STUDER A820
TLS-4000 MKI

INTERFACE DOCUMENTATION

Interface number : 1.812.126.23
IF - Doc number : 10.27.3100

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TECHNICAL DOCUMENTATION
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printed in Switzerland
Order No.: 10.27.3100 (Ed. 0592)

Summary

1 General Information

1.1 Ordering Information

- Interface Set
  (including Interface, Cable and Documentation) 21.812.126.23
- Interface Board (Hardware/Software) 1.812.126.23
- Software Set 1.812.954.22
- IF-Cable 1.5m 1.023.713.00

1.2 Slave Model

- STUDER A820-2 TC

1.3 Software

- First release index 20 1.812.954.20 (48/85)
- Update to Index 21 1.812.954.21 (35/86)
  - Approved with serial communication port of A820
  - Introduction of LIFTER DEFEAT function
- Update to Index 22 1.812.954.22 (13/92)
  - Lower limit of varispeed range at 7.5ips reduced to 6 ips. Allows synchronization at 7.5 ips with present SW of A820 (06/89)

2 Installing Procedures

2.1 TLS 4000 Requirements

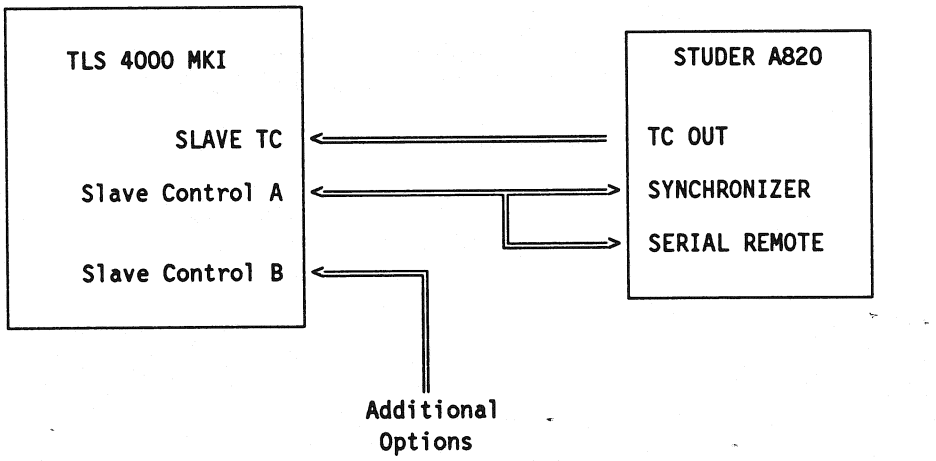
- Synchronizer Board 1.812.106.23 or later
- Interface: correct setup of the DIL switches (see 3.3)

2.2 Slave Requirements

The A820 has to be equipped with Delay Unit and Serial Remote Controller. The "Echo Mode" of the serial communication must be set to OFF.
The Interface was tested with the following software release of the A820:

MASTER	1.820.996.30	06/89
TAPE DECK	1.820.995.21	38/88
CAPSTAN	1.820.994.26	37/89
TC-DELAY	1.820.983.21	50/91

2.3 Connection Slave-Synchronizer



2.4 Quick Test, Adjustments

Insert the Interface after switching off the synchronizer.
Connect the slave machine and switch on synchronizer and slave.
The interface will first perform a short selftest. The result is commented with some led messages. If no errors have been found, the display is available for operation messages (see section 3.5)

The correct wiring of movepulse information may easily be checked by disconnecting the slave timecode cable. The time display on the LCU or a controller should be updated with correct speed and direction.

A good timecode on tape is essential for synchronizer operation and should be checked for master and slave.

No adjustments are necessary.

3 Operating Instructions

3.1 Technical Specifications

Slave type:	- Audio Tape Recorder with movepulse information and SMPTE/EBU timecode, capable of providing code in wind modes. - Parking in GOTO, EDIT and LOCK with PLAY-STOP sequence. - transition Chase to Playsync with preparking	
Tapedeck Control:	- with serial remote control	
Capstan control:	- frequency controlled (nominal 9600Hz)	
Movepulse information:	- direction: clock frequency:	low = forward 256Hz @ 7.5 ips 512Hz @ 15 ips 1024Hz @ 30 ips

There is no compensation of dropin/dropout delays. They have to be adjusted by a controller.

The delay between timecode and audio head is compensated by the A820's delay unit.

Sync accuracy:	typical 50usec
Park accuracy:	typical 20msec
Wow & Flutter:	additional wow & flutter within specification of A820.
Lock time:	(in CUED status, Master Start-SYNC): < 3sec (in CHASE 10*vnom, Master Start-SYNC): < 10sec

3.2 Summary of Supported Functions

Tape Deck Commands:

- STOP
- PLAY — nominal or external varispeed
- REC
- EDIT
- FORW, REW — full speed wind commands
- SHTLF, SHTLR — same as FORW/REW but with additional LIFTER DEFEAT
- LOC, LOCREL — performed with locator of A820
- REHEARSE, MUTE: — Both functions are available. They are transmitted serially. The rehearse mode can also be activated with an external control line (see section 3.4).
  MUTE commands may be disabled.
- EVENT Relay: — is available (see section 3.3 and 3.4)
- CONDITIONAL COMMANDS: — are available with the following functions

TAPE Deck Commands	STOP...SHTLR
Audio Commands	MUTEON...RHRSOFF
Relay Commands	EVON, EVOFF

- STATUS Request: — Status information is updated periodically by means of serial communication. Status modifications caused by local access are detected.
- AUDIO Channel Control: — is available for output selector (INP/REPRO/SYNC), READY/SAFE and MUTE (channels 1,2 only) with the following track assignment:

  CHANNEL 1 = Audio 1
  CHANNEL 2 = Audio 2
  CHANNEL 3 = Timecode
- TRANSPARENT Commands: — not available
- KEYBOARD DISABLE: — is available

3.3 DIL-Switch Functions

DIL Switch SZ81 allows the setting of the following modes:

- Switch 1: RECORD ENABLE
  Defines the polarity of RECEN (see section 3.4)

  OFF: RECORD enabled when
  - low level at RECEN pin

  ON: RECORD enabled when
  - high level at RECEN pin or input open

- Switch 2: AUDIO MUTE
  Allows to suppress MUTE commands, for applications where timecode is recorded on an audio track.

  OFF: MUTE commands are enabled
  ON: no MUTE commands are transmitted to the slave

All other switches are not used and should be in OFF position.
Default Settings: all switches in OFF position

Jumper JS1 defines the source of the relay control:

Position 1B-2B:	Relay controlled by EVON/EVOFF commands
Position 1A-1B:	Relay controlled by COUNTDOWN status (CDOWN1 or CDOWN2 in synchronizer tallies)
default position:	1B-2B

3.4 Additional Features at Slave Control B Connector

RECEN (Pin14):
This signal is used to enable/disable the RECORD function with an external hardware. According to DIL-Switch position 1 and the level of the signal RECEN, RECORD commands are passed to the slave of modified to PLAY.

REL1 (Pin11), REL2 (Pin12):
A general purpose relay is controlled either by EVON/EVOFF commands or by the COUNTDOWN status. The switch REL1-REL2 is closed with an EVON command or an active COUNTDOWN status.

S-REHSL (Pin19), B-REHSL (Pin18):
These signals are looped through to the A820 to provide a parallel remote option for rehearse mode (B-REHSL is not provided with IF-Cable 1.023.713.00).

REMON (Pin25):
Supply voltage of the A820 (+24V) is available for external circuits.

SX-LOCK (Pin5), SX-SLOCK (Pin24), B-LOCK (Pin13), B-CUED (Pin4), B-NSCOD (Pin7), B-NMCOD (Pin8), B-SYNC (Pin10)

are parallel remote lines for synchronizer operation (see TLS4000 manual)

3.5 LED Diagnostic Display

Two LEDs are situated at the front of the interface board. They provide information about the result of the initial selftest and the online status.

DL 1 2 (front view)

An initialization procedure is executed after reset and the main hardware devices are tested. Any resulting error is signalled with a blinking left LED (DL1, about 1Hz).

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

DL1	DL2	
#	-	RAM test failed.
#	#	SSDA test failed.

If no error was found, the two LEDs display the present status of the communication lines to synchronizer and slave.

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

DL1	DL2	DL3	
#	-		regular status, no errors detected
	*		no answer from A820 on serial link
*			communication with synchronizer board fails

3.6 Application Hints

The synchronizer may be switched on with the power supply of the A820 (refer to TLS4000 manual).

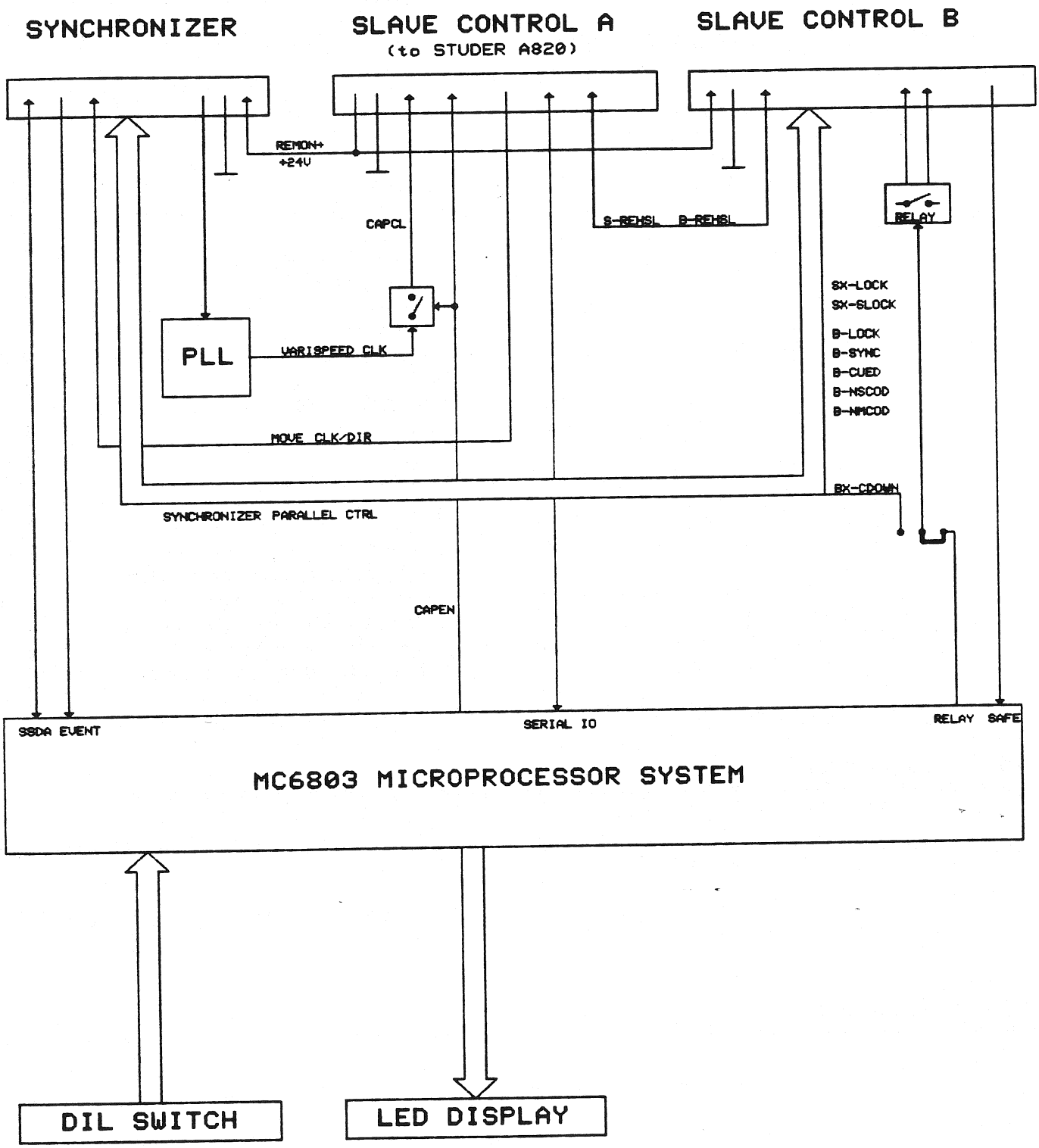
The "Fader Start" function is only enabled when the synchronizer is in OFF mode.

3.7 Testpoints

not available

4 Service Instructions

4.1 Block diagram



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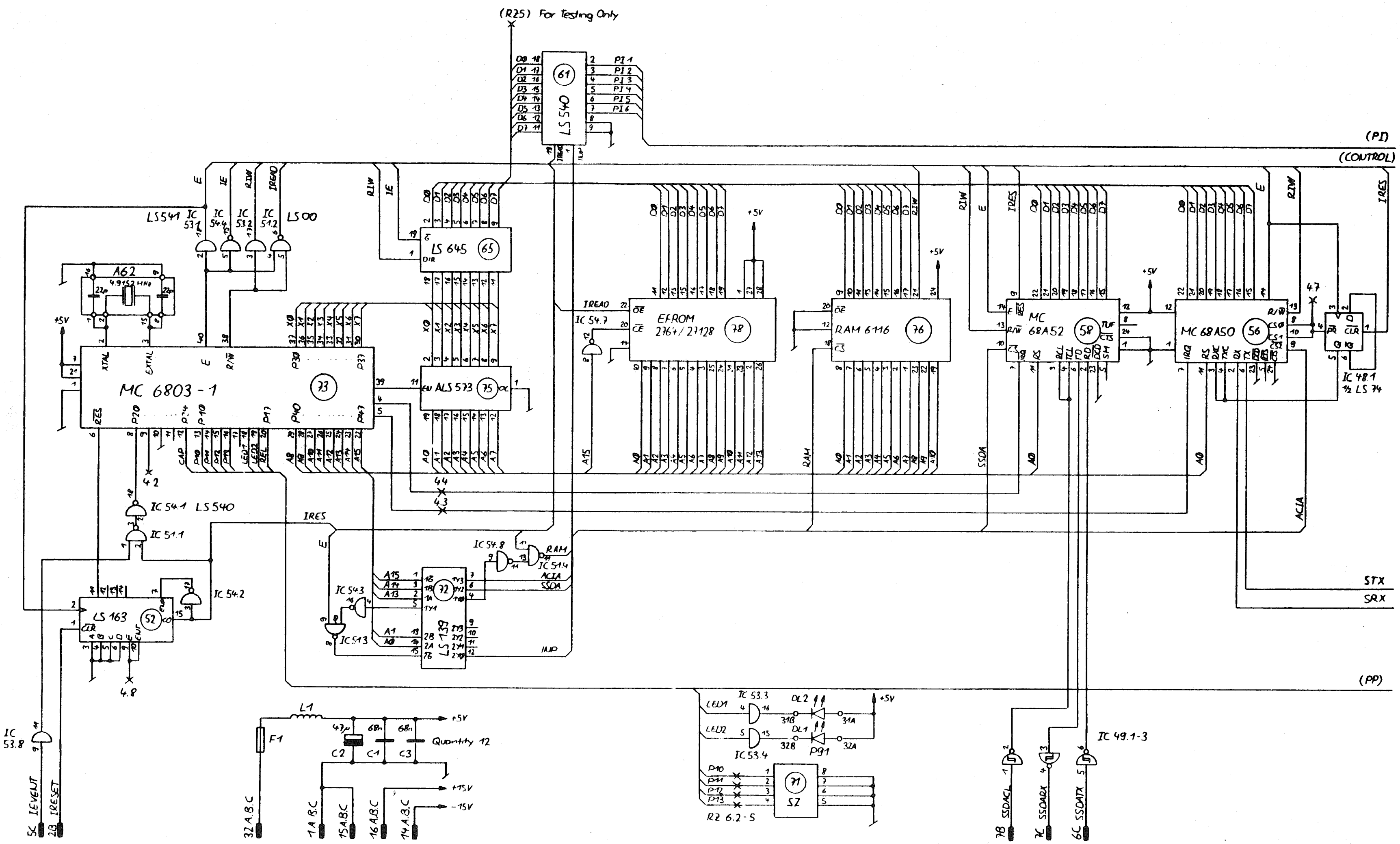
	TLS 4000 MK1		PAGE 1 OF 1
STUDER	INTERFACE STUDER A820	BL	1.812.126.23

4.2 Diagrams



⓪ 86.04.04	STA	○ . .	○ . .	○ . .	○ . .
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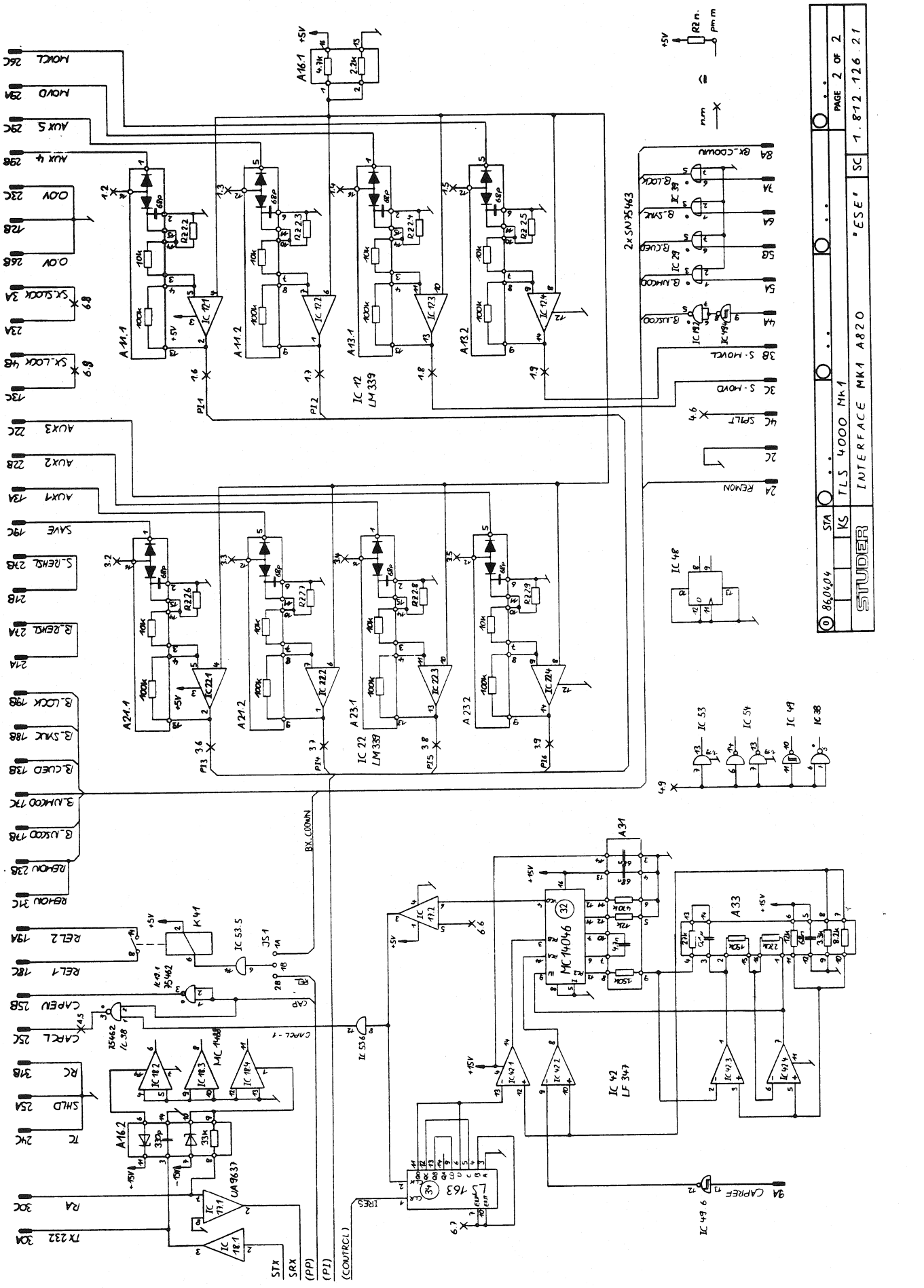
STUDER		INTERFACE MK1 A820	"ESE"	SC	1.812.126.21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TLS 4000 MK1
INTERFACE MK1 A820
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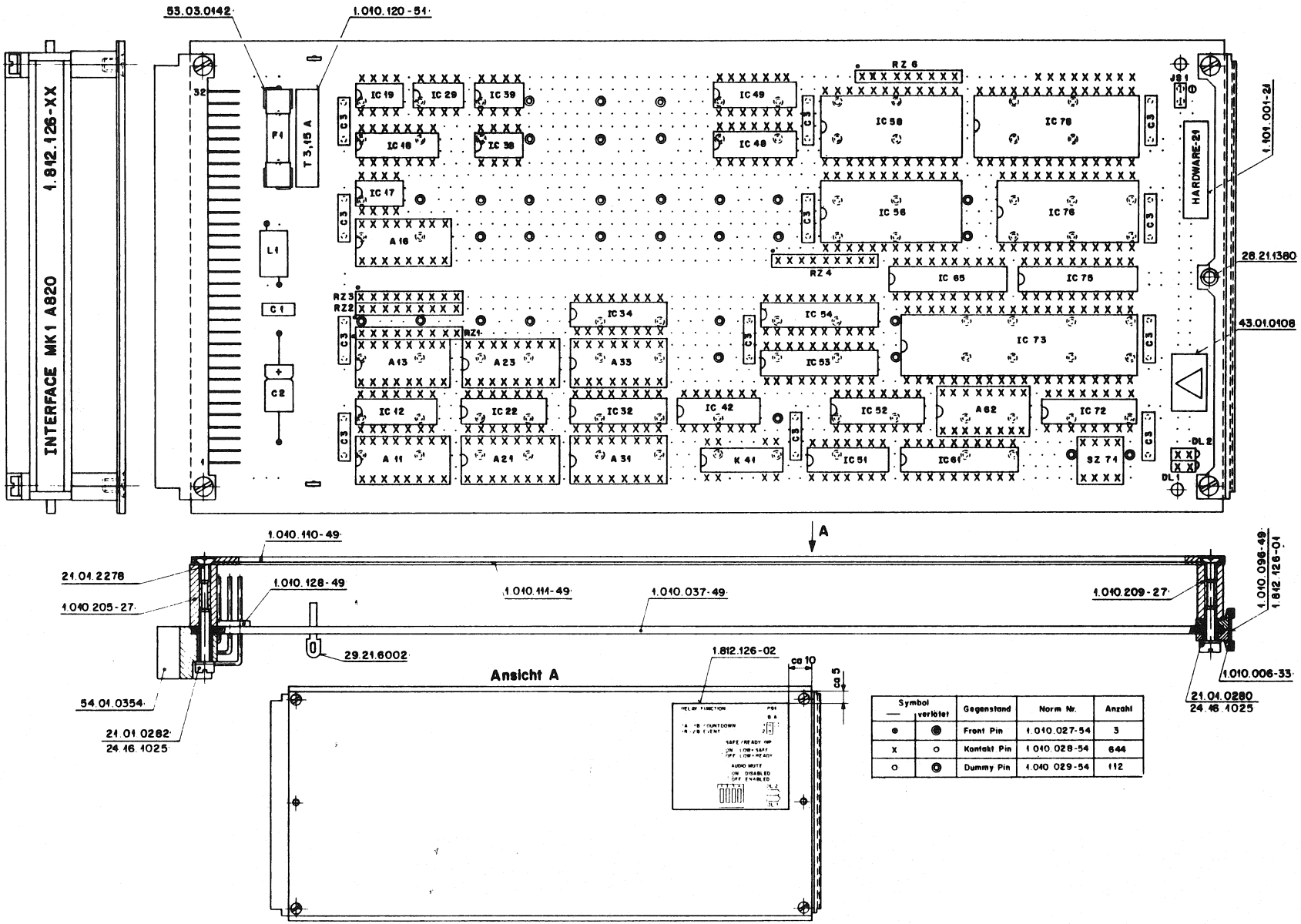
PAGE 2 OF 2
IC 12 LM 339
IC 22 LM 339
IC 42 LF 347
2x SN75463
MC 14046
UA 9637
IC 53
IC 54
IC 49
IC 38
IC 48
A 31
A 33
STX
SRX
(PP)
(P1)
(CONTROL)
BX.COMMN

4.3 Component arrangement



Symbol	verlötet	Gegenstand	Norm Nr.	Anzahl
⊕	◉	Front Pin	1.010.027-54	3
X	○	Kontakt Pin	1.010.028-54	644
○	◉	Dummy Pin	1.010.029-54	112

4.4 Component position list

INTERFACE MKI A820 1.812.126.23

Ad	..POS..	...REF.No...	DESCRIPTION		MANUFACTURER
A	11	1.812.208.00	Assembly 406 - 11		St
A	13	1.812.208.00	Assembly 406 - 11		St
A	16	1.812.211.00	Assembly 126 - 16		St
A	21	1.812.208.00	Assembly 406 - 11		St
A	23	1.812.208.00	Assembly 406 - 11		St
A	31	1.812.202.00	Assembly 120 - 45		St
A	33	1.812.203.00	Assembly 120 - 35		St
A	62	1.812.201.00	Assembly 106 - 62		St
C	1	59.99.0205	68 n	-20%, 63V , CER	
C	2	59.25.3470	47 u	-10%, 16V , EL	
C	3	59.99.1200	.068 u	20%, 63V , PE Quantity: 12	
DL	1	50.04.2107		LED red 555-2007	Di
DL	2	50.04.2107		LED red 555-2007	Di
F	1	51.01.0122	3,15 AT	250V, 5*20	
IC	...12	50.11.0104		LM 339 AN, uA 339 ,A	
IC	...17	50.15.0114		uA 9637	
IC	...18	50.15.0106		MC 1488 P, DS 1488	Mot,NS
IC	...19	50.05.0227		SN 75462	
IC	...22	50.11.0104		LM 339 AN, uA 339 ,A	
IC	...29	50.05.0203		SN 75463 P	
IC	...32	50.07.0046		MC 1 4046 BPC ,A	RCA,Ph,Mot
IC	...34	50.06.0163		SN 74 LS 163 AN	
IC	...38	50.05.0227		SN 75462	
IC	...39	50.05.0203		SN 75463 P	
IC	...42	50.09.0104		LF 347 N	
IC	...48	50.06.0074		SN 74 LS 74 N	
IC	...49	50.06.0014		SN 74 LS 14 N	
IC	...51	50.06.0000		SN 74 LS 00 N	
IC	...52	50.06.0163		SN 74 LS 163 AN	
IC	...53	50.06.0541		SN 74 LS 541 N	
IC	...54	50.06.0540		SN 74 LS 540 N	
IC	...56	50.16.0101		MC 68A50 P, S 68A50 ,A	Mot,AMI
IC	...58	50.16.0114		MC 68A52, ND 68A52 ,A	Mot,Hi
IC	...61	50.06.0540		SN 74 LS 540 N	
IC	...65	50.06.0645		SN 74 LS 645 N	
IC	...72	50.06.0139		SN 74 LS 139 N	
IC	...73	50.16.0107		MC 6803P-1, ND 6803P-1 ,A	Mot,Hi
IC	...75	50.06.1573		SN 74ALS 573 N	
IC	...76	50.14.0107		HM 6116 LP-4, MSM 5128-15 ,A	Hi,OKI
IC	...78	50.14.0113	see note	D 2764-3, HN 482764 G-3 ,A	It,Hi
JS	1	54.01.0021		Jumper 0,1"	
K	41	56.02.1003	5 V 1*A	100V/0.5A, Print Relay	
L	1	62.01.0115		Wide Band HF-Choke	
P	1	54.01.0354		Card Connector 3 * 32 Euro Wrap	
RZ	1	57.88.4332	8 * 3.3K	5%, Single Line	
RZ	2	57.88.4103	8 * 10K	5%, Single Line	
RZ	3	57.88.4332	8 * 3.3K	5%, Single Line	
RZ	4	57.88.4332	8 * 3.3K	5%, Single Line	
RZ	6	57.88.4332	8 * 3.3K	5%, Single Line	
SZ	...71	56.01.0164	4 * ON	DIL-Switch	

Note : Software release 1.812.954.22 (IC 78)

CER = Ceramic, EL = Electrolytic, MPETP = Met. Polyester

MANUFACTURERS : Di = Dialco, Hi = Hitachi, It = Intel,
OKI = OKI Semiconductor, Ph = Philips,
Mot = Motorola, St = Studer, NS = National
Semiconductors

1.812.126.23 INTERFACE MKI A820 KS 92/04/2700

4.5 Signal Description Slave Connectors

SLAVE CONTROL A:

Pin	Signal Name	Signal Type	Description
1	0.0V		signal ground
2	-		
3	-		
4	TC		signal ground
5	SHLD		signal ground
6	CAPEN	I out	capstan varispeed enable
7	CAPCL	I out *	capstan varispeed clock
8	-		
9	0.0V		signal ground
10	MOVCL	I in	movepulse clock from A820
11	B_REHSL		(not used)
12	S_REHSL		rehearse command to A820
13	-		
14	-		
15	-		
16	-		
17	MOVD	I in	movepulse direction from A820
18	AUX4	I in	(not used)
19	AUX5	I in	(not used)
20	TX232	RS232	serial data line to A820
21	-		
22	RA	RS232	serial data line from A820
23	-		
24	RC		signal ground
25	REMON	+24V	supply voltage of A820

I out logic output, active low
(open collector, max 30V/0.3A, * = will pullup resistor)

I in logic input, active low
(low: < 1V, high 2.0 ... 30V or open)

SLAVE CONTROL B:

Pin	Signal Name	Signal Type	Description
1	0.0V		signal ground
2	-		
3	AUX1	I in	(not used)
4	B-CUED	I out	CUED indication
5	SX-LOCK	ttl in	LOCK command
6	-		
7	B-NSCOD	I out	NO SLAVE CODE indication
8	B-NMCOD	I out	NO MASTER CODE indication
9	-		
10	B-SYNC	I out	SYNC indication
11	REL1		relay contact 1
12	REL2		relay contact 2
13	B-LOCK	I out	LOCK mode indication
14	SAFE	I in	RECORD Ready/Safe
15	-		
16	-		
17	-		
18	B-REHSL		(not used)
19	S-REHSL		REHEARSE command to A820
20	-		
21	-		
22	AUX2	I in	(not used)
23	AUX3	I in	(not used)
24	SX-SLOCK	ttl in	SLOW LOCK command
25	REMON	+24V	supply voltage of A820

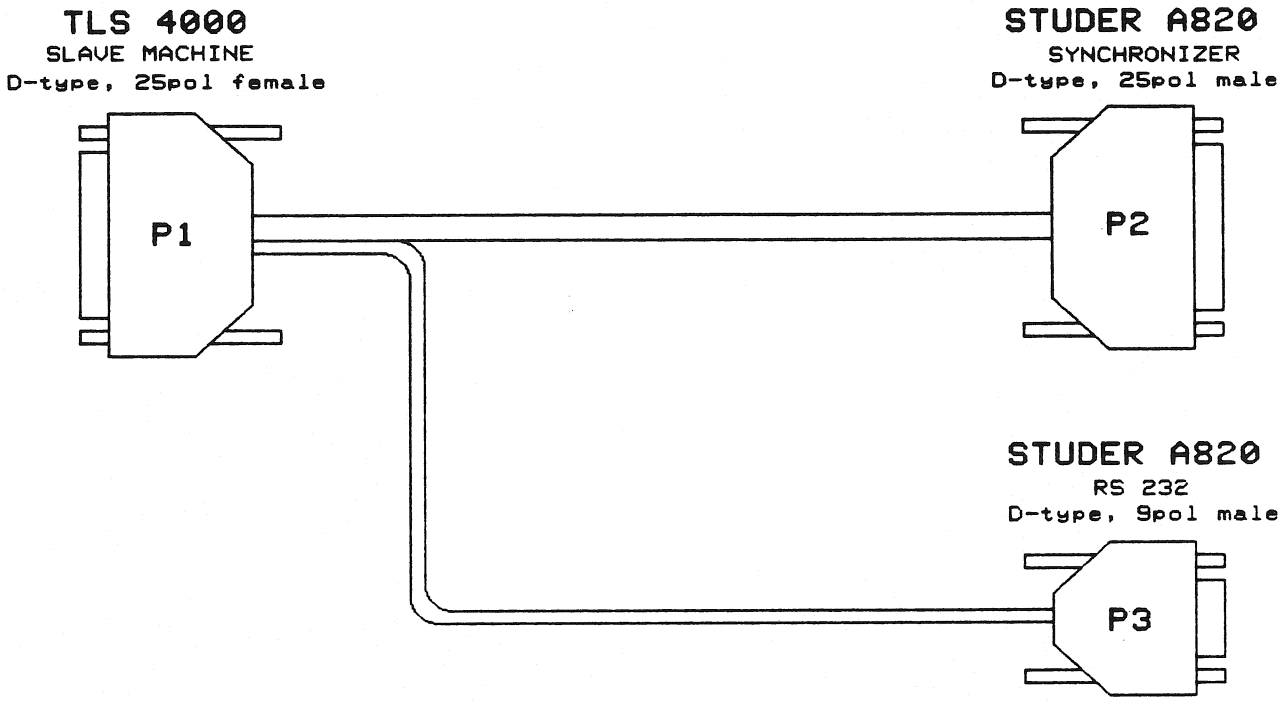
I out logic output, active low
(open collector, max 30V/0.3A)

I in logic input, active low
(low: < 1V, high 2.0 ... 30V or open)

ttl In logic input, active low
(low: < 0.4V, high 2.4 ... 5.25V)

SLAVE CONTROL C: not connected

4.6 IF-Cable Description



P1. 1	0.0V	P2. 1
6	CAPEN	5
7	CAPCL	13
10	MOVCL	7
12	S-REHSL	6
17	MOVD	10
18	SYENB	12
25	REMON	25
9	SCREEN	

20	TX232	P3. 8
22	RA	2
24	RC	9
	SCREEN	1

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STUDER	IF-KABEL MK1 A820	1.5M	Z	1.023.713.00