

# DOKUMENTATION

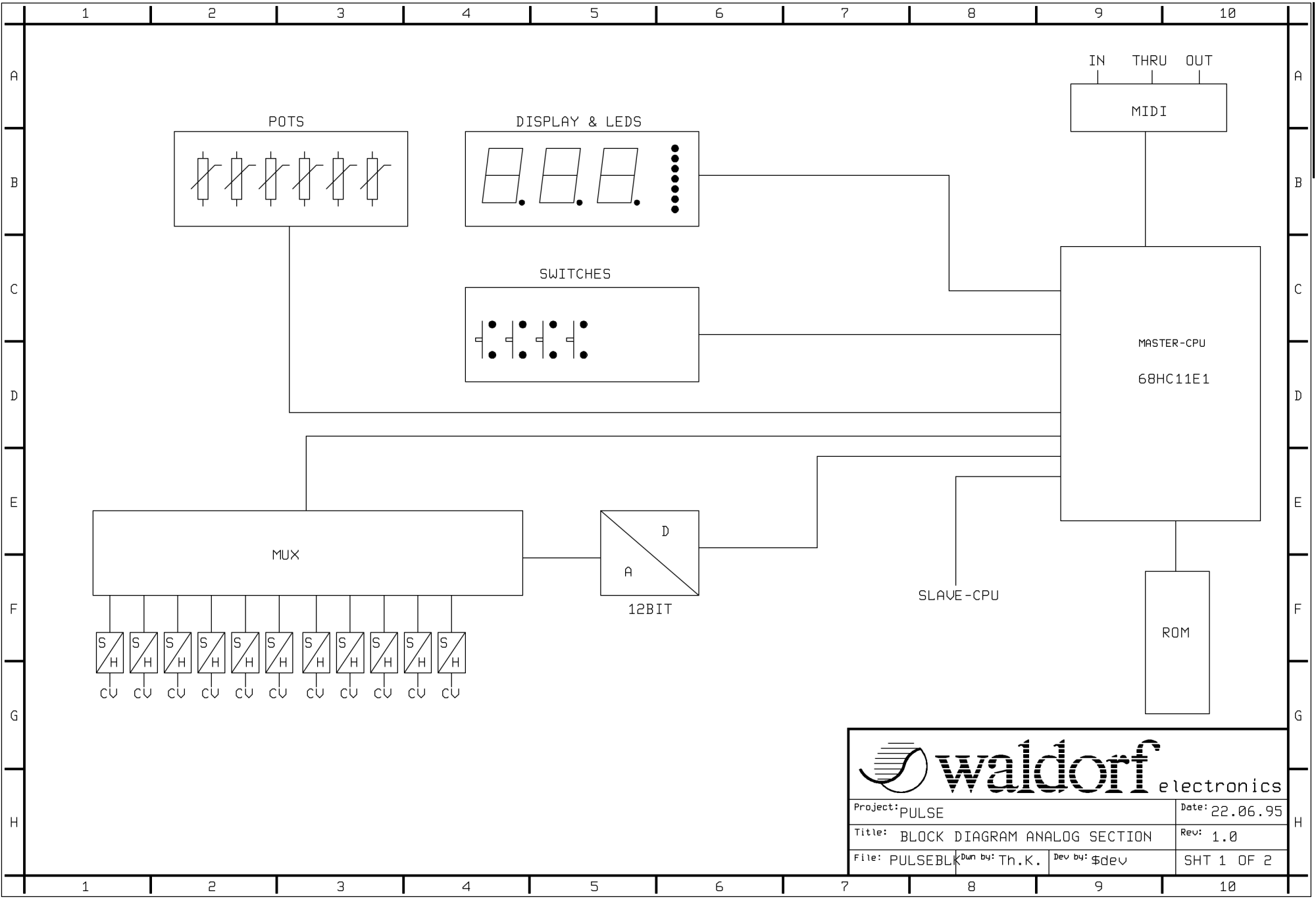
## PULSE

Stand: 17.10.95 , Rev.: 2.1

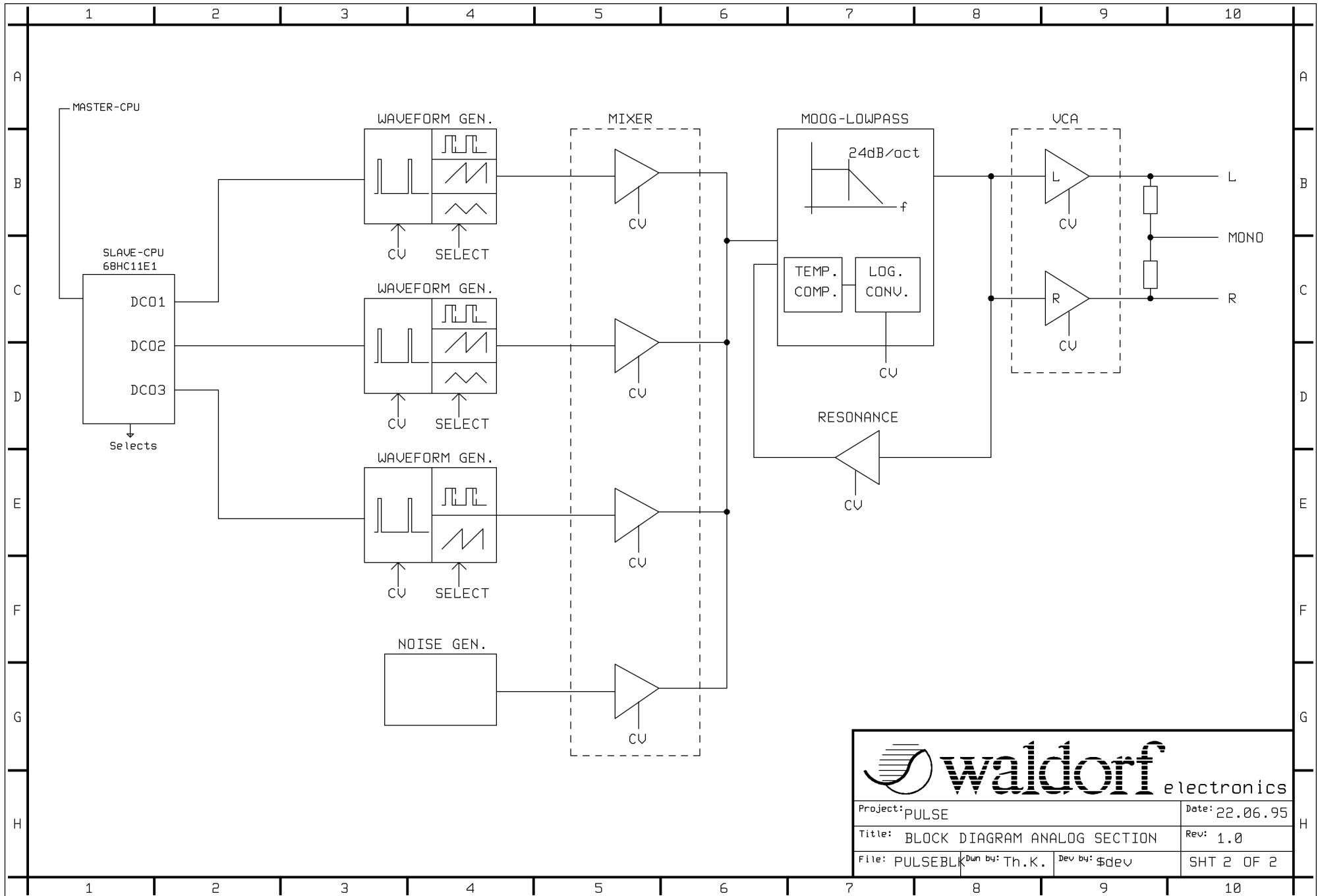



## INHALTSVERZEICHNIS

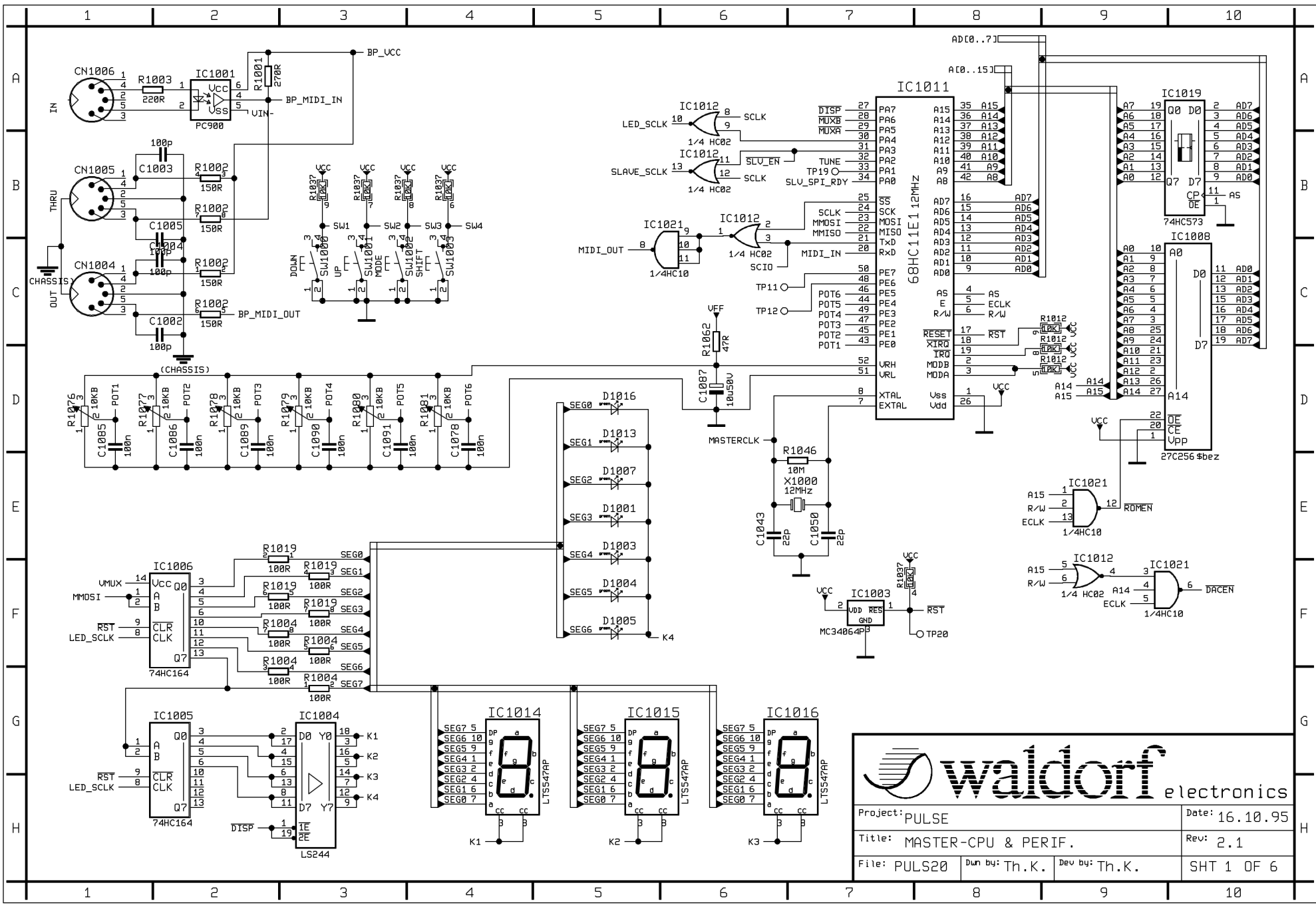
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		Date: 22.06.95	
		Rev: 1.0	
Project: PULSE	Dev by: Th.K.		SHT 1 OF 2
Title: BLOCK DIAGRAM ANALOG SECTION	Dev by: sdev		
File: PULSEBLK			



		Date: 22.06.95	
		Rev: 1.0	
Project: PULSE	Drawn by: Th.K.	Dev by: sdev	SHT 2 OF 2

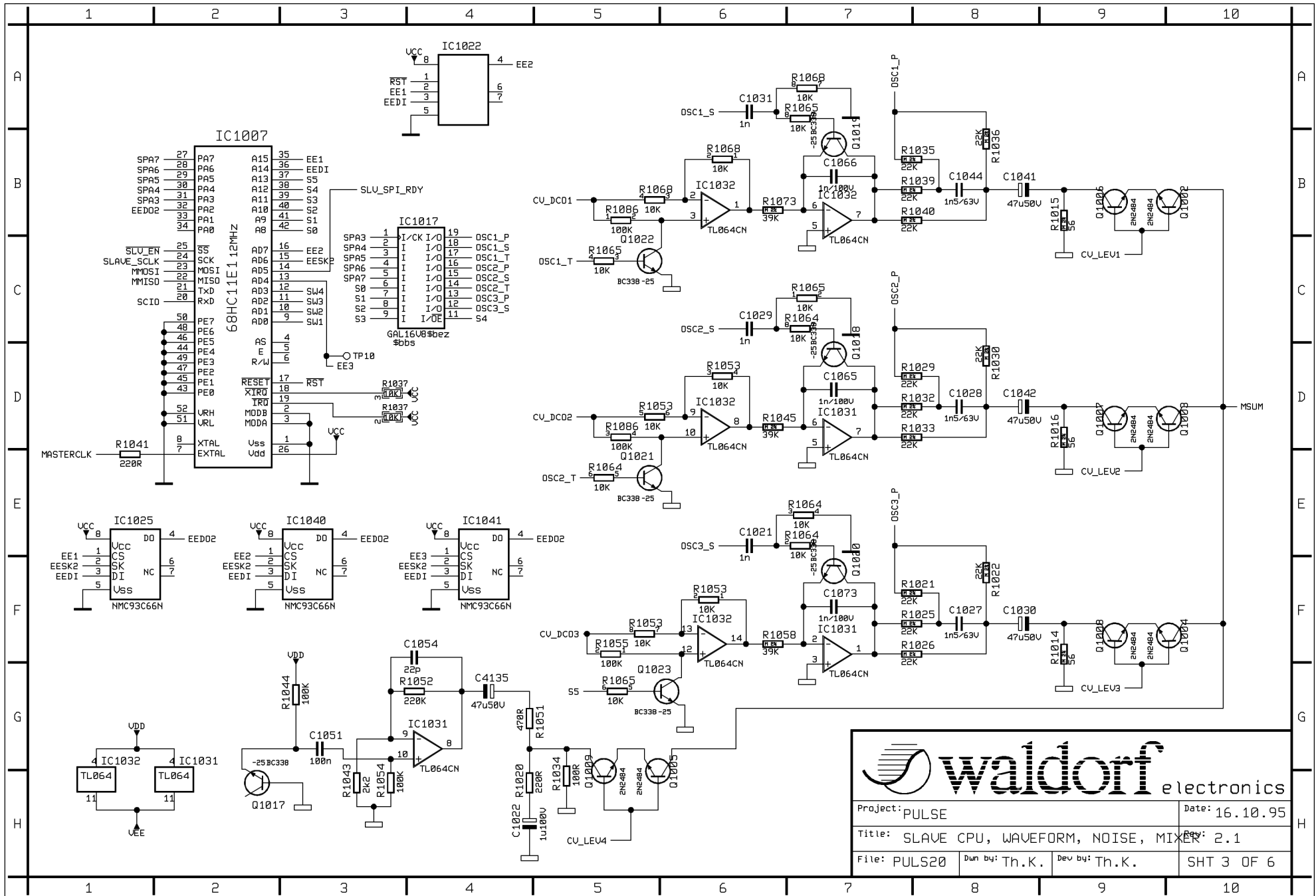


D PULS21- Seite 6 von 40



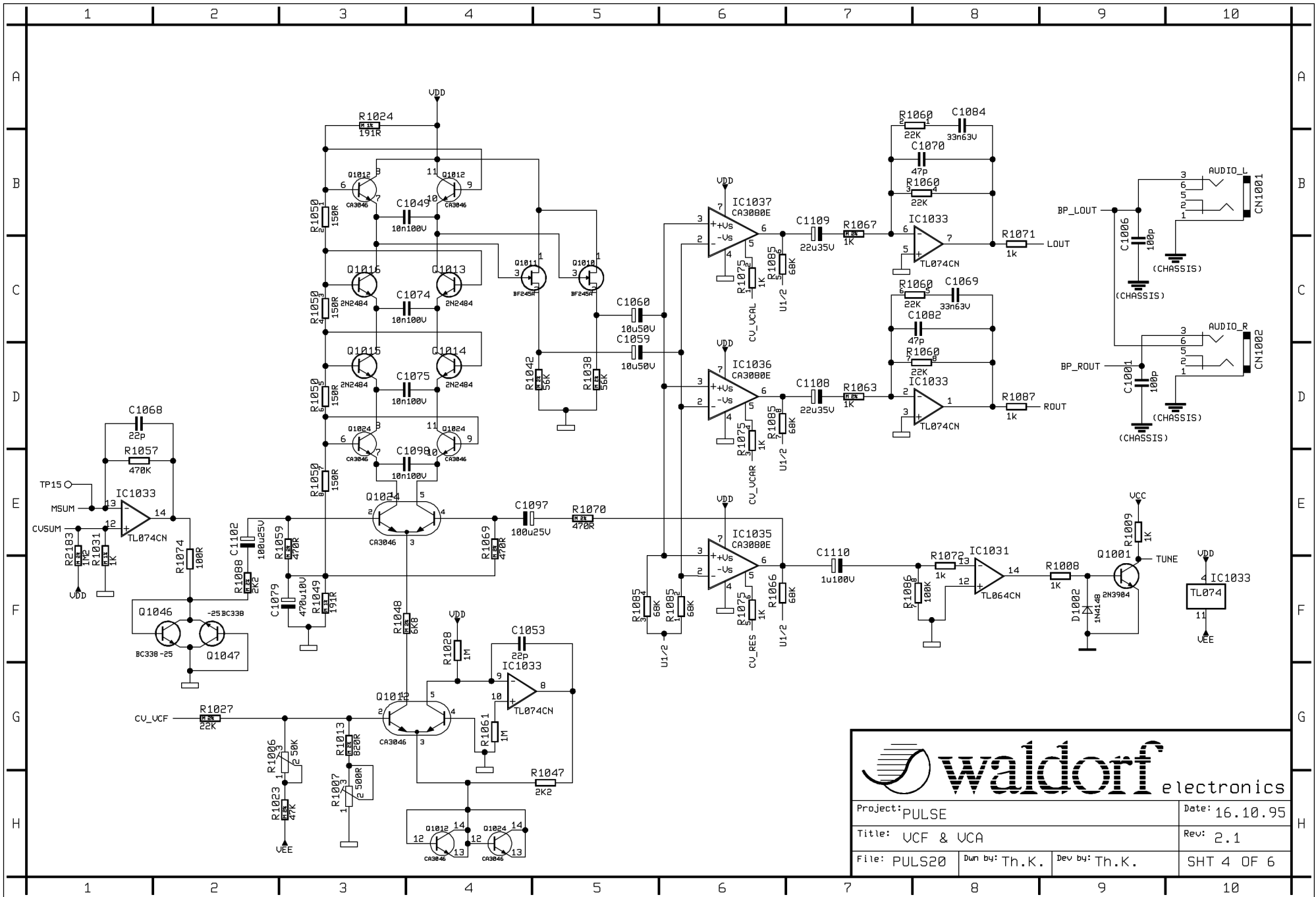
Project: PULSE	Date: 16.10.95
Title: MASTER-CPU & PERIF.	Rev: 2.1
File: PULS20	Dev by: Th.K.
Dev by: Th.K.	SHT 1 OF 6





**waldorf** electronics

Project: PULSE	Date: 16.10.95
Title: SLAVE CPU, WAVEFORM, NOISE, MIXER 2.1	Rev: 2.1
File: PULS20	Dev by: Th.K.
Dwn by: Th.K.	SHT 3 OF 6



Project: PULSE		Date: 16.10.95	
Title: VCF & VCA		Rev: 2.1	
File: PULS20	Des by: Th.K.	Dev by: Th.K.	SHT 4 OF 6



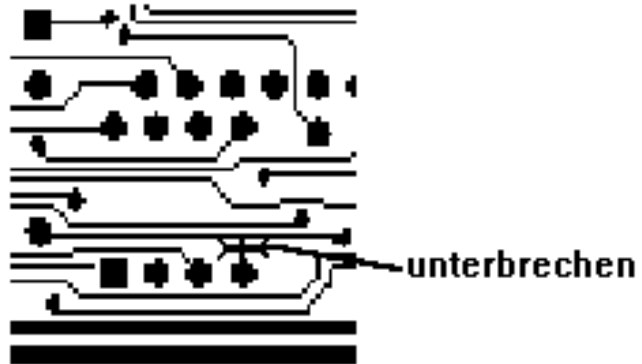
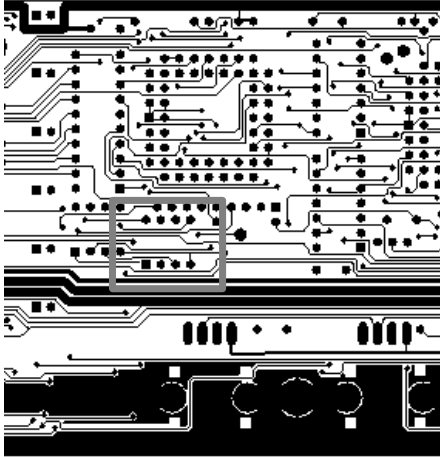


## **MODIFIKATIONEN**

an Leiterplatte PULSE Rev. 2.0:

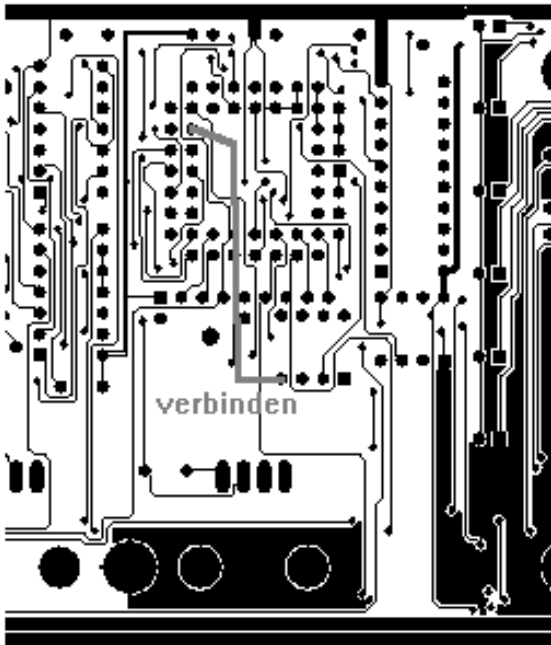
### **Auf der Bauteilseite:**

1. Leiterbahn zu IC1025 Pin 4 unterbrechen.



2. IC1025, IC1040, IC1041 übereinander löten, mit Ausnahme von von jeweils Pin 1.  
Pin 1 von IC1025 mit Pin 2 von IC1022 (bleibt unbestückt) verbinden.  
Pin 1 von IC1040 mit Pin 4 von IC1022 verbinden.  
Pin 1 von IC1041 mit TP10 (bei R1041) verbinden.

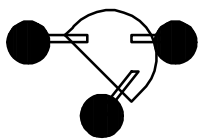
### **3. Auf der Leiterseite:**



Pin 4 von IC1025 mit Pin 32 von IC1007 verbinden.

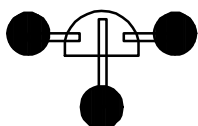
4. Bei Q1010 und Q1011 (BF245A) ist der Footprint falsch. Bitte folgendermassen einlöten:

Q1010, Q1011



5. Bei Q1001 (2N3904) ist der Footprint ebenfalls falsch. Einlöten wie folgt:

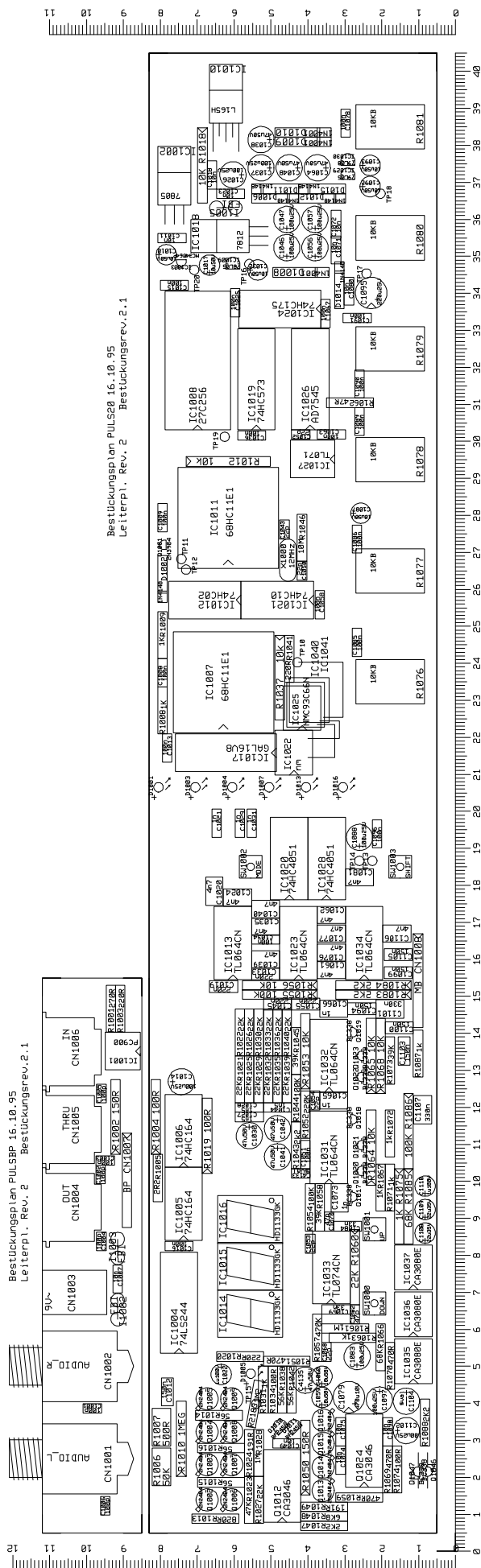
Q1001



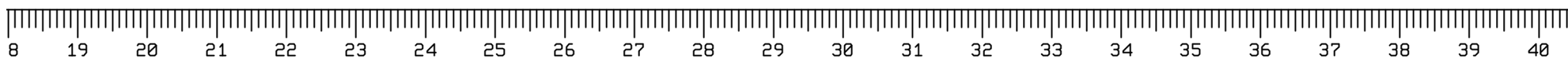
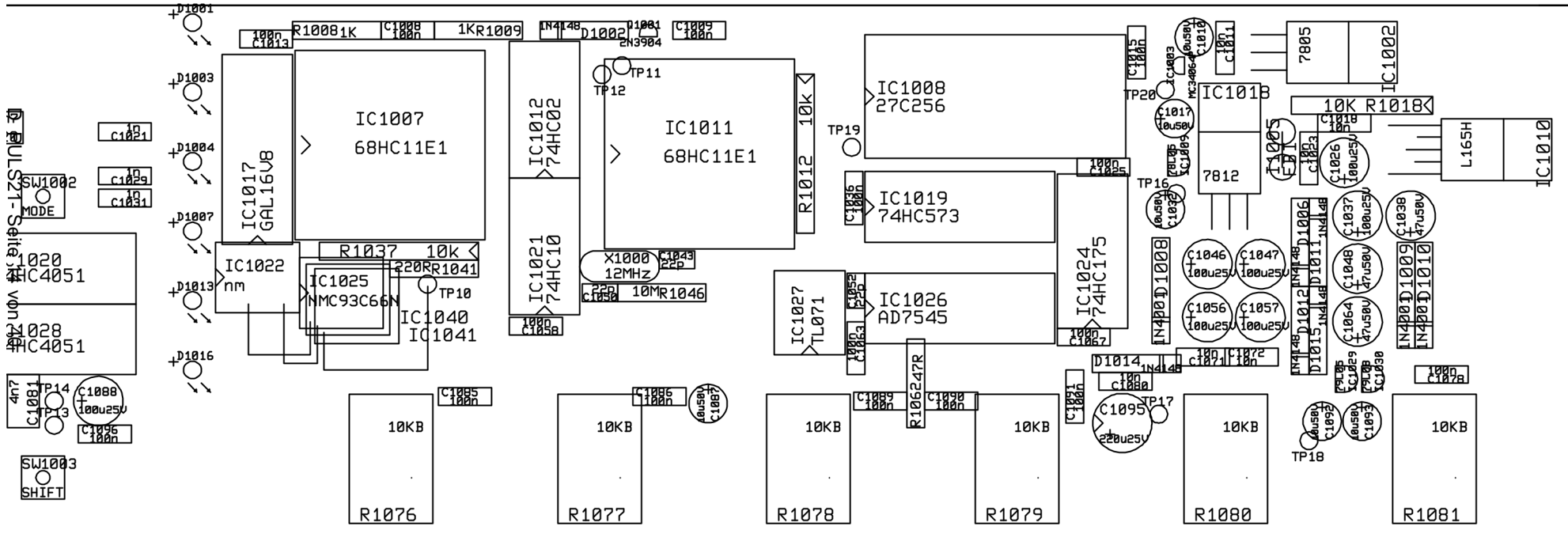
Es ist jeweils die Draufsicht auf die Bestückungsseite dargestellt.

6. Bei Q1046 und Q1047 vor dem Einlöten Collector und Basis verbinden. Dann wie Dioden einlöten. Dabei müssen beide Transistoren in die selbe Richtung eingelötet werden, nicht gegensinnig, wie fälschlich im Bestückungsplan eingezeichnet.
7. In Reihe zu R1051 (470R) wird ein ELKO mit 47u gelötet. Dabei kommt der Minuspol an den Pin, der dem R1057 zugewand ist. Den Becher des Elkos in Richtung R1050 auf die Leiterplatte legen (nicht in Richtung Display!).
8. Ein zusätzlicher Widerstand (R2183, 1M2), wird von R1031 (1K), bei D1005, nach R1024 (+12V), bei Q1008, gelötet.

# Bestückungsplan:



Bestückungsplan PULS20 16.10.95  
 Leiterpl. Rev. 2 Bestückungsrev.2.1





## Schaltplan - Bauteilreferenzliste

Cross-Referenz Bauteil-Liste / PROJEKT-Datei 'puls20.ddb'

			Blatt '1'	
PARTNAME	LOG.NAME	VALUE	SHEET	POS
CN1001	jack	AUDIO_L	4	B10
CN1002	jack	AUDIO_R	4	D10
CN1003	acplug	9V~	5	B1
CN1004	mab5	OUT	1	C1
CN1005	mab5	THRU	1	B1
CN1006	mab5	IN	1	A1
CN1007	rastersteg_10p	BP	5	F10
CN1008	rastersteg_10p	MB	5	F9
C1001	ccv_100p		4	D9
C1002	ccv_100p		1	C1
C1003	ccv_100p		1	B2
C1004	ccv_100p		1	C1
C1005	ccv_100p		1	C1
C1006	ccv_100p		4	C9
C1007	ccv_10n		5	B2
C1008	ccv_100n		5	H5
C1009	ccv_100n		5	H6
C1010	ce_10u50v		5	A6
C1011	ccv_10n		5	B5
C1012	cf_150n		2	F6
C1013	ccv_100n		5	H4
C1014	ce_100u25v		5	B6
C1015	ccv_100n		5	H7
C1016	ccv_100n		5	H6
C1017	ce_10u50v		5	D9
C1018	ccv_10n		5	D2
C1019	cf_220n		2	C5
C1020	cf_4n7_fkp		2	C4
C1021	cc_1n_rm5		3	E6
C1022	ce_1u100v		3	H4
C1023	ccv_10n		5	C3
C1024	cf_4n7_fkp		2	B6
C1025	ccv_100n		5	H7
C1026	ce_100u25v		5	C3
C1027	cf_1n5		3	F8
C1028	cf_1n5		3	D8
C1029	cc_1n_rm5		3	C6
C1030	ce_47u50v		3	F8
C1031	cc_1n_rm5		3	A6
C1032	ce_10u50v		5	D7
C1033	cf_220n		2	C8
C1034	ccv_100n		5	H3
C1035	cf_4n7_fkp		2	C9
C1036	ccv_100n		5	H6
C1037	ce_100u25v		5	E4
C1038	ce_47u50v		5	C3
C1039	cf_4n7_fkp		2	C6
C1040	cf_4n7_fkp		2	B8
C1041	ce_47u50v		3	B8
C1042	ce_47u50v		3	D8
C1043	cc_22p		1	E6
C1044	cf_1n5		3	B8
C1045	cf_220n		2	C7
C1046	ce_100u25v		5	C5
C1047	ce_100u25v		5	E5
C1048	ce_47u50v		5	D4

Cross-Referenz Bauteil-Liste / PROJEKT-Datei 'puls20.ddb'

			Blatt '2'	
PARTNAME	LOG.NAME	VALUE	SHEET	POS
C1049	cf_10n		4	B3
C1050	cc_22p		1	E7
C1051	ccv_100n		3	G3
C1052	cc_22p		2	B2
C1053	cc_22p		4	F4
C1054	cc_22p		3	F3
C1055	cf_220n		2	C10
C1056	ce_100u25v		5	C4
C1057	ce_100u25v		5	E5
C1058	ccv_100n		5	H5
C1059	ce_10u50v		4	D5
C1060	ce_10u50v		4	C5
C1061	cf_4n7_fkp		2	F8
C1062	cf_4n7_fkp		2	D8
C1063	ccv_100n		5	H2
C1064	ce_47u50v		5	E3
C1065	cf_1n100v_fkp		3	D7
C1066	cf_1n100v_fkp		3	B7
C1067	ccv_100n		5	H5
C1068	cc_22p		4	D1
C1069	cf_33n		4	C8
C1070	cc_47p		4	B7
C1071	ccv_10n		5	D5
C1072	ccv_10n		5	E5
C1073	cf_1n100v_fkp		3	F7
C1074	cf_10n		4	C3
C1075	cf_10n		4	D3
C1076	cf_4n7_fkp		2	B4
C1077	cf_4n7_fkp		2	C7
C1078	ccv_100n		1	E4
C1079	ce_470u10v		4	F3
C1080	ccv_10n		5	B3
C1081	cf_4n7_fkp		2	F5
C1082	cc_47p		4	C7
C1083	ce_100u25v		5	H3
C1084	cf_33n		4	A8
C1085	ccv_100n		1	E1
C1086	ccv_100n		1	E2
C1087	ce_10u50v		1	D6
C1088	ce_100u25v		5	H1
C1089	ccv_100n		1	E2
C1090	ccv_100n		1	E3
C1091	ccv_100n		1	E3
C1092	ce_10u50v		5	E9
C1093	ce_10u50v		5	E8
C1094	cf_150n		2	F9
C1095	ce_220u25v		5	A4
C1096	ccv_100n		5	H1
C1097	ce_100u25v		4	E5
C1098	cf_10n		4	E3
C1099	cf_150n		2	D9
C1100	cf_150n		2	D10
C1101	cf_330n		2	D6
C1102	ce_100u25v		4	E2
C1103	cf_150n		2	F9
C1105	cf_150n		2	F6



Cross-Referenz Bauteil-Liste / PROJEKT-Datei 'puls20.ddb'

Blatt '3'

PARTNAME	LOG.NAME	VALUE	SHEET	POS
C1106	cf_4n7_fkp		2	D5
C1107	cf_330n		2	D6
C1108	ce_22u35v		4	D7
C1109	ce_22u35v		4	B7
C1110	ce_1u100v		4	F7
C4135	ce_47u50v		3	G4
D1001	led_gn3		1	E5
D1002	1n4148		4	F9
D1003	led_gn3		1	F5
D1004	led_gn3		1	F5
D1005	led_gn3		1	F5
D1006	1n4148		5	D5
D1007	led_gn3		1	E5
D1008	1n4001		5	B3
D1009	1n4001		5	C4
D1010	1n4001		5	C4
D1011	1n4148		5	E3
D1012	1n4148		5	E4
D1013	led_gn3		1	D5
D1014	1n4148		5	C7
D1015	1n4148		5	E4
D1016	led_gn3		1	D5
IC1001	pc900		1	A2
IC1002	7805		5	A5
IC1003	mc34064p		1	F7
IC1004	741s244		1	G3
IC1005	74hc164		1	G1
IC1006	74hc164s		1	F1
IC1007	68hc11e1		3	B2
IC1008	27c256		1	C9
IC1009	78105		5	C8
IC1010	1165h		5	D2
IC1011	68hc11e1		1	A7
IC1012	74hc02		1	B6
IC1012	74hc02		1	A6
IC1012	74hc02		1	B6
IC1012	74hc02		1	F9
IC1013	t1064		2	B4
IC1013	t1064s		2	G4
IC1013	t1064		2	B6
IC1013	t1064		2	A6
IC1013	t1064		2	A8
IC1014	lts547ap		1	G4
IC1015	lts547ap		1	G5
IC1016	lts547ap		1	G6
IC1017	gal16v8		3	C3
IC1018	7812		5	C6
IC1019	74hc573		1	A10
IC1020	74hc4051		2	D3
IC1021	74hc10		1	B6
IC1021	74hc10		1	E9
IC1021	74hc10		1	F9
IC1022	dil8_notmount		3	A4
IC1023	t1064		2	G3
IC1023	t1064		2	A5
IC1023	t1064s		2	G6

Cross-Referenz Bauteil-Liste / PROJEKT-Datei 'puls20.ddb'

			Blatt '4'	
PARTNAME	LOG.NAME	VALUE	SHEET	POS
IC1023	t1064		2	B8
IC1023	t1064		2	B9
IC1024	74hc175		2	D1
IC1025	nmc93c66n		3	E1
IC1026	ad7545		2	B1
IC1027	t1071		2	B3
IC1028	74hc4051		2	E3
IC1029	79105		5	E8
IC1030	79108		5	F7
IC1031	t1064s		3	G2
IC1031	t1064		3	G3
IC1031	t1064		3	F7
IC1031	t1064		3	D7
IC1031	t1064		4	F8
IC1032	t1064s		3	G1
IC1032	t1064		3	F6
IC1032	t1064		3	D6
IC1032	t1064		3	B6
IC1032	t1064		3	B7
IC1033	t1074		4	E1
IC1033	t1074		4	G4
IC1033	t1074		4	D7
IC1033	t1074		4	B7
IC1033	t1074s		4	F10
IC1034	t1064		2	D5
IC1034	t1064		2	E5
IC1034	t1064s		2	G5
IC1034	t1064		2	E8
IC1034	t1064		2	D8
IC1035	ca3080e		4	F6
IC1036	ca3080e		4	D6
IC1037	ca3080e		4	B6
IC1038	dil28_socket		6	C5
IC1040	nmc93c66n		3	E2
IC1041	nmc93c66n		3	E4
INFO	pcbinfo	MAIN PCB	5	B7
INFO2	pcbinfo1	BACK PCB	6	G4
I1002	fbead2		5	A2
I1003	fbead2		5	B2
I1005	fbead2		5	C2
M1	mhole		5	F1
M2	mhole		5	G1
M3	mhole		5	G1
M4	mhole		5	G1
M5	mhole		5	F2
M6	mhole		5	G2
M7	mhole		5	G2
M8	mhole		5	G2
M9	mhole		5	F2
M10	mhole		5	G2
M11	mhole		5	G2
M12	mhole		5	G2
M13	mhole		5	G3
M14	mhole		5	F3
Q1001	2n3904		4	F9
Q1002	2n2484		3	B10

Cross-Referenz Bauteil-Liste / PROJEKT-Datei 'puls20.ddb'

Blatt '5'

PARTNAME	LOG.NAME	VALUE	SHEET	POS
Q1003	2n2484		3	D10
Q1004	2n2484		3	F10
Q1005	2n2484		3	H5
Q1006	2n2484		3	B9
Q1007	2n2484		3	D9
Q1008	2n2484		3	F9
Q1009	2n2484		3	H5
Q1010	bf245a		4	C5
Q1011	bf245a		4	C4
Q1012	ca3046_q3		4	B3
Q1012	ca3046_q12		4	G3
Q1012	ca3046_q5		4	H4
Q1012	ca3046_q4		4	B4
Q1013	2n2484		4	C4
Q1014	2n2484		4	D4
Q1015	2n2484		4	D3
Q1016	2n2484		4	C3
Q1017	bc338		3	H2
Q1018	bc338		3	C7
Q1019	bc338		3	A7
Q1020	bc338		3	E7
Q1021	bc338		3	E5
Q1022	bc338		3	C5
Q1023	bc338		3	G5
Q1024	ca3046_q3		4	D3
Q1024	ca3046_q12		4	E3
Q1024	ca3046_q4		4	D4
Q1024	ca3046_q5		4	H4
Q1046	bc338		4	F1
Q1047	bc338		4	F2
R1001	r	270R	1	A2
R1002	rn150r		1	C2
R1002	rn150r		1	C2
R1002	rn150r		1	B2
R1002	rn150r		1	B2
R1003	r	220R	1	A1
R1004	rn100r		1	G2
R1004	rn100r		1	F2
R1004	rn100r		1	G3
R1004	rn100r		1	F3
R1005	r	2R2	5	B6
R1006	rtrimmerh	50K	4	H3
R1007	rtrimmerh	500R	4	H3
R1008	r	1K	4	F9
R1009	r	1K	4	E9
R1010	rn1m		2	C5
R1010	rn1m		2	C7
R1010	rn1m		2	C8
R1010	rn1m		2	C10
R1012	ru10kvc		1	D8
R1012	ru10kvc		1	D8
R1012	ru10kvc		1	C8
R1013	rm2	820R	4	G3
R1014	rm2	56	3	G9
R1015	rm2	56	3	C9
R1016	rm2	56	3	E9

Cross-Referenz Bauteil-Liste / PROJEKT-Datei 'puls20.ddb'

Blatt '6'

PARTNAME	LOG.NAME	VALUE	SHEET	POS
R1018	rn10k		5	D2
R1018	rn10k		5	D2
R1018	rn10k		5	C2
R1018	rn10k		5	D2
R1019	rn100r		1	F2
R1019	rn100r		1	F2
R1019	rn100r		1	F3
R1019	rn100r		1	F3
R1020	r	220R	3	H4
R1021	rm2	22K	3	F7
R1022	rm2	22K	3	E8
R1023	rm2	47K	4	H3
R1024	rm	191R	4	A3
R1025	rm2	22K	3	F7
R1026	rm2	22K	3	F7
R1027	rm2	22K	4	G2
R1028	r	1M	4	G4
R1029	rm2	22K	3	D7
R1030	rm2	22K	3	C8
R1031	rm	1K	4	F1
R1032	rm2	22K	3	D7
R1033	rm2	22K	3	D7
R1034	r	100R	3	H5
R1035	rm2	22K	3	B7
R1036	rm2	22K	3	A8
R1037	ru10kvc		1	B3
R1037	ru10kvc		1	B3
R1037	ru10kvc		1	B3
R1037	ru10kvc		1	B4
R1037	ru10kvc		1	F7
R1037	ru10kvc		3	D3
R1037	ru10kvc		3	D3
R1038	rm2	56K	4	D5
R1039	rm2	22K	3	B7
R1040	rm2	22K	3	B7
R1041	r	220R	3	E1
R1042	rm2	56K	4	D5
R1043	r	2k2	3	H3
R1044	r	100K	3	G3
R1045	rm2	39K	3	D6
R1046	r	10M	1	E6
R1047	r	2K2	4	H4
R1048	rm2	6K8	4	F3
R1049	rm	191R	4	F3
R1050	rn150r		4	E3
R1050	rn150r		4	D3
R1050	rn150r		4	C3
R1050	rn150r		4	B3
R1051	r	470R	3	G4
R1052	r	220K	3	G3
R1053	rn10k		3	F5
R1053	rn10k		3	D5
R1053	rn10k		3	F6
R1053	rn10k		3	D6
R1054	r	100K	3	H3
R1055	rn100k		2	H2

Cross-Referenz Bauteil-Liste / PROJEKT-Datei 'puls20.ddb'

Blatt '7'

PARTNAME	LOG.NAME	VALUE	SHEET	POS
R1055	rn100k		2	G2
R1055	rn100k		3	F5
R1056	rn10k		2	C5
R1056	rn10k		2	C6
R1056	rn10k		2	C8
R1056	rn10k		2	C10
R1057	r	470K	4	E1
R1058	rm2	39K	3	F6
R1059	rm2	470R	4	F3
R1060	rn22k		4	C7
R1060	rn22k		4	A7
R1060	rn22k		4	D7
R1060	rn22k		4	B7
R1061	r	1M	4	G4
R1062	r	47R	1	D6
R1063	rm2	1K	4	D7
R1064	rn10k		3	E5
R1064	rn10k		3	E6
R1064	rn10k		3	C6
R1064	rn10k		3	E6
R1065	rn10k		3	C5
R1065	rn10k		3	G5
R1065	rn10k		3	A6
R1065	rn10k		3	C6
R1066	r	68K	4	F6
R1067	rm2	1K	4	B7
R1068	rn10k		3	B5
R1068	rn10k		3	B6
R1068	rn10k		3	A6
R1069	rm2	470R	4	F4
R1070	rm2	470R	4	E5
R1071	r	1k	4	C8
R1072	r	1k	4	F8
R1073	rm2	39K	3	B6
R1074	r	100R	4	F2
R1075	rn1k		4	F6
R1075	rn1k		4	E6
R1075	rn1k		4	C6
R1076	dpot	10KB	1	D1
R1077	dpot	10KB	1	D2
R1078	dpot	10KB	1	D2
R1079	dpot	10KB	1	D3
R1080	dpot	10KB	1	D3
R1081	dpot	10KB	1	D4
R1083	rn2k2		2	E6
R1083	rn2k2		2	D6
R1083	rn2k2		2	E9
R1083	rn2k2		2	D9
R1084	rn2k2		2	D5
R1084	rn2k2		2	E6
R1084	rn2k2		2	E9
R1084	rn2k2		2	D9
R1085	rn68k		4	F5
R1085	rn68k		4	F6
R1085	rn68k		4	D6
R1085	rn68k		4	C6

Cross-Referenz Bauteil-Liste / PROJEKT-Datei 'puls20.ddb'

Blatt '8'

PARTNAME	LOG.NAME	VALUE	SHEET	POS
R1086	rn100k		3	D5
R1086	rn100k		3	B5
R1086	rn100k		4	F8
R1087	r	1k	4	D8
R1088	rm2	2K2	4	F2
R2183	rm2	1M2	4	F1
SW1000	taster2wave	DOWN	1	C3
SW1001	taster2wave	UP	1	C3
SW1002	taster2wave	MODE	1	C3
SW1003	taster2wave	SHIFT	1	C4
TP10	tp		3	D3
TP11	tp		1	C7
TP12	tp		1	C7
TP13	tp		2	F4
TP14	tp		2	F4
TP15	tp		4	E1
TP16	tp		5	C7
TP17	tp		5	D9
TP18	tp		5	E9
TP19	tp		1	B7
TP20	tp		1	F7
X1000	quarz_hc49u70_v	12MHz	1	E6

## Schaltplan- Netzreferenzliste

Cross-Referenz LABEL-Liste / PROJEKT-Datei 'puls20.ddb'

LABELNAME	SCM-SEITE	POS	Blatt '1'
/dacen	: 1	F10	
/dacen	: 2	E1	
/dacen	: 2	C1	
/disp	: 1	H2	
/disp	: 1	A7	
/muxa	: 1	B7	
/muxa	: 2	E3	
/muxb	: 1	A7	
/muxb	: 2	F3	
/romen	: 1	E9	
/romen	: 6	E5	
/rst	: 1	H1	
/rst	: 1	F1	
/rst	: 1	F8	
/rst	: 1	C8	
/rst	: 3	D3	
/rst	: 3	A4	
/slv_en	: 1	B6	
/slv_en	: 3	C2	
a[0..15]	: 1	A8	
a[0..15]	: 2	B1	
a[0..15]	: 6	B5	
ad[0..7]	: 1	A8	
ad[0..7]	: 2	C1	
ad[0..7]	: 6	B6	
as	: 1	C8	
as	: 1	B10	
a14	: 1	D9	
a14	: 1	F9	
a15	: 1	F9	
a15	: 1	E9	
a15	: 1	D9	
bp_lout	: 4	B9	
bp_lout	: 5	F10	
bp_midi_in	: 1	A3	
bp_midi_in	: 5	F10	
bp_midi_out	: 1	C2	
bp_midi_out	: 5	F10	
bp_rout	: 4	D9	
bp_rout	: 5	F10	
bp_vcc	: 1	A3	
bp_vcc	: 5	F10	
chassis	: 1	C1	
chassis	: 1	C2	
chassis	: 4	C9	
chassis	: 4	D9	
chassis	: 4	D10	
chassis	: 4	C10	
chassis	: 5	G1	
chassis	: 5	G3	
chassis	: 5	G10	
cv_dco1	: 2	A5	
cv_dco1	: 3	B5	
cv_dco2	: 2	A7	
cv_dco2	: 3	D5	
cv_dco3	: 2	A8	

Cross-Referenz LABEL-Liste / PROJEKT-Datei 'puls20.ddb'

LABELNAME	SCM-SEITE	POS	Blatt '2'
cv_dco3	: 3	F5	
cv_lev1	: 2	C5	
cv_lev1	: 3	C9	
cv_lev2	: 2	C7	
cv_lev2	: 3	E9	
cv_lev3	: 2	C9	
cv_lev3	: 3	G9	
cv_lev4	: 2	C10	
cv_lev4	: 3	H5	
cv_res	: 2	D6	
cv_res	: 4	F6	
cv_vcal	: 2	D10	
cv_vcal	: 4	C6	
cv_vcar	: 2	E10	
cv_vcar	: 4	E6	
cv_vcf	: 2	E6	
cv_vcf	: 4	G2	
cvsum	: 4	E1	
cv1	: 2	D3	
cv1	: 2	C4	
cv2	: 2	D3	
cv2	: 2	C6	
cv3	: 2	D3	
cv3	: 2	C7	
cv4	: 2	D3	
cv4	: 2	C9	
cv5	: 2	D3	
cv5	: 2	A4	
cv6	: 2	E3	
cv6	: 2	A6	
cv7	: 2	E3	
cv7	: 2	A7	
cv8	: 2	E3	
cv8	: 2	E5	
cv9	: 2	E3	
cv9	: 2	D5	
cv10	: 2	E3	
cv10	: 2	D8	
cv11	: 2	F3	
cv11	: 2	E8	
eclk	: 1	C8	
eclk	: 1	E9	
eclk	: 1	F9	
eedi	: 3	F1	
eedi	: 3	F2	
eedi	: 3	B3	
eedi	: 3	A4	
eedi	: 3	F4	
eedo2	: 3	B2	
eedo2	: 3	E2	
eedo2	: 3	E3	
eedo2	: 3	E5	
eesk2	: 3	F1	
eesk2	: 3	F2	
eesk2	: 3	C3	
eesk2	: 3	F4	



Cross-Referenz LABEL-Liste / PROJEKT-Datei 'puls20.ddb'

LABELNAME	SCM-SEITE	POS	Blatt '3'
ee1	: 3	F1	
ee1	: 3	B3	
ee1	: 3	A4	
ee2	: 3	F2	
ee2	: 3	C3	
ee2	: 3	A4	
ee3	: 3	D3	
ee3	: 3	F4	
gnd	: 5	F2	
k1	: 1	G3	
k1	: 1	H4	
k2	: 1	G3	
k2	: 1	H5	
k3	: 1	H3	
k3	: 1	H6	
k4	: 1	H3	
k4	: 1	F5	
led_sclk	: 1	H1	
led_sclk	: 1	F1	
led_sclk	: 1	A6	
lout	: 4	C9	
lout	: 5	F9	
masterclk	: 1	D6	
masterclk	: 3	E1	
midi_in	: 1	C7	
midi_in	: 5	F9	
midi_out	: 1	C5	
midi_out	: 5	F9	
mmiso	: 1	B7	
mmiso	: 3	C2	
mmosi	: 1	F1	
mmosi	: 1	B7	
mmosi	: 3	C2	
msum	: 3	D10	
msum	: 4	E1	
osc1_p	: 3	C4	
osc1_p	: 3	A7	
osc1_s	: 3	C4	
osc1_s	: 3	A6	
osc1_t	: 3	C4	
osc1_t	: 3	C5	
osc2_p	: 3	C4	
osc2_p	: 3	C7	
osc2_s	: 3	C4	
osc2_s	: 3	C6	
osc2_t	: 3	C4	
osc2_t	: 3	E5	
osc3_p	: 3	C4	
osc3_p	: 3	E7	
osc3_s	: 3	C4	
osc3_s	: 3	E6	
pot1	: 1	D1	
pot1	: 1	D7	
pot2	: 1	D2	
pot2	: 1	C7	
pot3	: 1	D2	

Cross-Referenz LABEL-Liste / PROJEKT-Datei 'puls20.ddb'

LABELNAME	SCM-SEITE	POS	Blatt '4'
pot3	: 1	C7	
pot4	: 1	D3	
pot4	: 1	C7	
pot5	: 1	D3	
pot5	: 1	C7	
pot6	: 1	D4	
pot6	: 1	C7	
r/w	: 1	C8	
r/w	: 1	F9	
r/w	: 1	E9	
rout	: 4	D9	
rout	: 5	F9	
scio	: 1	C6	
scio	: 3	C2	
sclk	: 1	B6	
sclk	: 1	A6	
sclk	: 1	B7	
slave_sclk	: 1	B6	
slave_sclk	: 3	C2	
slv_spi_rdy	: 1	B7	
slv_spi_rdy	: 3	B3	
spa3	: 3	B2	
spa3	: 3	C3	
spa4	: 3	B2	
spa4	: 3	C3	
spa5	: 3	B2	
spa5	: 3	C3	
spa6	: 3	B2	
spa6	: 3	C3	
spa7	: 3	B2	
spa7	: 3	C3	
sw1	: 1	B3	
sw1	: 3	C3	
sw2	: 1	B3	
sw2	: 3	C3	
sw3	: 1	B4	
sw3	: 3	C3	
sw4	: 1	B4	
sw4	: 3	C3	
s0	: 3	B3	
s0	: 3	C3	
s1	: 3	B3	
s1	: 3	C3	
s2	: 3	B3	
s2	: 3	C3	
s3	: 3	B3	
s3	: 3	C3	
s4	: 3	B3	
s4	: 3	C4	
s5	: 3	B3	
s5	: 3	G5	
tune	: 1	B7	
tune	: 4	F9	
u1/2	: 2	G3	
u1/2	: 4	F6	
u1/2	: 4	F6	

Cross-Referenz LABEL-Liste / PROJEKT-Datei 'puls20.ddb'

LABELNAME	SCM-SEITE	POS	Blatt '5'
u1/2	: 4	D6	
u1/2	: 4	C6	
vdd	: 2	G2	
vdd	: 2	B3	
vdd	: 2	G5	
vdd	: 3	G1	
vdd	: 3	G3	
vdd	: 4	F1	
vdd	: 4	A4	
vdd	: 4	F4	
vdd	: 4	E6	
vdd	: 4	D6	
vdd	: 4	B6	
vdd	: 4	F10	
vdd	: 5	G3	
vdd	: 5	C7	
vee	: 2	H5	
vee	: 3	H1	
vee	: 4	H3	
vee	: 4	F10	
vee	: 5	G4	
vee	: 5	F8	
vff	: 1	C6	
vff	: 2	C2	
vff	: 5	C9	
vgg	: 2	B2	
vgg	: 2	F3	
vgg	: 2	C3	
vgg	: 5	G1	
vgg	: 5	E9	
vin	: 5	C2	
vin	: 5	A4	
vin	: 5	A4	
vin	: 5	F9	
vin+	: 5	A2	
vin+	: 5	F10	
vin-	: 1	A2	
vin-	: 5	B2	
vin-	: 5	F10	
vmux	: 1	F1	
vmux	: 5	B6	

--Ende--

**Bestückungsliste:**

WALDORF Electronics BAUTEILLISTE PULS20

10-17-1995

Seite: 1

**IC's:**

NAME	WERT	FOOTPRNT	BESCHREIBUNG	POS X,Y
IC1001	PC900	DIL6	OPTO-COUPLER	
IC1002	7805	TO220	REGULATOR	
IC1003	MC34064P	MC34064P	SUPERVISORY CIRCUIT	
IC1004	74LS244	DIL20	BUS DRIVER	
IC1005	74HC164	DIL14	SHIFT REGISTER	
IC1006	74HC164	DIL14	SHIFT REGISTER	
IC1007	68HC11E1	12MHz	PLCC52S	
IC1008	27C256	200ns	DIL28	EPROM 32K
IC1009	78L05	TO39	REGULATOR	
IC1010	L165H	PENTAWAT	POWER OP-AMP	
IC1011	68HC11E1	12MHz	PLCC52S	
IC1012	74HC02	DIL14	4 x NOR	
IC1013	TL064CN	CN	DIL14	QUAD OP-AMP LOW POWER
IC1014	HD1133GK	DIL10	7-SEG.ANZEIGE	Gn(K)
IC1015	HD1133GK	DIL10	7-SEG.ANZEIGE	Gn(K)
IC1016	HD1133GK	DIL10	7-SEG.ANZEIGE	Gn(K)
IC1017	GAL16V8	DIL20		
IC1018	7812	TO220	REGULATOR	
IC1019	74HC573	DIL20	D-LATCH	
IC1020	74HC4051	DIL16	Analog Multiplexer	
IC1021	74HC10	DIL14	3-Input Nand	
IC1023	TL064CN	CN	DIL14	QUAD OP-AMP LOW POWER
IC1024	74HC175	DIL16	4 x D-FLIP-FLOP	
IC1025	NMC93C66N	DIL8	SER. EEPROM 4K	
IC1026	AD7545	DIL20	MOS D/A CONVERTER	
IC1027	TL071	DIL8	OP-AMP	
IC1028	74HC4051	DIL16	Analog Multiplexer	
IC1029	79L05	TO39	REGULATOR	
IC1030	79L08	TO39	REGULATOR	
IC1031	TL064CN	CN	DIL14	QUAD OP-AMP LOW POWER
IC1032	TL064CN	CN	DIL14	QUAD OP-AMP LOW POWER
IC1033	TL074CN	DIL14	QUAD OP-AMP	
IC1034	TL064CN	CN	DIL14	QUAD OP-AMP LOW POWER
IC1035	CA3080E	DIL8	OTA / HARRIS	
IC1036	CA3080E	DIL8	OTA / HARRIS	
IC1037	CA3080E	DIL8	OTA / HARRIS	
IC1038	DIL28-Socket	DIL28		
IC1040	NMC93C66N	DIL8	SER. EEPROM 4K	
IC1041	NMC93C66N	DIL8	SER. EEPROM 4K	

**Q's:**

NAME	WERT	FOOTPRNT	BESCHREIBUNG	POS X,Y
Q1001	2N3904	SOT54C	NPN TRANSISTOR	270, 78
Q1002	2N2484	TO18	NPN TRANSISTOR	13, 67
Q1003	2N2484	TO18	NPN TRANSISTOR	23, 67
Q1004	2N2484	TO18	NPN TRANSISTOR	32, 67
Q1005	2N2484	TO18	NPN TRANSISTOR	41, 67
Q1006	2N2484	TO18	NPN TRANSISTOR	13, 60
Q1007	2N2484	TO18	NPN TRANSISTOR	23, 60
Q1008	2N2484	TO18	NPN TRANSISTOR	32, 60
Q1009	2N2484	TO18	NPN TRANSISTOR	41, 60
Q1010	BF245A	TO92	FET	32, 48
Q1011	BF245A	TO92	FET	32, 45

## Q's: (Fortsetzung)

NAME	WERT		FOOTPRNT	BESCHREIBUNG	POS X,Y
Q1012	CA3046		DIL14	Transistor-Array	10, 43
Q1013	2N2484		TO18	NPN TRANSISTOR	16, 35
Q1014	2N2484		TO18	NPN TRANSISTOR	22, 35
Q1015	2N2484		TO18	NPN TRANSISTOR	29, 35
Q1016	2N2484		TO18	NPN TRANSISTOR	35, 35
Q1017	BC338	-25	TRANSIST	NPN TRANSISTOR	93, 27
Q1018	BC338	-25	TRANSIST	NPN TRANSISTOR	114, 27
Q1019	BC338	-25	TRANSIST	NPN TRANSISTOR	137, 27
Q1020	BC338	-25	TRANSIST	NPN TRANSISTOR	105, 25
Q1021	BC338	-25	TRANSIST	NPN TRANSISTOR	112, 25
Q1022	BC338	-25	TRANSIST	NPN TRANSISTOR	130, 25
Q1023	BC338	-25	TRANSIST	NPN TRANSISTOR	136, 25
Q1024	CA3046		DIL14	Transistor-Array	19, 20
Q1046	BC338	-25	TRANSIST	NPN TRANSISTOR	18, 7
Q1047	BC338	-25	TRANSIST	NPN TRANSISTOR	24, 10

## C's:

NAME	WERT	TYP		BESCHREIBUNG	POS X,Y
C1001	100p	EC 04	CE 0 101 K	KER. VIELSCH. 10% RM2.5	38, 99
C1002	100p	EC 04	CE 0 101 K	KER. VIELSCH. 10% RM2.5	100, 96
C1003	100p	EC 04	CE 0 101 K	KER. VIELSCH. 10% RM2.5	105, 96
C1004	100p	EC 04	CE 0 101 K	KER. VIELSCH. 10% RM2.5	85, 95
C1005	100p	EC 04	CE 0 101 K	KER. VIELSCH. 10% RM2.5	122, 95
C1006	100p	EC 04	CE 0 101 K	KER. VIELSCH. 10% RM2.5	11, 94
C1007	10n	EC04	ZEO 103KHB	KER. VIELSCH. 10% RM5	76, 91
C1008	100n	EC04	WDO 104MHB	KER. VIELSCH. 10% RM5	234, 79
C1009	100n	EC04	WDO 104MHB	KER. VIELSCH. 10% RM5	276, 79
C1010	10u50V	THRS	10/50	ELKO RM2.0 RADIAL	350, 79
C1011	10n	EC04	ZEO 103KHB	KER. VIELSCH. 10% RM5	354, 79
C1012	150n	BF024	D 0154K	FOLIE 63V 10% RM5	45, 78
C1013	100n	EC04	WDO 104MHB	KER. VIELSCH. 10% RM5	219, 78
C1014	100u25V	THRS	100/25	ELKO RM2.5 RADIAL	126, 75
C1015	100n	EC04	WDO 104MHB	KER. VIELSCH. 10% RM5	342, 73
C1016	100n	EC04	WDO 104MHB	KER. VIELSCH. 10% RM5	82, 72
C1017	10u50V	THRS	10/50	ELKO RM2.0 RADIAL	346, 66
C1018	10n	EC04	ZEO 103KHB	KER. VIELSCH. 10% RM5	369, 66
C1019	220n	BF024	D 0224K	FOLIE 63V 10% RM5	152, 65
C1020	4n7	FKP2	4700/63	FOLIE 63V 10% RM5	180, 65
C1021	1n	2222	630 19102	KER. SCHEIBENK. 10% RM5	199, 64
C1022	1u100V	THRS	1/100	ELKO RM2.0 RADIAL	48, 63
C1023	10n	EC04	ZEO 103KHB	KER. VIELSCH. 10% RM5	366, 63
C1024	4n7	FKP2	4700/63	FOLIE 63V 10% RM5	176, 61
C1025	100n	EC04	WDO 104MHB	KER. VIELSCH. 10% RM5	339, 59
C1026	100u25V	THRS	100/25	ELKO RM2.5 RADIAL	372, 59
C1027	1n5	BF014	D 0152K	FOLIE 100V 10% RM5	117, 58
C1028	1n5	BF014	D 0152K	FOLIE 100V 10% RM5	119, 58
C1029	1n	2222	630 19102	KER. SCHEIBENK. 10% RM5	199, 58
C1030	47u50V	THRS	47/50	ELKO RM2.5 RADIAL	113, 55
C1031	1n	2222	630 19102	KER. SCHEIBENK. 10% RM5	199, 55
C1032	10u50V	THRS	10/50	ELKO RM2.0 RADIAL	346, 54
C1033	220n	BF024	D 0224K	FOLIE 63V 10% RM5	156, 53
C1034	100n	EC04	WDO 104MHB	KER. VIELSCH. 10% RM5	165, 53
C1035	4n7	FKP2	4700/63	FOLIE 63V 10% RM5	168, 53

C's: (Fortsetzung)

NAME	WERT	TYP	BESCHREIBUNG	POS X,Y
C1036	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	301, 52
C1037	100u25V	THRS 100/25	ELKO RM2.5 RADIAL	373, 51
C1038	47u50V	THRS 47/50	ELKO RM2.5 RADIAL	381, 51
C1039	4n7	FKP2 4700/63	FOLIE 63V 10% RM5	159, 48
C1040	4n7	FKP2 4700/63	FOLIE 63V 10% RM5	173, 48
C1041	47u50V	THRS 47/50	ELKO RM2.5 RADIAL	107, 48
C1042	47u50V	THRS 47/50	ELKO RM2.5 RADIAL	115, 48
C1043	22p	2222 680 34229	KER. SCHEIBENK. 2% RM2.5	274, 46
C1044	1n5	BF014 D 0152K	FOLIE 100V 10% RM5	119, 45
C1045	220n	BF024 D 0224K	FOLIE 63V 10% RM5	147, 45
C1046	100u25V	THRS 100/25	ELKO RM2.5 RADIAL	351, 45
C1047	100u25V	THRS 100/25	ELKO RM2.5 RADIAL	358, 45
C1048	47u50V	THRS 47/50	ELKO RM2.5 RADIAL	373, 43
C1049	10n	BF014 D 0103K	FOLIE 100V 10% RM5	29, 43
C1050	22p	2222 680 34229	KER. SCHEIBENK. 2% RM2.5	266, 41
C1051	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	104, 40
C1052	22p	2222 680 34229	KER. SCHEIBENK. 2% RM2.5	301, 40
C1053	22p	2222 680 34229	KER. SCHEIBENK. 2% RM2.5	81, 39
C1054	22p	2222 680 34229	KER. SCHEIBENK. 2% RM2.5	120, 38
C1055	220n	BF024 D 0224K	FOLIE 63V 10% RM5	147, 38
C1056	100u25V	THRS 100/25	ELKO RM2.5 RADIAL	351, 38
C1057	100u25V	THRS 100/25	ELKO RM2.5 RADIAL	358, 38
C1058	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	258, 36
C1059	10u50V	THRS 10/50	ELKO RM2.0 RADIAL	40, 36
C1060	10u50V	THRS 10/50	ELKO RM2.0 RADIAL	46, 36
C1061	4n7	FKP2 4700/63	FOLIE 63V 10% RM5	157, 36
C1062	4n7	FKP2 4700/63	FOLIE 63V 10% RM5	172, 36
C1063	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	301, 36
C1064	47u50V	THRS 47/50	ELKO RM2.5 RADIAL	373, 36
C1065	1n	FKP2 1000/100	FOLIE 100V 10% RM5	121, 35
C1066	1n	FKP2 1000/100	FOLIE 100V 10% RM5	146, 35
C1067	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	337, 35
C1068	22p	2222 680 34229	KER. SCHEIBENK. 2% RM2.5	52, 34
C1069	33n	BF014 D 0333K	FOLIE 63V 10% RM5	65, 29
C1070	47p	2222 680 10479	KER. SCHEIBENK. 2% RM2.5	90, 34
C1071	10n	ECO4 ZEO 103KHB	KER. VIELSCH. 10% RM5	354, 32
C1072	10n	ECO4 ZEO 103KHB	KER. VIELSCH. 10% RM5	356, 32
C1073	1n	FKP2 1000/100	FOLIE 100V 10% RM5	92, 31
C1074	10n	BF014 D 0103K	FOLIE 100V 10% RM5	27, 31
C1075	10n	BF014 D 0103K	FOLIE 100V 10% RM5	34, 31
C1076	4n7	FKP2 4700/63	FOLIE 63V 10% RM5	161, 31
C1077	4n7	FKP2 4700/63	FOLIE 63V 10% RM5	166, 31
C1078	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	388, 29
C1079	470u10V	THRS 470/10	ELKO RM3.5 RADIAL	41, 28
C1080	10n	ECO4 ZEO 103KHB	KER. VIELSCH. 10% RM5	343, 28
C1081	4n7	FKP2 4700/63	FOLIE 63V 10% RM5	182, 28
C1082	47p	2222 680 10479	KER. SCHEIBENK. 2% RM2.5	62, 27
C1083	100u25V	THRS 100/25	ELKO RM2.5 RADIAL	51, 26
C1084	33n	BF014 D 0333K	FOLIE 63V 10% RM5	87, 26
C1085	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	243, 26
C1086	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	271, 26
C1087	10u50V	THRS 10/50	ELKO RM2.0 RADIAL	280, 26
C1088	100u25V	THRS 100/25	ELKO RM2.5 RADIAL	191, 26
C1089	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	302, 26
C1090	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	312, 26

## C's: (Fortsetzung)

NAME	WERT	TYP	BESCHREIBUNG	POS X,Y
C1091	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	333, 24
C1092	10u50V	THRS 10/50	ELKO RM2.0 RADIAL	368, 24
C1093	10u50V	THRS 10/50	ELKO RM2.0 RADIAL	374, 24
C1094	150n	BF024 D 0154K	FOLIE 63V 10% RM5	146, 22
C1095	220u25V	THRS 220/25	ELKO RM3.5 RADIAL	340, 22
C1096	100n	ECO4 WDO 104MHB	KER. VIELSCH. 10% RM5	191, 21
C1097	100u25V	THRS 100/25	ELKO RM2.5 RADIAL	42, 20
C1098	10n	BF014 D 0103K	FOLIE 100V 10% RM5	34, 18
C1099	150n	BF024 D 0154K	FOLIE 63V 10% RM5	156, 13
C1100	150n	BF024 D 0154K	FOLIE 63V 10% RM5	141, 12
C1101	330n	BF074 D 0334K	FOLIE 63V 10% RM5	146, 15
C1102	100u25V	THRS 100/25	ELKO RM2.5 RADIAL	32, 14
C1103	150n	BF024 D 0154K	FOLIE 63V 10% RM5	132, 13
C1105	150n	BF024 D 0154K	FOLIE 63V 10% RM5	161, 13
C1106	4n7	FKP2 4700/63	FOLIE 63V 10% RM5	166, 13
C1107	330n	BF074 D 0334K	FOLIE 63V 10% RM5	116, 8
C1108	22u35V	2222 035 90003	ELKO RM2.0 RADIAL	85, 8
C1109	22u35V	2222 035 90003	ELKO RM2.0 RADIAL	91, 8
C1110	1u100V	THRS 1/100	ELKO RM2.0 RADIAL	97, 8
C4135	47u50V	THRS 47/50	ELKO RM2.5 RADIAL	45, 40

## R's:

NAME	WERT	TOL. / TYP	BESCHREIBUNG	POS X,Y
R1001	270R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	141, 93
R1002	150R	2% 0.2W TK200/ L08-3	RNET 4-FACH B	108, 92
R1003	220R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	141, 90
R1004	100R	2% 0.2W TK200/ L08-3	RNET 4-FACH B	108, 81
R1005	2R2	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	105, 80
R1006	50K	PTC10LH	WID-TRIMMER	22, 79
R1007	500R	PTC10LH	WID-TRIMMER	33, 79
R1008	1K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	222, 79
R1009	1K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	252, 79
R1010	1MEG	2% 0.2W TK200/ L08-3	RNET 4-FACH B	21, 74
R1012	10k	2% 0.125W TK200	RNET 8-FACH A	294, 71
R1013	820R	2% 0.5W TK125	METALL-SCHICHTW. 0207	8, 70
R1014	56	2% 0.5W TK125	METALL-SCHICHTW. 0207	36, 69
R1015	56	2% 0.5W TK125	METALL-SCHICHTW. 0207	18, 68
R1016	56	2% 0.5W TK125	METALL-SCHICHTW. 0207	27, 68
R1018	10K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	383, 68
R1019	100R	2% 0.2W TK200/ L08-3	RNET 4-FACH B	103, 67
R1020	220R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	52, 63
R1021	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	132, 58
R1022	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	135, 58
R1023	47K	2% 0.5W TK125	METALL-SCHICHTW. 0207	18, 55
R1024	191R	1% 0.6W TK100	METALL-SCHICHTW. 0207	21, 55
R1025	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	132, 55
R1026	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	135, 55
R1027	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	8, 53
R1028	1M	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	31, 53
R1029	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	132, 53
R1030	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	135, 53
R1031	1K	1% 0.6W TK100	METALL-SCHICHTW. 0207	38, 52
R1032	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	132, 50

R's: (Fortsetzung)

NAME	WERT	TOL. / TYP	BESCHREIBUNG	POS X,Y
R1033	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	135, 50
R1034	100R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	38, 49
R1035	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	132, 48
R1036	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	135, 48
R1037	10k	2% 0.125W TK200	RNET 8-FACH A	246, 47
R1038	56K	2% 0.5W TK125	METALL-SCHICHTW. 0207	48, 46
R1039	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	132, 45
R1040	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	135, 45
R1041	220R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	246, 45
R1042	56K	2% 0.5W TK125	METALL-SCHICHTW. 0207	48, 44
R1043	2k2	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	104, 43
R1044	100K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	117, 43
R1045	39K	2% 0.5W TK125	METALL-SCHICHTW. 0207	140, 43
R1046	10M	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	279, 41
R1047	2K2	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	6, 40
R1048	6K8	2% 0.5W TK125	METALL-SCHICHTW. 0207	9, 40
R1049	191R	1% 0.6W TK100	METALL-SCHICHTW. 0207	11, 40
R1050	150R	2% 0.2W TK200/ L08-3	RNET 4-FACH B	16, 40
R1051	470R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	51, 40
R1052	220K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	112, 40
R1053	10K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	126, 40
R1054	100K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	87, 39
R1055	100K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	150, 38
R1056	10K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	152, 38
R1057	470K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	52, 37
R1058	39K	2% 0.5W TK125	METALL-SCHICHTW. 0207	98, 36
R1059	470R	2% 0.5W TK125	METALL-SCHICHTW. 0207	14, 31
R1060	22K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	85, 27
R1061	1M	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	60, 24
R1062	47R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	310, 23
R1063	1K	2% 0.5W TK125	METALL-SCHICHTW. 0207	57, 22
R1064	10K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	100, 22
R1065	10K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	125, 22
R1066	68K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	60, 20
R1067	1K	2% 0.5W TK125	METALL-SCHICHTW. 0207	103, 20
R1068	10K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	125, 20
R1069	470R	2% 0.5W TK125	METALL-SCHICHTW. 0207	17, 18
R1070	470R	2% 0.5W TK125	METALL-SCHICHTW. 0207	45, 17
R1071	1k	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	93, 17
R1072	1k	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	118, 17
R1073	39K	2% 0.5W TK125	METALL-SCHICHTW. 0207	127, 17
R1074	100R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	17, 15
R1075	1K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	102, 15
R1076	10KB		POTI	235, 15
R1077	10KB		POTI	265, 15
R1078	10KB		POTI	295, 15
R1079	10KB		POTI	324, 15
R1080	10KB		POTI	354, 15
R1081	10KB		POTI	384, 15
R1083	2K2	2% 0.2W TK200/ L08-3	RNET 4-FACH B	150, 13
R1084	2K2	2% 0.2W TK200/ L08-3	RNET 4-FACH B	152, 13
R1085	68K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	102, 12
R1086	100K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	122, 12
R1087	1k	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	129, 10
R1088	2K2	2% 0.5W TK125	METALL-SCHICHTW. 0207	29, 8



## R's: (Fortsetzung)

NAME	WERT	TOL. / TYP	BESCHREIBUNG	POS X,Y
R2183	1M2	2% 0.5W TK125	METALL-SCHICHTW. 0207	34, 55

## D's:

NAME	WERT	TYP	BESCHREIBUNG	POS X,Y
D1001			LED 3mm gruen	206, 80
D1002	1N4148		DIODE	267, 79
D1003			LED 3mm gruen	206, 70
D1004			LED 3mm gruen	206, 60
D1005			LED 3mm gruen	47, 55
D1006	1N4148		DIODE	365, 53
D1007			LED 3mm gruen	206, 50
D1008	1N4001		DIODE	345, 48
D1009	1N4001		DIODE	380, 47
D1010	1N4001		DIODE	383, 47
D1011	1N4148		DIODE	368, 43
D1012	1N4148		DIODE	365, 41
D1013			LED 3mm gruen	206, 40
D1014	1N4148		DIODE	337, 31
D1015	1N4148		DIODE	368, 31
D1016			LED 3mm gruen	206, 30

## I's:

NAME	WERT	TYP	BESCHREIBUNG	POS X,Y
I1002	FBI	BL02RN2-R62	EMI SUPPRESSION FILTER	67, 91
I1003	FBI	BL02RN2-R62	EMI SUPPRESSION FILTER	79, 91
I1005	FBI	BL02RN2-R62	EMI SUPPRESSION FILTER	363, 59

## MISC's:

NAME	BESCHREIBUNG	POS X,Y
CN1001	AUDIO_L	KLINKE STEREO 25,111
CN1002	AUDIO_R	KLINKE STEREO 50,111
CN1003	9V~	Typ 52025 Kleinspgsbuchse 70,111
CN1004	OUT	MAB5SH MIDI-BUCHSE 92,109
CN1005	THRU	MAB5SH MIDI-BUCHSE 114,109
CN1006	IN	MAB5SH MIDI-BUCHSE 134,109
CN1007	BP	RASTERSTEGLEITG. LOETANSCHLUSS 111, 88
CN1008	MB	RASTERSTEGLEITG. LOETANSCHLUSS 165, 10
INFO	MAIN PCB	Leiterplatte 2-seitig 273, 88
INFO2	BACK PCB	Leiterplatte 1-seitig 72,114
SW1000	DOWN	Taster Wave 67, 21
SW1001	UP	Taster Wave 86, 21
SW1002	MODE	Taster Wave 185, 55
SW1003	SHIFT	Taster Wave 185, 15
X1000	12MHz	HC49U70 QUARZ 270, 45

# Bestell-Bauteilliste

WALDORF Electronics BESTELLISTE PULS20

10-17-1995

Seite: 1

## IC's:

Anzahl	WERT	FOOTPRNT	BESCHREIBUNG	ca.Preis
1 Stk.	27C256	200ns	DIL28 EPROM 32K	4.90
2 Stk.	68HC11E1	12MHz	PLCC52S	13.50
1 Stk.	74HC02		DIL14 4 x NOR	0.26
1 Stk.	74HC10		DIL14 3-Input Nand	0.51
2 Stk.	74HC164		DIL14 SHIFT REGISTER	0.80
1 Stk.	74HC175		DIL16 4 x D-FLIP-FLOP	0.51
2 Stk.	74HC4051		DIL16 Analog Multiplexer	0.83
1 Stk.	74HC573		DIL20 D-LATCH	0.65
1 Stk.	74LS244		DIL20 BUS DRIVER	0.65
1 Stk.	7805		TO220 REGULATOR	0.64
1 Stk.	7812		TO220 REGULATOR	0.64
1 Stk.	78L05		TO39 REGULATOR	0.38
1 Stk.	79L05		TO39 REGULATOR	0.38
1 Stk.	79L08		TO39 REGULATOR	0.38
1 Stk.	AD7545		DIL20 MOS D/A CONVERTER	5.25
3 Stk.	CA3080E		DIL8 OTA / HARRIS	0.85
1 Stk.	DIL28-Socket		DIL28	0.30
1 Stk.	GAL16V8		DIL20	1.73
3 Stk.	HD1133GK		DIL10 7-SEG.ANZEIGE Gn(K)	1.20
1 Stk.	L165H		PENTAWAT POWER OP-AMP	3.95
1 Stk.	MC34064P		MC34064P SUPERVISORY CIRCUIT	0.66
3 Stk.	NMC93C66N		DIL8 SER. EEPROM 4K	1.38
1 Stk.	PC900		DIL6 OPTO-COUPLER	1.25
5 Stk.	TL064CN	CN	DIL14 QUAD OP-AMP LOW POWER	0.80
1 Stk.	TL071		DIL8 OP-AMP	0.50
1 Stk.	TL074CN		DIL14 QUAD OP-AMP	0.70
Gesamt: 39 Stk. -----				Summe: 68.79

## Q's:

Anzahl	WERT	FOOTPRNT	BESCHREIBUNG	ca.Preis
12 Stk.	2N2484	to18	NPN TRANSISTOR	0.36
1 Stk.	2N3904	sot54c	NPN TRANSISTOR	0.28
9 Stk.	BC338	-25	transist NPN TRANSISTOR	0.28
2 Stk.	BF245A	to92	FET	0.37
2 Stk.	CA3046	dill14	Transistor-Array	0.74
Gesamt: 26 Stk. -----				Summe: 9.34

## C's:

Anzahl	WERT	TYP	BESCHREIBUNG	ca.Preis
19 Stk.	100n	EC04 WDO 104MHB	KER. VIELSCH. 10% RM5	0.07
6 Stk.	100p	EC 04 CE 0 101 K	KER. VIELSCH. 10% RM2.5	0.16
11 Stk.	100u25V	THRS 100/25	ELKO RM2.5 RADIAL	0.10
4 Stk.	10n	BF014 D 0103K	FOLIE 100V 10% RM5	0.13
7 Stk.	10n	EC04 ZEO 103KHB	KER. VIELSCH. 10% RM5	0.18
8 Stk.	10u50V	THRS 10/50	ELKO RM2.0 RADIAL	0.09
6 Stk.	150n	BF024 D 0154K	FOLIE 63V 10% RM5	0.22
3 Stk.	1n	2222 630 19102	KER. SCHEIBENK. 10% RM5	0.08
3 Stk.	1n	FKP2 1000/100	FOLIE 100V 10% RM5	0.27
3 Stk.	1n5	BF014 D 0152K	FOLIE 100V 10% RM5	0.13

## C's: (Fortsetzung)

Anzahl	WERT	TYP	BESCHREIBUNG	ca.Preis
2 Stk.	1u100V	THRS 1/100	ELKO RM2.0 RADIAL	0.09
4 Stk.	220n	BF024 D 0224K	FOLIE 63V 10% RM5	0.32
1 Stk.	220u25V	THRS 220/25	ELKO RM3.5 RADIAL	0.12
6 Stk.	22p	2222 680 34229	KER. SCHEIBENK. 2% RM2.5	0.07
2 Stk.	22u35V	2222 035 90003	ELKO RM2.0 RADIAL	0.18
2 Stk.	330n	BF074 D 0334K	FOLIE 63V 10% RM5	0.32
2 Stk.	33n	BF014 D 0333K	FOLIE 63V 10% RM5	0.14
1 Stk.	470u10V	THRS 470/10	ELKO RM3.5 RADIAL	0.12
2 Stk.	47p	2222 680 10479	KER. SCHEIBENK. 2% RM2.5	0.08
7 Stk.	47u50V	THRS 47/50	ELKO RM2.5 RADIAL	0.10
11 Stk.	4n7	FKP2 4700/63	FOLIE 63V 10% RM5	0.28
Gesamt: 110 Stk.			Summe:	15.99

## R's:

Anzahl	WERT	TOLERANZ/TYP	BESCHREIBUNG	ca.Preis
2 Stk.	100K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
2 Stk.	100K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	0.27
2 Stk.	100R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
2 Stk.	100R	2% 0.2W TK200/ L08-3	RNET 4-FACH B	0.27
6 Stk.	10K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	0.27
6 Stk.	10KB		POTI	0.80
1 Stk.	10M	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
2 Stk.	10k	2% 0.125W TK200	RNET 8-FACH A	0.27
2 Stk.	150R	2% 0.2W TK200/ L08-3	RNET 4-FACH B	0.25
2 Stk.	191R	1% 0.6W TK100	METALL-SCHICHTW. 0207	0.02
2 Stk.	1K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
1 Stk.	1K	1% 0.6W TK100	METALL-SCHICHTW. 0207	0.02
2 Stk.	1K	2% 0.5W TK125	METALL-SCHICHTW. 0207	0.02
1 Stk.	1K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	0.27
2 Stk.	1M	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
1 Stk.	1M2	2% 0.5W TK125	METALL-SCHICHTW. 0207	0.02
1 Stk.	1MEG	2% 0.2W TK200/ L08-3	RNET 4-FACH B	0.27
3 Stk.	1k	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
1 Stk.	220K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
3 Stk.	220R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
13 Stk.	22K	2% 0.5W TK125	METALL-SCHICHTW. 0207	0.02
1 Stk.	22K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	0.27
1 Stk.	270R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
1 Stk.	2K2	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
1 Stk.	2K2	2% 0.5W TK125	METALL-SCHICHTW. 0207	0.02
2 Stk.	2K2	2% 0.2W TK200/ L08-3	RNET 4-FACH B	0.27
1 Stk.	2R2	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
1 Stk.	2k2	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
3 Stk.	39K	2% 0.5W TK125	METALL-SCHICHTW. 0207	0.02
1 Stk.	470K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
1 Stk.	470R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
3 Stk.	470R	2% 0.5W TK125	METALL-SCHICHTW. 0207	0.02
1 Stk.	47K	2% 0.5W TK125	METALL-SCHICHTW. 0207	0.02
1 Stk.	47R	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
1 Stk.	500R	PTC10LH	WID-TRIMMER	0.65
1 Stk.	50K	PTC10LH	WID-TRIMMER	0.65
3 Stk.	56	2% 0.5W TK125	METALL-SCHICHTW. 0207	0.02

## R's: (Fortsetzung)

Anzahl	WERT	TOLERANZ/TYP	BESCHREIBUNG	ca.Preis
2 Stk.	56K	2% 0.5W TK125	METALL-SCHICHTW. 0207	0.02
1 Stk.	68K	5% 0.25W TK200	KOHLE-SCHICHTW. 0207	0.01
1 Stk.	68K	2% 0.2W TK200/ L08-3	RNET 4-FACH B	0.27
1 Stk.	6K8	2% 0.5W TK125	METALL-SCHICHTW. 0207	0.02
1 Stk.	820R	2% 0.5W TK125	METALL-SCHICHTW. 0207	0.02
Gesamt: 86 Stk. -----				Summe: 12.38

## D's:

Anzahl	WERT	TYP	BESCHREIBUNG	ca.Preis
7 Stk.			LED 3mm gruen	0.35
3 Stk.	1N4001		DIODE	0.10
6 Stk.	1N4148		DIODE	0.06
Gesamt: 16 Stk. -----				Summe: 3.11

## I's:

Anzahl	WERT	TYP	BESCHREIBUNG	ca.Preis
3 Stk.	FBI	BL02RN2-R62	EMI SUPPRESSION FILTER	0.14
Gesamt: 3 Stk. -----				Summe: 0.42

## MISC's:

Anzahl	BESCHREIBUNG		ca.Preis	
2 Stk.	AUDIO_R	jack	KLINKE STEREO 1.20	
1 Stk.	9V~	Typ 52025	con_dc_52 Kleinspgsbuchse 0.90	
3 Stk.	IN	mab5sh	MAB5SH MIDI-BUCHS 0.75	
2 Stk.	MB	RASTERSTEGLEITG.	sil10 LOETANSCHLUSS 0.00	
1 Stk.	BACK PCB	Leiterplatte	pcbinfo 1-seitig 3.00	
1 Stk.	MAIN PCB	Leiterplatte	pcbinfo 2-seitig 17.00	
4 Stk.	SHIFT	alptaster	Taster Wave 0.21	
1 Stk.	12MHz	HC49U70	quarz_hc4 QUARZ 1.20	
Gesamt: 15 Stk. -----				Summe: 27.59

## Kalkulation

**Gesamtsummen:**

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	<b>Anzahl</b>	<b>Betrag</b>
IC's	: 39	68.79
Q's	: 26	9.34
C's	: 110	15.99
R's	: 86	12.38
D's	: 16	3.11
I's	: 3	0.42
MISC's	: 15	27.59
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<b>Gesamt</b>	<b>: 295</b>	<b>137,62</b>

<b>Bestückungskosten ca.:</b>	<b>55,58</b>
<b>Gehäuse</b>	<b>: 45,00</b>
<b>Zusammenbau</b>	<b>: 8,00</b>
<b>Test</b>	<b>: 5,00</b>
<b>Manual</b>	<b>: 3,00</b>
<b>Verpackung</b>	<b>: 6,00</b>
<b>Einpacken</b>	<b>: 2,00</b>
<b>Steckernetzteil</b>	<b>: 6,00</b>

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<b>Gesamtsumme</b>	<b>:</b>	<b>268,20</b>
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