REVOX C-27X
C270 TC - C274 - C278
TLS-4000

INTERFACEDOCUMENTATION

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3 Operating Instructions

3.1 Technical Specifications

- Slave type:
  - SMPTE/EBU - TC machine with move pulse information
  - No code during wind modes
  - GOTO function with PLAY - STOP sequenze
  - Park in LOCK with delay.
  - CHASE-PLAY with delay.

- Link type:
  parallel (PLAY, STOP, FWD, RWD,REC)

- Capstan control:
  frequency 9600 Hz nominal

- Movepulse information:
  Clock and direction.
  (frequency see 3.4)

- Lock time (typ):
  (in CUED status, Master Start - SYNC): 2 sec
  (in CHASE 10*vnom, Master Start - SYNC): 10 sec

- Drop-In Delay: compensated
  Drop-Out Delay: compensated

- TC Compensation:
  C270TC with slave internal compensation
  C274/C278 not necessary

- Wow & Flutter:
  less then 20% higher than the Wow & Flutter of the slave
  (normaly within the slave rates)

3.2 Summary of Supported Functions

Operating conditions:

- STOP
- PLAY, REC nominal (internal reference or ext. varispeed, TLS reference ± 50 %)

- EDIT same as STOP
- FORW, REW Variable continuously from 0 to .. vmax
- SHTLF, SHTLR same as FORW,REW

- LOC, LOCREL
  made by interface

- MUTE
  not implemented

- REHEARSE
  available with PLAY instead of REC
  (see 3.3 DIL-SWITCH)

- EVENT RELAY
  There is a relay available for the user. The relay can be switched on by the EVON synchronizer command and off by the EVOFF command. (see 3.4)

- CONDITIONAL COMMANDS
  The execution of synchronizer commands can be submitted at certains events.

- STATUS REQUEST
  The status information are requested and updated through the parallel communication link by the interface software.
  Additional information on the nominal speed is available at the synchronizer via the move pulse connection.
  The C270 TC does not have a tapeout status. Instead of this the C270 TC answers with a STOP status.

- Audio-, TC channel set up
  not implemented.

- TRANSPARENT Commands
  not implemented.

- KEYBOARD DISABLE
  Not implemented.

3.3 DIL-SWITCH Functions

The following functions are given to the DIL SWITCH SZ81:

- switch 1: Active polarity of the RECEN signal.
  OFF : recording mode enabled with RECEN LOW
  ON : recording enabled with RECEN HIGH or open

- switch 2: Rehearsal mode
  If the rehearsal mode is active, RECORD commands will be
  OFF : replaced by PLAY commands
  ON : directly passed to the slave

  This switch will be off when there is no external REHEARSAL circuit (controled by the signal B-REHR at SLAVE CONTROL B). So you can be shure, than no RECORD command will be given to the slave during the rehearsal mode.
  The position of the DIL-SWITCH will only be checked just after switching on the rehearsal mode. If you change the position of this switch, it is necessary to switch on the rehearsal mode one more time.

- All other switches are not used, but they should be in off position to guaranty compatibilily with later software versions.

- Default Settings:
  all switches in OFF position

3.4 Additional Features at Slave Control B Connector

RECEN (PIN 2):
Hardware record enable. The function of this input are ruled by the DIL-SWITCH 1. (Ref to section 3.3)

REL1 (PIN6), REL2 (PIN7):
This relay contact can be used for any general purpose.
It has to be turned ON and OFF by the EVON and EVOFF synchronizer commands.

B-REHR (PIN15):
Output of the rehearse status (open collector, active low).
It is switched active by the RHRSON synchronizer command.

SREHSL (PIN 12):
TTL compatible input for switching on the rehearsal mode.
HIGH (OR OPEN): REHEARSAL OFF
LOW: REHEARSAL ON

MVCL (PIN21), MVDR (PIN24):
This output (open collector) provides out the slave movepulse information for external use.
MVCL: The frequency depends on the nominal speed
MVDR: LOW = forward

3.75 ips : 8 Hz
7.5 ips : 16 Hz
15 ips : 32 Hz

XVSENB/XVSREF (PIN 5, PIN 3):
An external varispeed circuit can be connected to the slave control B connector. The two signals are switched to the slave during the OFF-mode of the synchronizer.

PAIN 9	LOW = varispeed enable
PAIN 10	reference frequency (nominal 9600 Hz)

3.5 LED Diagnostic Display

Three LEDs are available as error condition display and status indicators of the front part of the interface.

DL 1 2 3 (Front view)

- An initialization procedure is executed after reset and the main hardwaredevices are tested. If an error condition occurs the left LED (DL1) will blink (ca 1 hz) and the other two LED will indicate the error code.

  DL 1 2 3 (# = LED blinking, - = LED off, * = LED on)

DL1	DL2	DL3	
#	-	-	CPU RAM test failed.
#	-	*	RAM test failed.
#	*	-	SSDA test failed.

- After the program initialization the left LED must be off and the other two right LEDs are used as status indicator in this way:

  DL 1 2 3

DL1	DL2	DL3	
-	*	*	no connection with the synchronizer board
-	#	-	no connection with the SLAVE

- If the left LED is on, a fatal processor error has occurred. The following list shows the error codes. A reset is necessary to return to operation mode.

DL1	DL2	DL3	
*	-	-	Fatal soft- or hardware error (ev. ROM defect)
*	-	*	Watch dog error
*	*	-	Clock error
*	*	*	Illegal opcode
#	#	#	Microprocessor 68HC11 has to be reconfigured

3.6 Test points

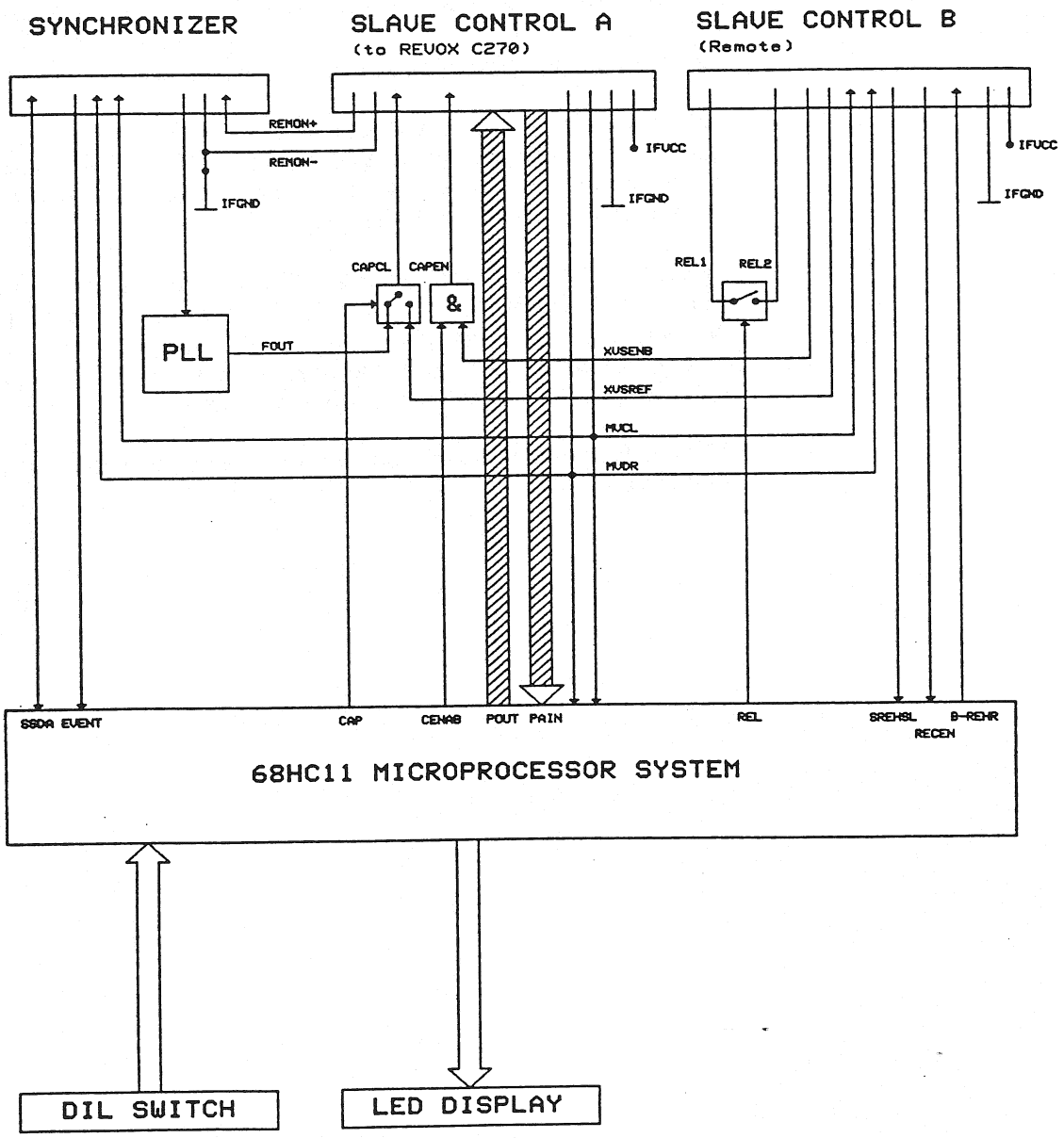
None

3.7 Applications hints

- Use move pulse information as master tallies (see 2.2)
- With a C270 TC it is recommended to run with 7.5 or 15 ips, because of the poor time code quality provided by the internal time code processor.
  There are no restrictions with the C274 or C278, because time code is recorded on any of the audio tracks.
- Since the C270 TC doesn't provide a 'Tapeout' status, the interface can not recognize it and reads a 'STOP'. If a 'Tapeout' occurs during locating or chasing, it is recommended to switch the synchronizer to OFF before loading the tape again. After the new loading put the slave to 'PLAY', so that the synchronizer can read a good time code.
- The interface can be used to support an external rehearsal circuit.
  (see 3.4 and 3.5)

4 Service documentation

4.1 Block diagram



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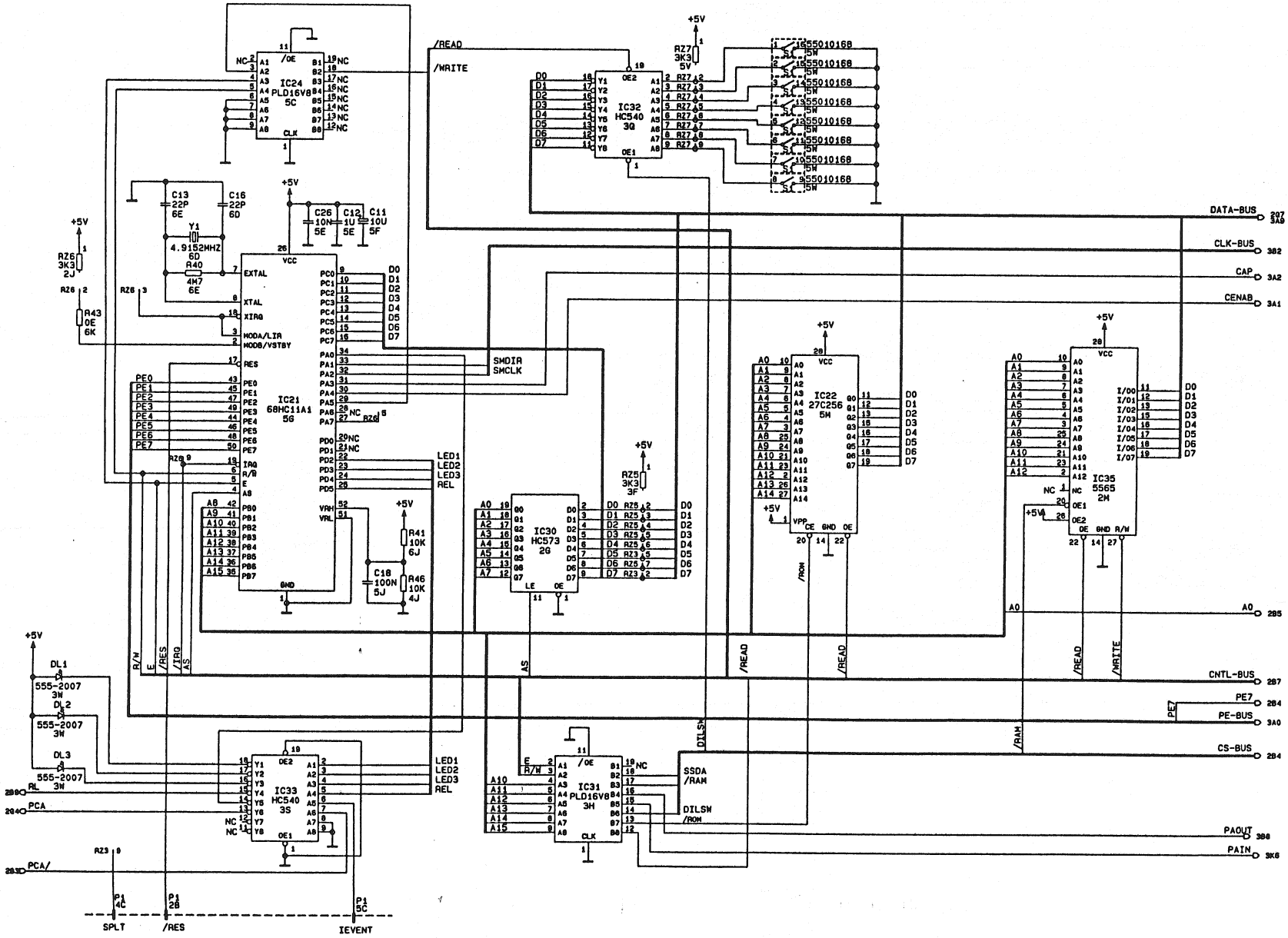

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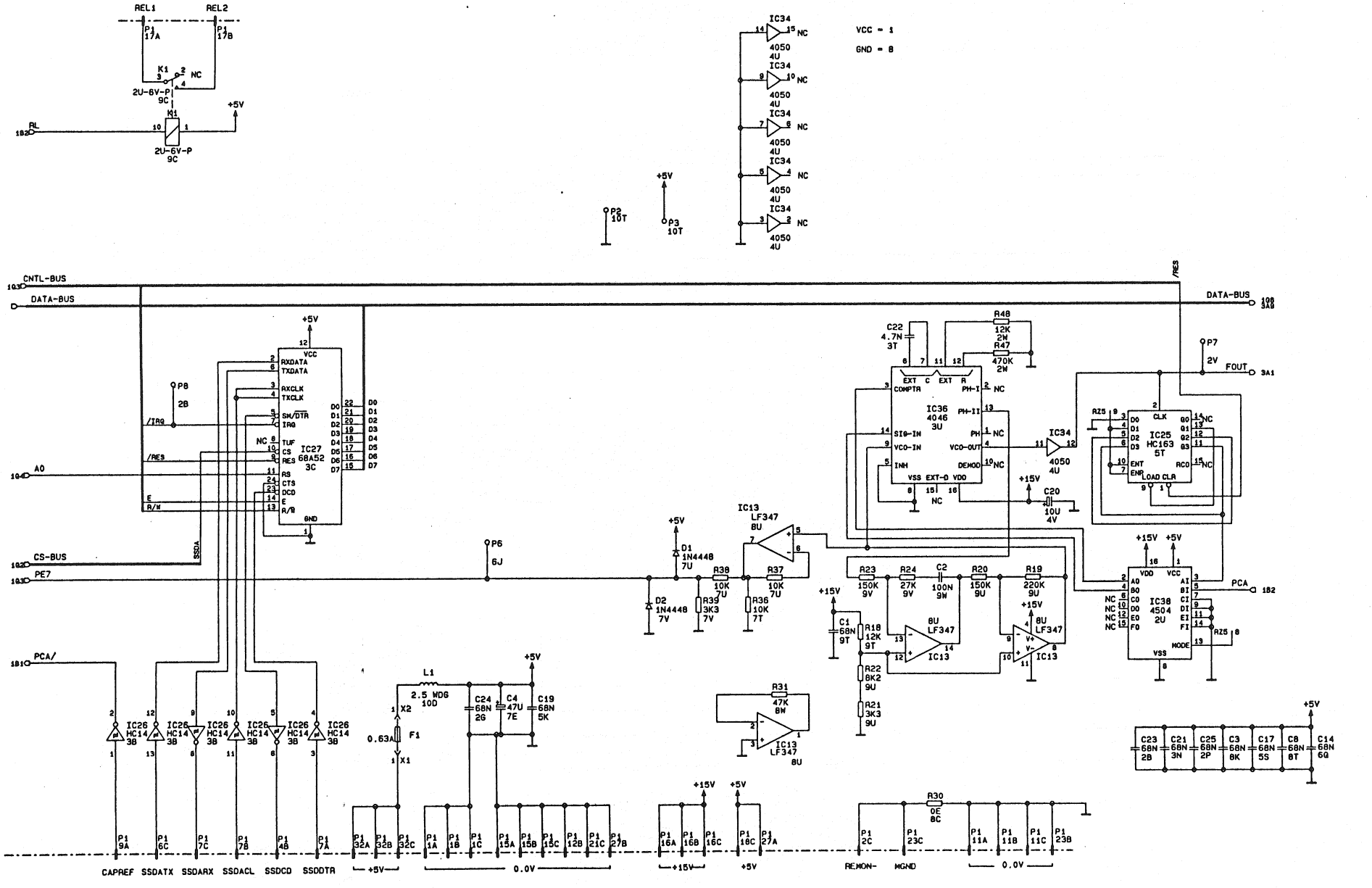

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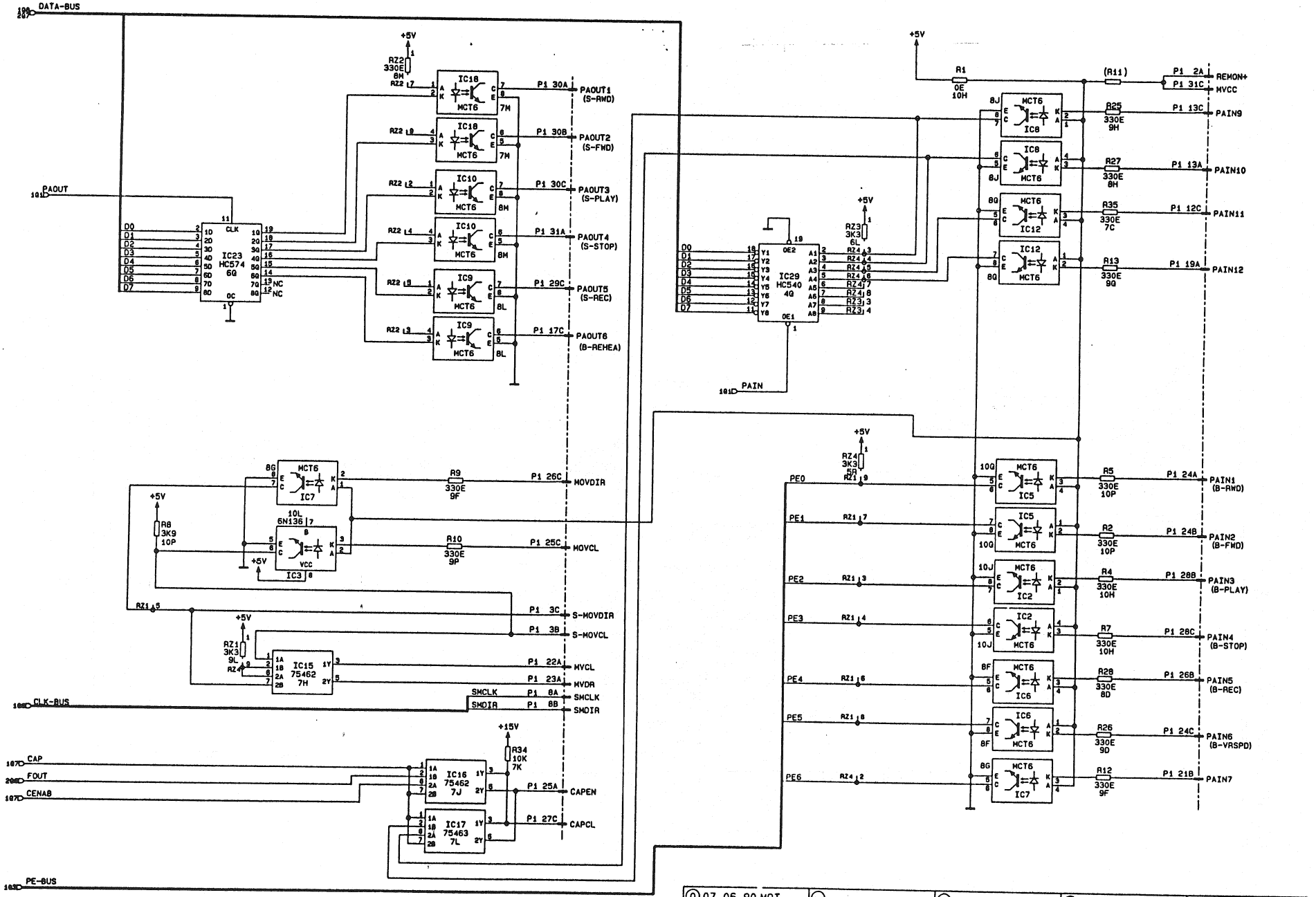

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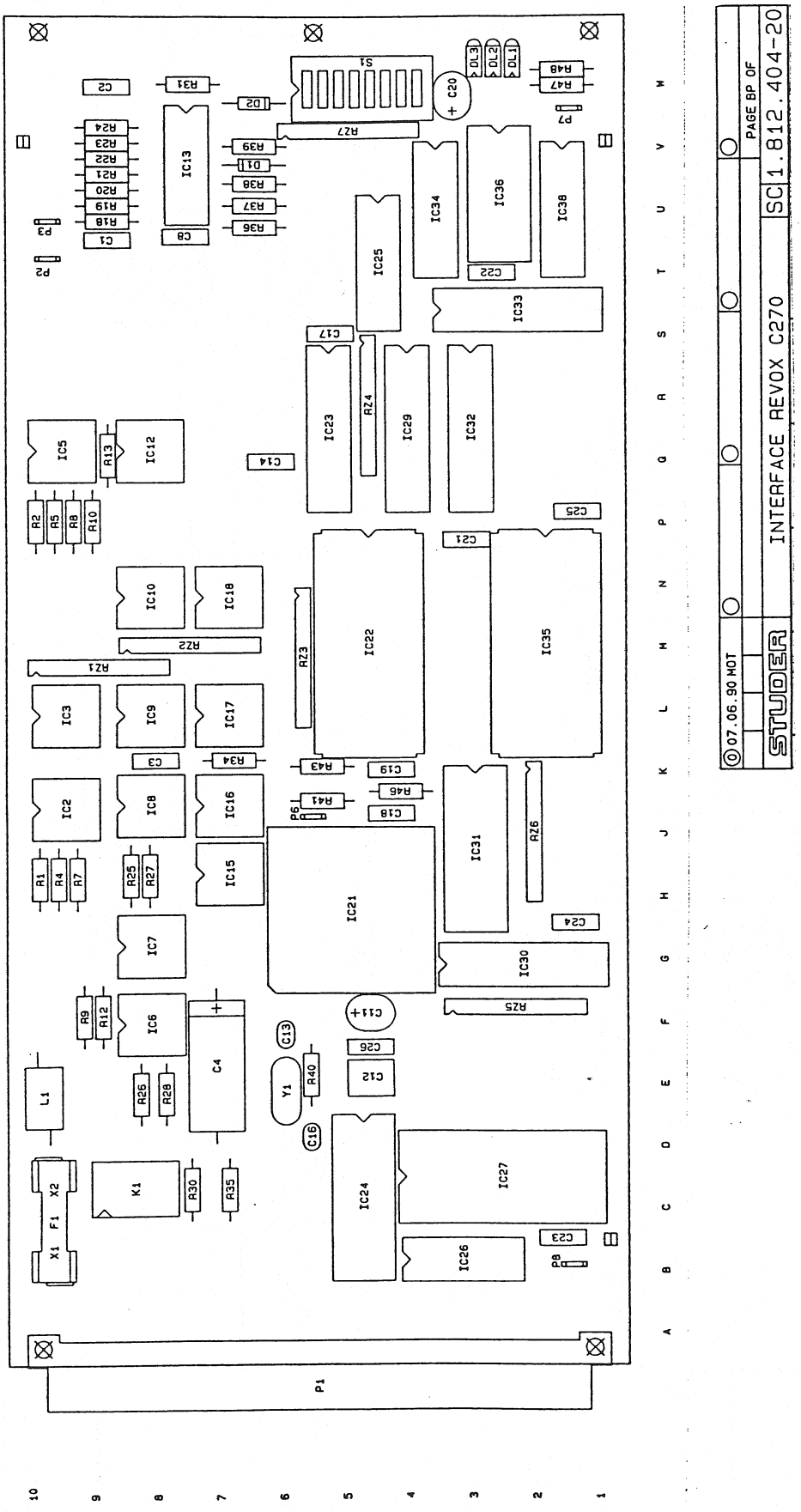
4.3 Component arrangement



4.4 Component position list

IND.	POS.NO.	PART NO.	VALUE	SPECIFICATIONS / EQUIVALENT	MANUF.
	C....01	59.06.0683	.068 u	10%, 63V , PET	
	C....02	59.06.0104	.1 u	10%, 63V , PET	
	C....03	59.06.0683	.068 u	10%, 63V , PET	
	C....04	57.25.6470	47 u	-20%, 63V , EL	
	C....08	59.06.0683	.068 u	10%, 63V , PET	
	C....11	59.26.5100	10 u	20%, 25V , EL	
	C....12	59.06.0125	1 u	10%, 50V , PET	
	C....13	59.34.2220	22 p	5%, 63V , CER	
	C....14	59.06.0683	.068 u	10%, 63V , PET	
	C....16	59.34.2220	22 p	5%, 63V , CER	
	C....17	59.06.0683	.068 u	10%, 63V , PET	
	C....18	59.06.0104	.1 u	10%, 63V , PET	
	C....19	59.06.0683	.068 u	10%, 63V , PET	
	C....20	59.26.5100	10 u	20%, 25V , EL	
	C....21	59.06.0683	.068 u	10%, 63V , PET	
	C....22	59.06.0472	4700 p	10%, 63V , PET	
	C....23	59.06.0683	.068 u	10%, 63V , PET	
	C....24	59.06.0683	.068 u	10%, 63V , PET	
	C....25	59.06.0683	.068 u	10%, 63V , PET	
	C....26	59.06.0103	.01 u	10%, 63V , PET	
	D....01	50.04.0125		1N4448	
	D....02	50.04.0125		1N4448	
	DL...01	50.04.2107		LED red +555-2007	DI
	DL...02	50.04.2107		LED red +555-2007	DI
	DL...03	50.04.2107		LED red +555-2007	DI
	F....01	51.01.0115	630 mAT	250V, 5 * 20	
	IC...02	50.99.0111		MCT 6	GI
	IC...03	50.04.2163		6N 136	TI,GI
	IC...05	50.99.0111		MCT 6	GI
	IC...06	50.99.0111		MCT 6	GI
	IC...07	50.99.0111		MCT 6	GI
	IC...08	50.99.0111		MCT 6	GI
	IC...09	50.99.0111		MCT 6	GI

IND.	POS.NO.	PART NO.	VALUE	SPECIFICATIONS / EQUIVALENT	MANUF.
	IC...10	50.99.0111		MCT 6	GI
	IC...12	50.99.0111		MCT 6	GI
	IC...13	50.09.0104		LF 347 N	TI,NS
	IC...15	50.05.0227		SN 75 462 JG	TI,NS
	IC...16	50.05.0227		SN 75 462 JG	TI,NS
	IC...17	50.05.0203		SN 75 463 P	TI
	IC...18	50.99.0111		MCT 6	GI
	IC...21	50.63.0004		68 MC 11 A1 FN	Mot
	IC...22	50.14.2004	see note	HN 27C 256G-25, EPROM, 32K * 8, 250nsec	St
	IC...23	50.17.1574		74 HC 574	
	IC...24	50.18.0100	see note	16V8-25LP, GAL	St
	IC...25	50.17.1163		74 HC 163	
	IC...26	50.17.1014		74 HC 14	
	IC...27	50.16.0114		MC 68A52	Mot
	IC...29	50.17.1540		74 HC 540	
	IC...30	50.17.1573		74 HC 573	
	IC...31	50.18.0100	see note	16V8-25LP, GAL	St
	IC...32	50.17.1540		74 HC 540	
	IC...33	50.17.1540		74 HC 540	
	IC...34	50.07.0050		MC 14 050	
	IC...35	50.14.0133		HM 6264 LP, RAM, 8K * 8, 150nsec	HI
	IC...36	50.07.0046		CD 4046 BE, MC 14046 BCP	RCA,Mot
	IC...38	50.15.0103		MC 14 504	
	K....01	56.04.0195	5V 2*U	100V/0.3A, Print	
	L....01	62.01.0115		Wide Band HF-Choke	
	P....01	54.01.0358		Card Connector 3 * 32 Euro	
	P....02	54.02.0320		Faston-Connector	
	P....03	54.02.0320		Faston-Connector	
	P....06	54.02.0320		Faston-Connector	
	P....07	54.02.0320		Faston-Connector	
	P....08	54.02.0320		Faston-Connector	
	R....01	57.11.3000	0		
	R....02	57.11.3331	330	2%, MF	

IND.	POS.NO.	PART NO.	VALUE	SPECIFICATIONS / EQUIVALENT	MANUF.
	R....04	57.11.3331	330	2%, MF	
	R....05	57.11.3331	330	2%, MF	
	R....07	57.11.3331	330	2%, MF	
	R....08	57.11.3392	3.9 k	2%, MF	
	R....09	57.11.3331	330	2%, MF	
	R....10	57.11.3331	330	2%, MF	
	R....12	57.11.3331	330	2%, MF	
	R....13	57.11.3331	330	2%, MF	
	R....18	57.11.3123	12 k	2%, MF	
	R....19	57.11.3224	220 k	2%, MF	
	R....20	57.11.3154	150 k	2%, MF	
	R....21	57.11.3332	3.3 k	2%, MF	
	R....22	57.11.3822	8.2 k	2%, MF	
	R....23	57.11.3154	150 k	2%, MF	
	R....24	57.11.3273	27 k	2%, MF	
	R....25	57.11.3331	330	2%, MF	
	R....26	57.11.3331	330	2%, MF	
	R....27	57.11.3331	330	2%, MF	
	R....28	57.11.3331	330	2%, MF	
	R....30	57.11.3000	0		
	R....31	57.11.3473	47 k	2% MF	
	R....34	57.11.3103	10 k	2%, MF	
	R....35	57.11.3331	330	2%, MF	
	R....36	57.11.3103	10 k	2%, MF	
	R....37	57.11.3103	10 k	2%, MF	
	R....38	57.11.3103	10 k	2%, MF	
	R....39	57.11.3332	3.3 k	2%, MF	
	R....40	57.11.5475	4.7 M	5%, MF	
	R....41	57.11.3103	10 k	2%, MF	
	R....43	57.11.3000	0		
	R....46	57.11.3103	10 k	2%, MF	
	R....47	57.11.3474	470 k	2%, MF	
	R....48	57.11.3123	12 k	2%, MF	
	RZ...01	57.88.4332	8 * 3.3 K	2%, Single Line	
	RZ...02	57.88.4331	8 * 330	2%, Single Line	
	RZ...03	57.88.4332	8 * 3.3 k	2%, Single Line	

IND.	POS.NO.	PART NO.	VALUE	SPECIFICATIONS / EQUIVALENT	MANUF.
	RZ...04	57.88.4332	8 * 3.3 k	2%, Single Line	
	RZ...05	57.88.4332	8 * 3.3 k	2%, Single Line	
	RZ...06	57.88.4332	8 * 3.3 k	2%, Single Line	
	RZ...07	57.88.4332	8 * 3.3 k	2%, Single Line	
	S....01	55.01.0168		8 * ON, DIL-Switch	
	Y....01	89.01.0560	4.9152Mc	Quartz	

Notes : Software 1.812.951.20 (IC 22)
1.812.997.20 (IC 31)
1.812.998.20 (IC 24)

The following ICs are socketed : IC2 .. IC22, IC24, IC27, IC31, IC35

CER = Ceramic, EL = Electrolytic, PET = Mat. Polyester

MANUFACTURERS : DI = Dialco
GI = General Instruments
HI = Hitachi
Mot = Motorola
NS = National Semiconductor
RCA = RCA Corporation
St = Studer
TI = Texas Instruments

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4.5 Signal description, slave connectors

SLAVE CONTROL A:

Pin	Signal	Type	Description
1	MGND		0.0 V
2	B-RWD		Rewind status
3	B-FWD		Forward wind status
4	B-VRSPD		(not used, cause only in C274/78 impl.)
5	CAPEN	o.c. out	capstan varispeed enable (LOW = enb)
6	RX/RA	RS232 in	(not used)
7	MOVCLK	a.l. input	move signal clock from C270
8	TX/TA	RS232 out	(not used)
9	B-REC		Record status
10	MOVDIR	a.l. input	move signal direction from C270 LOW = rewind
11	IFVCC		(not used)
12	IFGND		(not used)
13	CAPCL	o.c. out	capstan clock (9600Hz nominal)
14	RB		0.0 V (not used)
15	B-PLAY		PLAY status
16	B-STOP		STOP status
17	S-MUTE		(not used, cause it's not impl.)
18	S-LIFT		(not used, cause it's not impl.)
19	S-RECORD		Record command
20	S-REWIND		Rewind command
21	S-FORWARD		Forward wind command
22	S-PLAY		PLAY command
23	S-STOP		STOP command
24	TB		(not used)
25	MVCC		+ 24 V

signal types:

o.c. out	open collector output, max 30V/0.03A (no internal pullup resistor)
a.l. input	activ low optoisolator input, driven by open collector, or by a switch to GND. (activ: > 10 mA)

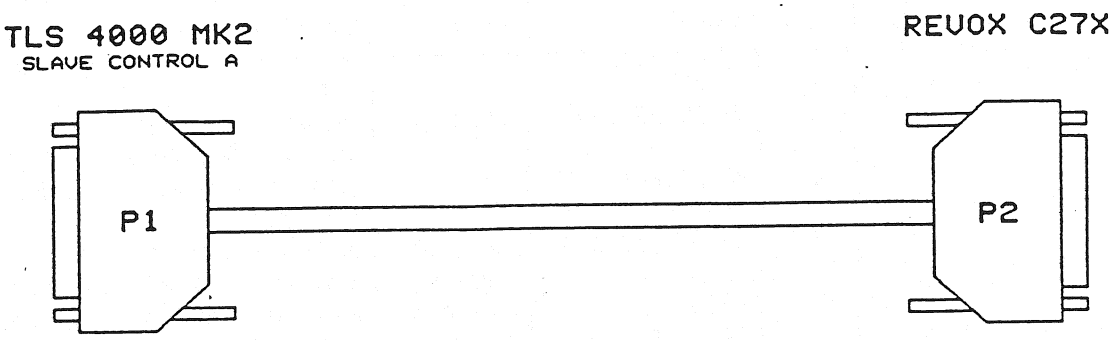
SLAVE CONTROL B:

Pin	Signal	Type	Description
1	IFGND		0.0 V
2	RECEN/PAIN11	a.l. input	record enable / safe input (see DIL-SWITCH 81.1)
3	XVSREF/PAIN10		external varispeed frequency
4	BVRSPD		(not used)
5	XVSENB/PAIN9	a.l. input	external varispeed enable
6	REL1	current lp.	event relay contact 100V/0.3A
7	REL2	current lp.	event relay contact 100V/0.3A
8	PAOUT6	o.c. out	rehearsal on indication
9	PAOUT7		
10	PAOUT8		
11	IFVCC		(not used)
12	SREHSL/PAIN12	a.l. input	rehearsal input
13	PAIN13	a.l. input	(not used)
14	DC		(not used)
15			(not used)
16	PAIN14		(not used)
17	PAIN15		(not used)
18	PAIN16		(not used)
19	PAIN17		(not used)
20	IFGND		(not used)
21	MVCL	o.c. out	move signal clock (9600Hz nominal)
22	SCITX		
23	SCIRX		
24	MVDR	o.c. out	move signal direction (LOW = REW)
25	IFGND		(not used)

signal types:

o.c. out	open collector output, max 30V/0.03A (no internal pullup resistor)
a.l. input	activ low optoisolator input, driven by open collector, or by a switch to GND. (activ: > 10 mA)
current lp.	current loop, max 24V AC/DC

4.6 IF Cable Description



P1. 1	MGND	P2. 1
2	PAIN1	2
3	PAIN2	3
5	CAPEN	5
7	MOVCL	7
9	PAIN5	9
10	MOVDIR	10
13	CAPCL	13
15	PAIN3	15
16	PAIN4	16
19	PAOUT5	19
20	PAOUT1	20
21	PAOUT2	21
22	PAOUT3	22
23	PAOUT4	23
25	MVCC	25
12	SCREEN	

⓪ 20/02/90 PG				
	TLS4000 MK2			PAGE 1 OF 1
STUDER	IF-KABEL REVOX C27X	5M	Z	1.023.768.00