

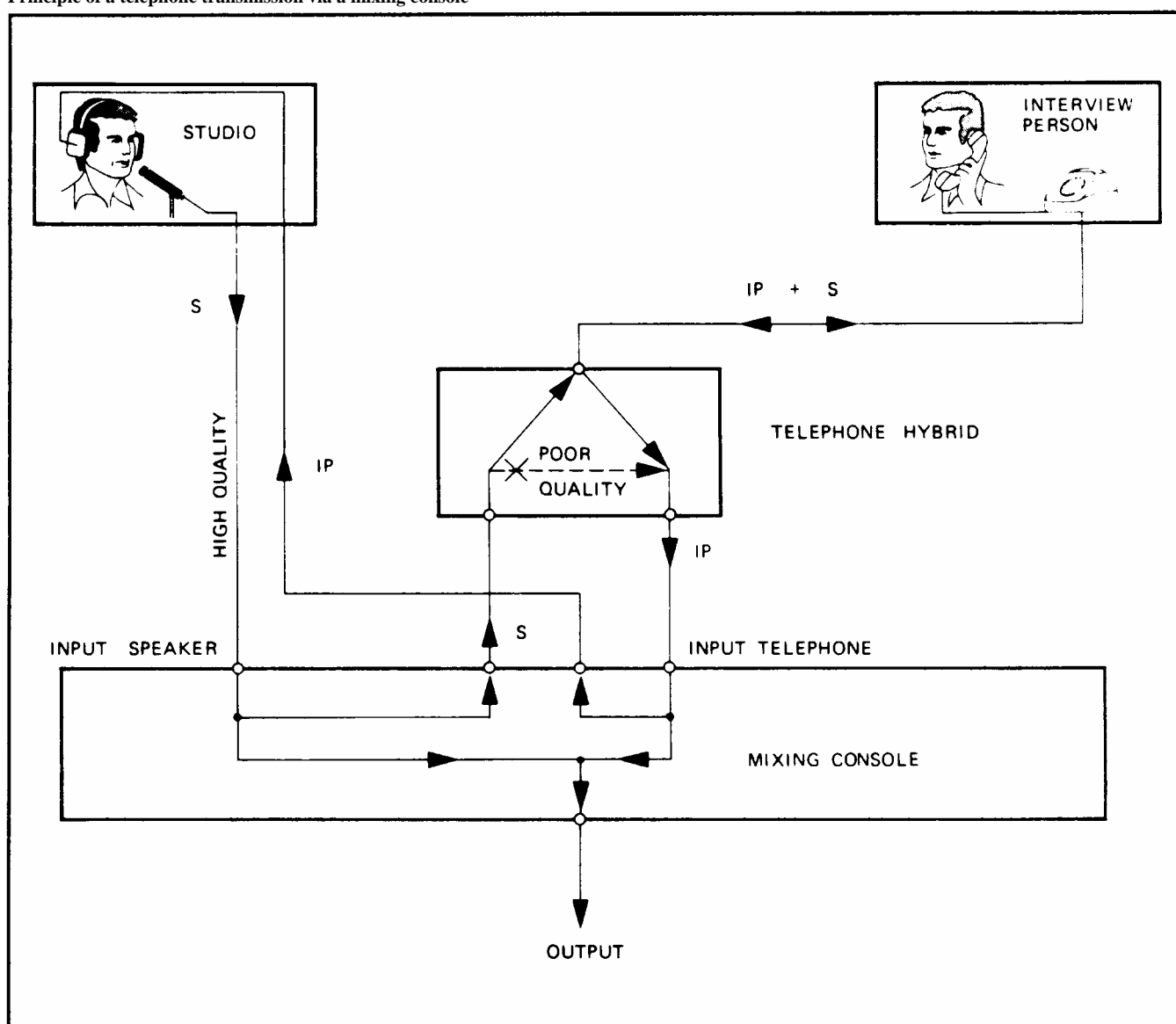
Telephone Hybrid

1.915.760/764

In order to record or transmit a conversation between the announcer in the studio and a person outside the studio being interviewed by telephone, the telephone line must be connected to the mixing console.

In such a case, the full conversation is transmitted, since both voice signals are carried on normal 2-wire telephone lines. However, also the voice of the announcer in the studio is then transmitted in telephone quality (300... 3400 Hz). By mixing the microphone signal of the announcer (in studio quality) to the conversation, the addition of the “good” and “poor” signals results in a distorted and untrue signal.

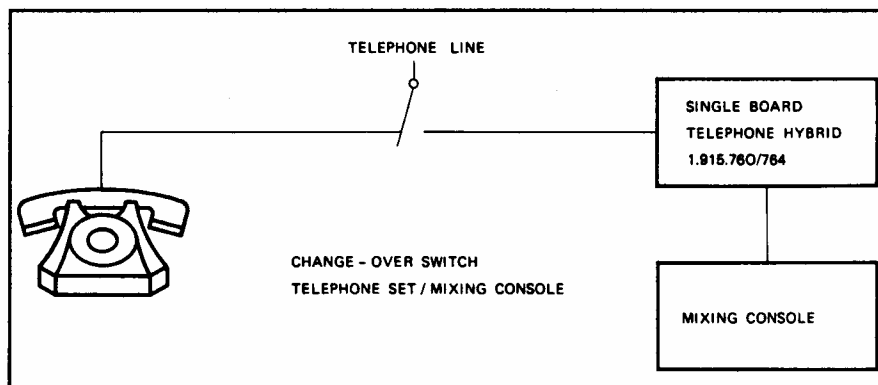
Principle of a telephone transmission via a mixing console



The telephone hybrid allows to greatly improve the quality of a telephone transmission by selectively suppressing the undesired “poor” announcer signal (side-tone attenuation). This side-tone attenuation is done in principle by a hybrid circuit which is a familiar feature in telephony.

The Studer telephone hybrid permits high-quality transmission of telephone conversations with the announcer in the studio. Apart from connecting it to the telephone line, the hybrid works automatically.

Maximum side-tone attenuation of the studio voice signal in the receiver line is achieved by automatically constituting a dummy load for the telephone line. This adjustment is performed electronically, the real (resistive) and imaginary (capacitive) components of the telephone line impedance being matched as near as possible. This automatic matching process begins as soon as an announcer signal is present.



Operation with a single Telephone Hybrid Board

The telephone set is used to establish a telephone connection (call). After switching over to the mixing console, the holding current for the subscriber's relay is maintained by a resistor on the hybrid board.

Versions:

A variety of 19" Telephone Hybrid units with one or two channels is available, consisting of the following versions:

- Standard version (ST) – 19"/1U Telephone Hybrid unit for direct connection to the telephone line and a relay to switch the telephone line from the telephone set to the hybrid.
- Noise gate version (NG) – same as standard version, equipped with a noise gate
- Current-adjustable version (CA) – same as standard version, but additionally featuring adjustable holding current for the telephone line.

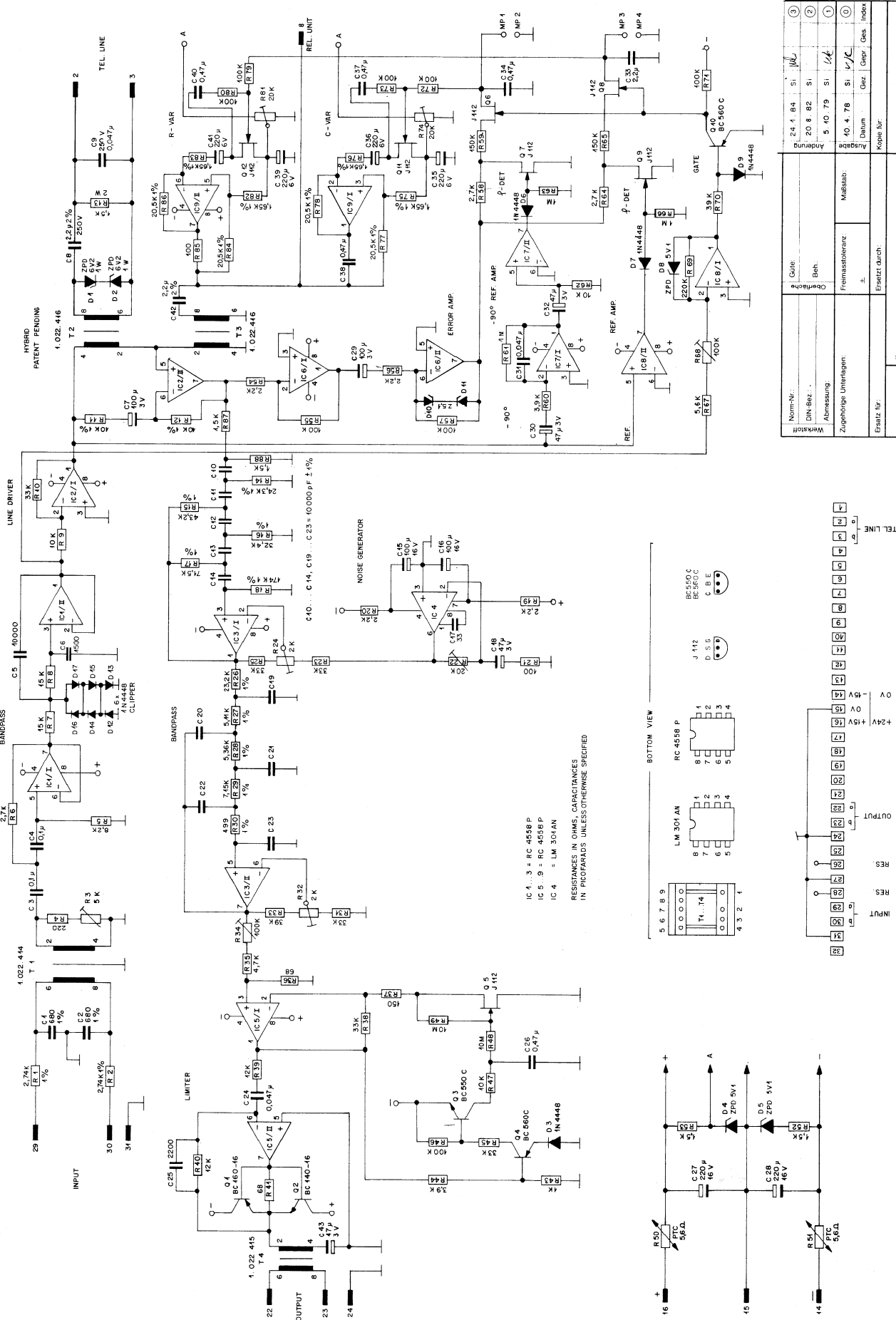
Ordering Information:

Euro-cards:

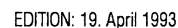
- | | |
|---|--------------|
| • Telephone hybrid card | 1.915.760.xx |
| • Telephone hybrid card with noise gate | 1.915.764.xx |

19" standard products:

- | | |
|------------------------------|--------------|
| • Telephone hybrid 1CH-ST | 75.700.89118 |
| • Telephone hybrid 2CH-ST | 75.700.89228 |
| • Telephone hybrid 1CH-NG | 75.700.89114 |
| • Telephone hybrid 2CH-NG | 75.700.89224 |
| • Telephone hybrid 1CH-CA | 75.700.89116 |
| • Telephone hybrid 2CH-CA | 75.700.89226 |
| • Telephone hybrid 1CH-CA/NG | 75.700.89117 |
| • Telephone hybrid 2CH-CA/NG | 75.700.89227 |



Norm-Nr.:	Güte:	24 1 84	Si	3
DIN-Bez.:	Beh.:	20 8 82	Si	2
Abmessung:	Freiasselenz:	5 10 79	Si	1
Zugehörige Unterlagen:	Maßstab:	10 4 78	Si	0
Erstellt für:	Erstellt durch:	Datum:	Gedr.:	Index:
Automatic Telephone Hybrid				
STUDER REGENSDORF ZÜRICH				
Bezeichnung:				
Nummer:				
SC 1.915.760/81				



Ad	POS.	REF.No.	DESCRIPTION	MANUFACTURER	Ad	POS.	REF.No.	DESCRIPTION	MANUFACTURER
	C.1	59.12.9681	680pF 1% 500V-	PS		R.4	57.11.4221	220	
	C.2	59.12.9681	680pF 1%	PS		R.5	57.11.4822	8,2k 2%	
	C.3	59.31.6104	0,1pF 10%	PE		R.6	57.11.4272	2,7k 2%	
	C.4	59.31.6104	0,1pF 10%	PE		R.7	57.11.4153	15k 2%	
	C.5	59.12.4103	0,01pF 5%	PE		R.8	57.11.4153	15k	
	C.6	59.11.6152	1500pF 5%	PC		R.9	57.11.4103	10k	
	C.7	59.22.4101	100pF 3V	EL		R.10	57.11.4333	33k	
①	C.8	1.915.760.03	2,2pF 1% 250V-	PE	ST				
①③	C.9	59.31.8473	0,047pF 400V-	PE		R.11	57.39.1002	10k 1%	
	C.10	59.12.7103	0,01pF 1%	PS		R.12	57.39.1002	10k 1%	
						R.13	57.56.5152	1,5k 2W	
	C.11	59.12.7103	0,01pF 1%	PS		R.14	57.39.2432	24,3k 1%	
	C.12	59.12.7103	0,01pF 1%	PS		R.15	57.39.4322	43,2k 1%	
	C.13	59.12.7103	0,01pF 1%	PS		R.16	57.39.3242	32,4k 1%	
	C.14	59.12.7103	0,01pF 1%	PS		R.17	57.39.7152	71,5k 1%	
	C.15	59.22.4101	100pF 16V	EL		R.18	57.39.1743	174k 1%	
	C.16	59.22.4101	100pF 16V	EL		R.19	57.11.4222	2,2k	
	C.17	59.34.2330	33pF	CER		R.20	57.11.4222	2,2k	
	C.18	59.36.0470	47pF 3V	TA					
	C.19	59.12.7103	0,01pF 1%	PS		R.21	57.11.4101	100	
	C.20	59.12.7103	0,01pF 1%	PS		R.22	58.01.7203	20k LIN 10%	TR, SP
						R.23	57.11.4333	33k 2%	
	C.21	59.12.7103	0,01pF 1%	PS		R.24	58.01.8202	2k LIN 10%	TR, SP
	C.22	59.12.7103	0,01pF 1%	PS		R.25	57.11.4333	33k 2%	
	C.23	59.12.7103	0,01pF 1%	PS		R.26	57.39.2322	23,2k 1%	
	C.24	59.12.4473	0,047pF	PE		R.27	57.39.5111	5,11k 1%	
	C.25	59.32.2222	2200pF	CER		R.28	57.39.5361	5,36k 1%	
	C.26	59.02.0474	0,47pF 5%	PC		R.29	57.39.7151	7,15k 1%	
	C.27	59.22.4221	220pF 16V	EL		R.30	57.39.4990	499 1%	
	C.28	59.22.4221	220pF 16V	EL					
	C.29	59.22.4101	100pF 3V	EL		R.31	57.11.4333	33k 2%	
	C.30	59.36.0470	47pF 3V	TA		R.32	58.01.8202	2k LIN 10%	TR, SP
						R.33	57.11.4393	39k 2%	
	C.31	59.12.4473	0,047pF	PE		R.34	58.01.7104	100k LIN 10%	TR, SP
	C.32	59.36.0470	47pF 3V	TA		R.35	57.11.4472	4,7k	
	C.33	59.02.2225	2,2pF	PC		R.36	57.11.4680	68	
①	C.34	59.02.0474	0,47pF	PE		R.37	57.11.4151	150	
	C.35	59.22.2221	220pF 6V	EL		R.38	57.11.4333	33k	
	C.36	59.22.2221	220pF 6V	EL		R.39	57.11.4123	12k	
	C.37	59.02.0474	0,47pF	PC		R.40	57.11.4123	12k	
	C.38	59.02.0474	0,47pF	PC					
	C.39	59.22.2221	220pF	EL		R.41	57.11.4680	68	
	C.40	59.02.0474	0,47pF	PC		R.42			
						R.43	57.11.4102	1k	
	C.41	59.22.2221	220pF 6V	EL	ST	R.44	57.11.4392	3,9k	
①	C.42	1.915.760.03	2,2pF 1% 250V-	PE		R.45	57.11.4333	33k	
	C.43	59.36.0470	47pF 3V	TA		R.46	57.11.4104	100k	
						R.47	57.11.4103	10k	
	D.1	50.04.1511	U ₂ 6,2V ZPD 6V2 1W	SI		R.48	57.02.5106	10M	
	D.2	50.04.1511	U ₂ 6,2V ZPD 6V2 1W	SI		R.49	57.02.5106	10M	
	D.3	50.04.0125	1N4448	SI		R.50	57.99.0209	5,6k PTC 2322 662 91005	PH
	D.4	50.04.1112	U ₂ 5,1V ZPD 5V1 0,4W	SI					
	D.5	50.04.1112	U ₂ 5,1V ZPD 5V1 0,4W	SI		R.51	57.99.0209	5,6k PTC	PH
	D.6	50.04.0125	1N4448	SI		R.52	57.11.4152	1,5k	
	D.7	50.04.0125	1N4448	SI		R.53	57.11.4152	1,5k	
	D.8	50.04.1112	U ₂ 5,1V ZPD 5V1 0,4W	SI		R.54	57.11.4222	2,2k	
	D.9	50.04.0125	1N4448	SI		R.55	57.11.4104	100k	
②	D.10	50.04.1112	U ₂ 5,1V ZPD 5V1 0,4W	SI		R.56	57.11.4222	2,2k	
						R.57	57.11.4104	100k	
②	D.11	50.04.1112	U ₂ 5,1V ZPD 5V1 0,4W	SI		R.58	57.11.4272	2,7k	
③	D.12	50.04.0125	1N4448	SI		R.59	57.11.4154	150k	
③	D.13	50.04.0125	1N4448	SI		R.60	57.11.4392	3,9k	
③	D.14	50.04.0125	1N4448	SI					
③	D.15	50.04.0125	1N4448	SI		R.61	57.11.4105	1M	
③	D.16	50.04.0125	1N4448	SI		R.62	57.11.4103	10k	
③	D.17	50.04.0125	1N4448	SI		R.63	57.11.4105	1M	
						R.64	57.11.4272	2,7k	
④	IC.1	50.09.0107	RC4559NB	DUAL OP AMP	TI, RA	R.65	57.11.4154	150k	
④	IC.2	50.09.0107	RC4559NB			R.66	57.11.4105	1M	
④	IC.3	50.09.0107	RC4559NB			R.67	57.11.4562	5,6k	
	IC.4	50.05.0144	LM301AN	OP AMP	NS	R.68	58.01.7104	100k LIN 10%	TR, SP
④	IC.5	50.09.0107	RC4559NB			R.69	57.11.4224	220k	
④	IC.6	50.09.0107	RC4559NB			R.70	57.11.4393	39k	
④	IC.7	50.09.0107	RC4559NB						
④	IC.8	50.09.0107	RC4559NB			R.71	57.11.4104	10k	
④	IC.9	50.09.0107	RC4559NB			R.72	57.11.4104	100k	
						R.73	57.11.4104	100k	
	Q.1	50.03.0315	BC160-16	SIE, F		R.74	58.01.8203	20k LIN 10%	TR, SP
	Q.2	50.03.0316	BC140-16	SIE, F		R.75	57.39.1651	1,65k 1%	
	Q.3	50.03.0497	BC550-C	T, ITT		R.76	57.39.1651	1,65k 1%	
	Q.4	50.03.0496	BC560-C	T, ITT		R.77	57.39.2052	20,5k 1%	
	Q.5	50.03.0350	J112	SIX, NS		R.78	57.39.2052	20,5k 1%	
	Q.6	50.03.0350	J112	SIX, NS		R.79	57.11.4104	100k	
	Q.7	50.03.0350	J112	SIX, NS		R.80	57.11.4104	100k	
	Q.8	50.03.0350	J112	SIX, NS					
	Q.9	50.03.0350	J112	SIX, NS		R.81	58.01.8203	20k LIN 10%	TR, SP
	Q.10	50.03.0496	BC560-C	T, ITT		R.82	57.39.1651	1,65k 1%	
						R.83	57.39.1651	1,65k 1%	
	Q.11	50.03.0350	J112	SIX, NS		R.84	57.39.2052	20,5k 1%	
	Q.12	50.03.0350	J112	SIX, NS		R.85	57.11.4101	100 2%	
						R.86	57.39.2052	20,5k 1%	
	R.1	57.39.2741	2,74k 1%		①	R.87	57.02.5152	1,5k	
	R.2	57.39.2741	2,74k 1%		①	R.88	57.02.5152	1,5k	
①	R.3	58.01.7502	5k LIN	TR, SP					

TEL. HYBRID

T. . . . 1	1.022.414	1:1	ST
T. . . . 2	1.022.416	1:1	ST
T. . . . 3	1.022.416	1:1	ST
T. . . . 4	1.022.415	1:2	ST

CER=Ceramic, EL=Electrolytic, TA=Tantalum, PE=Polyester, PS=Polystyrene, PC=Polycarbonate

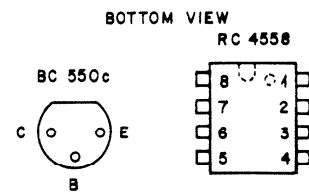
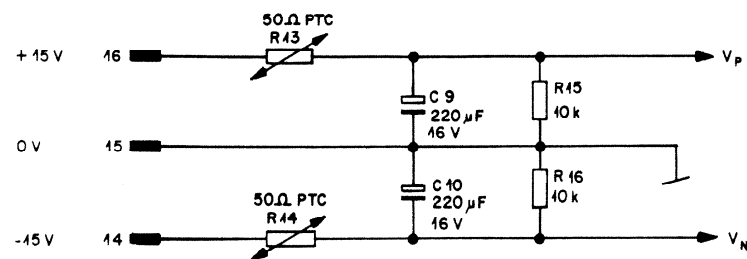
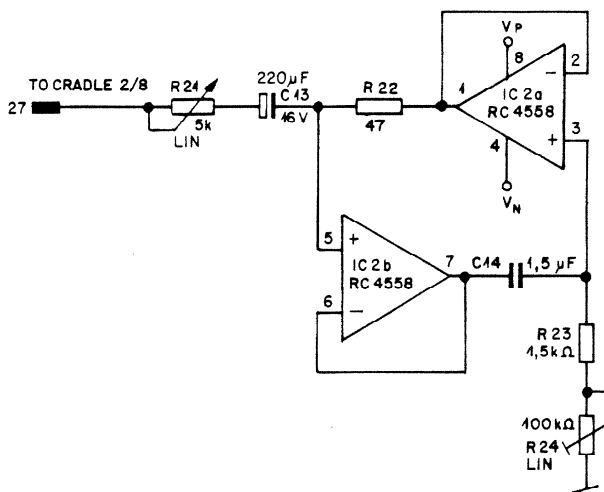
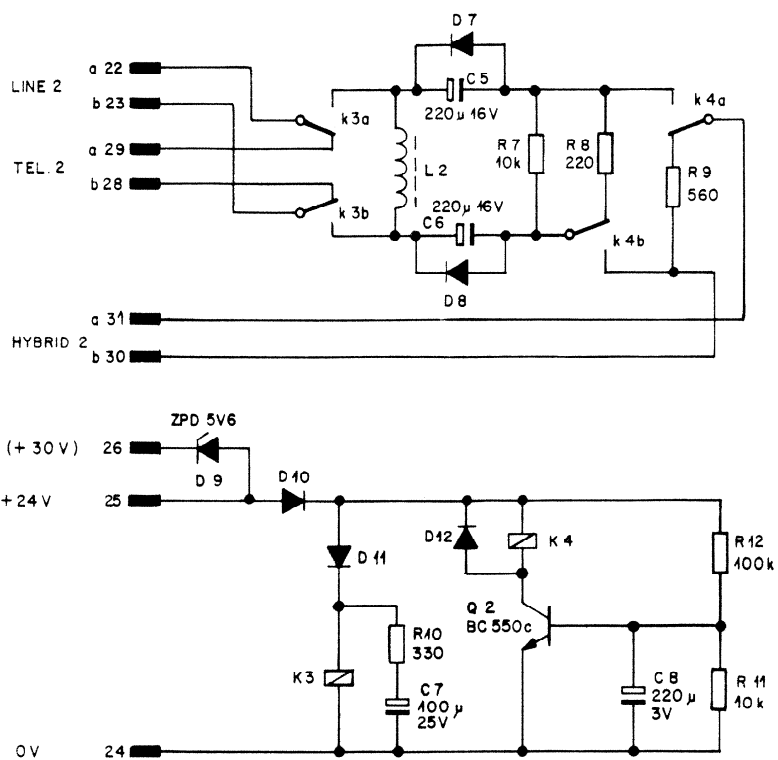
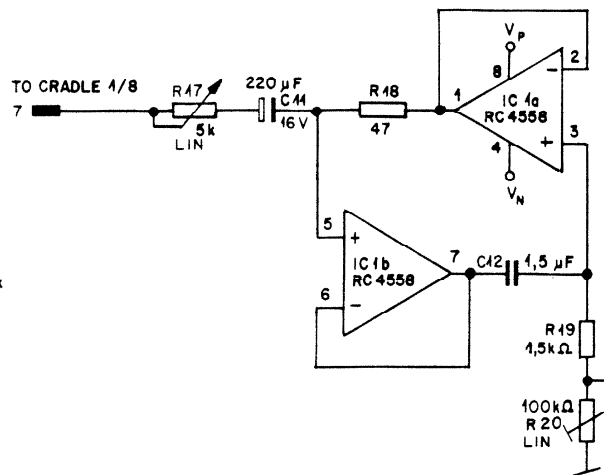
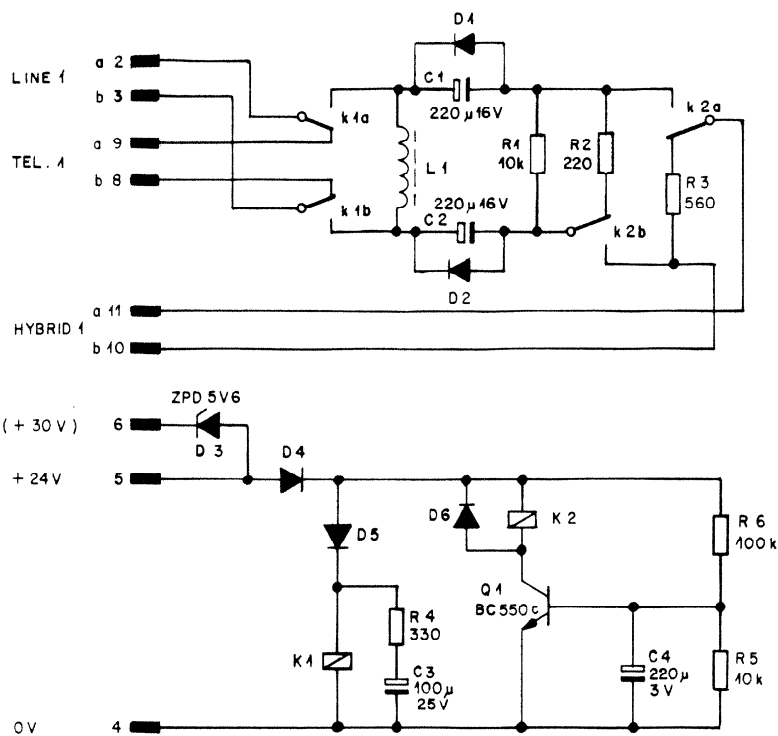
MANUFACTURER: ST=Studer, PH=Philips, TR=TRW, SP=Spectrol, TI=Texas Instruments, RA=Raytheon

NS=National Sem., SIX=Siliconix, T=Telefunken, SIE=Siemens, F=Fairchild

1.915.760.81	TELEPHONE HYBRID	FRI 14/03/78
1.915.760.81	TELEPHONE HYBRID	① FRI 06/11/78
1.915.760.81	TELEPHONE HYBRID	② HO 11/05/79
1.915.760.81	TELEPHONE HYBRID	③ HO 10/09/80
1.915.760.81	TELEPHONE HYBRID	④ VO 11/03/81
1.915.760.81	TELEPHONE HYBRID	⑤ VO 20/08/82

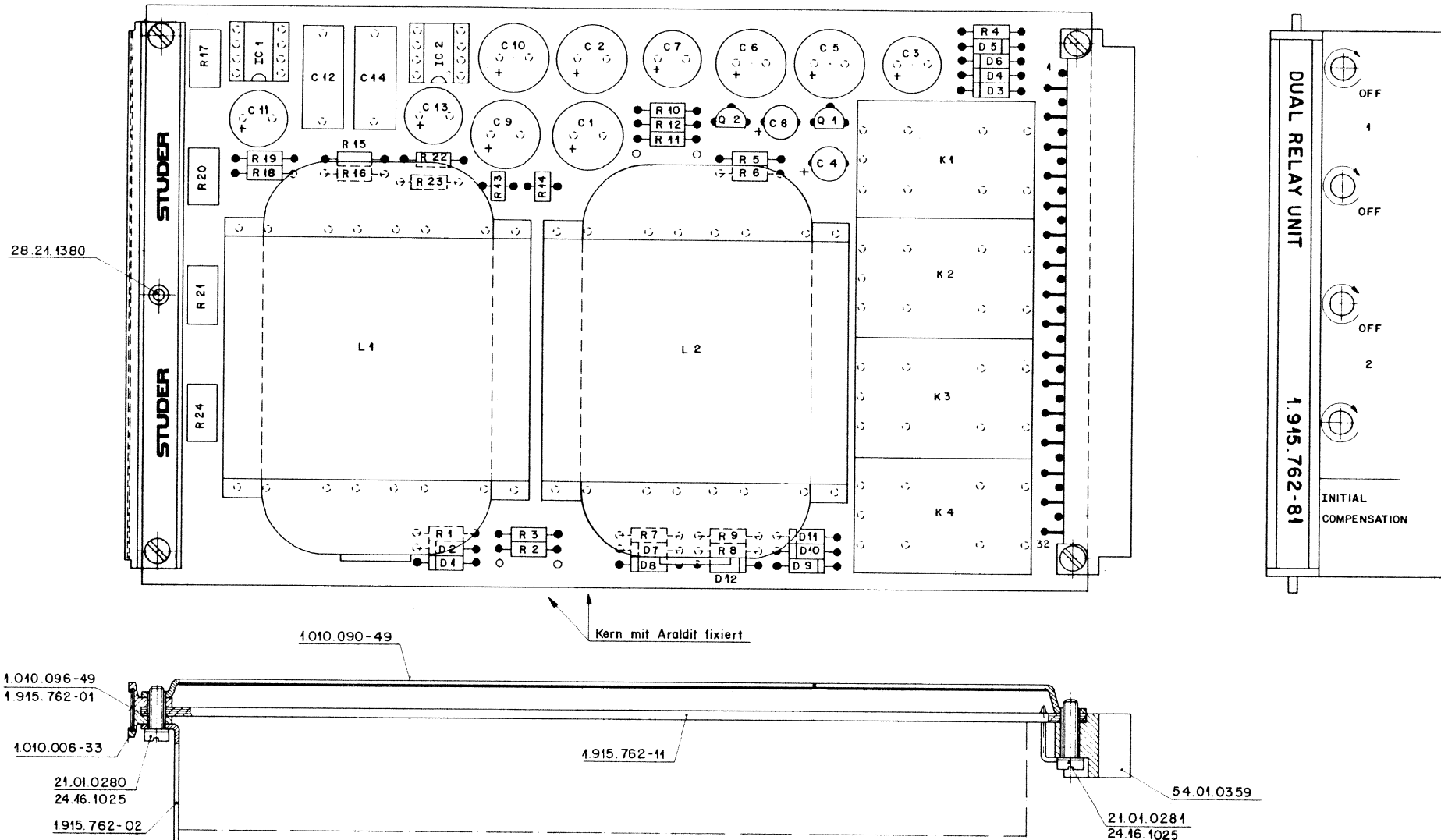
END

→



D = 1N 4448
L1, L2 = 1.022.525

Ersatz für:		Ersetzt durch:		Kopie für:	
STUDER REGENSDORF ZÜRICH		DUAL RELAY UNIT		Nummer: SC 1.915.762-81	
Ausgabe		Datum		Gez.	
16. 2. 79		Si		Gepr.	
				Ges.	
				Index	



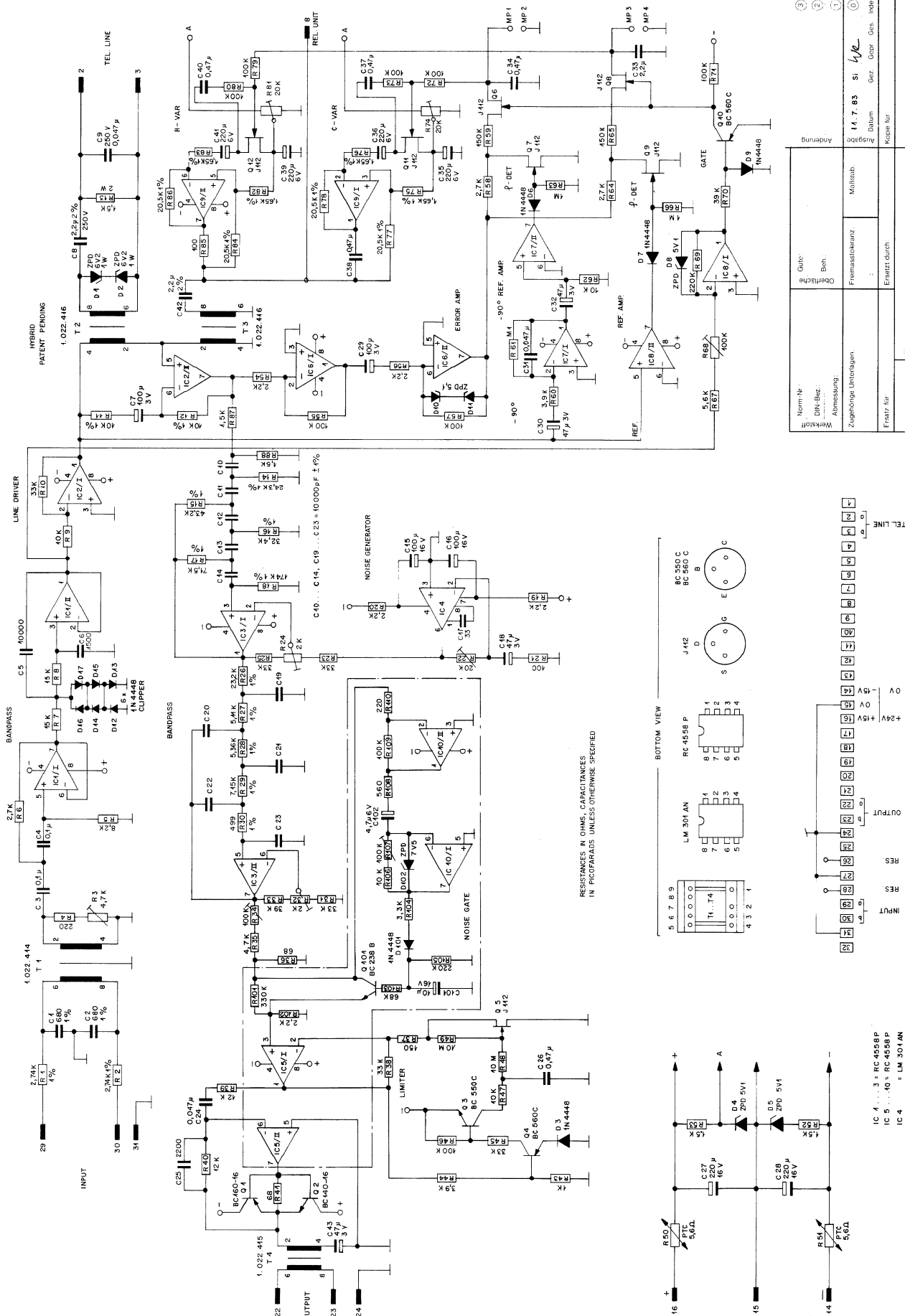
Werkstoff	Norm Nr. DIN-Bez. Abmessung	Leiter- Oberfläche Ben.	Änderung
Zugehörige Unterlagen	Freimasstoleranz	Maßstab	4.4.84 A.Ho <i>vr</i>
PL, AL		2:1	18.7.79 Ho <i>vr</i> 0.
Ersatz für	Ersetzt durch	Kopie für	Datum Gez Gepr Ges Index
STUDER REGENSDORF ZÜRICH	Dual Relay Unit		Nummer 1.915.762-81

IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT		MFR
C	1	59.22.4221	220 μ F	16 V	EL	
C	2	59.22.4221	220 μ F	16 V	EL	
C	3	59.22.5101	100 μ F	25V	EL	
C	4	59.30.1221	220 μ F	3V	TA	
C	5	59.22.4221	220 μ F	16 V	EL	
C	6	59.22.4221	220 μ F	16 V	EL	
C	7	59.22.5101	100 μ F	25V	EL	
C	8	59.30.1221	220 μ F	3V	TA	
C	9	59.22.4221	220 μ F	16 V	EL	
C	10	59.22.4221	220 μ F	16 V	EL	
C	11	59.22.2221	220 μ F	6V	EL	
C	12	59.05.1155	1,5 μ F	63V	MPC	
C	13	59.22.2221	220 μ F	6V	EL	
C	14	59.05.1155	1,5 μ F	63V	MPC	
D	1...12	50.04.0125	1N4448	or equivalent		ANY
	except					
D	3, 9	50.04.1108	ZPD5V6	BZX83 5V6		ITT, S
① IC	1, 2	50.09.0107	RC 4559 NB	Dual Op. Amp.		TI, RA
② K	1...4	56.04.0143	2u, AgAu	Relay		NA
L	1, 2	1.022.525		Inductivity		ST
P		54.01.0359		Edge Connector		
Q	1, 2	50.03.0497	BC550C			T, P, ITT

IND	DATE	NAME		
④			ITT INTERMETALL	ST STUDER
③			NA NATIONAL	TI TEXAS INSTRUMENTS
②	15.9.82	7ff	P PHILIPS	EL ELECTROLYTIC
①	11.3.81	16	RA RAYTHEON	TA TANTALLUM
○	18.7.79	WY	S SIEMENS	MPC POLYCARBONATE
STUDER			DUAL RELAY UNIT	1.915.762-81 PAGE 1 OF 2

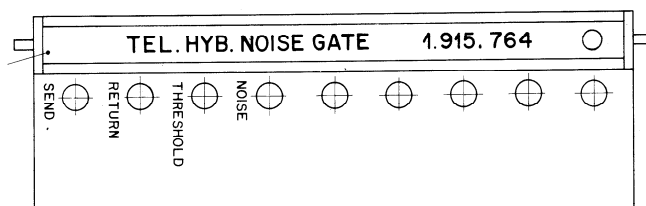
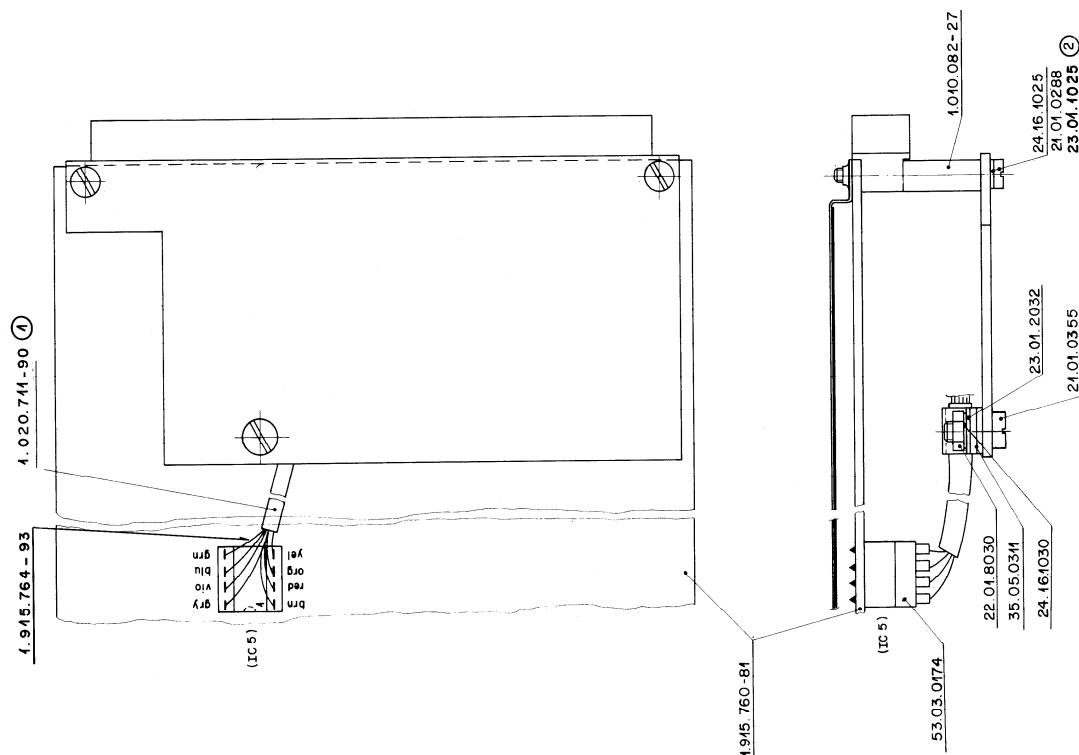
IND	POS NO	PART NO	VALUE	SPECIFICATIONS/EQUIVALENT		MFR
R	1	57.11.4103	10 k			
R	2	57.11.4221	220			
R	3	57.11.4561	560			
R	4	57.11.4331	330			
R	5	57.11.4103	10 k			
R	6	57.11.4104	100k			
R	7	57.11.4103	10 k			
R	8	57.11.4221	220			
R	9	57.11.4561	560			
R	10	57.11.4331	330			
R	11	57.11.4103	10 k			
R	12	57.11.4104	100k			
R	13	57.99.0206	50	PTC		
R	14	57.99.0206	50	PTC		
R	15	57.11.4103	10 k			
R	16	57.11.4103	10 k			
R	17	58.01.7502	5 k	Potm.		
R	18	57.11.4470	47			
R	19	57.11.4152	1,5k			
R	20	58.01.7104	100k	Potm.		
R	21	58.01.7502	5 k	Potm.		
R	22	57.11.4470	47			
R	23	57.11.4152	1,5k			
R	24	58.01.7104	100k	Potm.		
XIC		53.03.0166		IC-socket DIL 8 pins		

IND	DATE	NAME		
④				
③				
②	15.9.82	7ff		
①	11.3.81	16		
○	18.7.79	WY		
STUDER			DUAL RELAY UNIT	1.915.762-81 PAGE 2 OF 2



Norm-Nr.: DIN-Bez.: Werkstoff:	Guss: Boh: Oberfläche:	Zugheftungen:	Maßstab:	Ausgäbe:					14. 7. 83 Datum	St.	lye	Guss Guss Index	1 2 3
				Änderung:									
Ersatz für:				Ersetzt durch:				Nummer:					
STUDEF REGENSBORF ZÜRICH				Automatic Telephone Hybrid (Pösterle pending)				SC 1. 915. 764					

TEL. HYBRID



Ad	POS.	REF.No.	DESCRIPTION	MANUFACTURER
C...	101	59.26.2100	10µF 16V	EL
C...	102	59.26.1479	4,7µF 10V	EL
① C...	103	59.32.1101	110µF	CR
D...	101	50.04.0125	1N4448	
D...	102	50.04.1103	ZPD7V5	
IC...	5	50.09.0107	RC4559	DUAL OP AMP
IC...	10	50.09.0107	RC4559	DUAL OP AMP
Q...	1	50.03.0436	BC237B	NPN
		53.03.0174	ADAPTER PLUG	
		1.915.760.81	TEL. HYBRID KOMPL	
		21.01.0355	M3x8	SCREW
		23.01.2032	7/3,2	WASHER
		22.01.8030	M3	NUT
		35.05.0311	4,8	BINDER
		21.01.0288	M2,5x25	
		1.010.082.27	3,2/5x13	SPACER
		1.915.764.01		LABEL
R...	101	57.11.4334	330k	
R...	102	57.11.4222	2,2k	
R...	103	57.11.4683	68k	
R...	104	57.11.4332	3,3k	
R...	105	57.11.4224	220k	
R...	106	57.11.4103	10k	
R...	107	58.01.7104	100k	LIN
R...	108	57.11.4561	560	
R...	109	57.11.4104	100k	
R...	110	57.11.4221	220	

EL=Electrolytic

MANUFACTURER: ST=Studer, TI=Texas Instruments, RA=Raytheon, PH=Philips, SIE=Siemens, MOT=Motorola

1.915.764.00 TEL. HYBRID WITH NOISE GATE

FRI 30/11/81

1.915.764.00 TEL. HYBRID WITH NOISE GATE

① VO 19/10/87

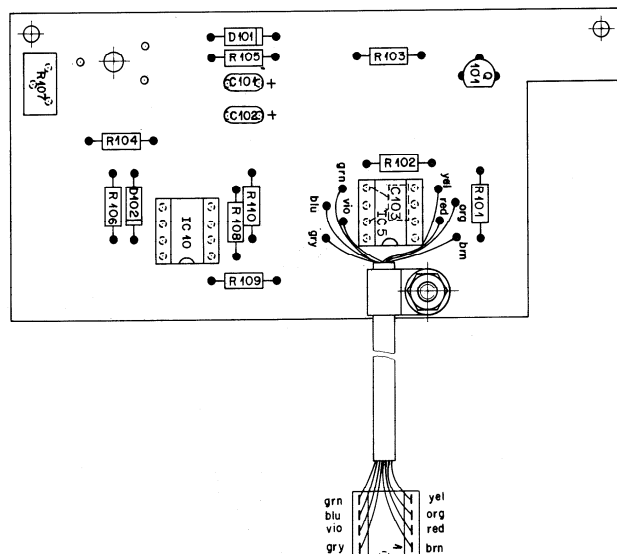
TI, RA

TI, RA

PH, SIE, MOT

ST

ST



END



Norm. Nr.	Güte	49.40.87	Si	Ge	3
Norm. Bez.	Charakter	27.5.87	Si	Ge	2
Abmessung	Abmessung	3.6.86	Ho	Ge	1
Zugehörige Unterlage:	Freimassentoleranz	3.6.81	Ho	Ge	1
PL, LL	Maßstab	2:1	Ho	Ge	1
Erstellt für	Erstellt durch	Kopie für	Ho	Ge	1
STUDER	Telephone Hybrid	1.915.764-00	Ho	Ge	1
REGENSDORF	with Noise Gate		Ho	Ge	1
ZÜRICH			Ho	Ge	1