

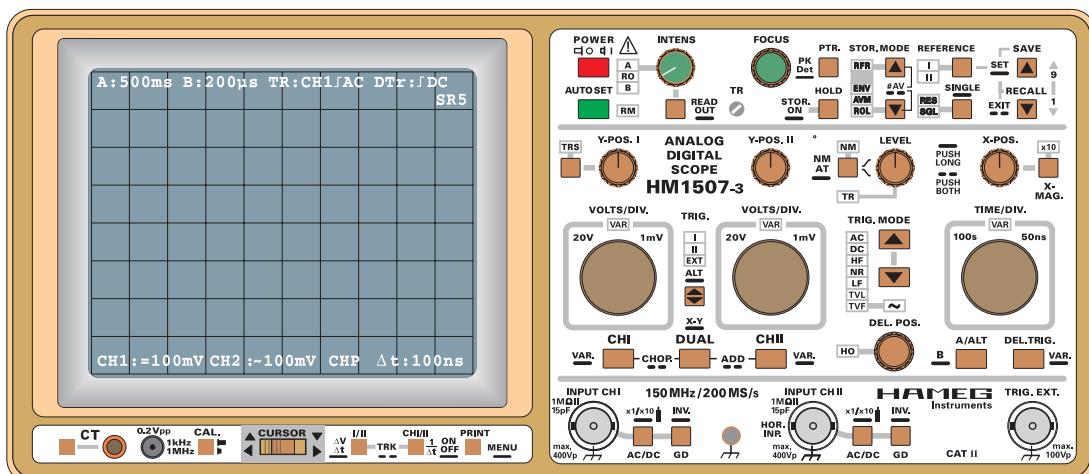
15 AUG 2003

ENGLISH

4S-1507-03E0

HAMEG®
Instruments

Oscilloscope
HM1507-3



SERVICE-MANUAL

HM1507-3

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Hersteller
Manufacturer
Fabricant

HAMEG GmbH
Kestnerbacherstraße 15-19
D - 60528 Frankfurt

Bezeichnung / Product name / Designation:

Oszilloskop/Oscilloscope/Oscilloscope

Typ / Type / Type: HM1507-3

mit / with / avec: -

Optionen / Options / Options: HO79-6

mit den folgenden Bestimmungen / with applicable regulations / avec les directives suivantes

EMV Richtlinie 89/336/EWG ergänzt durch 91/263/EWG, 92/31/EWG
EMC Directive 89/336/EEC amended by 91/263/EWG, 92/31/EEC
Directive EMC 89/336/CEE amendée par 91/263/EWG, 92/31/CEE

Niederspannungsrichtlinie 73/23/EWG ergänzt durch 93/68/EWG
Low-Voltage Equipment Directive 73/23/EEC amended by 93/68/EEC
Directive des équipements basse tension 73/23/CEE amendée par 93/68/CEE

KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY
DECLARATION DE CONFORMITÉ

**HAMEG®
Instruments**

Angewendete harmonisierte Normen / Harmonized standards applied / Normes harmonisées utilisées

Sicherheit / Safety / Sécurité

EN 61010-1: 1993 / IEC (CEI) 1010-1: 1990 A 1: 1992 / VDE 0411: 1994

EN 61010-1/A2: 1995 / IEC 1010-1/A2: 1995 / VDE 0411 Teil 1/A1: 1996-05

Überspannungskategorie / Overvoltage category / Catégorie de surtension: II

Verschmutzungsgrad / Degree of pollution / Degré de pollution: 2

Elektromagnetische Verträglichkeit / Electromagnetic compatibility / Compatibilité électromagnétique

EN 61326-1/A1

Störaussendung / Radiation / Emission: Tabelle / table / tableau 4; Klasse / Class / Classe B.

Störfestigkeit / Immunity / Imunité: Tabelle / table / tableau A1.

EN 61000-3-2/A14

Oberschwingungsströme / Harmonic current emissions / Émissions de courant harmonique: Klasse / Class / Classe D.

EN 61000-3-3

Spannungsschwankungen u. Flicker / Voltage fluctuations and flicker / Fluctuations de tension et du clignotement.

Datum / Date / Date

15.01.2001

Unterschrift / Signature / Signatur

E. Baumgartner
Technical Manager
Directeur Technique

General information regarding the CE marking

HAMEG instruments fulfill the regulations of the EMC directive. The conformity test made by HAMEG is based on the actual generic- and product standards. In cases where different limit values are applicable, HAMEG applies the severer standard. For emission the limits for residential, commercial and light industry are applied. Regarding the immunity (susceptibility) the limits for industrial environment have been used.

The measuring- and data lines of the instrument have much influence on emmission and immunity and therefore on meeting the acceptance limits. For different applications the lines and/or cables used may be different. For measurement operation the following hints and conditions regarding emission and immunity should be observed:

1. Data cables

For the connection between instruments resp. their interfaces and external devices, (computer, printer etc.) sufficiently screened cables must be used. Without a special instruction in the manual for a reduced cable length, the maximum cable length of a dataline must be less than 3 meters and not be used outside buildings. If an interface has several connectors only one connector must have a connection to a cable.

Basically interconnections must have a double screening. For IEEE-bus purposes the double screened cables HZ72S and HZ72L from HAMEG are suitable.

2. Signal cables

Basically test leads for signal interconnection between test point and instrument should be as short as possible. Without instruction in the manual for a shorter length, signal lines must be less than 3 meters and not be used outside buildings.

Signal lines must screened (coaxial cable - RG58/U). A proper ground connection is required. In combination with signal generators double screened cables (RG223/U, RG214/U) must be used.

3. Influence on measuring instruments.

Under the presence of strong high frequency electric or magnetic fields, even with careful setup of the measuring equipment an influence of such signals is unavoidable.

This will not cause damage or put the instrument out of operation. Small deviations of the measuring value (reading) exceeding the instruments specifications may result from such conditions in individual cases.

4. RF immunity of oscilloscopes.

4.1 Electromagnetic RF field

The influence of electric and magnetic RF fields may become visible (e.g. RF superimposed), if the field intensity is high. In most cases the coupling into the oscilloscope takes place via the device under test, mains/line supply, test leads, control cables and/or radiation. The device under test as well as the oscilloscope may be effected by such fields.

Although the interior of the oscilloscope is screened by the cabinet, direct radiation can occur via the CRT gap. As the bandwidth of each amplifier stage is higher than the total -3dB bandwidth of the oscilloscope, the influence RF fields of even higher frequencies may be noticeable.

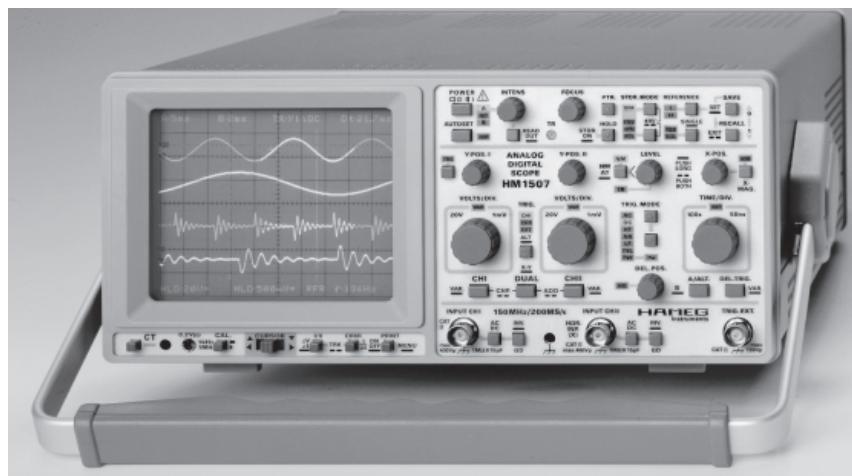
4.2 Electrical fast transients / electrostatic discharge

Electrical fast transient signals (burst) may be coupled into the oscilloscope directly via the mains/line supply, or indirectly via test leads and/or control cables. Due to the high trigger and input sensitivity of the oscilloscopes, such normally high signals may effect the trigger unit and/or may become visible on the CRT, which is unavoidable. These effects can also be caused by direct or indirect electrostatic discharge.

HAMEG GmbH

The 150 MHz Analog-/Digital-Oscilloscope HM1507-3 (200MSa/s)

- Autoset**
- Auto Cursor**
- Readout / Cursor**
- Save / Recall**
- 2 Reference Memories**
- Dual Time Base**
- Component Tester**
- 1kHz/1MHz Calibrator**
- RS232 Interface**



Analog:

- 2 x DC to 150MHz, 2 x 1mV-50V/div
- Time Base A with Trig. DC to 250MHz
- Time Base B with 2ndTrig. to 250MHz
- Trig. DC to 250MHz, TV Sync. Separator
- 1kHz/1MHz Calibrator, CRT with 14kV

Digital:

- Refresh, Single, Roll-, Envelope-, Average-, XY-Mode
- Max. Sampling Rate 200MSa/s, Storage 2x2048x8 bit
- Time Base A: 100s - 50ns/div., B: 20ms - 50ns/div.
- Pre Trigger 25-50-75-100%, Post Trigger 25-50-75%
- Screen Refresh 180/s, Dot Join (linear)

Specifications

Vertical Deflection

Operating modes:	Channel I or II separate both Channels (alternated or chopped)
Chopper frequency:	approx. 0.5MHz
Sum or Difference:	from CH I and CH II
Invert:	CH I and CH II
XY-Mode:	via channel I (Y) and channel II(X)
Frequency range:	DC to 150MHz (-3dB)
Rise time:	<2.3ns
Overshoot:	≤1%
Deflection coefficient:	14 calibrated positions from 1mV/div to 20V/div in 1-2-5 sequence, variable 2.5:1 to min. 50V/div.
Accuracy in calibrated positions	
1mV/div - 2mV/div:	±5% (DC-10MHz(-3dB))
5mV/div - 20V/div:	±3%
Input impedance:	1MΩ II 15pF
Input coupling:	DC-AC-GD (ground)
Input voltage:	max. 400V (DC + peak AC)
Delay line:	approx. 70ns

Triggering

Automatic (peak to peak):	20Hz-250MHz (≥0.5div.)
Normal with level control: DC-250MHz	(≥0.5div.)
Indicator for trigger action:	LED
Slope:	positive or negative
Sources:	Channel I or II, line and external
ALT. Triggering:	CH I/CH II (≥ 0.8div.)
Coupling:	AC (10 - 250MHz) DC (0 - 250MHz) HF (50kHz - 250MHz) LF (0 - 1.5kHz)
NR (Noise reject):	0 - 50MHz (≥ 0.8div.)
Triggering time base B:	normal with level control and slope selection (0 - 250 MHz)
External:	≥0.3V _{pp} (0 - 250MHz)
Active TV Sync. Separator:	field & line, + / -

Horizontal Deflection

Analog Time Base:

Accuracy in calibr. position	3%; 1-2-5 sequence
A:	0.5s-50ns/div.
B:	20ms-50ns/div.
Operating modes:	A or B, alternate A/B
Variable:	2.5:1 up to 1.25s/div.
X-MAG. x10 (±5%)	max. 5ns/div.
Holdoff time:	variable to approx. 10:1
Bandwidth X-amplifier:	0 - 3MHz (-3dB)
X-Y phase shift:	<3° below 220kHz

Digital Time Base:

Accuracy:	3%; 1-2-5 sequence
A:	100s-0.1μs/div.
Peak detect:	100s - 5μs/div.
B:	20ms-0.1μs/div.
Peak detect:	20ms - 5μs/div.
Operating modes:	A or B, alternate A/B
X-MAG. x10 (±5%)	10ns/div.
Bandwidth X-Amplifier:	0 - 20MHz (-3dB)
X-Y phase shift:	<3° below 20MHz
Input X-amplifier:	via Channel II
Sensitivity:	see CH II

Digital Storage

Operating modes:	Refresh, Roll, Single, XY Peak Detect, Average (2 to 512), Envelope
Dot Join function:	automatically
Acquisition (real time)	
8 bit flash A/D	max. 200MSa/s
Peak detect:	5ns
Display refresh rate:	max. 180/s
Memory & display:	2k x 8bit per channel
Reference memory:	2 waveforms 2k x 8bit
Saved in:	(EEPROM).
Resolution (samples/div.):	X 200/div. Y 25 /div. XY 25 x 25/div.
Pre-/Post Trigger:	25,50,75,100,-25,-50,-75%

Operation / Control

Manual:	front panel switches
Auto Set:	signal related automatic parameter selection
Save & Recall:	9 user defined parameter settings
Readout & Cursor (analog/digital)	

Display of parameter settings and other functions on the screen. Trigger point indication. Cursor measurement of ΔU, Δt or 1/Δt (frequency), separate or in tracking mode.

Readout intensity: separately adjustable.

Interface

PC remote control:	built in RS232 interface
Option:	HO79-6 Multifunction-Interface

IEEE-Bus, RS232, and Centronics

Output formats (HO79-6): PCL, Post Script
HPGL, EPSON
Opto interface HZ70

Component Tester

Test voltage:	max. 7V _{rms} (o/c).
Test current:	max. 7mA _{rms} (s/c)
Test frequency:	approx. 50Hz One test lead is grounded (Safety Earth)

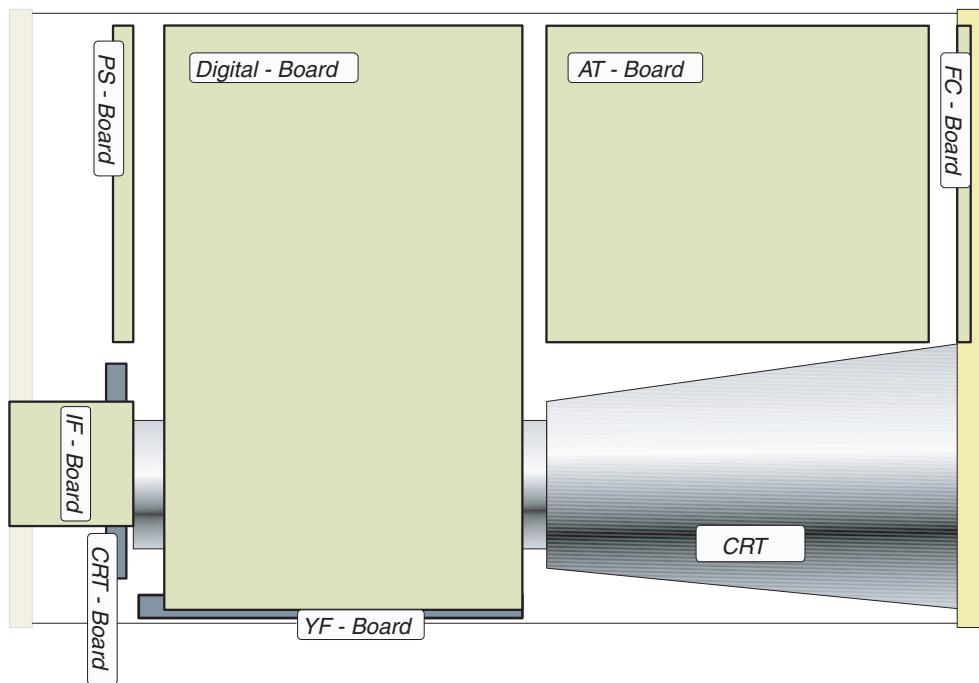
General Information

CRT:	D14-375GY, 8x10cm internal graticule
Acceleration voltage:	approx. 14kV
Trace rotation:	adjustable on front panel
Calibrator:	0.2V ±1%, ≈ 1kHz/1MHz (tr <4ns)
Line voltage:	100-240V AC ±10%, 50/60Hz
Power consumption:	approx. 47 Watt at 50Hz
Min./Max. ambient temperature:	0°C...+40°C
Protective system:	Safety class I (IEC1010-1)
Weight:	approx. 6.5kg (12lbs)
Color:	techno-brown
Cabinet:	W 285, H 125, D 380 mm
Lockable tilt handle	7/00

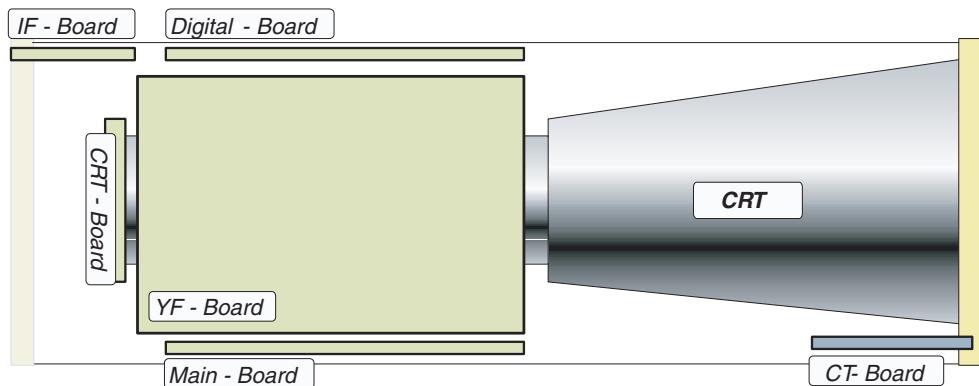
Accessories supplied: Operators Manual and PC software on CD-ROM, 4 Disks, Line Cord, 2 Probes 10:1

Typical board allocation

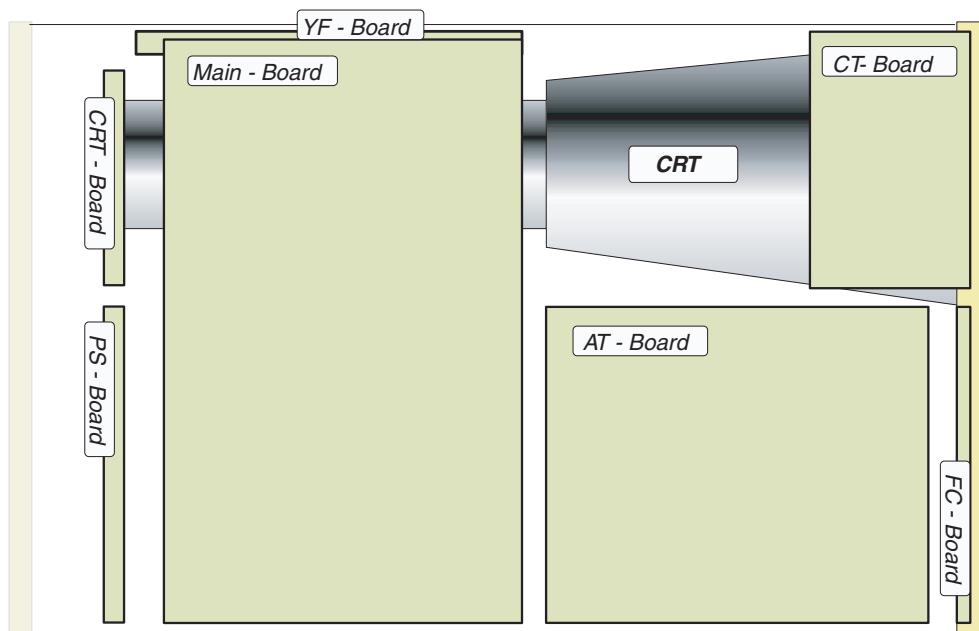
Typical boards allocation (Top view)

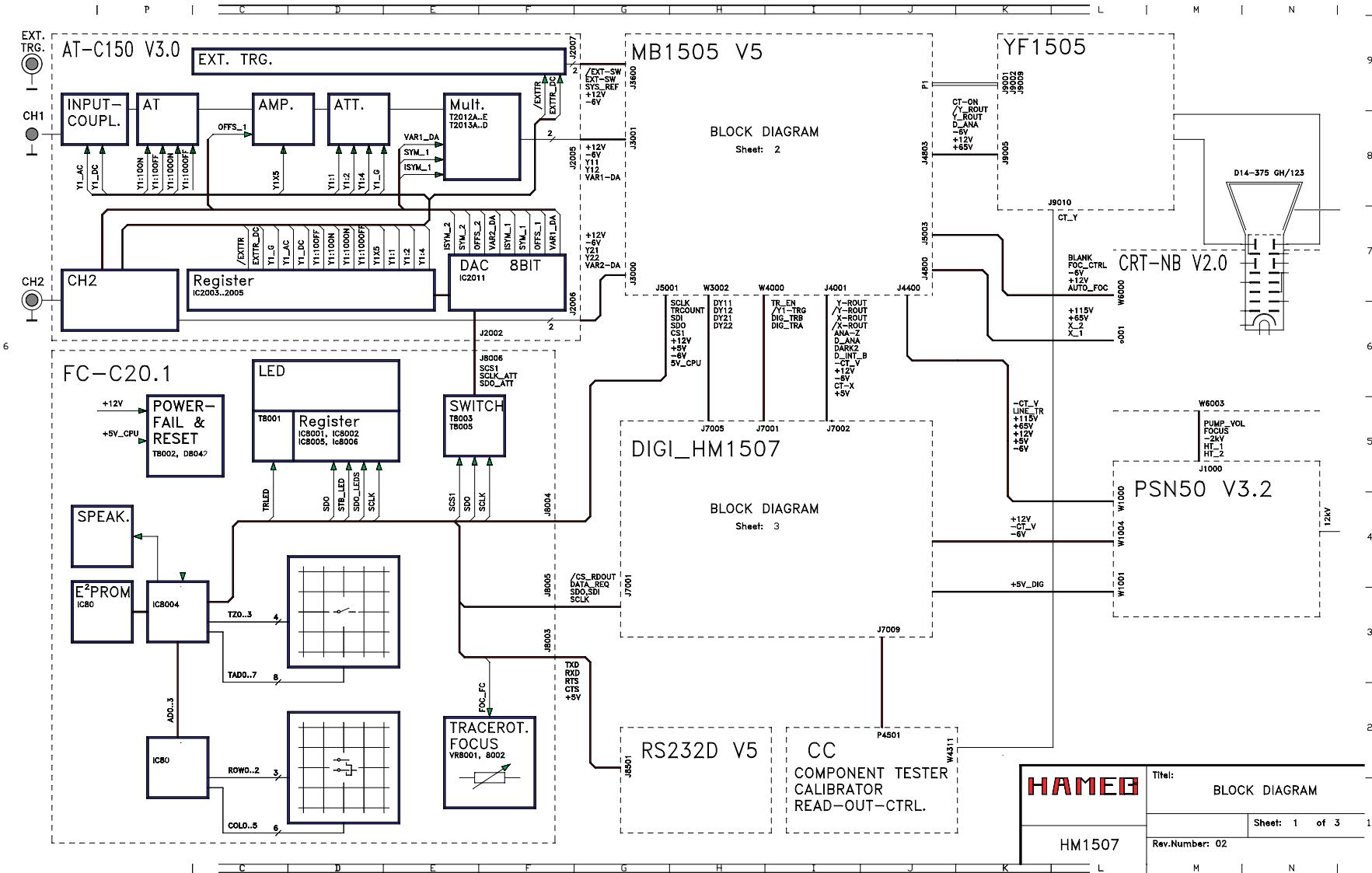


Typical boards allocation (Back side)

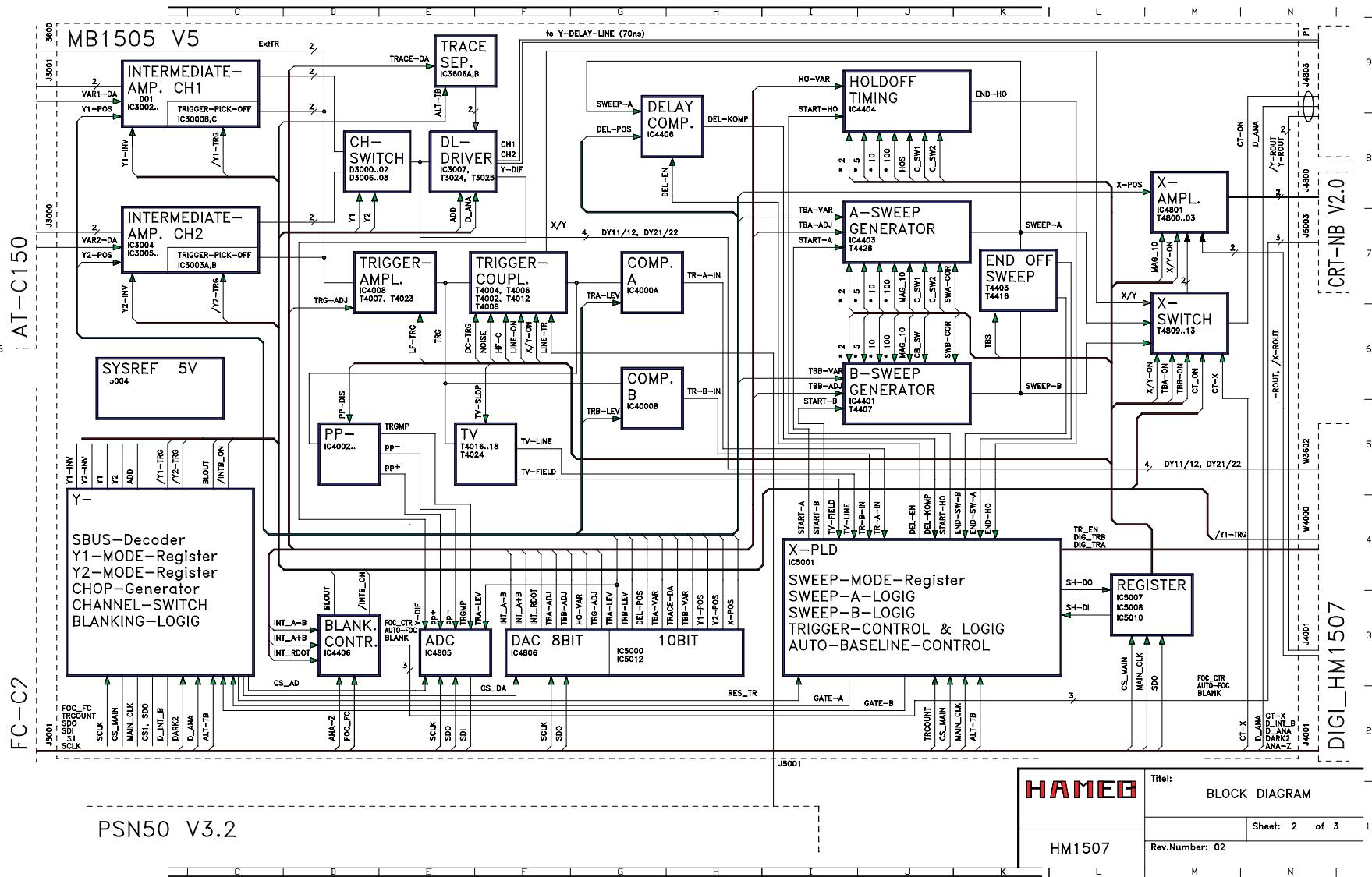


Typical boards allocation (Bottom view)

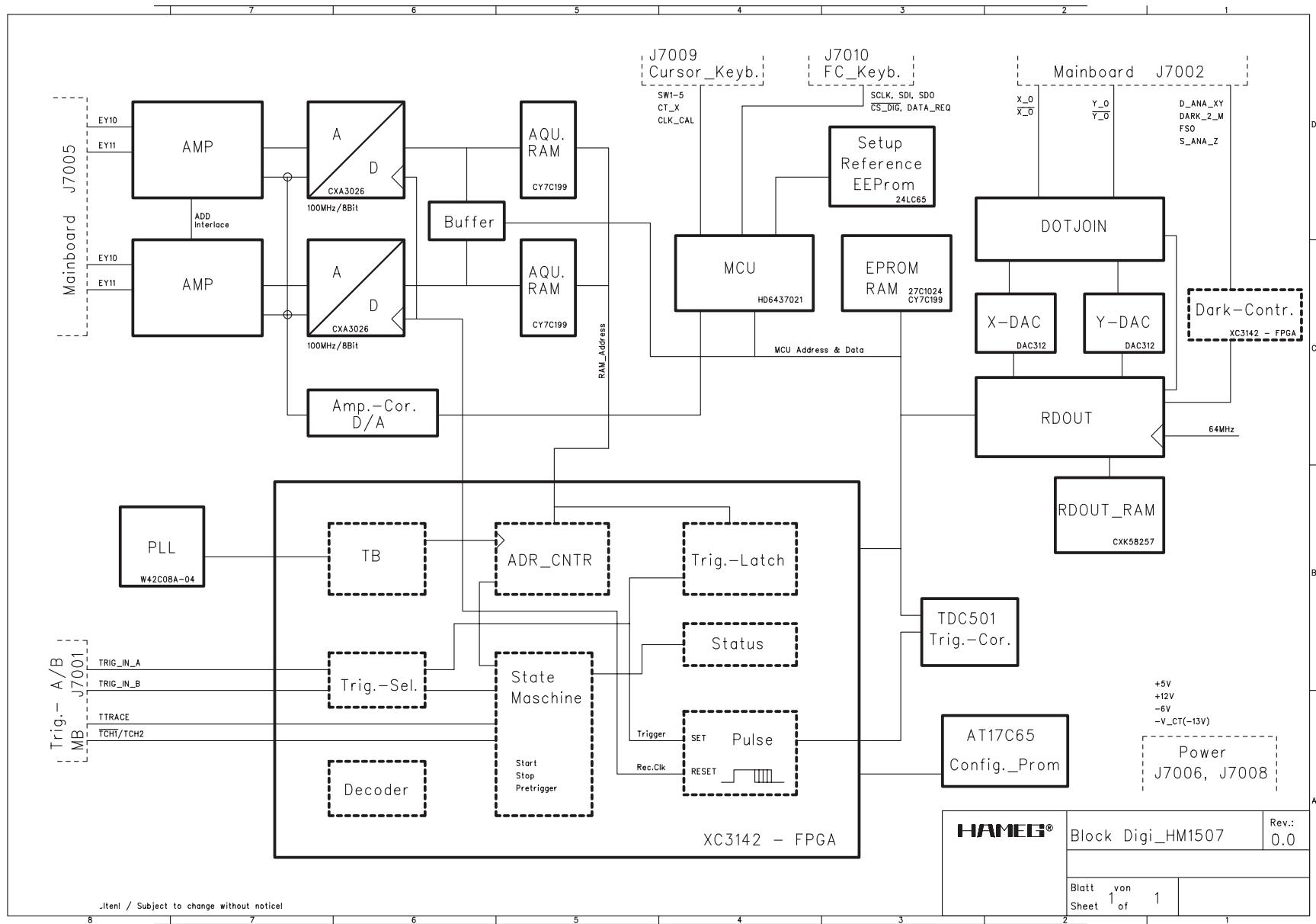


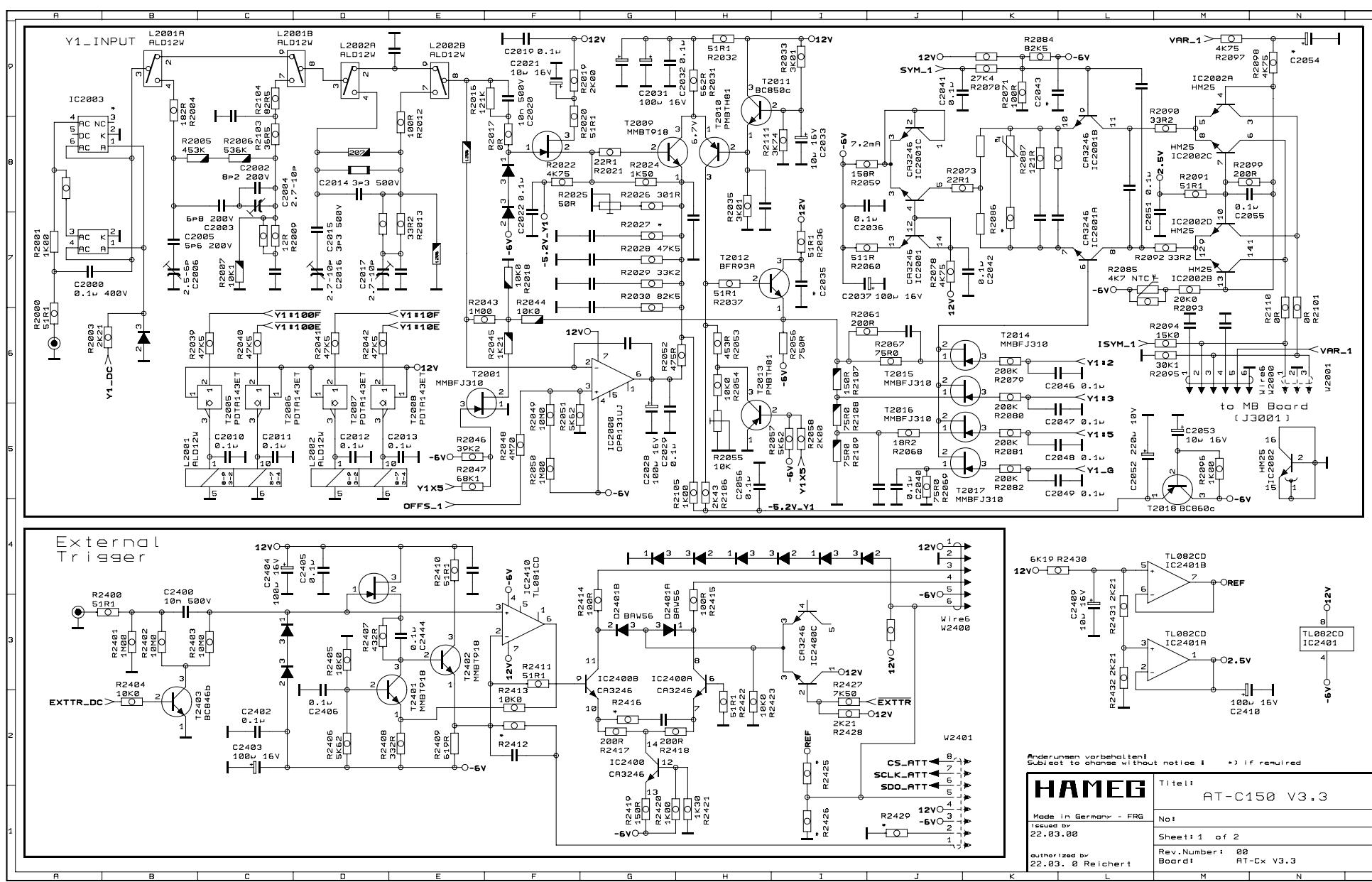


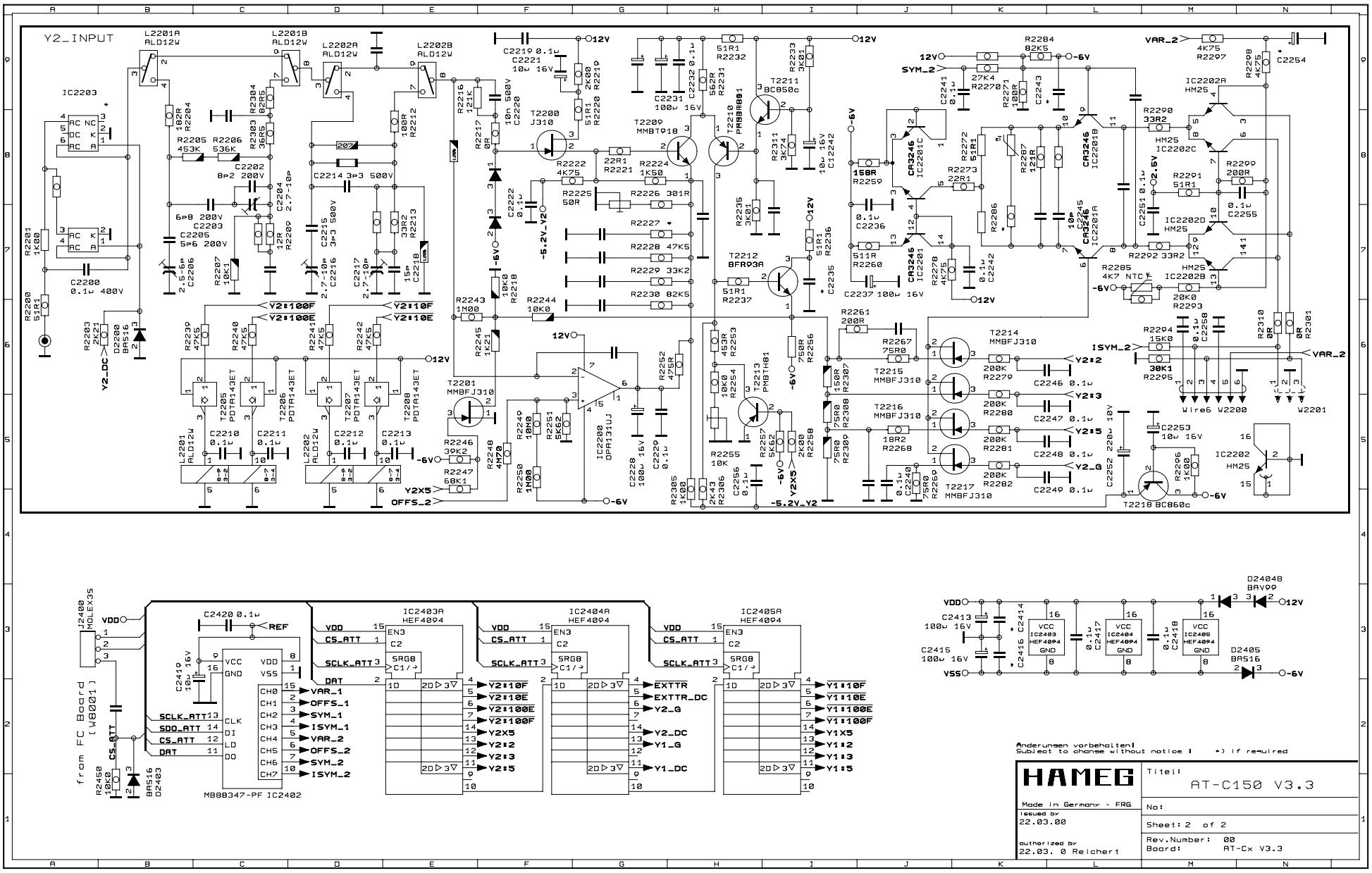
Block Diagramm



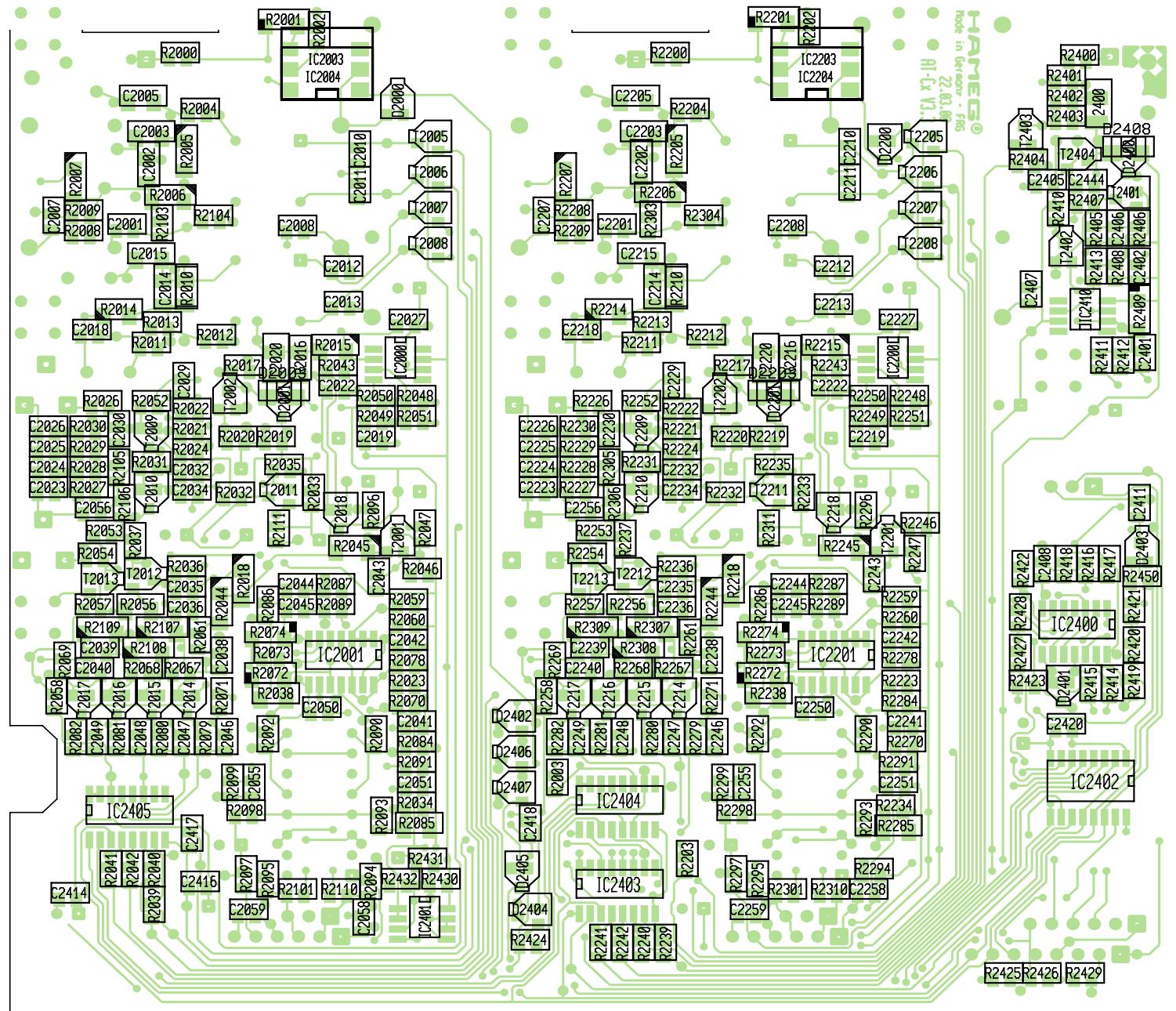
Block Diagramm



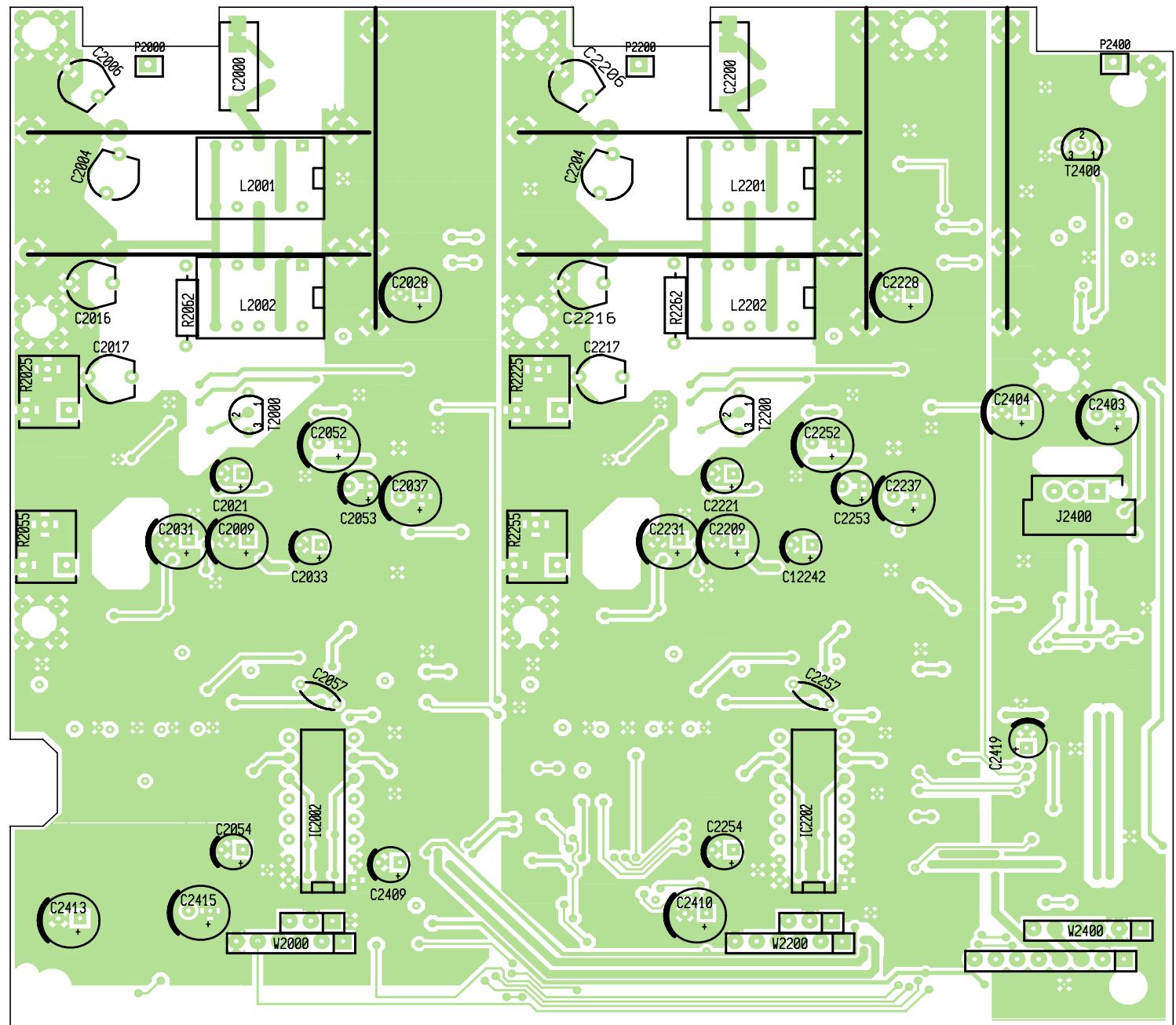




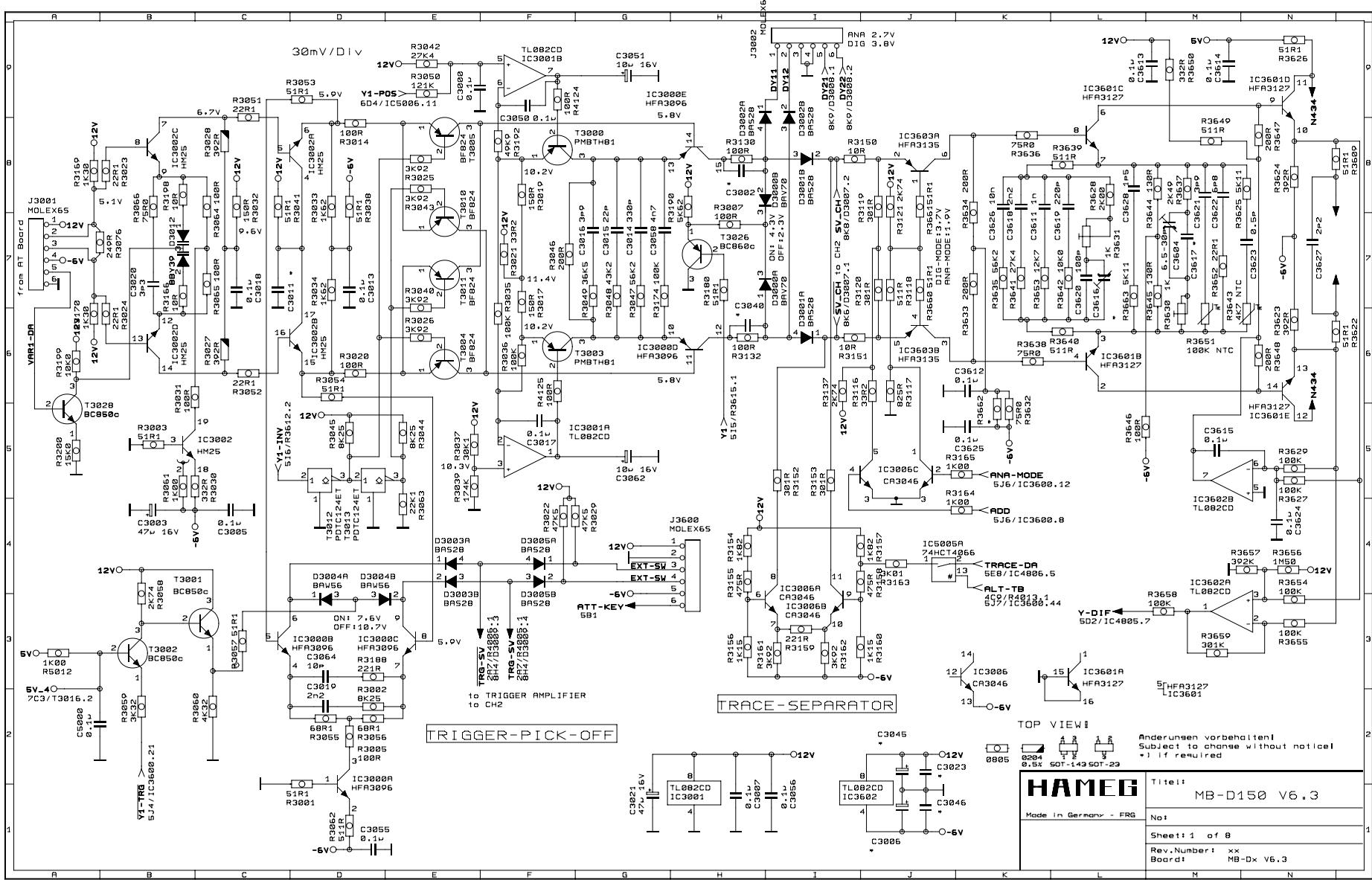
AT - Board Diagramm / Top Side



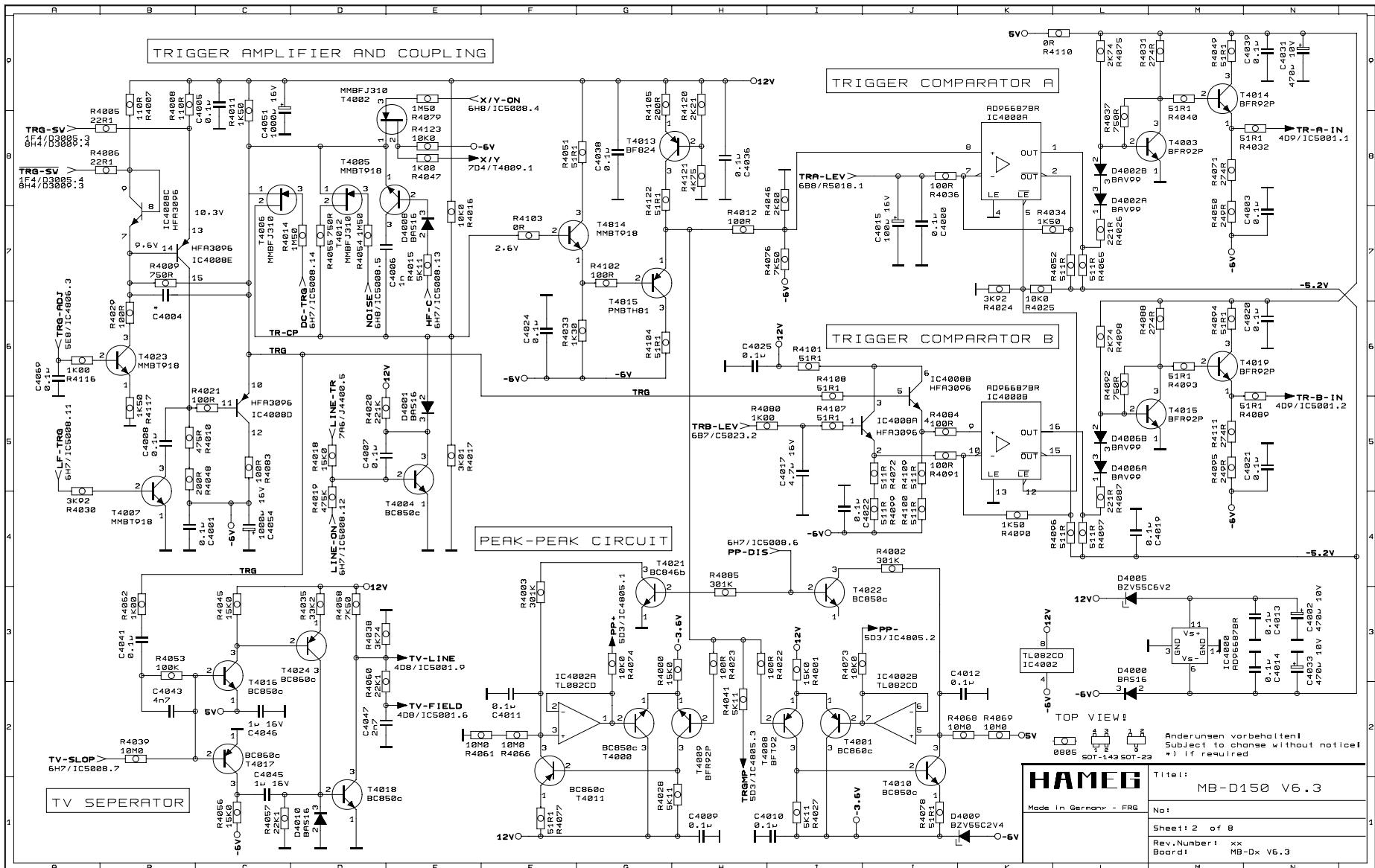
A^T - Board Diagramm / Bottom Side



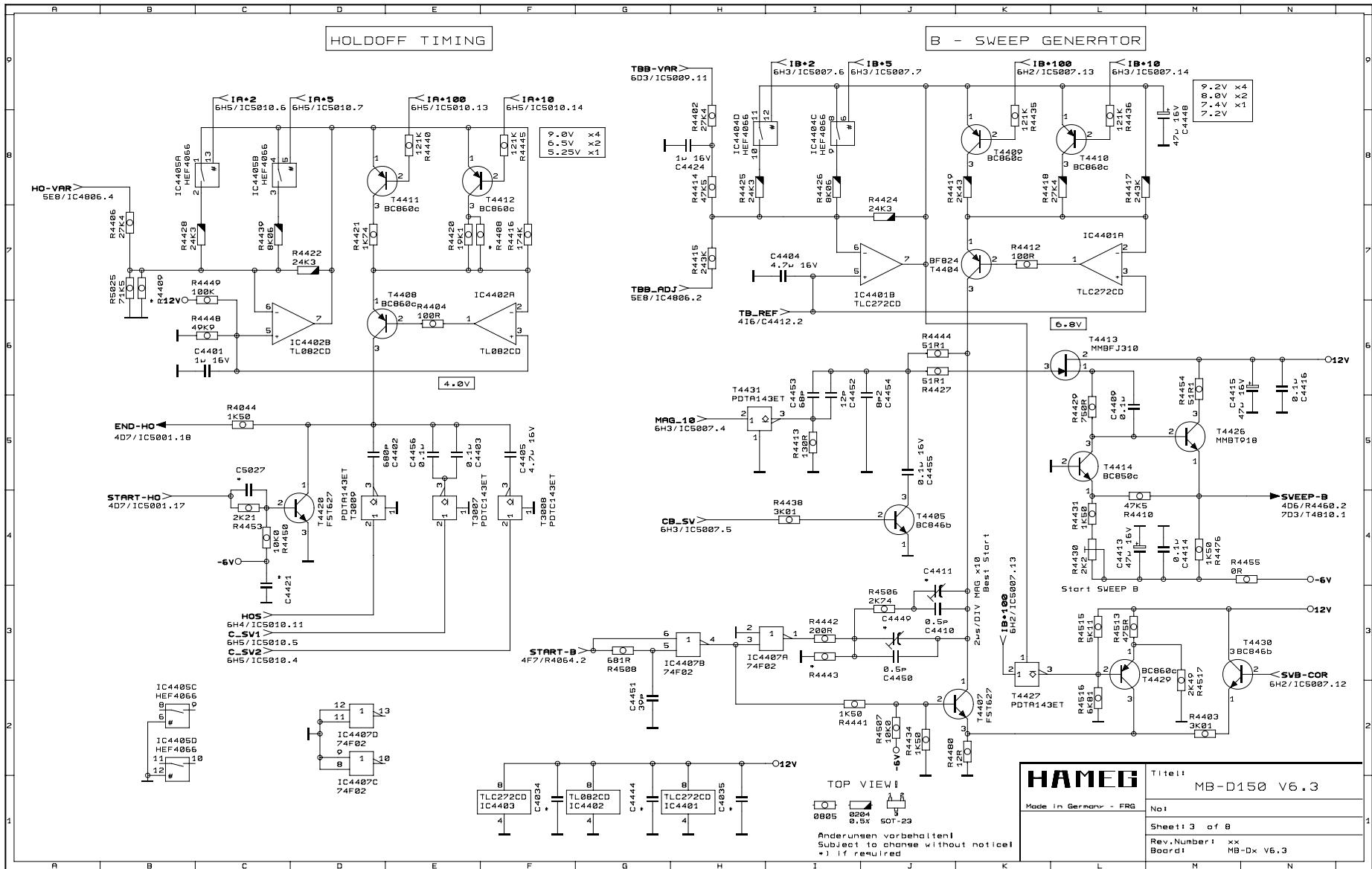
Main - Board Diagram



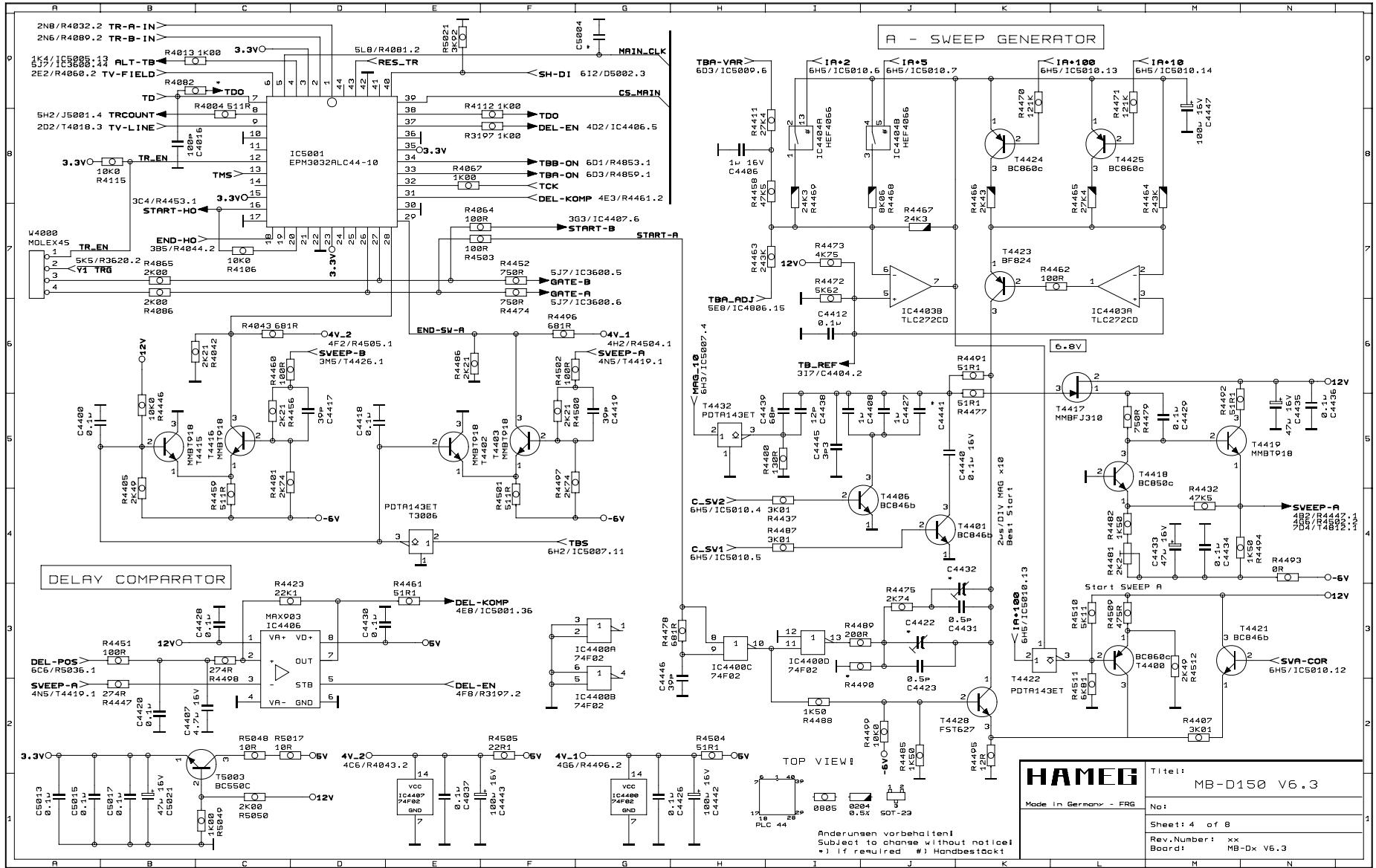
Main - Board Diagramm



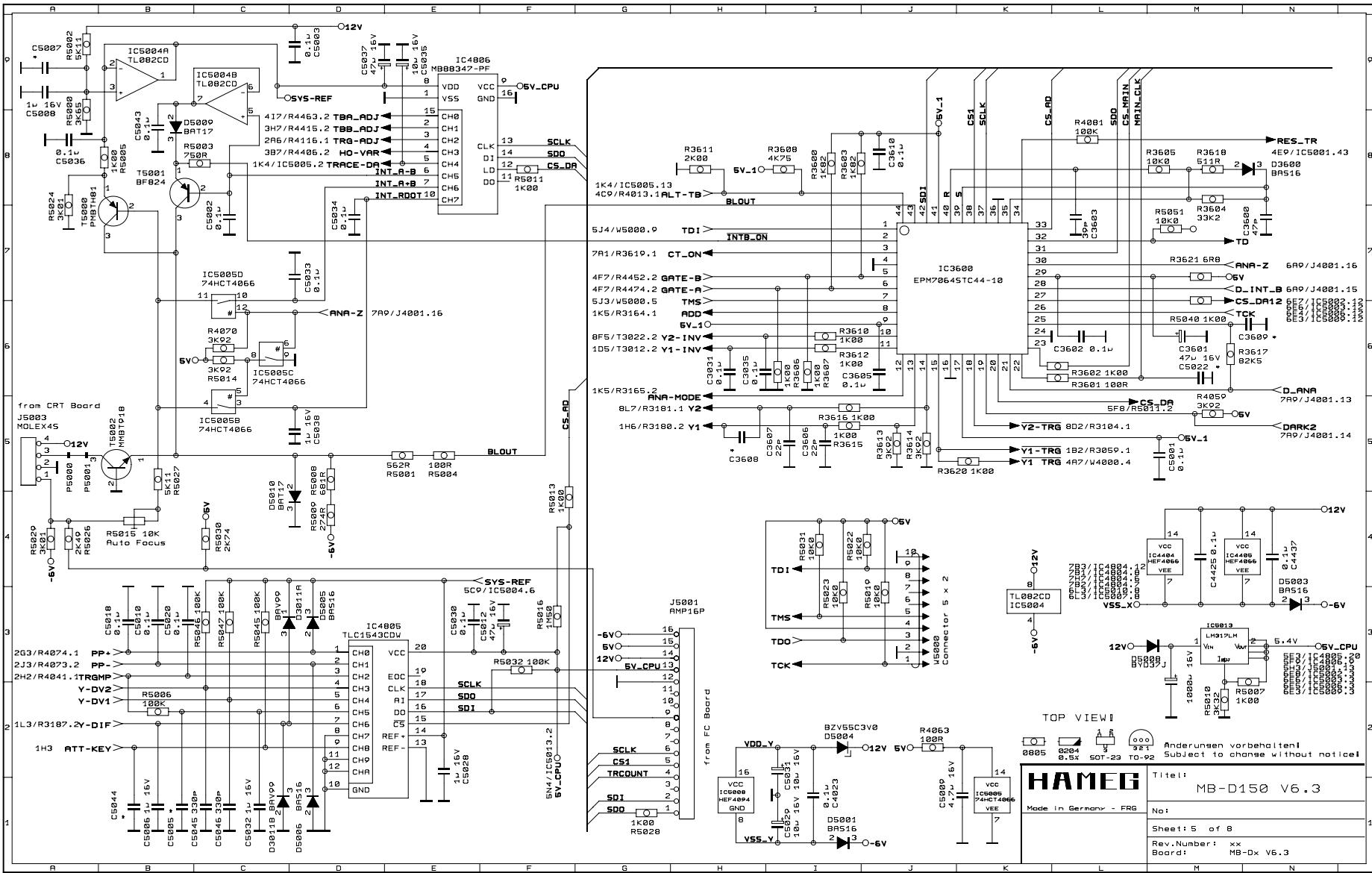
Main - Board Diagramm



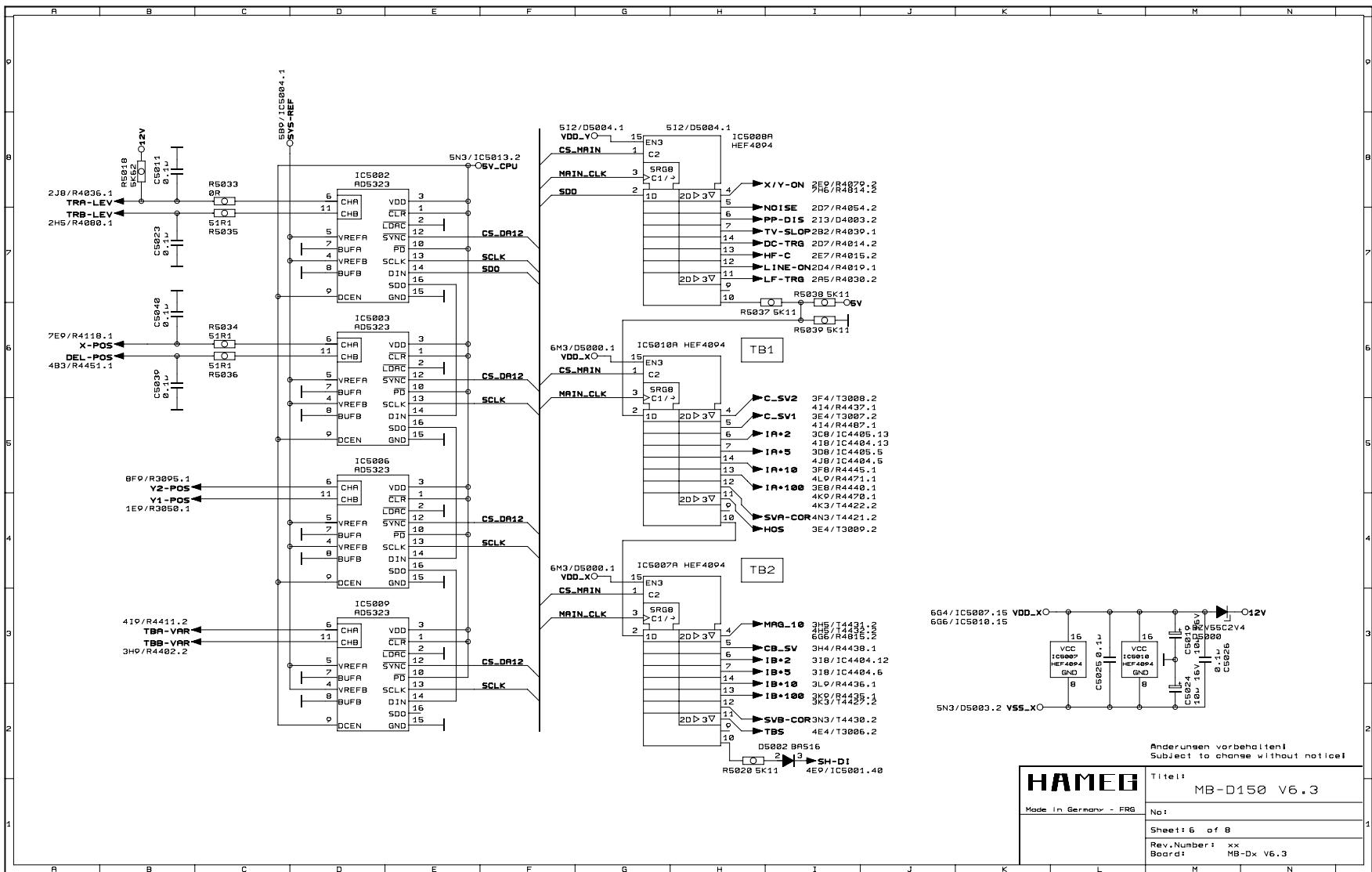
Main - Board Diagramm



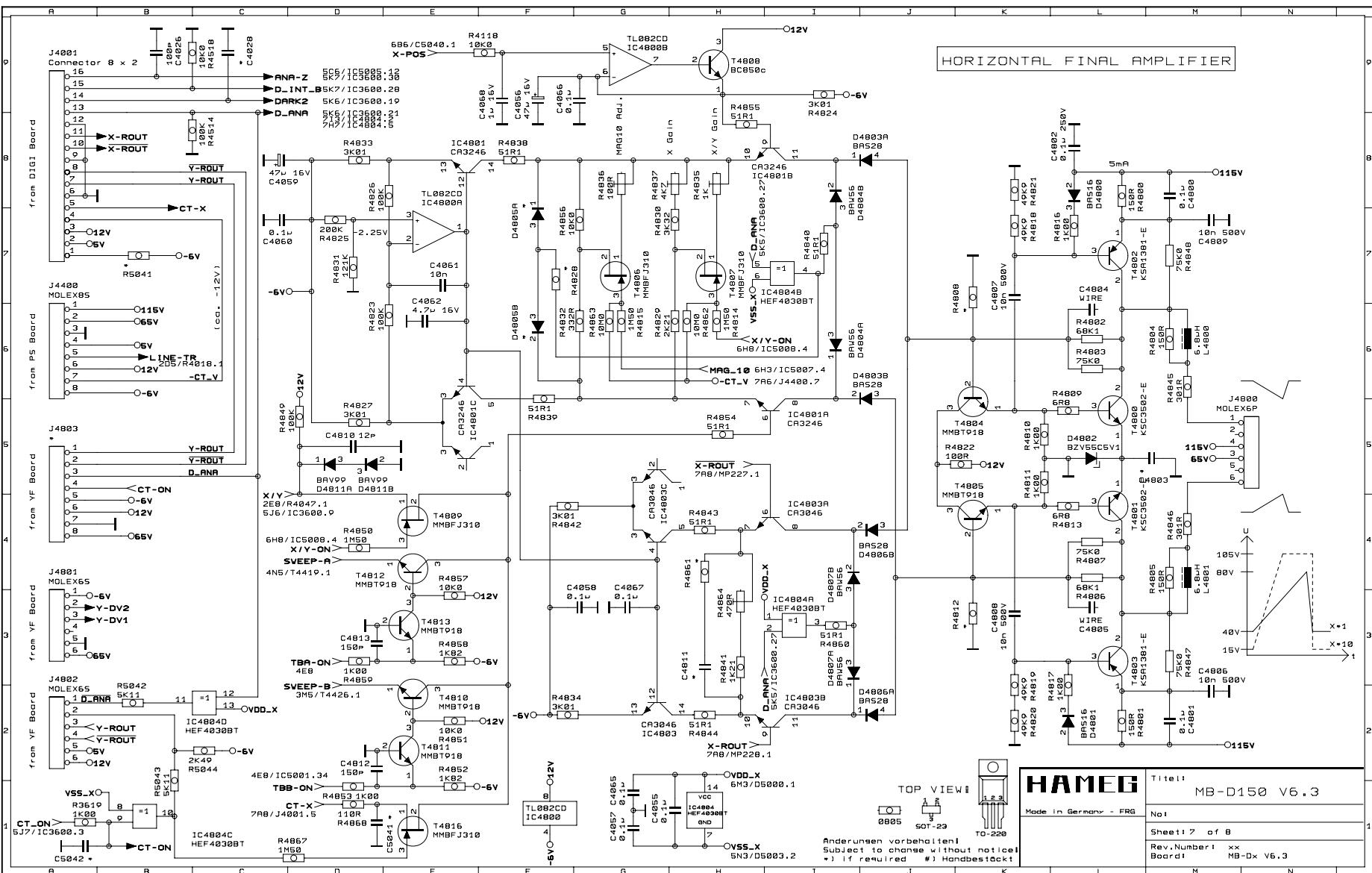
Main - Board Diagramm



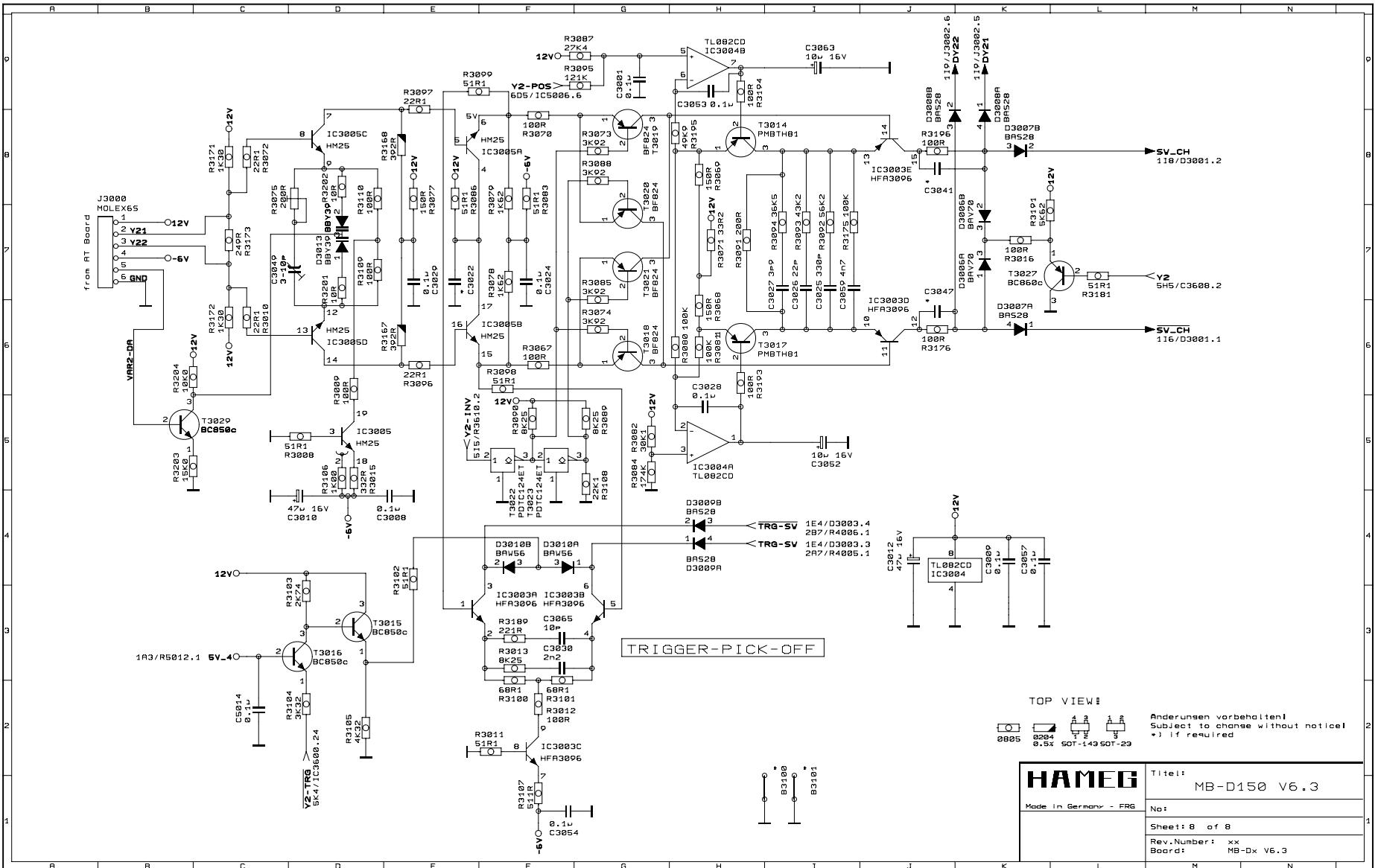
Main - Board Diagramm



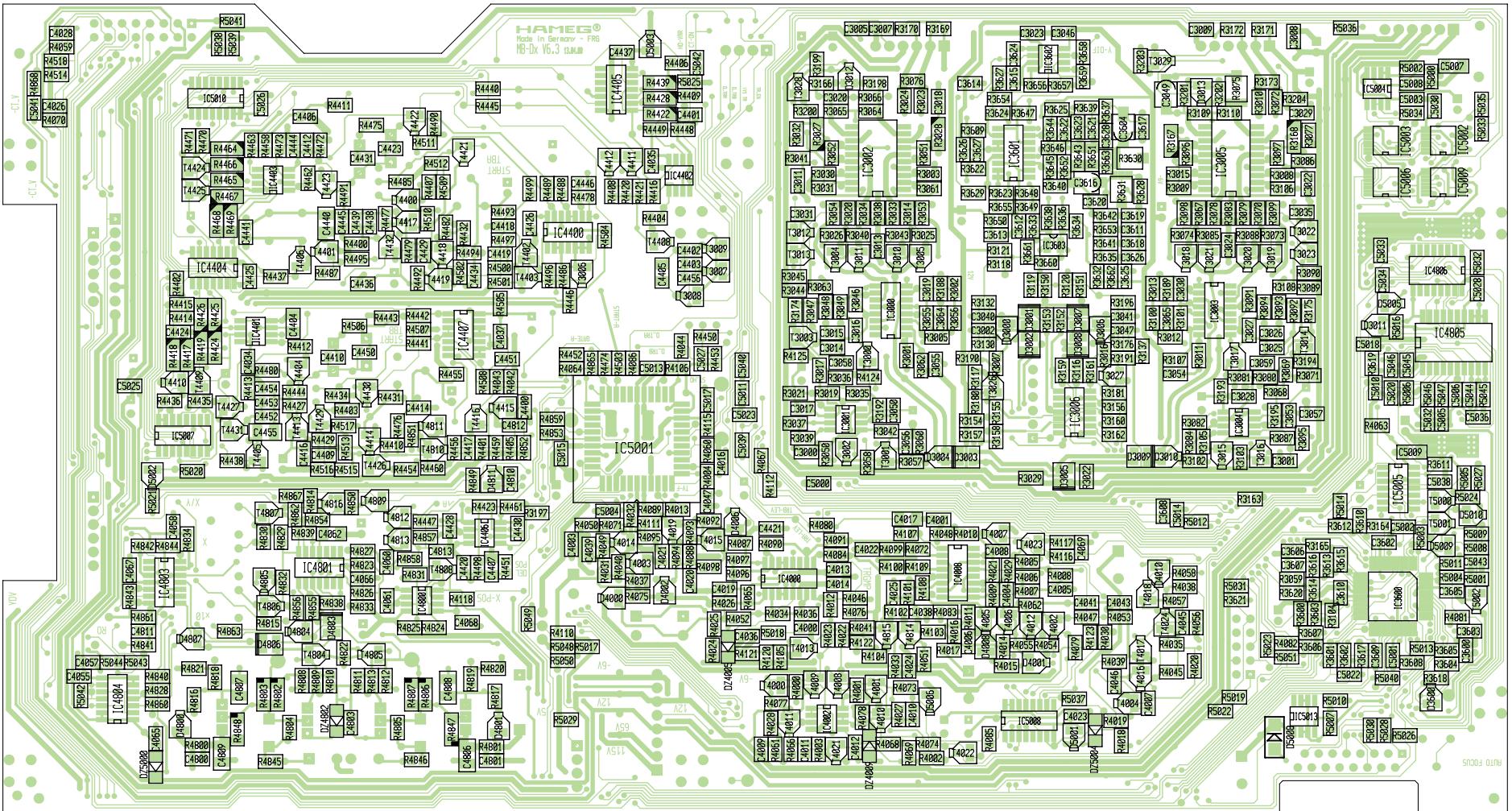
Main - Board Diagram



Main - Board Diagramm



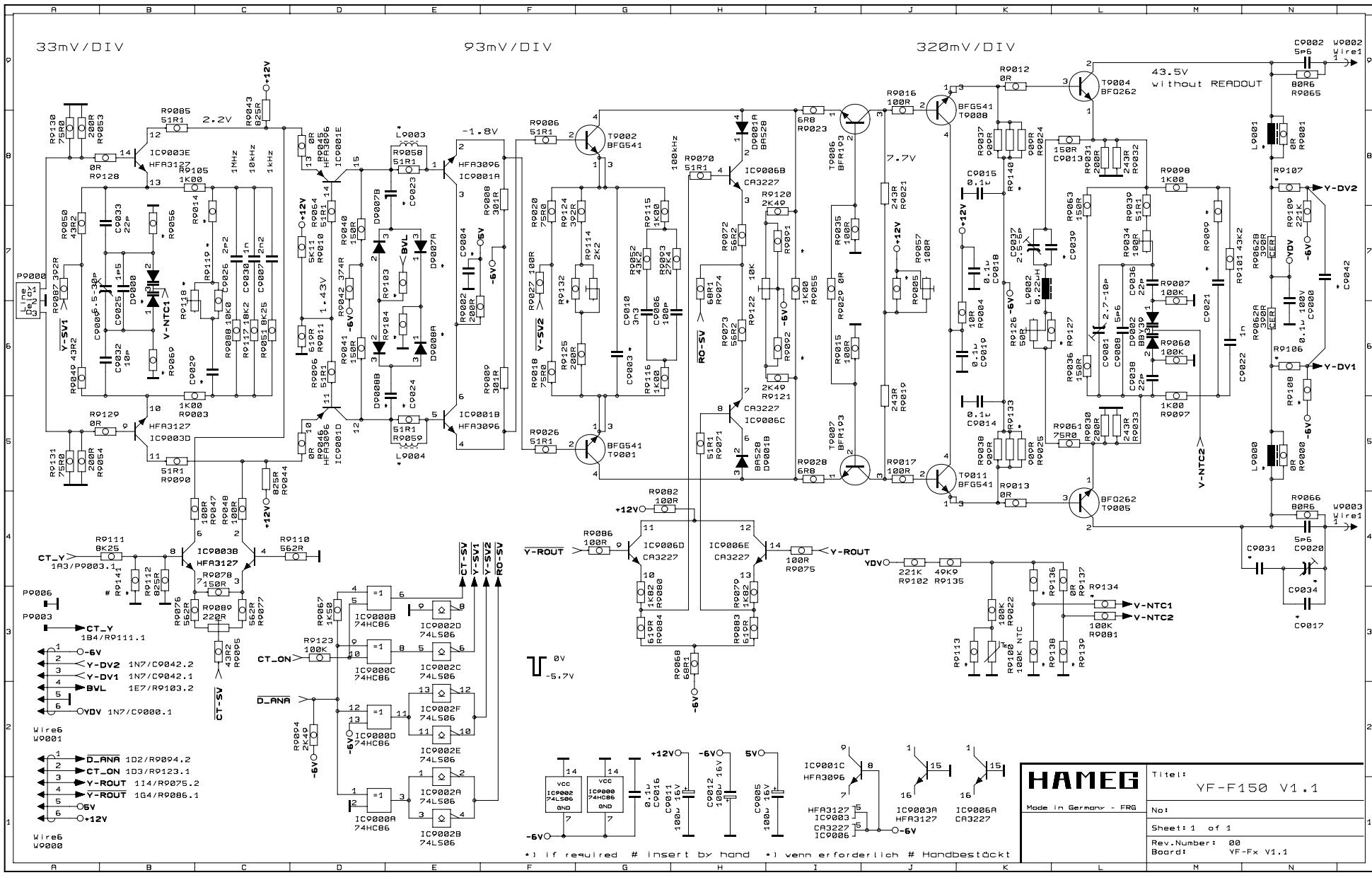
Main - Board Top Side



YF - Board Diagram

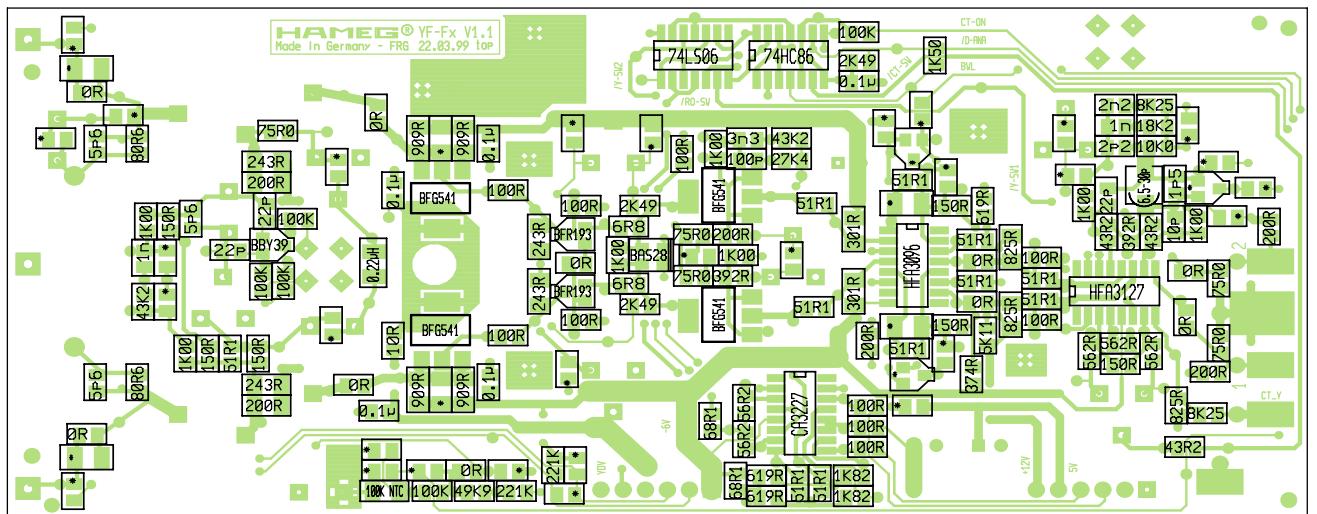
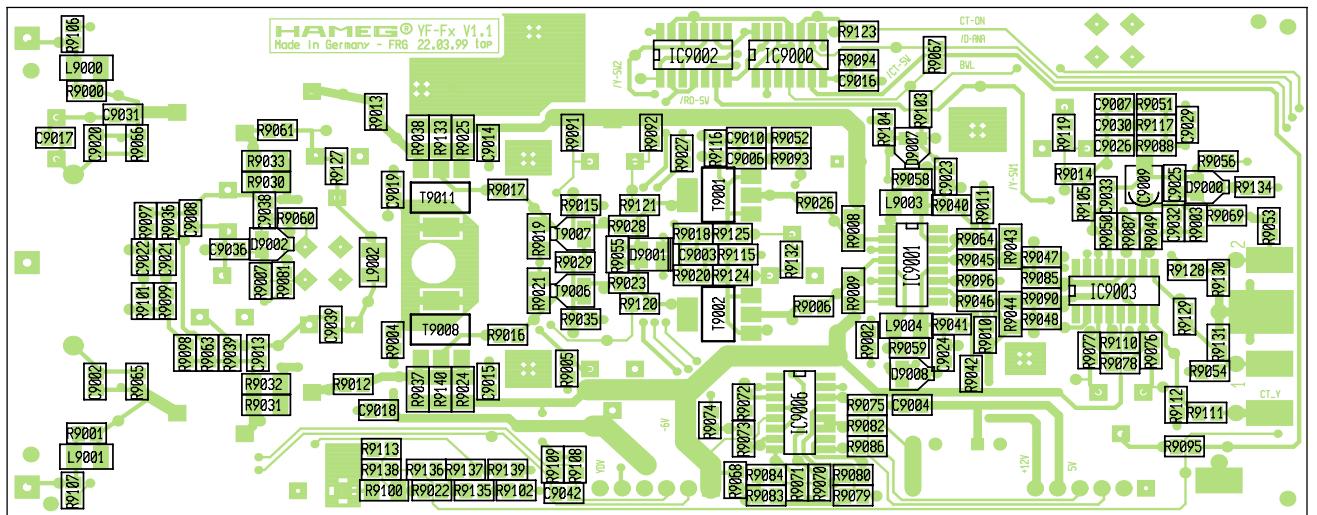
Subject to change without notice

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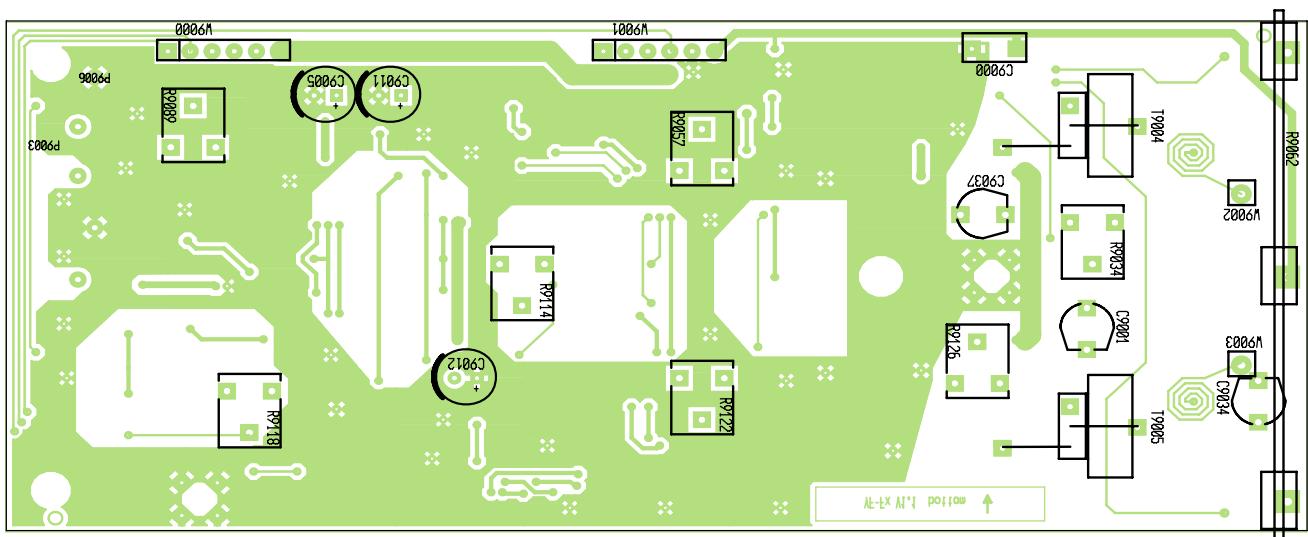
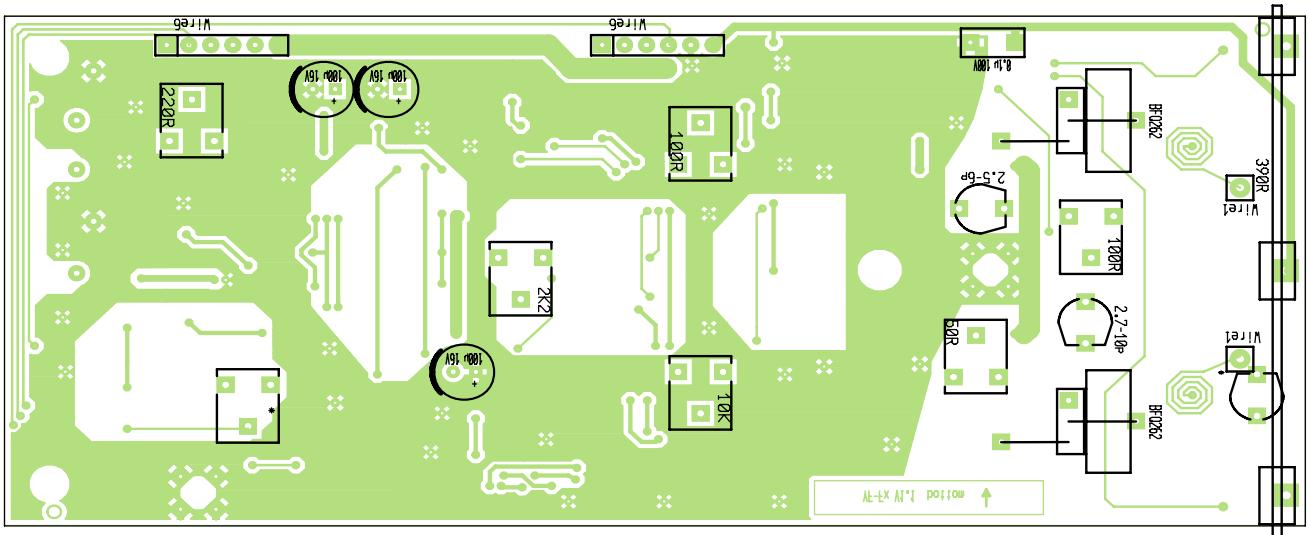


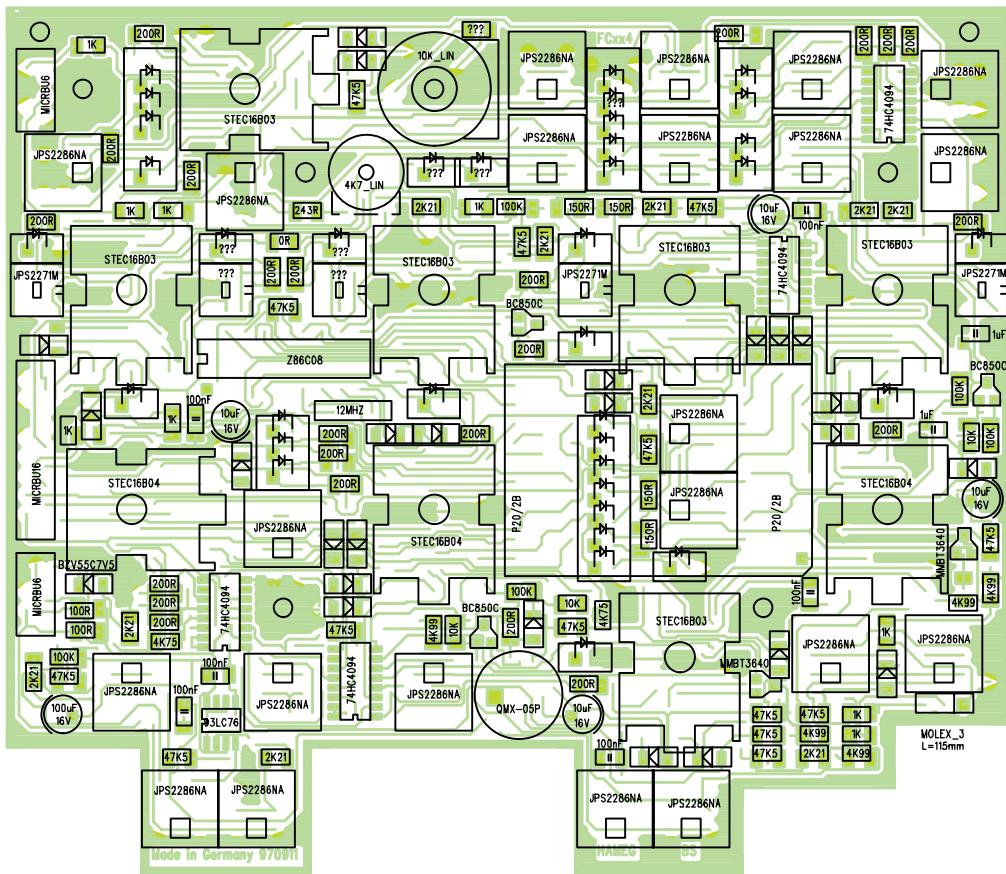
HAMEG

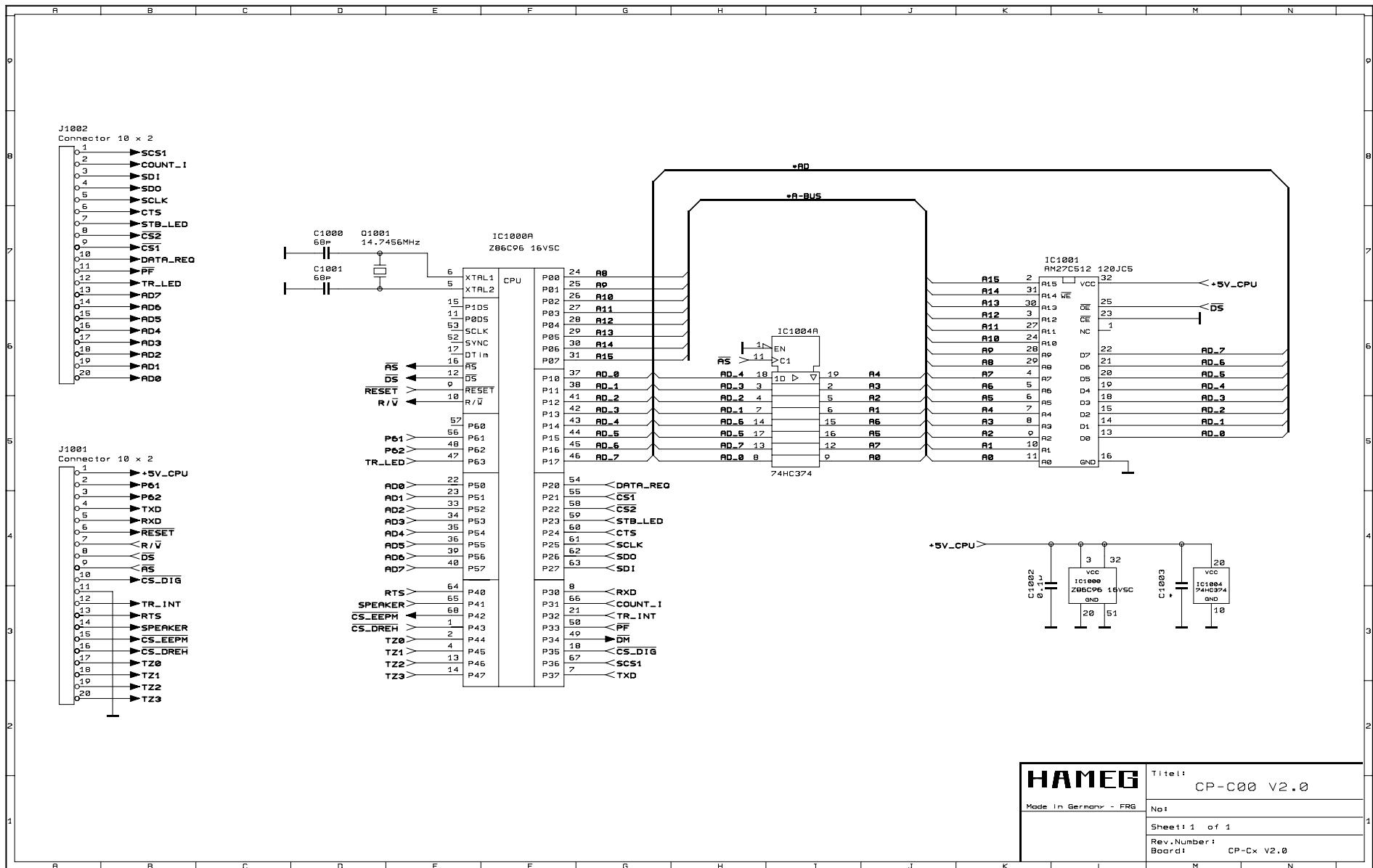
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No:	
Sheet:	1 of 1
Rev.Number:	00
Board:	YF-Fx V1.1



YF - Board Bottom Side





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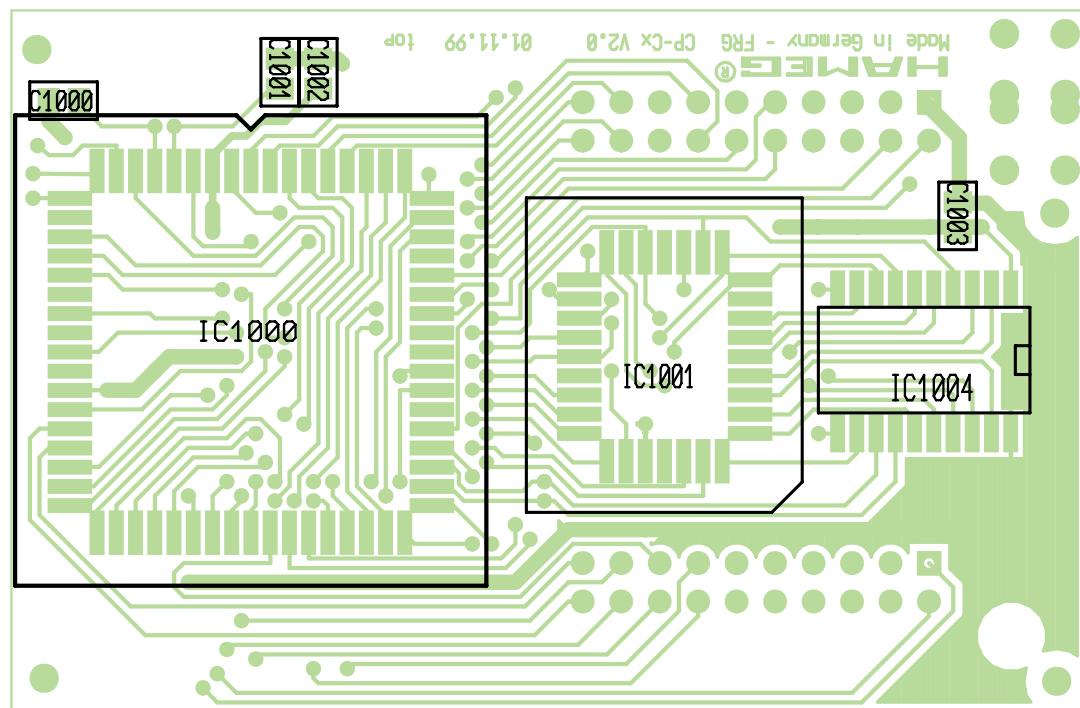
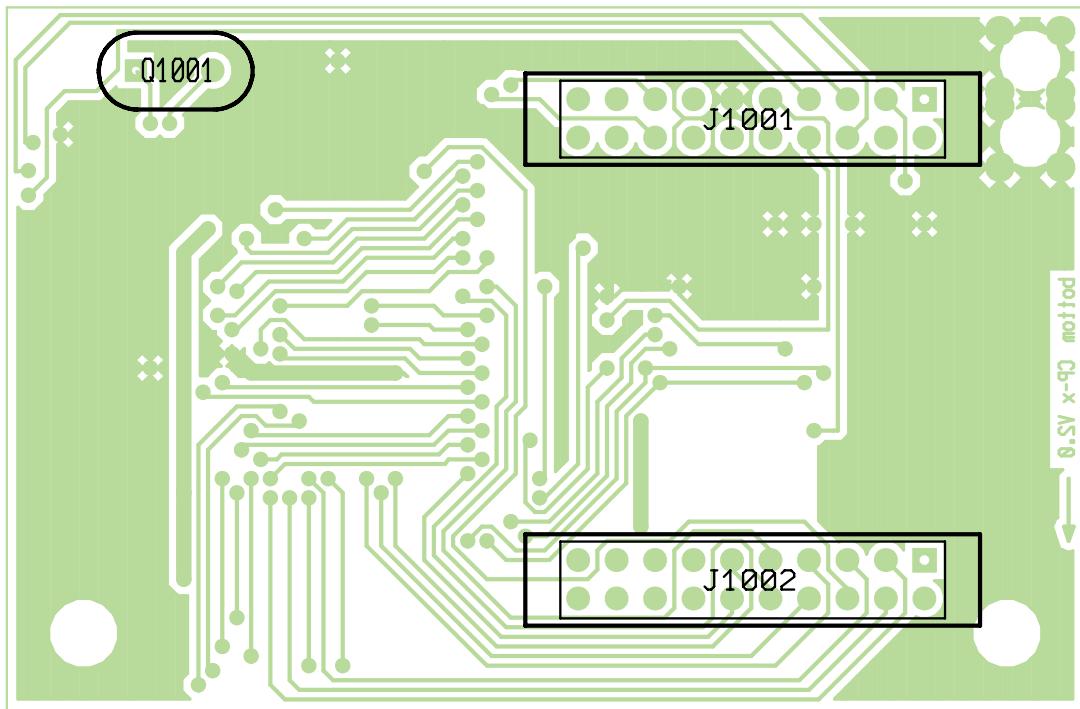
Title: CP-C00 V2.0

No:

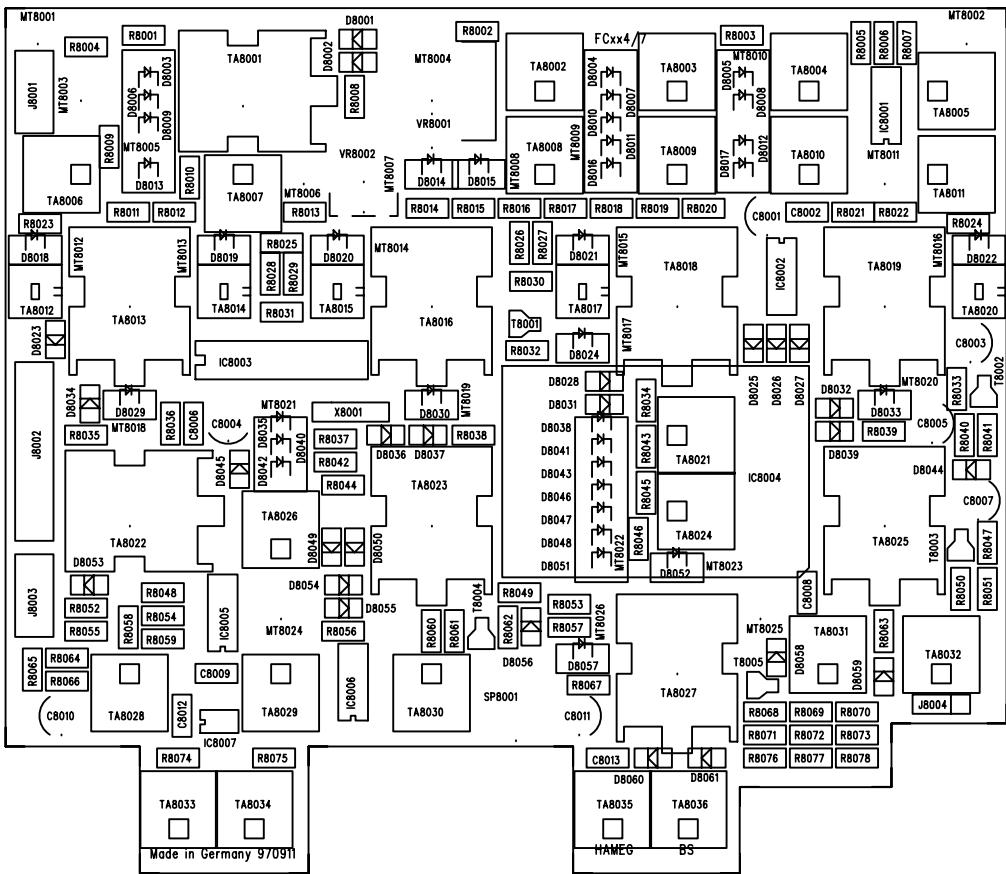
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Rev. Number:

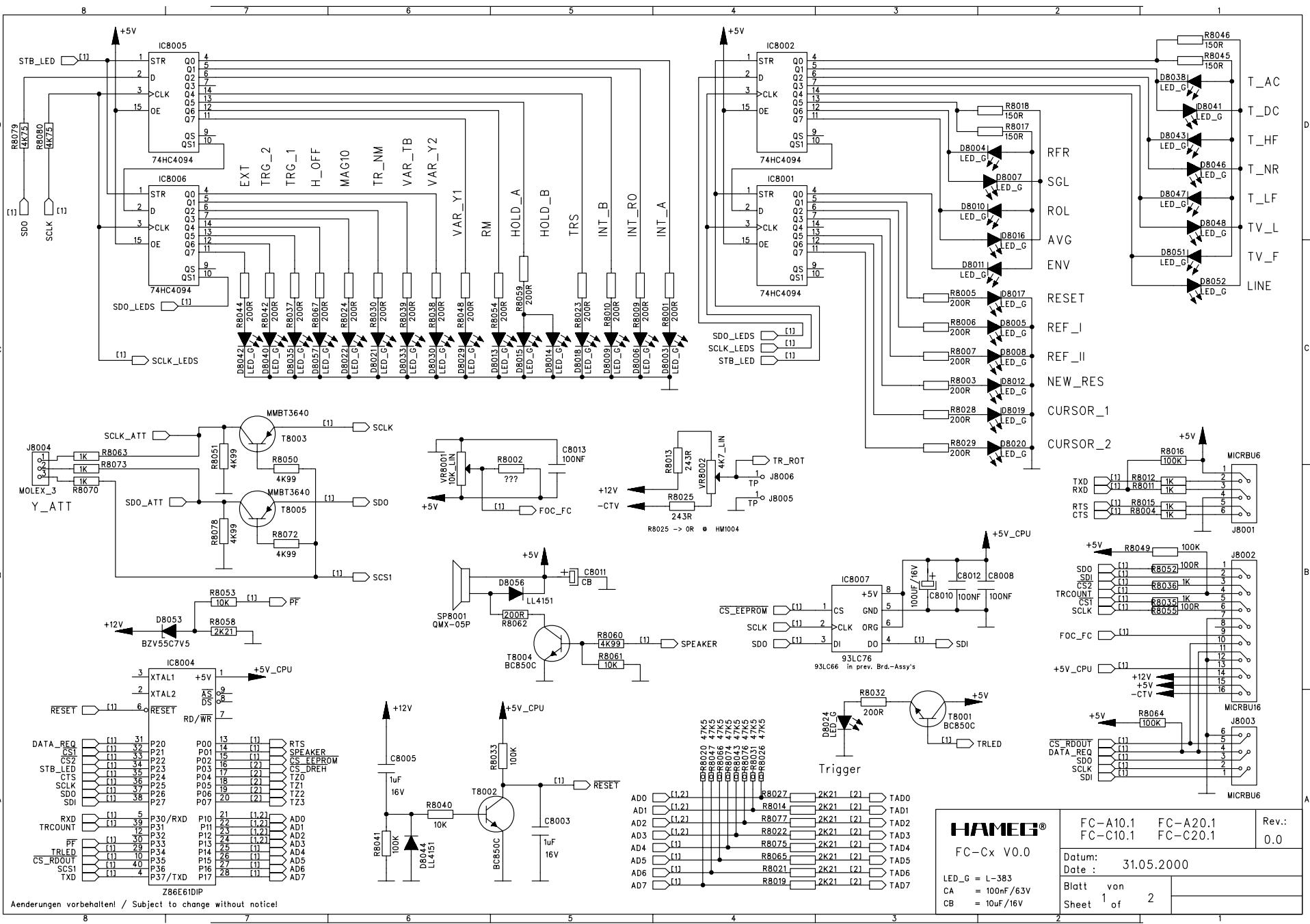
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FC - Board Diagramm

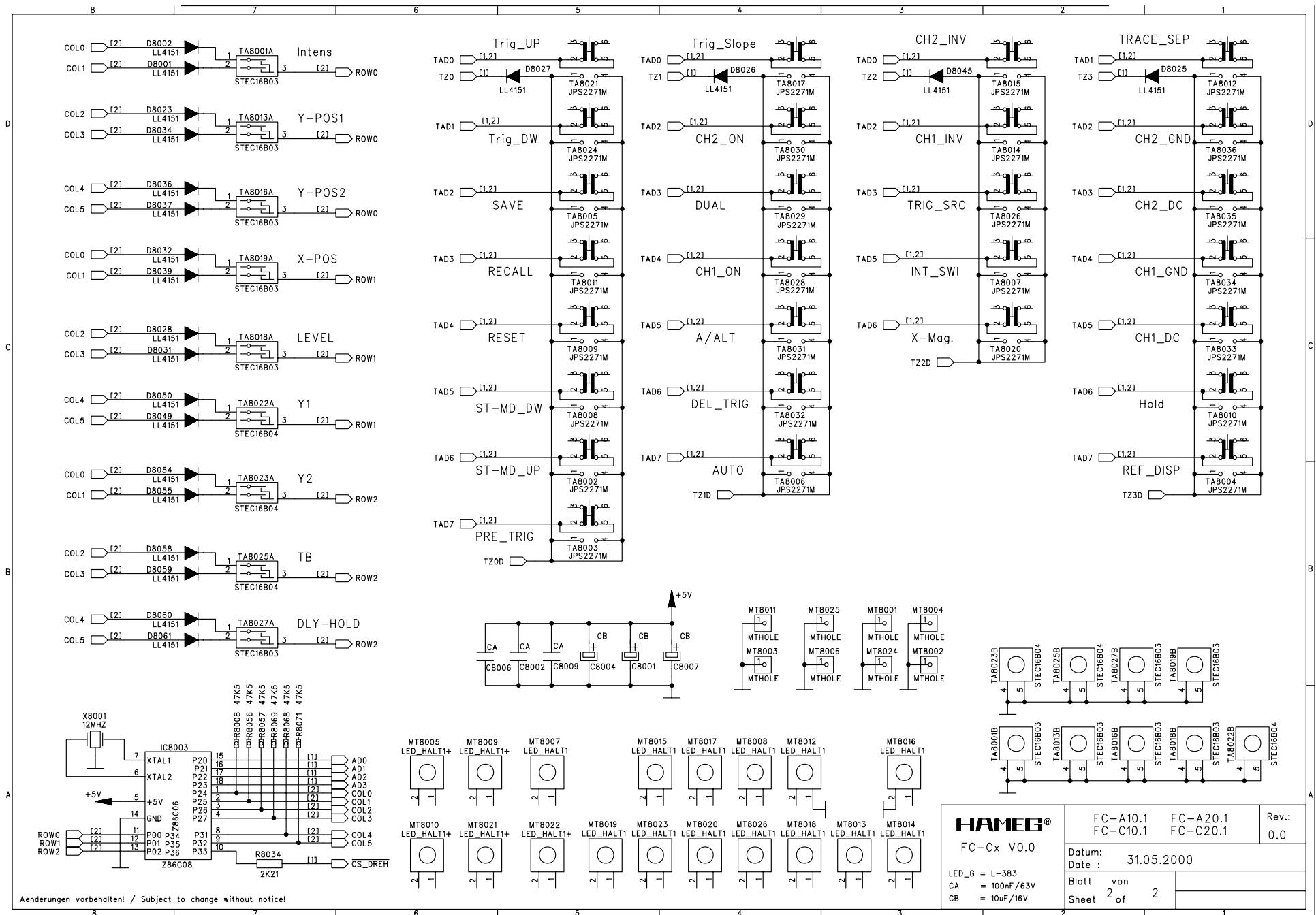


FC - Board Diagramm

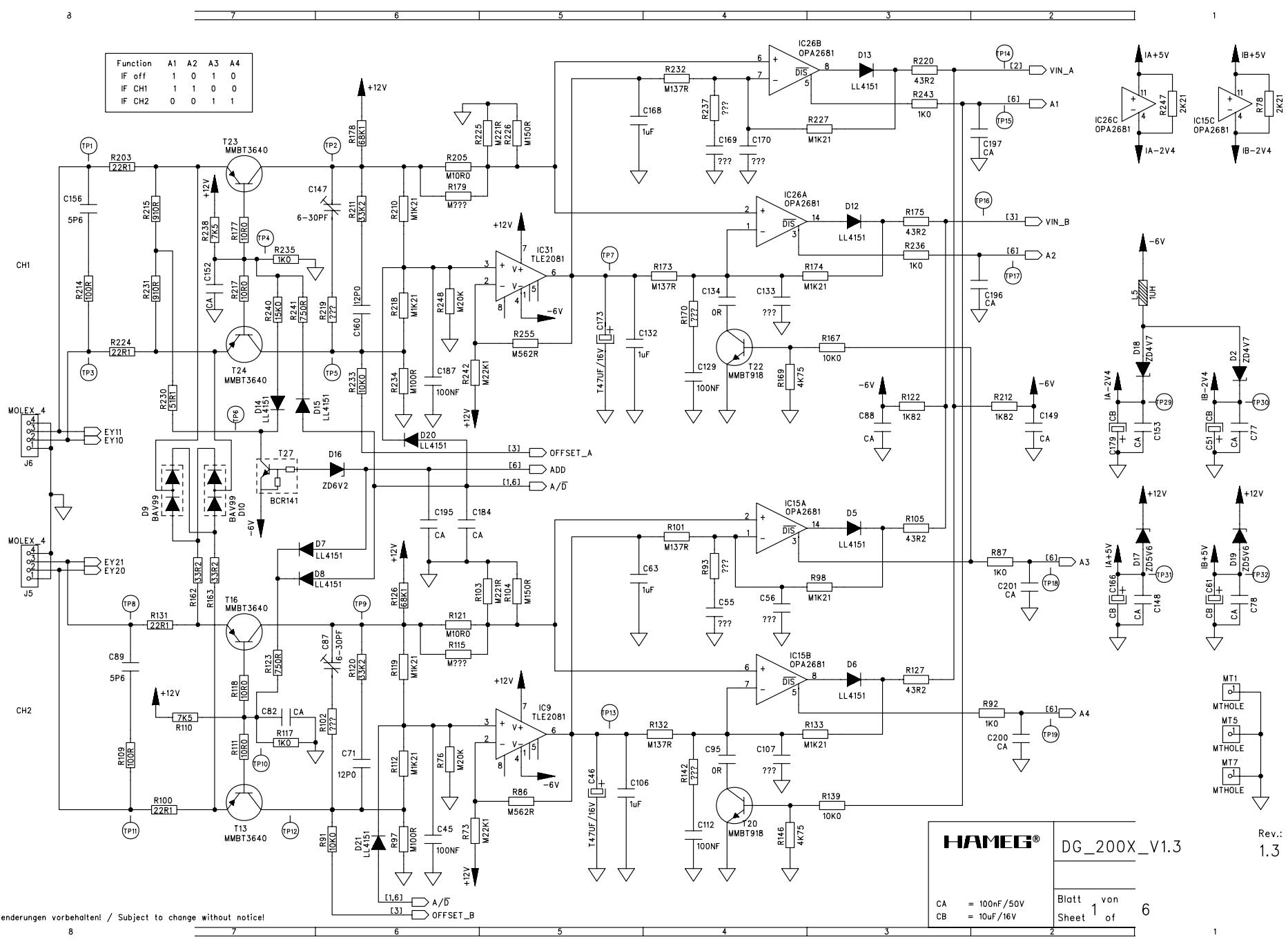


FC - Board Diagramm

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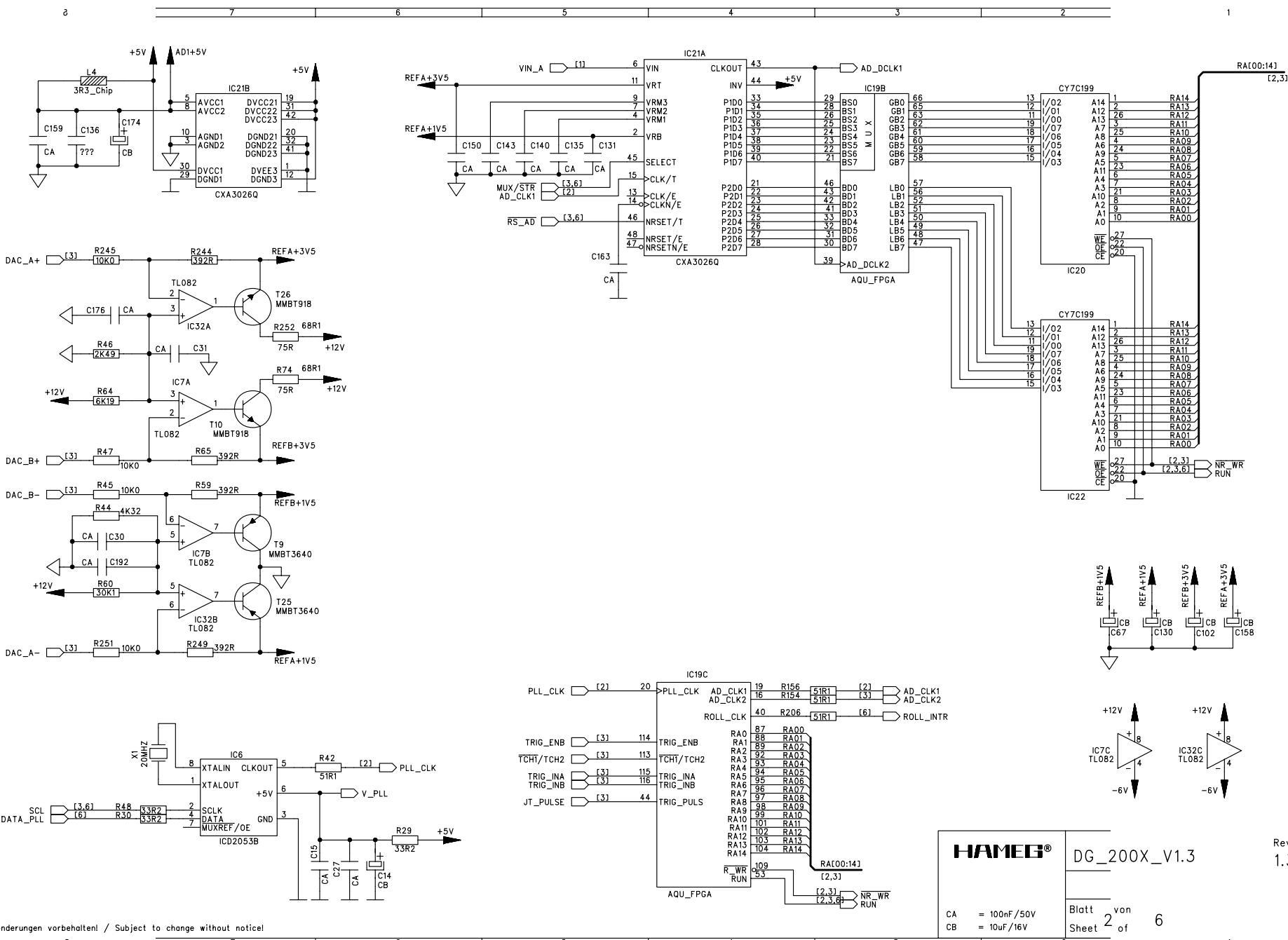


Digital - Board Diagramm



Digital - Board Diagramm

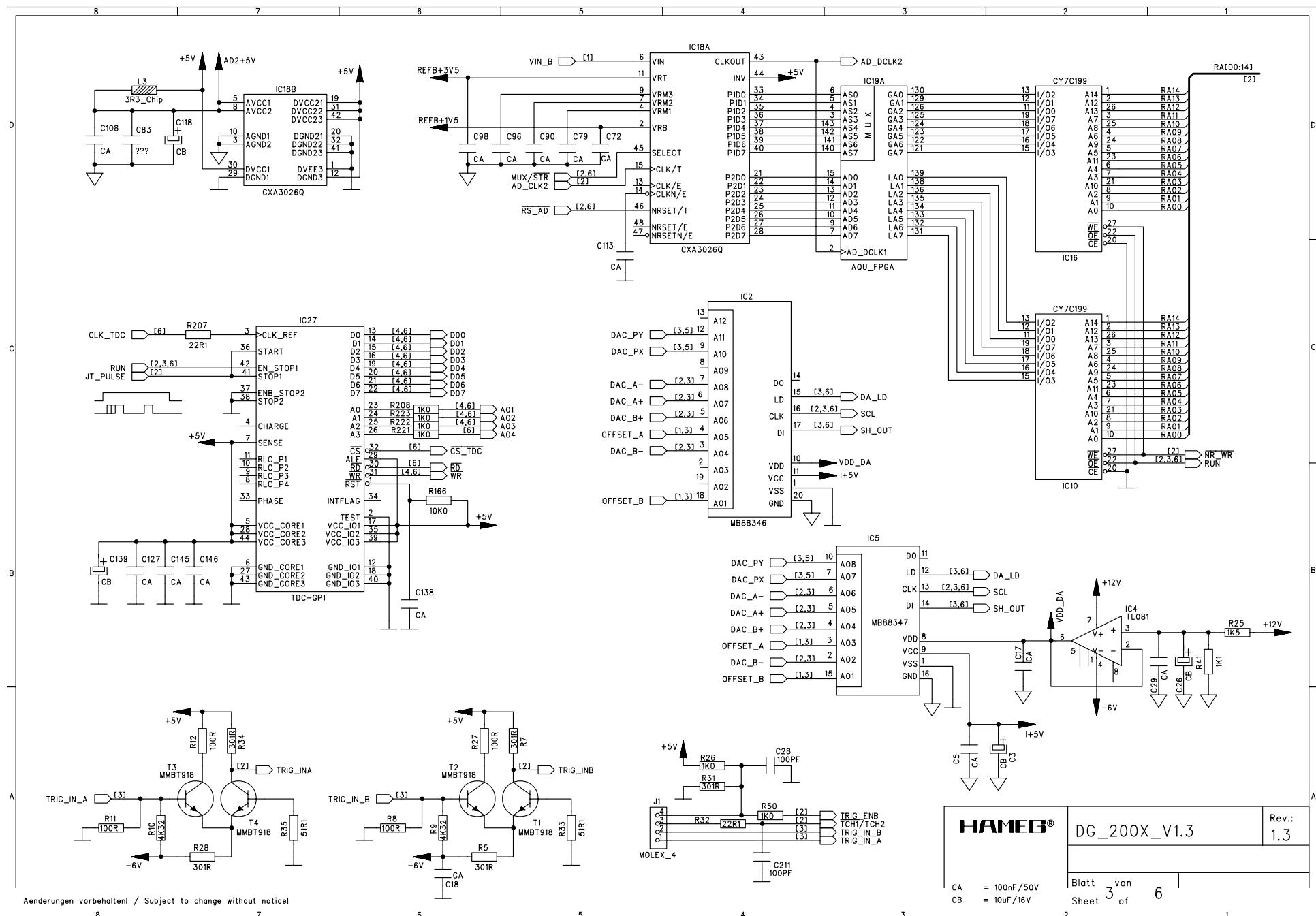
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Subject to change without notice

Aenderungen vorbehalten! / Subject to change without notice!

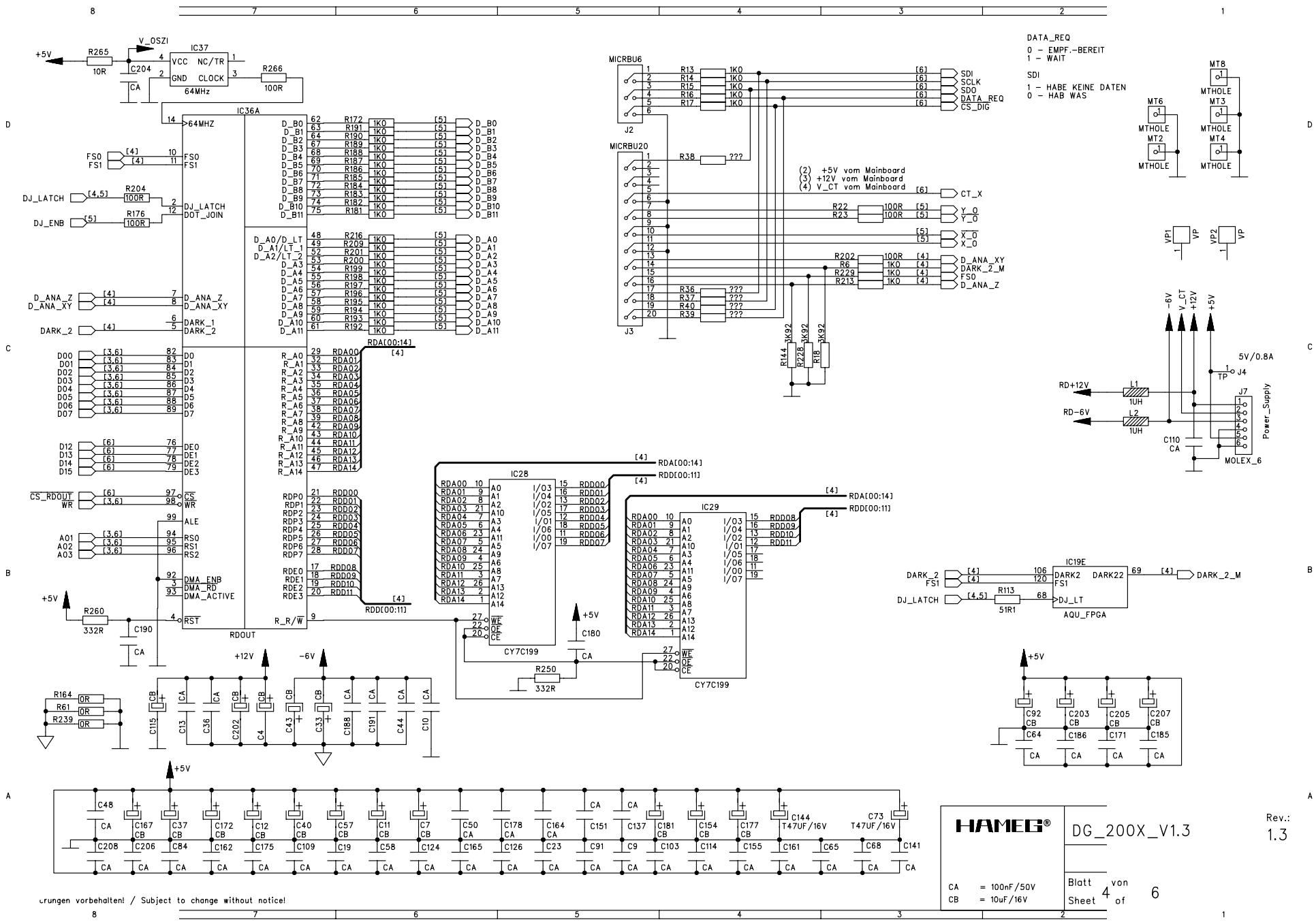
Digital - Board Diagramm

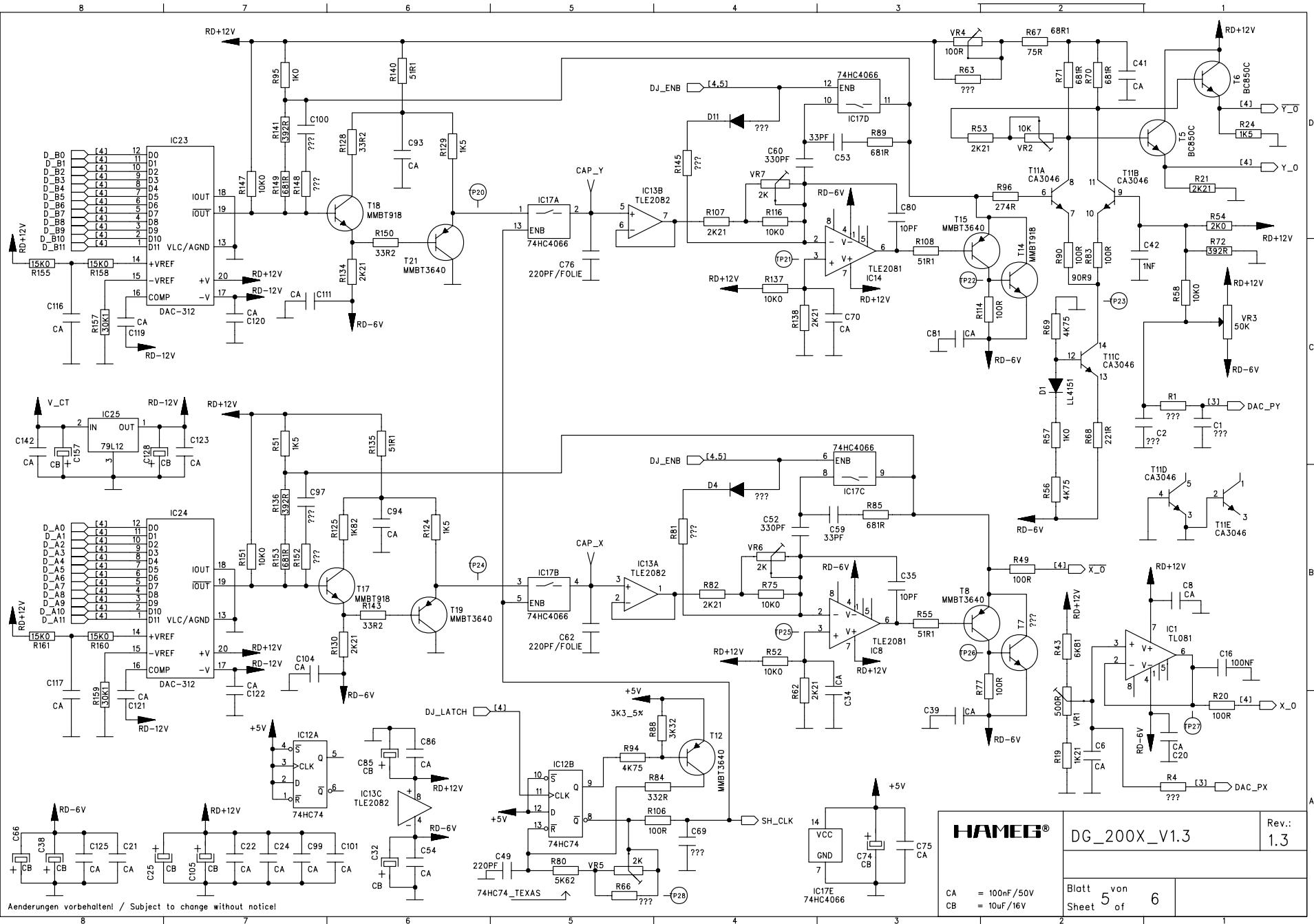


Digital - Board Diagramm

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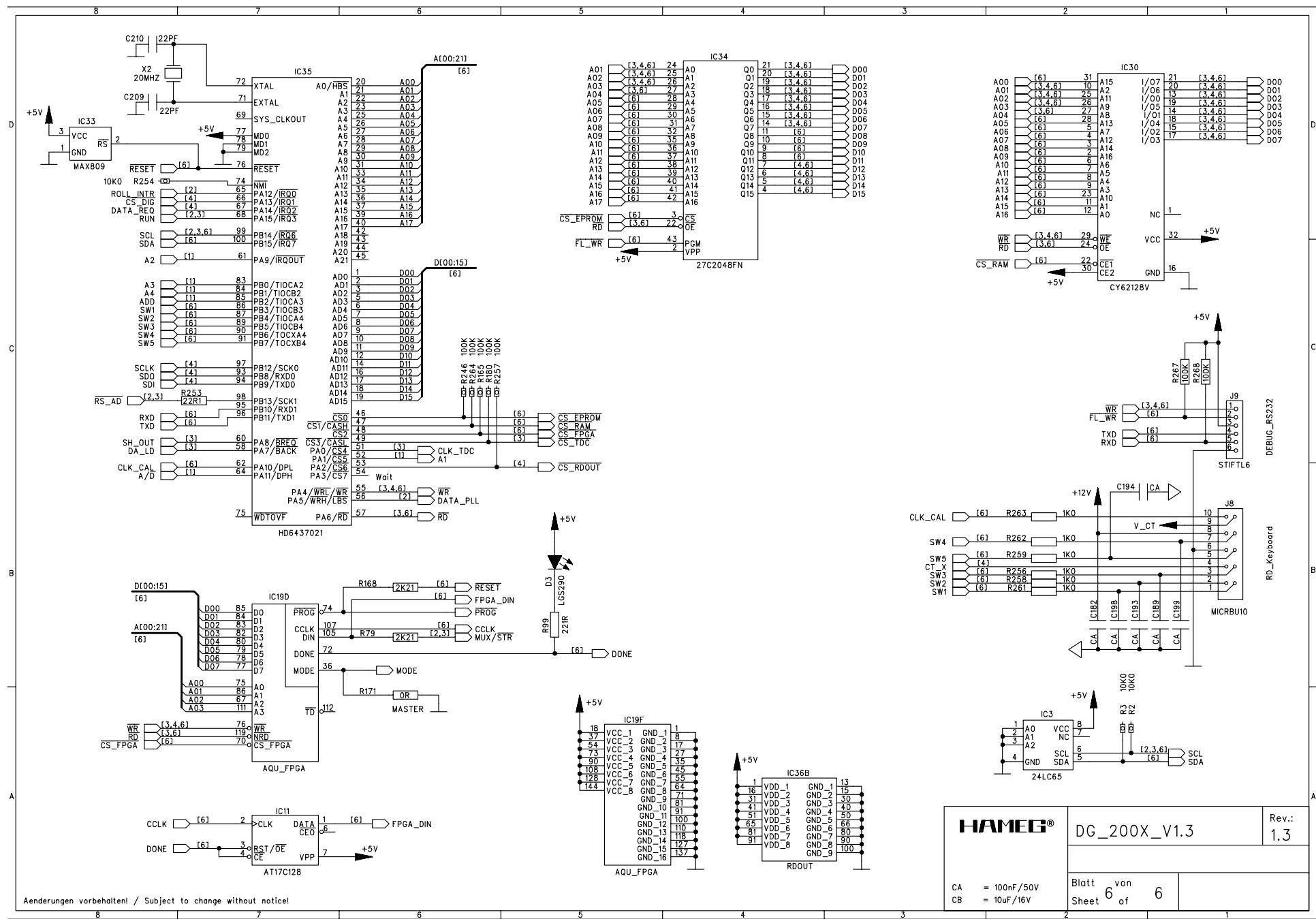
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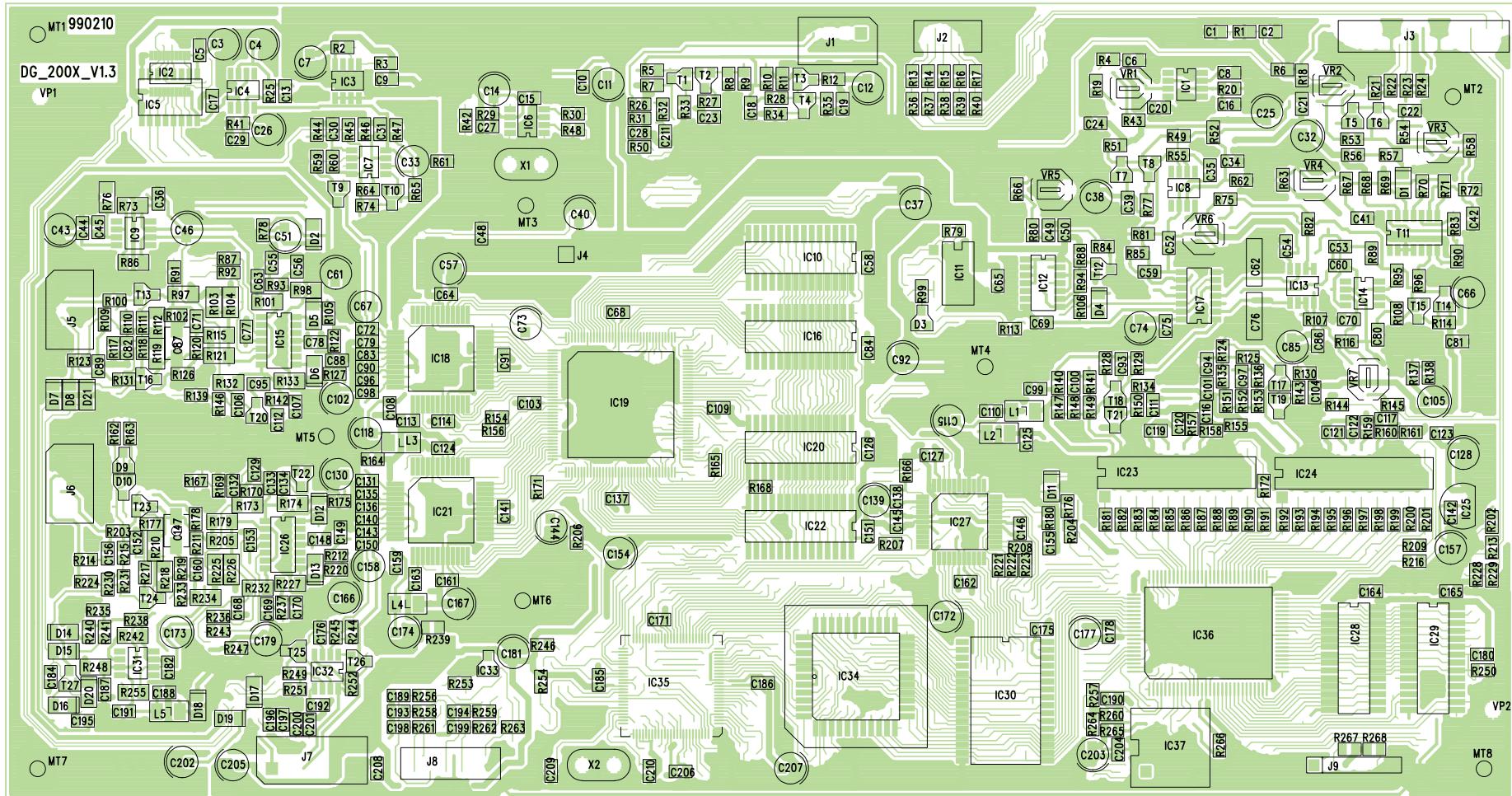


Digital - Board Diagramm

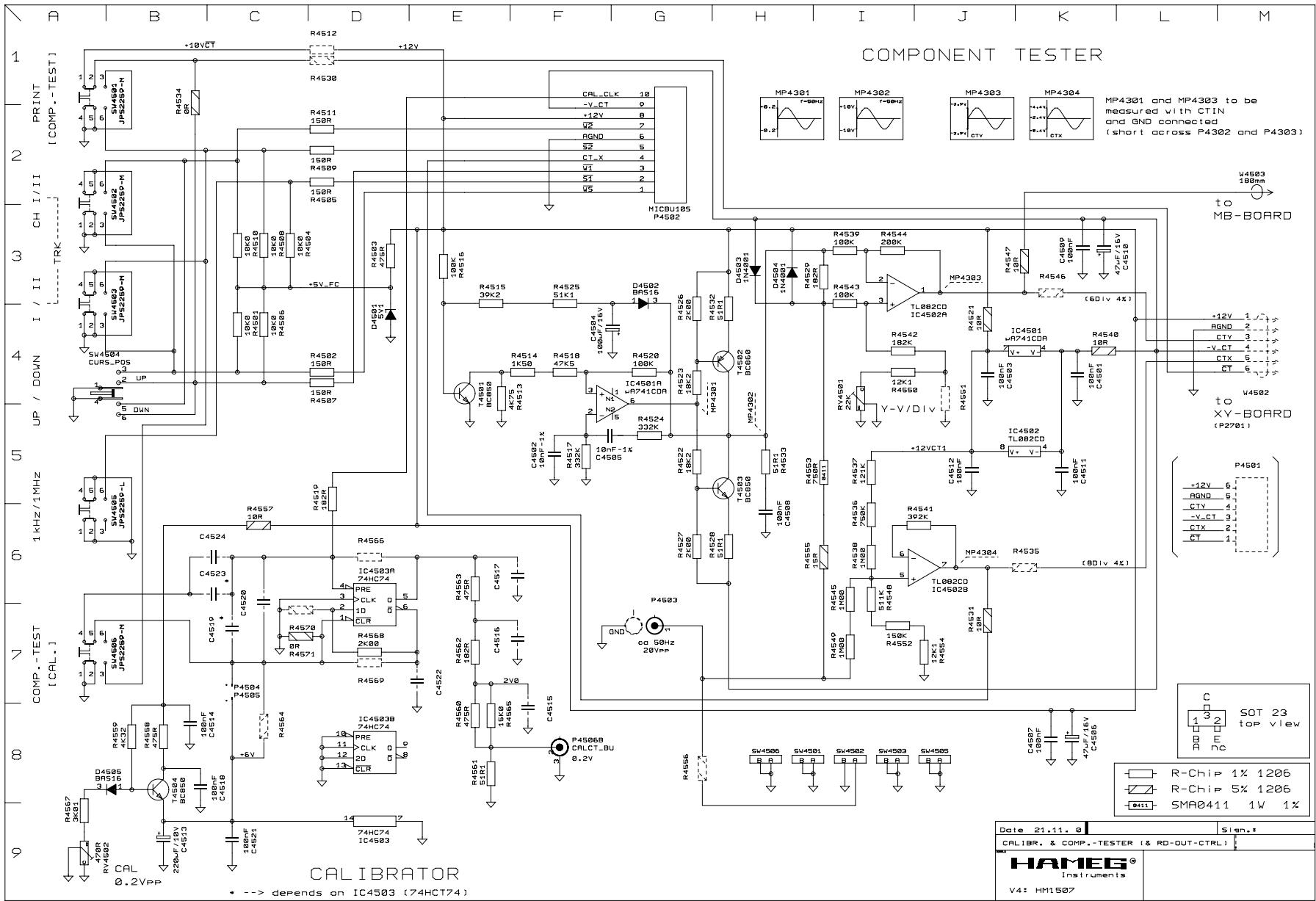
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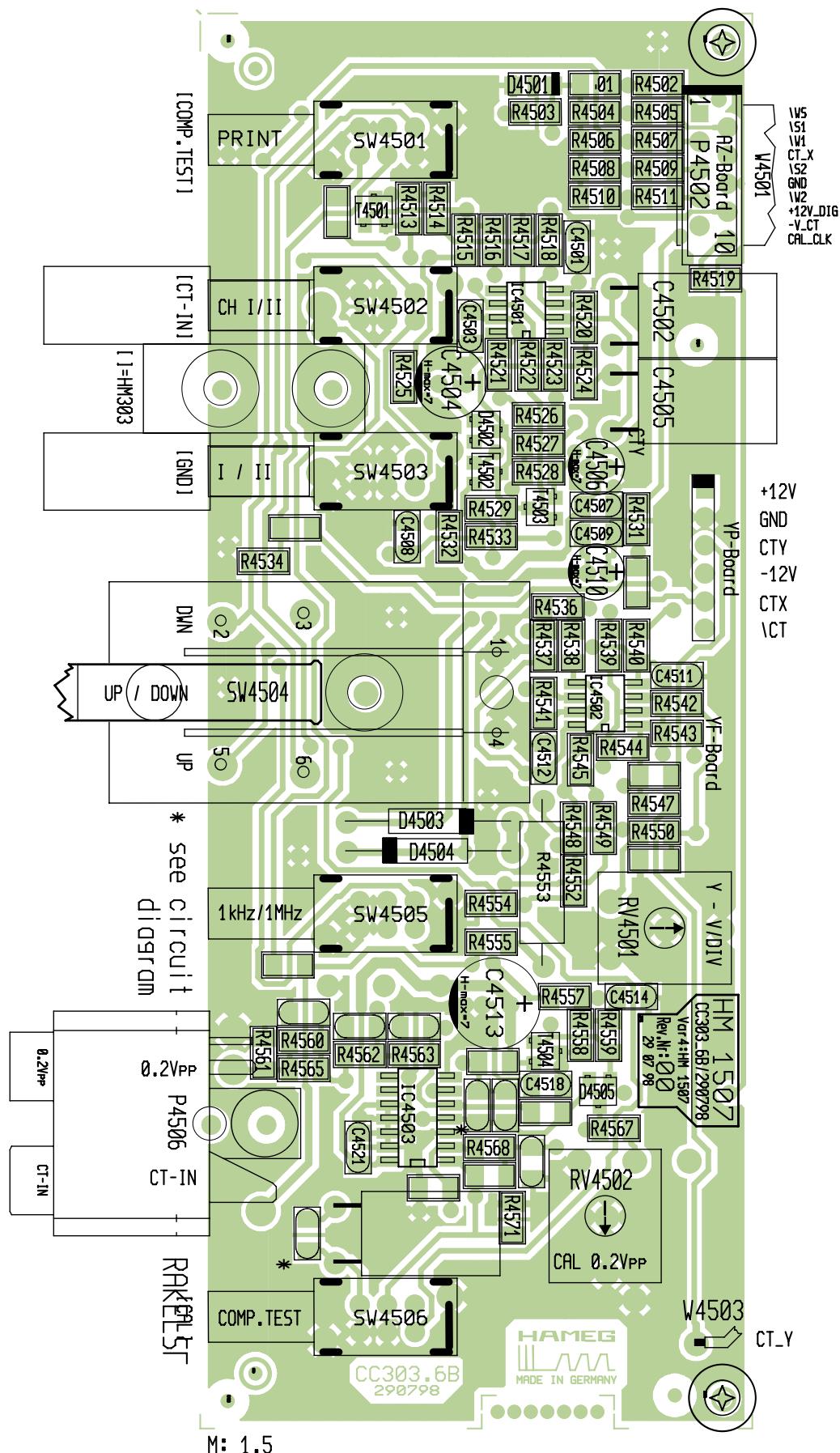


Digital - Board Board Top Side



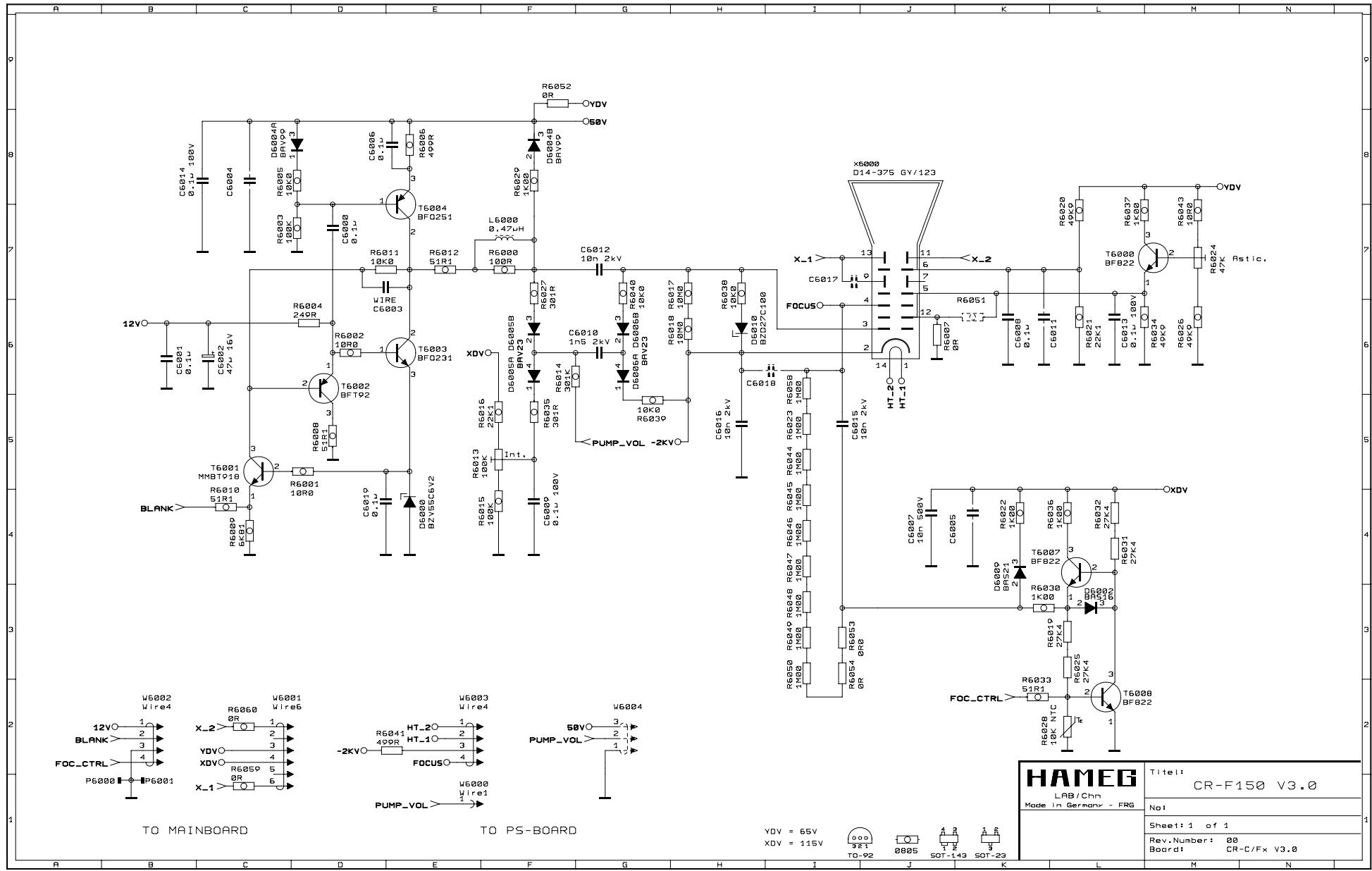
CT - Board Diagramm



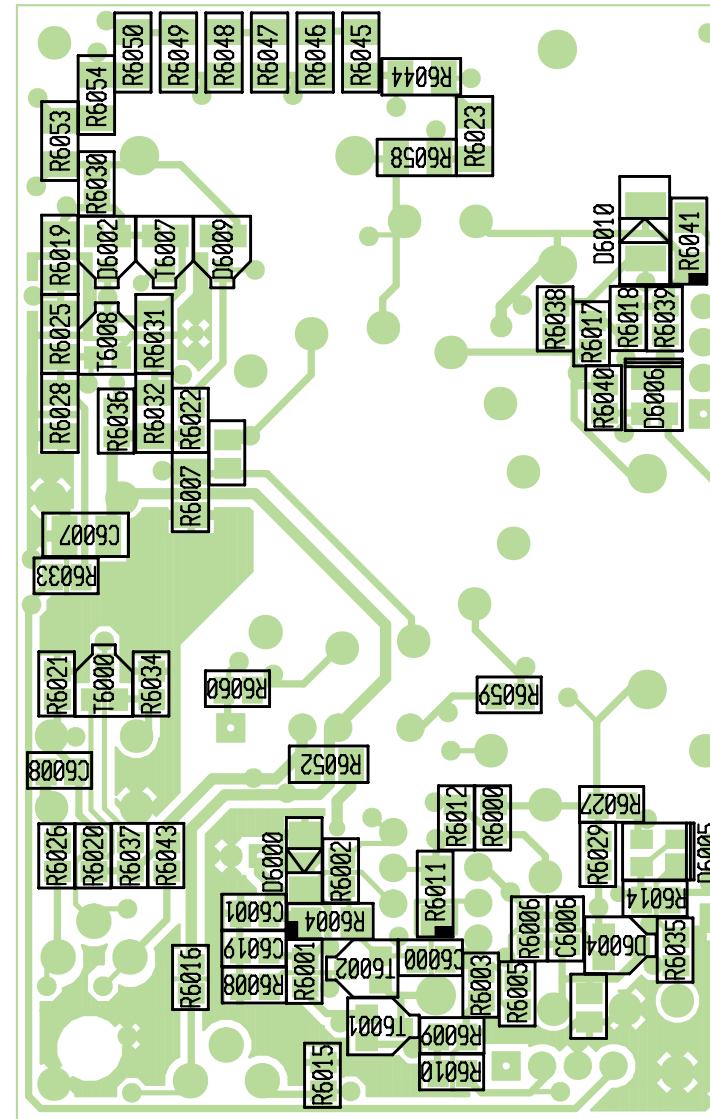


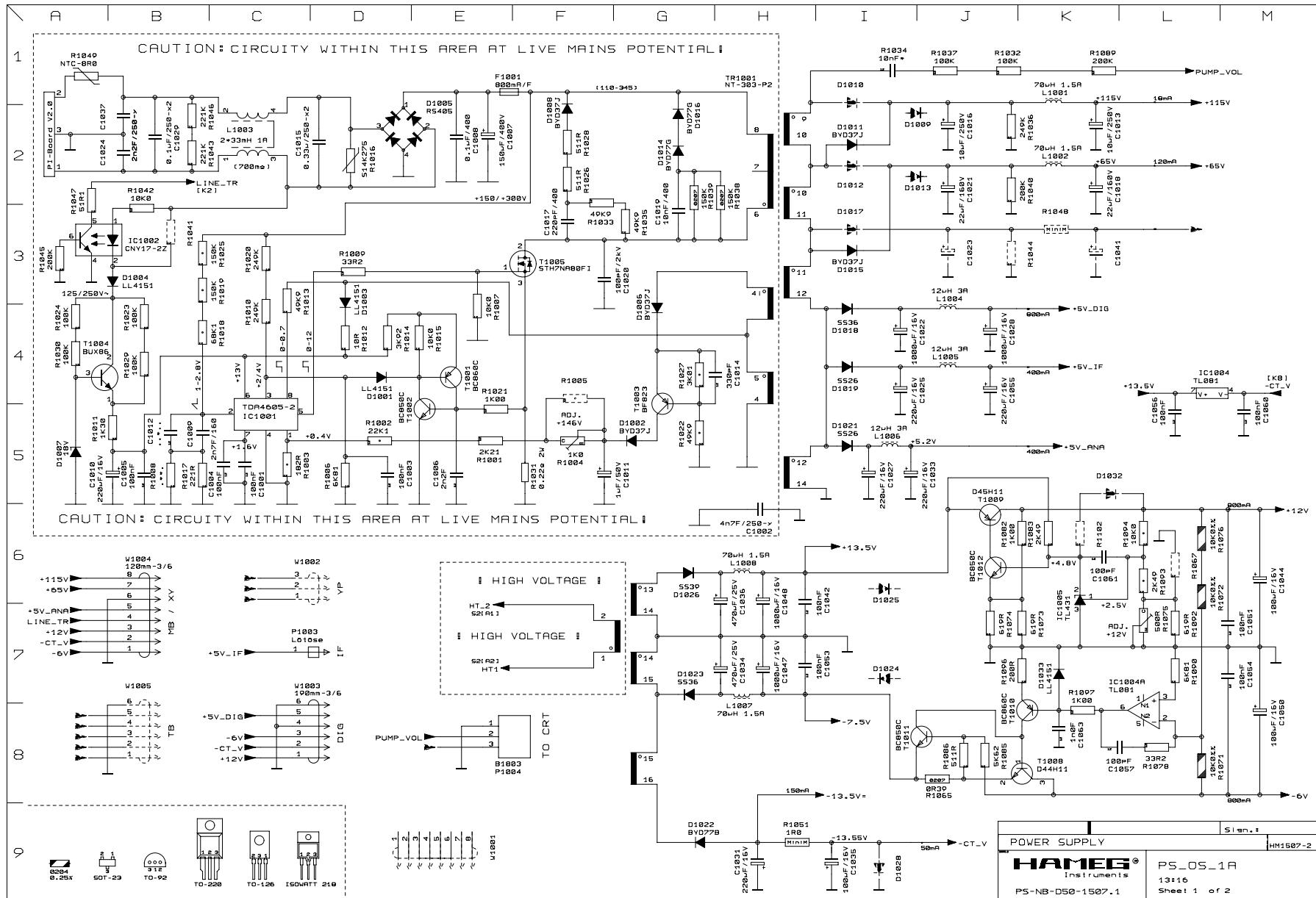
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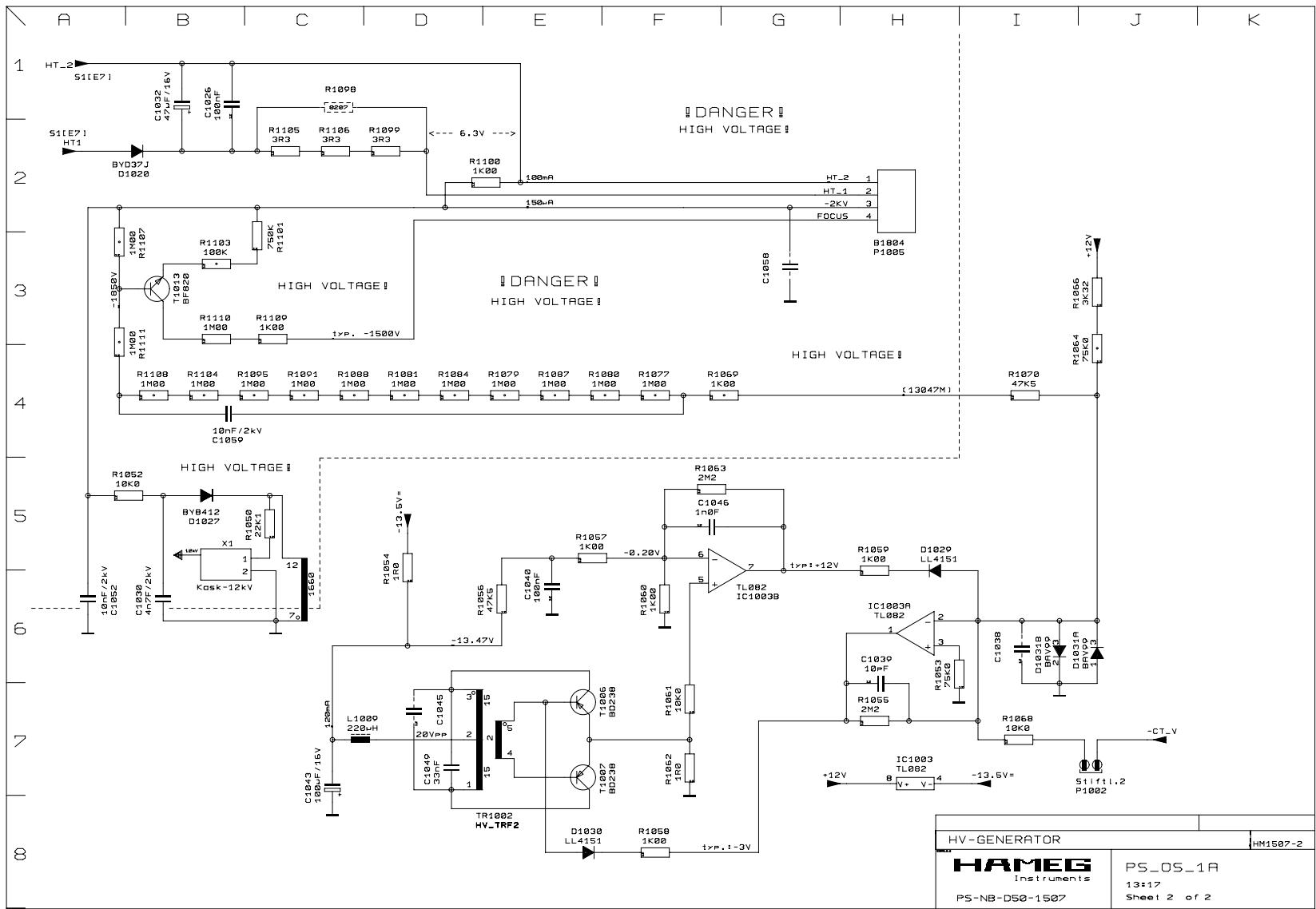
CRT - Board Diagramm



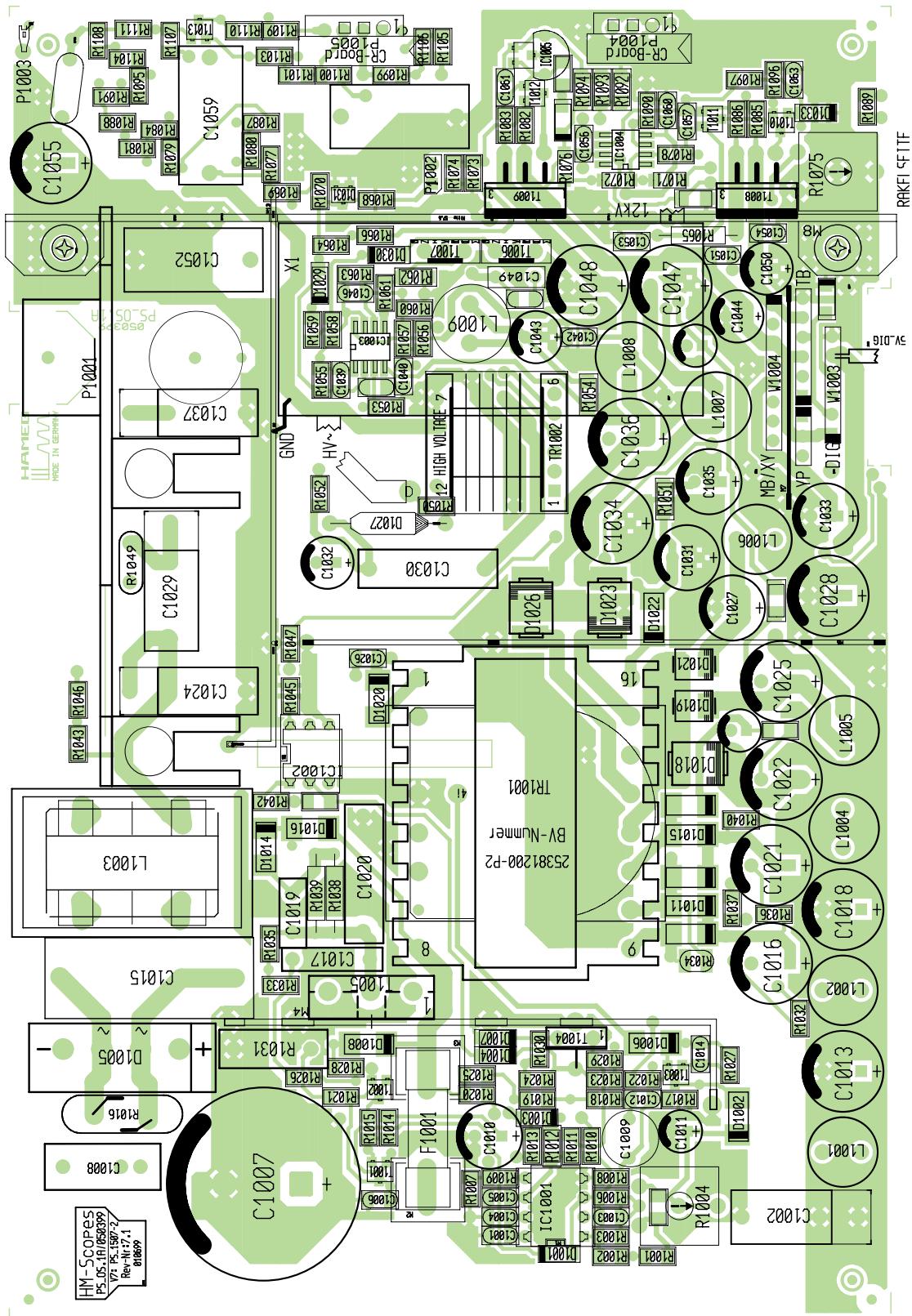
CRT - Board (Top and Bottom Side)

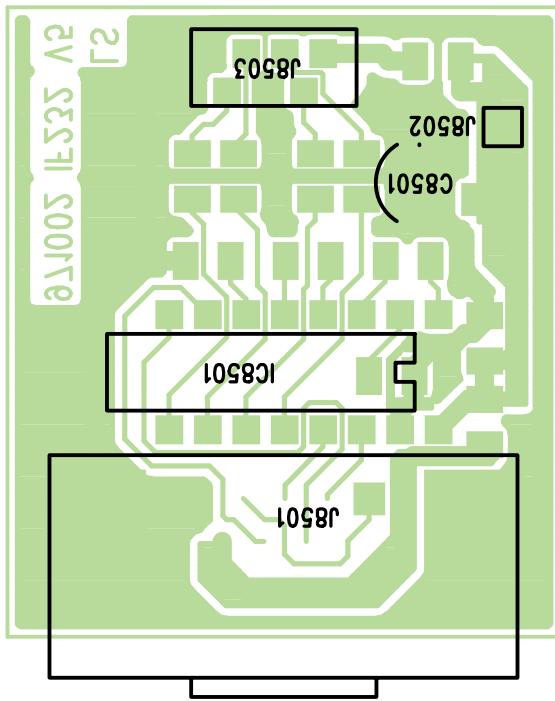
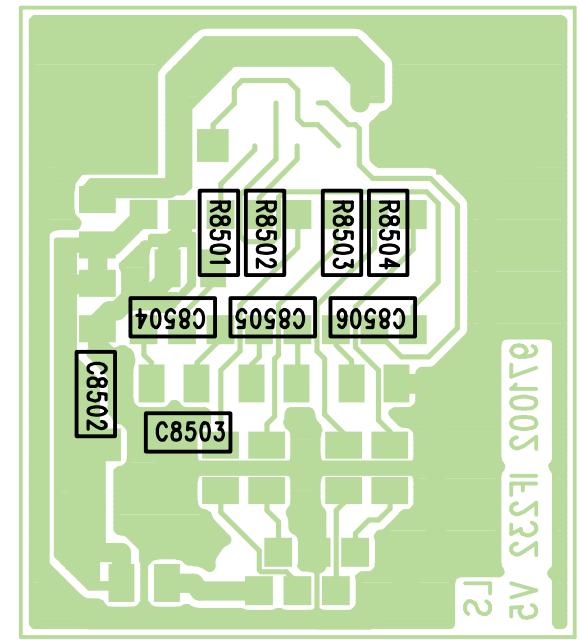


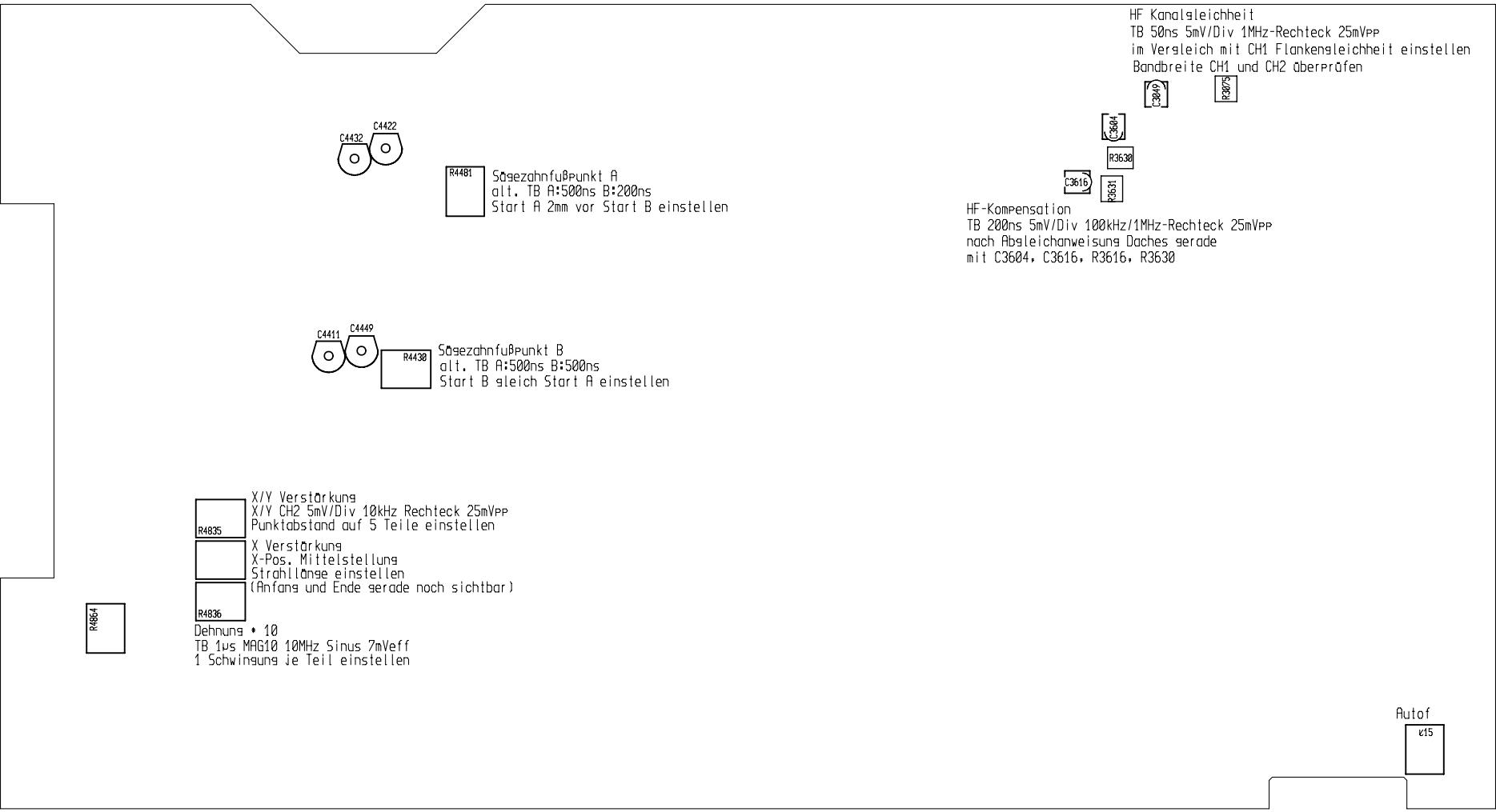




PS - Board Top Side









Oscilloscopes

Multimeters

Counters

Frequency Synthesizers

Generators

R- and LC-Meters

Spectrum Analyzers

Power Supplies

Curve Tracers

4S-1507-03E0

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