2
mk3	3
mk2	4
mk1	5
GND	6
+12 V	7
mk5	8
Sp1	9
Sp2	10
Sp3	11
Sp 4+5	12

SP4 SP3 SP2 P1

Kabelbaum
cable loom EMP Mars 111
0003175

Schalter geschlossen:
Münze wird akzeptiert.

D6
1N4004

10k R1   BC337 T1
3k3 R2

10k R3   BC337 T2
3k3 R4

10k R5   BC337 T3
3k3 R6

10k R7   BC337 T4
3k3 R8

10k R9   BC337 T5
3k3 R10

D1 D2 D3 D4 D5

1000µF/25V C1

TAS1

P6B

1	+30V
2	GND
3	30 V AC
4	GND
5	+12V
6	GND

P6

1	+30V
2	GND
3	30 V AC
4	GND
5	+12V
6	GND

1	GND
2	mk1
3	mk2
4	mk3
5	mk4
6	mk5
7	T-KRED

P7

br	GND
rt	
or	1
ge	2
gn	5
bl	4
vi	T1

zu Münzeingängen
SCC - Steuerung

to coin input
S&CC computer

P15

1	Comm (A)	br
2	Acc1	rt
3	NC	or X
4	Acc2	ge
5	Acc3	gn
6	Select	bl X
7	Acc4	vi
8	Inh.4	gr
9	+12V	ws
10	GND	sw
11	Inh.3	br
12	Inh.2	rt
13	Inh.1	or
14	Inh.5/6	ge X
15	Inh.7/8	X

P12

+12 V	1
mk4	2
mk3	3
mk2	4
mk1	5
GND	6
+12 V	7
mk5	8
Sp1	9
Sp2	10
Sp3	11
Sp 4+5	12

Kabelbaum
cable loom EMP Coin Control 220B
0047903

Schaltplan / wiring diagram
Interface EMP 5 Münzen / 5 coins
Art.-Nr. / part no. 0004197

Anschlußplan
Rainbow (CD2-Mechanik)
mit CDM 12 Spieler und Verstärker l84

Connection diagram
Rainbow (CD2 mechanism)
with CDM 12 player type and amplifier l84

IR-Empfänger
IR-Receiver

IR-Decoder

edienung
emote

Tastatur
Keyboard

Digitalanzeige
Digital Display

Elektronischer
Münzprüfer
Elektronical
Coin Rejector

MARS

EMP-Interface
Interface for electonical coin validator

EMP111

WURLIZER
o VOLUME
o BASS
o TREBLE
o BALANCE

MODE   PRESET

CANCEL   MUTE

Tone
Treble
Bass

WURLIZER
Amplifier F91
0039155

Low Level

Input CD

Input Tape

Mic.-Kit

Line Out

P10

Remote Mode
Stereo 2-Kanal
CD   Tape

Volume

Gain   BGM Level

R   R
L   L

P4 BGM

High
R

Mid
R

Low
L

Low
R

vi/gr +

br/rt +

WURLIZER
Selection &
Credit Computer
— CDM 12 —
Wurlitzer Tower

0045411

P6

P5

P8

Druckeranschluß
Printer Terminal

CDM12

CDM12-SC

AUDIO_IN

POWER

Zwischentransformator
Sub transformer

P15

F91 Endstufe
F91 final stage

angsübertrager
ut transformer

Fuse 1A, M   Fuse 1A, M
25 V - Interface

Netztrafo
Main transformer

Motorbuch-
ansteuerung
Page system
controller

USA-UL-transformer
43910

VDE-trafo
39402

Buchantriebe
Page drives

Motor
L   Re

CD2 S&CC Interface
43905

P4
P16
P2C
P2B

P3   P14

Auswahlschlitten

Motor
hor. Antrieb
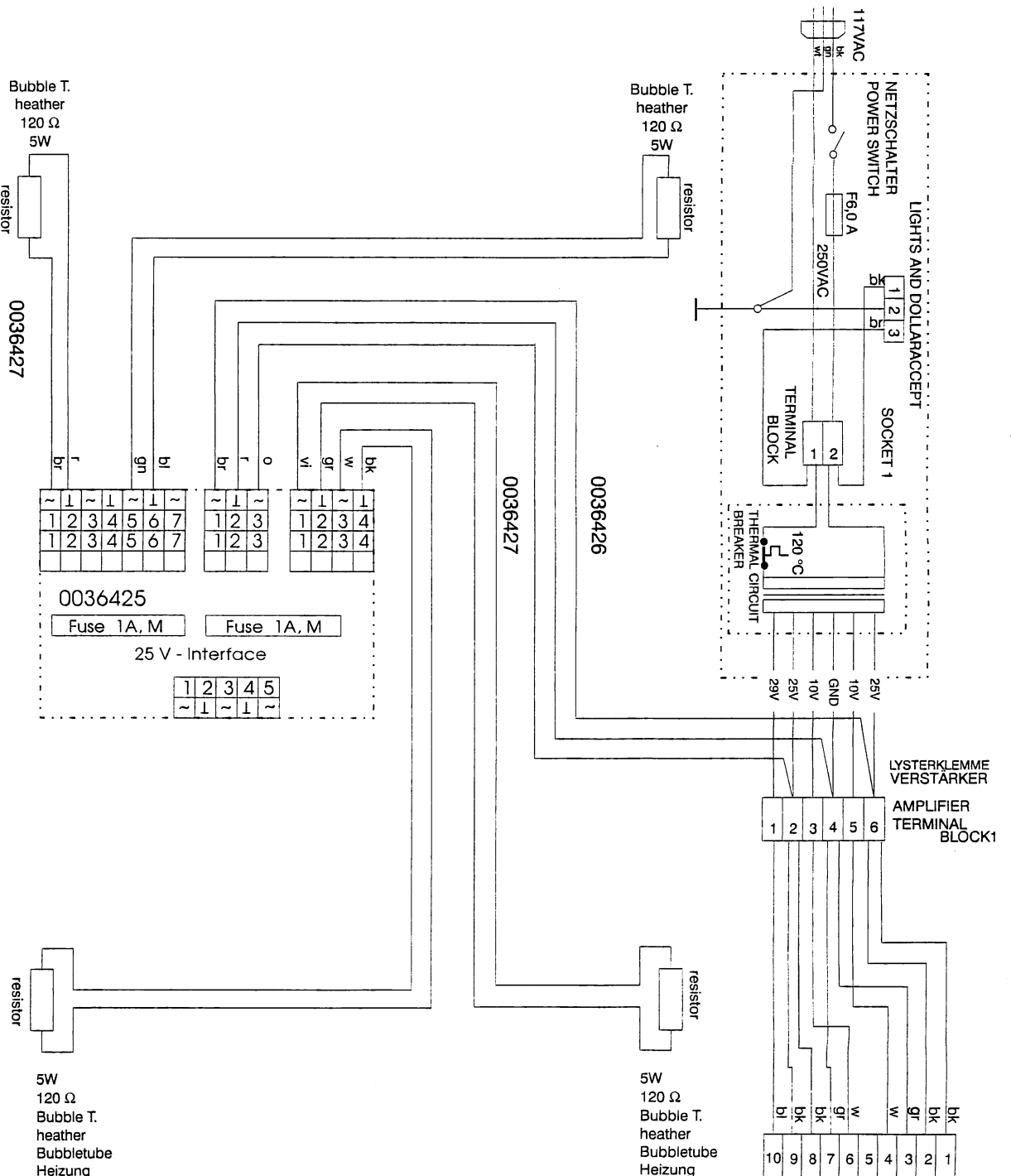36193

Motor
vert. Antrieb
35392

Steckverbinder:
Pin Nr. 1 ist immer der rechte Kontakt, bei Sicht auf
die Stiftleiste, und generell die äußere braune Ader
eines Kabels.

Pin connector:
Pin no. 1 of a pin connector is always the most R.H.one
- view from top - and in general the brown wire of a cable.

Colours:
br - br
rt - r
or - or
ge - y
gn - gn
bl - bl
vi - vi
gr - gy
ws - wt
sw - bk

Anschlußplan
CD2-Mechanik, CDM12 Spieler &
Verstärker F91

Connection diagram
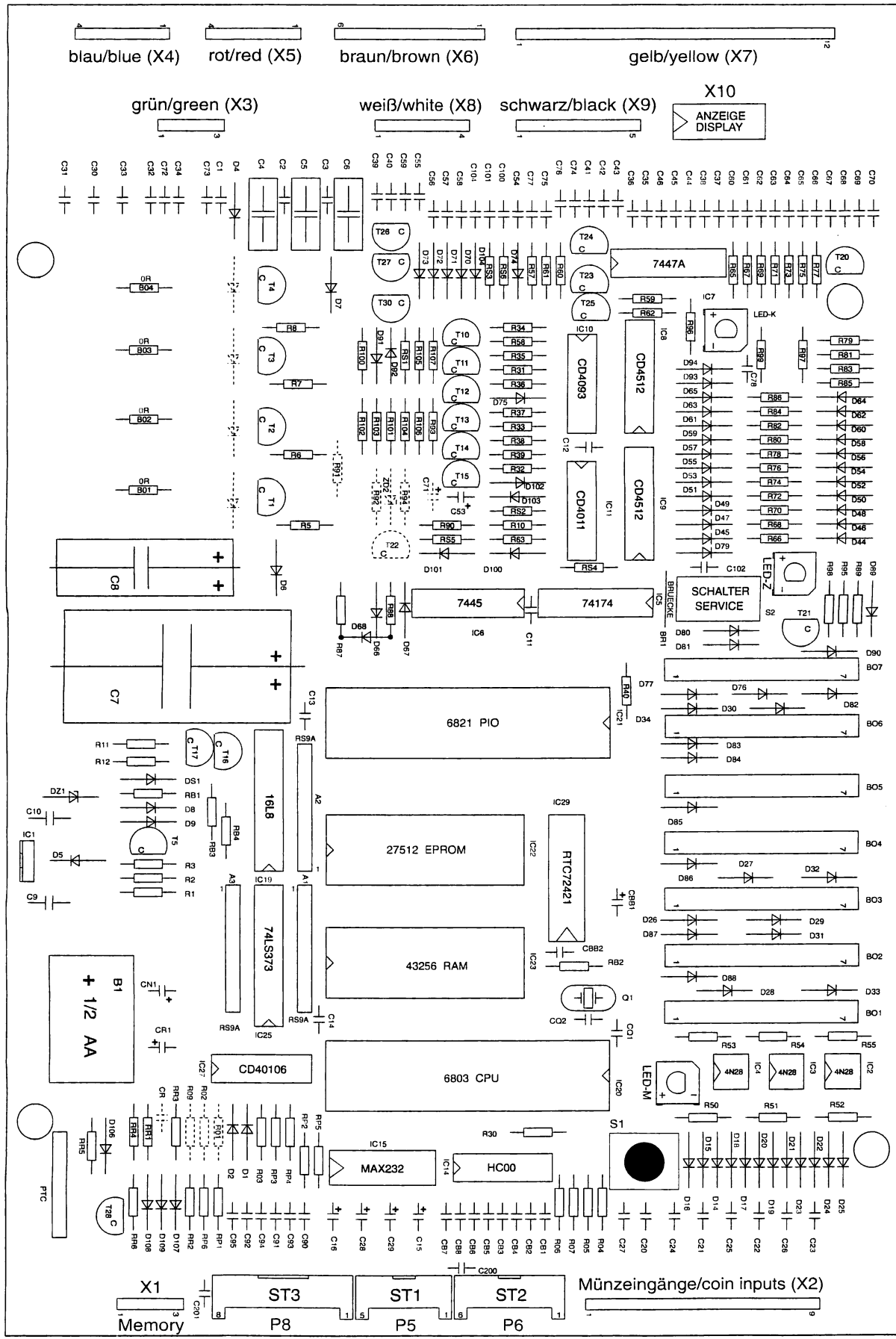CD2 mechanism, CDM12 player &
amplifier F91

68

117VAC

NETZSCHALTER
POWER SWITCH

LIGHTS AND DOLLARACCEPT

F6,0 A
250VAC

SOCKET 1

TERMINAL BLOCK

THERMAL CIRCUIT BREAKER
120 °C

Bubble T.
heather
120 Ω
5W

resistor

0036427

Bubble T.
heather
120 Ω
5W

resistor

br r   gn bl   br r o   vi gr w bk

~	⊥	~	⊥	~	⊥	~
1	2	3	4	5	6	7
1	2	3	4	5	6	7

~	⊥	~
1	2	3
1	2	3

⊥	~	⊥
1	2	3	4
1	2	3	4

0036425

Fuse 1A, M   Fuse 1A, M

25 V - Interface

1	2	3	4	5
~	⊥	~	⊥	~

0036427

0036426

29V 25V 10V GND 10V 25V

LYSTERKLEMME
VERSTÄRKER

AMPLIFIER
TERMINAL
BLOCK1

1	2	3	4	5	6

resistor

5W
120 Ω
Bubble T.
heather
Bubbletube
Heizung

resistor

5W
120 Ω
Bubble T.
heather
Bubbletube
Heizung

bl bk bk gr w   w gr bk bk

10	9	8	7	6	5	4	3	2	1

AMPLIFIER P.C.B.

VERSTÄRKER
PLATINE

Farbcodierung:
Colorcode:
bk = black = schwarz
bl = blue   = blau
br = brown = braun
gn = green = grün
gr = grey   = grau
o = orange = orange
r = red   = rot
vi = violet = violett
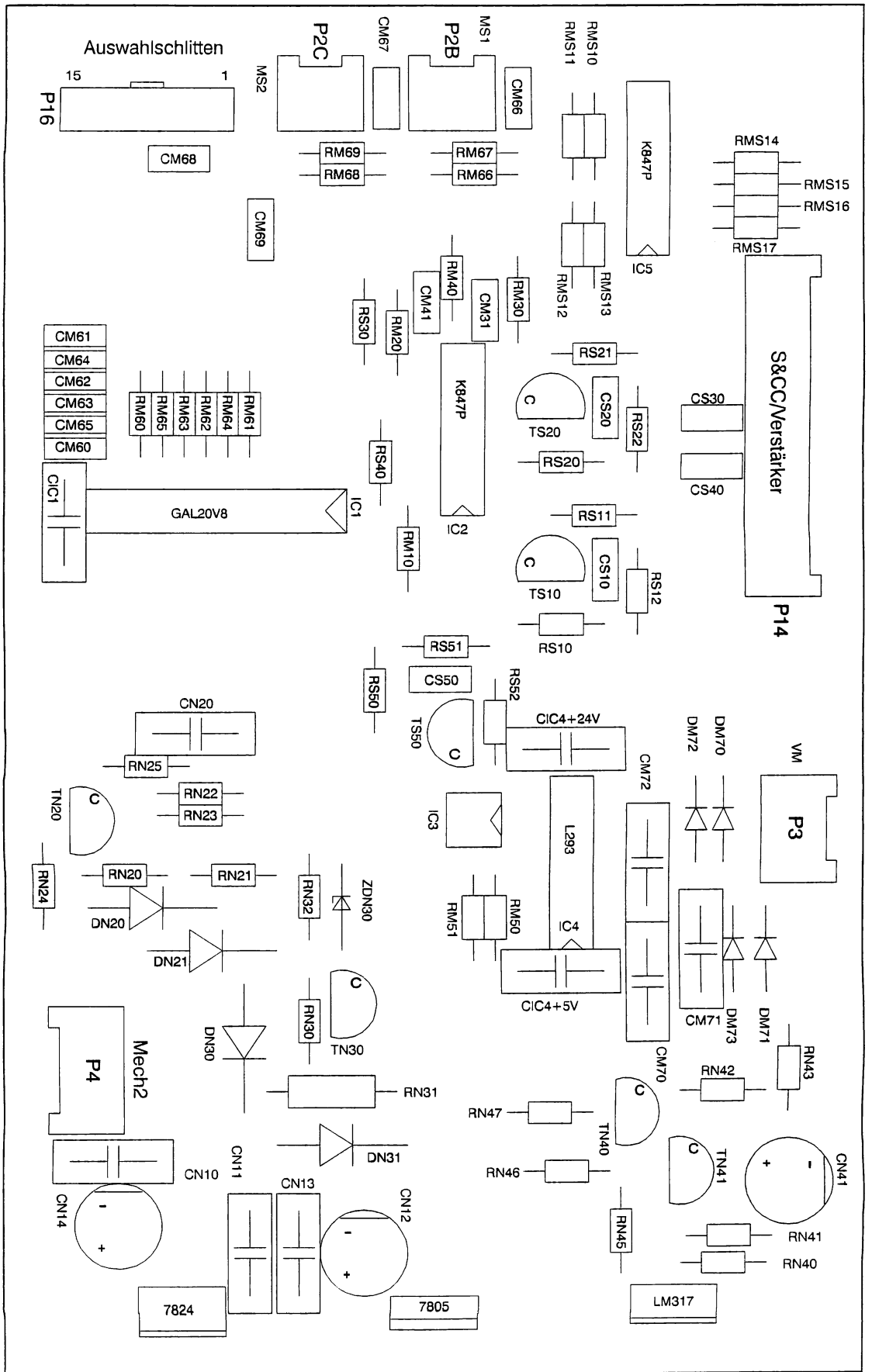w = white = weiß
y = yellow = gelb

Schaltplan
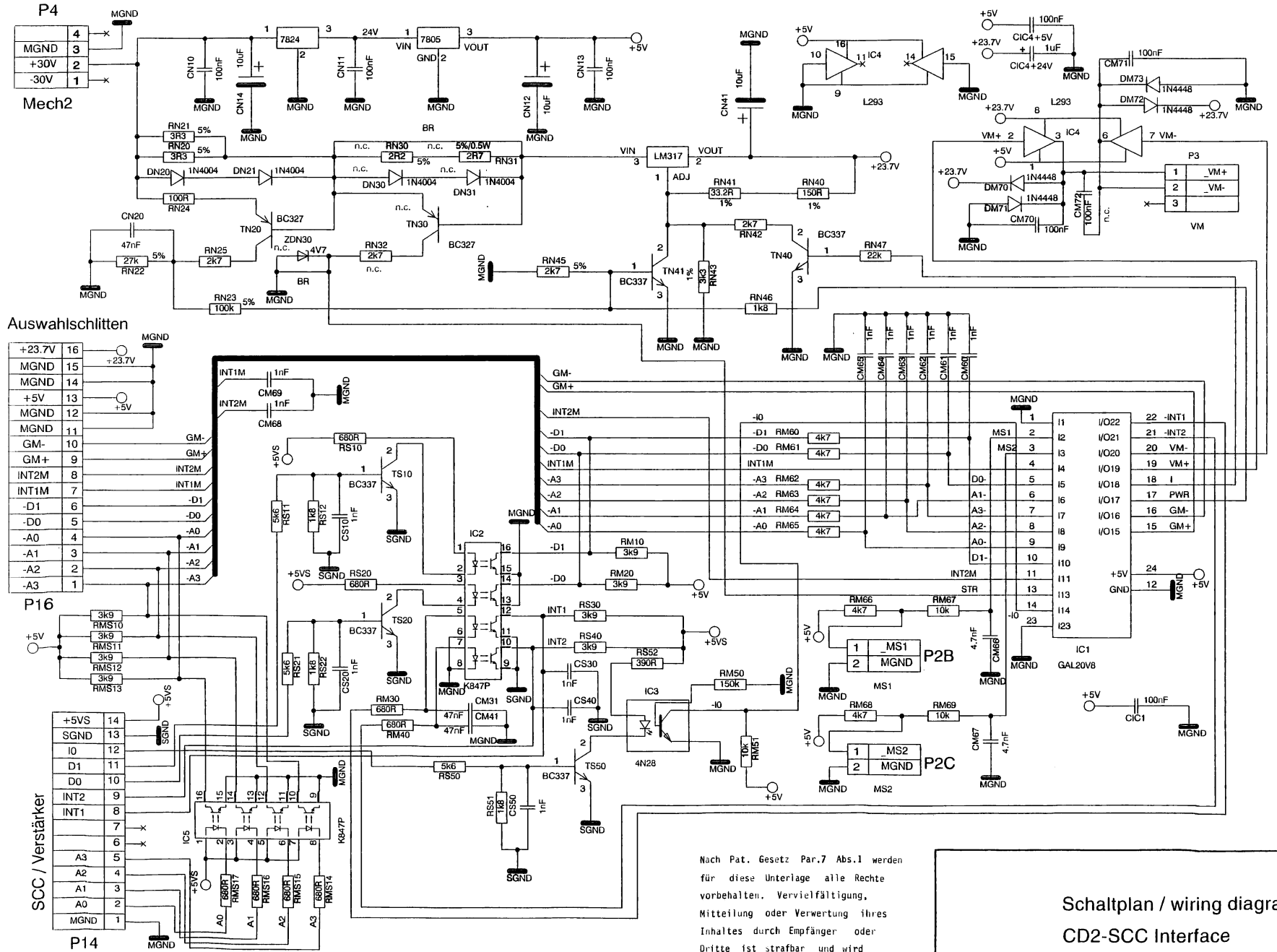Bubble Tubes Rainbow

Wiring Diagram
Bubble Tubes Rainbow

blau/blue (X4) rot/red (X5) braun/brown (X6) gelb/yellow (X7)

grün/green (X3) weiß/white (X8) schwarz/black (X9) X10

ANZEIGE DISPLAY

7447A

SCHALTER SERVICE

BRÜCKE BRIDGE

6821 PIO

27512 EPROM

43256 RAM

6803 CPU

16L8

74LS373

CD40106

MAX232 HC00

RTC72421

CD4093 CD4512 CD4512 CD4011

7445 74174

B1 + 1/2 AA

Memory ST3 ST1 ST2

P8 P5 P6

Münzeingänge/coin inputs (X2)

X1

PTC

LED-K LED-Z LED-M

4N28 4N28 4N28

BO1 BO2 BO3 BO4 BO5 BO6 BO7

IC1 IC2 IC3 IC4 IC5 IC6 IC7 IC8 IC9 IC10 IC11 IC14 IC15 IC19 IC20 IC21 IC22 IC23 IC25 IC27 IC29

Bestückungsplan
Board layout
Selection & Credit Computer 45411

V. 96

70
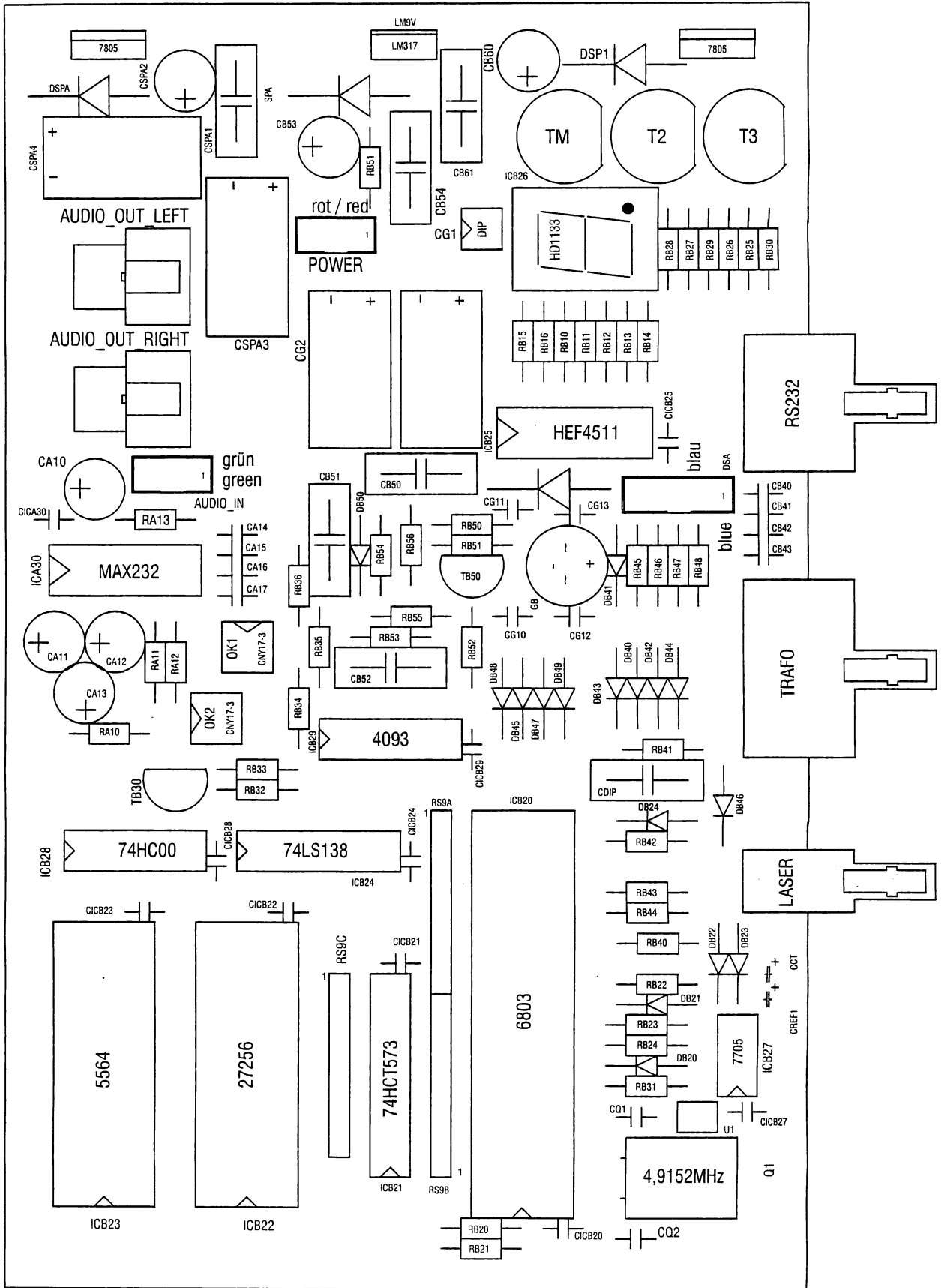
Bestückungsplan
CDM12 SC-Steuerung
Board Layout
CDM12 Serial Controller

73

Bestückungsplan / board layout
CD2-SCC Interface

VII 95

P4

Mech2

Auswahlschlitten

P16	
+23.7V	16
MGND	15
MGND	14
+5V	13
MGND	12
MGND	11
GM-	10
GM+	9
INT2M	8
INT1M	7
-D1	6
-D0	5
-A0	4
-A1	3
-A2	2
-A3	1

P4	
MGND	4
MGND	3
+30V	2
-30V	1

SCC / Verstärker

P14	
+5VS	14
SGND	13
I0	12
D1	11
D0	10
INT2	9
INT1	8
	7
	6
A3	5
A2	4
A1	3
A0	2
MGND	1

IC1 GAL20V8

I1	1	22	-INT1	I/O22
I2	2	21	-INT2	I/O21
I3	3	20	VM-	I/O20
I4	4	19	VM+	I/O19
I5	5	18	I	I/O18
I6	6	17	PWR	I/O17
I7	7	16	GM-	I/O16
I8	8	15	GM+	I/O15
I9	9			
I10	10			
I11	11	24	+5V	
I13	13	12	GND	
I14	14			
I23	23			

7824   7805   LM317

L293   IC4

P3 VM
_VM+ 1
_VM- 2
3

P2B
_MS1 1
MGND 2
MS1

P2C
_MS2 1
MGND 2
MS2

IC2   IC3 4N28   IC5 K847P   K847P

Schaltplan / wiring diagram
CD2-SCC Interface

VII 95

Schaltplan
Auswahlschlitten (AWS) - CD2

Wiring diagram
Selection sledge (AWS) - CD2

Bestückungsplan
Auswahlschlitten (AWS) - CD2

Board layout
Selection sledge (AWS) - CD2

Schaltplan
Mikrofon - Kit (0006953)

Circuit diagram
Microphone kit (0006953)

P16

Mikrofon
microphone

Lautstärke
Volume

(NE 542)
LM387

7pol. DIN Buchse
7pol DIN socket

MUTE

Lautst. absenken

5pol. DIN Stecker
zum Verstärker
5pol DIN plug
to amplifier

5 - rechter Kanal
right channel

3 - linker Kanal
left channel

STOCKO

Schaltplan
Verstärker 184

Wiring diagram
Amplifier 184

Bauteilebezeichnung:
0- 99 allgemeine Bauteile
100- 199 linker Kanal
200- 299 rechter Kanal

alle Sicherungen T 3,15A

78

Schematic (top)
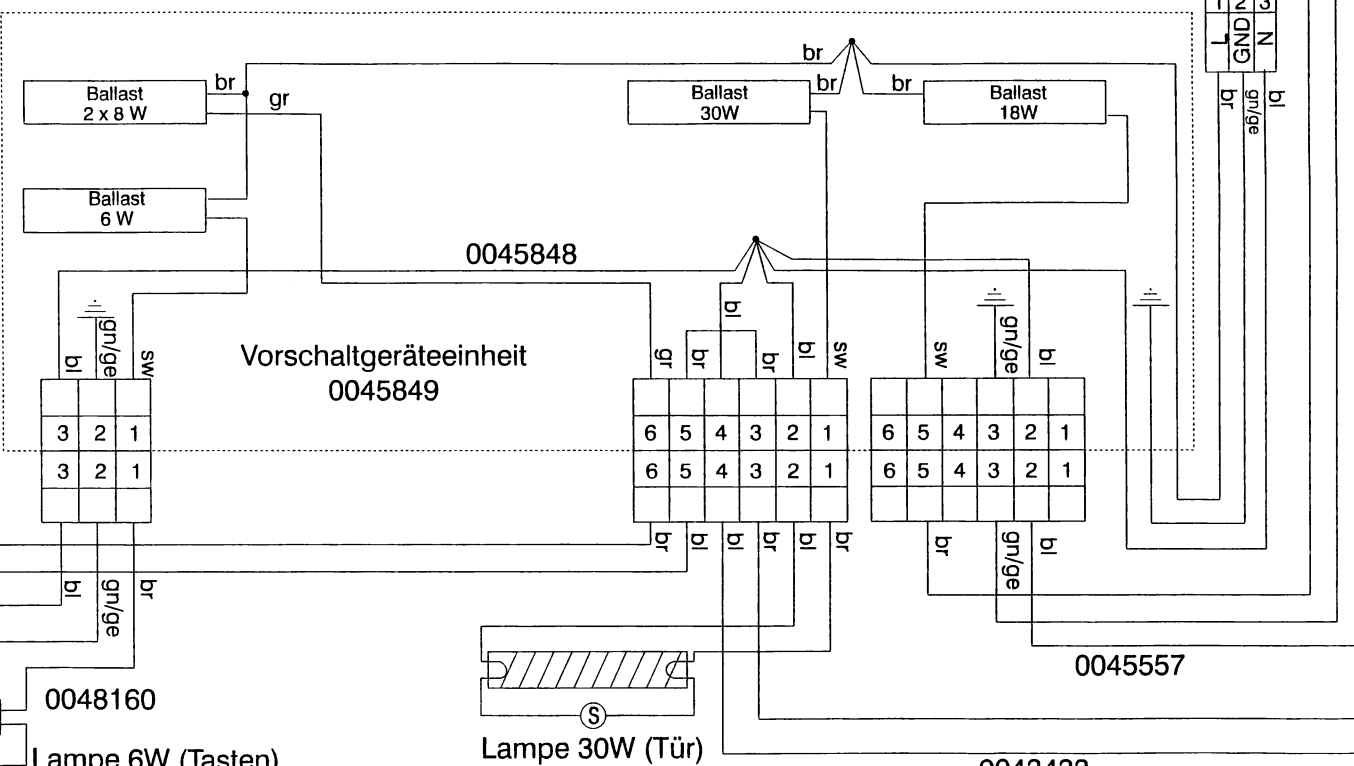
Sockel IC1

links

rechts

+16V +16V

R2 39k R1 4k7 BC337 T1
BC337 T2
R3 10k R4 2k2 R5 2k2
GND

S1 +16V GND

R2 39k R1 4k7 BC337 T1
BC337 T2
R3 10k R4 2k2 R5 2k2
GND

Wird dieser Vorverstärker eingesetzt, ist
der vorherige Phonoeingang der CD-Eingang.
Die Widerstände R107 und R207 (1k8)
auf der I84-Verstärkerplatine dürfen nicht
unterbrochen sein.

Vorverstärker für Verstärker I84
und CD Spieler CDM4i und CDM12

Pre-amplifier for amplifier I84
and CD player CDM4i and CDM12

Board layout

HOEHEN R2 BAESSE R1 TONABNEHMER ZUSATZVERSTAERKER FERNREGLER MIKROFON

VORVERSTAERKER IC1

KLANGREGLER

S1 STEREO

ENDSTUFE ENDSTUFE

NETZTEIL +30V SI4
SI6 -30V C11
SI5 Si3 -30V Si2 SI1
RECHTER KANAL LINKER KANAL
Rechts Links STEREO S2

P NETZTRAFO P MECHANIK P ZUSATZGERAET

Bestückungsplan Verstärker I84
Board layout amplifier I84

79

Lampe 18W (Gehäuse)

Verstärker I84
230V
P3

| 1 | 2 | 3 |
| ⏚ | GND | N |

br · gn/ge · bl

Ballast 2 x 8 W   br — gr

Ballast 6 W

Ballast 30W   br — br — br   Ballast 18W
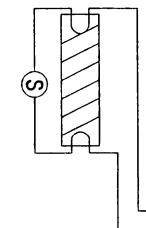
0045848

Vorschaltgeräteeinheit
0045849

Lampe 8W (Tür)

Lampe 8W (Tür)

bl · gn/ge · sw

| 3 | 2 | 1 |
| 3 | 2 | 1 |

bl · gn/ge · br

0048160

Lampe 6W (Tasten)

gr · br · bl · br · bl · sw

| 6 | 5 | 4 | 3 | 2 | 1 |
| 6 | 5 | 4 | 3 | 2 | 1 |

br · bl · bl · br · bl · br

sw · gn/ge · bl

| 6 | 5 | 4 | 3 | 2 | 1 |
| 6 | 5 | 4 | 3 | 2 | 1 |

br · gn/ge · bl

0045557

Lampe 30W (Tür)

0043433

80
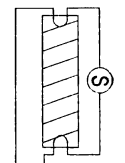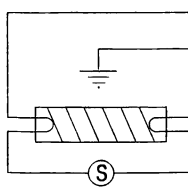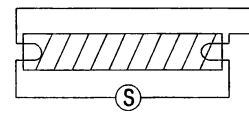
Verdrahtungsplan
Vorschaltgeräteeinheit 230V, Rainbow
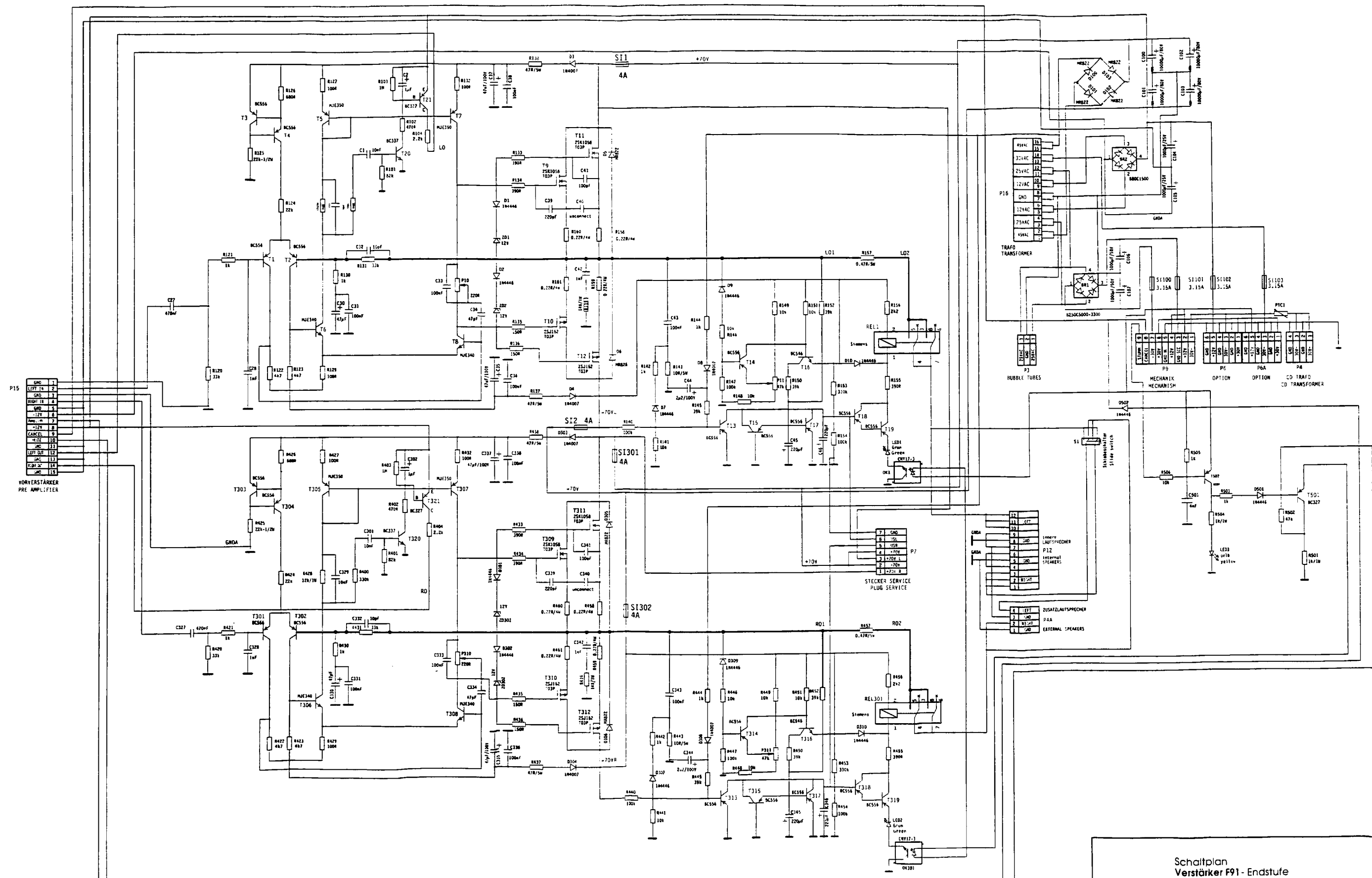Wiring diagram
Ballasts unit 230, Rainbow

XI '95

Input Tape / IC7 / Klang

R / IC1 / IC1 / IC1

Input CD

L / **Input Tape** / IC8 / IC2 / IC2 / IC2

Input CD

Low-Level / IC5 / IC5 / IC5 / IC5 / LED1 (gelb) / R46 / IC6 / ALC / IC6 / IC6 / C15 / R48

R50 / R47

R66 / R366 / Clipping

Lautstärke, Balance / BGM-Schalter

Treiberstufe

LED3 (rot) / IC1 / Gain-R / BGM-R / IC3

IC6 / IC6

LED4 (rot) / Gain-L / BGM-L / IC4 / IC2

LED1 (grün) / +12V / Power on

Lautsprecher-relais

LED2 (grün) / Power on

Stumm Cancel

LED3 (gelb) Mute

Endstufen-transistoren

Input select / S4

P4 / BGM

Zähler Höhen / max / min

Zähler Bass / max / min

Klang Voreinstellung

Lautst. Zähler Low / max

Lautst. Zähler High / min

Lautst.-Voreinstellung

Takt / S4 / 27256 EPROM

nach oben/ unten zählen Takt / 2 / 2

Lautst. Zähler Low / max

Lautst. Zähler High / min

Lautstärkevoreinstellung links

+ / − / Mode

Q1 / Q2 / Preset

Zurück zu 'Volume', wenn keine Taste gedrückt.

Reset

CD4516B Zähler (Volume, Bass, Treble, Balance) IC25

WURLITZER

☀ VOLUME
O BASS
O TREBLE
O BALANCE

MODE PRESET

CANCEL MUTE

Prinzip-Schaltplan
Verstärker F91

Principal schematic
Amplifier F91

Bestückungsplan
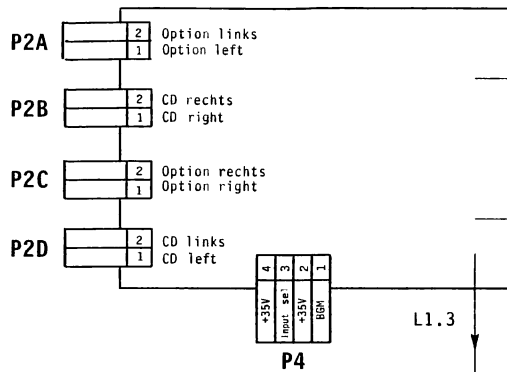Endstufe Verstärker F91
Board layout
Power amplifier F91

Schaltplan
Verstärker F91 - Endstufe

Wiring diagram
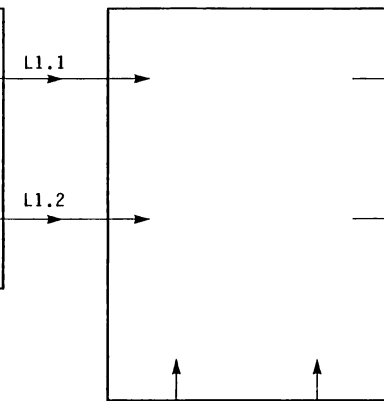**Amplifier F91** - Power amp.
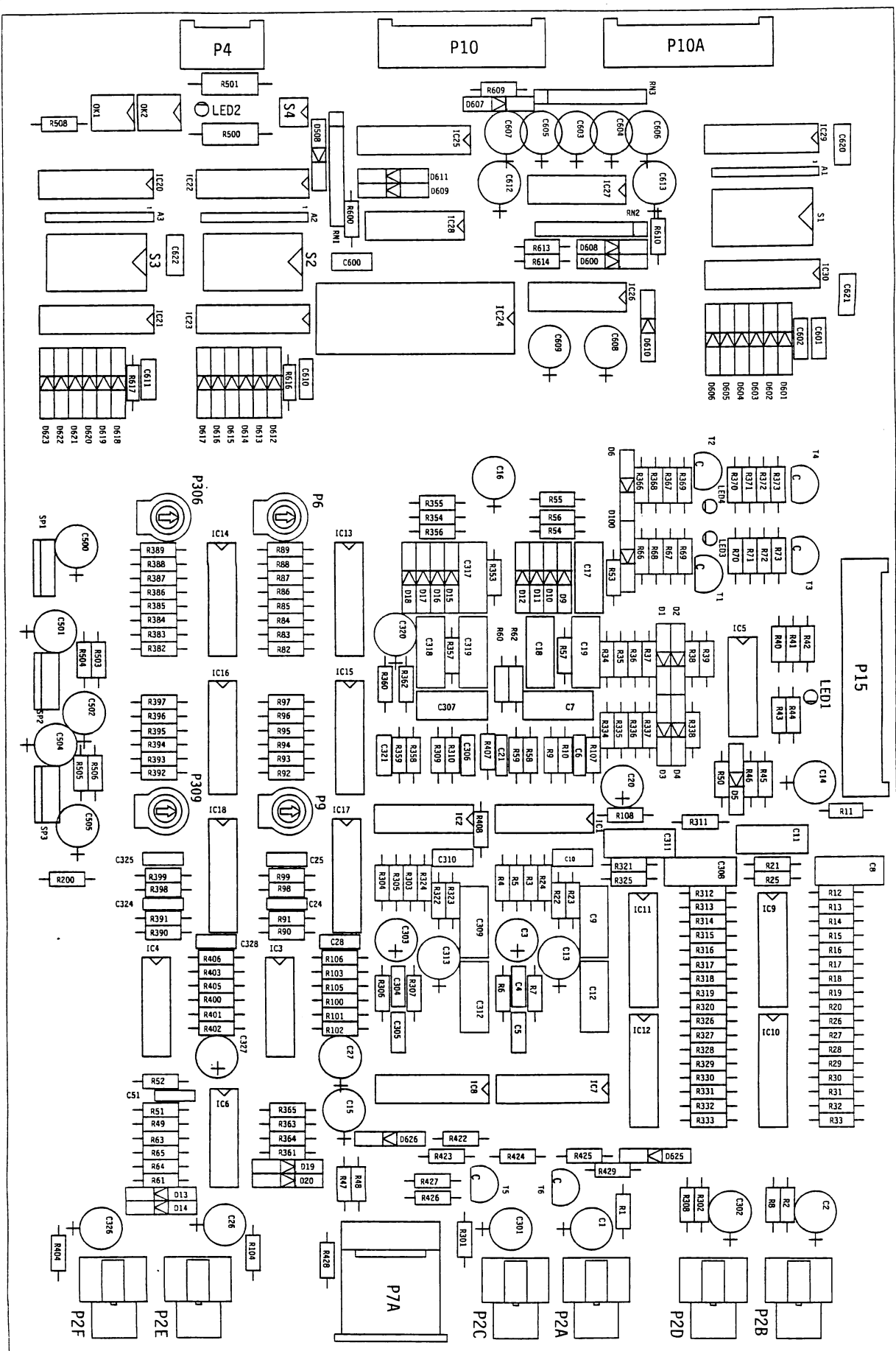
Bestückungsplan
Vorstufe Verstärker F91
Board layout
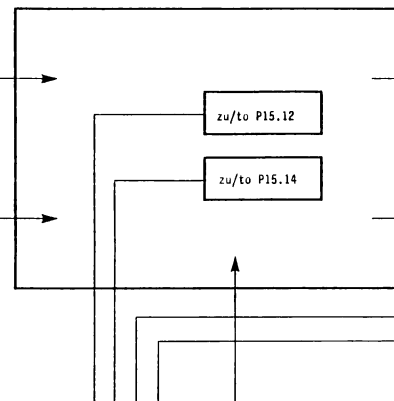Pre-stage amplifier F91
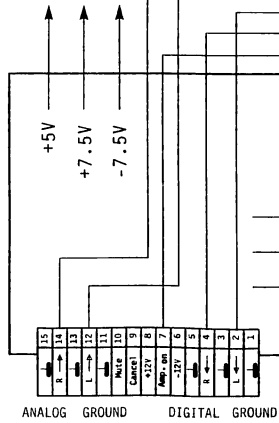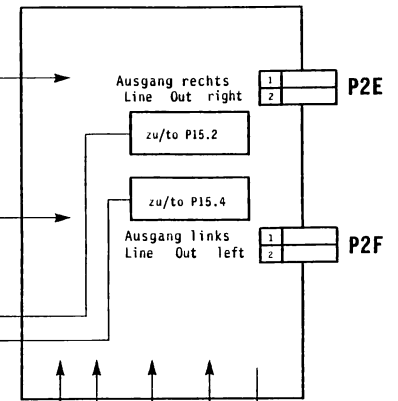
Schaltplan 1 Vorverstärker
Wiring diagram 1 Pre amplifier
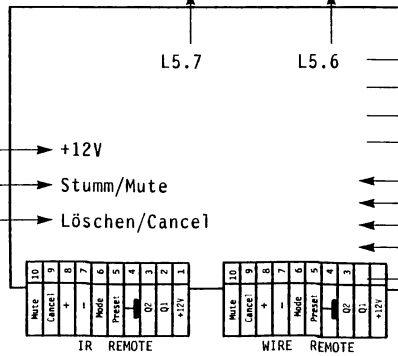
Schaltplan 2: Klangreglung
Diagram 2: Sound controller

Schaltplan 3: Pegelkontrolle (AVC)
Wiring diagram 3: A.Volume Controller

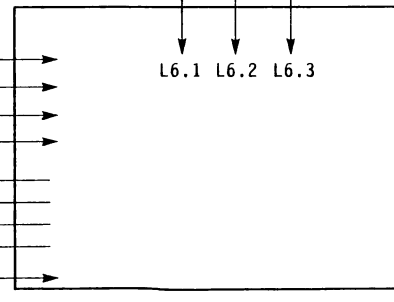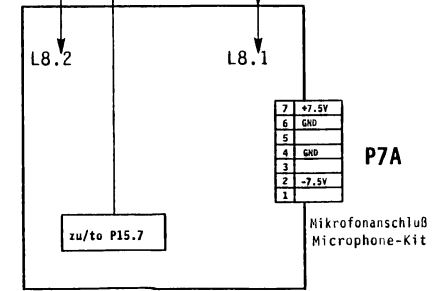Schaltplan 4: Balance,Lautstärke,BGM
Diagram 4: Balance,Volume,BGM

P2A — 2 Option links / 1 Option left

P2B — 2 CD rechts / 1 CD right

P2C — 2 Option rechts / 1 Option right

P2D — 2 CD links / 1 CD left

P4 — 4 +35V | 3 Input sel | 2 +35V | 1 BGM

L1.1
L1.2
L1.3

L2.1
L2.2

zu/to P15.12
zu/to P15.14

L3.1
L3.2

Ausgang rechts / Line Out right — P2E
zu/to P15.2
zu/to P15.4
Ausgang links / Line Out left — P2F

BGM

L1.3

+5V
+7.5V
-7.5V

L7.1 → +12V
L7.2 → Stumm/Mute
L7.3 → Löschen/Cancel

L5.7   L5.6

L5.1
L5.2
L5.3
L5.4
L6.4
L6.5
L6.6
L6.7
L5.5
Preset

L6.1 L6.2 L6.3

L8.2   L8.1

P15 — 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
R ↑ L Mute Cancel +12V Amp. on R L
ANALOG GROUND   DIGITAL GROUND

P10A — 10 9 8 7 6 5 4 3 2 1
Mute Cancel + - Mode Preset Q2 Q1 +12V
IR REMOTE

P10 — 10 9 8 7 6 5 4 3 2 1
Mute Cancel + - Mode Preset Q2 Q1 +12V
WIRE REMOTE

zu/to P15.7

P7A — 7 +7.5V | 6 GND | 5 | 4 GND | 3 | 2 -7.5V | 1
Mikrofonanschluß
Microphone-Kit

Schaltplan 6: Digitalteil Balance,Lautstärke
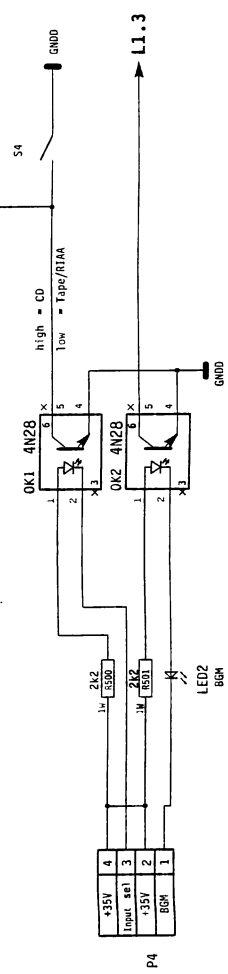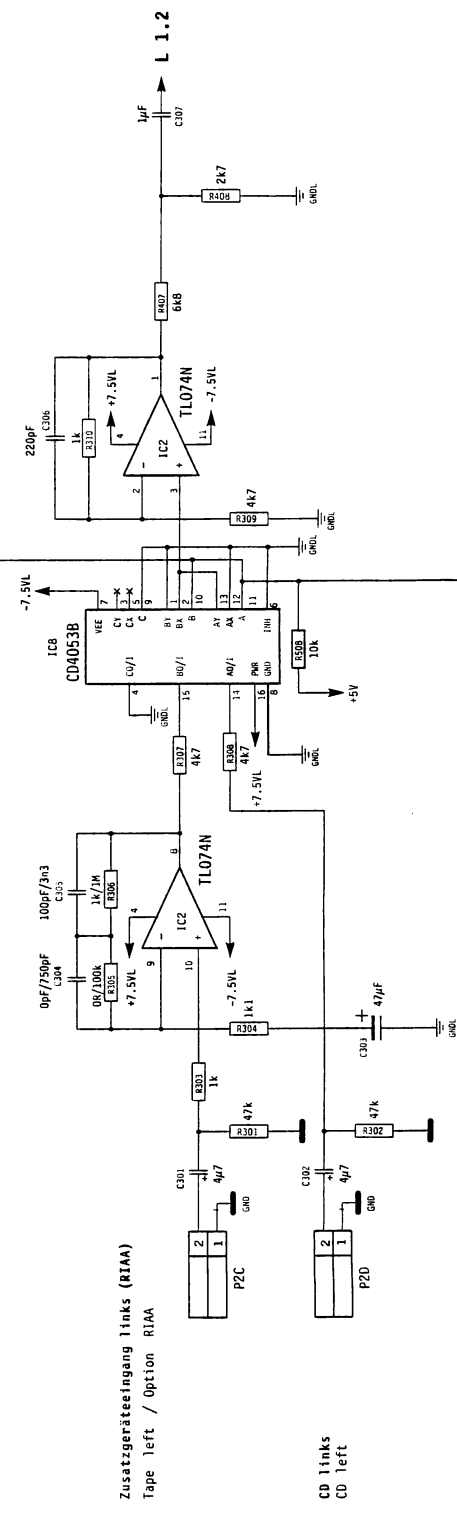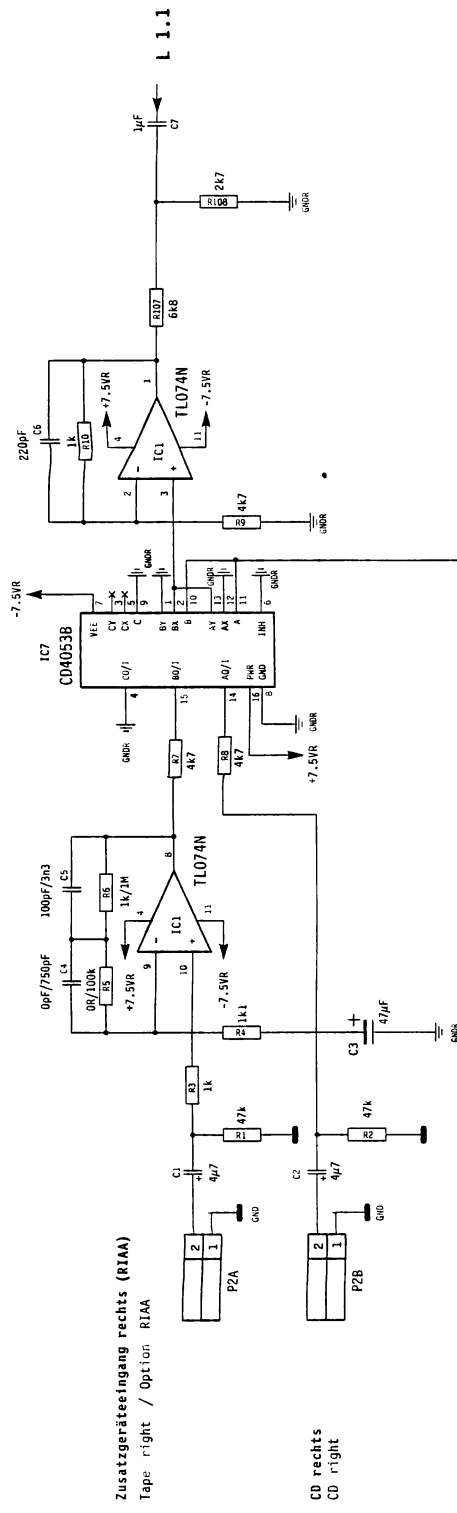Diagram 6: Digital stage Balance, Volume
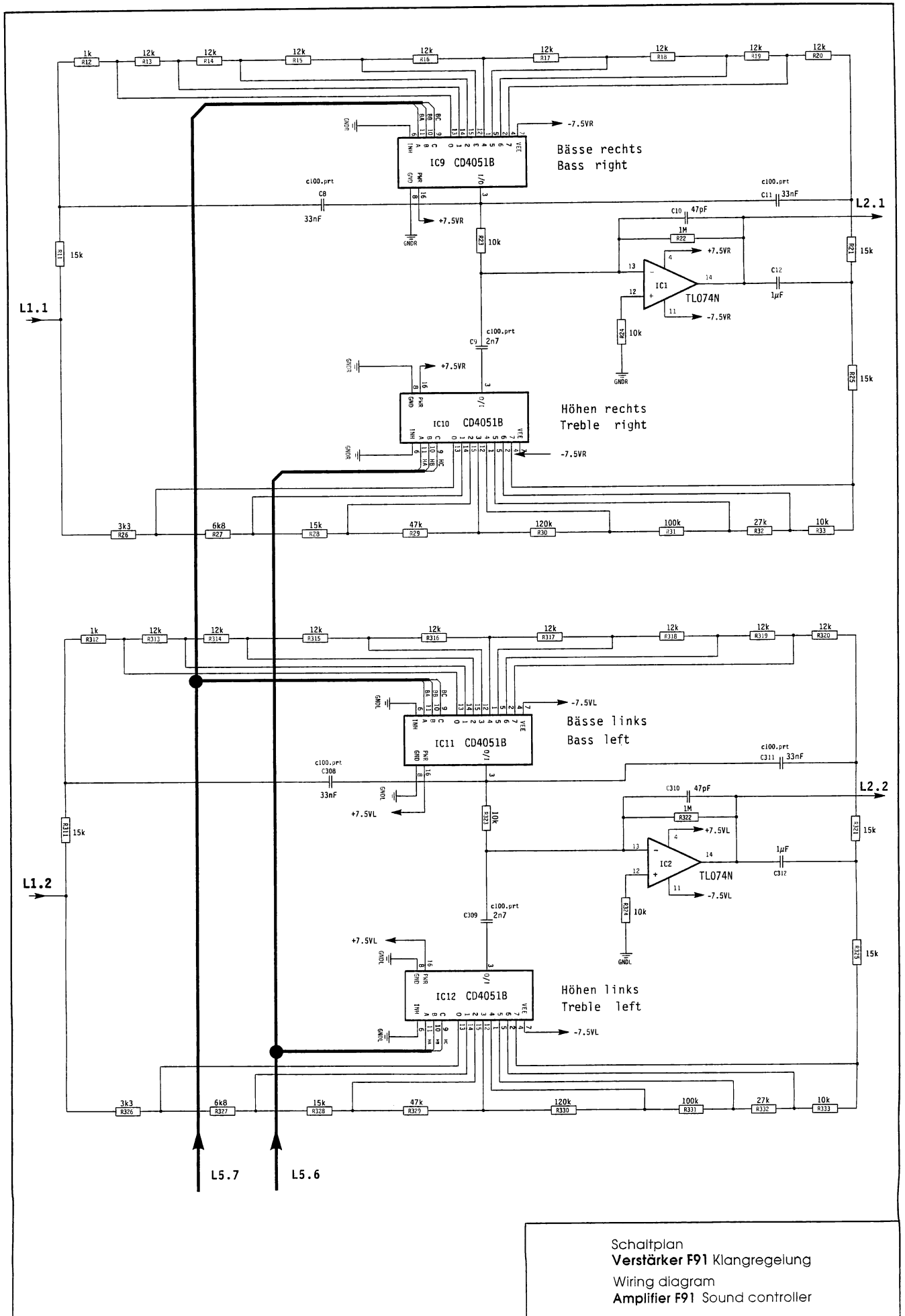
Schaltplan 8: Mikrofonanschluß
Wiring diagram 8: Mike-kit

Schaltplan 7: Spannungsversorgung
Diagram 7: Power supply

Schaltplan 5: Digitalteil Klang
Diagram 5: Digital stage sound

Schaltplanübersicht
Verstärker F91 - Vorstufe
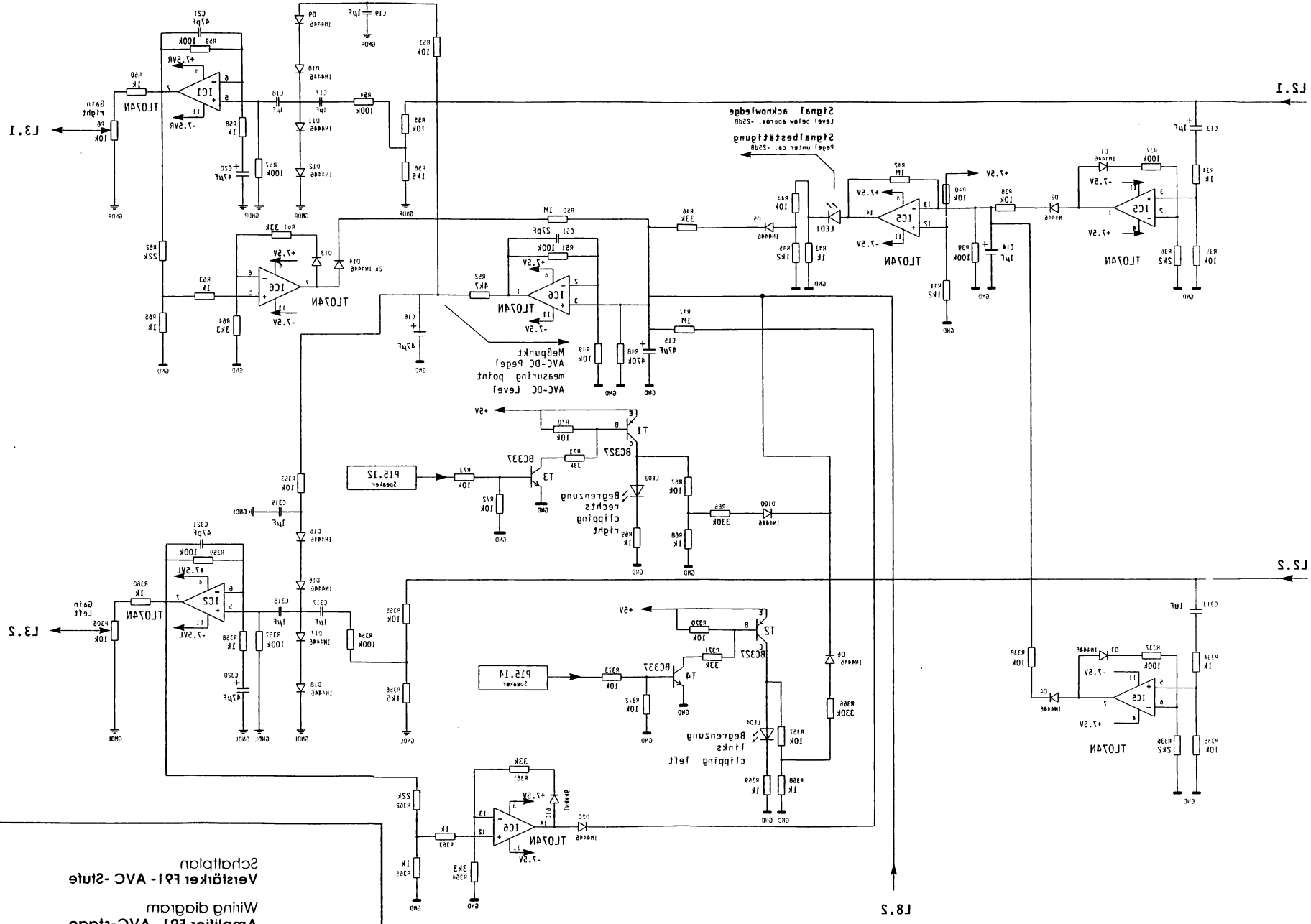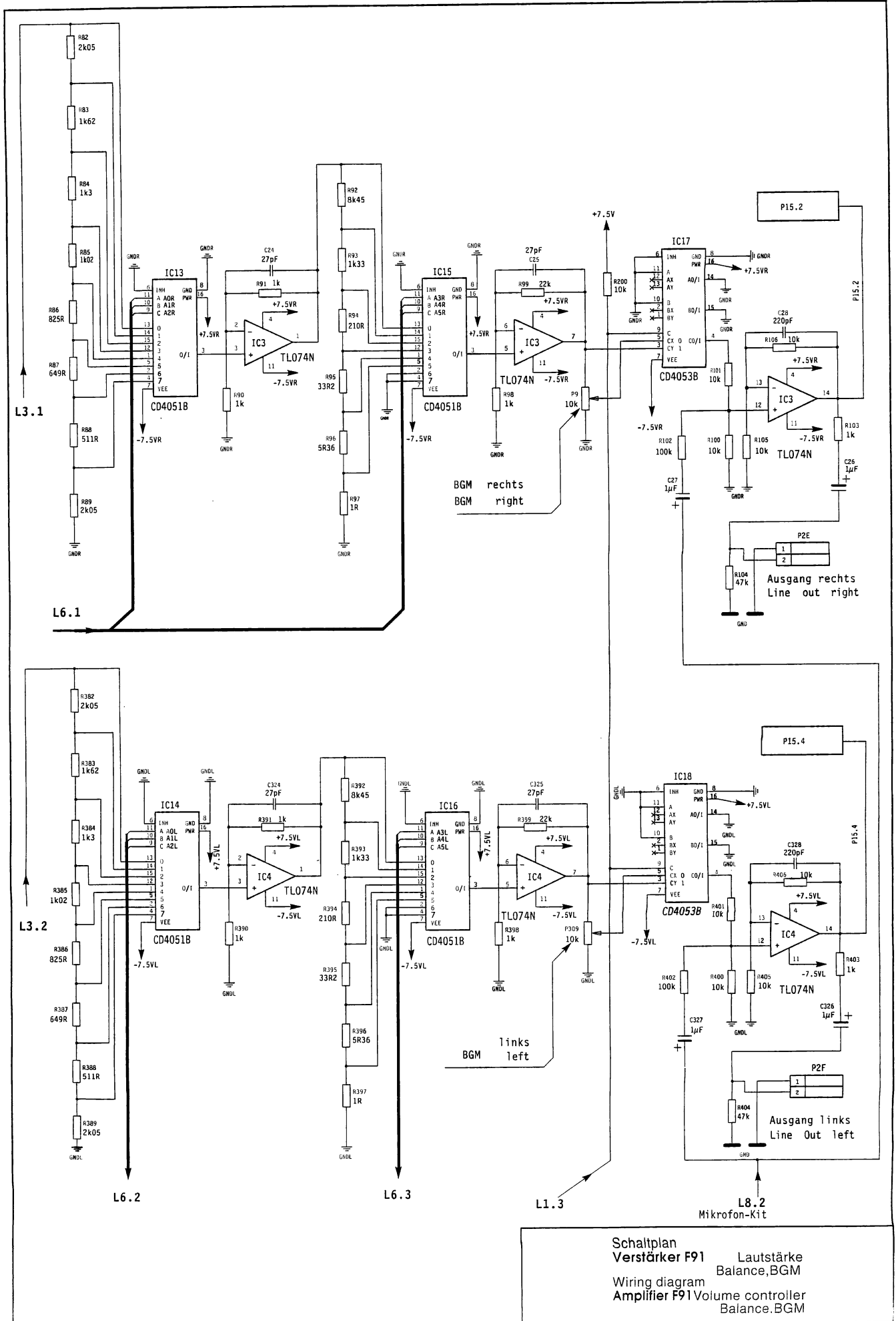
Diagram overview
Amplifier F91 - Prestage

Schaltplan
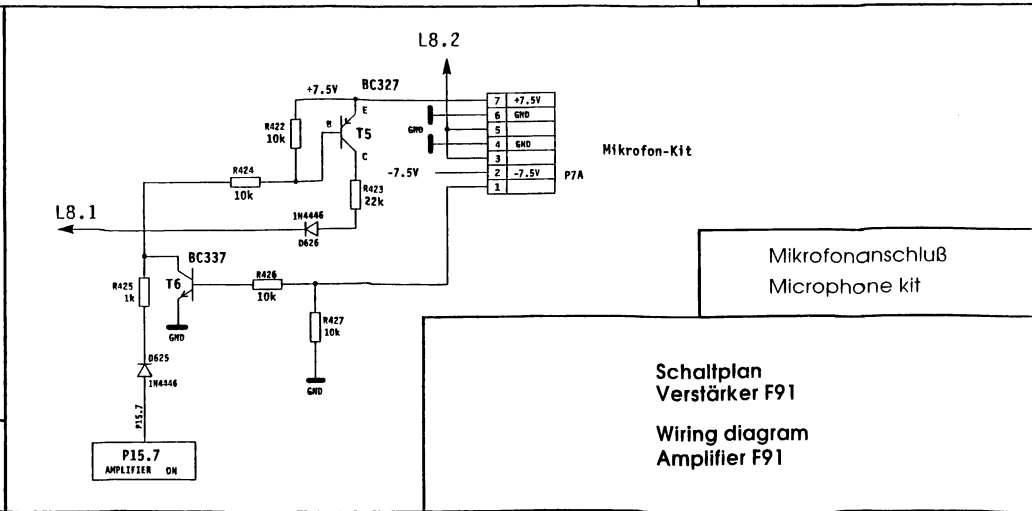**Verstärker F91** - Vorverstärker
Wiring diagram
Amplifier F91 - Pre amplifier

L 1.1

L 1.2

L 1.3

1µF C7

2k7 R108

GNDR

R107 6k8

220pF C6

1k R10

+7.5VR

-7.5VR

TL074N IC1

R9 4k7

GNDR

IC7 CD4053B

-7.5VR

R7 4k7

R8 4k7

+7.5VR

GNDR

TL074N IC1

100pF/3n3 C5

1k/1M R6

0pF/750pF C4

0R/100k R5

+7.5VR

-7.5VR

R4 1k1

C3 47µF

GNDR

R3 1k

R1 47k

R2 47k

C1 4µ7

C2 4µ7

GND

GND

P2A

P2B

Zusatzgeräteeingang rechts (RIAA)
Tape right / Option RIAA

CD rechts
CD right

1µF C307

2k7 R408

GNDL

R407 6k8

220pF C306

1k R310

+7.5VL

-7.5VL

TL074N IC2

R309 4k7

GNDL

IC8 CD4053B

-7.5VL

R307 4k7

R308 4k7

+7.5VL

GNDL

+5V

R508 10k

TL074N IC2

100pF/3n3 C305

1k/1M R306

0pF/750pF C304

0R/100k R305

+7.5VL

-7.5VL

R304 1k1

C303 47µF

GNDL

R303 1k

R301 47k

R302 47k

C301 4µ7

C302 4µ7

GND

GND

P2C

P2D

Zusatzgeräteeingang links (RIAA)
Tape left / Option RIAA

CD links
CD left

S4

GNDD

high = CD
low = Tape/RIAA

OK1 4N28

OK2 4N28

2k2 R500

2k2 R501

LED2
BGM

GNDD

P4
4 +35V
3 Input sel
2 +35V
1 BGM

R12 1k · R13 12k · R14 12k · R15 12k · R16 12k · R17 12k · R18 12k · R19 12k · R20 12k

GNDR

IC9 CD4051B
INH A B C 0 1 2 3 4 5 6 7 VEE
-7.5VR

Bässe rechts
Bass right

c100.prt
C8
33nF
PWR GND

+7.5VR
GNDR

R23 10k

c100.prt
C11 33nF
L2.1

C10 47pF
R22 1M
+7.5VR
13 4
IC1 14
12 TL074N
11
-7.5VR
R24 10k
GNDR

C12 1µF

R21 15k

R11 15k

L1.1

c100.prt
C9 2n7

GNDR
+7.5VR

IC10 CD4051B
INH A B C 0 1 2 3 4 5 6 7 VEE
PWR GND O/I

Höhen rechts
Treble right

GNDR
-7.5VR

R25 15k

R26 3k3 · R27 6k8 · R28 15k · R29 47k · R30 120k · R31 100k · R32 27k · R33 10k

R312 1k · R313 12k · R314 12k · R315 12k · R316 12k · R317 12k · R318 12k · R319 12k · R320 12k

GNDL

IC11 CD4051B
INH A B C 0 1 2 3 4 5 6 7 VEE
-7.5VL

Bässe links
Bass left

c100.prt
C308
33nF
PWR GND

+7.5VL
GNDL

R323 10k

c100.prt
C311 33nF
L2.2

C310 47pF
R322 1M
+7.5VL
13 4
IC2 14
12 TL074N
11
-7.5VL
R324 10k
GNDL

C312 1µF

R321 15k

R311 15k

L1.2

c100.prt
C309 2n7

+7.5VL
GNDL

IC12 CD4051B
INH A B C 0 1 2 3 4 5 6 7 VEE
PWR GND O/I

Höhen links
Treble left

GNDL
-7.5VL

R325 15k

R326 3k3 · R327 6k8 · R328 15k · R329 47k · R330 120k · R331 100k · R332 27k · R333 10k

L5.7   L5.6

Schaltplan
Verstärker F91 Klangregelung

Wiring diagram
Amplifier F91 Sound controller

87

Schaltplan
Verstärker F91- AVC- Stufe

Wiring diagram
Amplifier F91- AVC-stage

Signalbestätigung
Pegel unter ca. -25dB

Signal acknowledge
Level below approx. -25dB

Meßpunkt
AVC-DC Pegel
measuring point
AVC-DC Level

Begrenzung rechts
clipping right

Begrenzung links
clipping left

L2.1
L3.1
L2.2
L3.2
L8.2

Gain right
Gain left

Schaltplan
Verstärker F91 Lautstärke
Balance, BGM
Wiring diagram
Amplifier F91 Volume controller
Balance, BGM

BGM rechts
BGM right

Ausgang rechts
Line out right

BGM links
BGM left

Ausgang links
Line Out left

L3.1 L6.1 L3.2 L6.2 L6.3 L1.3 L8.2 Mikrofon-Kit

Digitalstufe Balance,Lautstärke

Digital stage Balance,Volume

Spannungsversorgung

Power supply

Mikrofonanschluß

Microphone kit

Schaltplan
Verstärker F91

Wiring diagram
Amplifier F91

Schaltplan
Verstärker F91-Digitalstufe Klang

Wiring diagram
Amplifier F91-Digital stage sound

P12

R	R	R	GNDR	GNDR	GNDL	GNDL	GNDL	L	L	L
1	2	3	4	5	6	7	8	9	10	11	12

0036385
Kabelbaum
cable loom

Mid R   High R   Low R

2R2 R3   2R2 R4

C8 1uF   C7 33uF

L5 3,3mH   L6 3,3mH

L4 0,56mH

10uF C6

0036387
Kabelbaum
cable loom

P11

1	TT-R
2	TT-R
3	GNDR
4	GNDR
5	GNDL
6	GNDL
7	TT-L
8	TT-L
9	
10	
11	

gr	HT-R	8
vi	GNDR	7
bl	MT-R	6
gn	GNDR	5
ge	GNDL	4
or	MT-L	3
rt	GNDL	2
br	HT-L	1

P8

L3 2,2mH
C4 5,6uF

10uF C5

0036386
Kabelbaum
cable loom

Low L

L2 2,2mH
C3 5,6uF

L1 0,56mH   C2 33uF   2R2 R2

C1 1uF   2R2 R1

0036383
Gedr. Schaltg. best
P.C.B.

Mid L   High L

Schaltplan
Frequenzweiche für F91

Wiring diagram
Cross over network for F91

70V		0V

transformer
left

70V		0V

transformer
right

| L2 | 9 | 8 | 6 | 4 | 2 | 1 |

| 9 | 8 | 6 | 4 | 2 | 1 | L1 |

Lautstärke
interne
Lautsprecher

volume
internal
speakers

S1   high   low

low   high   S2

V_LEFT	12
V_LEFT	11
V_LEFT	10
V_GNDL	9
V_GNDL	8
V_GNDL	7
V_GNDR	6
V_GNDR	5
V_GNDR	4
V_RIGHT	3
V_RIGHT	2
V_RIGHT	1

P12

1	F_RIGHT
2	F_RIGHT
3	F_RIGHT
4	F_GNDR
5	F_GNDR
6	F_GNDR
7	F_GNDL
8	F_GNDL
9	F_GNDL
10	F_LEFT
11	F_LEFT
12	F_LEFT

P12B

--> Verstärker
amplifier

Frequenzweiche -->
frequency
crossover

| 6 | 5 | 4 | 3 | 2 | 1 | KL |

| 6 | 5 | 4 | 3 | 2 | 1 | KR |

32,8V   22V   2V
30V   6V   0V

32,8V   22V   2V
30V   6V   0V

external
speaker
left

external
speaker
right

Schaltplan
Ausgangsübertrager F91

Wiring diagram
output transformer F91
00 43 157

+U_ref

R1 1M

100 n

IC3/1

8 9

10

+U_ref

R2 2,2k

C

8 4 2 1

4x 100k

R3
R4
R5
R6

5 6

IC3/2 - 4099

4 7

1 2

IC3/3

3

R7 1M

12 13

1n

IC3/4

11

4

Sperr

ICM
7555
IC 1

+U_ref

10 μ

R8 470 k

7 8

R9 330k

2

6

C3
1 μ

1 5

UP/DN PL P_3 P_2 P_1 P_0

10 1 3 13 12 4 16 +U_ref

8

7 $\overline{TC}$ 4516 IC 2

$\overline{CE}$

5

MR Q_3 Q_2 Q_1 Q_0

CP 15

1n

3

9 2 14 11 6

10k R10 R11 R12 R13 82k

22k 39k

1N
4004

Haller

22k

R16 R17 22k

220k R18 +U_ref

R19
220k

Lösch Sturm Leiser Lauter

K4 K3 K2 K1

15V

4,7 k

4x BC 548B

4,7 k

4,7 k

4,7 k

aufgesteckte
Decoderplatine

Decoder on
pin connector

2x 33Ω

4.000 kHz

18 + 10

PIC 16C54

– 9

100n 7805

39k

2x 4,7 μF / 50V

1 IN 1 +5V

Anschluß für Empfänger
Socket for receiver

22k R14

R15 330

Z15

(3)

(2,3,4,6) = Belegung des 6pol. Steckers
(2,3,4,6) = Pin/pole number of plug

(2)

(1)

Stecker zum Verstärker
Plug to RVC socket of amplifier

(4) (6)

R20 22

1N4004

+ Ub

Z15

Alle nicht bezeichneten Dioden = 1N4446
All diodes not marked = 1N4446
S1 Binärschalter - 16 positionen
S1 binary switch - 16 positiones

SMD - board 4703 - 431

8 2 3 4 5 6 7 8 9 10 11

+ 5V
OUT

3 rt / r
1 sw / bk

GND

2 br

Prinzipschaltbild Empfänger
Basic circuit diagram receiver

Schaltplan / wiring diagram

Telecontrol / control unit (I84)
0039074

Empfänger / receiver (I84)
0039129

(8=GND,16=+12V)

HEF4053B

BR1
OR

IC1

14 15 4
A0/I   B0/I   CO/I

INH A AX AY B BX BY C CX CY VEE
6   11 12 13 10 2   1   9   5   3   7

C1
1µF

ZDIC1
12V

R2
33k

+12V

50k
P2

50k
P1

R3
270R

P8A

GND

+16V

+16V

7   GND
6   +16V
5   −
4   R   <=I84
3   L
2   Lösch
1   UREF

−
−R   BR2
OR
−L   OR
BR3
Lösch / Cancel
U_ref

=>regulator

4 5
3 6
2 1

P7A

P6B

+35V   6   R1
2k2
5   ×
4   ×
3   ×
2   ×
BGM   1

=>S&CC

CNY17-3

LED1
rot/red

IC2

<=regulator

C1

ZDIC1   R2   IC2

R3   IC1   DIP16

P8A

BR2

BR3

P7A

LED1

<=I84

P2   P1   R1   =>S&CC

L   R   BR1   P6B

15. Technical Data

15.1. Jukeboxes with amplifier I84

Power supply	110 - 240 Volts
Power consumption	in standby: 146 Watt maximum: 205 Watt
Dimensions	height: 146,5 cm width: 98,5 cm depth: 69,5 cm
Weight	188,0 kg
Power output	2x 60 Watts rms

15.2. Jukeboxes with amplifier F91

Power supply	110 - 240 Volts
Power consumption	in standby: 146 Watts maximum: 540 Watts
Dimensiones	height: 146,5 cm width: 98,5 cm depth: 69,5 cm
Weight	188,0 kg
Power output	2x 170 Watts rms