

# **POWER ROUTER DIGITAL**

**Technical Manual**

**Version 003**

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**BRUKER**

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# OVERVIEW

# 1

The HP POWER ROUTER is designed to route HF signals from the transmitter to the probehead. Different types of measurements require their own amplifier configuration (DSX, DMX HIGH POWER, DMX HIGH POWER 3rd channel, DMX XBB 1kW)

The autotuning signals for the X and 1H channels are generated in the sensor module.

The HP POWER ROUTER has its own power supply.

The HP POWER ROUTER is connected to the TCU, TRANSMITTER (GAIN and BLANKING signals), the HIGH VOLTAGE SUPPLY and the B-HPCU ([page 11](#)).

The unit is located in the spectrometer for DSX and DMX HIGH POWER. The basic version has one LOW POWER MODULE (DMX XBB 1kW) or one RELAY MODULE (DSX, DMX HIGH POWER, DMX HIGH POWER 3rd channel). It is possible to equip the X/H, Y/Z channel with a LOW POWER MODULE or a RELAY MODULE ([page 9](#))

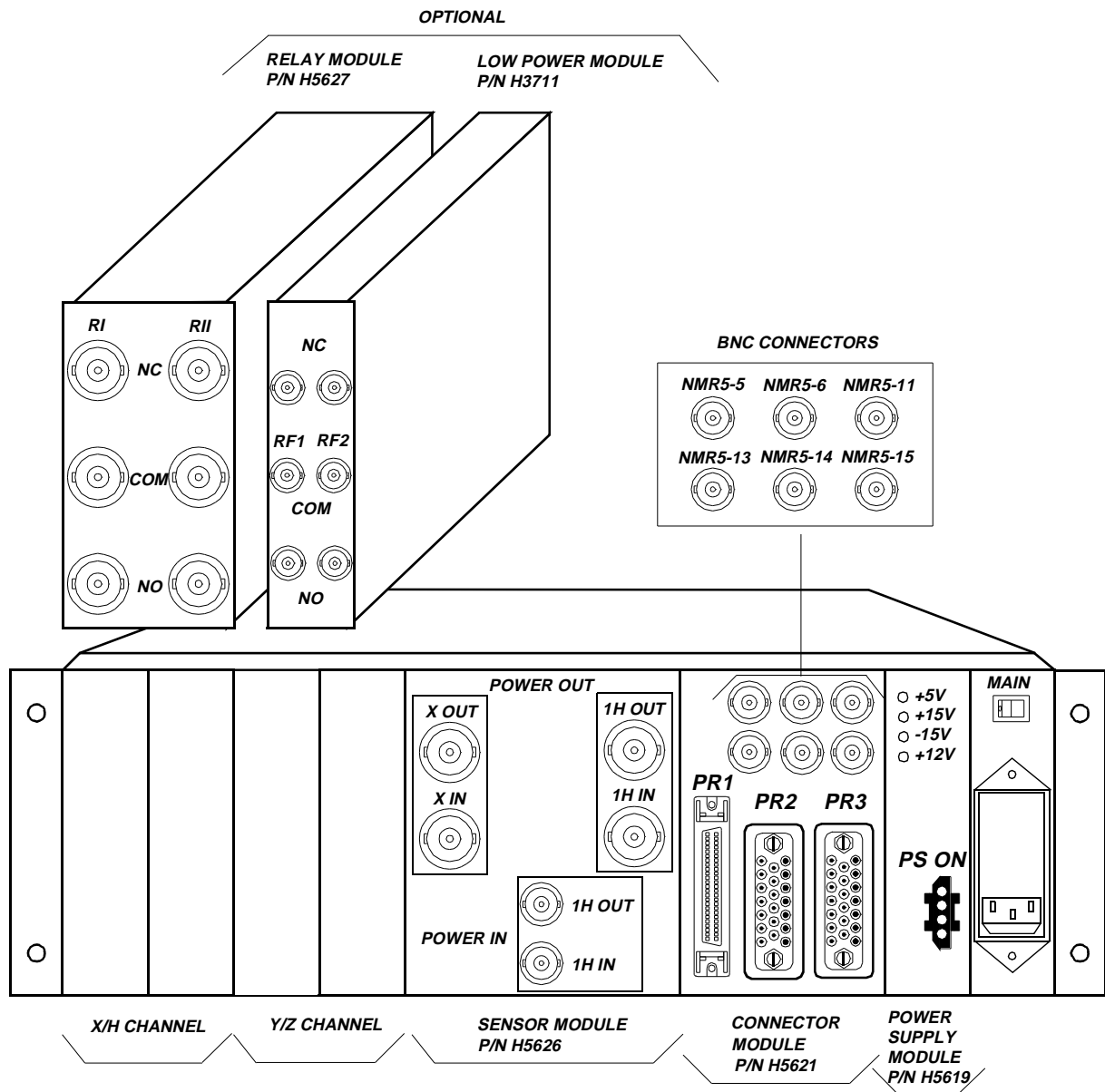




# HP POWER ROUTER MODULES

# 2

Figure 2.1. POWER ROUTER DIGITAL



The power supply board generates the following voltages: +15V, -15V, +12V, +5V.

Each correct voltage is indicated by a green LED on the front panel and is protected with a fuse.

+15V fused by	F1:	0.63A
+24V AC fused by	F2:	3.15A
+12V fused by	F3:	0.8A
-15V fused by	F4:	0.63A
+5V fused by	F5:	0.8A

The 24V AC switched by the solid state relay on the motherboard is connected to the QIKMATE connector (PS ON) on the frontpanel.

There is only one connector slot available on the motherboard to insert the power module [page 9](#).

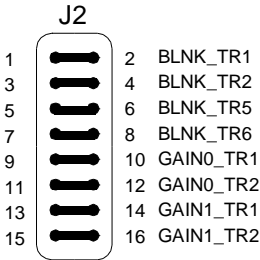
All input signals from the TCU (Timing Control Unit) are low active. The following programmable signals are connected to the BNC's on the front panel ([page 9](#)).

NMR5\_5  
NMR5\_6  
MMR5\_11  
NMR5\_13  
NMR5\_14  
NMR5\_15

All STRAYFIELD signals are brought through from SCSI (PR1) to the burndy2 (PR3) connector ([page 20](#)). The blanking and the gain signals are connected to the line driver (74AS805). It is possible to invert the logic of each signal by placing jumpers on J2.

Function: When a jumper is populated, the relevant signal will be inverted.

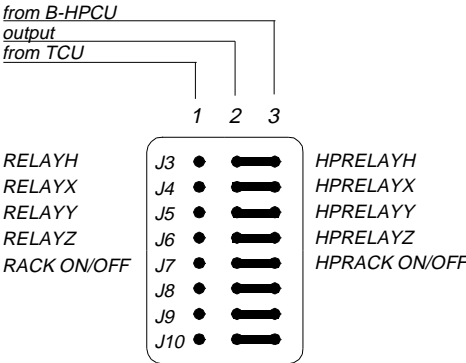
Figure 2.2. Jumper J2



Function: When all the jumpers are populated on the right side, the signals will come from the B-HPCU.

When all the jumpers are populated on the left side the signals will come from the TIMING CONTROL UNIT (TCU).

Figure 2.3. Jumpers 3-10



Inside the sensor box there are three different power sensors.

1. For X-channel P/N. H5646 max. power 1kW
2. For H-channel P/N. 19535 max. power 1kW
3. For 1H IN-channel P/N.12285 max power 40W

The directional coupler for the X channel generates two voltages (FORWX, REFLX).

The directional coupler for the H channel generates two voltages (FORWH, REFLH).

The directional coupler for the 1HIN generates a single voltage (REFIN1H).

The voltages generated are proportional to the forward power and the reflected power. After digitisation in the B-HPCU they are used to control the LED's on the B-HPCU keyboard. The FORWX, FORWH and REFIN1H signals are used to by the autotuning in the B-HPCU to get minimum reflected power in the amplifier.

The relay module for the X/H channel has a fixed position on the left side in the rack. To its immediate right it is possible (optional) to insert a second relay module for a Y/Z channel [page 9](#).

The relay module routes the signals coming from the amplifier (BLAX300, BLARH100) to the 1H, X transmitters or cavities.

Function: see wiring relay module [page 24](#).

Refer to the wiring table (HIGH POWER CABINETT MANUAL) for instructions on how to connect the relay module (s).

***ELECTRICAL CHARACTERISTICS*****2.4.1**

---

**MAX. Input power:** 300W DC at 1,000MHz, 1kW PEP at up to 30MHz.

**MAX. Frequency:** 2,500MHz, (less than 1: 1.5VSWR).

**Insertion loss:** Less than 0.2dB at 1.5GHz.

**Circuit impedance:** 50 ohms

***THE LOW POWER MODULE*****2.5**

---

For low power module measurements it is possible to insert one (X/H channel) or two (X/H Y/Z channels) LOW POWER MODULES. These are inserted in the same positions as the relay modules.

Refer to the wiring table (HIGH POWER CABINET MANUAL) for instructions on how to connect the relay power module (s).

***ELECTRICAL CHARACTERISTICS*****2.5.1**

---

The LOW POWER MODULE allows very fast switching of HF signals (5-600MHz), which are used for switching transmitters with 1 Vpp signals.

- The transmission loss is adjustable to 0dB
- The insertion loss is higher than 70dB over the whole frequency range.
- The switching time is less than 2us.



# PIN ASSIGNMENT

# 3

## TIMING CONTROL UNIT (T1)

3.1

Figure 3.1. Connector T1

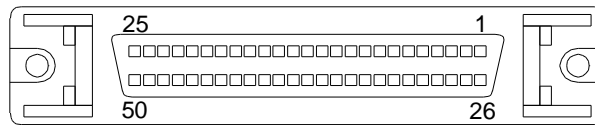


Table 3.1. CONNECTOR (T1)

Connector T1 TCU (solid) SCSI			
PIN (right row)	SIGNAL	PIN (left row)	SIGNAL
1	BLNK_TR1	26	GND
2	NMR5_0	27	NMR5_1
3	NMR5_2	28	GND
4	BLNK_TR2	29	GND
5	NMR5_3	30	NMR5_4
6	NMR5_5	31	GND
7	BLNK_TR5	32	GND
8	NMR5_6	33	GND
9	BLNK_TR6	34	GND
10	NMR5_7	35	NMR5_8
11	TRIG3	36	GND
12	NMR5_9	37	NMR5_10
13	NMR5_11	38	GND
14	NMR5_12	39	GND

# PIN ASSIGNMENT

Table 3.1. CONNECTOR (T1)

Connector T1 TCU (solid) SCSI			
PIN (right row)	SIGNAL	PIN (left row)	SIGNAL
15	NMR5_13	40	GND
16	NMR5_14	41	GND
17	NMR5_15	42	GND
18	NMR6_0	43	NMR6_1
19	NMR6_2	44	GND
20	NMR6_3	45	GND
21	NMR6_4	46	GND
22	NMR6_5	47	GND
23	NMR6_6	48	GND
24	NMR6_7	49	GND
25	TRIG2	50	GND



Figure 3.2. Connector PR1

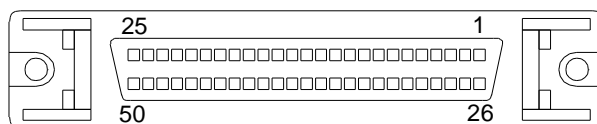


Table 3.2. Connector (PR1)

Connector PR1 High Power Router SCSI			
PIN (right row)	SIGNAL	PIN (left row)	SIGNAL
1	BLNK_TR1	26	GND
2	GAIN0_TR1	27	GAIN1_TR1
3	NMR5_2	28	GND
4	BLNK_TR2	29	GND
5	GAIN0_TR2	30	GAIN1_TR2
6	NMR5_5	31	GND
7	BLNK_TR5	32	GND
8	NMR5_6	33	GND
9	BLNK_TR6	34	GND
10	RELAYH	35	RELAYX
11	EXTERNAL1 (MAS TRIGGER)	36	GND
12	RELAYY	37	RACK ON/OFF
13	NMR5_11	38	GND
14	RELAYZ	39	GND
15	NMR5_13	40	GND
16	NMR5_14	41	GND
17	NMR5_15	42	GND
18	SF_STEP1DIR	43	SF_LB_SELECT

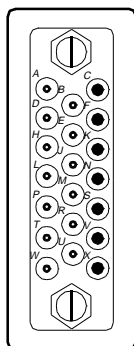
# PIN ASSIGNMENT

Table 3.2. Connector (PR1)

Connector PR1 High Power Router SCSI			
PIN (right row)	SIGNAL	PIN (left row)	SIGNAL
19	SF_DCMOTSTART	44	GND
20	SF_STEP1_CLK	45	GND
21	SF_STEP2_CLK	46	GND
22	SF_RESET_STEPPER1	47	GND
23	SF_DCMO_RESET	48	GND
24	SF_GOTO_POSITION	49	GND
25	SF_EXTERNAL2	50	GND

Figure 3.3. BURNDY1 (PR2)

MS 20 RM  
FRONTAGE



- DC MALE
- ⦿ COAX MALE

Table 3.3. BURNDY1 (PR2)

PIN	SIGNAL	Typ
A	BLNK_TR1 (X)	COAX
D	BLNK_TR1_2	COAX
H	BLNK_TR2 (1H)	COAX
L	BLNK_TR5_1 (Y)	COAX
P	BLNK_TR5_2 (Y AMT)	COAX
T	BLNK_TR6	COAX
W	GAIN0_TR1 (X)	COAX
B	GAIN0_TR2 (1H)	COAX
E	GAIN1_TR1 (X)	COAX
J	GAIN1_TR2 (1H)	COAX
M	NMR5_2	COAX
R	Hin_REFL	COAX
U	EXTERNAL1 (MAS TRIGGER)	COAX
C		DC
F		DC
K		DC
N		DC
S		DC
V		DC
X		DC

Figure 3.4. BURNDY2 (PR3)

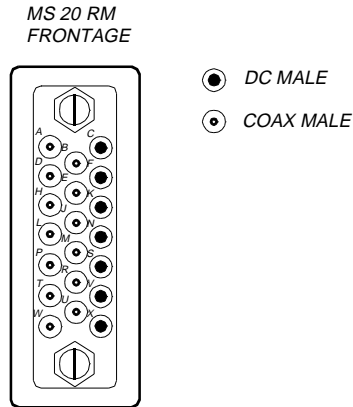


Table 3.4. BURNDY2 (PR3)

Pin	Signal	Typ
A	SF_STEP1DIR	COAX
D	SF_DCMOTSTART	COAX
H	SF_STEP1_CLK	COAX
L	SF_STEP2_CLK	COAX
P	SF_RESET_STEPPER1	COAX
T	SF_DCMO_RESET	COAX
W	SF_GOTO_POSITION	COAX
B	SF_EXTERNAL2	COAX
E	SF_LB_SELECT	COAX
J	X_FORW	COAX
M	X_REFL	COAX
R	H_FORW	COAX
U	H_REFL	COAX
C	HPRELAYH-	DC
F	HPRELAYX-	DC
K	HPRELAYY-	DC
N	HPRELAYZ-	DC
S	HPRACK_ON/OFF-	DC
V	GND	DC
X		DC

# POWER CONNECTION

# 4

## ***Transformer***

---

**4.1**

Primary: 230V 50/60 Hz total power 89VA

Secondary: 8V 0.8A fused by F5 (0.8A/250V time-lag) on power board  
17V 0.63A fused by F1 (0.63A/250V time-lag) on power board  
17V 0.63A fused by F4 (0.63A/250V time-lag) on power board  
14V 1.0A fused by F3 (0.8A/250V time-lag) on power board  
24V 2.0A fused by F2 (3.15A/250V time-lag) on power board  
(at BOARD REVISION B)

## ***Main filter***

---

**4.2**

Fuses in main filter 2x0.8A/ 250V time lag.

# POWER CONNECTION

Table 5.1. X-RELAY

	Jumper J3-J10 on the left side	Jumper J3-J10 on the right side
	COM	COM
NO	RELAYX (LOW)	HPRELAYX (LOW)
NC	RELAYX (HIGH)	HPRELAYX (HIGH)

Table 5.2. 1H-RELAY

	Jumper J3-J10 on the left side	Jumper J3-J10 on the right side
	COM	COM
NO	RELAYH (LOW)	HPRELAYH (LOW)
NC	RELAYH (HIGH)	HPRELAYH (HIGH)

Figure 5.1. WIRING RELAY MODULE X/1H

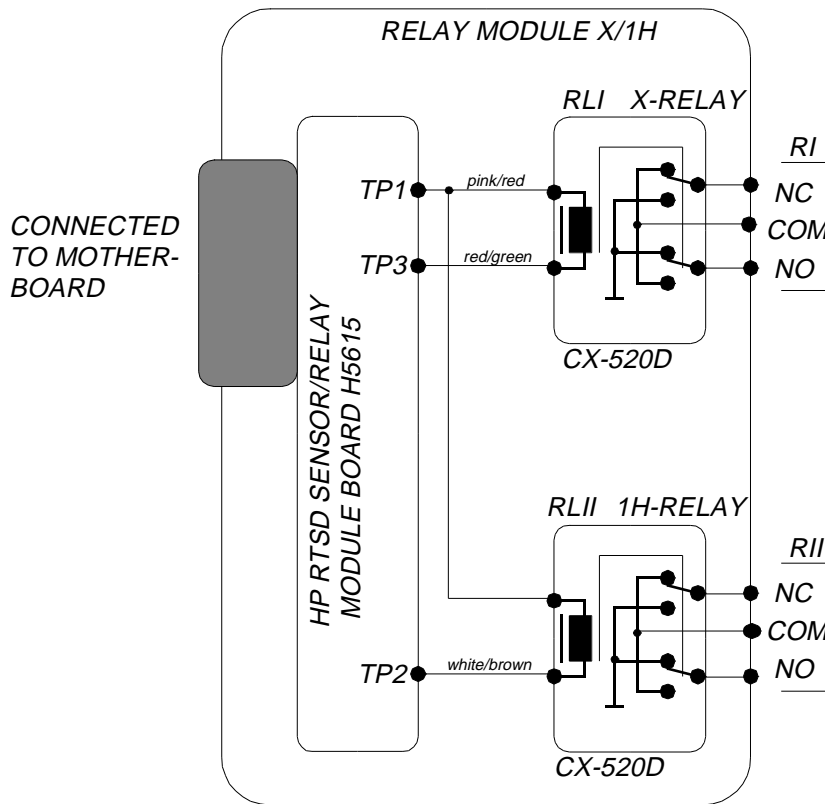




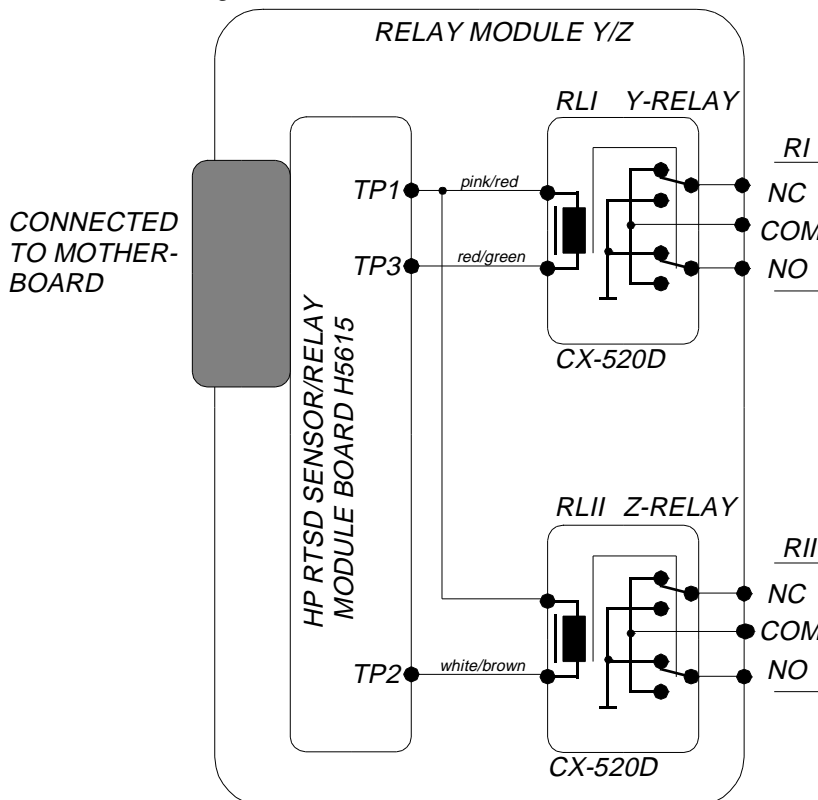
Table 5.3. Y-RELAY

	Jumper J3-J10 on the left side	Jumper J3-J10 on the right side
	COM	COM
NO	RELAY Y (LOW)	HPRELAY Y (LOW)
NC	RELAY Y (HIGH)	HPRELAY Y (HIGH)

Table 5.4. Z-RELAY

	Jumper J3-J10 on the left side	Jumper J3-J10 on the right side
	COM	COM
NO	RELAY Z (LOW)	HPRELAY Z (LOW)
NC	RELAY Z (HIGH)	HPRELAY Z (HIGH)

Figure 5.2. WIRING RELAY MODULE Y/Z





# ***SCHEMATICS***

***HP RTSD CONNECTOR and DRIVER BOARD***

***A.1***

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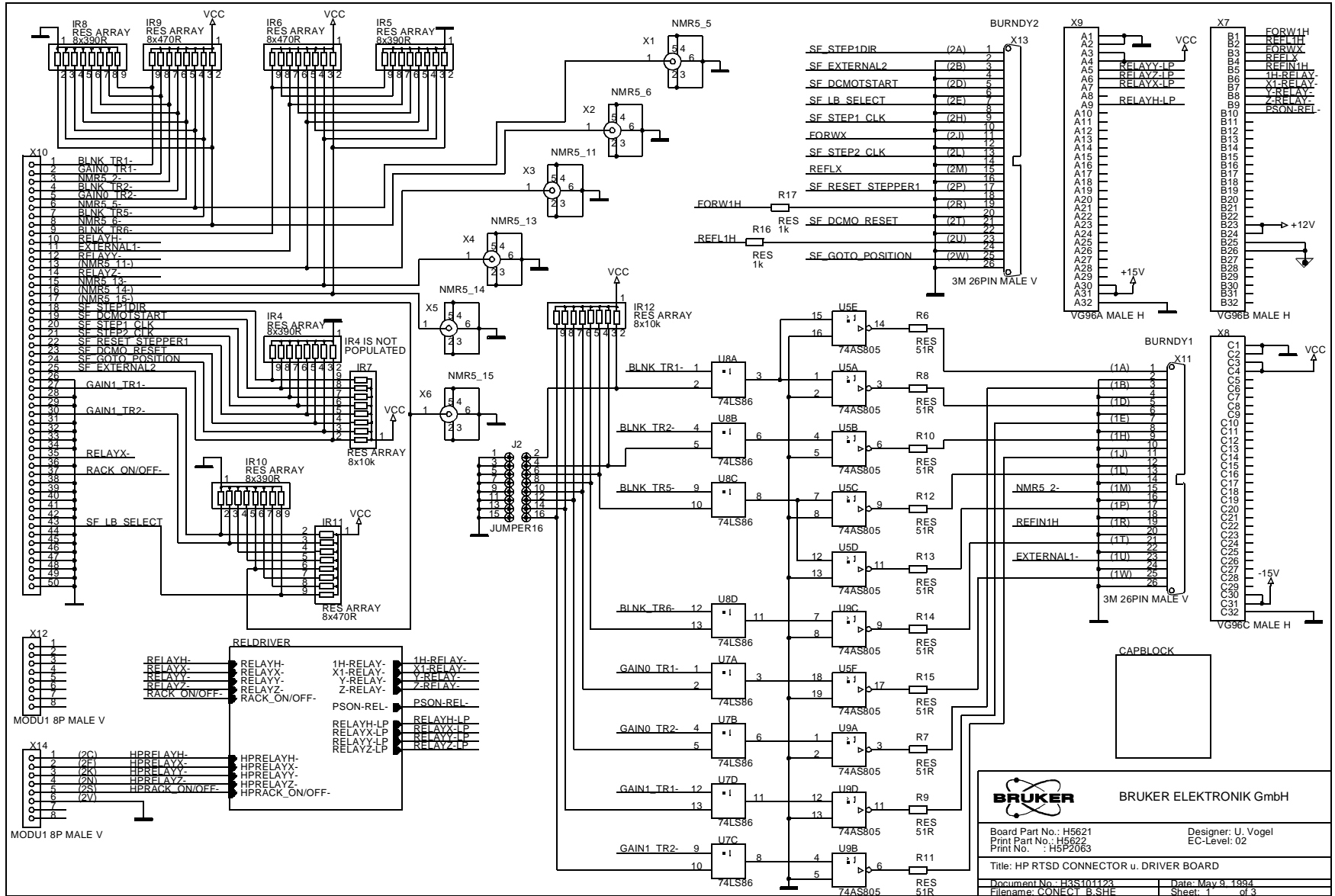


Figure A.1. HP RTSD CONNECTOR and DRIVER BOARD

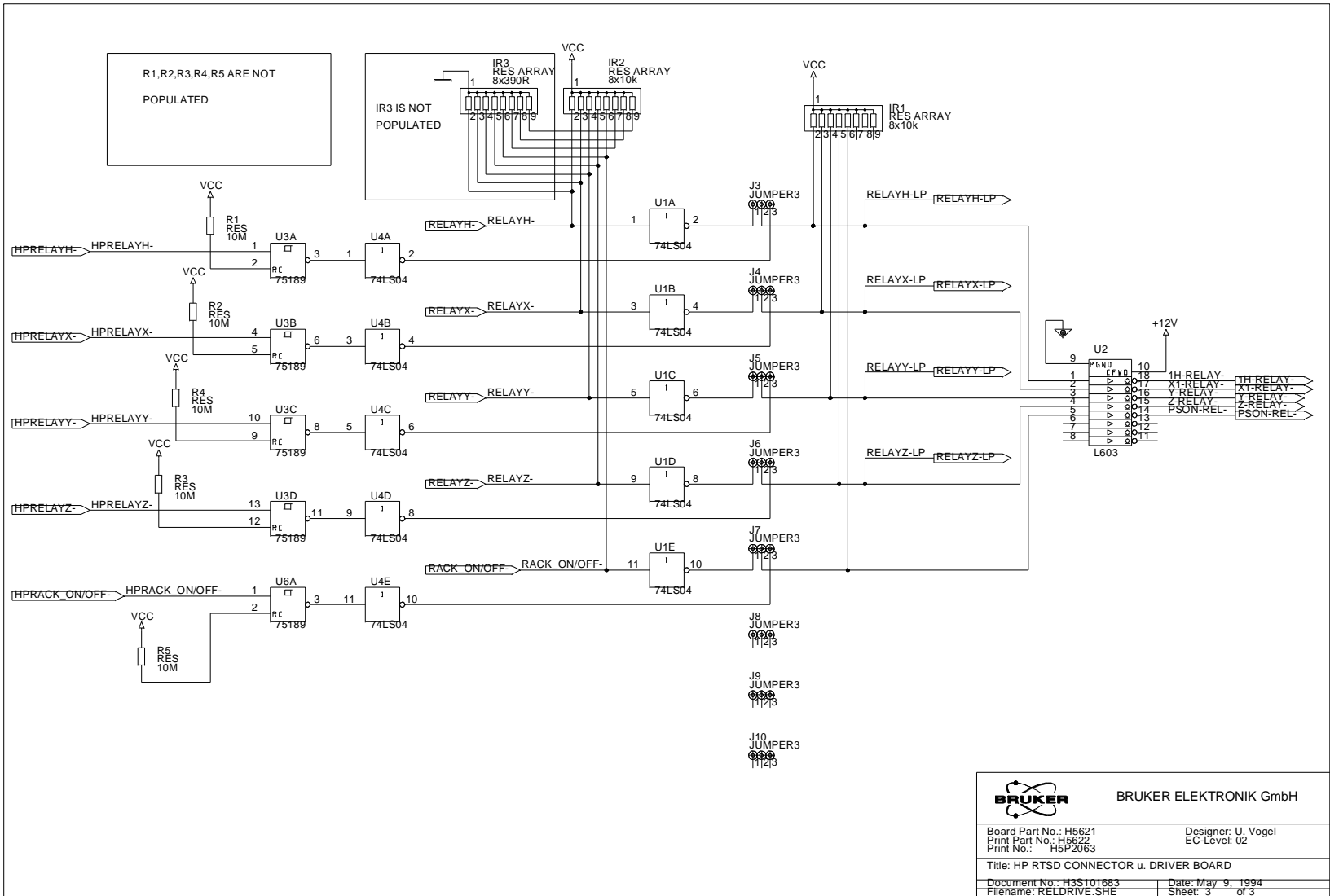
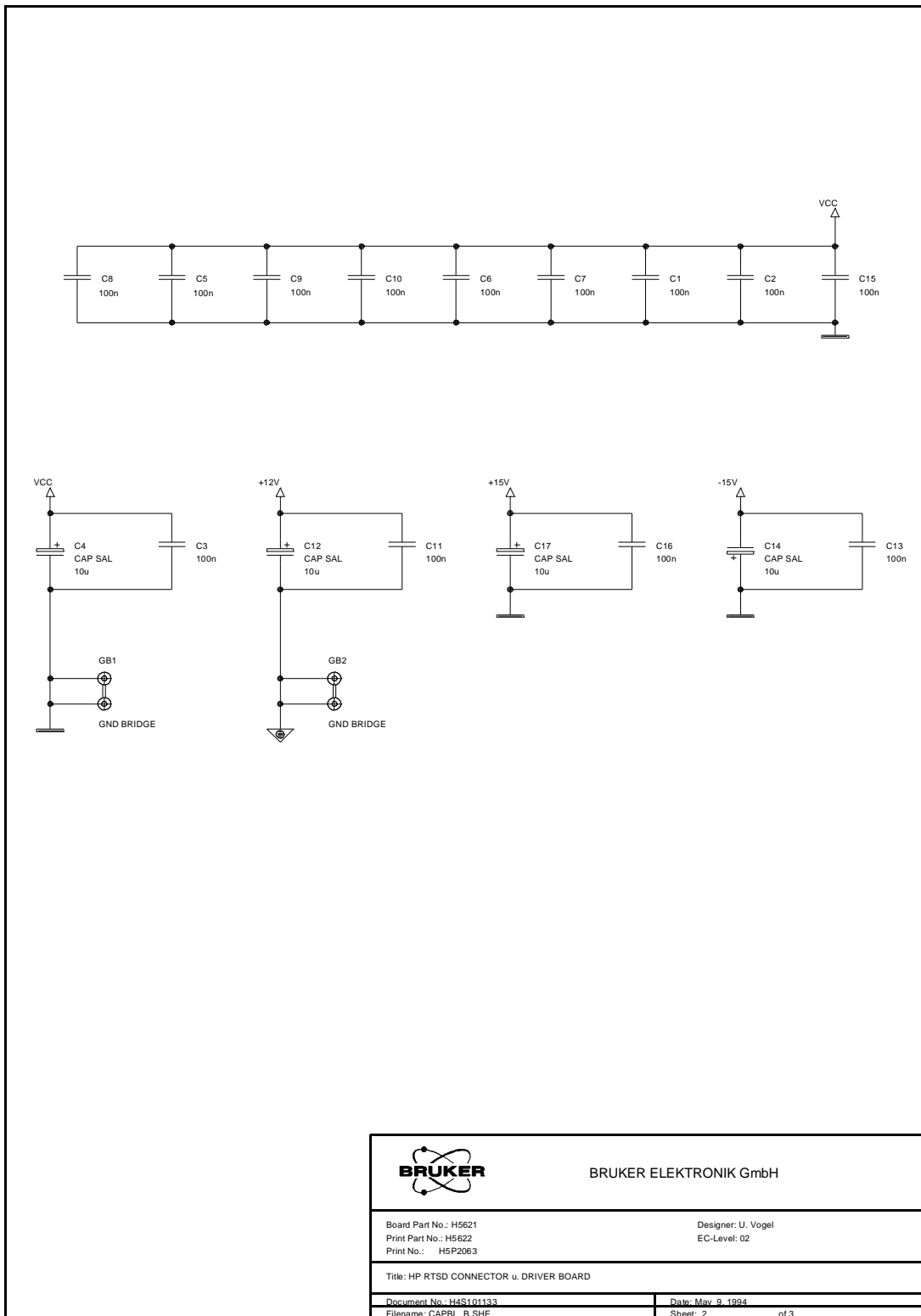


Figure A.2. HP RTSD CONNECTOR and DRIVER BOARD

Figure A.3. HP RTSD CONNECTOR and DRIVER BOARD



BRUKER ELEKTRONIK GmbH

Board Part No.: H5621  
 Print Part No.: H5622  
 Print No.: H5P2063

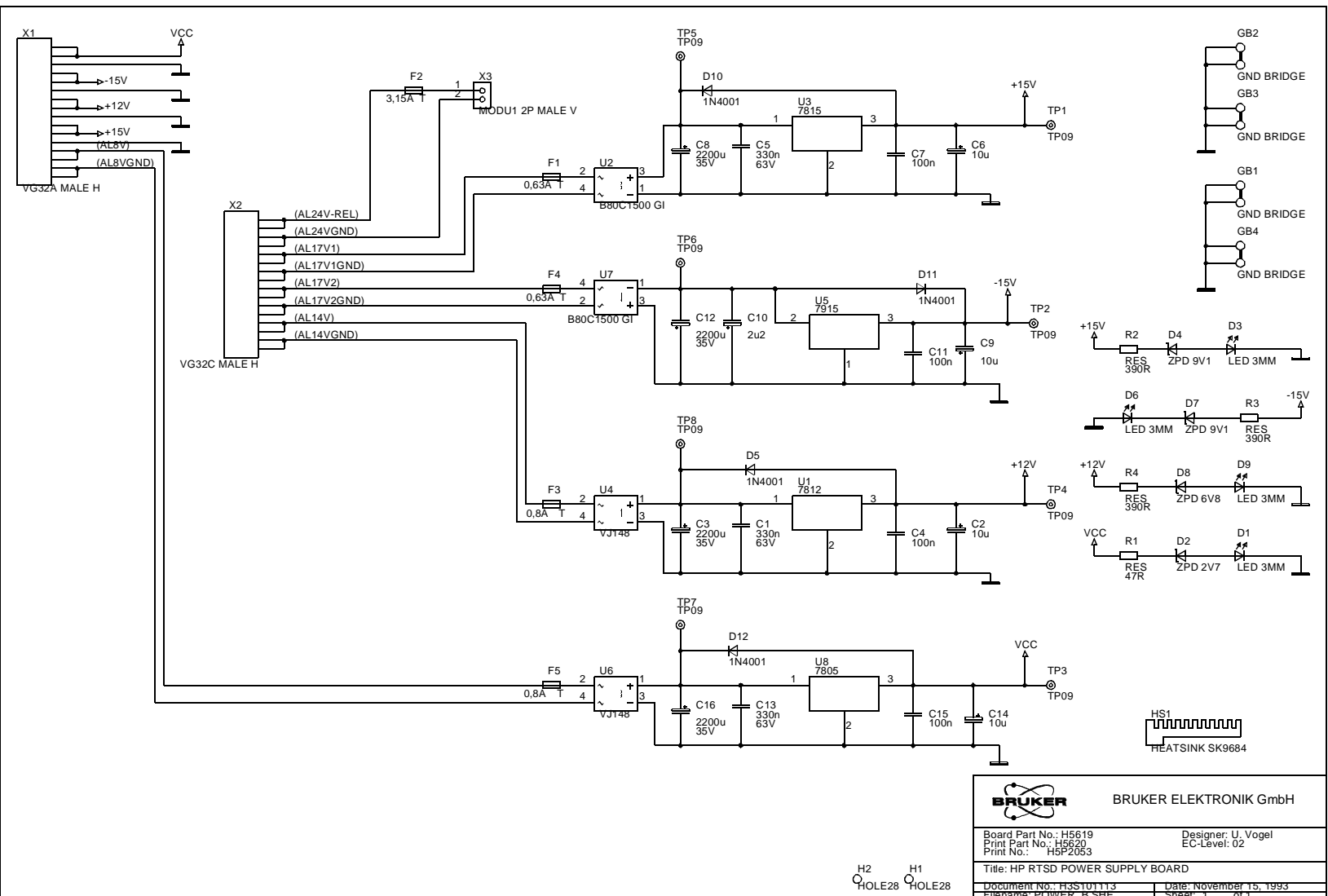
Designer: U. Vogel  
 EC-Level: 02

Title: HP RTSD CONNECTOR u. DRIVER BOARD

Document No.: H4S101133  
 Filename: CAPBL\_B.SHE

Date: May 9, 1994  
 Sheet: 2 of 3

Figure A.4. HP RTSD POWER SUPPLY BOARD



<b>BRUKER</b>		BRUKER ELEKTRONIK GmbH	
Board Part No.: H5619	Print Part No.: H5620	Designer: U. Vogel	EC-Level: 02
Print No.: H5P2053			
Title: HP RTSD POWER SUPPLY BOARD			
Document No.: H3S101113	Date: November 15, 1993		
Filename: POWER_B.SHE	Sheet: 1	of 1	

H2 HOLE28  
H1 HOLE28

Figure A.5. HP RTSD SENSOR/RELAY - MODULE BOARD

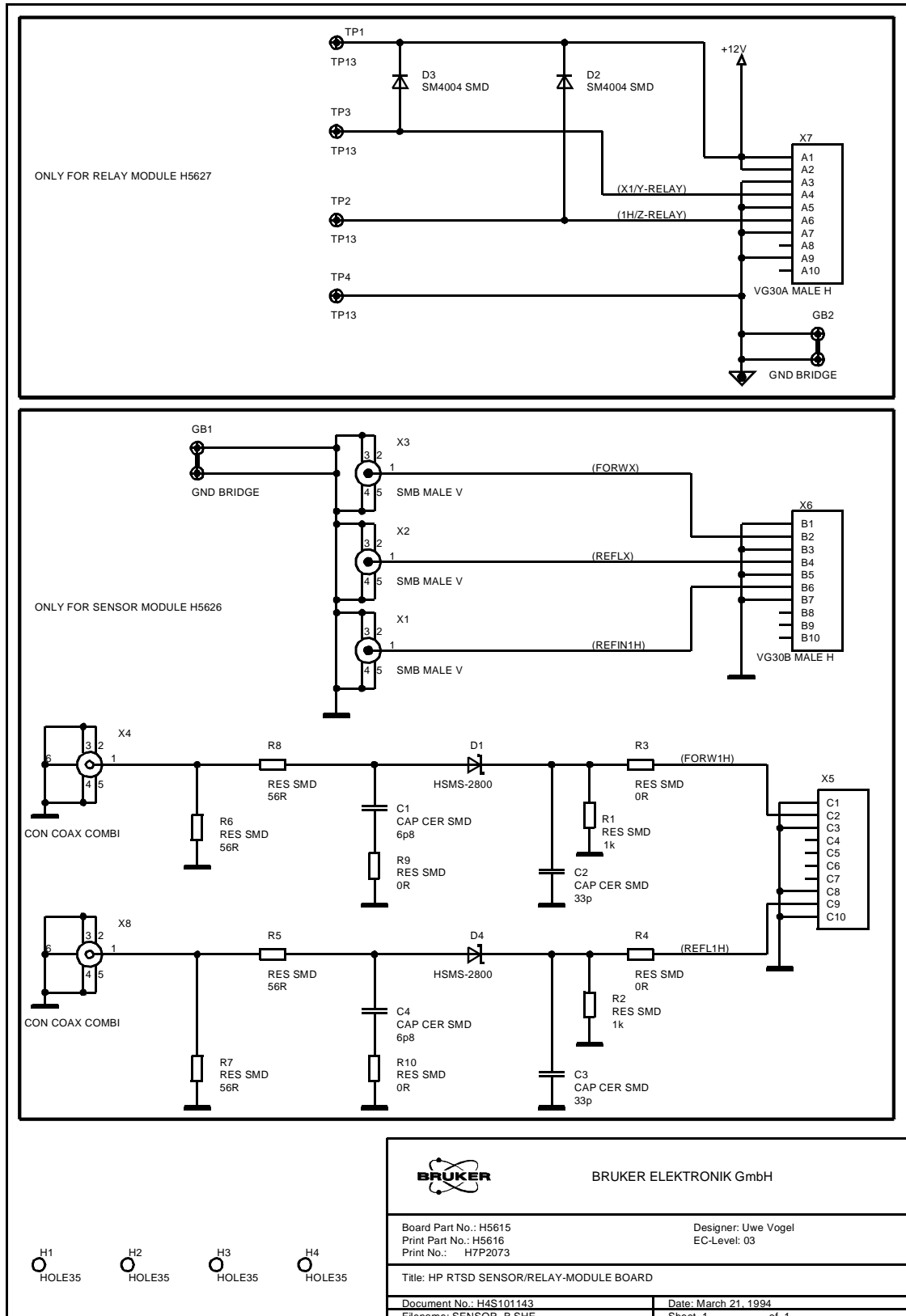
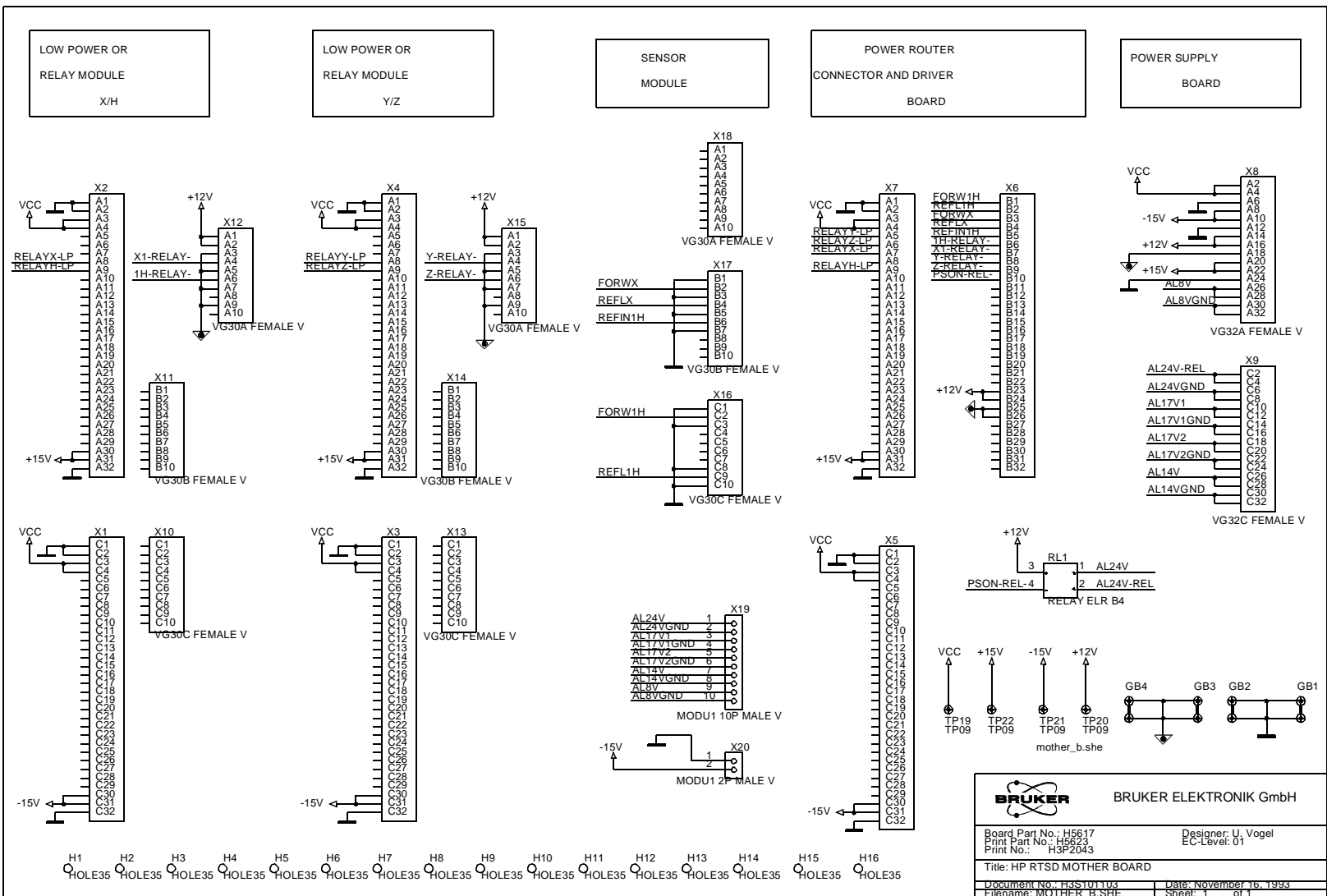




Figure A.6. HP RTSD MOTHER BOARD



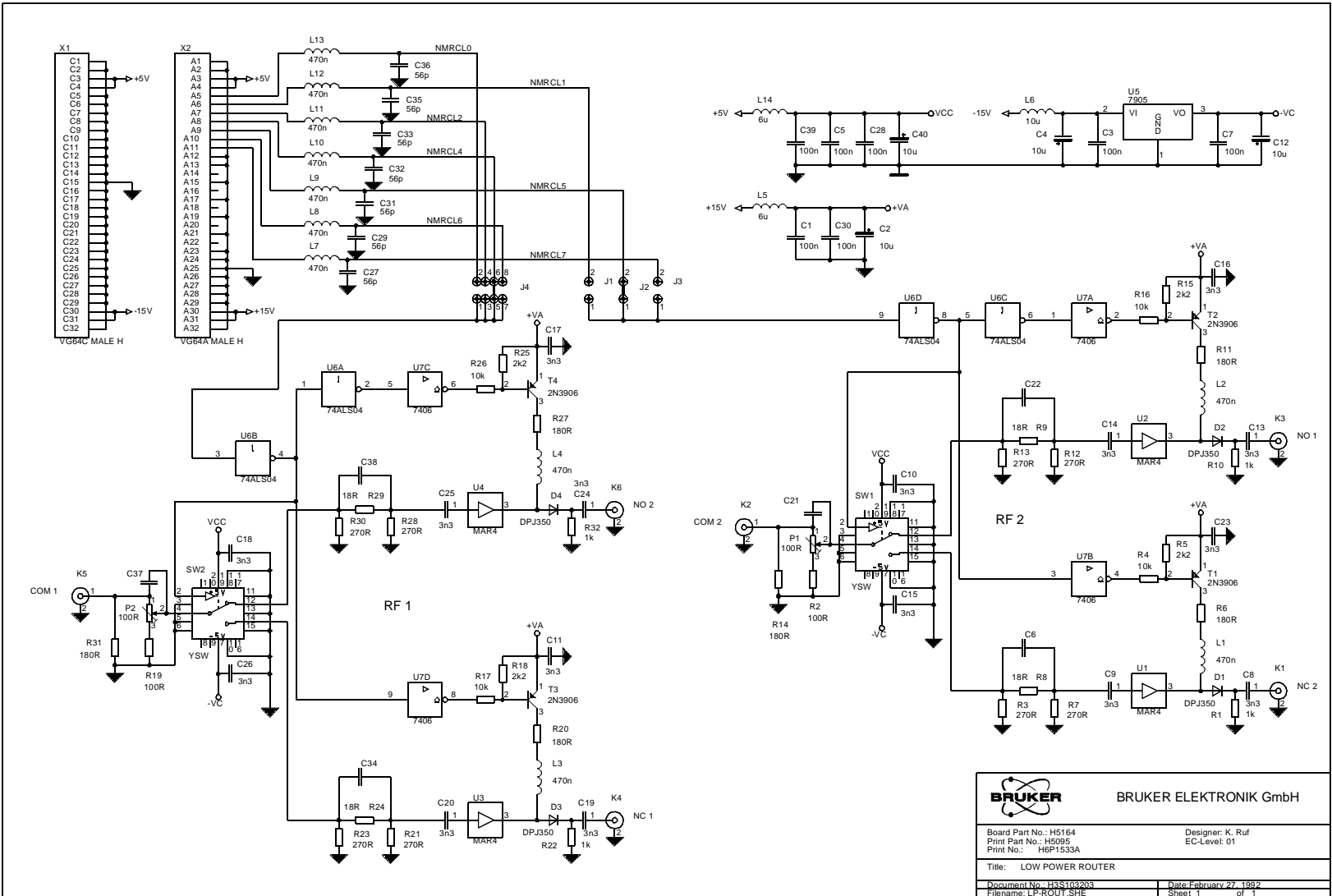


Figure A.7. LOW POWER ROUTER

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