HAMEG Instruments

Oscilloscope HM1507-3

Service-Manual

CE

Hersteller / Manufacturer / Fabricant: HAMEG Instruments GmbH, Industriestraße 6, D-63533 Mainhausen

KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY
DECLARATION DE CONFORMITE

HAMEG Instruments

Die HAMEG Instruments GmbH bescheinigt die Konformität für das Produkt
The HAMEG Instruments GmbH herewith declares conformity of the product
HAMEG Instruments GmbH déclare la conformite du produit

Bezeichnung / Product name / Designation:
Oszilloskop
Oscilloscope
Oscilloscope

Typ / Type / Type: **HM1507-3**
mit / with / avec: **–**

Optionen / Options / Options: **–**

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 equipements basse tension 73/23/CEE amendée par 93/68/CEE

Angewendete harmonisierte Normen / Harmonized standards applied / Normes harmonisées utilisées:
Sicherheit / Safety / Sécurité: EN 61010-1:2001 (IEC 61010-1:2001)

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 / Imunitée: 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 flicker.

Datum /Date /Date
24. 02. 2005

Unterschrift / Signature / Signatur

Manuel Roth
Manager

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.

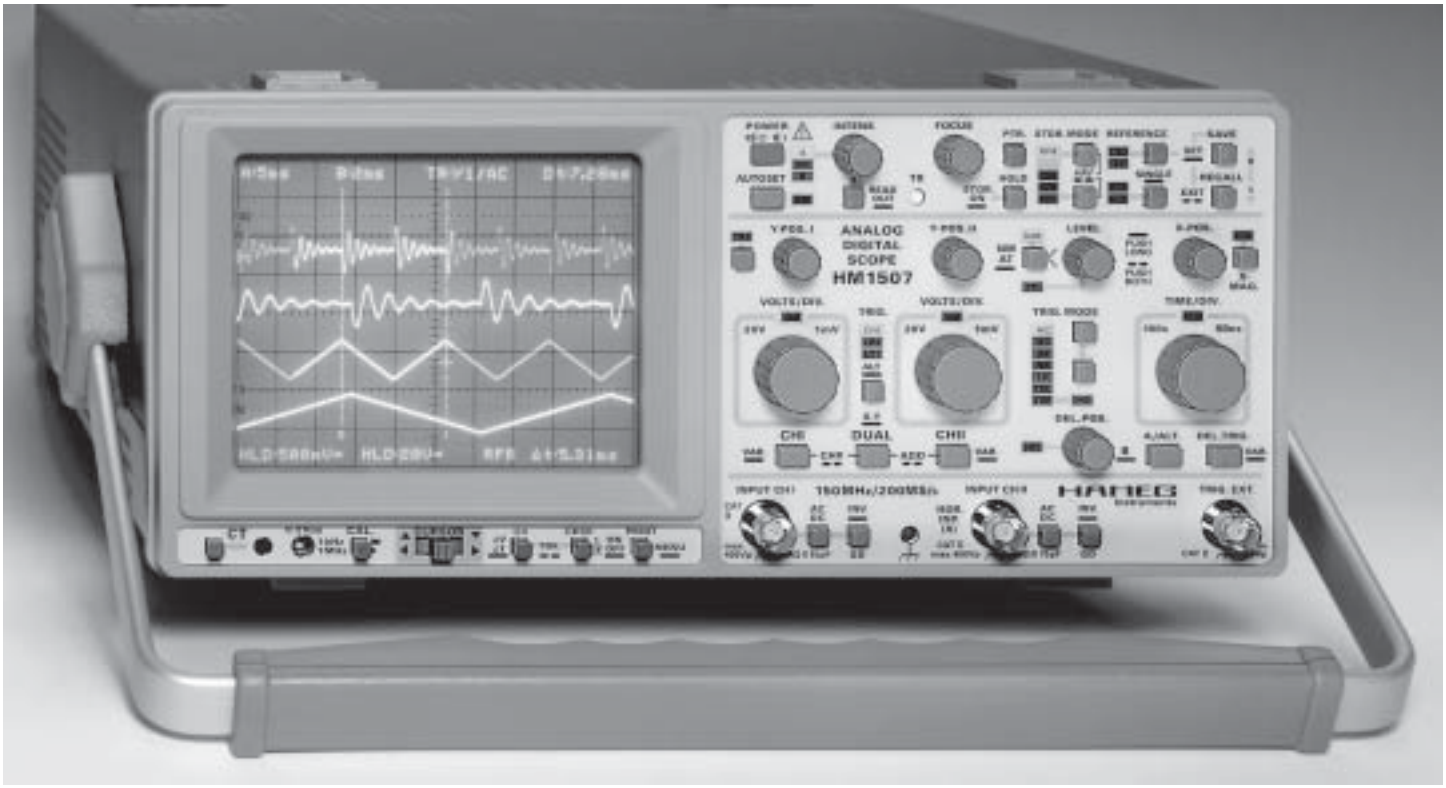
Although the interior of the oscilloscope is screened by the cabinet, direct radiation can occur via the CRT gap. As the bandwidth of each amplifier stage is higher than the total –3dB bandwidth of the oscilloscope, the influence RF fields of even higher frequencies may be noticeable.

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 Instruments GmbH

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



- **DC to 150MHz, Trigger: DC to 250MHz, 2 Channels: 1mV-20V**
- **5ns Peak Detector, Adjustment Menu, Calibrator 1kHz/1MHz**
- **Autoset, Save/Recall, Readout/Cursor, RS-232 Interface**
- **Real Time Sample Rate 200MSa/s, 11 Cursor Meas. Functions**

The HM1507-3 combines **digital storage** technology and **real time analog** signal analysis. High sample rates and peak detect facility minimize aliasing while capturing different waveforms. The excellent frequency response of the signal amplifiers and the stable triggering abilities from only **5mm** peak to peak on the screen, enable the scope to display sine waves far beyond its -3dB frequency without any problems (up to 250MHz).

The instrument contains a **second trigger** system to ensure stable triggering of even asynchronous signal components. With its **second time base**, the **HM1507-3** scope is capable of displaying a freely selectable expanded section in mixed mode.

When the Autoset function is enabled, **all** relevant **parameter settings** are performed by the scope's circuitry **automatically**. The Setup parameters and the measured values are clearly displayed on the screen in alpha numeric characters. Autoset also initiates automatic cursor settings for Time, Frequency and Voltage measurement.

A remarkable feature of the scope is the built in calibrator, a **1kHz/1MHz square wave generator**. It allows frequent checking of the instrument's frequency response, from the probe tip to the display on the screen. It also permits high frequency alignment of the probes. A **built in adjustment menu** allows closed case adjustment.

With all of the new **HAMEG** scope range, microprocessors manage the front panel inputs, calculations, and other control functions. In addition, **32 bit RISC processors** accelerate the digital signal processing.

Low noise **8 bit flash converters** are used to digitize the signals to be analyzed. The dot join function linearly connects successive points within display curves without gaps.

The scope digitizes and stores any signal with more than 2000 samples per sweep. The well proven **CRT** is ideal to reproduce signals with this high horizontal resolution.

200MSa/s allows a clear display of single shot (real time) events up to frequencies of 20MHz.

To display reduce variations of a signal over several samples it is recommended to use the envelope or the average mode. Pre/post trigger function enables the user to analyze signal components that occur before/after the trigger event.

Two full size **reference memories** allow the comparison of signals with those already stored in memory. The scope features a peak detect function in TB ranges from 100s/div to 5µs/div. It facilitates the capture of pulses (5ns) which normally would not be seen.

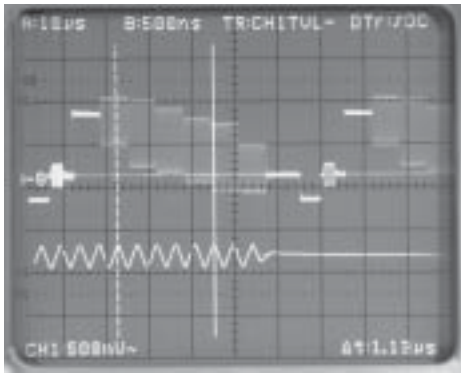
The instrument may be **remotely controlled** by any **PC** via its **built in serial RS-232 interface** in all relevant functions. A suitable software program is supplied with the scope on delivery.

Autoset performs all relevant parameter settings automatically for the best readout of the signal on the screen, even with input signals as small as 5mV. Any Autoset parameter can be changed manually to fit special needs. The set up parameters and the result of the selected measurement function are displayed on the screen.

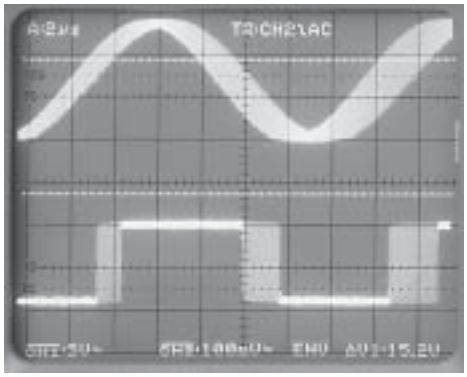
Another feature is the storage capability for **nine** complete parameter set ups, which may be stored and recalled simply by pressing the appropriate front panel key (SAVE/RECALL Mode). **Eleven** cursor measuring functions and two reference memories facilitate instrument settings.

The Software AS100E

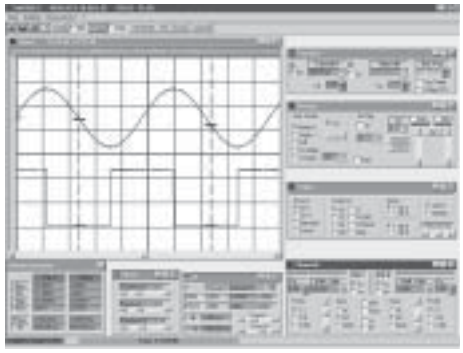
The **HAMEG** Oscilloscope PC software allows you to control the instrument functions and the transfer of signal data to a PC via the built in RS-232 interface. The software is compatible with **Windows® 9x, ME, NT4.0, 2000** and **XP**. Analysis and documentation on a PC in storage mode are easy tasks. The actual version can be downloaded under **www.hameg.com**. In addition FFT analysis software and Power Line Harmonics analysis soft-ware is available on request.



The screen photo shows a composite video signal with burst. The two time bases of the **HM1507-3** are operating in the mixed mode. Since the burst is asynchronous to other components of the **TV signal**, a second trigger circuit is required. It can display the **signal and** the **burst** concurrently in **two curves**.



When signals are displayed in the envelope mode, the influence of jitter effects, amplitude changes and aberrations can be demonstrated significantly. The scope builds the envelope curve by storing the minimum and maximum values over a number of consecutive sampling periods.



Specifications HM1507-3

Reference Temperature: 23°C ±2°C

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% (DC-150MHz -3dB)
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 – 150MHz)
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.
Hold off 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: linear
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: 2k x 8bit per channel
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 (control, signal data): **RS-232** interface
Option: **HO79-6** Multifunction Interface
HZ70 Opto-Interface
Output formats (HO79-6): PCL, Post Script HPGL, EPSON

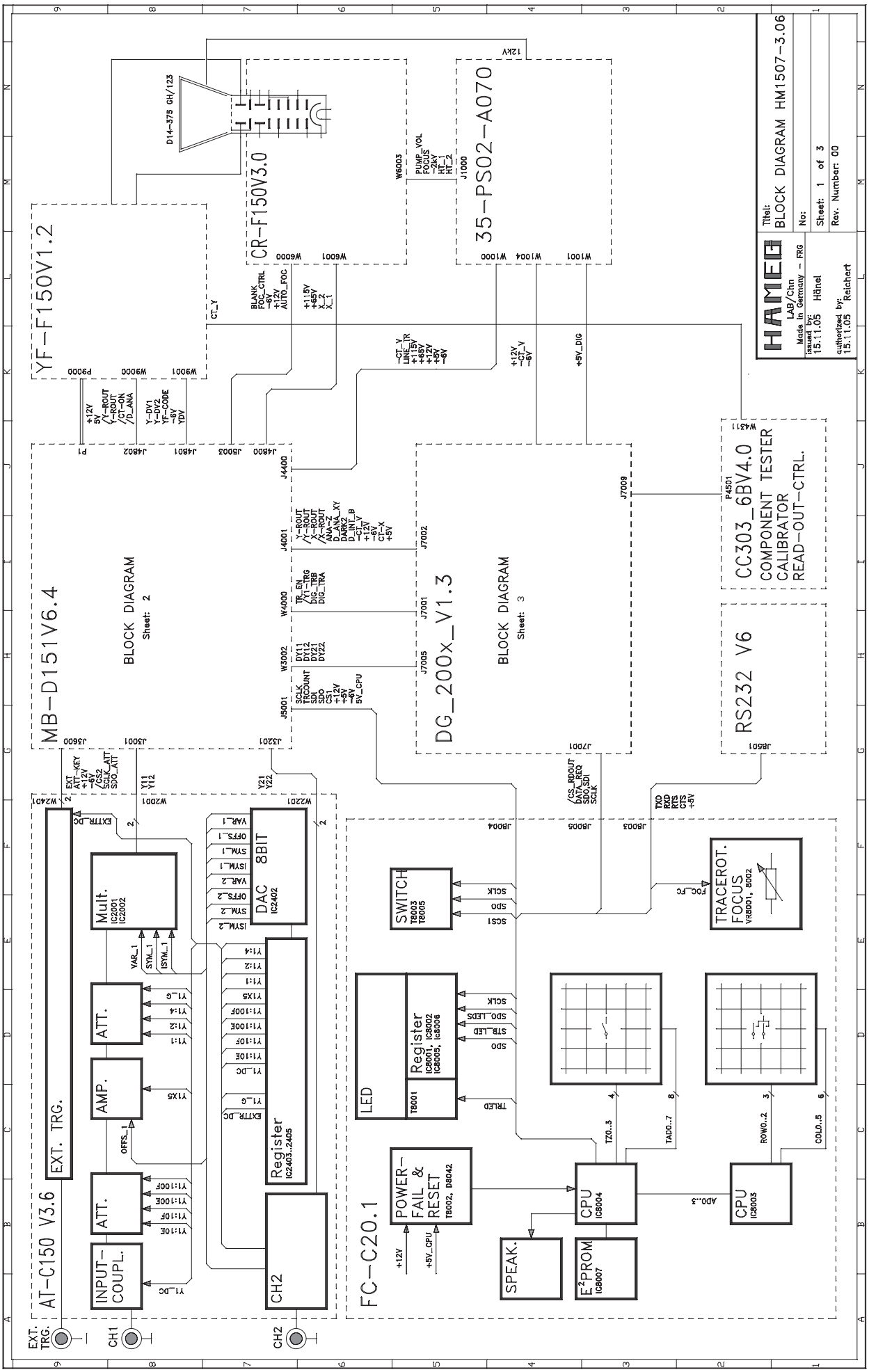
Component Tester

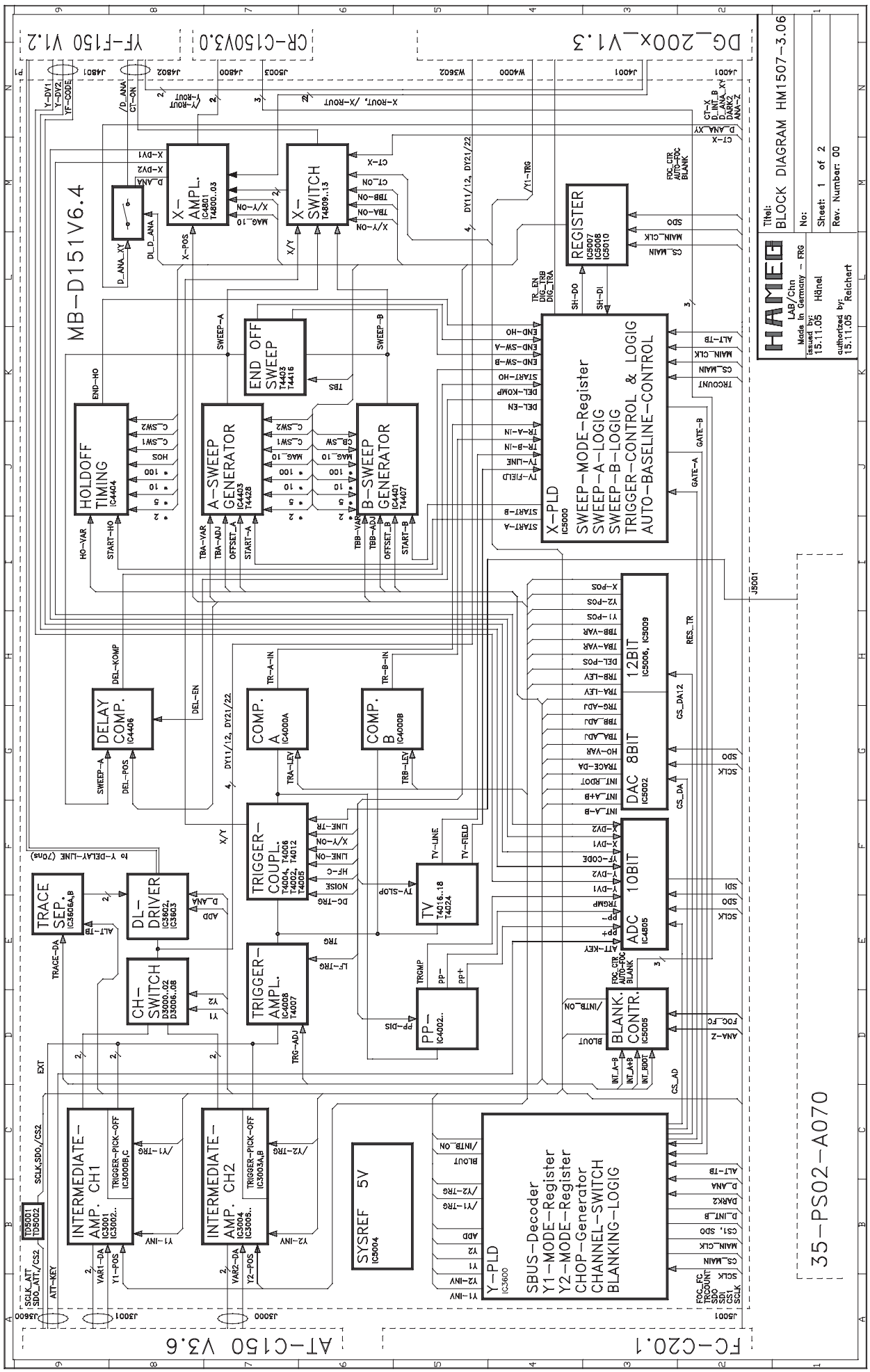
Test voltage: max. 7V_{rms} (o/c).
Test current: max. 7mA_{rms} (s/c)
Test frequency: approx.50Hz
One test lead is grounded (Safety Earth)

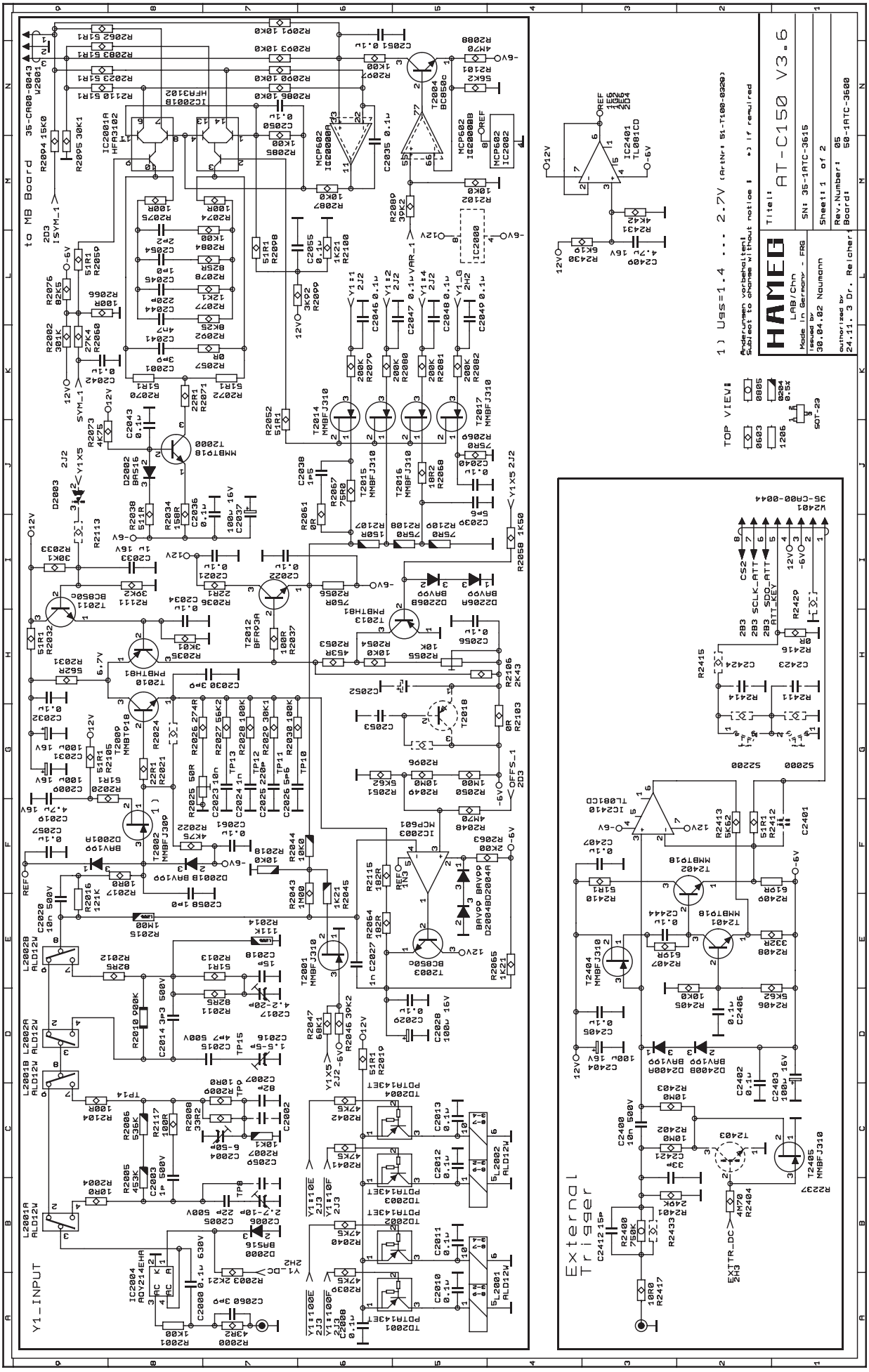
General Information

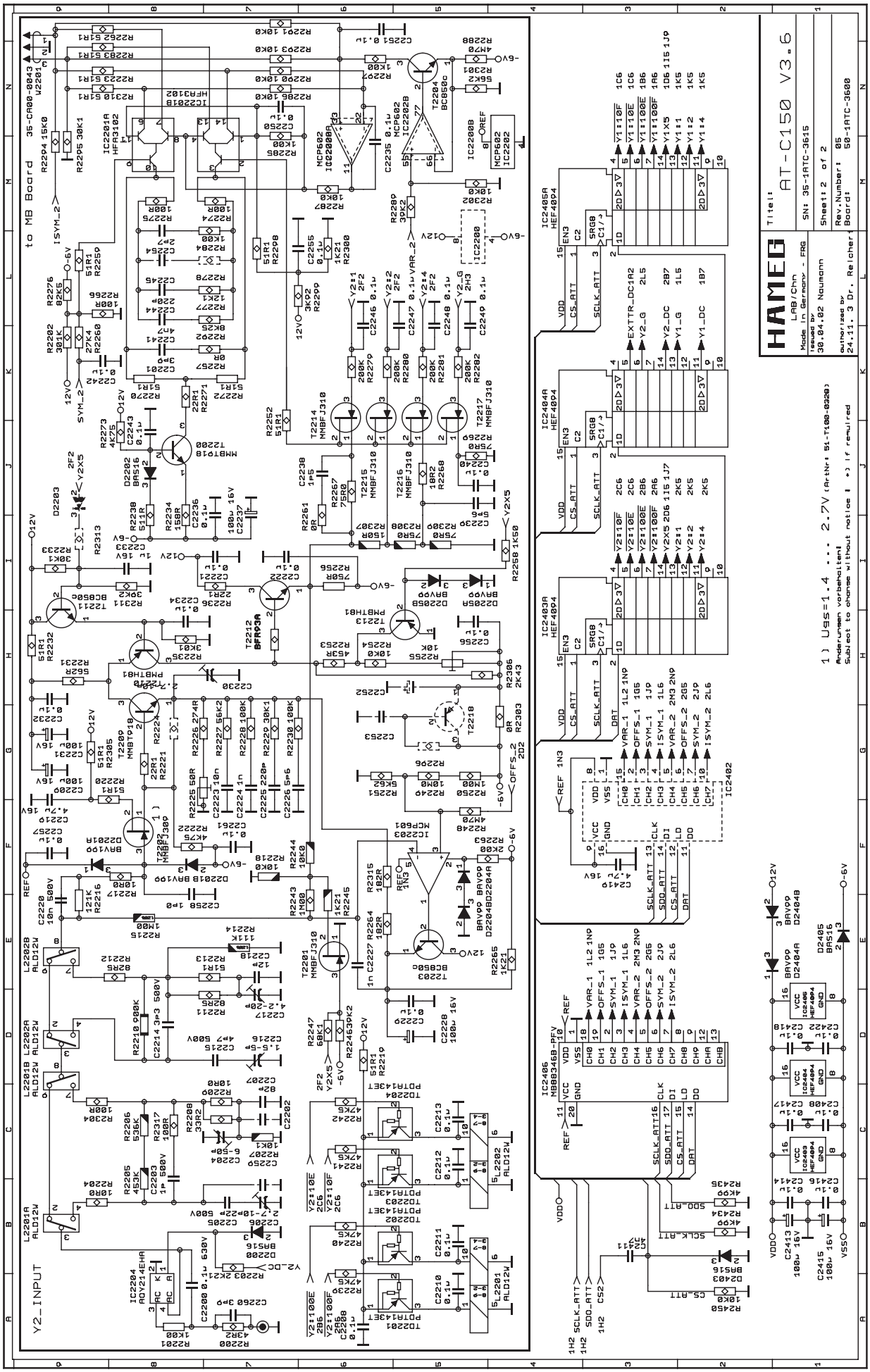
CRT: D14-375GH, 8x10cm internal graticule
Acceleration voltage: approx. 14kV
Trace rotation: adjustable on front panel
Calibrator: 0.2V ±1%, ≈ 1kHz/1MHz (tr <4ns)
Line voltage: 100-240V AC ±10%, 50/60Hz
Power consumption: approx. 47 Watt at 50Hz
Min./Max. ambient temperature: 0°C...+40°C
Protective system: Safety class I (IEC1010-1)
Weight: approx. 6.5 kg (12.4lbs)
Color: techno-brown
Cabinet: **W** 285, **H** 125, **D** 380 mm
Lockable tilt handle

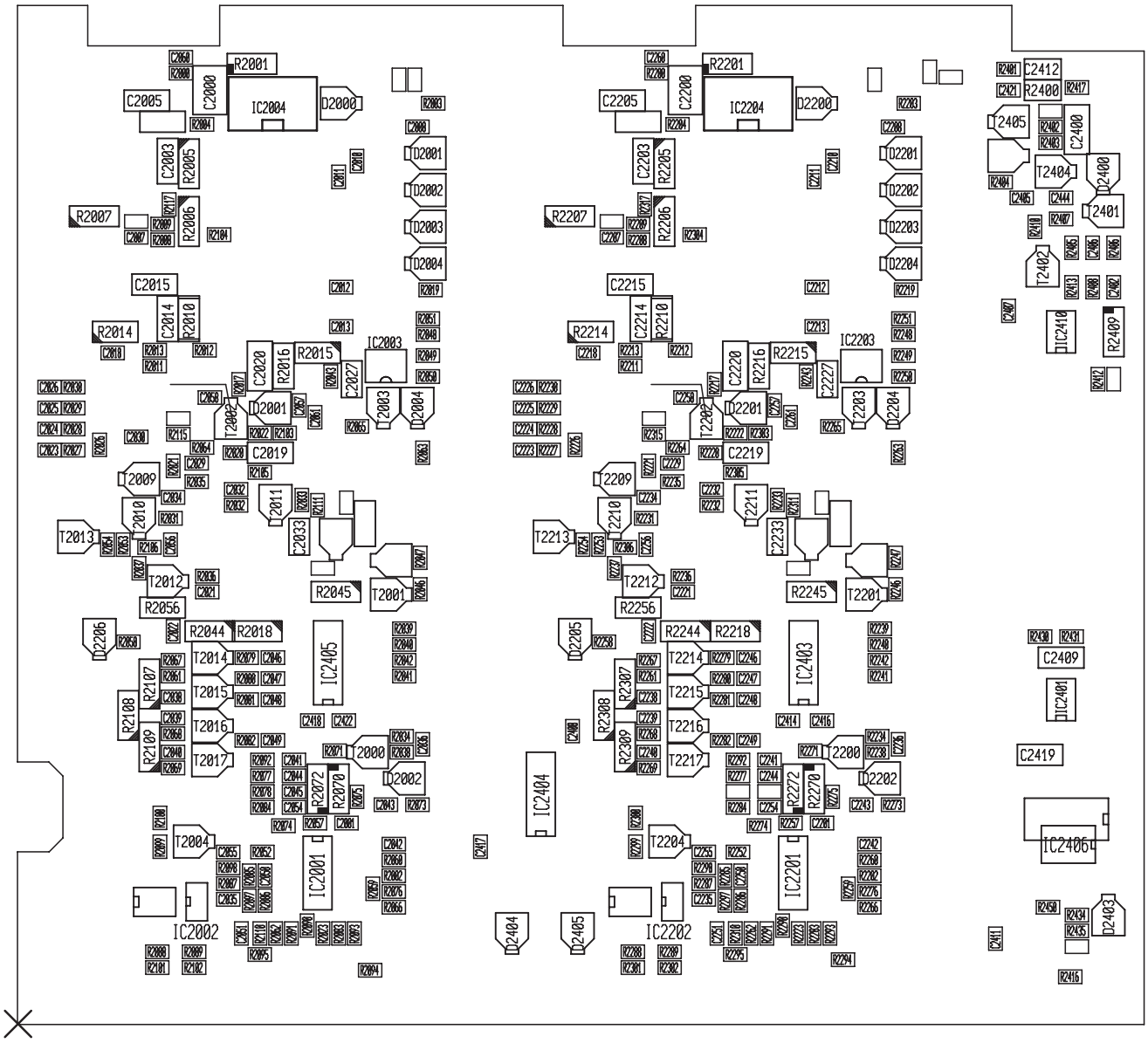
Accessories supplied: Operators Manual, Software on CDR, Line Cord, 2 Probes 10:1


HAMEG
Titel: BLOCK DIAGRAM HM1507-3.06
No:
Sheet: 1 of 3
Rev. Number: 00
Made in Germany - FRG
LAB/Chn
issued by: Hänel
15.11.05
authorized by: Reichert
YF-F150V1.2
CR-F150V3.0
35-PS02-A070
MB-D151V6.4
BLOCK DIAGRAM
Sheet: 2
DG_200x_V1.3
BLOCK DIAGRAM
Sheet: 3
CC303_6BV4.0
COMPONENT TESTER
CALIBRATOR
READ-OUT-CTRL.
RS232 V6
AT-C150 V3.6
EXT. TRG.
Mult.
IC2001
IC2002
ATT.
AMP.
ATT.
INPUT-
COUPL.
DAC 8BIT
IC2402
Register
IC2403..2405
CH2
FC-C20.1
SWITCH
T8003
T8005
LED
Register
IC8001, IC8002
IC8005, IC8006
T8001
POWER-
FAIL &
RESET
T8002, D8042
CPU
IC8004
CPU
IC8003
SPEAK.
E²PROM
IC8007
TRACEROT.
FOCUS
VR8001, R002
EXT.
TRG.
CH1
CH2


MB-D151V6.4
DG_200x_V1.3
CR-C150V3.0
YF-F150 V1.2
AT-C150 V3.6
FC-C20.1
35-PS02-A070
HAMEG
Title: BLOCK DIAGRAM HM1507-3.06
Sheet: 1 of 2
Rev. Number: 00
X-PLD IC5000 SWEEP-MODE-Register SWEEP-A-LOGIG SWEEP-B-LOGIG TRIGGER-CONTROL & LOGIG AUTO-BASELINE-CONTROL
Y-PLD IC3600 SBUS-Decoder Y1-MODE-Register Y2-MODE-Register CHOP-Generator CHANNEL-SWITCH BLANKING-LOGIG
REGISTER IC5007 IC5008 IC5010
X-AMPL. IC4801 T4800..03
X-SWITCH T4809..13
HOLDOFF TIMING IC4404
A-SWEEP GENERATOR IC4403 T4428
B-SWEEP GENERATOR IC4401 T4407
END OFF SWEEP T4403 T4416
DELAY COMP. IC4406
COMP. A IC4000A
COMP. B IC4000B
TRIGGER-COUPL. T4004, T4006 T4012 T4005
TRIGGER-AMPL. IC4008 T4007
TV T4016..18 T4024
PP- IC4002..
DAC 8BIT IC5002
12BIT IC5006, IC5009
ADC 10BIT IC4805
BLANK. CONTR. IC5005
TRACE SEP. IC3604A,B
DL-DRIVER IC3602 IC3603
CH-SWITCH D3000..02 D3006..08
INTERMEDIATE-AMP. CH1 IC3001 IC3002.. TRIGGER-PICK-OFF IC3000B,C
INTERMEDIATE-AMP. CH2 IC3004 IC3005.. TRIGGER-PICK-OFF IC3003A,B
SYSREF 5V IC3004
J5001
J5600
J4801
J4802
J4800
J5003
W3602
W4000
J4001


HAMEG
AT-C150 V3.6
Y1_INPUT
External Trigger
to MB Board
TOP VIEW
1) Ugs=1.4 ... 2.7V


HAMEG
AT-C150 V3.6
Y2_INPUT
to MB Board 35-CR00-0043
1) Uss=1.4 ... 2.7V (ArtNr: 51-T100-0320)
Änderungen vorbehalten! Subject to change without notice ! *) if required

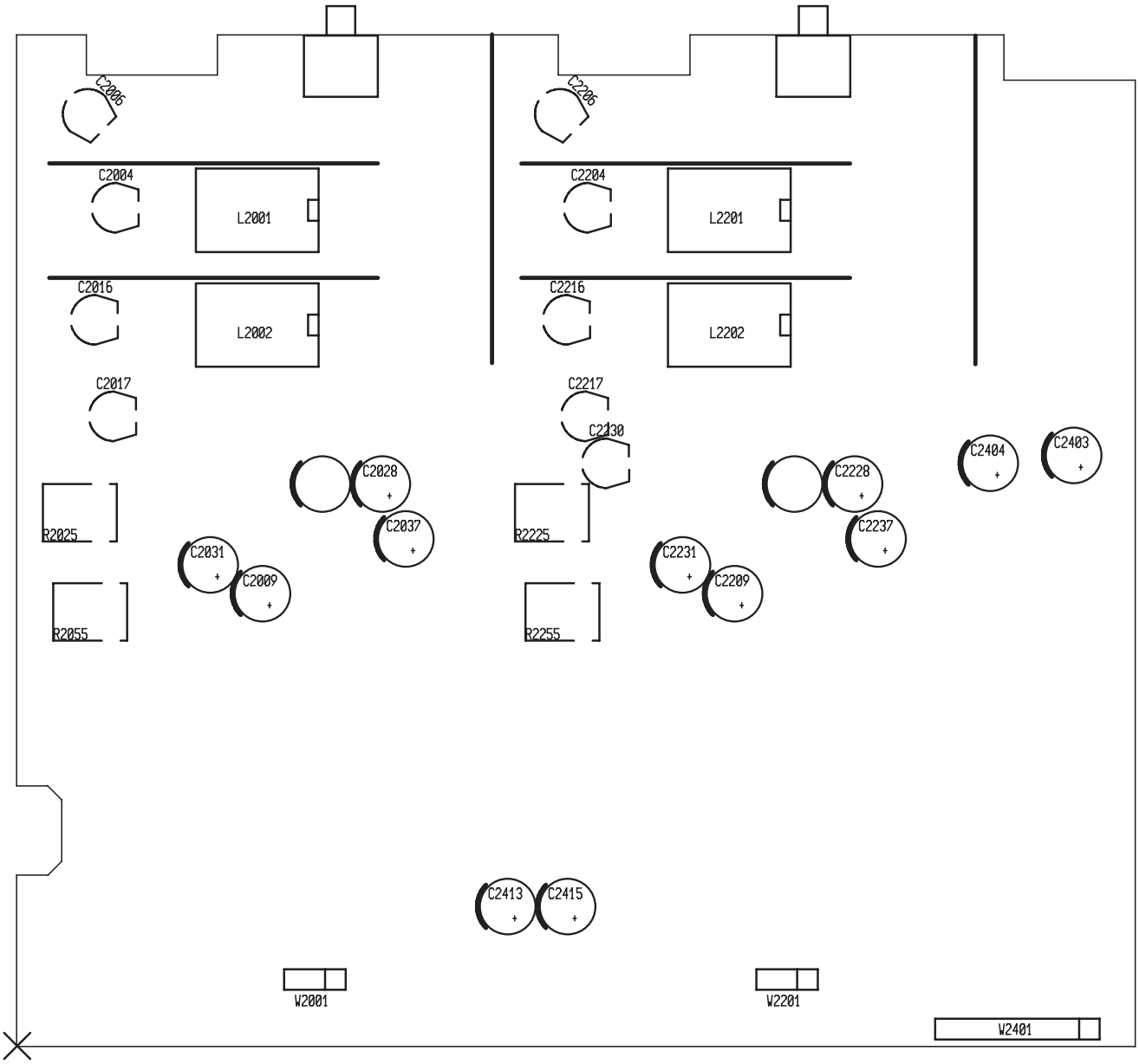


35-1ATC-3615R05

issued by: 30.04.02 Naumann

No:

authorized by: 24.11. 3 Dr. Reichert



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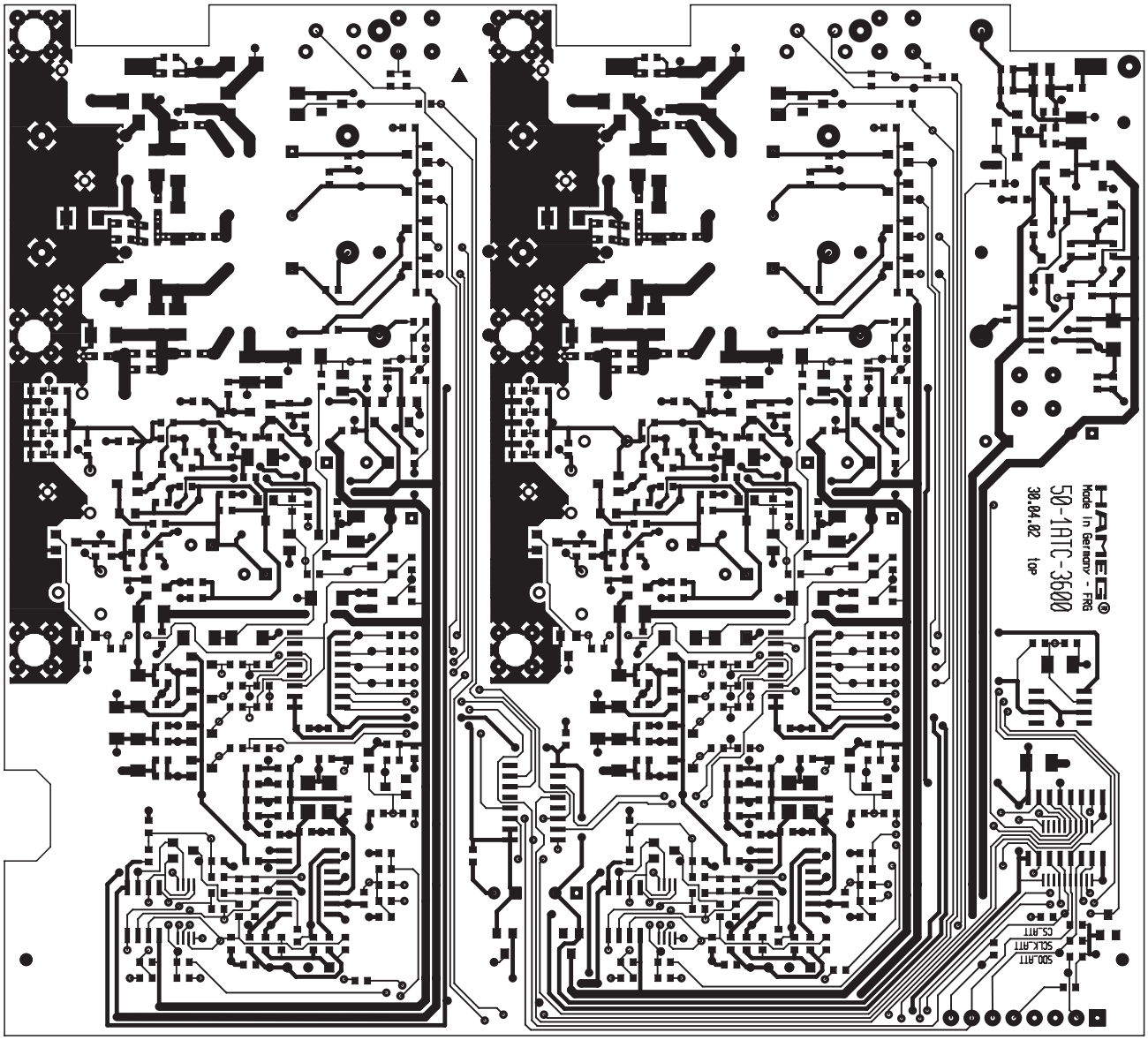
authorized by: 24.11. 3 Dr. Reichert



50-1ATC-3600

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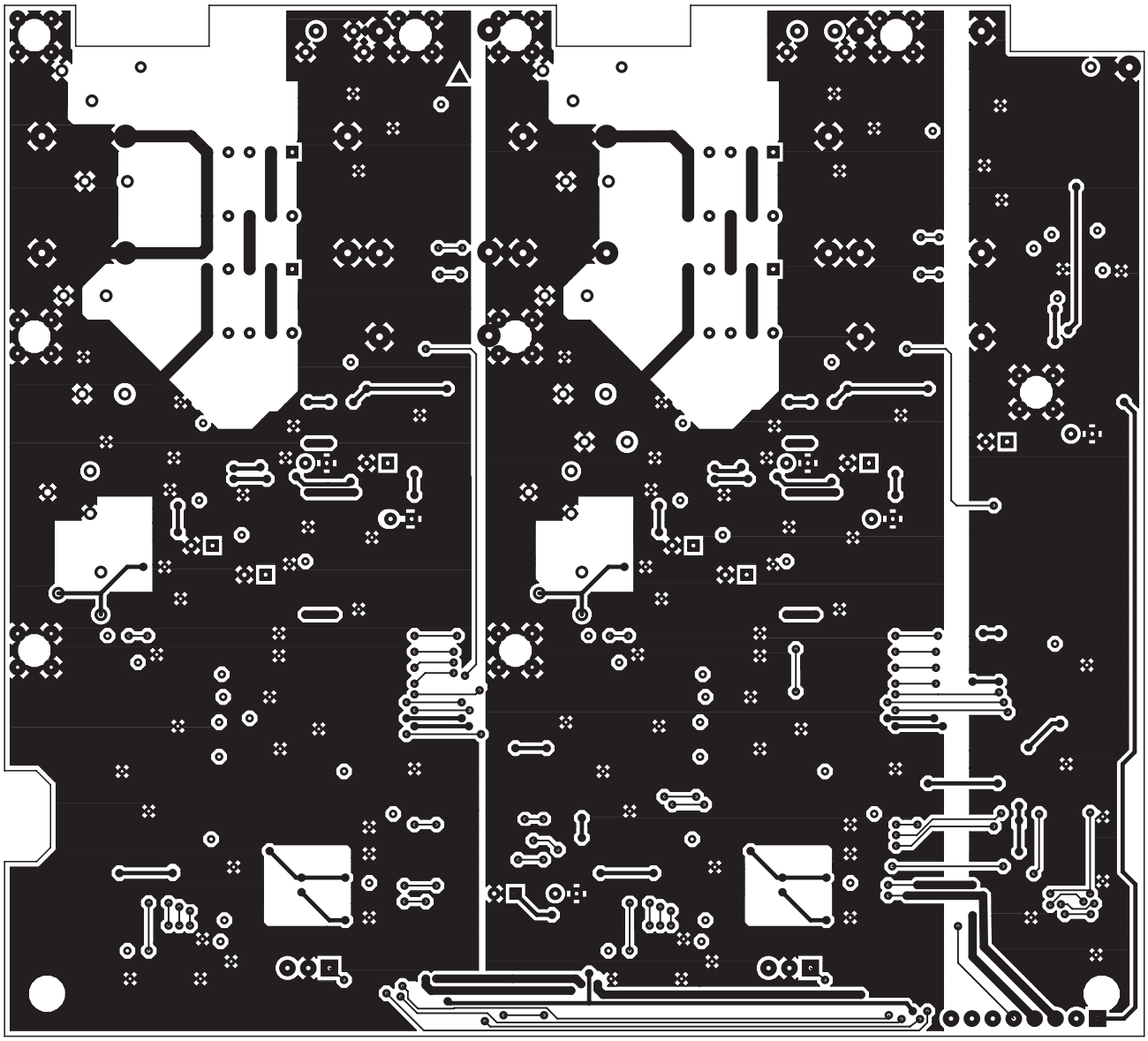
authorized by: 24.11. 3 Dr. Reichert



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No:

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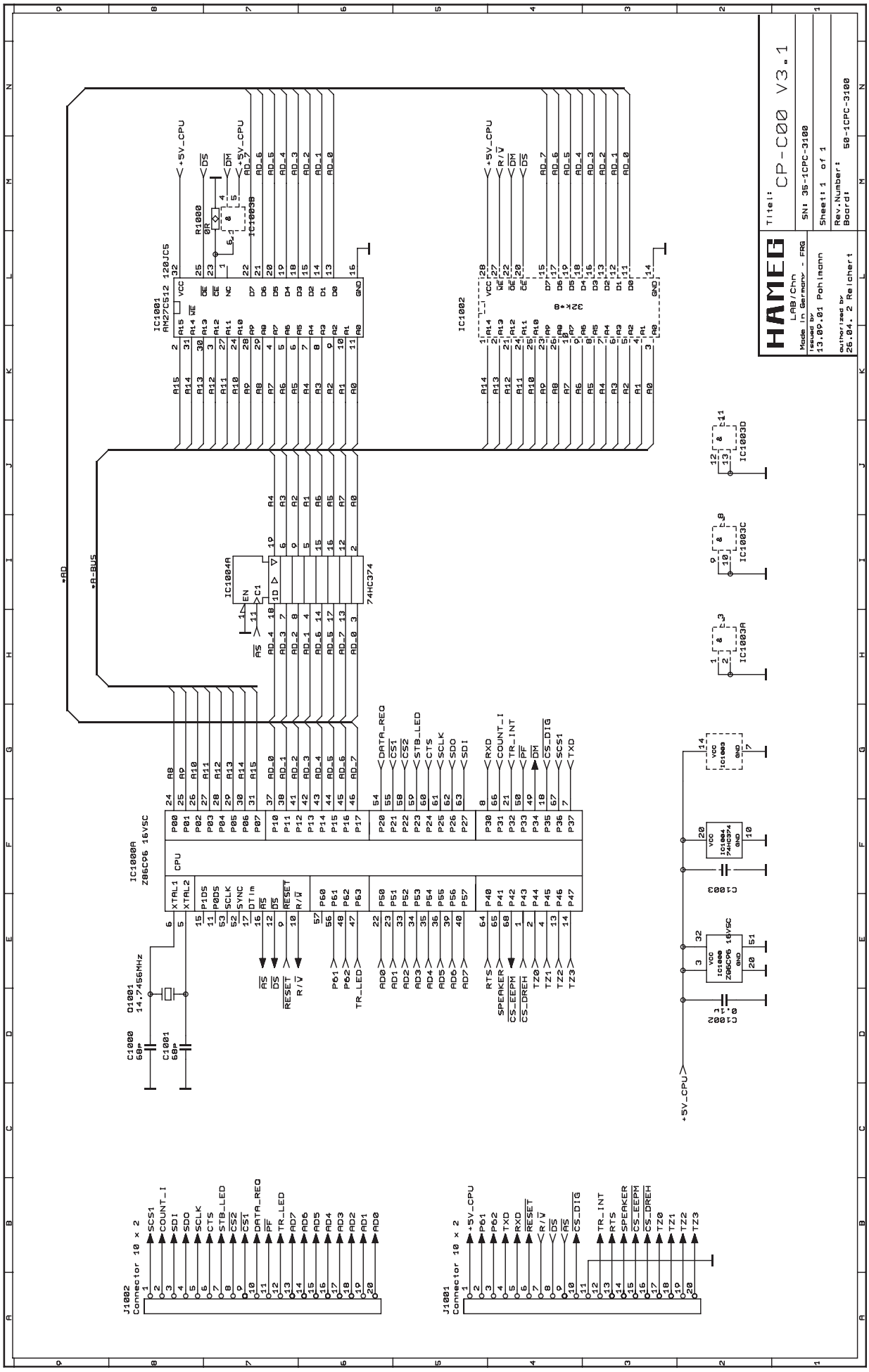
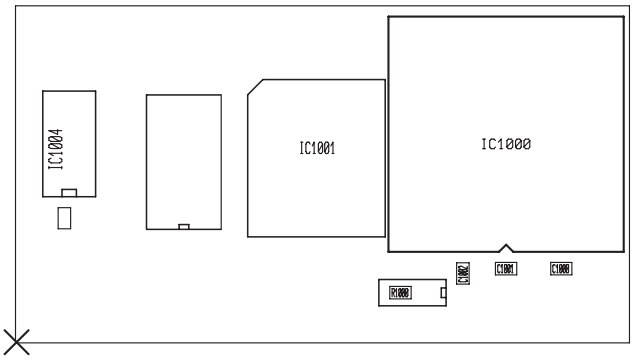
authorized by: 24.11. 3 Dr. Reichert


HAMEG
LAB/Chn
Made in Germany - FRG
Issued by
13.09.01 Pohlmann
Authorized by
26.04. 2 Reichert
Title:
CP-C00 V3.1
SN: 35-1CPC-3100
Sheet: 1 of 1
Rev.Number:
Board: 50-1CPC-3100
IC1001
AM27C512 120JC5
IC1002
32K*8
IC1004A
74HC374
IC1000A
Z86C96 16VSC
Q1001
14.7456MHz
C1000 68p
C1001 68p
C1002 0.1µ
C1003
R1000 0R
IC1003A
IC1003B
IC1003C
IC1003D
J1002
Connector 10 x 2
J1001
Connector 10 x 2
+5V_CPU
+A-BUS
*A0
SCS1
COUNT_I
SDI
SDO
SCLK
CTS
STB_LED
CS2
CS1
DATA_REQ
PF
TR_LED
AD7
AD6
AD5
AD4
AD3
AD2
AD1
AD0
P61
P62
TXD
RXD
RESET
R/W
DS
AS
CS_DIG
TR_INT
RTS
SPEAKER
CS_EEPM
CS_DREH
TZ0
TZ1
TZ2
TZ3

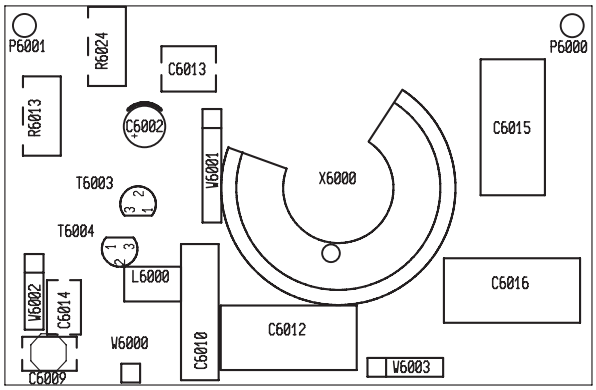


35-1CPC-3100R00

No:

issued by: 13.09.01 Pohlmann

authorized by: 13.09. 1 Reichert

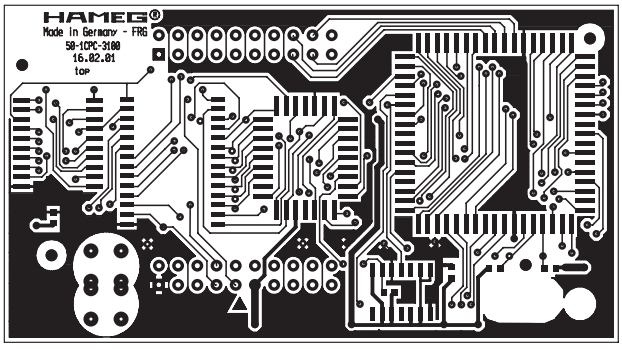


CR-F150V3.0R02

No:

issued by: 14.01.99 Günther

authorized by: 10.06. 5 Reichert



50-1CPC-3100-3100

No:

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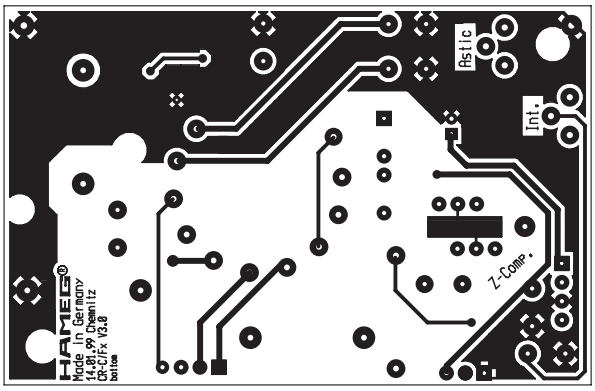
authorized by: 13.09. 1 Reichert

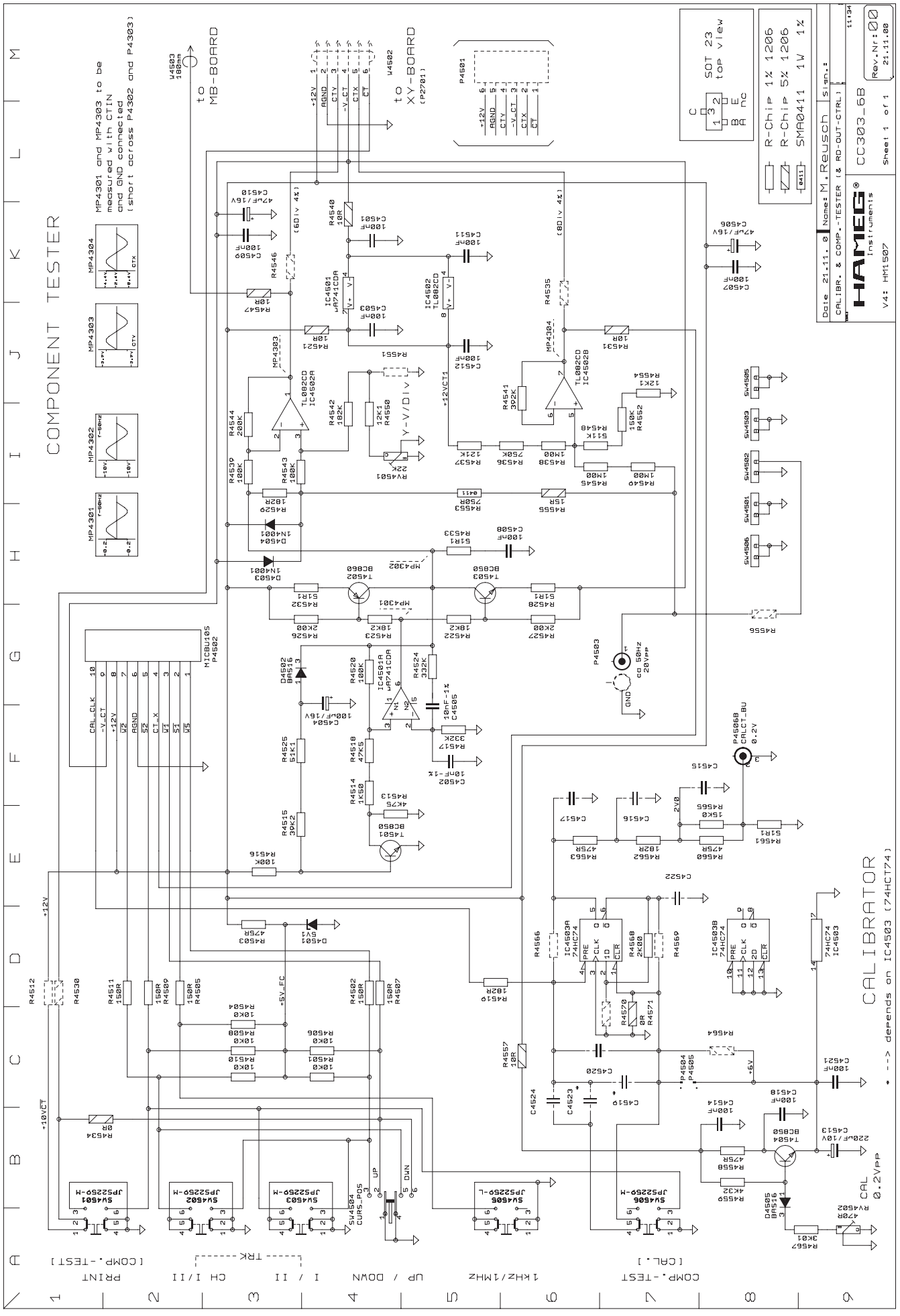


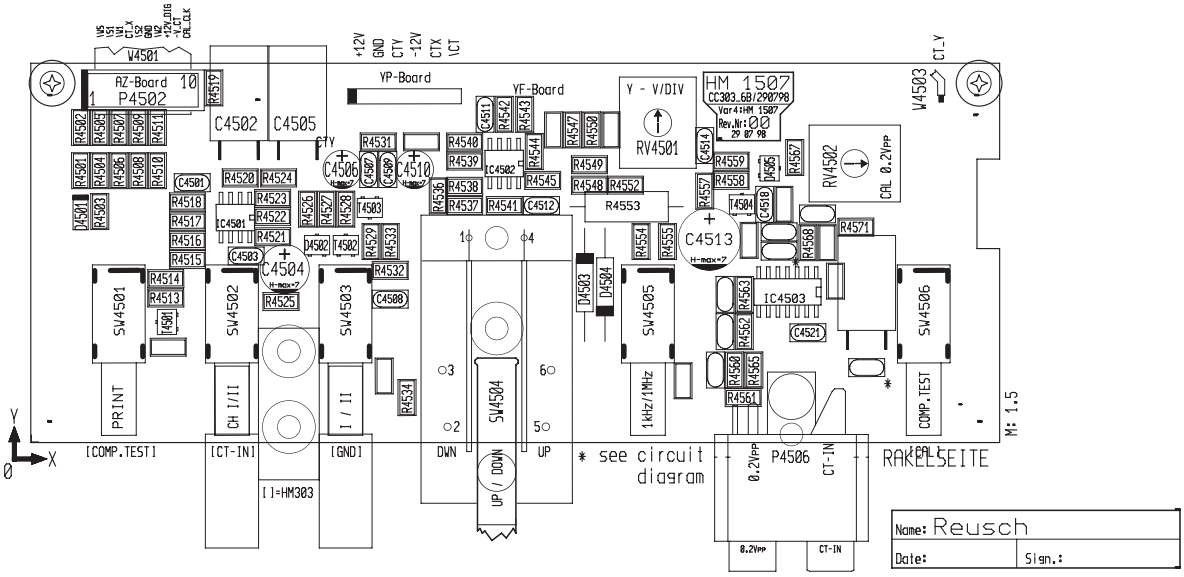
CR-C/FxV3.0

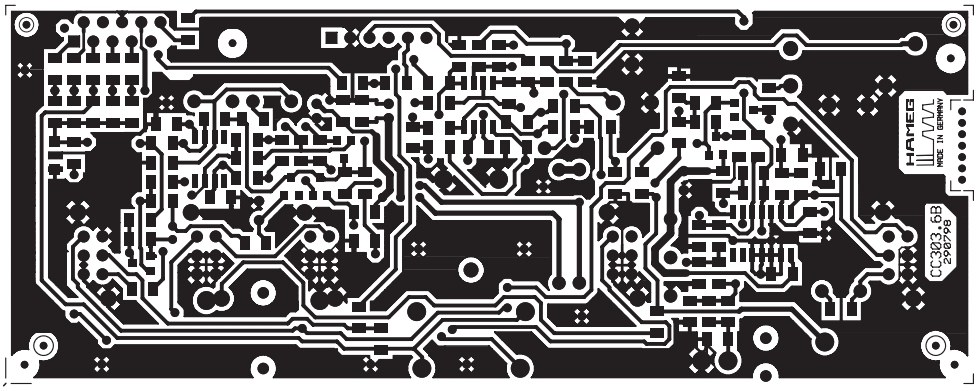
No:

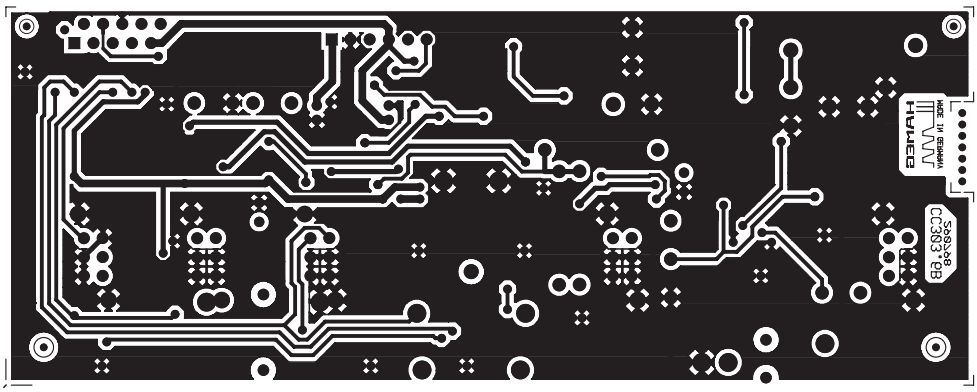
issued by: 14.01.99 Günther

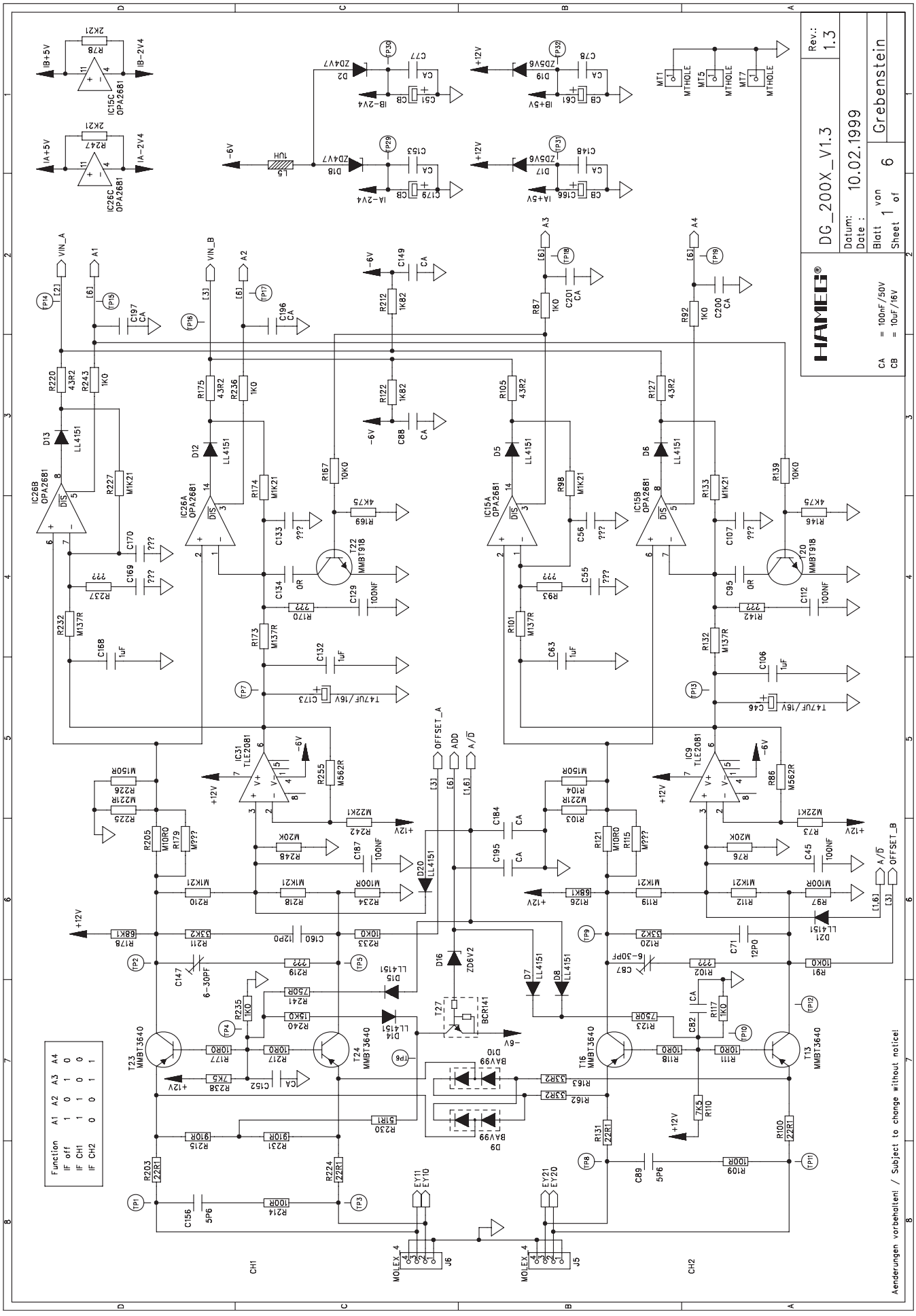
authorized by: 10.06. 5 Reichert

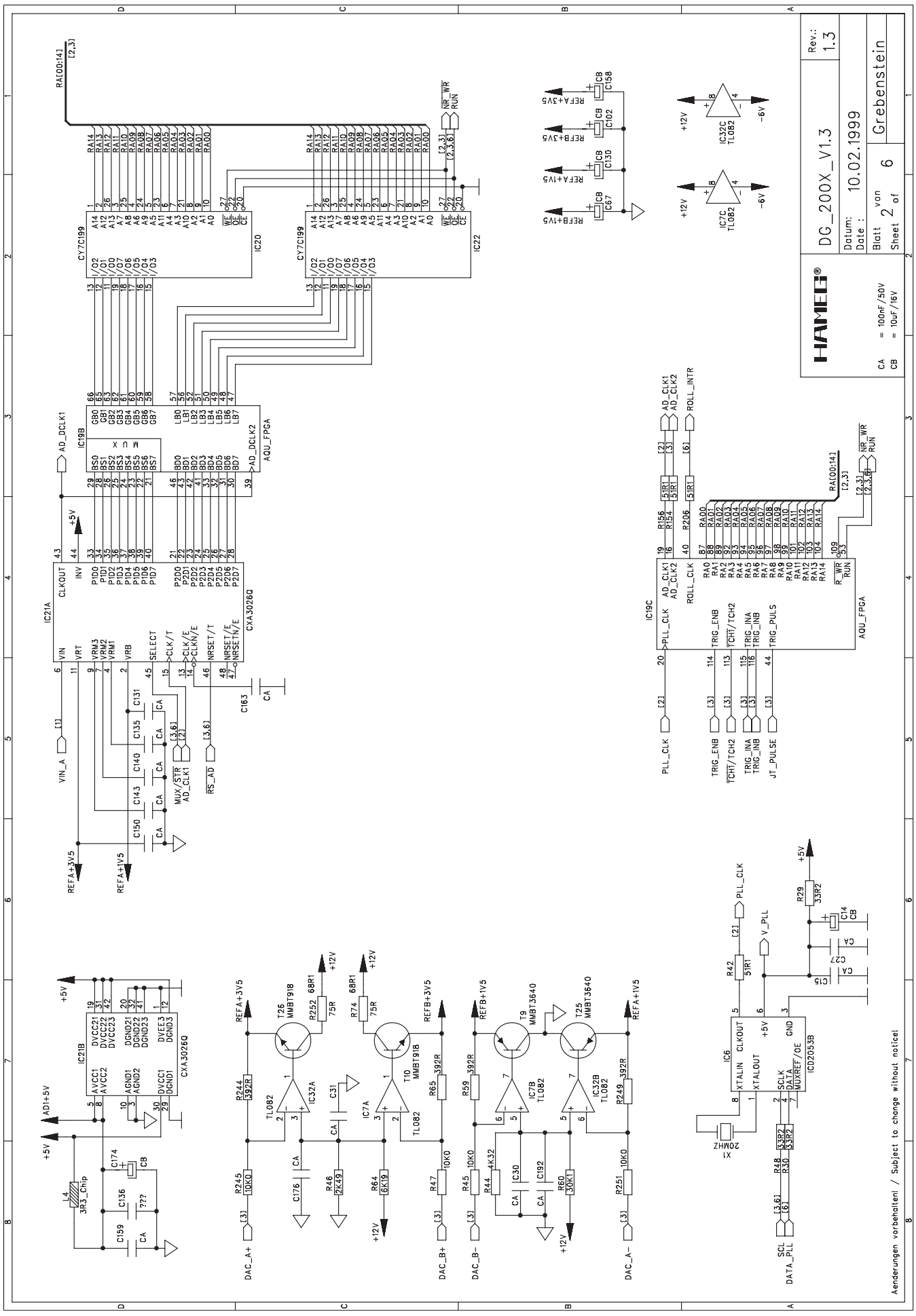

COMPONENT TESTER
CALIBRATOR
HAMEG
Instruments
CC303_6B
Rev.Nr:00
Sheet 1 of 1
V4: HM1507
R-Chip 1% 1206
R-Chip 5% 1206
SMA0411 1W 1%
SOT 23
top view
to MB-BOARD
to XY-BOARD
MP4301 and MP4303 to be measured with CTIN and GND connected (short across P4302 and P4303)
* --> depends on IC4503 (74HCT74)
PRINT
CH I/II
I / II
UP / DOWN
1KHZ/1MHZ
COMP.-TEST
[CAL.]
TRK
[COMP.-TEST]
CAL 0.2Vpp

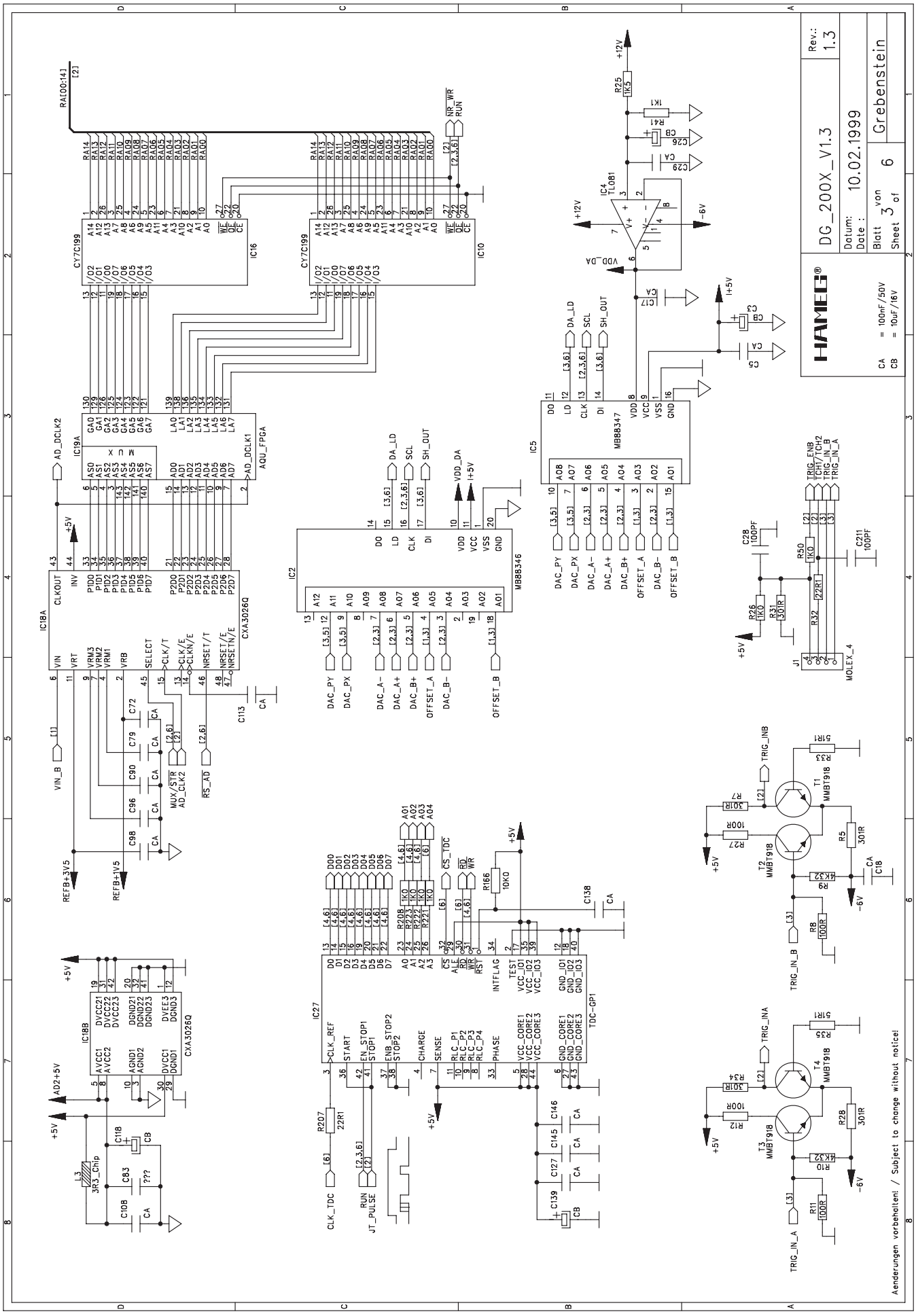

W4501
AZ-Board 10
1 P4502
YP-Board
YF-Board
Y - V/DIV
RV4501
HM 1507
CC303.6B/290798
Var4:HM 1507
Rev.Nr:00
29 07 98
W4503
CT_Y
RV4502
CAL 0.2Vpp
C4502
C4505
C4506
C4510
C4513
C4504
R4553
IC4503
SW4501
SW4502
SW4503
SW4504
SW4505
SW4506
PRINT
CH I/II
I / II
DWN
UP
1kHz/1MHz
COMP.TEST
M: 1.5
[COMP.TEST]
[CT-IN]
[GND]
[ ]=HM303
* see circuit diagram
P4506
RAKELSEITE
Name: Reusch
Date:
Sign.:

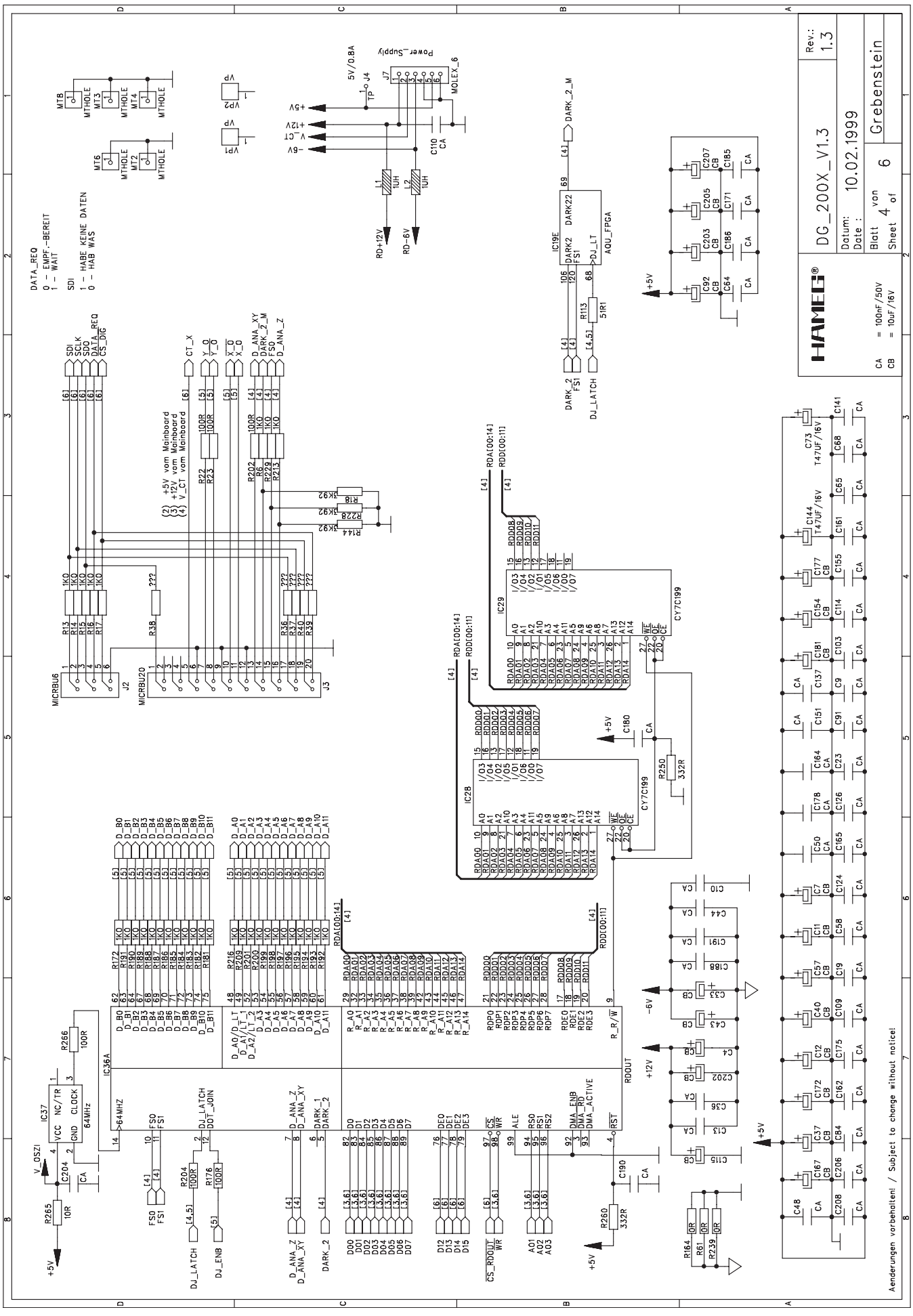

HAMEG
MADE IN GERMANY
CC303.6B
290798

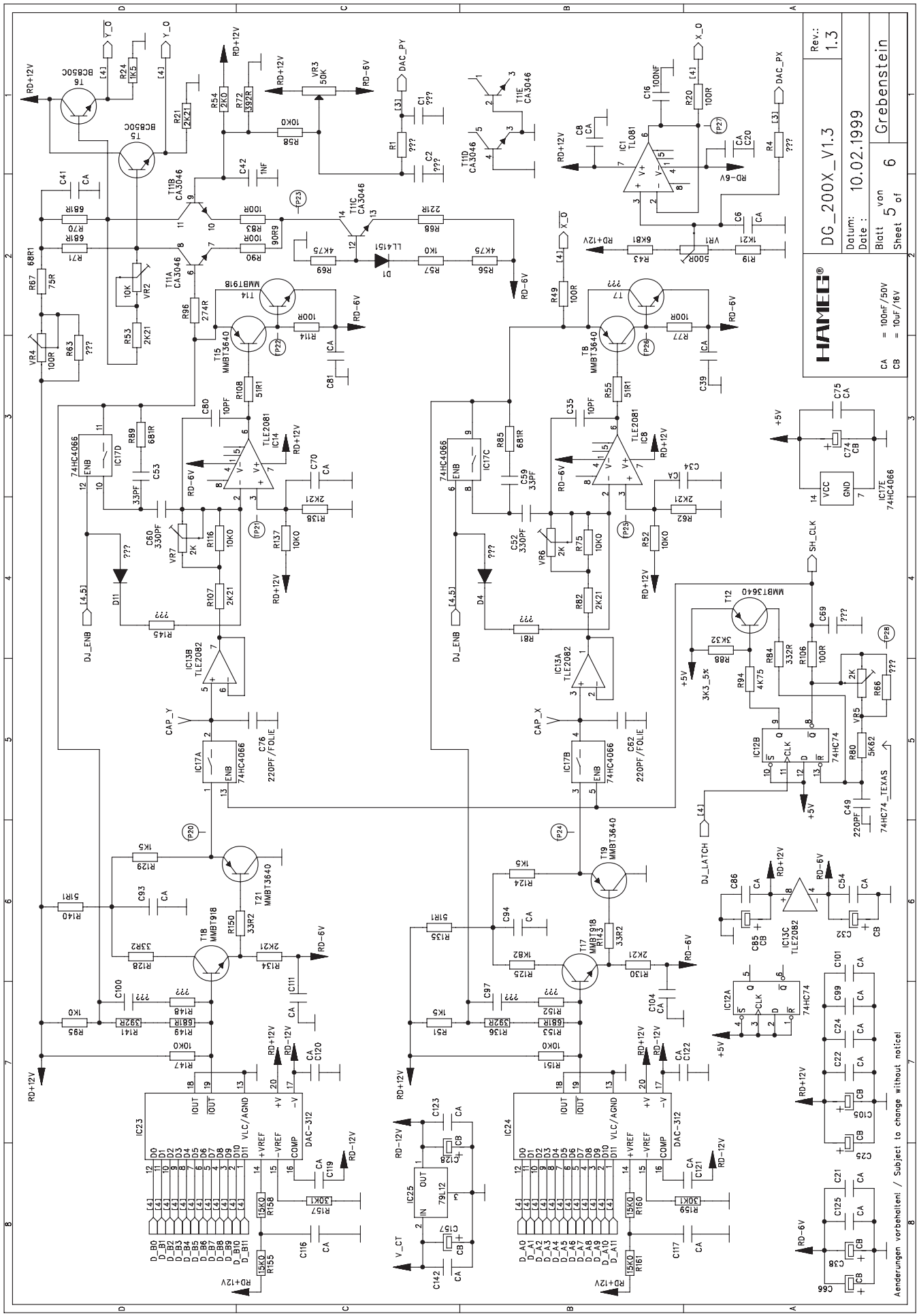

HAMEG
MADE IN GERMANY
CC303.6B
290798

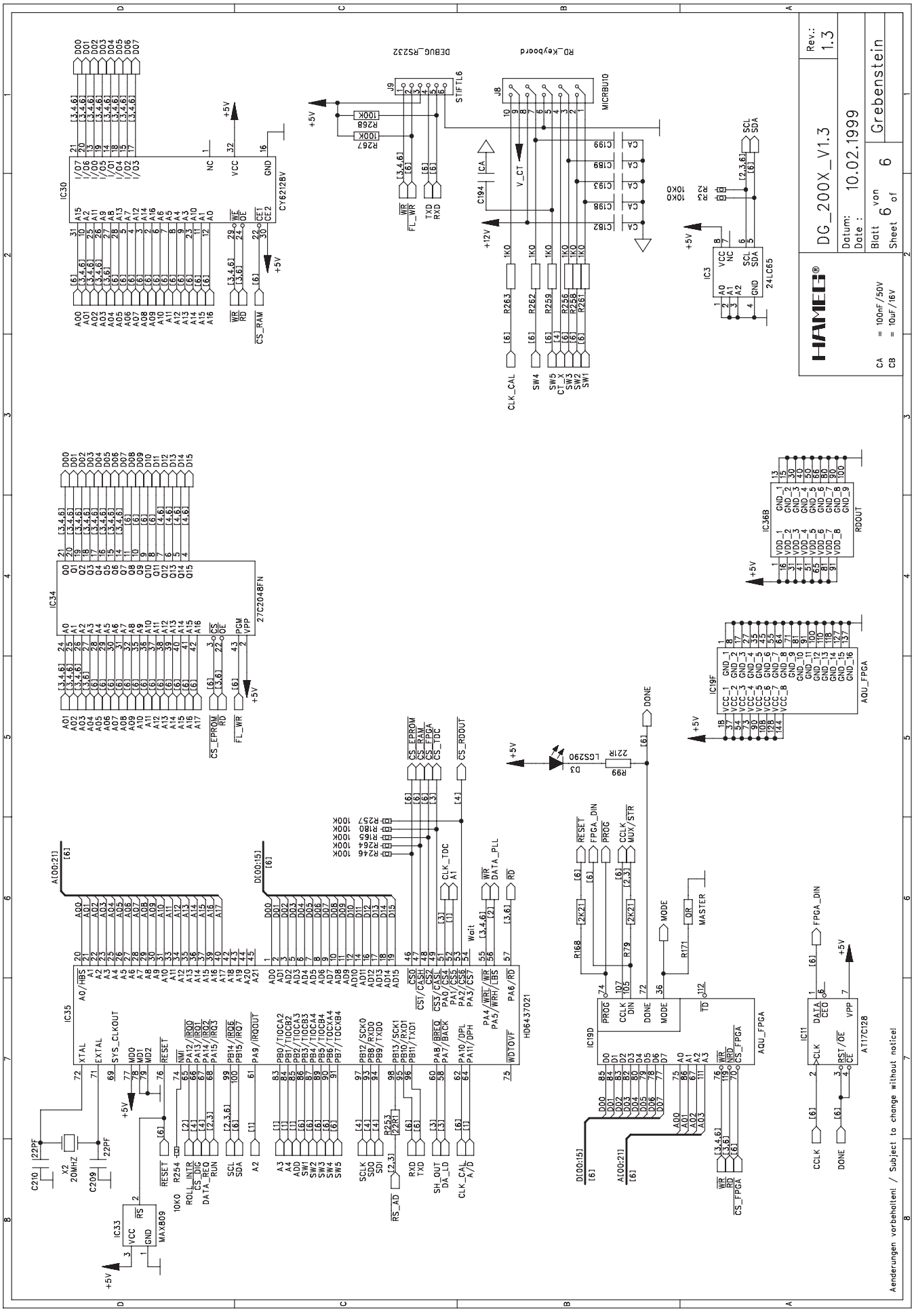

DG_200X_V1.3
Rev.: 1.3
Datum: 10.02.1999
Date :
Blatt 1 von 6
Sheet 1 of 6
Grebenstein
HAMEG®
CA = 100nF/50V
CB = 10uF/16V
Änderungen vorbehalten! / Subject to change without notice!
CH1
CH2
Function A1 A2 A3 A4
IF off 1 1 0 1
IF CH1 0 1 0 0
IF CH2 1 0 0 1


HAMEG®
DG_200X_V1.3
Rev.: 1.3
Datum: 10.02.1999
Date : 10.02.1999
Blatt 2 von 6
Sheet 2 of 6
Grebenstein
CA = 100nF/50V
CB = 10uF/16V
Aenderungen vorbehalten! / Subject to change without notice!
IC21A CXA3026Q
IC19B AQU_FPGA
IC19C AQU_FPGA
IC20 CY7C199
IC22 CY7C199
IC21B CXA3026Q
IC6 ICD2053B
IC7A TL082
IC7B TL082
IC7C TL082
IC32A TL082
IC32B TL082
IC32C TL082
T26 MMBT918
T10 MMBT918
T9 MMBT3640
T25 MMBT3640
X1 20MHZ
L4 3R3_Chip
VIN_A
MUX/STR
AD_CLK1
RS_AD
REFA+3V5
REFA+1V5
REFB+3V5
REFB+1V5
REFA+1V5
REFB+1V5
REFA+3V5
REFA+3V5
REFB+3V5
REFB+1V5
+12V
-6V
AD1+5V
+5V
DAC_A+
DAC_B+
DAC_B-
DAC_A-
SCL
DATA_PLL
PLL_CLK
V_PLL
TRIG_ENB
TCH1/TCH2
TRIG_INA
TRIG_INB
JT_PULSE
ROLL_CLK
ROLL_INTR
NR_WR
RUN
RA00:14
AD_DCLK1
AD_DCLK2
AD_CLK1
AD_CLK2


HAMEG®
DG_200X_V1.3
Rev.: 1.3
Datum: 10.02.1999
Date :
Blatt 3 von 6
Sheet 3 of 6
Grebenstein
CA = 100nF/50V
CB = 10uF/16V
Aenderungen vorbehalten! / Subject to change without notice!

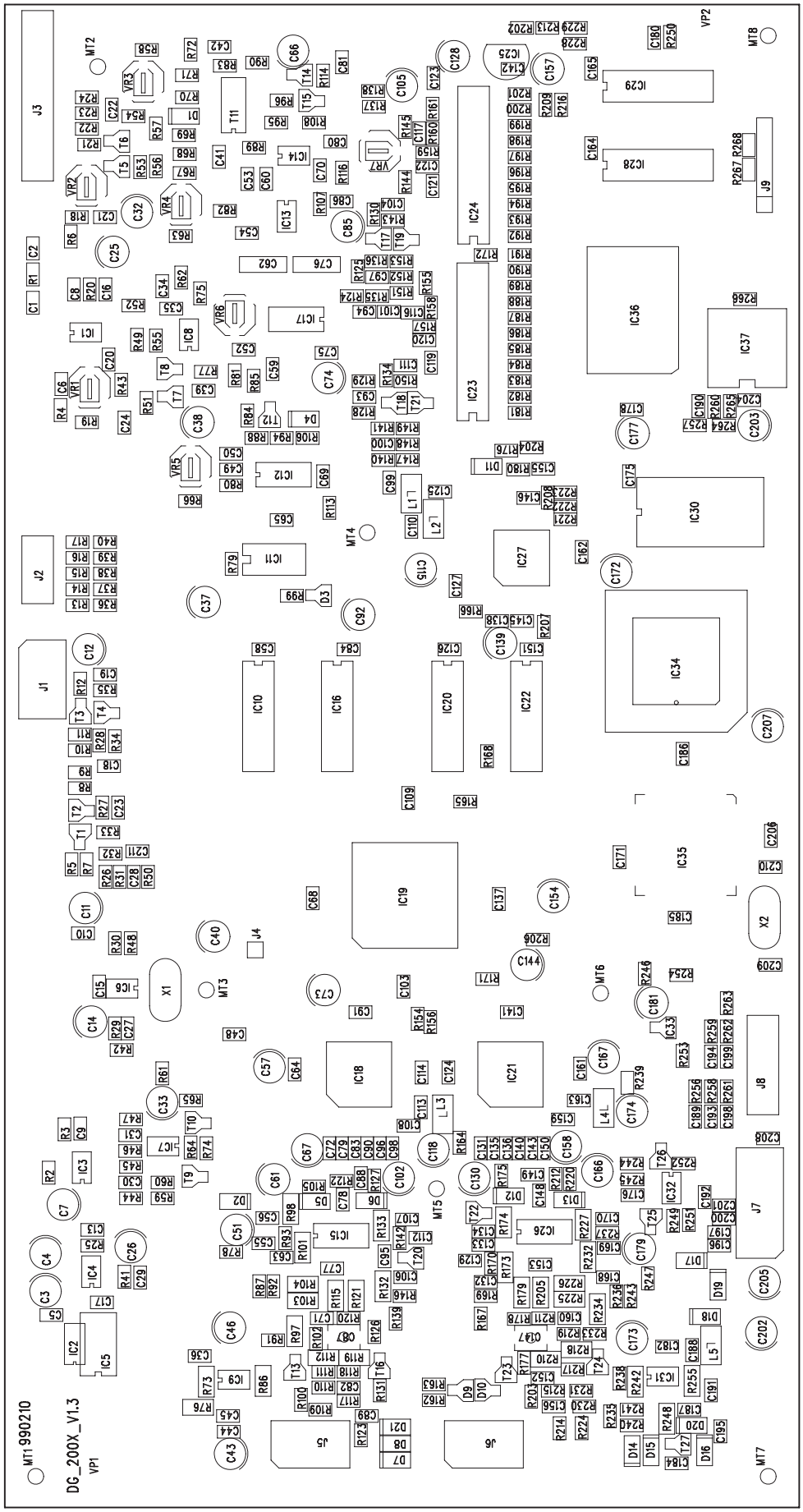

DG_200X_V1.3
Rev.: 1.3
Datum: 10.02.1999
Date:
Blatt 4 von 6
Sheet 4 of 6
Grebenstein
HAMEG
CA = 100nF/50V
CB = 10uF/16V
Aenderungen vorbehalten! / Subject to change without notice!
DATA_REQ
0 – EMPF.-BEREIT
1 – WAIT
SDI
1 – HABE KEINE DATEN
0 – HAB WAS
Power_Supply
MOLEX_6
MICRBU6
MICRBU20
IC37
IC36A
IC2B
IC29
CY7C199
AQU_FPGA
64MHz
+5V
-6V
+12V
RD+12V
RD-6V
DJ_LATCH
DJ_ENB
D_ANA_Z
D_ANA_XY
DARK_1
DARK_2
R/W
RDOUT
RST
CS_RDOUT
WR
ALE
DMA_ENB
DMA_RD
DMA_ACTIVE


DG_200X_V1.3
Rev.: 1.3
Datum: 10.02.1999
Date :
Blatt 5 von 6
Sheet 5 of 6
Grebenstein
HAMEG®
CA = 100nF/50V
CB = 10uF/16V
Aenderungen vorbehalten! / Subject to change without notice!
RD+12V
RD-6V
+5V
DAC_PY
DAC_PX
X_O
Y_O
CAP_Y
CAP_X
SH_CLK
DJ_ENB
DJ_LATCH
V_CT
D_B0
D_B1
D_B2
D_B3
D_B4
D_B5
D_B6
D_B7
D_B8
D_B9
D_B10
D_B11
D_A0
D_A1
D_A2
D_A3
D_A4
D_A5
D_A6
D_A7
D_A8
D_A9
D_A10
D_A11


HAMEG®
DG_200X_V1.3
Rev.: 1.3
Datum: 10.02.1999
Date :
Grebenstein
Blatt 6 von 6
Sheet 6 of 6
CA = 100nF/50V
CB = 10uF/16V
Aenderungen vorbehalten! / Subject to change without notice!

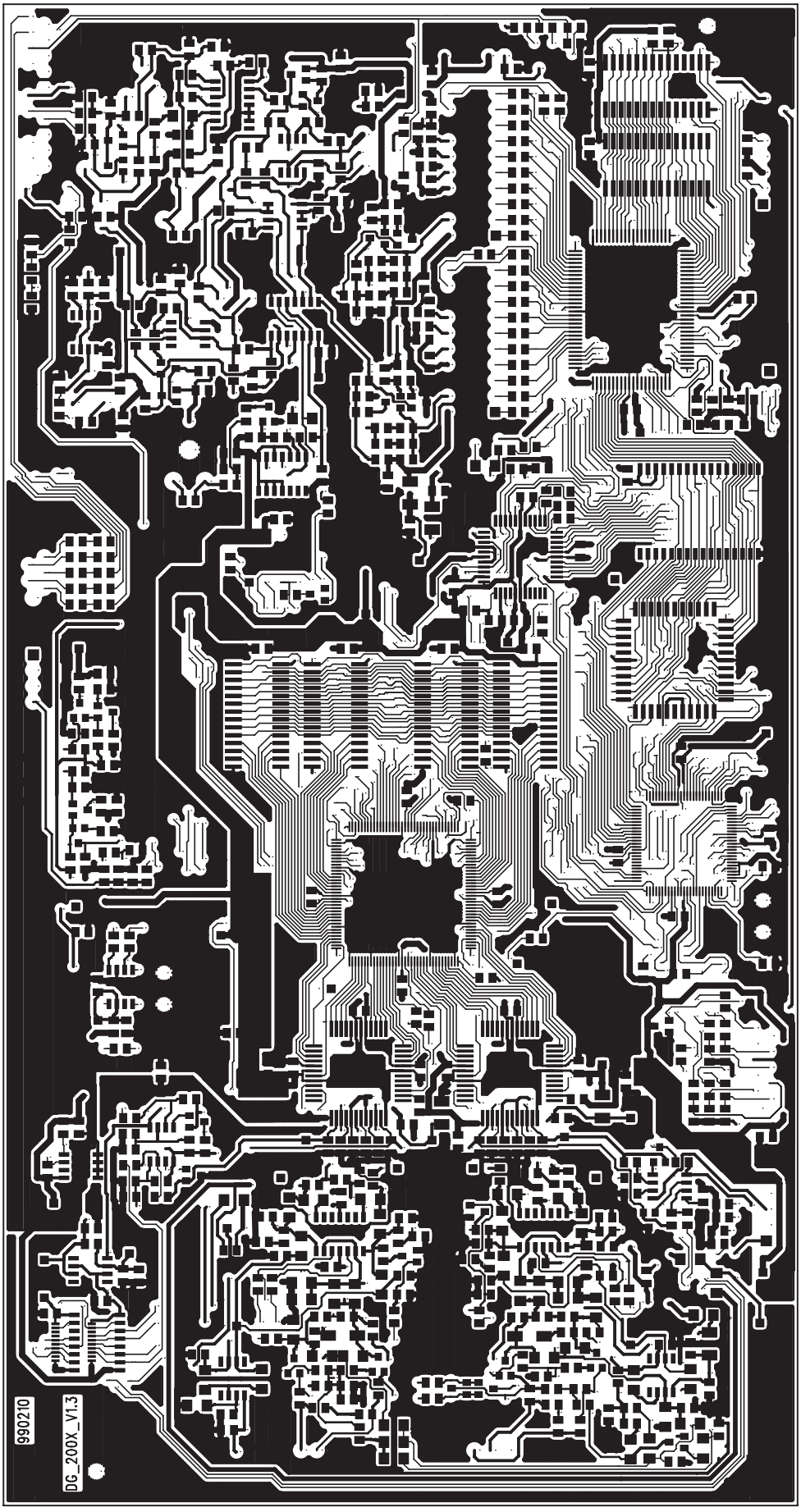
DG_200X_V1.3 990210

Stand: 10.02.99



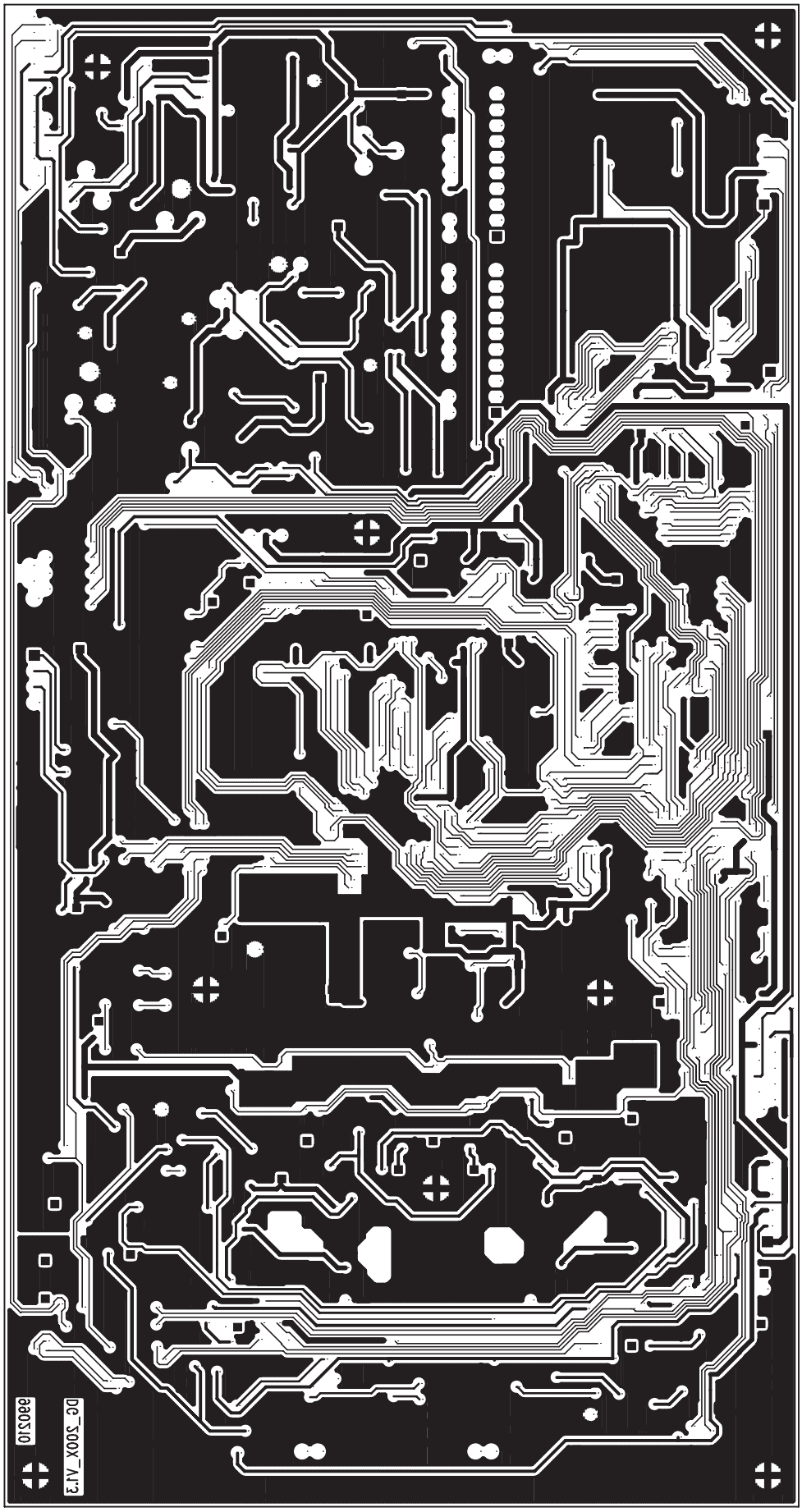
DG_200X_V1.3 990210

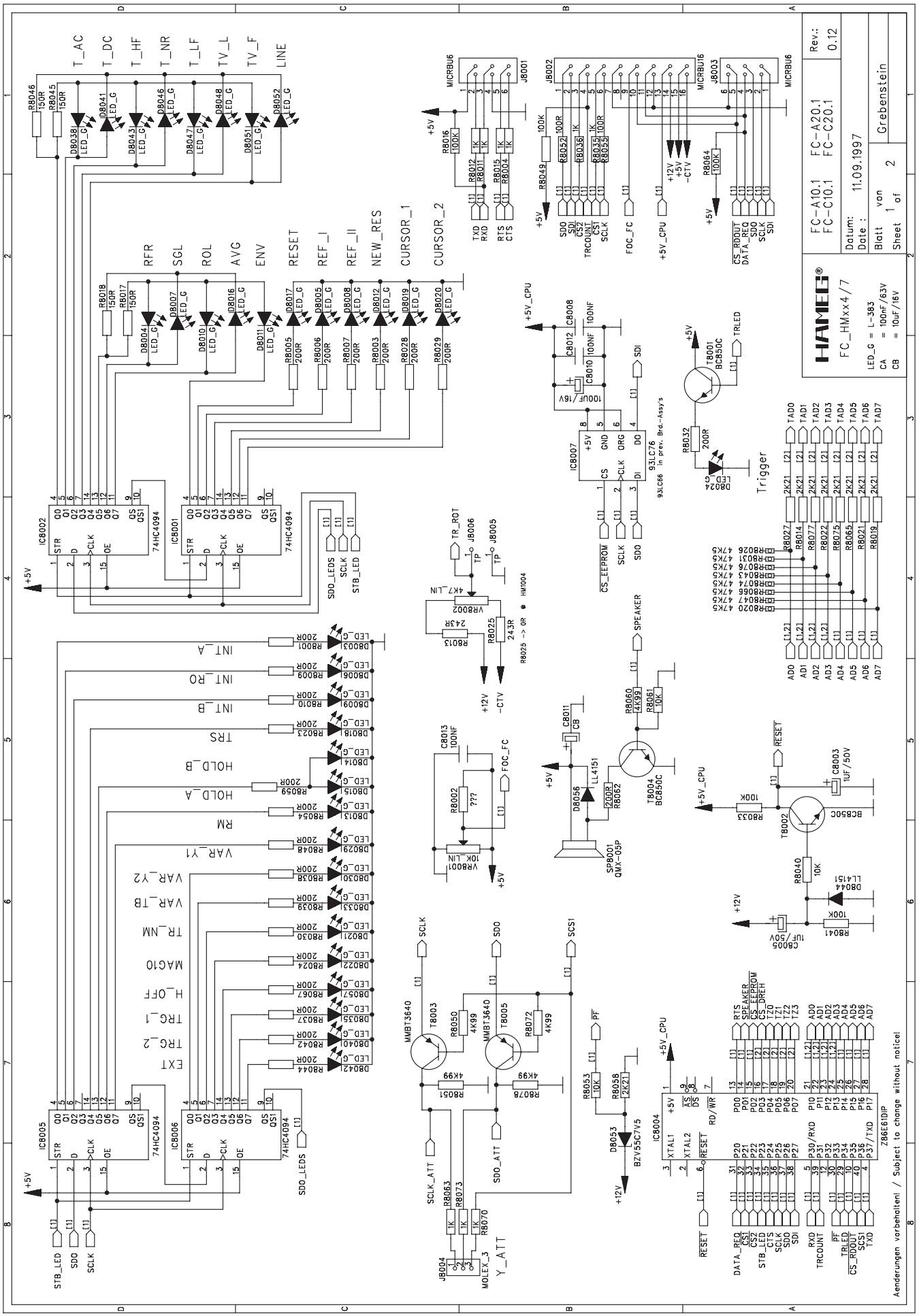
Stand: 10.02.99

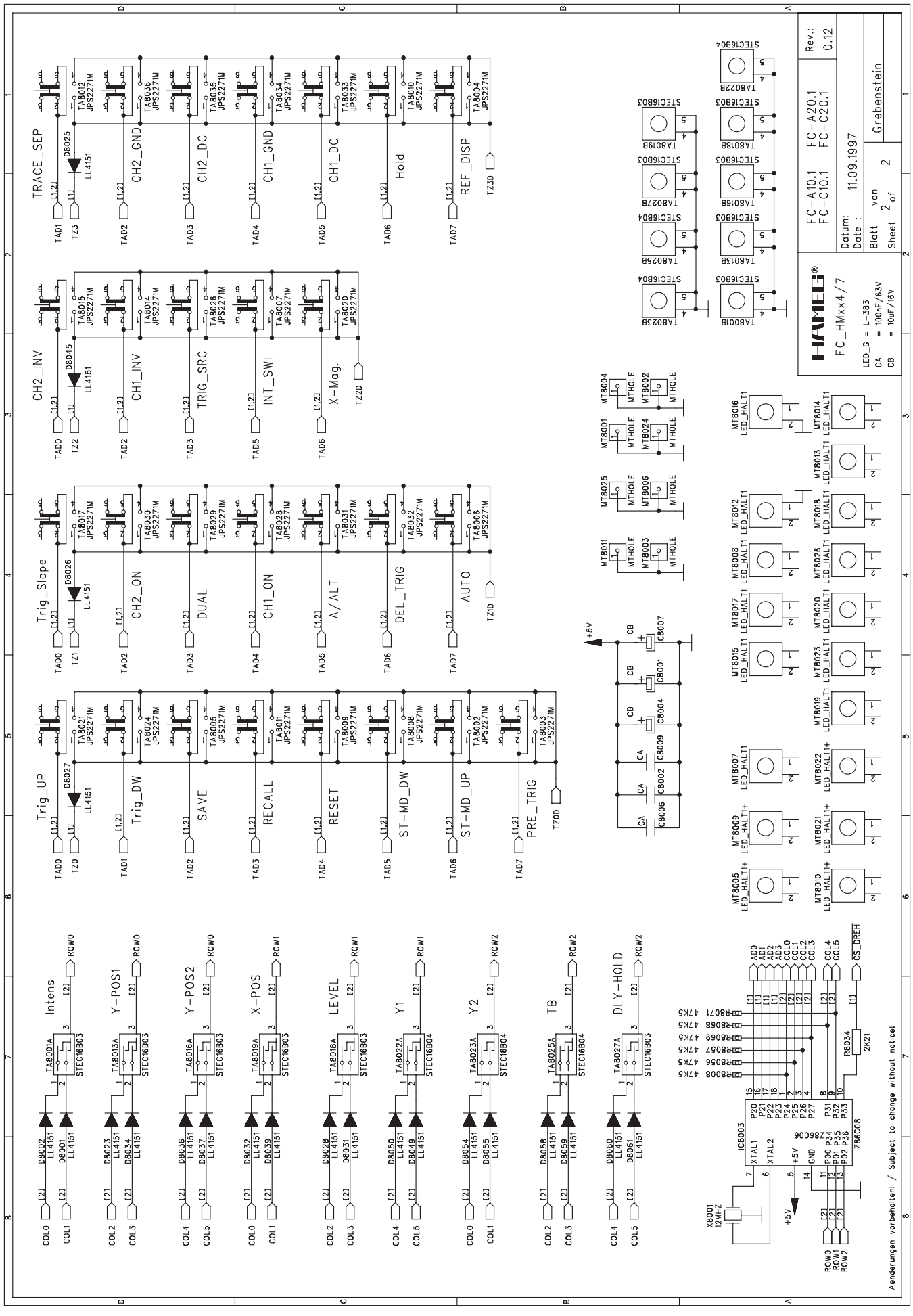


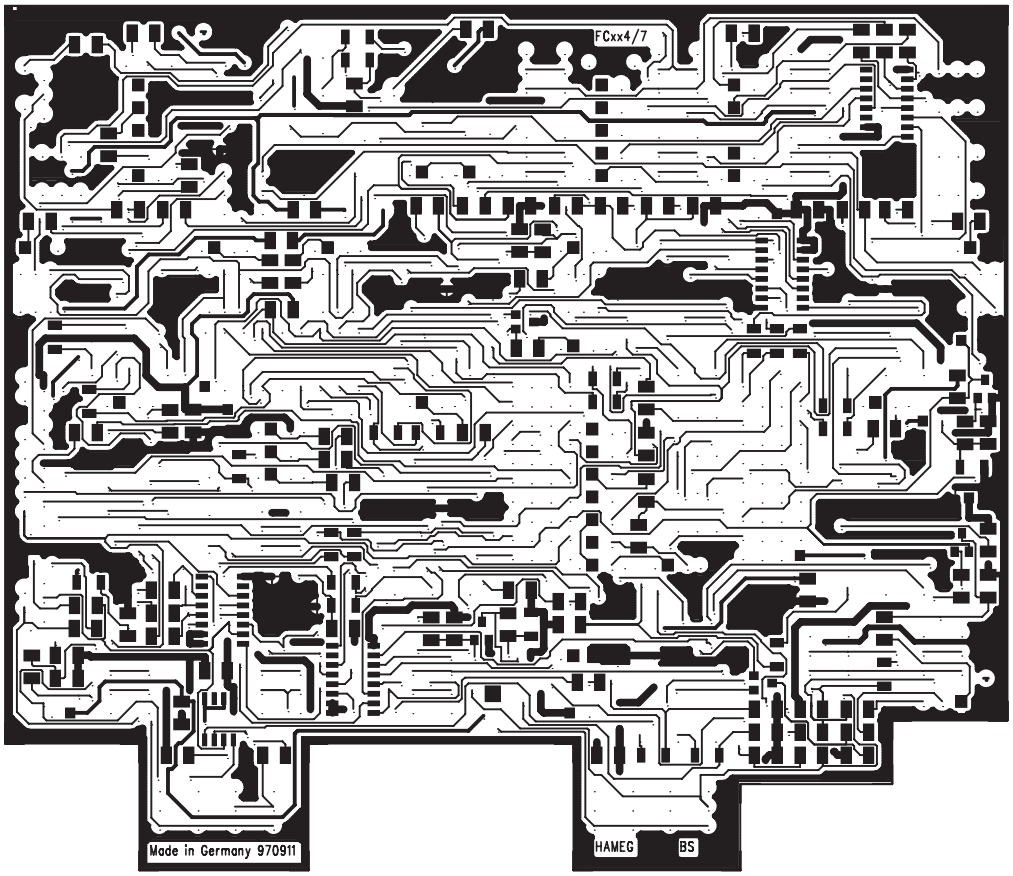
DG_200X_V1.3 990210

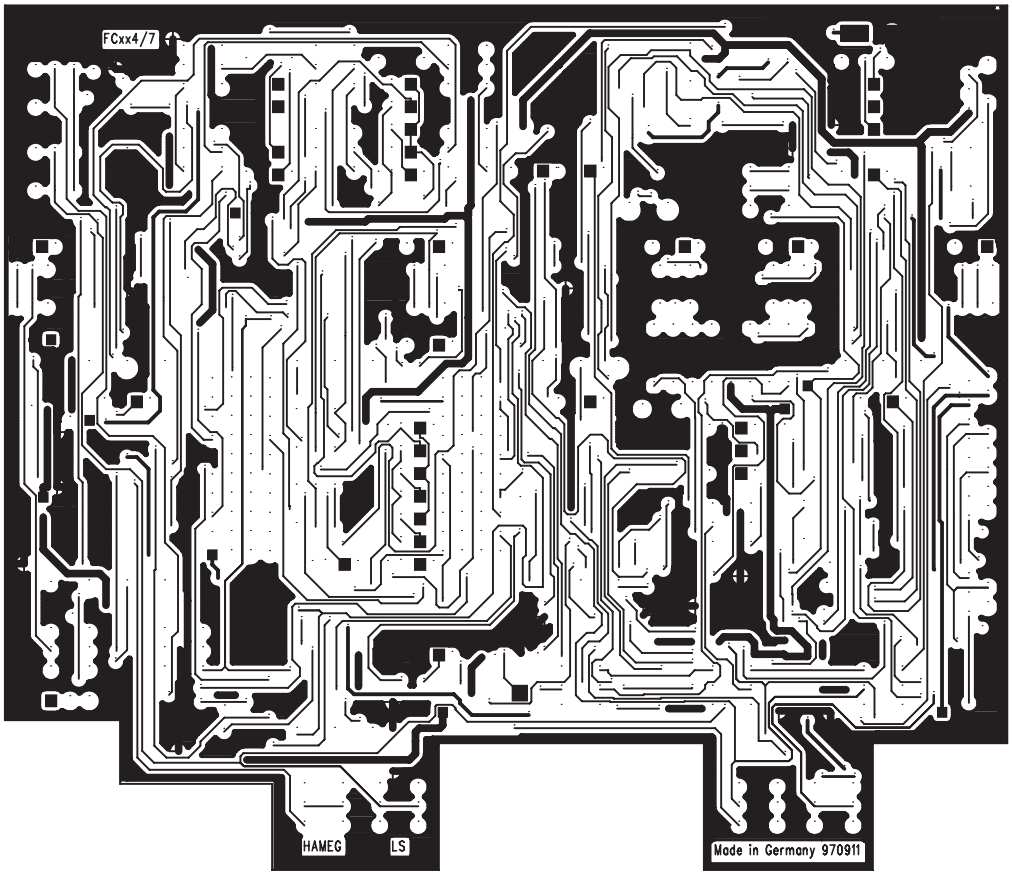
Stand: 10.02.99

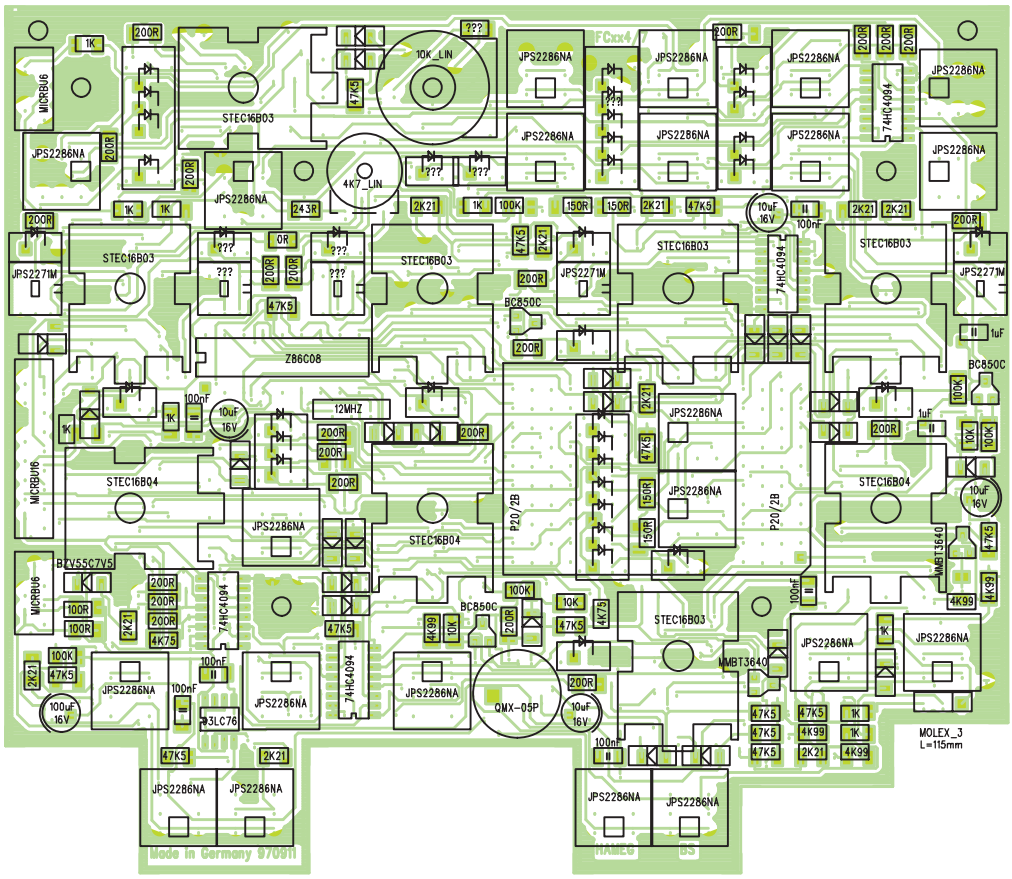


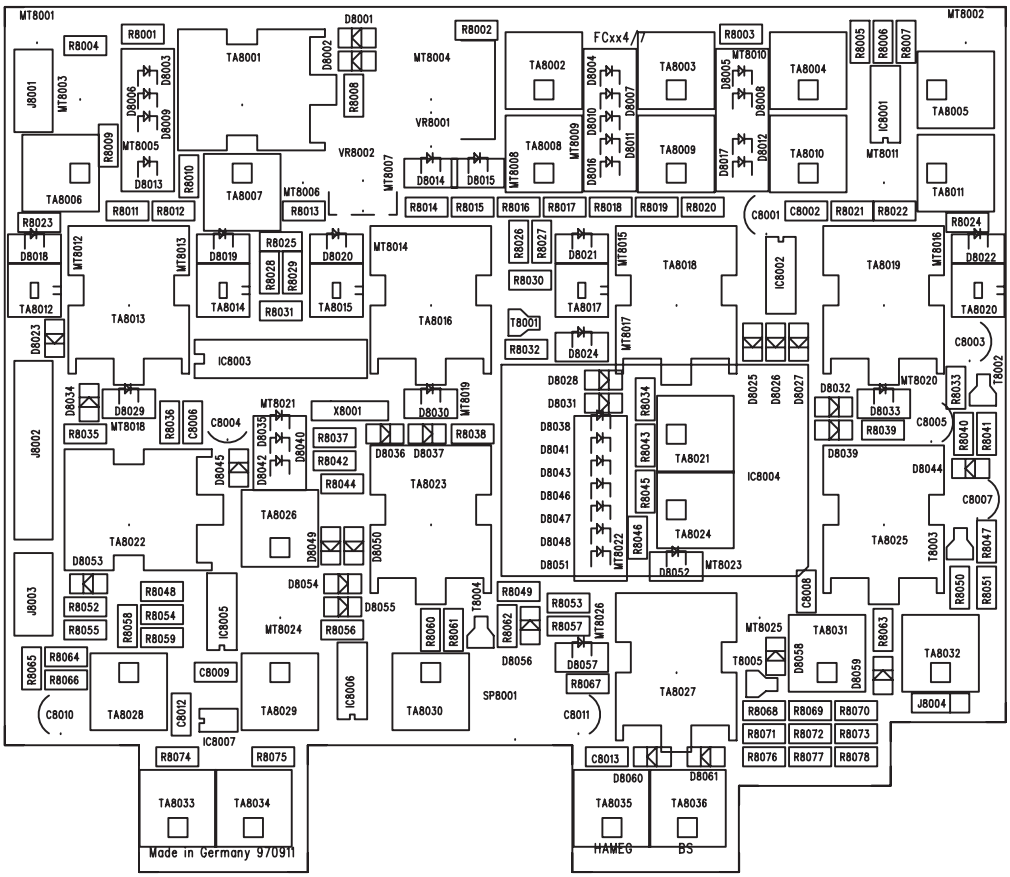

HAMEG®
FC_HMxx4/7
FC-A10.1 FC-A20.1
FC-C10.1 FC-C20.1
Rev.: 0.12
Datum: 11.09.1997
Date : Grebenstein
Blatt von 2
Sheet 1 of 2
LED_G = L-383
CA = 100nF/63V
CB = 10uF/16V
T_AC
T_DC
T_HF
T_NR
T_LF
TV_L
TV_F
LINE
RFR
SGL
ROL
AVG
ENV
RESET
REF_I
REF_II
NEW_RES
CURSOR_1
CURSOR_2
EXT
TRG_2
TRG_1
H_OFF
MAG10
TR_NM
VAR_TB
VAR_Y2
VAR_Y1
RM
HOLD_A
HOLD_B
TRS
INT_B
INT_RO
INT_A
Trigger
Aenderungen vorbehalten! / Subject to change without notice!

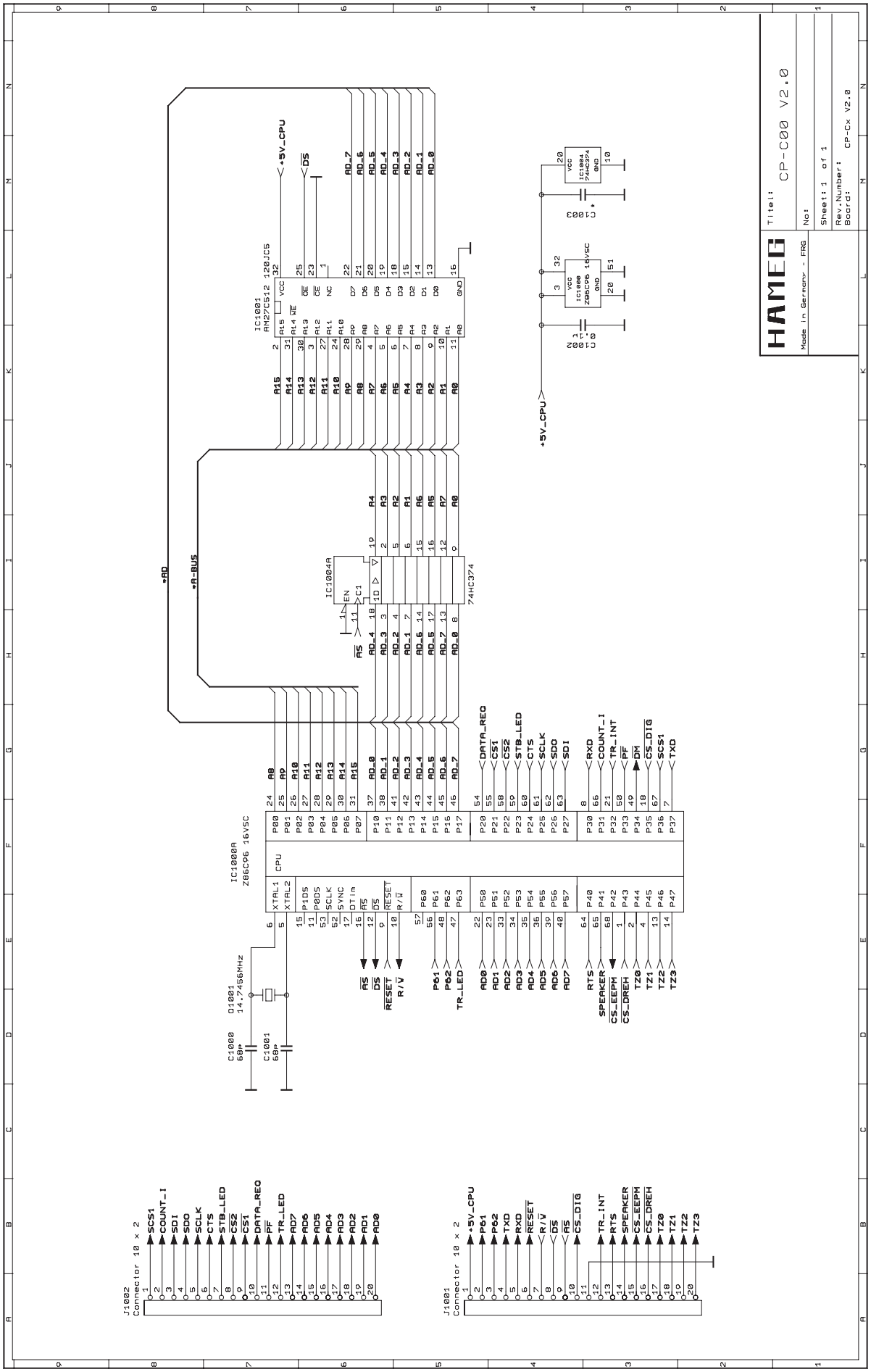

HAMEG®
FC_HMxx4/7
FC-A10.1 FC-A20.1
FC-C10.1 FC-C20.1
Rev.: 0.12
Datum: 11.09.1997
Date :
Blatt von 2
Sheet 2 of 2
Grebenstein
LED_G = L-383
CA = 100nF/63V
CB = 10uF/16V
Aenderungen vorbehalten! / Subject to change without notice!
Trig_UP
Trig_DW
SAVE
RECALL
RESET
ST-MD_DW
ST-MD_UP
PRE_TRIG
Trig_Slope
CH2_ON
DUAL
CH1_ON
A/ALT
DEL_TRIG
AUTO
CH2_INV
CH1_INV
TRIG_SRC
INT_SWI
X-Mag.
TRACE_SEP
CH2_GND
CH2_DC
CH1_GND
CH1_DC
Hold
REF_DISP
Intens
Y-POS1
Y-POS2
X-POS
LEVEL
Y1
Y2
TB
DLY-HOLD
X8001 12MHZ
ICB003 Z86C08
R8034 2K21
R8071 4K7
R8068 4K7
R8069 4K7
R8057 4K7
R8056 4K7
R8008 4K7
ROW0
ROW1
ROW2
COL0
COL1
COL2
COL3
COL4
COL5
CS_DREH

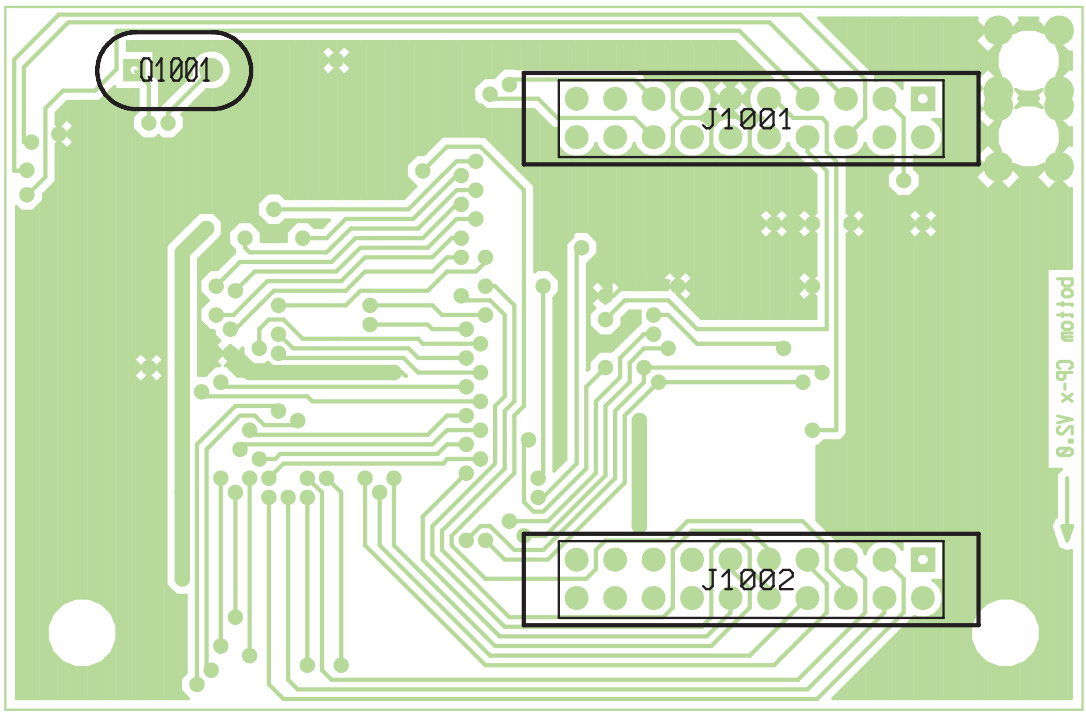

FCxx4/7
Made in Germany 970911
HAMEG
BS

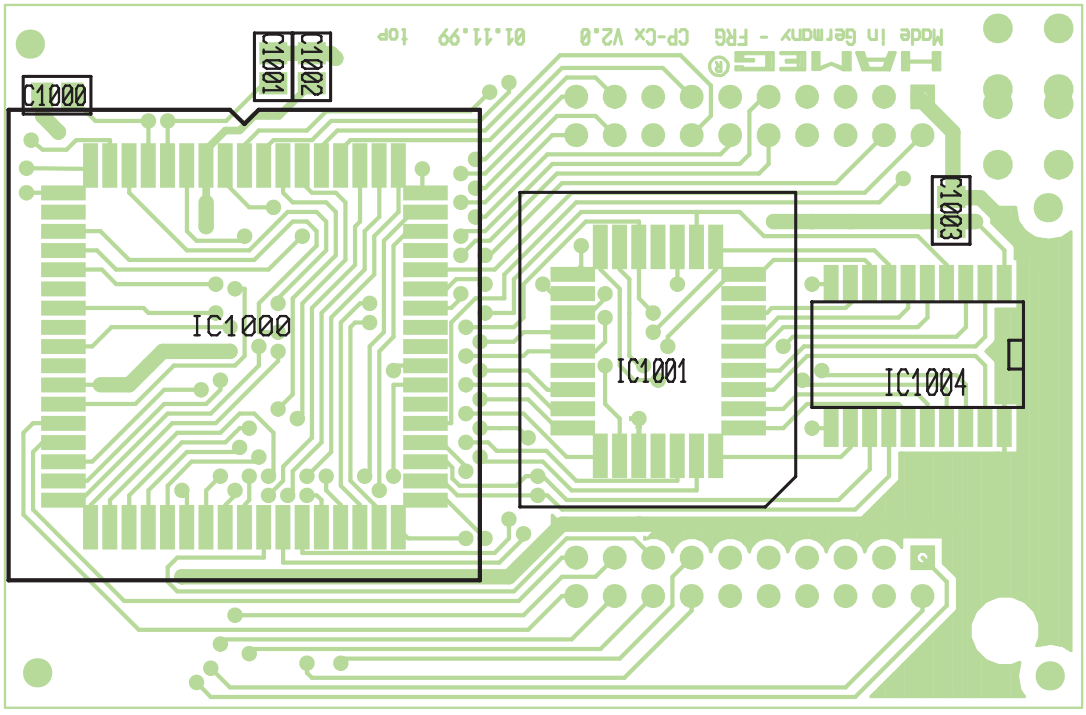

FCxx4/7
HAMEG
LS
Made in Germany 970911

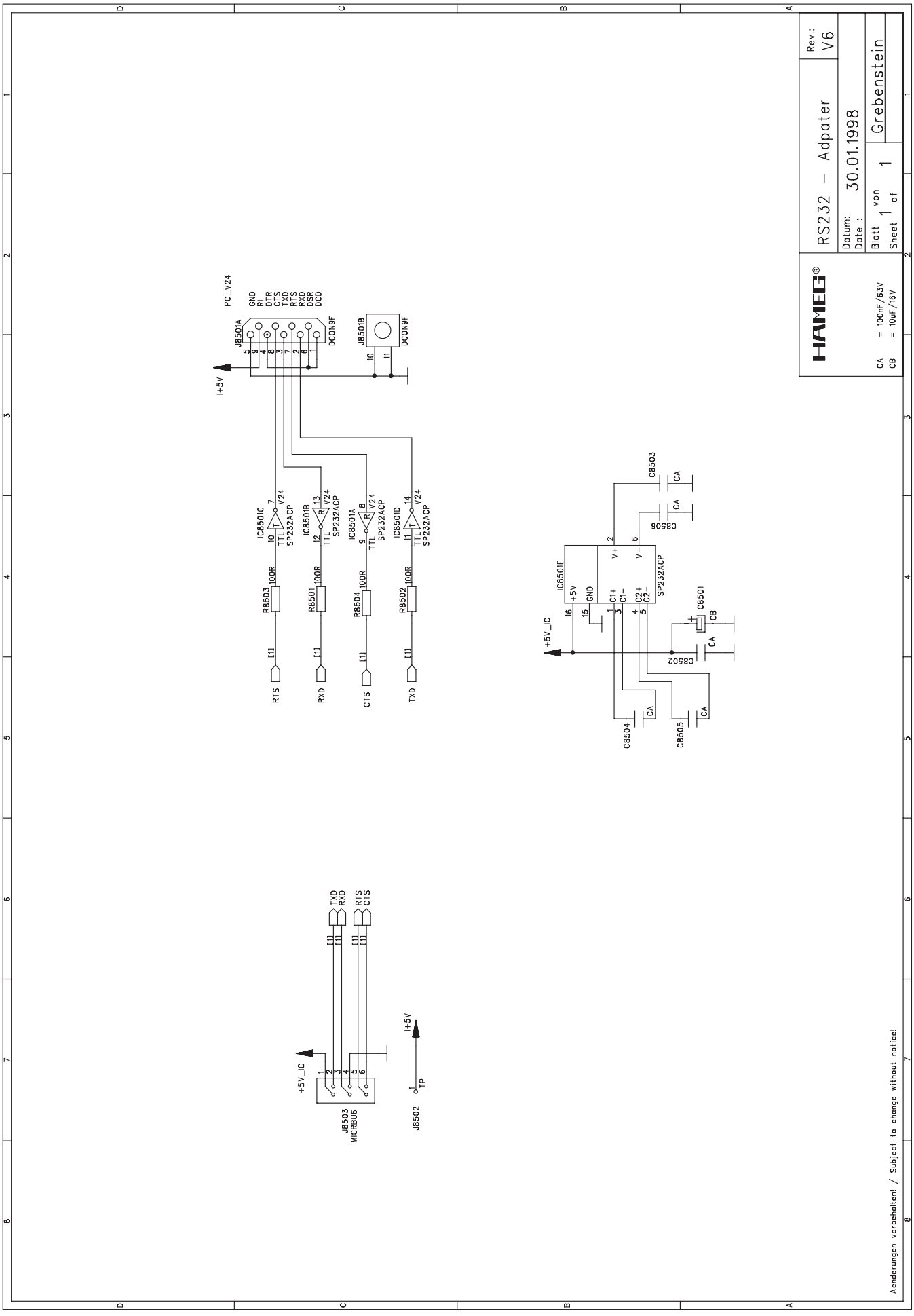

FCxx4/7
STEC16B03
STEC16B04
JPS2286NA
JPS2271M
74HC4094
MICRBU6
Z86C08
12MHZ
BC850C
BZV55C7V5
93LC76
QMX-05P
MMBT3640
P20/2B
10K_LIN
4K7_LIN
MOLEX_3
L=115mm
Made in Germany 970911
HAMEG
BS

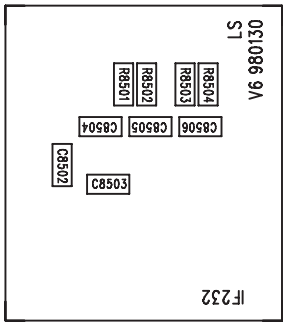

FCxx4/7
Made in Germany 970911
HAMEG
BS

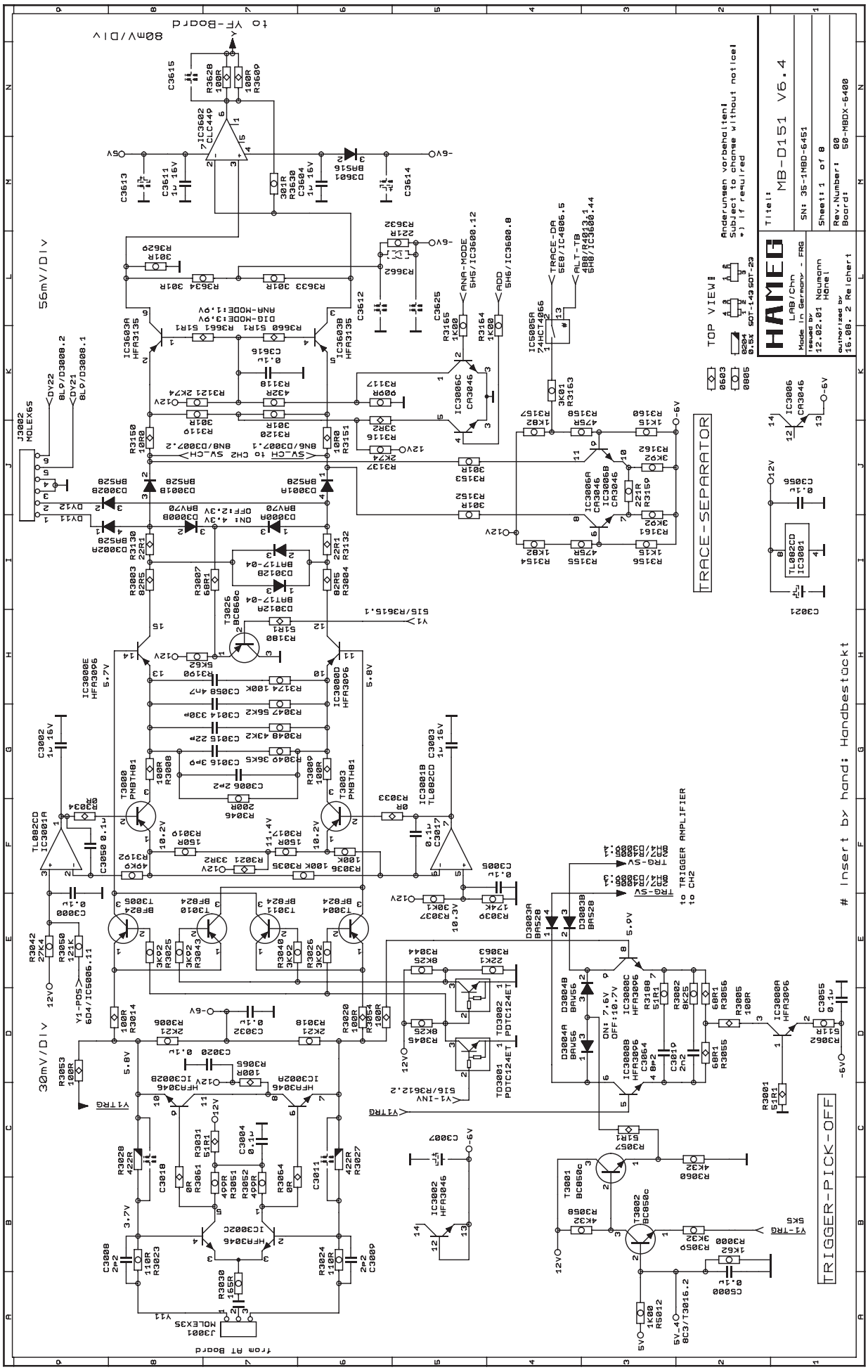

HAMEG
Made in Germany - FRG
Title: CP-C00 V2.0
No:
Sheet: 1 of 1
Rev.Number:
Board: CP-Cx V2.0
IC1000A Z86C96 16VSC
IC1001 AM27CS12 120JC5
IC1004A 74HC374
Q1001 14.7456MHz
C1000 68p
C1001 68p
C1002 0.1µ
C1003 0.1µ
J1002 Connector 10 x 2
J1001 Connector 10 x 2
+A-BUS
+AD
+5V_CPU
SCS1
COUNT_I
SDI
SDO
SCLK
CTS
STB_LED
CS2
CS1
DATA_REQ
PF
TR_LED
AD7
AD6
AD5
AD4
AD3
AD2
AD1
AD0
+5V_CPU
P61
P62
TXD
RXD
RESET
R/V
DS
AS
CS_DIG
TR_INT
RTS
SPEAKER
CS_EEPM
CS_DREH
TZ0
TZ1
TZ2
TZ3

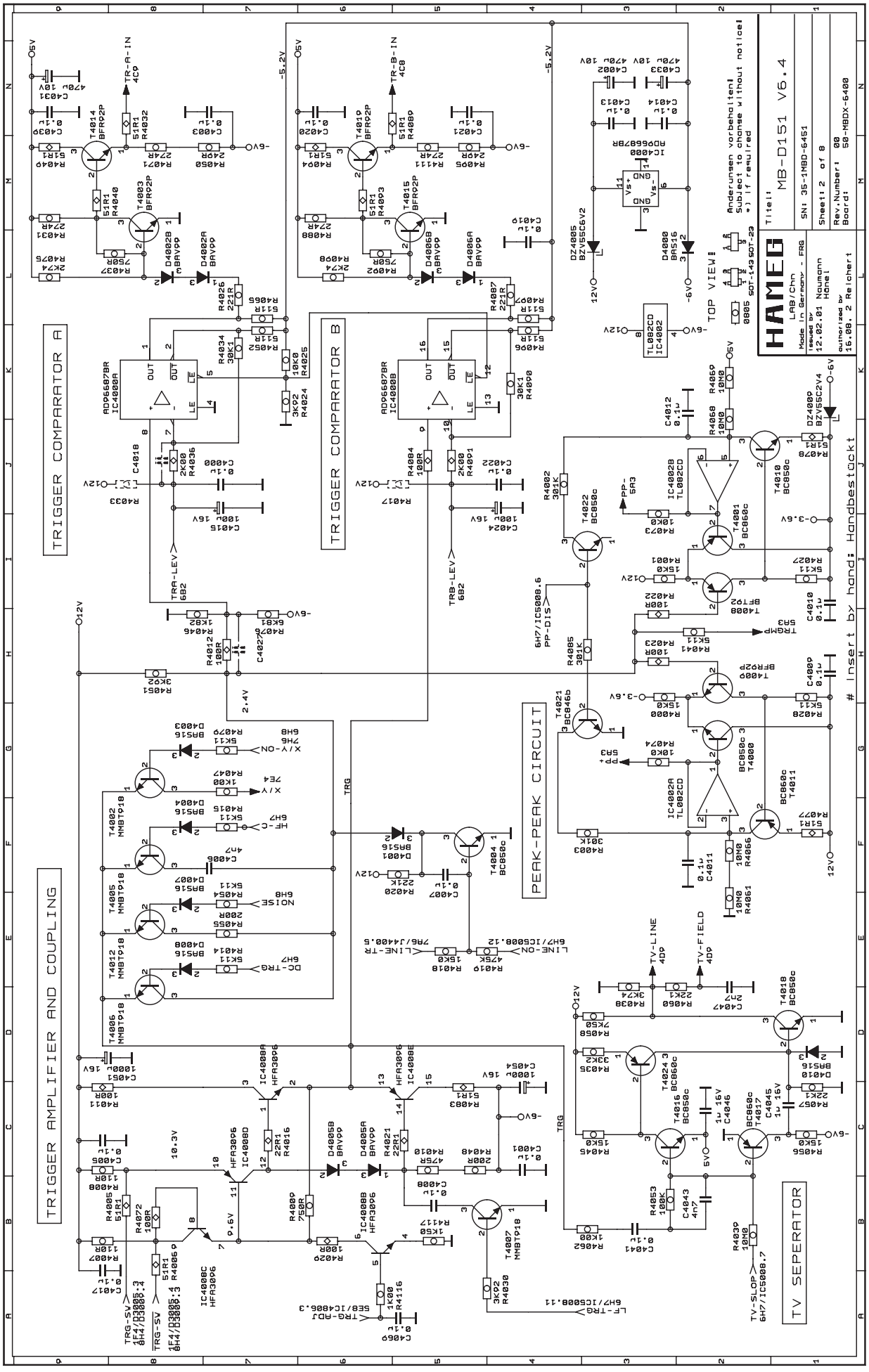

Q1001
J1001
J1002

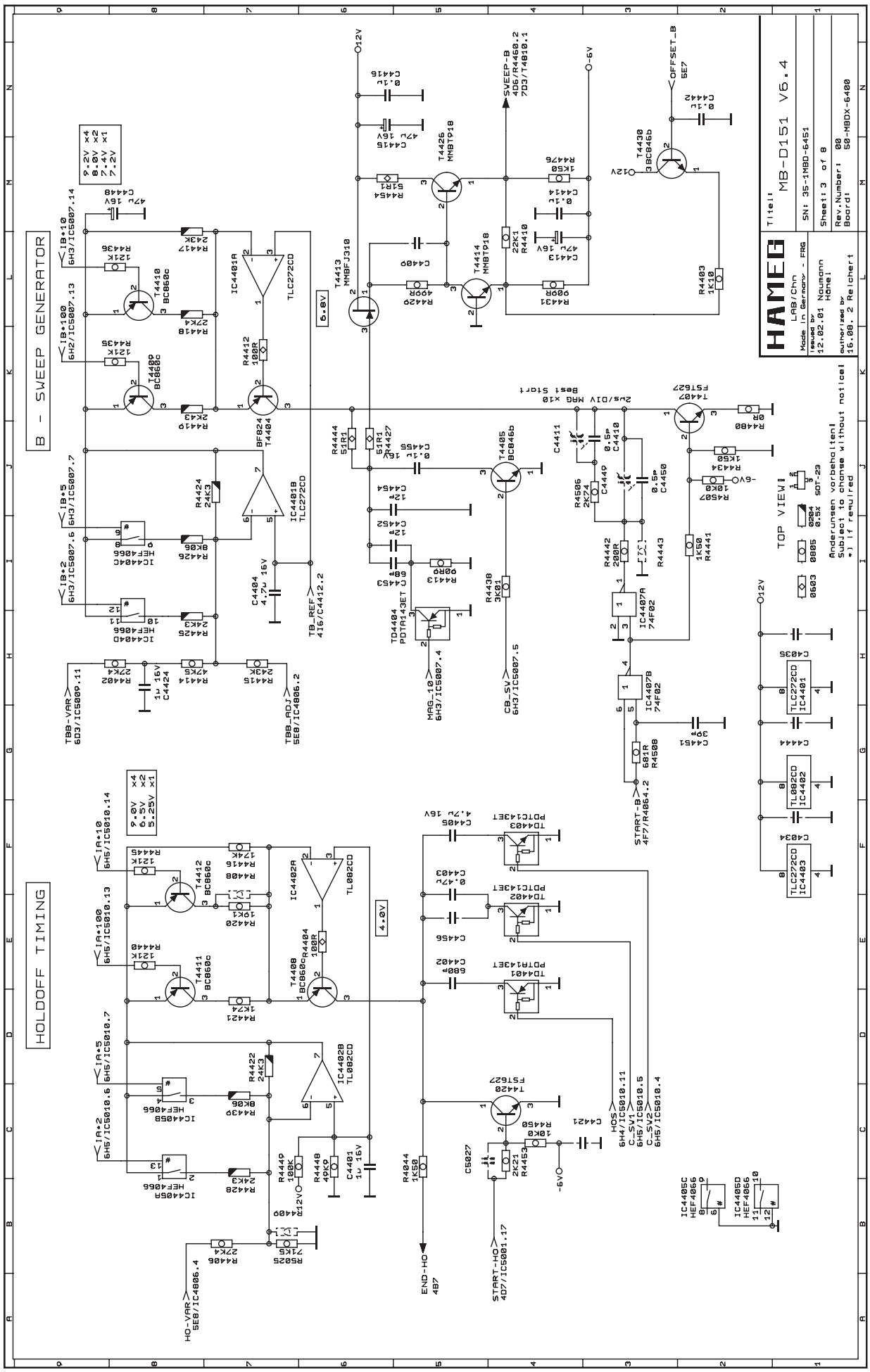

C1000
C1001
C1002
C1003
IC1000
IC1001
IC1004

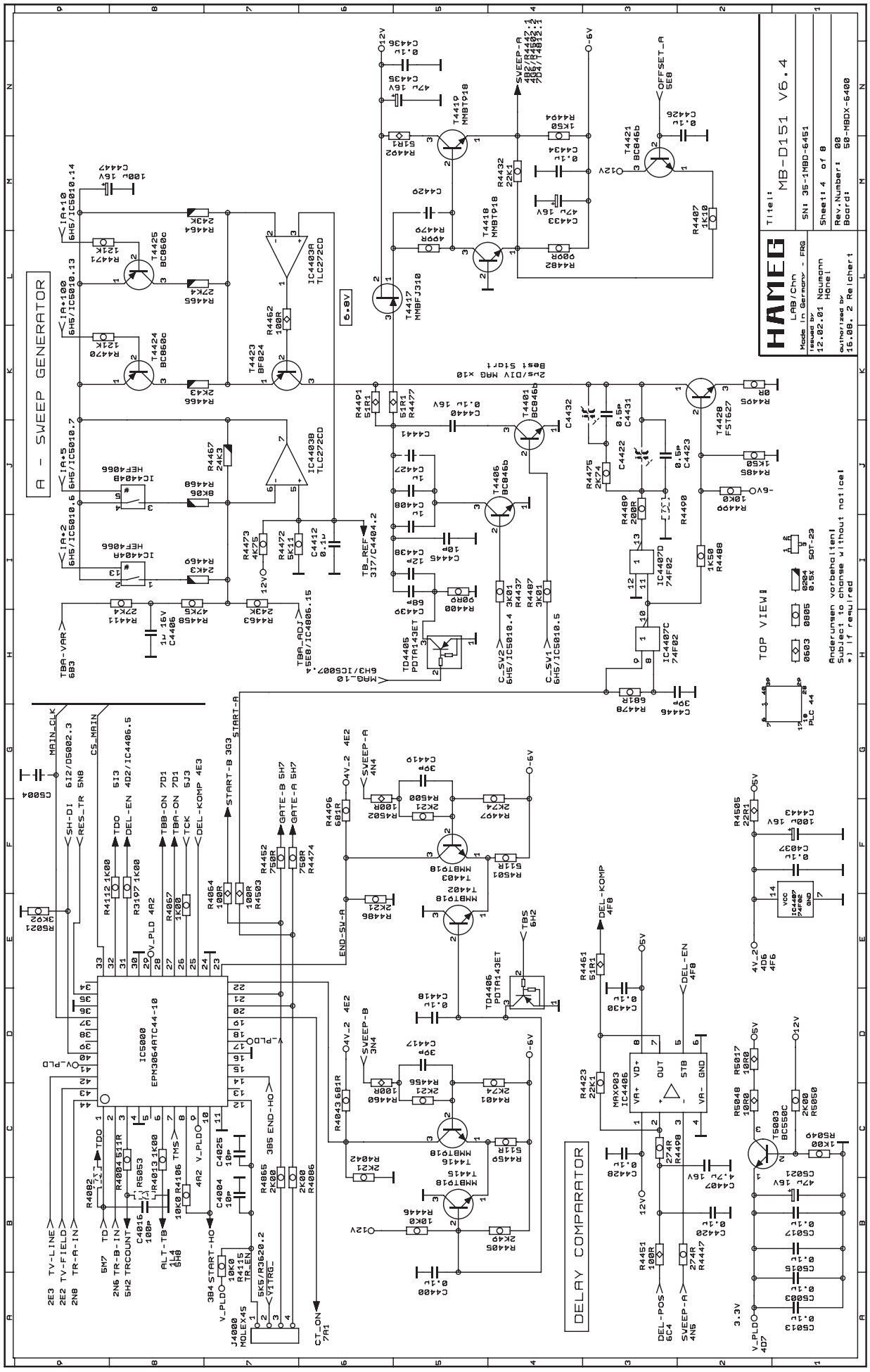

HAMEG®
RS232 – Adpater
Rev.: V6
Datum: 30.01.1998
Date :
Blatt 1 von 1
Sheet 1 of 1
Grebenstein
CA = 100nF/63V
CB = 10uF/16V
Aenderungen vorbehalten! / Subject to change without notice!
PC_V24
GND
RI
DTR
CTS
TXD
RTS
RXD
DSR
DCD
J8501A
DCON9F
J8501B
DCON9F
I+5V
IC8501C
IC8501B
IC8501A
IC8501D
SP232ACP
R8503 100R
R8501 100R
R8504 100R
R8502 100R
RTS
RXD
CTS
TXD
IC8501E
+5V
GND
C1+
C1-
C2+
C2-
V+
V-
SP232ACP
C8501
CB
C8502
C8503
C8504
C8505
C8506
CA
+5V_IC
J8503
MICRBU6
J8502
TP

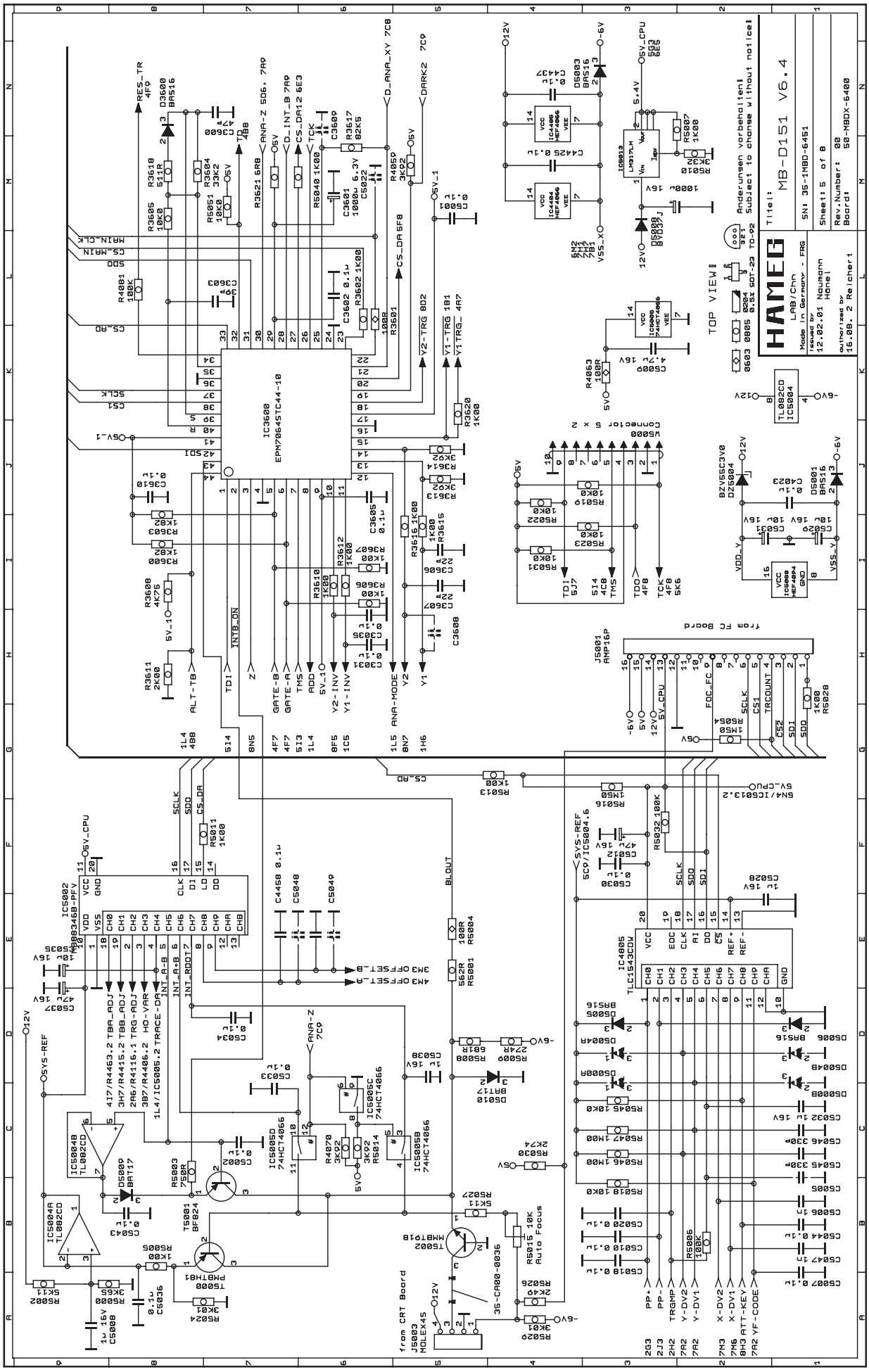

LS
V6 980130
R8501
R8502
R8503
R8504
C8506
C8505
C8504
C8502
C8503
IF232

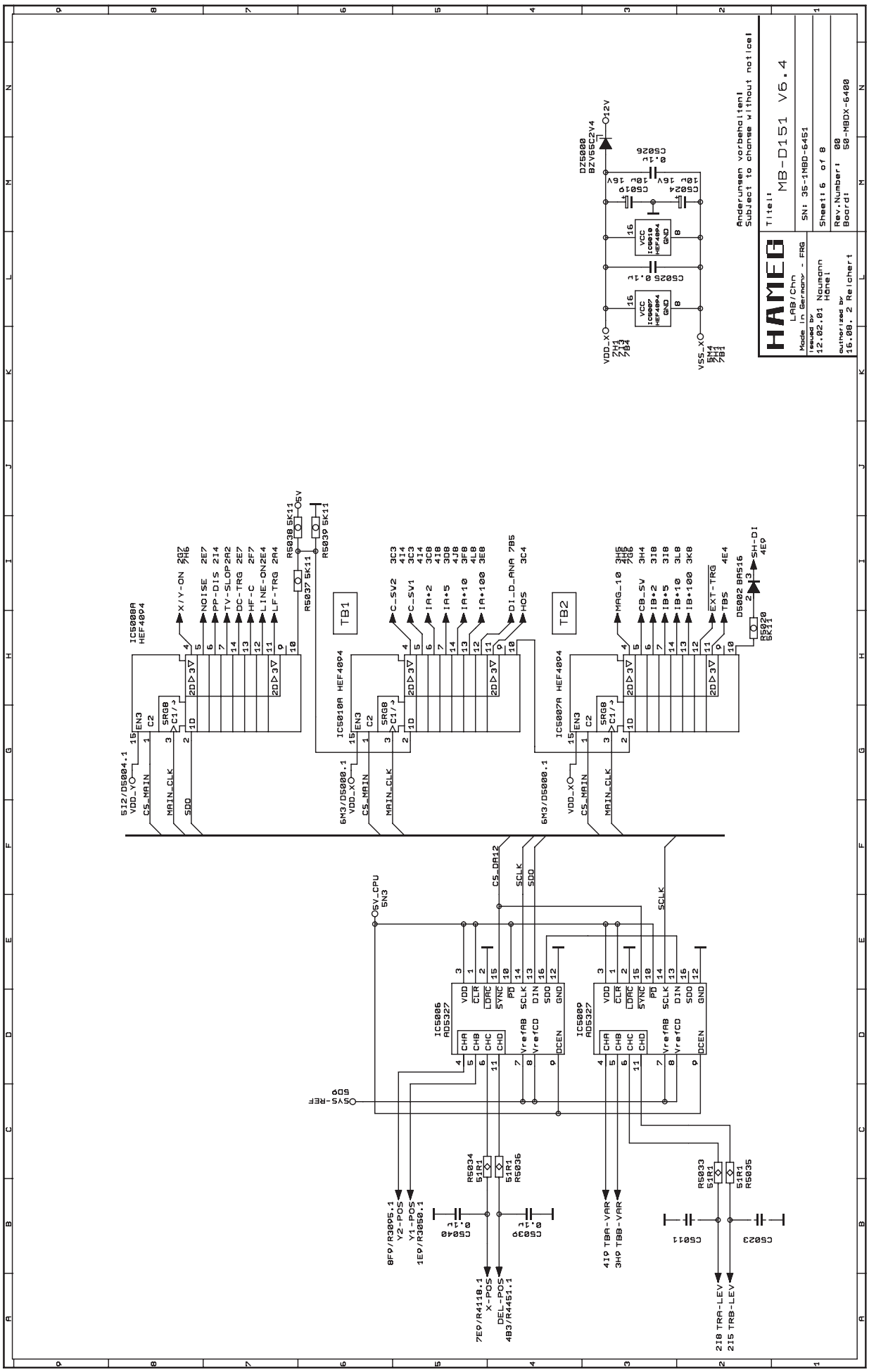

TRACE-SEPARATOR
TRIGGER-PICK-OFF
MB-D151 V6.4
HAMEG
TOP VIEW!
Insert by hand: Handbestückt
from AT Board
to VF-Board
to TRIGGER AMPLIFIER to CH2
80mV/Div
56mV/Div
30mV/Div

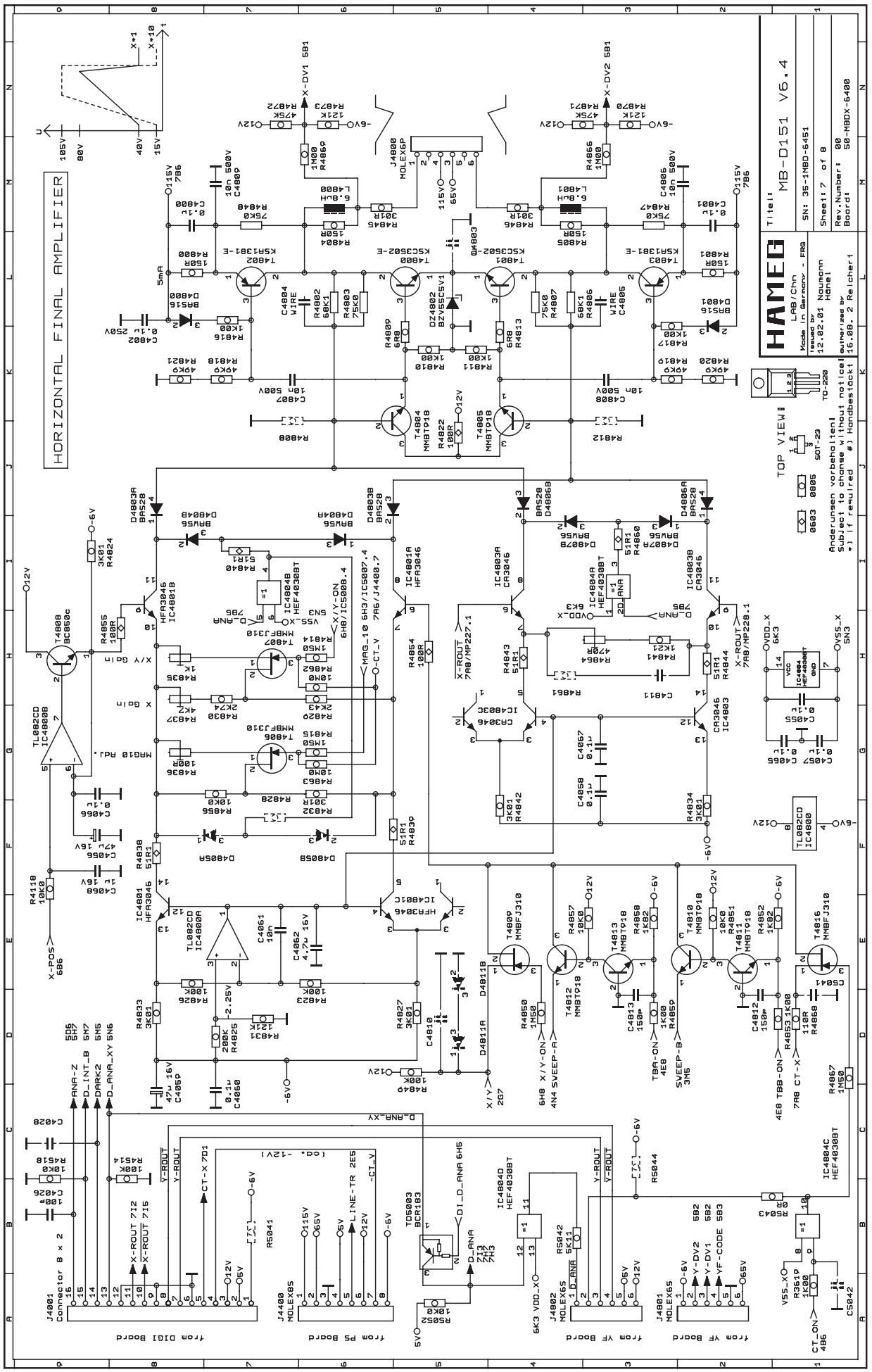

TRIGGER COMPARATOR A
TRIGGER COMPARATOR B
TRIGGER AMPLIFIER AND COUPLING
PEAK-PEAK CIRCUIT
TV SEPERATOR
TOP VIEW!
HAMEG
MB-D151 V6.4
Insert by hand: Handbestückt

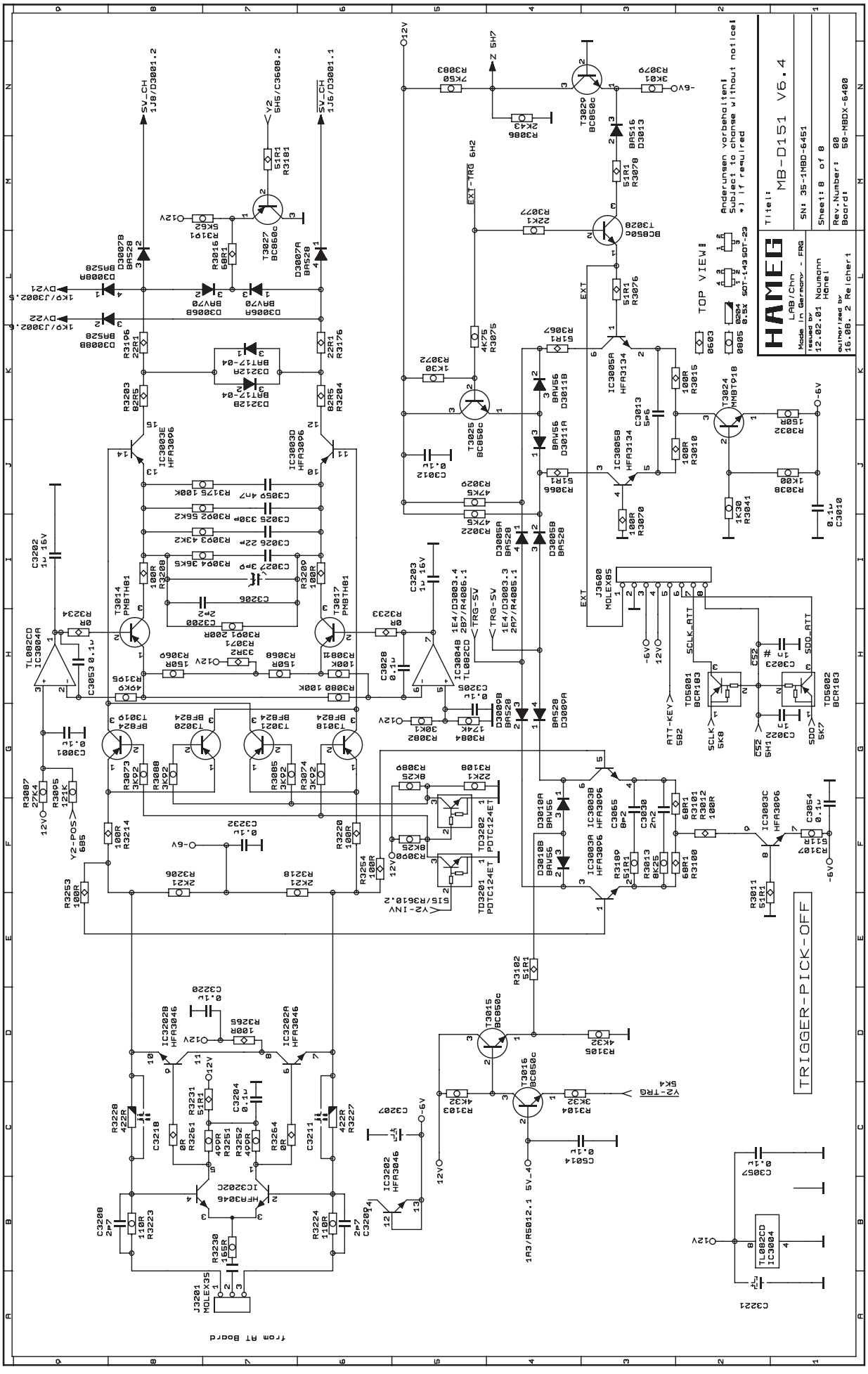

B - SWEEP GENERATOR
HOLDOFF TIMING
HAMEG
MB-D151 V6.4
SN: 35-1MBD-6451
Sheet: 3 of 8
Rev.Number: 00
Board: 58-MBDX-6400
TOP VIEW
Änderungen vorbehalten!
Subject to change without notice!
* if required

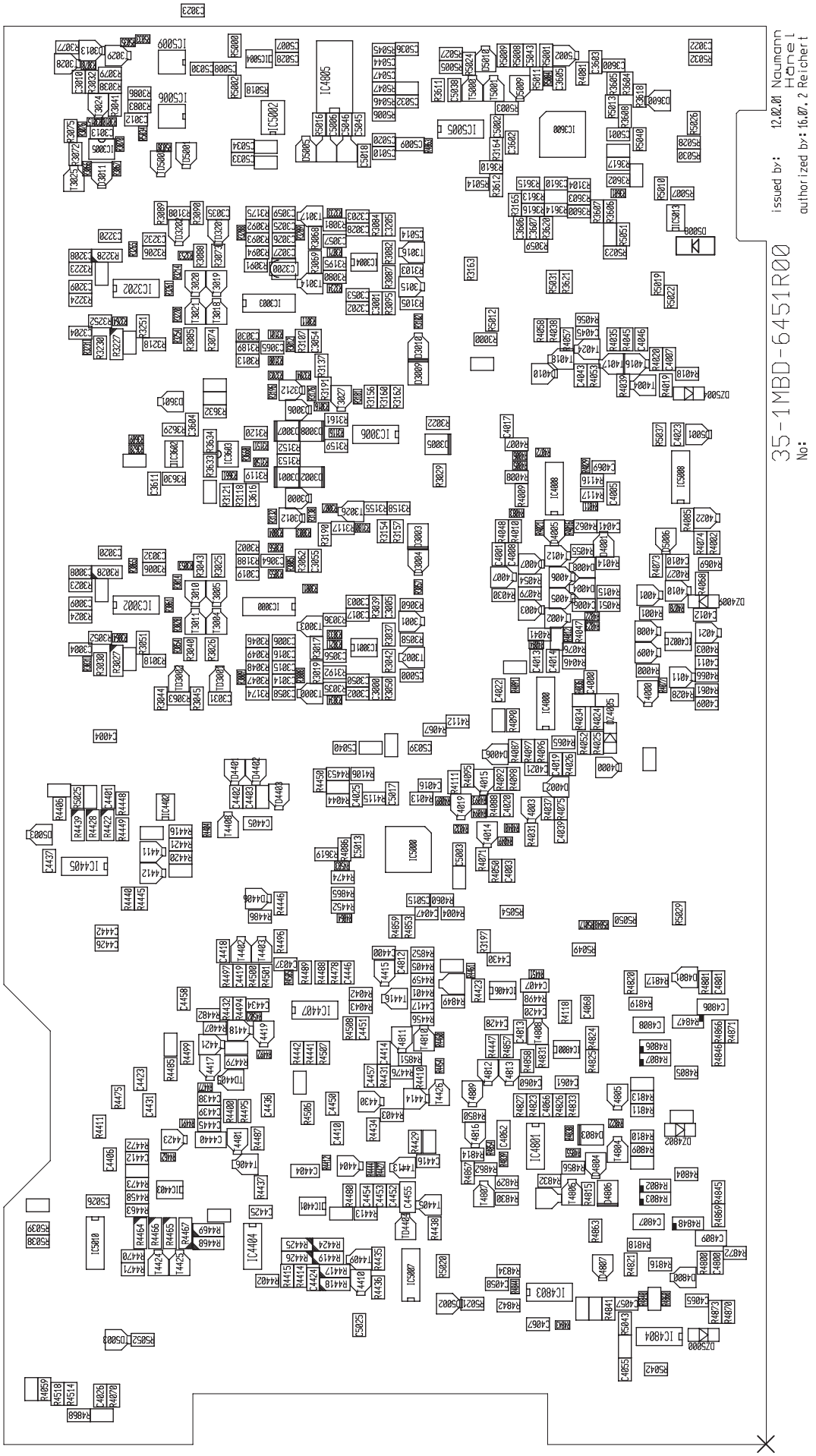

A - SWEEP GENERATOR
DELAY COMPARATOR
HAMEG
Titel: MB-D151 V6.4
SN: 35-1MBD-6451
Sheet: 4 of 8
Rev.Number: 00
Board: 50-MBDX-6400
TOP VIEW
Änderungen vorbehalten!
Subject to change without notice!
*) if required

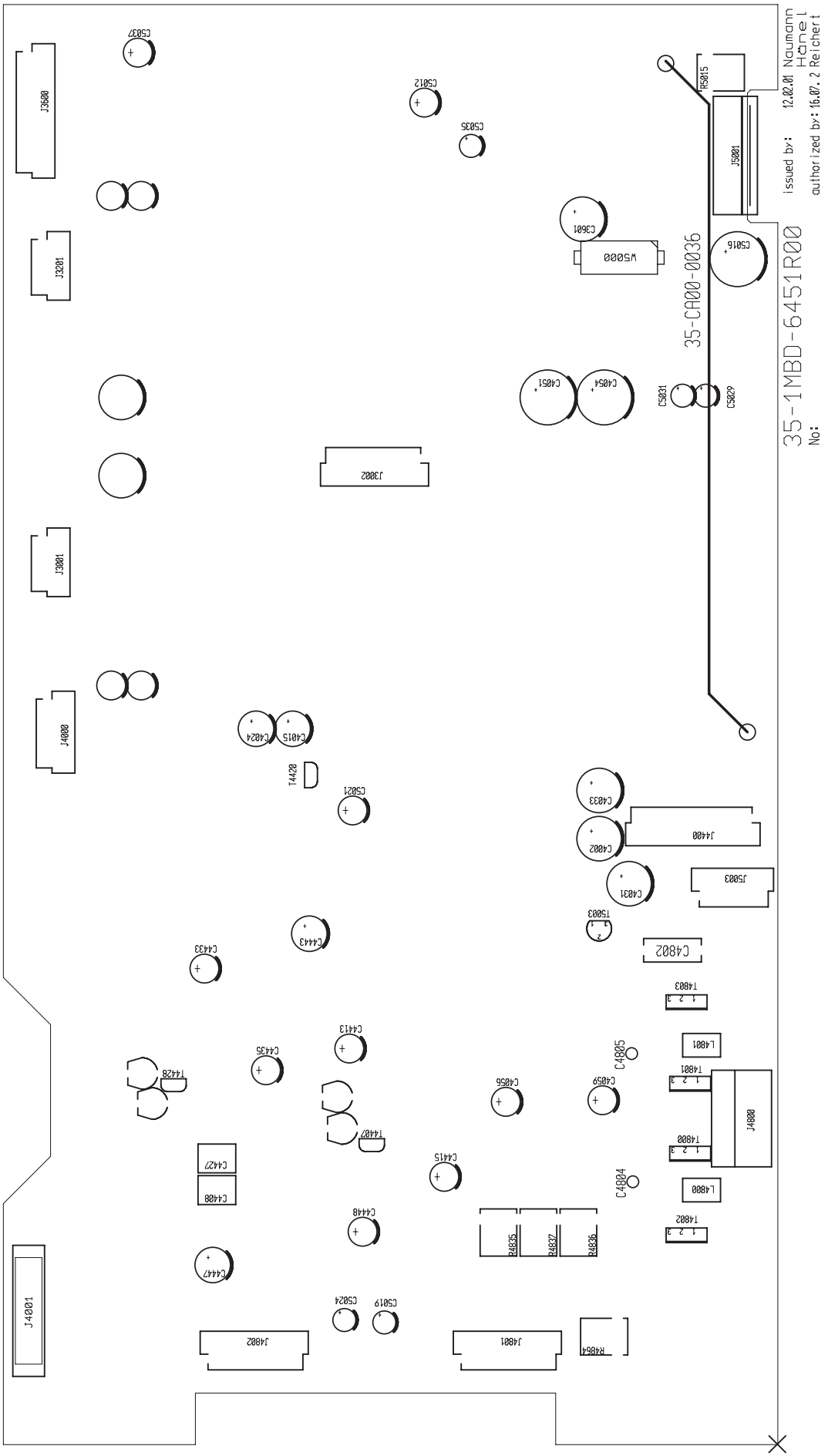



HAMEG
MB-D151 V6.4
SN: 35-1MBD-6451
Sheet: 6 of 8
Rev.Number: 00
Board: 50-MBDX-6400
Änderungen vorbehalten!
Subject to change without notice!
TB1
TB2
IC5008A HEF4094
IC5010A HEF4094
IC5007A HEF4094
IC5006 AD5327
IC5009 AD5327
DZ5000 BZV55C2V4
D5002 BAS16
X/Y-ON
NOISE
PP-DIS
TY-SLOP
DC-TRG
HF-C
LINE-ON
LF-TRG
C_SV2
C_SV1
IA+2
IA+5
IA+10
IA+100
DI_D_ANA
HOS
MAG_10
CB_SV
IB+2
IB+5
IB+10
IB+100
EXT-TRG
TBS
CS_MAIN
MAIN_CLK
SDO
SCLK
VDD_X
VSS_X
+5V_CPU
+5V_REF
+12V
X-POS
Y2-POS
Y1-POS
DEL-POS
TRA-VAR
TRB-VAR
TRA-LEV
TRB-LEV


HORIZONTAL FINAL AMPLIFIER
HAMEG
Title: MB-D151 V6.4
SN: 35-1MBD-6451
Sheet: 7 of 8
Rev.Number: 00
Board: 50-MBDX-6400
Made in Germany - FRG
Issued by: Naumann Hänel
Authorized by:
Änderungen vorbehalten! Subject to change without notice! *) If required
TOP VIEW
SOT-23
TO-220
from DIGI Board
from PS Board
from VF Board
from VF Board


TRIGGER-PICK-OFF
TOP VIEW!
HAMEG
MB-D151 V6.4
Änderungen vorbehalten!
Subject to change without notice!
+) if required
Made in Germany - FRG
Issued by
12.02.01 Naumann
Manel
authorized by
16.08.2 Reichert
SN: 35-1MBD-6451
Sheet: 8 of 8
Rev.Number: 00
Board: 50-MBDX-6400
from AT Board


35-1MBD-6451R00
issued by: 12.02.01 Naumann Hänel
authorized by: 16.07. 2 Reichert
No:


35-1MBD-6451R00
No:
issued by: 12.02.01 Naumann Hünel
authorized by: 16.07.2 Reichert
35-CA00-0036
J3600
J3201
J3001
J4000
J4001
J3002
J4400
J5003
J4800
J4802
J4801
J5001
W5000
R5015
R4864
R4835
R4837
R4836
T4420
T4428
T4407
T5003
T4803
T4801
T4800
T4802
L4801
L4800
C4802
C4805
C4804
C5037
C5012
C5035
C5016
C5031
C5029
C4051
C4054
C4015
C4024
C5021
C4033
C4002
C4031
C4443
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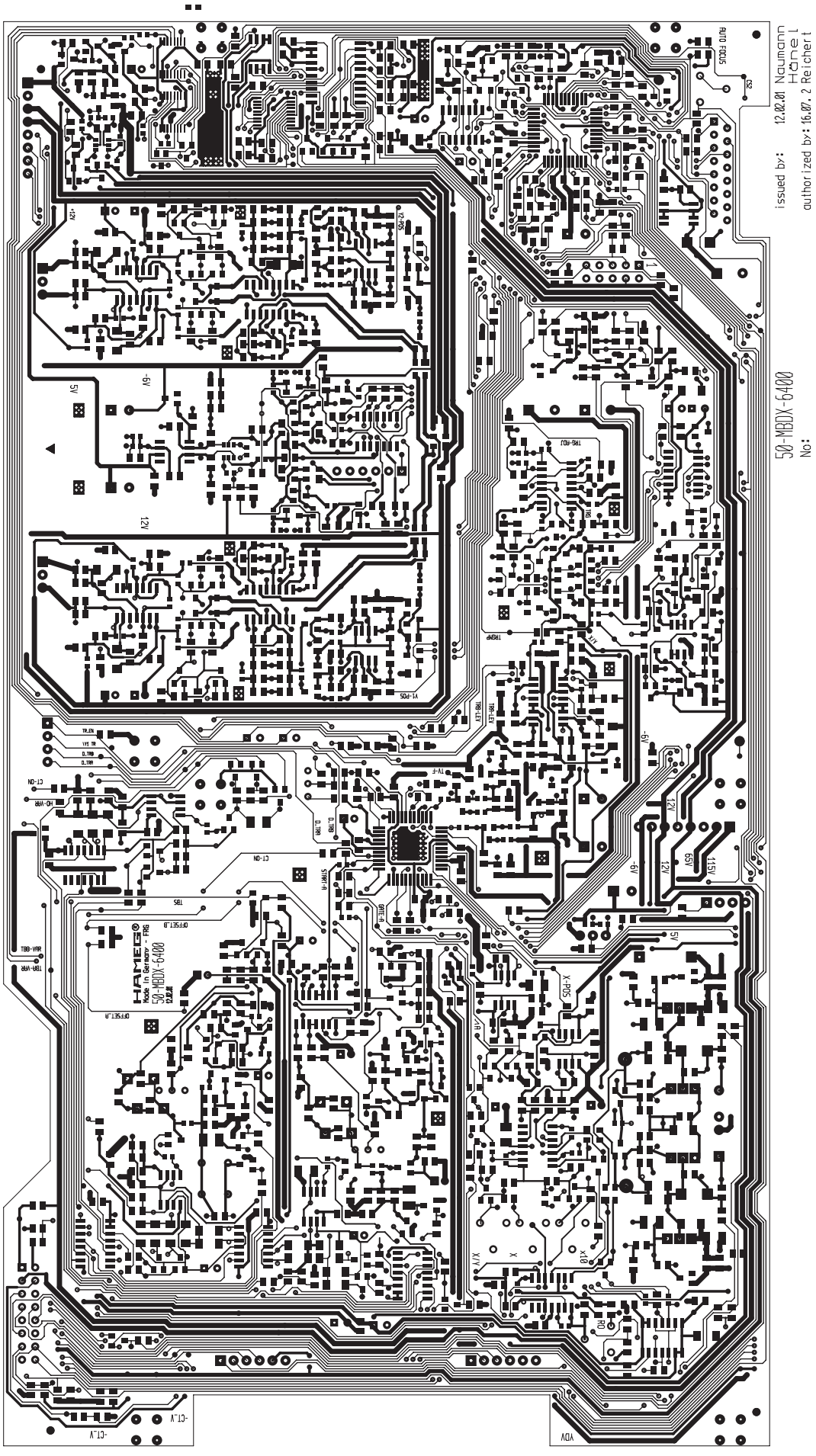
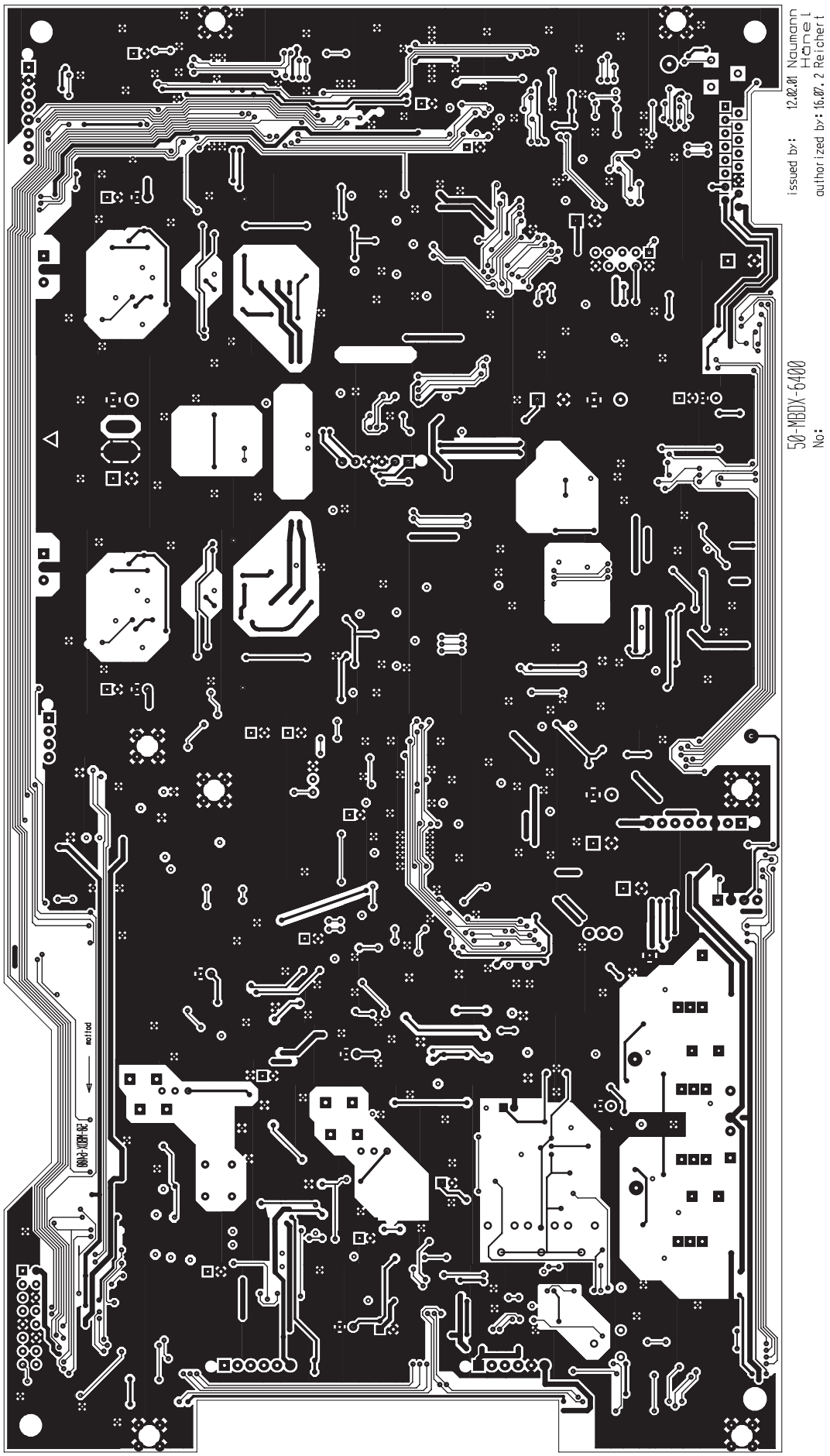
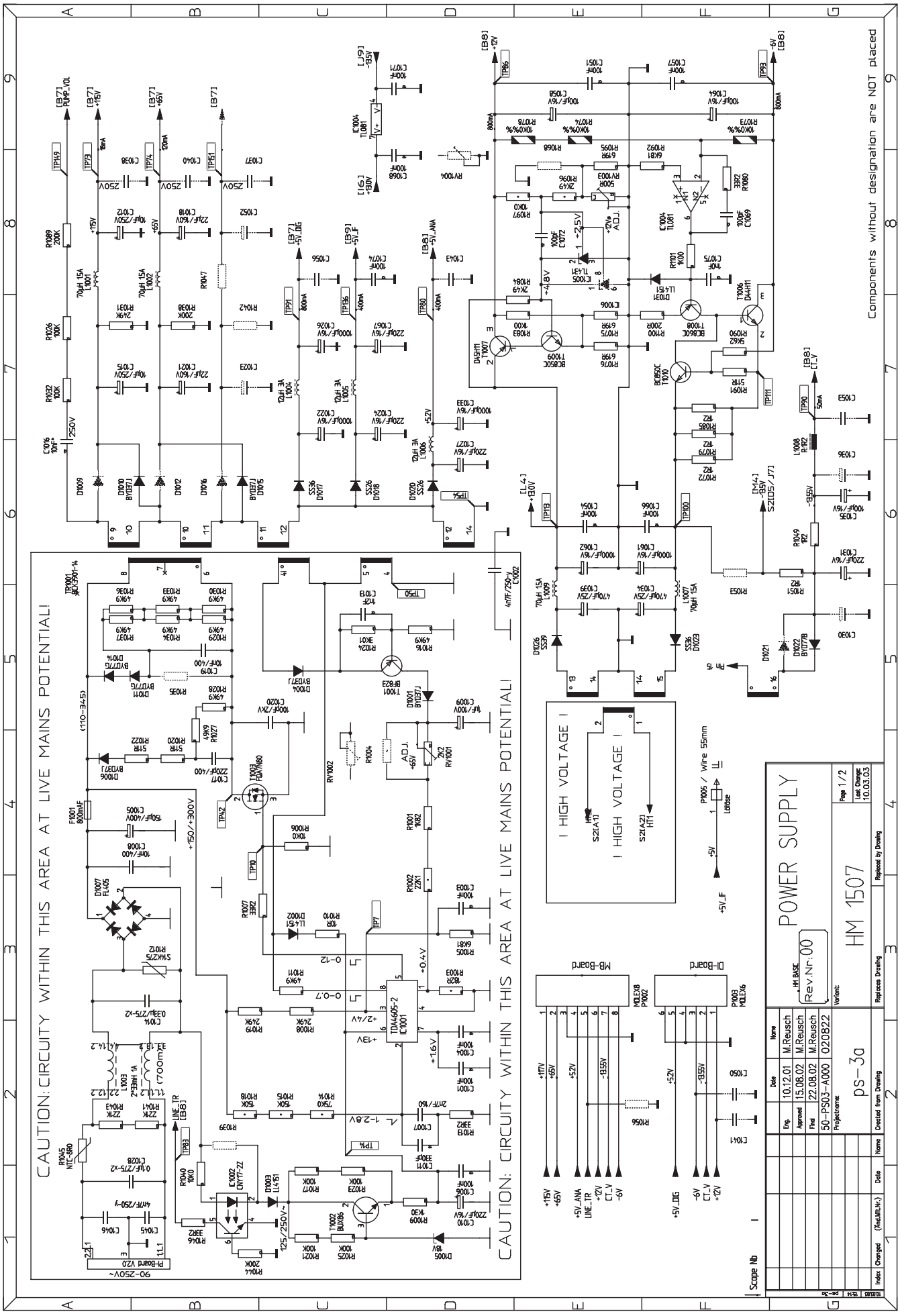
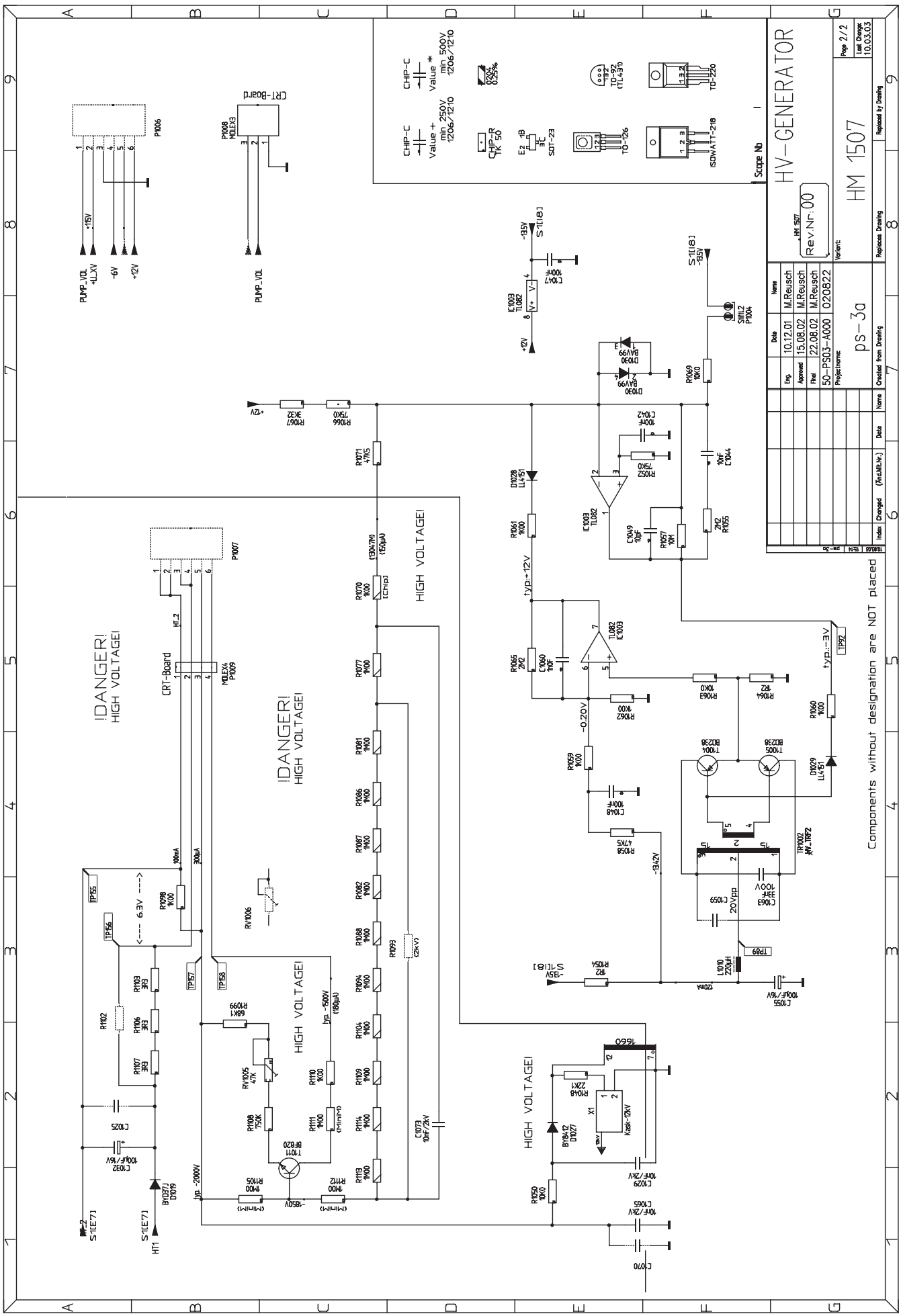
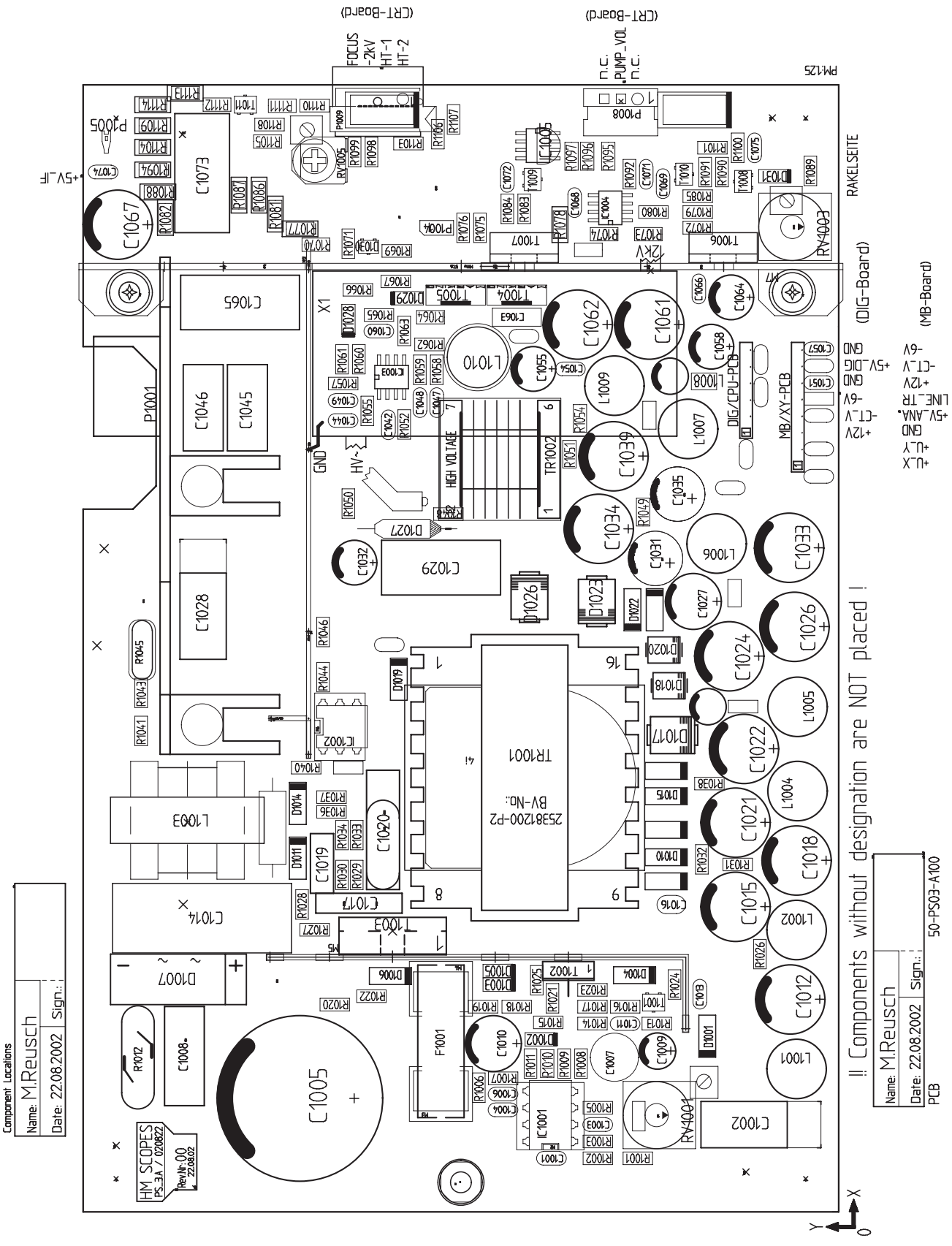
C4427
C4408
C4448
C4447
C5024
C5019

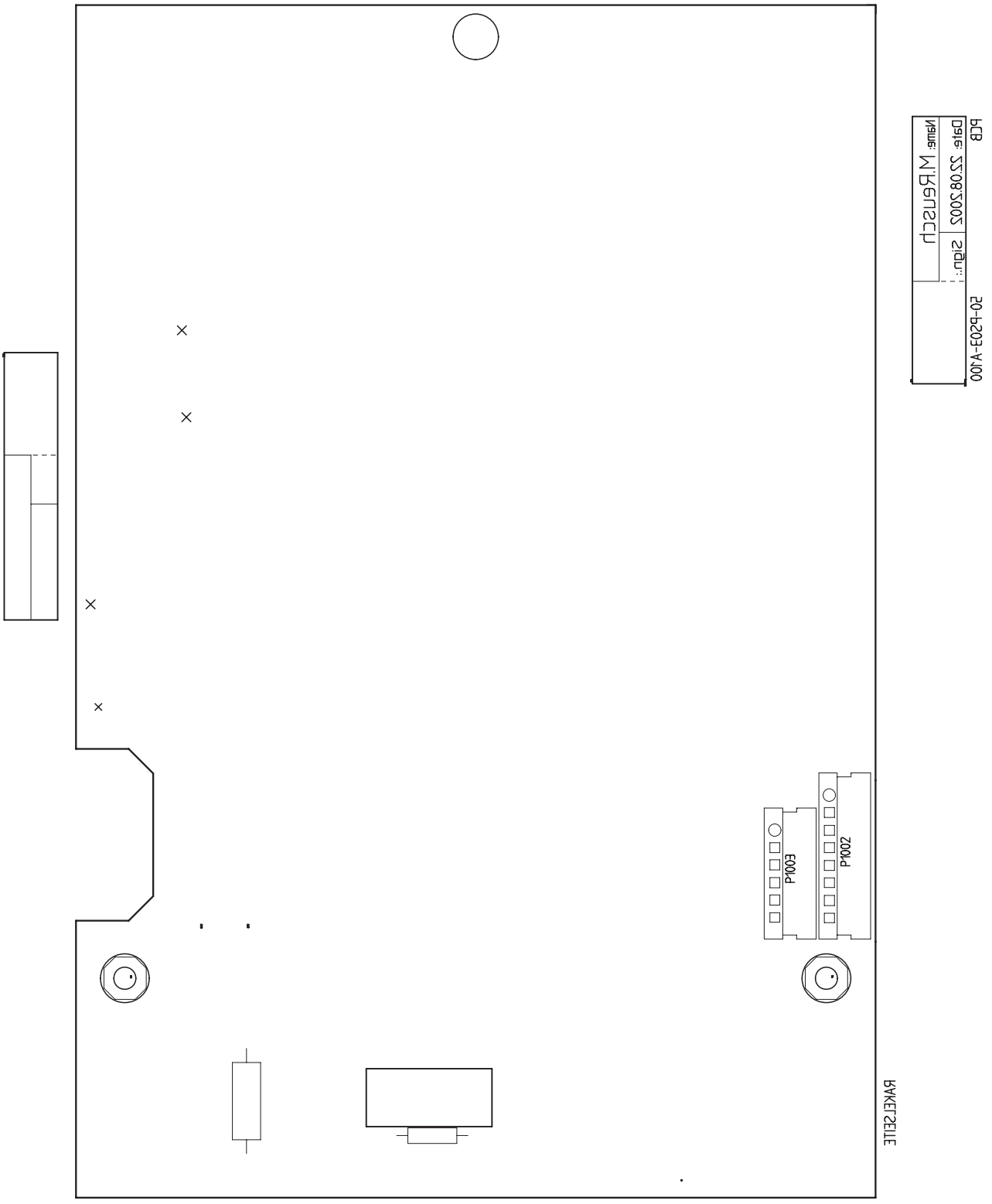

issued by: 12.02.01 Naumann Hänel
authorized by: 16.07.2 Reichert
50-MBDX-6400
No:
HAMEG
Made in Germany - PRS
50-MBDX-6400
12.01

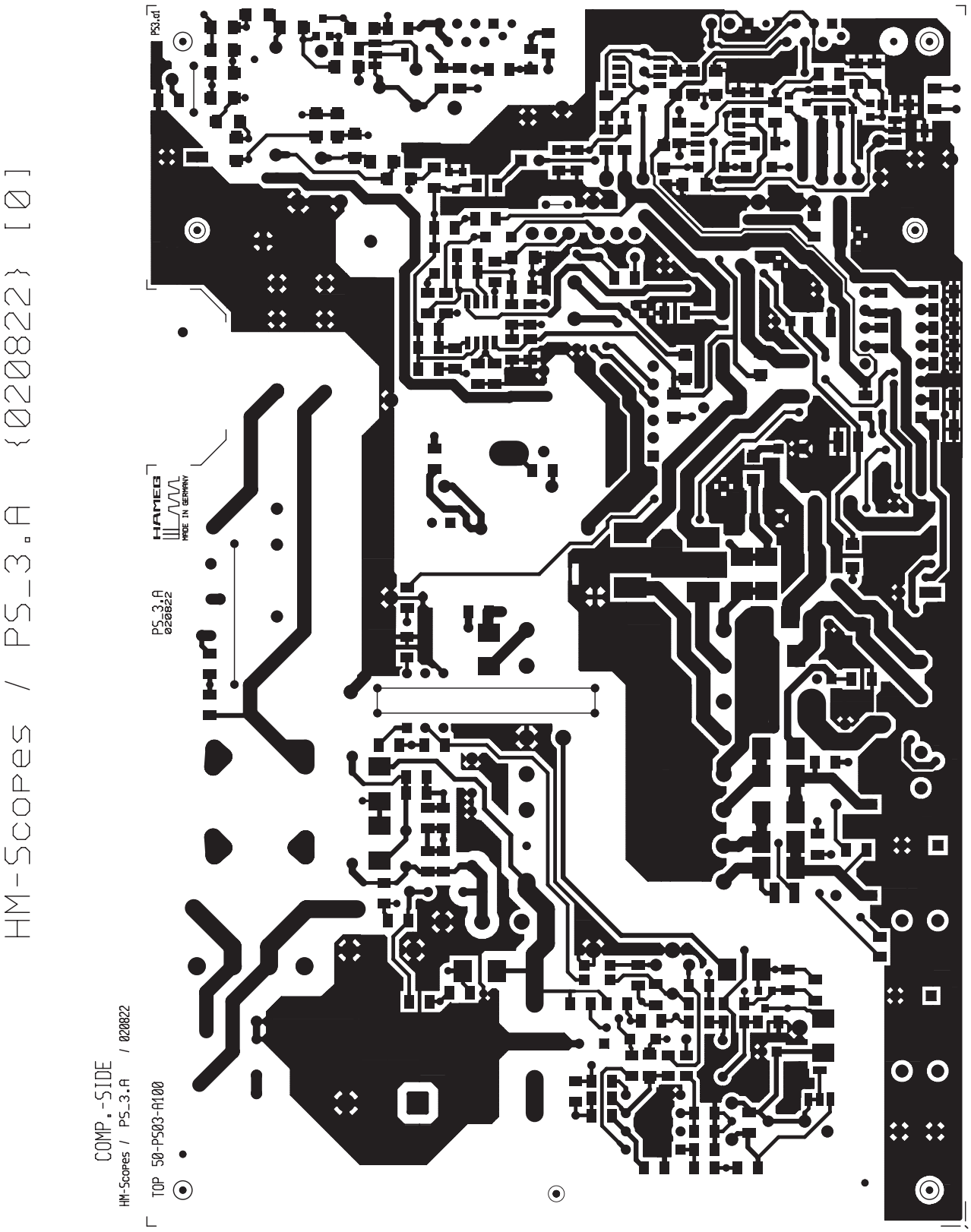

issued by: 12.02.01 Naumann Hänel
authorized by: 16.07.2 Reichert
50-MBDX-6400
No:
20-MBDX-6400
Point


CAUTION: CIRCUITY WITHIN THIS AREA AT LIVE MAINS POTENTIAL!
CAUTION: CIRCUITY WITHIN THIS AREA AT LIVE MAINS POTENTIAL!
! HIGH VOLTAGE !
! HIGH VOLTAGE !
Components without designation are NOT placed
POWER SUPPLY
HM 1507
ps-3a
Rev.Nr.:00
Page 1/2
Last Change: 10.03.03
Eng. 10.12.01 M.Reusch
Approved 15.08.02 M.Reusch
Find 22.08.02 M.Reusch
50-PS03-A000 020822
MB-Board
DI-Board
Scope Nb

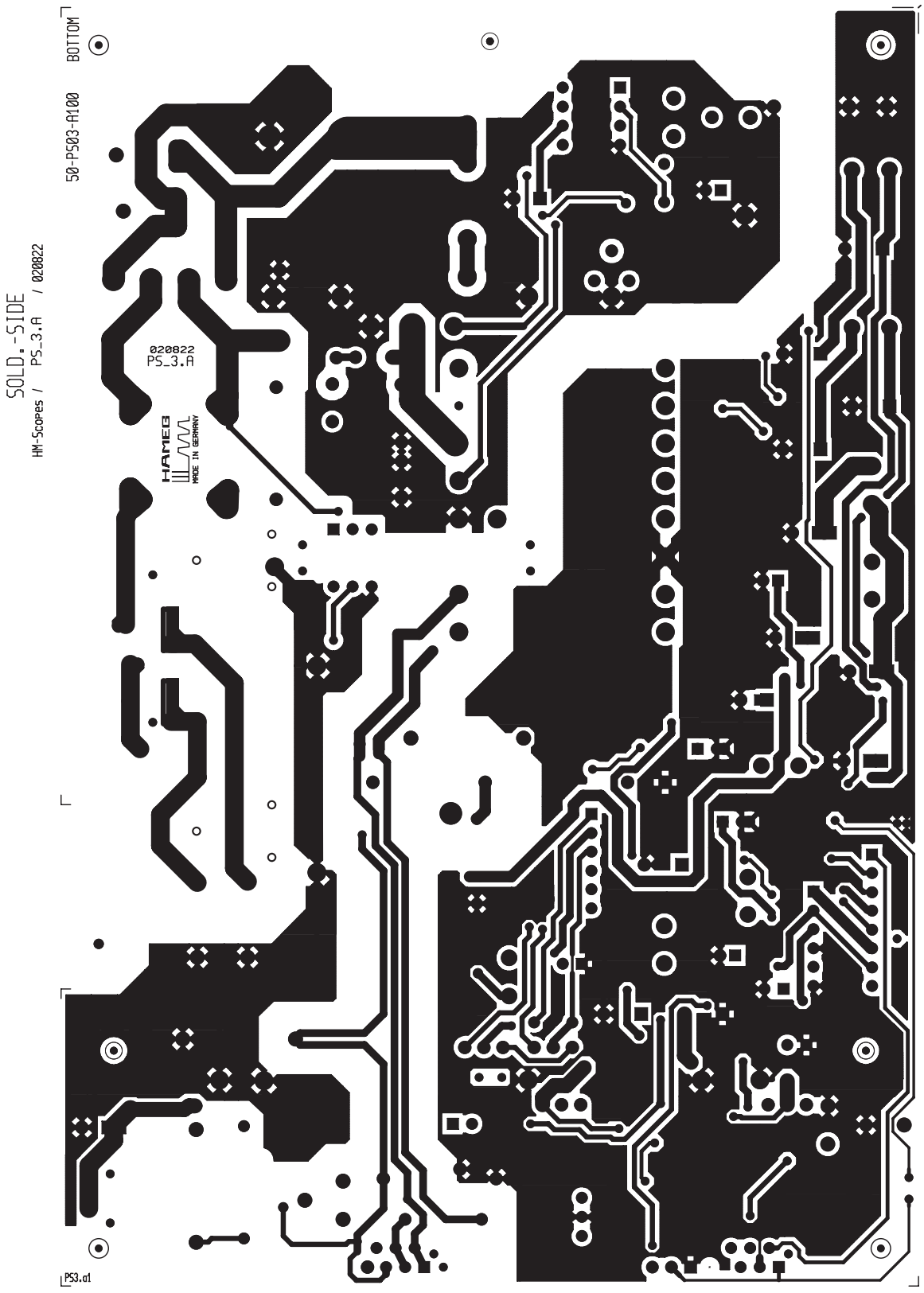

HV-GENERATOR
HM 1507
ps-3a
Components without designation are NOT placed
!DANGER!
HIGH VOLTAGE!
CRT-Board
PUMP_VOL
+115V
-6V
+12V
-135V
typ.+12V
typ.-3V
-0.20V
-1342V
20Vpp
-2000V
-1850V
typ. -5500V
6.3V

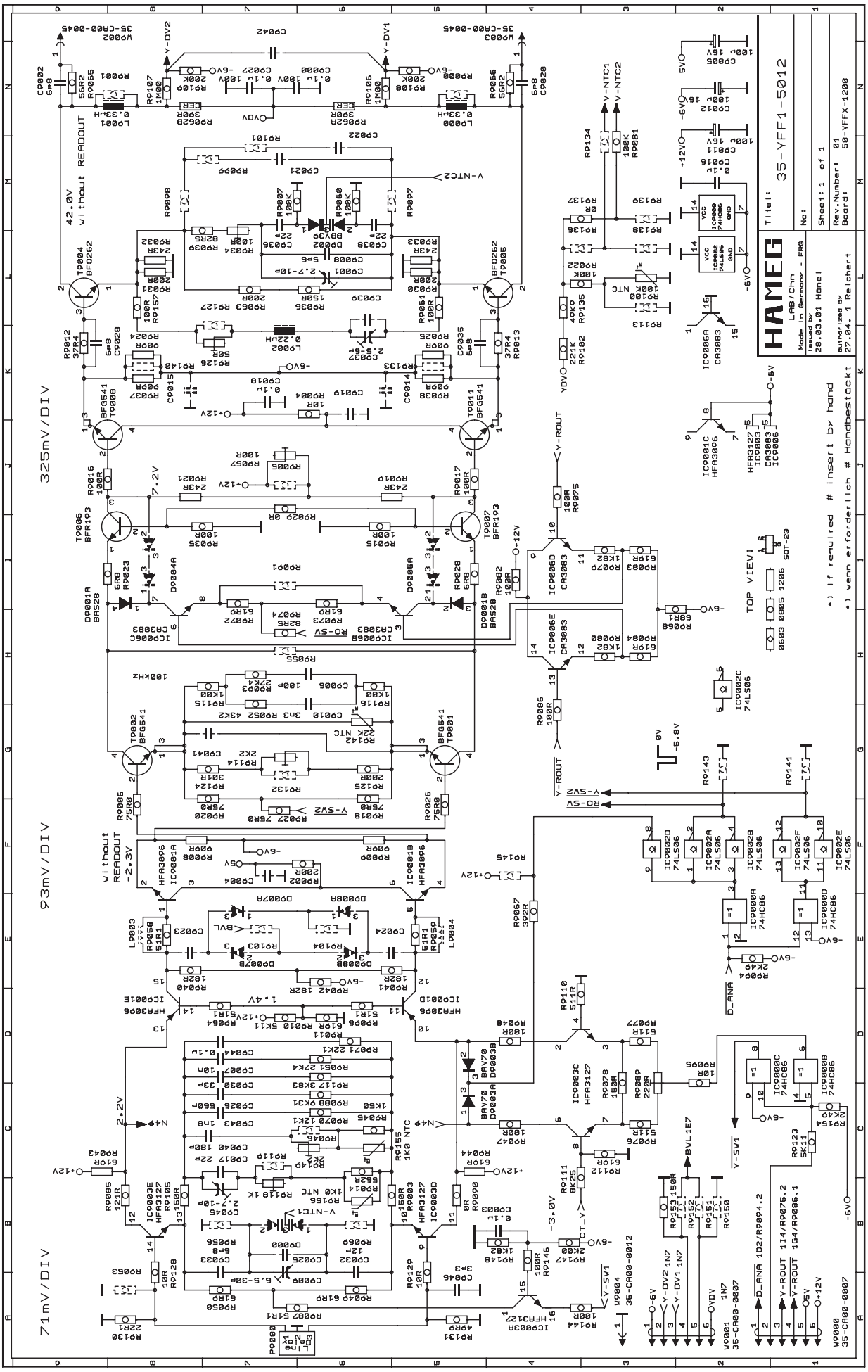

(CRT-Board)
FOCUS
-2kV
HT-1
HT-2
(CRT-Board)
n.c.
PUMP_VOL
n.c.
PM:125
RAKELSEITE
(DIG-Board)
(MB-Board)
+5V_JF
HIGH VOLTAGE
GND
HV~
TR1001
2538120O-P2
BV-No.:
TR1002
DIG/CPU-PCB
MB/XY-PCB
+12V
-CT_V
-6V
GND
+5V_DIG
GND
+12V
-CT_V
-6V
+5V_ANA
GND
+U_Y
+U_X
LINE_TR
!! Components without designation are NOT placed !
Component Locations
Name: M.Reusch
Date: 22.08.2002
Sign.:
HM_SCOPES
PS_3A / 020822
Rev.Nr: 00
22.08.02
Name: M.Reusch
Date: 22.08.2002
Sign.:
PCB
50-PS03-A100

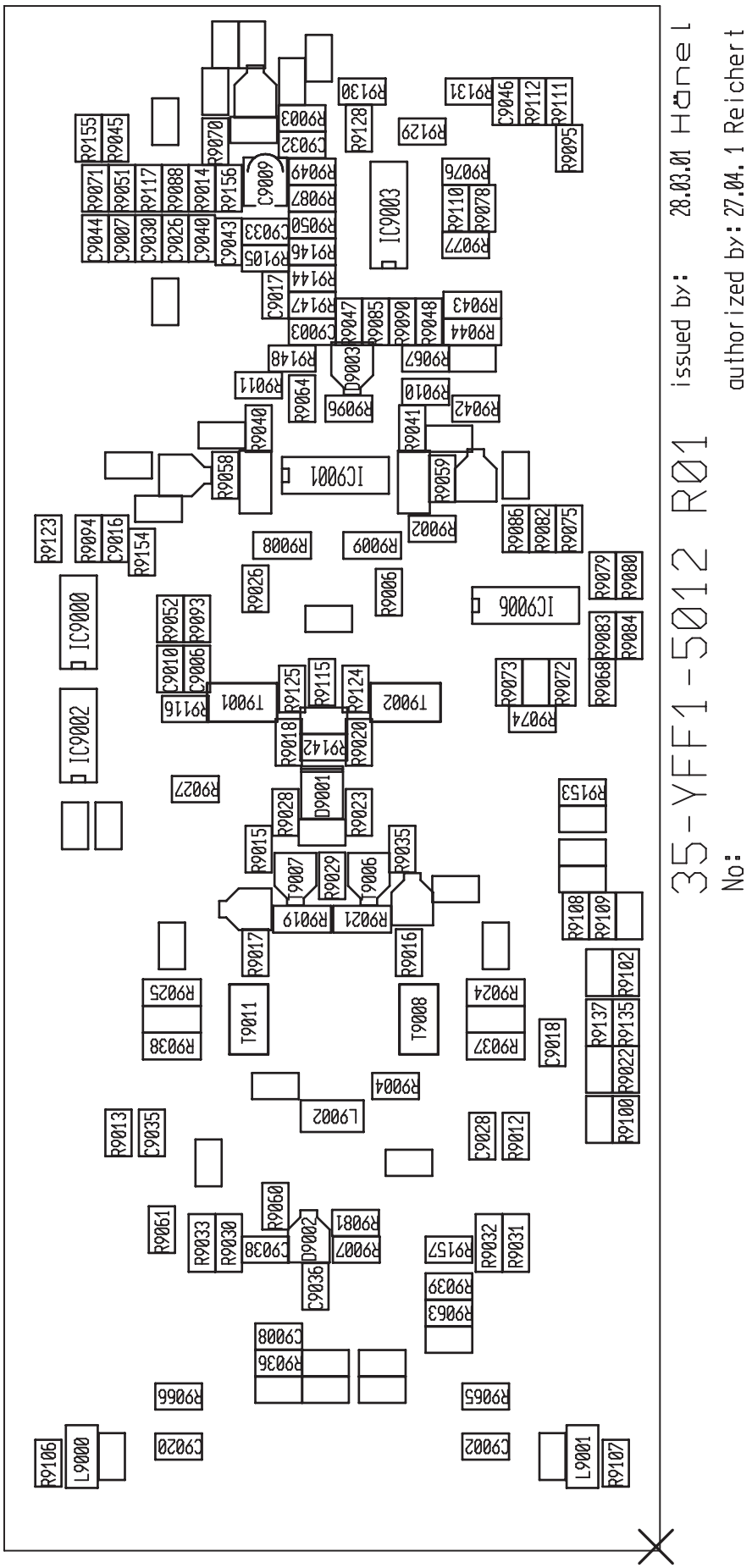

PCB
Date: 22.08.2002
Name: M.Rausch
20-4203-A100
P002
P003
BAKER ELITE


HM-Scopes / PS_3.A {020822} [0]
COMP.-SIDE
HM-Scopes / PS_3.A / 020822
TOP 50-PS03-A100
PS_3.A
020822
HAMEG
MADE IN GERMANY
PS3.dri

HM-Scopes / PS_3.A {020822} [0]




35-YFF1-5012
HAMEG
LAB/Chn
Made in Germany - FRG
Issued by
28.03.01 Hänel
Authorized by
27.04.1 Reichert
Sheet:1 of 1
Rev.Number: 01
Board: 50-YFFX-1200
42.0V without READOUT
325mV/DIV
93mV/DIV
71mV/DIV
without READOUT -2.3V
7.2V
2.2V
1.4V
-3.0V
-5.8V
100kHz
Y-DV2
Y-DV1
Y-NTC1
Y-NTC2
Y-ROUT
Y-SV1
Y-SV2
RO-SV
D_ANA
CT_Y
TOP VIEW!
*) If required # Insert by hand
*) wenn erforderlich # Handbestückt


35-YFF1-5012 R01
issued by: 28.03.01 Hänel
authorized by: 27.04.1 Reichert
No:
IC9000
IC9001
IC9002
IC9003
IC9006
T9001
T9002
T9008
T9011
L9000
L9001
L9002
D9001
D9002
D9003
C9009
C9017
C9018
C9020
C9028
C9035
C9036
C9038
C9046
R9006
R9008
R9009
R9026
R9027
R9028
R9035
R9037
R9039
R9042
R9043
R9044
R9048
R9057
R9059
R9063
R9065
R9066
R9067
R9073
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R9080
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R9086
R9095
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R9106
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R9111
R9112
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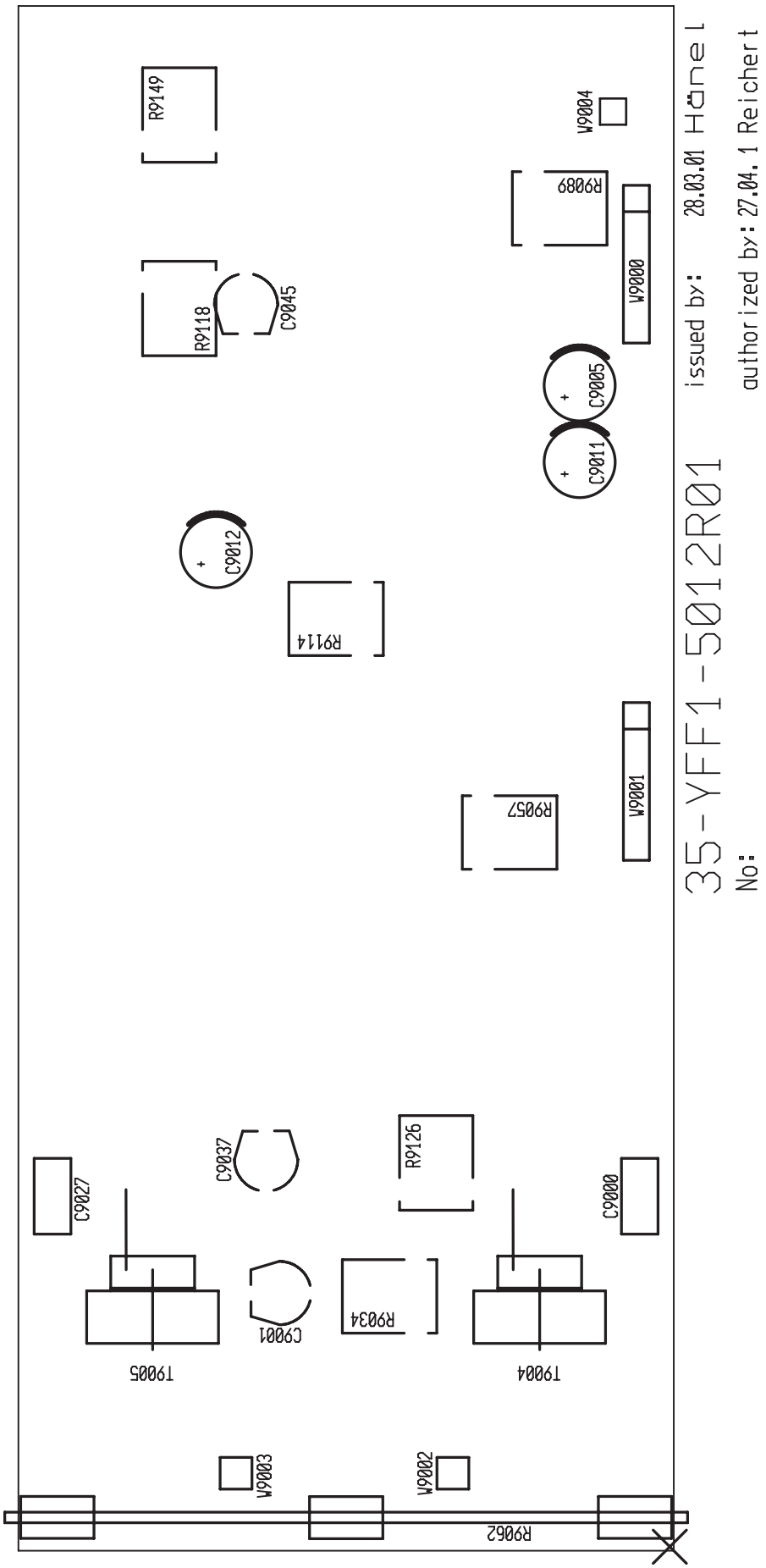
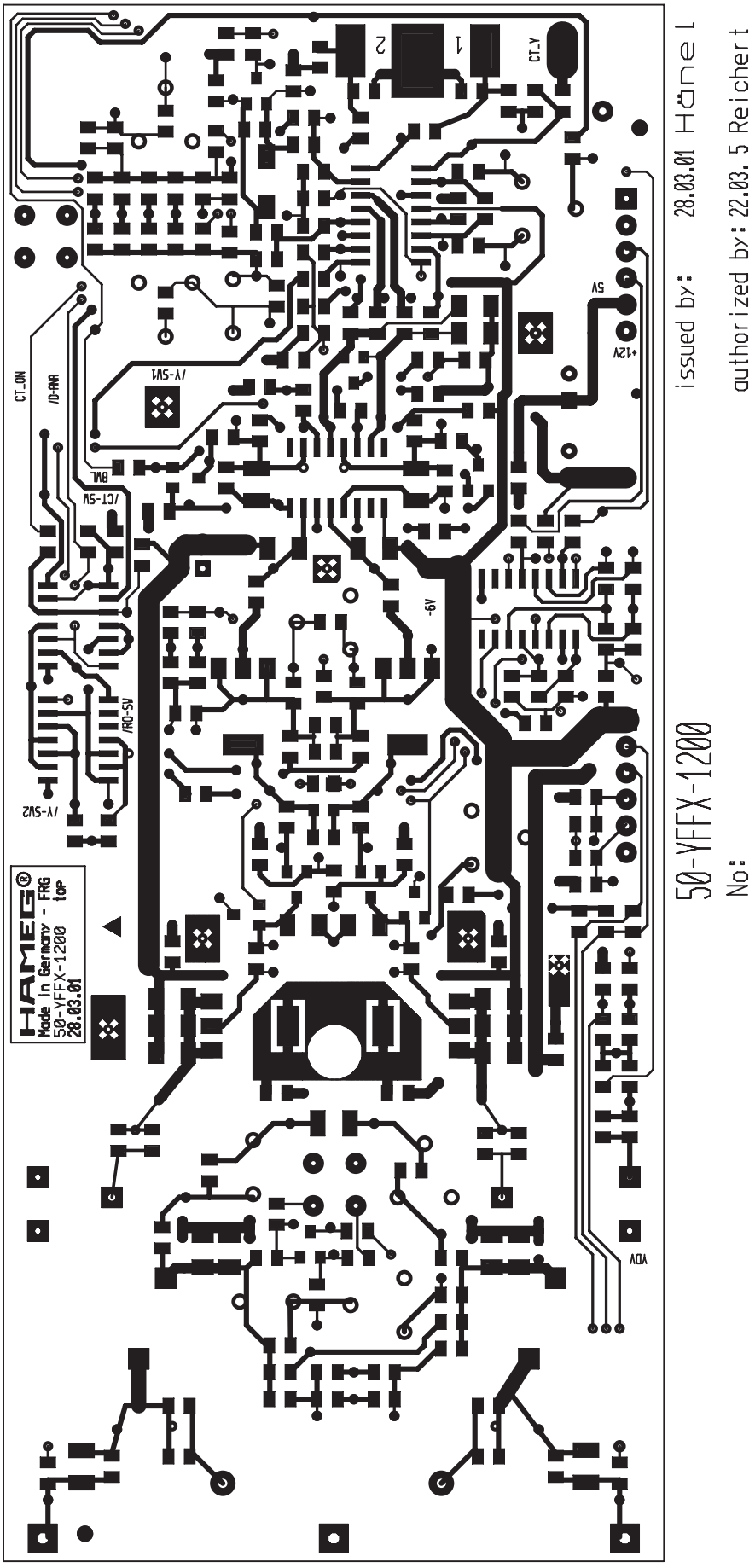
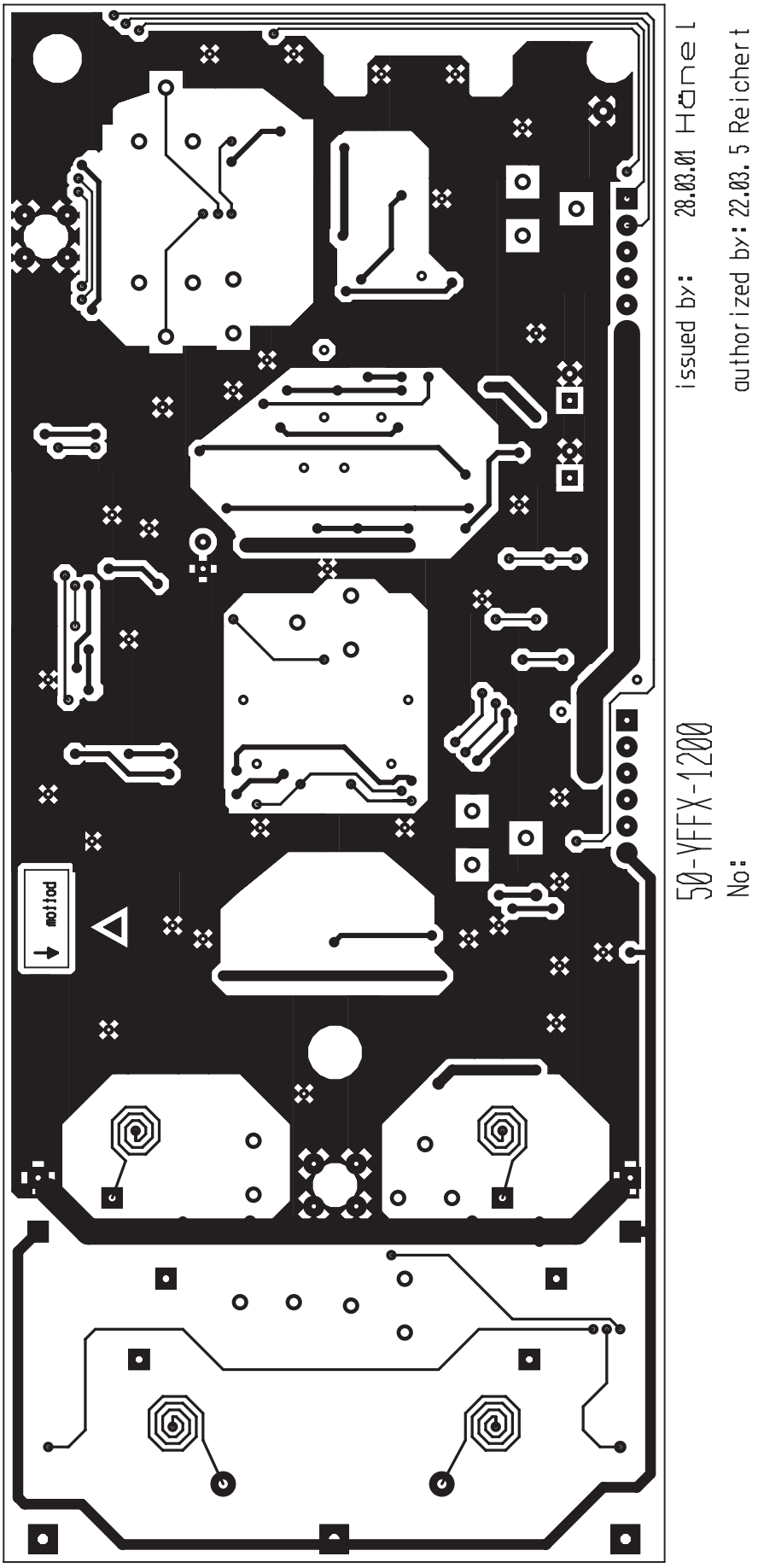
R9137
R9153
R9154
R9155
R9156
R9157


35-YFF1-5012R01
No:
issued by: 28.03.01 Hänel
authorized by: 27.04.1 Reichert
R9149
R9118
C9045
C9012
R9114
R9089
W9004
W9000
C9005
C9011
R9057
W9001
C9027
C9037
R9126
C9000
T9005
C9001
R9034
T9004
W9003
W9002
R9062


HAMEG®
Made in Germany - FRG
50-YFFX-1200 top
28.03.01
CT_ON
/D-ANA
/CT-SW
BUL
/RO-SW
/Y-SW2
/Y-SW1
CT_Y
2
1
5V
+12V
-6V
VDV
issued by: 28.03.01 Hänel
authorized by: 22.03.5 Reichert
50-YFFX-1200
No:


motiod
issued by: 28.03.01 Hänel
authorized by: 22.03.5 Reichert
50-YFFX-1200
No:

HAMEG Instruments

Oscilloscopes

Spectrum Analyzer

Power Supplies

Modular System
8000 Series

Programmable Instruments
8100 Series

authorized dealer

4S-1507-03E1

www.hameg.de

DQS-Certification: DIN EN ISO 9001:2000
Reg.-Nr.: 071040 QM

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D-63533 Mainhausen
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Fax +49 (0) 61 82 800-100
sales@hameg.de