

STUDER

PROFESSIONAL AUDIO EQUIPMENT

Service Information

Up-date A827-SW 48/89

SI 138/90 E 10.85.7140

A. APPLICATION :

**SOFTWARE & HARDWARE UPDATE
FOR STUDER A827 TAPE RECORDER**

The present SI 138/90 deals with a new software and some hardware modifications for the A827 tape recorder.

This new software must be retrofitted on all A827 tape recorders delivered by STUDER INTERNATIONAL before the 29th January 1990.

The following positions are concerned :

1. A new software for the A827 has been officially released.
The order-no. for the complete software kit A827 is 20.100.827.00 .

It consists of:

Audio 48/89	1.827.987.21	(3 EPROMs)
Master 03/90	1.827.986.22	(3 EPROMs)
Tape Deck 48/89	1.820.985.25	(2 EPROMs)
Capstan 37/89	1.820.994.26	(1 EPROM)
Audio Remote 48/89	1.827.988.21	(1 EPROM)
Parallel Audio IF 48/89	1.827.984.21	(1 EPROM)
(for Console Interface 21.328.540.00)		

Attention:

- Capstan software 37/89 1.820.994.26 is not new !
It is included here for completeness' sake.
- The new software must be used in the combination cited above.

The main features of the new software 48/89 are :

- Reverse Record;
can only be activated from STOP mode.
- Reverse Play Varispeed;
- Improved dynamics of tape transport
(faster acceleration, deceleration)
- With GROUP SELECT NO (F 059) :
 - the window for simultaneous Drop-In/Out of several channels with the READY keys has been extended to 18 ms.
This should comfortably allow simultaneous Drop-In/Out of up to 8 channels.
 - Drop-in with the ALL READY key has been inhibited to prevent accidental erasing of all channels.
- Channel status setting now also possible locally on the machine: in the menu ALIGNMENT AUDIO, you can select REPRO/SYNC/INPUT and also set channels to READY.
In this way you can align the machine without the Audio Remote Control.
- Reverse Play and Set Varispeed now also available on the RS-232 Serial Interface (see attached command list).

2. Reverse Play with Synchronizers

To have the function REVERSE PLAY also accessible on the SYNCHRONIZER port, a modification has to be done on the Parallel Remote Interface 1.820.738.82 in the machine (see below). On the SYNCHRONIZER port itself, the key in position PIN 24 has to be removed, as PIN 24 will be used for the REVERSE PLAY function.

3. Pinch Roller Gate 1.820.831.00

The new Tape Deck software 48/89 causes the monitoring circuit of the pinch roller gate to trigger erroneously during high speed peaks in locator operations, leading to the appearance of the error message "Pinch Roller slipping". In order to prevent such malfunctioning, the modifications described below must be executed on the Pinch Roller Gate 1.820.831.00.

4. Audio Inputs/Outputs (XLR connectors)

It has been noticed on several machines that the locking screws of the XLR connectors have not been fastened tightly. This may cause level- and frequency range problems with asymmetrical loads, due to bad grounding. Therefore, those screws should be checked on every machine (refer to the description below).

5. Power Supply 1.820.353.00

The error message "Power Drop Out" appears erroneously. The Mains Soft Start PCB 1.820.830.00 inside the power supply has to be modified according to the instructions below.

Note: These modification instructions have already been issued in a FAX dated November '89. They are mentioned again here for completeness' sake.

6. Spooling Motor Tacho 1.820.771 / Move Sensor Tacho 1.820.770

In case of an increased occurrence of the error messages

"Spooling Motor Tacho Left/Right" or
"Move Sensor Hardware" or
"Spooling Motor Servo Hardware"

modify and realign the Tacho boards as indicated below, or replace them with:

Spooling Motor Tacho PCB	1.820.771.81 or 1.820.771.83
Move sensor Tacho PCB	1.820.770.00 or 1.820.770.82

Note: These modification instructions have already been issued in a FAX dated November '89. They are mentioned again here for completeness' sake.

B. MODIFICATIONS :

1. Fitting the new software

1. Save Audio parameters on tape (see attached instructions).
2. Write down tape deck parameters:

Tape A:

Tape Tension Play Left: Right:
 Wind:
 Edit:
 Rev. Play Left: Right:

Tape B:

Tape Tension Play Left: Right:
 Wind:
 Edit:
 Rev. Play Left: Right:

3. Erase the RAMs on the MPU boards equipped with a battery.
4. Replace the EPROMs on the following MPU boards with the new EPROMs containing software 48/89:

	<u>old PCB index</u>	<u>new PCB index</u>
- MPU Audio	1.827.782.20	1.827.782.21
- MPU Master	1.827.784.20	1.827.784.22
- MPU Tape Deck	1.820.781.24	1.820.781.25
- MPU Audio Remote	1.827.783.20	1.827.783.21
- MPU Audio Remote IF	1.827.787.20	1.827.787.21

5. Attach the corresponding index labels to these PCBs.

2. Reverse Play with Synchronizers

1. Take out the Parallel Remote Interface 1.820.738.82, situated on the left inner side of the console.
2. Retrofit the following components according to the attached schematic :
 - D 4 1N4448 50.04.0125
 - D 21 BAT 85 50.04.0127
 - C 22 100 uF 59.40.0104
 - R 15 1.5 M 57.11.5155 .
3. The Parallel Remote Interface changes to index .83; Attach label .83 .
4. On the SYNCHRONIZER port on the back of the machine, carefully remove the key in position PIN 24.
The function REVERSE PLAY is now accessible on pin 24 of the SYNCHRONIZER port.

Attention: Do not confuse the pin assignment of the SYNCHRONIZER port at the back of the machine with the pin assignment of the synchronizer connector (P3) on the Parallel Remote Interface 1.820.738.82/83 !

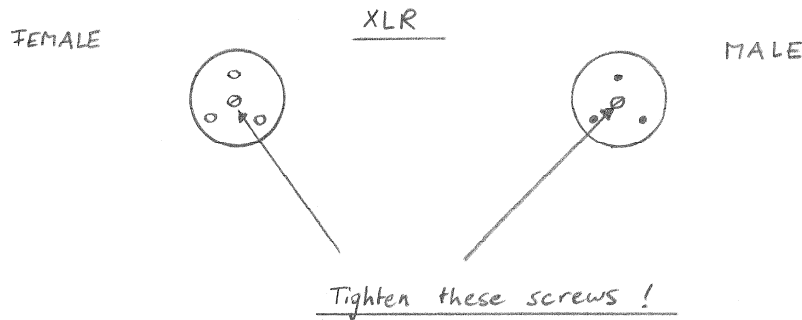
3. Pinch Roller Gate 1.820.831.00

(see also Technical Protocol No. 182)

1. Replace R16 130k with 5.1k (Order No. 57.11.3512)
2. The index of the Pinch Roller Gate changes to .81.
3. Attach label .81.

4. Audio Inputs/Outputs (XLR connectors)

Check if the locking screws of the XLR audio connectors are fastened tightly. If not, tighten them.



5. Power supply 1.820.353.00

1. Remove power supply
2. Remove Soft Start PCB 1.820.830.00 and modify as follows:
3. Replace R31 and R32 with a wire link
4. Replace C7 (33nF) with 68nF (59.06.53333).
5. Remove R26 (2,2 k Ω) and insert 6,8k Ω resistor (57.11.4682) on the solder side of the PC-board, as shown in the circuit diagram

Attention: To prevent short circuits insulate the connecting wires of the resistor!

6. With this modification the Soft Start PCB 1.820.830.00 changes to index .81.
7. Attach label .81.
8. The power supply 1.820.353.00 changes to index .81.
9. Attach label .81.

6. Spooling Motor Tacho 1.820.771.82 /
Move Sensor Tacho 1.820.770.81

Attention :

Spooling Motor Tacho 1.820.771.81 --> no modification required
Spooling Motor Tacho 1.820.771.82 --> add pot.meters !

Move sensor 1.820.770.00 --> no modification required !
Move sensor 1.820.770.81 --> add pot.meters !

Both Spooling Motor Tacho PCBs 1.820.771.82 and
the Move sensor PCB 1.820.770.81 must be equipped with two
potentiometers on each PC-Board.

* Spooling motor tacho PCB 1.820.771.82 :

1. Remove R5/R8/R10/R13/C3 and C4 (all these parts are no longer required)
2. Insert (solder) pot.meters RA1 and RA2 (2k lin 58.05.0202)
3. Remove R2 and R4;
These two resistors must be matched individually to the circuit.

Alignment instructions:

- Modify PCBs as mentioned above.
- Check that the resistors which must be matched to the circuit are unsoldered.
- For easier current measurements solder 2 short wires in place of the removed resistors.
- For alignment, connect the PC-board without installation onto the flat cable. (Light barrier not covered, i.e. without tacho disk)
- Connect digital current-meter and measure current
- Select the corresponding resistor value according to the table on the circuit diagram.
- Solder resistor in (use, if possible, 1 % resistors).

Example: Spooling Motor Tacho 1.820.771.83

- The current measured with Ampère-meter connected instead of R4 is 1.78 mA
- The correct resistor according to the table on the circuit diagram is 1.2 k

- After both resistors are selected and the PCB has been installed, adjust the duty cycle of the square wave signals for 50 % (pins 1 & 2, 3 & 4, 7 & 8 on Tape Deck Counter Timer 1.820.823.00)

4. The PC-Board changes to Index .83.
Attach index label .83.

* Move sensor PCB 1.820.770.81 :

1. Remove R1/R3/R8/R10/C2 and C3 (all these parts are no longer required)
2. Insert (solder) pot.meters RA1 and RA2 (2k lin 58.05.0202)
3. Remove R5 and R12;
These two resistors must be matched individually to the circuit.

Alignment instructions:

--> see Spooling Motor Tacho above

4. The PC-Board changes to Index .82.
Attach index label .82.

Control sheet for A827 up date SW 48/83

Please fill in this control sheet after the modification has been completed and send it back to:

STUDER INTERNATIONAL AG
Secretary Engineering Dept.

CH-8105 Regensdorf
SWITZERLAND

Representative/Company :

Country :

A827 MCH Serial-No. :

.....

.....

Date :

Engineer / Name, Signature :

4.7 External Storage of the Audio Parameters

For copying the audio parameters of the RAM to an external storage medium the tape recorder must be equipped with the COMMUNICATION CONTROLLER PCB 1.820.718.

In the following the expressions SAVE (for external storage of the recorder's RAM data), VERIFY (for comparing the externally stored data with those in the recorder's RAM), and LOAD (for writing the externally stored data into the recorder's RAM) will be used.

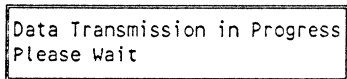
4.7.1 Storing the Parameters on Tape (SAVE)

If the recorder receives the command "SAVE" the microprocessor transmits all the stored audio and tape tension parameters in serial format to the connector OUT of the COMMUNICATION CONTROLLER PCB 1.820.718. This output connector is unbalanced, its output level is adjustable (nominal 1 Vpp). The output impedance is switchable between 5 kΩ (jumper JS1 inserted) and 470 kΩ (jumper JS1 removed). Output level adjustment: with R36 adjust for 1Vpp with Load connected. Three complete copies of the parameters are transmitted each time for safety reasons. However, one correct transmission is sufficient when reloading. The complete save process takes approximately 60 seconds.

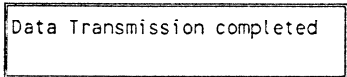
Procedure:

- Connect one of the line inputs of the tape recorder to the OUT connector on the COMMUNICATION CONTROLLER PCB 1.820.718 (see Fig. 4.7.1).
Select tape speed.
Mount tape of sufficient length (recording time at least 60 seconds)
Press READY button of the desired recording channel.
Start recorder in RECORD mode.
Press RESET TIMER.
Press SAVE on the COMMUNICATION CONTROLLER PCB 1.820.718.

The LC display indicates:



Now, the data are written to the tape. When the procedure is terminated, the LC display indicates:



- Press the STORE to clear the display.
Press ZERO LOC, the tape is rewound to the beginning of the recording.

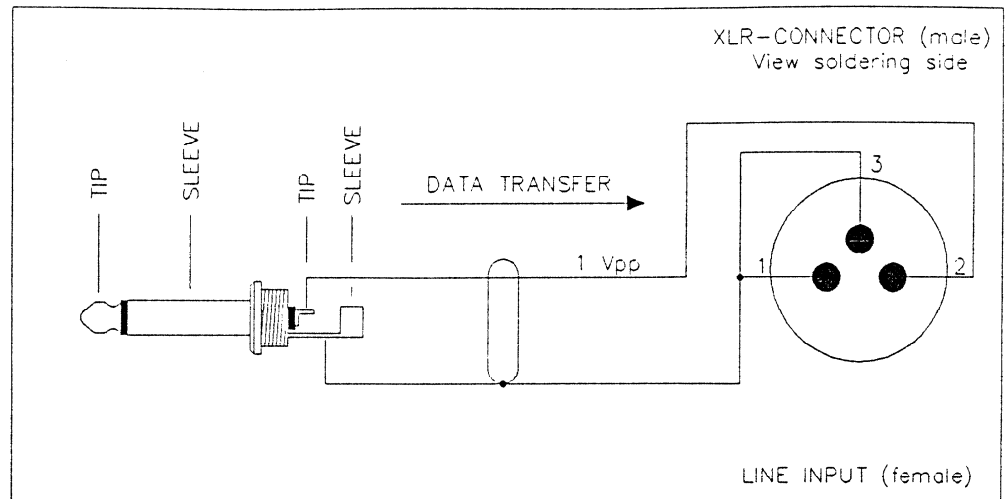


Fig. 4.7.1-1 Adapter cable for 1.820.718.00/81

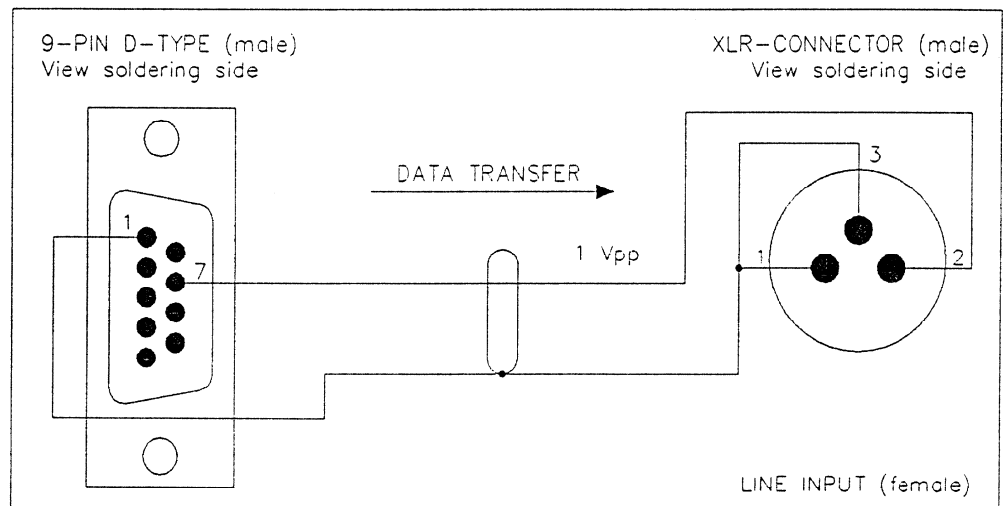


Fig. 4.7.1-2 Adapter cable for 1.820.718.82 / 83

4.7.2 Comparing the Data on Tape (VERIFY)

If the tape recorder receives the command "VERIFY" the microprocessor receives all audio and tape tension parameters in serial format on the connector IN of the COMMUNICATION CONTROLLER PCB 1.820.718. This input connector is unbalanced. The nominal input level is $1 V_{pp}$, the sensitivity is adjustable. Three complete copies of the parameters are transmitted each time for safety reasons. However, one correct transmission is sufficient when verifying. The complete verification process takes approximately 60 seconds.

Procedure:

- Connect the same line output of the tape recorder to the IN connector on the COMMUNICATION CONTROLLER PCB 1.820.718 (see Fig. 4.7.2).
- Select the same tape speed as was used for the SAVE procedure.
- Mount tape with the recorded parameters, and wind to the beginning of the recording.
- Press REPRO button of the channel used for the SAVE procedure.
- Start recorder in PLAY mode.
- Press VERIFY on the COMMUNICATION CONTROLLER PCB 1.820.718.
- Adjust reproduce level: Turn potentiometer LEVEL on the COMMUNICATION CONTROLLER PCB 1.820.718 fully counterclockwise, then clockwise until the LEVEL LED just lights up.

- Wind back to the beginning of the recording, e.g. with LOC START, and select again VERIFY and PLAY.

The LC display panel indicates:

Verifying data
Please Wait

Now, the data stored in the RAM are compared with those read from the tape. When the procedure is terminated, the LC display indicates:

Verification successfully
completed

- Press the STORE key to clear the display.

If data transmission errors have occurred (e.g. caused by a transient system voltage failure or contaminated soundheads), the following message appears:

ERROR
verify failed

- Press the STORE key to clear the display and repeat the procedure.

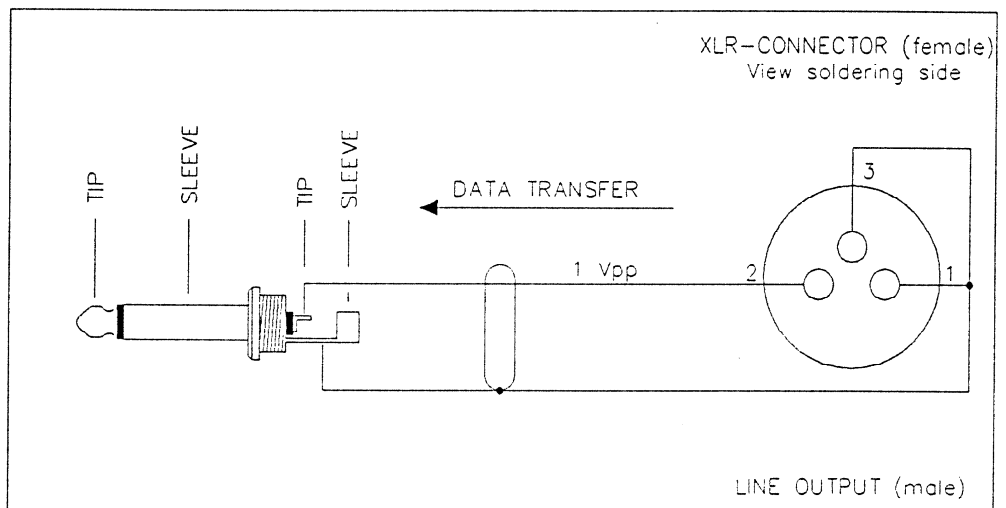


Fig. 4.7.2-1 Adapter cable for 1.820.718.00/81

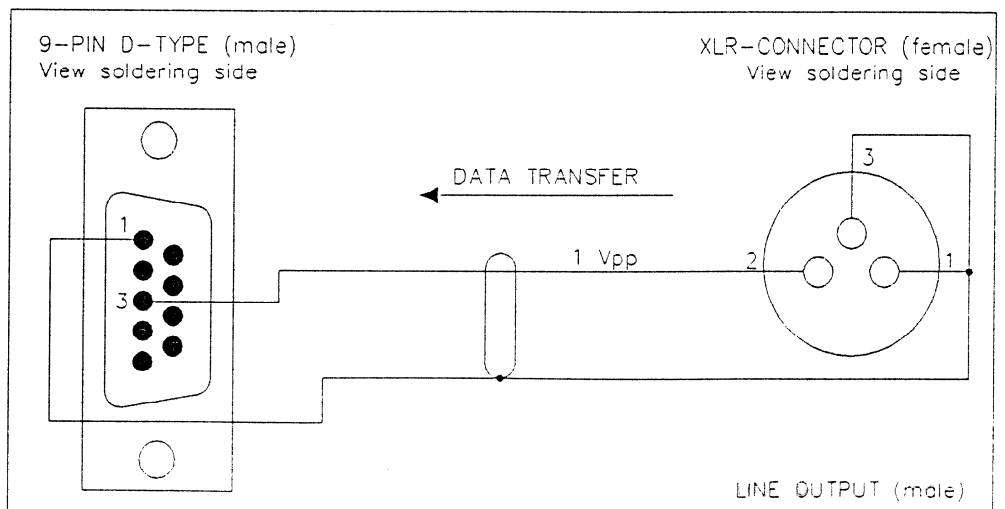


Fig. 4.7.2-2 Adapter cable for 1.820.718.82/83

4.7.3 Loading the Data from Tape (LOAD)

If the recorder receives the command "LOAD" the microprocessor receives all audio parameters in serial format and loads them into the RAM. The same cable is used as for the VERIFY procedure.

Generally, the first of the three identical data blocks is sufficient for the LOAD procedure. If errors should occur during LOAD, the microprocessor can read from one of the two following data blocks.

Procedure:

- Connect the same line input of the tape recorder to the IN connector on the COMMUNICATION CONTROLLER PCB 1.820.718.
- Select the same tape speed as was used for the SAVE procedure.
- Mount tape with the recorded parameters, and wind to the beginning of the recording.
- Press REPRO button of the channel used for the SAVE procedure.
- Start recorder in PLAY mode.
- Press LOAD on the COMMUNICATION CONTROLLER PCB 1.820.718.
- Adjust reproduce level: Turn potentiometer LEVEL on the COMMUNICATION CONTROLLER PCB 1.820.718 fully counterclockwise, then clockwise until the LEVEL LED just lights up.
- Wind back to the beginning of the recording, e.g. with LOC START, and select again LOAD and PLAY.

The LC display indicates:

Data Loading in Progress
Please Wait

Now, the data read from the tape are stored in the RAM. When the procedure is terminated, the LC display indicates:

Data Loading completed

- Press the STORE key to clear the display.

If data transmission errors have occurred (e.g. caused by a transient system voltage failure or contaminated soundheads), the following message appears:

ERROR
no data found

- Press the STORE key to clear the display and repeat the procedure.
- Check with VERIFY if the data are correctly stored in the RAM, refer to Section 4.7.2.

4.8

Externe Speicherung der Audioparameter

Zum Kopieren der Audio- parameter vom RAM auf einen externen Datenträger werden die Anschlüsse IN/OUT auf dem COMMUNICATION CONTROLLER PCB 1.820.718 verwendet.

Im folgenden werden die Bezeichnungen SAVE (für die Speicherung der im RAM vorhandenen Parameter auf einen externen Datenträger), VERIFY (zum Vergleichen der extern gespeicherten Daten mit den RAM-Daten des Tonbandgerätes) und LOAD (für das Laden der auf dem externen Datenträger befindlichen Parameter in das RAM) verwendet.

4.8.1

Speichern der Parameter auf Band (SAVE)

Wenn das Tonbandgerät den SAVE-Befehl erhält, überträgt der Mikroprozessor alle gespeicherten Audio- und Bandzugparameter im seriellen Format an den OUT-Anschluß auf dem COMMUNICATION CONTROLLER PCB 1.820.718. Dieser Anschluß ist asymmetrisch und sein Ausgangspegel ist einstellbar (nom. 1 Vpp). Der Ausgangswiderstand kann zwischen 5 k Ω (Jumper JS1 gesteckt) und 470 k Ω (Jumper JS1 entfernt) umgeschaltet werden. Der Ausgangspegel kann mit R36 eingestellt werden. Aus Sicherheitsgründen werden bei jedem Sicherungsvorgang drei vollständige Kopien der Parameter übertragen. Zum Laden der Parameter genügt jedoch eine korrekte Aufzeichnung. Der gesamte Sicherungsvorgang dauert ca. 60 s.

Vorgehensweise:

- Einen der Leitungseingänge des Tonbandgerätes mit dem OUT-Anschluß des COMMUNICATION CONTROLLER PCB 1.820.718 verbinden (siehe Fig. 4.8.1).
- Bandgeschwindigkeit wählen
- Ein genügend langes Band einlegen (Aufzeichnungsdauer mindestens 60 s)
- READY-Taste des gewünschten Kanals drücken.
- Gerät im Aufnahmebetrieb starten.
- RESET TIMER drücken
- SAVE auf dem COMMUNICATION CONTROLLER PCB 1.820.718 drücken.

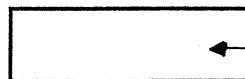
Die LC-Anzeige

meldet:



" DATA TRANSMISSION IN PROGRESS "
PLEASE WAIT

Jetzt werden die Daten auf Band geschrieben. Nach Beendigung dieses Vorgangs meldet die LC-Anzeige:



" DATA TRANSMISSION COMPLETED "

- STORE -Taste drücken, um die Anzeige zu löschen.
- ZERO LOC drücken: das Band wird an den Anfang der Aufzeichnung zurückgespult

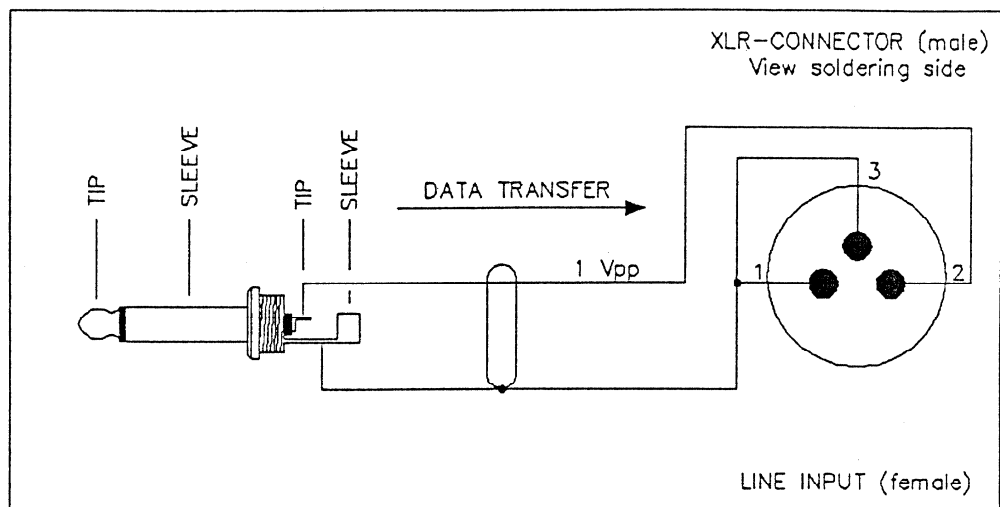


Fig. 4.8.1-1 Adapterkabel für 1.820.718.00/81

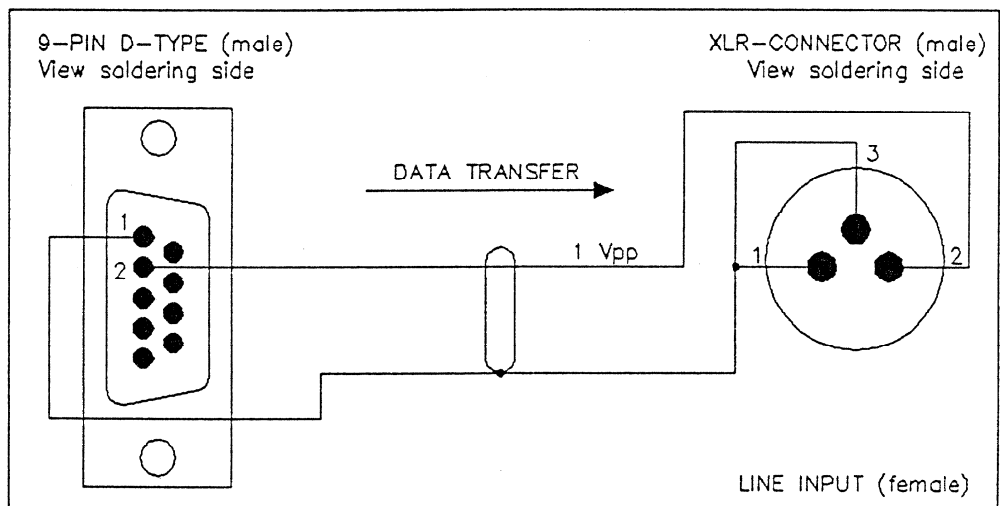


Fig. 4.8.1-2 Adapterkabel für 1.820.718.82 / 83

4.8.2 Vergleichen der Daten auf Band (VERIFY)

Wenn das Tonbandgerät den VERIFY-Befehl erhält, werden dem Mikroprozessor alle Audio- und Bandzugparameter in serieller Form über den IN-Anschluß des COMMUNICATION CONTROLLER PCB 1.820.718 übertragen. Dieser Anschluß ist asymmetrisch. Der nominelle Pegel ist 1 Vpp, die Empfindlichkeit ist einstellbar.

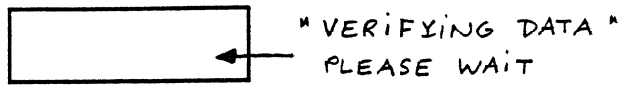
Aus Sicherheitsgründen werden jeweils drei vollständige Kopien der Parameter übertragen. Für den VERIFY-Vorgang genügt jedoch eine korrekte Übertragung. Der gesamte Prüfvorgang dauert ca. 60 s.

Vorgehensweise:

- Den gleichen Leitungsausgang an den IN-Anschluß des COMMUNICATION CONTROLLER PCB 1.820.718 anschließen (siehe Fig. 4.8.2).
- Gleiche Bandgeschwindigkeit wählen, die für den SAVE-Vorgang verwendet wurde.
- Band mit den aufgezeichneten Parametern einlegen und an den Anfang zurückspulen.
- REPRO-Taste auf dem Kanal drücken, der für den SAVE-Vorgang verwendet wurde.
- Tonbandgerät im Wiedergabebetrieb starten.
- VERIFY-Taste auf dem COMMUNICATION CONTROLLER PCB 1.820.718 drücken.
- Wiedergabepiegel einstellen: LEVEL-Potentiometer auf dem COMMUNICATION CONTROLLER 1.820.718 ganz zum linken Anschlag drehen und dann im Uhrzeigersinn öffnen, bis die LEVEL-LED gerade aufleuchtet.

- Band an den Anfang der Aufzeichnung zurückspulen, d.h. mit LOC START, und nochmals VERIFY und PLAY wählen.

Die LC-Anzeige meldet:

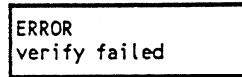


Die im RAM gespeicherten Daten werden jetzt mit den vom Band gelesenen Daten verglichen. Nach Beendigung dieses Vorgangs meldet die LC-Anzeige:



- STORE Taste drücken um die Anzeige zu löschen.

Falls Übertragungsfehler aufgetreten sind (z.B. verursacht durch transiente Fehler in der Systemspannung oder verschmutzte Tonköpfe), wird folgende Meldung eingeblendet:



- STORE Taste drücken, um die Anzeige zu löschen und den Vorgang wiederholen.

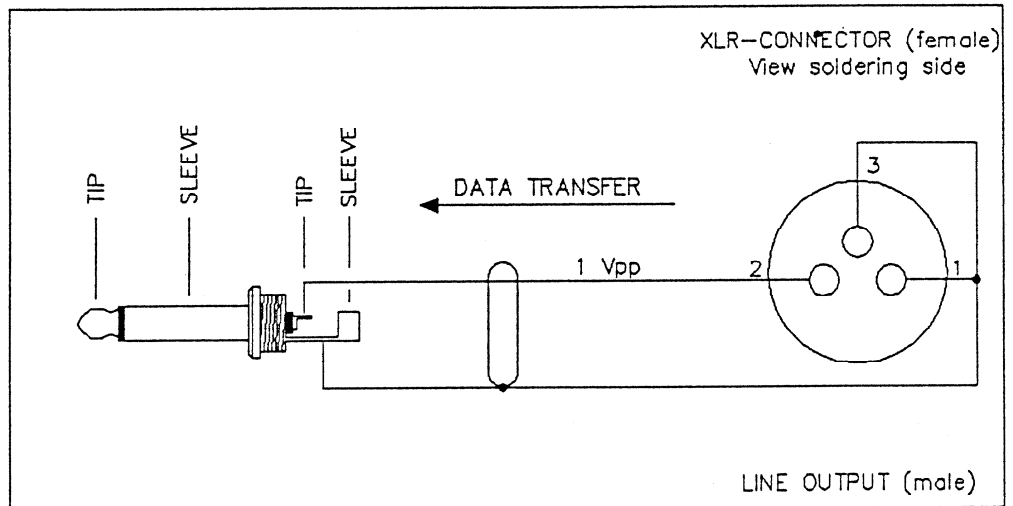


Fig. 4.8.2-1 Adapterkabel für 1.820.718.00/81

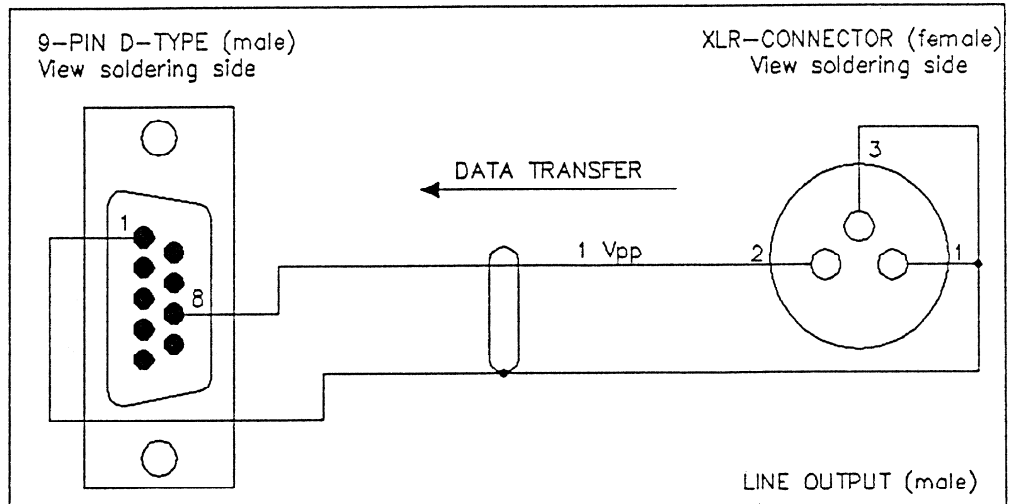


Fig. 4.8.2-2 Adapterkabel für 1.820.718.82 /83

4.8.3 Laden der Parameter ab Band (LOAD)

Wenn das Tonbandgerät den LOAD-Befehl erhält, werden dem Mikroprozessor alle Audio- in serieller Form übertragen, von wo sie in das RAM geschrieben werden. Es wird das gleiche Anschlußkabel verwendet wie beim VERIFY-Vorgang.

Normalerweise genügt der erste der drei identischen Datenblöcke zum Laden der Parameter. Falls beim ersten LOAD-Versuch ein Fehler auftreten sollte, kann der Mikroprozessor einen der beiden folgenden Datenblöcke lesen.

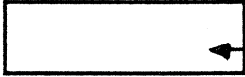
Vorgehensweise:

- Den gleichen Leitungsausgang des Tonbandgerätes mit dem IN-Anschluß des COMMUNICATION CONTROLLER PCB 1.820.718 verbinden.
- Die gleiche Bandgeschwindigkeit wählen, wie beim Aufzeichnen der Daten mit der SAVE-Funktion.
- Band mit den aufgezeichneten Parametern einlegen und an den Anfang zurückspulen.
- Tonbandgerät im Wiedergabebetrieb starten.
- LOAD-Taste auf dem COMMUNICATION CONTROLLER PCB 1.820.718 drücken.
- Wiedergabepegel einstellen: LEVEL-Potentiometer auf dem COMMUNICATION CONTROLLER PCB 1.820.718 ganz zum linken Anschlag drehen und dann soweit im Uhrzeigersinn öffnen, bis die LEVEL-LED gerade aufleuchtet.
- An den Anfang der Aufzeichnung zurückspulen, d.h. mit LOC START und nochmals LOAD- und PLAY-Taste drücken.

Die LC-Anzeige meldet:

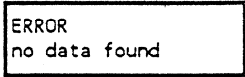
 "DATA LOADING IN PROGRESS"
PLEASE WAIT

Jetzt werden die auf dem Band vorhandenen Daten in das RAM geschrieben. Nach Beendigung des Vorgangs meldet die LC-Anzeige:

 "DATA LOADING COMPLETED"

- STORE -Taste drücken, um die Anzeige zu löschen.

Falls bei der Übertragung ein Fehler aufgetreten ist (z.B. verursacht durch transiente Fehler in der Systemspannung oder verschmutzte Tonköpfe), wird folgende Meldung eingeblendet:

 ERROR
no data found

- STORE drücken, um die Anzeige zu löschen und den Vorgang wiederholen.
- Mit VERIFY prüfen, daß die Daten korrekt im RAM gespeichert wurden (siehe Kapitel 4.8.2).

ASCII Protocol of RS232 Serial Interface for STUDER A820-MCH, A827-MCH

Changes

- 21.06.89 : status RPL (reverse play) redefined from 0AH/8AH to 25H/0A5H;
status RPU (rev play vspd), RPI (rev play vspd int ref) and
RPE (rev play vspd ext ref) new implemented
- 09.08.89 : command RPL implemented for A820MCH and A827MCH
- 27.11.89 : SSA (set speed 3.75 ips) new implemented
- 06.12.89 : SVS, CVS, VS? and SVP new implemented

Syntax

- [-,A,B,C] means input/output - or A or B or C is definitively expected
- (-,A,B,C) means input/output - or A or B or C is possibly expected

Machine properties

- "-" not implemented
- "1" implemented at least in one option of the family
- "x" optionally implemented in future

Error messages

- "?" CR LF: input is unknown command or has wrong format (no echo mode)
- "INPUT FORMAT ERROR" CR LF: input has wrong format (echo mode)

USE OF CNTRL X: (without space or CR)
ctrl x cancels last input section (output CR LF)

USE OF CNTRL W: (without space or CR)
ctrl w is a flip-flop with the same function as x-on/off)

XON,XOFF:
XOFF means: stop sending new commands (else overrun)
XON means: continue sending commands (ready again)
(see normal X-ON/OFF protocol)

TLS 4000 synchronizer supposes no XON/XOFF !

Important Note : This release of the ASCII protocol of the serial RS-232 Interface is implemented in the A827 MASTER software 03/90 (Order No. 1.827.986.22).
The ASCII protocol implemented in other MASTER software versions may deviate from the present one.

Specifications by TLS controller demands

1. Data transfer, data save

Each transfer is initiated by controller and quitted by tape recorder within maximal 100 ms:

- Exceptions:
- After power on the slave machine may announce itself with a welcome message of any length.
 - The commands "F" and "R" of A810 are not quitted (increases transfer rate for toggling) !

If a transfer initiated by controller isn't quitted by slave within demanded time or is quitted with an error message, including a '?', the command is cleared by CX (18H) and after receipt of a LF once repeated. If also this command won't be quitted in requested time, the connection is considered as interrupted and is restarted newly.

2. Command sequences for special consideration

Status Request

The first status request after a command must receive already an updated status. Before a message from tape deck is available, status 'not achieved' can be shown.

If e.g. a tape out occurred on a machine, it can answer with 'play not achieved' for a short time after reception of command 'PLY'. If a status request doesn't receive at least the last requested status as 'not achieved', the controller can assume, that the command cannot be executed or that a command on slave machine has been initiated by pressing a key.

Locate / Play Locate commands

While a locate is executed, the machine may answer with status 'locate achieved/not achieved' or 'stop not achieved'. Locating is finished by sending status 'stop'.

A Play Locate command is initiated by sending to slave machine one or several 'PLY' after a locate command. The slave may answer while play locating with status message 'play locate achieved/not achieved' or with 'play not achieved'. Play locating is finished by sending status 'play achieved'.

TAPE DECK COMMANDS						
sign set	machine		input	output		meaning
	820MCH	827MCH				
STP	1	1	STP [,CR]	CR LF		stop
EDI	1	1	EDI [,CR]	CR LF		edit
PLV	1	1	PLY [,CR]	CR LF		play
RPL	1	1	RPL [,CR]	CR LF		reverse play
REC	1	1	REC [,CR]	CR LF		record
FWD	1	1	FWD [,CR]	CR LF		forward
RWD	1	1	RWD [,CR]	CR LF		rewind
WNR <SPEED>	1 1	1 1	WNR [] <xxxx> (0<=xxxx<=5FFF)	CR LF		contr. rewind
WNF <SPEED>	1 1	1 1	WNF [] <xxxx> (0<=xxxx<=5FFF)	CR LF		contr. wind forward
SSA	1	1	SSA [,CR]	CR LF		set play speed A (3.75 IPS)
SSB	1	1	SSB [,CR]	CR LF		set play speed B (7.50 IPS)
SSC	1	1	SSC [,CR]	CR LF		set play speed C (15 IPS)
SSD	1	1	SSD [,CR]	CR LF		set play speed D (30 IPS)
SUP	1	1	SUP [] xxxxxx [,CR]	CR LF		set varispeed parameter 00A5FE <= xxxxxx <= 018ACE (hex) parameter refers to nominal speed, signless, independent of td status 010000 = nominal (fixed) speed
NS?	1	1	NS? [,CR]	text CR LF		nominal speed ?
VS?	1	1	VS? [,CR]	xxxxxx CR LF		varispeed parameter ? 00A5FE <= xxxxxx <= 018ACE (hex) parameter refers to nominal speed, signless, independent of td status 010000 = nominal (fixed) speed
SUS	1	1	SUS [,CR]	CR LF		varispeed on
CUS	1	1	CUS [,CR]	CR LF		varispeed off
VEN	1	1	VEN [,CR]	CR LF		external varispeed on
VEF	1	1	VEF [,CR]	CR LF		external varispeed off
FEN	1	1	FEN [,CR]	CR LF		fader enable on
FEF	1	1	FEF [,CR]	CR LF		fader enable off

sign set	machine		input	output	meaning
	820MCH	827MCH			
EOT	1	1	EOT [,CR]	CR LF	lifter mode on/audio on sync (tape on heads)
LFT	1	1	LFT [,CR]	CR LF	lifter mode off (tape not on heads)
LFM	1	1	LFM [,CR]	CR LF	lifter mode on/audio on input (tape on heads)
LOC <address>	1	1	LOC [] <(-)hh[,:]/mm[,:/] ss[,:/] x> x=dsec	CR LF	locate to address < >
LMV <address>	1	1	LMV [] <xxxxxxxx> 4 Byte (hex)	CR LF	locate move roll < >
ZLO	1	1	ZLO [,CR]	CR LF	locate to zero
MV?	1	1	MV? [,CR]	xx[]xx[]xx[]xx CR LF	move roll counter ?
STM <address>	1	1	STM [] <(-)hh[,:]/mm[,:/] ss[,:/]xxx> x= dsec	CR LF	set timer on address < > -9:59:59:999<ADDR<23:59:59:999
RTI	1	1	RTI [,CR]	CR LF	reset timer
TN?	1	1	TN? [,CR]	[-,u,o,h] h:mm:ss:x CR LF u=under-, o=overflow, x=dsec	timer ? -9:59:59<ADDR<23:59:59
DST	1	1	DST [,CR]	CR LF hh:mm:ss:x nn tt address,td_st. in numb.,text	display machine status (go out: ctrl x)

sign set	machine		input	output	meaning
	820MCH	827MCH			
ST?	1	1	ST? [,CR]	xx CR LF	status ?
	1	1		xx: 01 = tape out	
	1	1		81 = tape out achieved	
	1	1		02 = stop	
	1	1		82 = stop achieved	
	1	1		03 = rewind	
	1	1		83 = rewind achieved	
	1	1		04 = forward	
	1	1		84 = forward achieved	
	1	1		05 = play	
	1	1		85 = play achieved	
	1	1		06 = play varispeed	
	1	1		86 = play vari achieved	
	1	1		07 = play internal ref	
	1	1		87 = play int ref ach	
	1	1		08 = play external ref	
	1	1		88 = play ext ref ach	
	1	1		09 = record	
	1	1		89 = record achieved	
	1	1		0B = edit	
	1	1		8E = edit achieved	
	-	-		0C = play fader	
	-	-		8C = play fader achieved	
	1	1		25 = reverse play	
	1	1		A5 = reverse play ach	
	1	1		26 = reverse play vari	
	1	1		A6 = rev play vari ach	
	1	1		27 = rev play int ref	
	1	1		A7 = rev ply int ref ach	
	1	1		28 = rev play ext ref	
	1	1		A8 = rev ply ext ref ach	
	1	1		29 = reverse record	
	1	1		A9 = reverse record ach	
	1	1		40 = shuttle backward	
	1	1		C0 = shuttle backw ach	
	1	1		41 = shuttle forward	
	1	1		C1 = shuttle forw ach	
	1	1		42 = locate rewind	
	1	1		C2 = locate rewind ach	
	1	1		43 = locate forward	
	1	1		C3 = locate forward ach	
	-	-		44 = locate play reverse	
	-	-		C4 = loc play revers ach	
	-	-		45 = locate play forw	
	-	-		C5 = loc play forw ach	
	1	1		46 = cueing reverse	
	1	1		C6 = cueing reverse ach	
	1	1		47 = cueing forward	
	1	1		C7 = cueing forward ach	
	-	-		48 = position play rev	
	-	-		C8 = position ply rv ach	
	-	-		49 = position play forw	
	-	-		C9 = position ply fw ach	
	1	1		4A = rewind controlled	
	1	1		CA = rewind contrl ach	
	1	1		4B = wind forw contrl	
	1	1		CB = wind forw ctrl ach	

sign set	machine		input	output	meaning
	820MCH	827MCH			
	1	1		59 = tape dump B9 = tape dump achieved 5A = cut DA = cut achieved DD = burn in achieved	
SD?	1	1	SD? [,CR]	dd:ww:yy CR LF	software date ?
MK?	1	1	MK? [,CR]	aa CR LF	mark nr of software version ? aa=mark number: 0,1,'?'=mark I, 2=mark II
MT?	1	1	MT? [,CR]	aa CR LF	machine type ? aa=machine type number 1=820, 2=812, 3=820MCH, 4=827MCH 5=807

AUDIO COMMANDS

all commands are used by master rs232

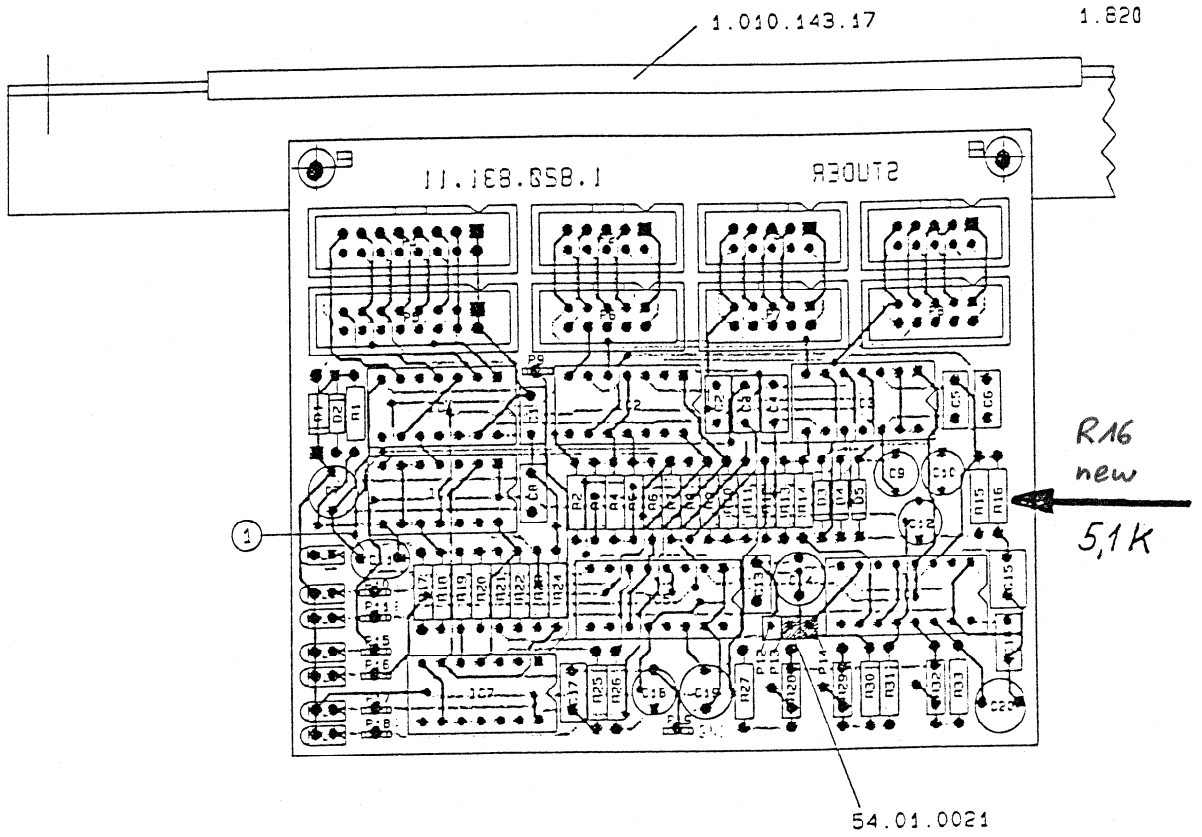
exception : EMC & DMC are used by audio rs232

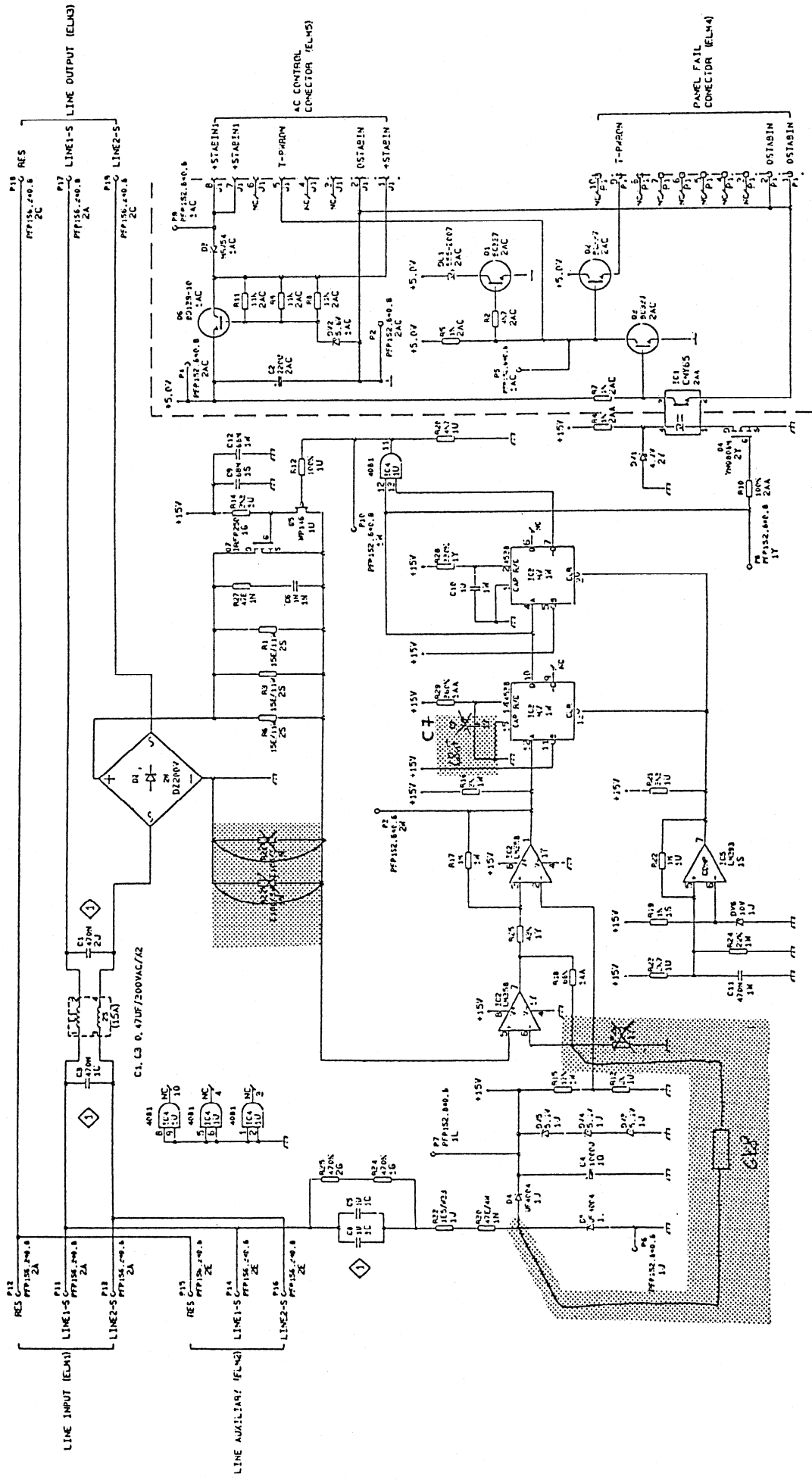
sign set	machine		input	output	meaning
	820MCH	827MCH			
EMC	1	1	EMC [,CR]	CR LF	set enable memory change
DMC	1	1	DMC [,CR]	CR LF	set disable memory change
SMB	1	1	SMB [,CR]	CR LF	set NAB equalization
SCR	1	1	SCR [,CR]	CR LF	set CCIR equalization
STA	1	1	STA [,CR]	CR LF	set tape sort A
STB	1	1	STB [,CR]	CR LF	set tape sort B
MSH	1	1	MSH [,CR]	CR LF	master safe on
MSF	1	1	MSF [,CR]	CR LF	master safe off
SRH	1	1	SRH [,CR]	CR LF	rehearsal mode on only with dropin/out delay on
CRH	1	1	CRH [,CR]	CR LF	rehearsal mode off
DDN	1	1	DDN [,CR]	CR LF	drop in/out delay on
DDF	1	1	DDF [,CR]	CR LF	drop in/out delay off
AA?	1	1	AA? [,CR]	aabbccdd CR LF aa: 0 = safe 1 = ready/record bb: 0 = tape 1 = input cc: 0 = rep 1 = sync dd: 0 = denute 1 = mute	channel 1..8 status ? MSB(xx) : chnl 8 LSB(xx) : chnl 1 xx = aa .. dd
AB?	1	1	AB? [,CR]	aabbccdd CR LF aa: 0 = safe 1 = ready/record bb: 0 = tape 1 = input cc: 0 = rep 1 = sync dd: 0 = denute 1 = mute	channel 9..16 status ? MSB(xx) : chnl 16 LSB(xx) : chnl 9 xx = aa .. dd
AC?	1	1	AC? [,CR]	aabbccdd CR LF aa: 0 = safe 1 = ready/record bb: 0 = tape 1 = input cc: 0 = rep 1 = sync dd: 0 = denute 1 = mute	channel 17..24 status ? MSB(xx) : chnl 24 LSB(xx) : chnl 17 xx = aa .. dd

sign set	machine		input	output	meaning
	820MCH	827MCH			
REA <i>	1	1	REA [] <i> [,CR]	CR LF	set channel i to ready
	1	1	i=1..24 or OFFH for all		
SAF <i>	1	1	SAF [] <i> [,CR]	CR LF	set channel i to safe
	1	1	i=1..24 or OFFH for all		
INP <i>	1	1	INP [] <i> [,CR]	CR LF	set channel i to input
	1	1	i=1..24 or OFFH for all		
SVN <i>	1	1	SVN [] <i> [,CR]	CR LF	set channel i to synch
	1	1	i=1..24 or OFFH for all		
REP <i>	1	1	REP [] <i> [,CR]	CR LF	set channel i to repro
	1	1	i=1..24 or OFFH for all		
MTN <i>	1	1	MTN [] <i> [,CR]	CR LF	mute channel i
	1	1	i=1..24 or OFFH for all		
MTF <i>	1	1	MTF [] <i> [,CR]	CR LF	demute channel i
	1	1	i=1..24 or OFFH for all		
CHN <i>	1	1	CHN [] <i> [,CR]	CR LF	channel i on
	1	1	i=1..24 or OFFH for all		
CHF <i>	1	1	CHF [] <i> [,CR]	CR LF	channel i off
	1	1	i=1..24 or OFFH for all		

MACHINE AND TIME CODE COMMANDS					
sign set	machine		input	output	meaning
	820MCH	827MCH			
TP?	1	1	TP? [,CR]	aabbccddeeff gghhiijjkkll mmnooppqrr CR LF tape width 1": aa: tape tension play left bb: tape tension play right cc: tape tension wind dd: tape tension edit ee: ttension rev play left ff: ttension rev play right tape width 2": gg: tape tension play left hh: tape tension play right ii: tape tension wind jj: tape tension edit kk: ttension rev play left ll: ttension rev play right tape width Unrust: mm: tape tension play left nn: tape tension play right oo: tape tension wind pp: tape tension edit qq: ttension rev play left rr: ttension rev play right	tape tension parameter ?
LCD	1	1	LCD [,CR]	CR LF	local keyboard disabled
LCE	1	1	LCE [,CR]	CR LF	local keyboard enabled
RMD	1	1	RMD [,CR]	CR LF	remote keyboard disabled
RME	1	1	RME [,CR]	CR LF	remote keyboard enabled
SBA <address>	1 1	1 1	SBA []<xxxx>	CR LF	set bus address (8280-FFFF)
BA?	1	1	BA? L ,CR]	xxxx CR LF	bus address ?

PINCH ROLLER GATE 1.820.831.00 ⁸¹

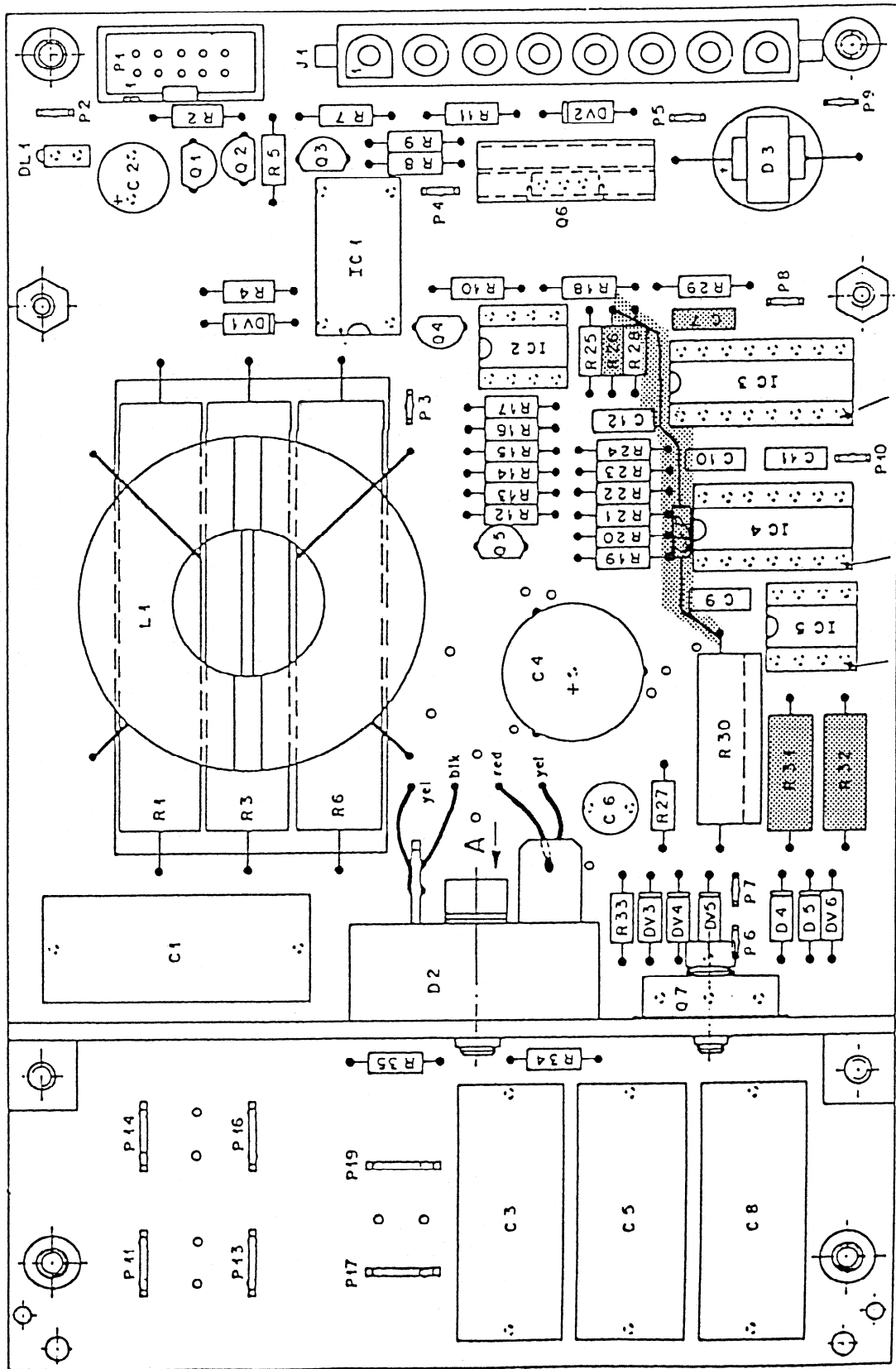




11 JAN 68
 13 PRC 81
 14 HAS BEEN MODIFIED
Main soft start PCB 1-820-830-81

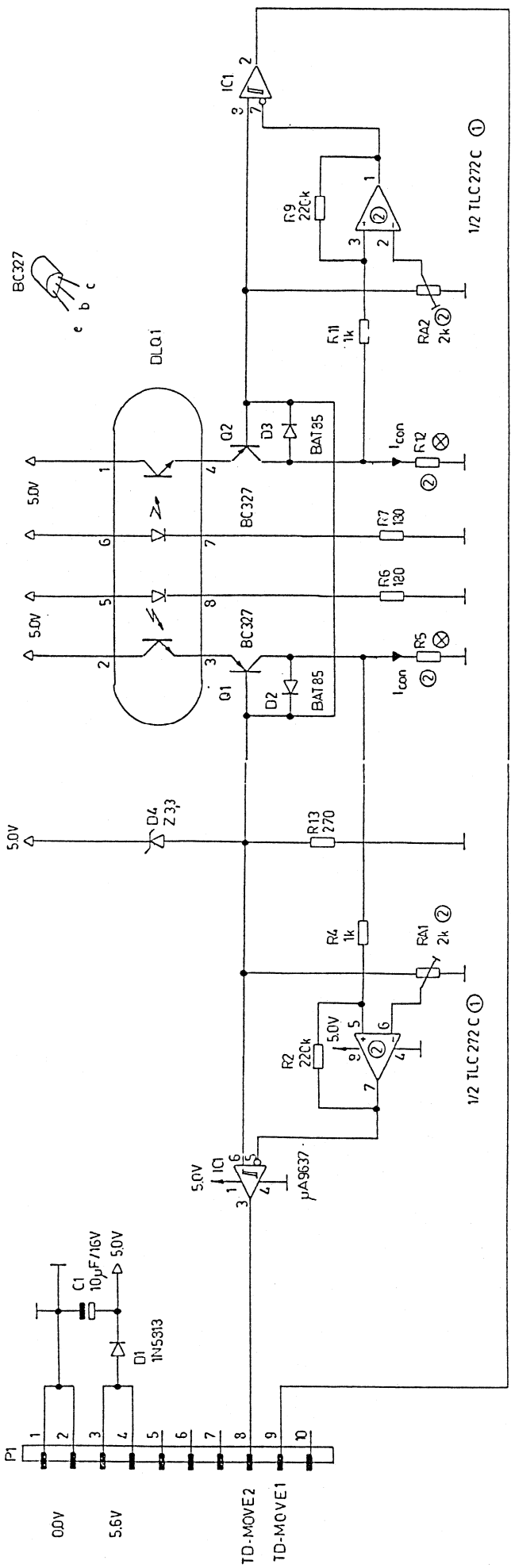
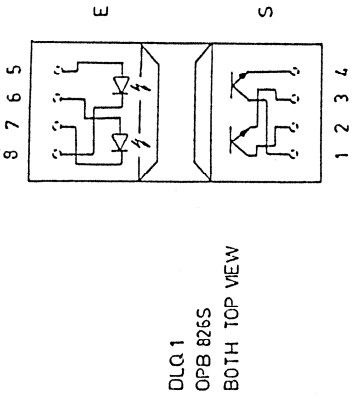
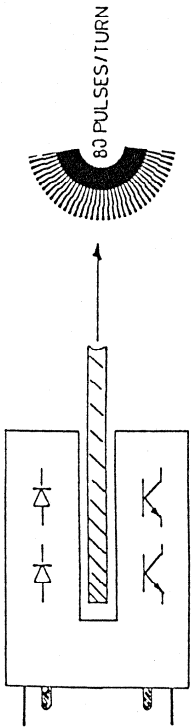
AC 115V 60Hz

0	B_05-69-GBU	24-02-09	SC1.820.830-00	PAGE 1 OF 1
1	STUDER	MAIN SOFT START PCB		



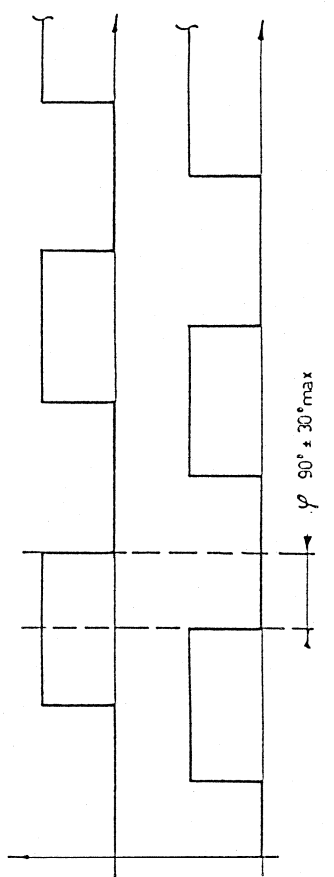
53 03 0167 | 53 03 016R

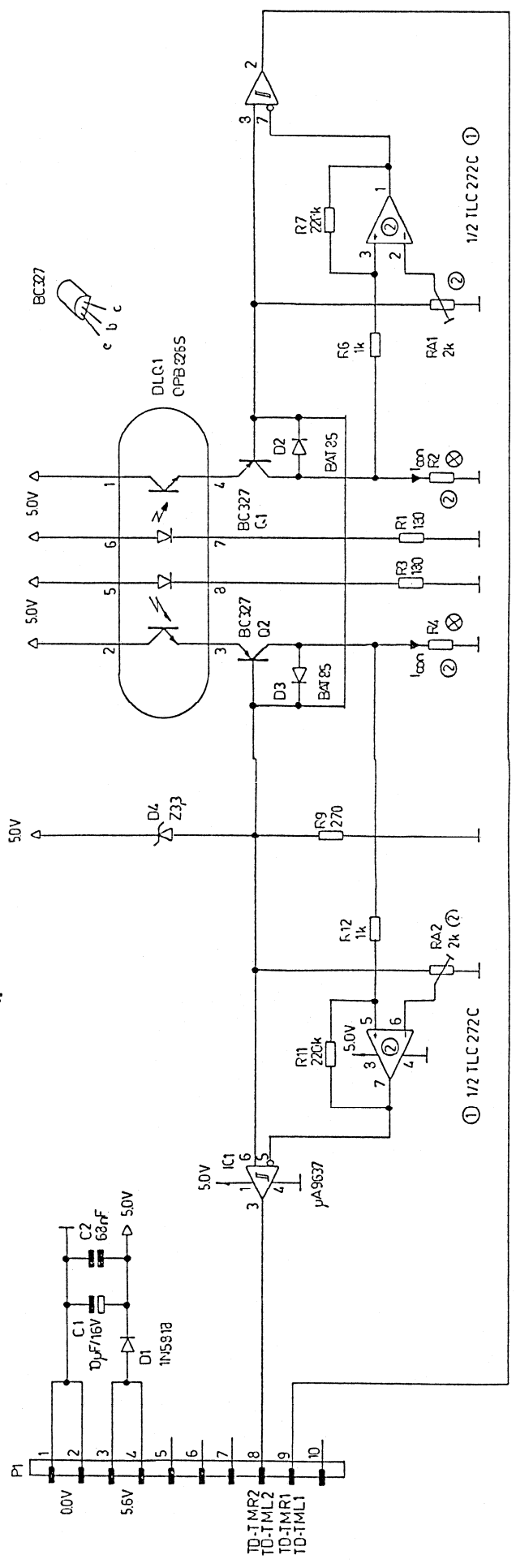
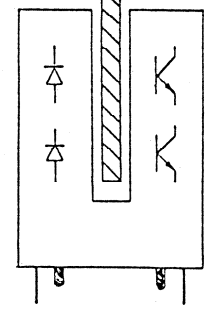
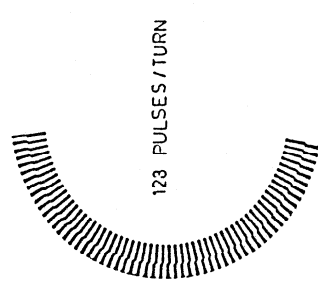
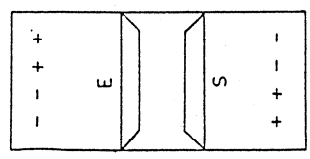
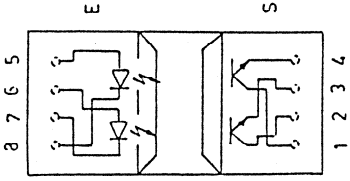
Main soft start PCB 1.820.830.81



R5/R12 factory adjusted according to following table
 coupling measured without tacho disk
 I_{con} measurement R2/R4 replaced by digital milliampere meter

I_{con}	250 μ A	360 μ A	520 μ A	720 μ A	107 μ A	155 mA	22 mA	31 mA	46 mA	65 mA	10 mA
R2/R4	7k5	5k1	3k6	2k4	1k6	1k6	1k2	820	560	390	270
Mouse Sensor 1.820.770.82											
① 18.01.88 ZOLLER ① 14.03.89 ZOLLER ② 06.11.89 ZOLLER											
A 2 2 0											
MIC VE SE H S R R											
SC 1 . 82 C . 7 7 0 .											
PAGE 1 OF 1											

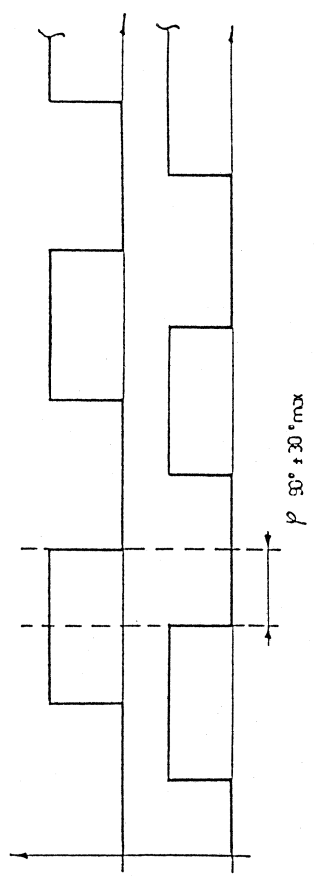


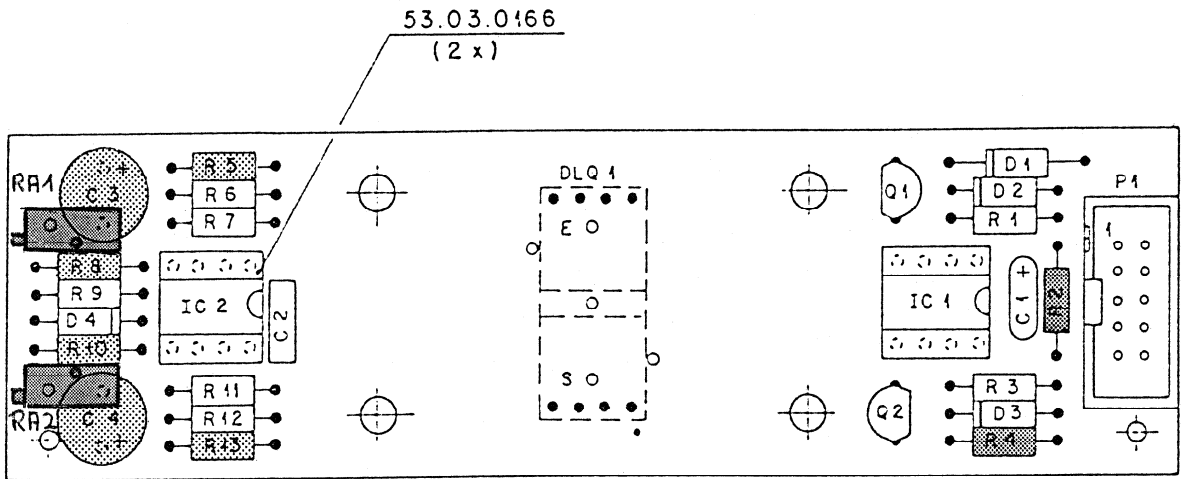


⊗ R2/R4 factory adjusted according to following table
 coupling measured without tacho disk
 Icon measurement R2/R4 replaced by digital milliampere meter

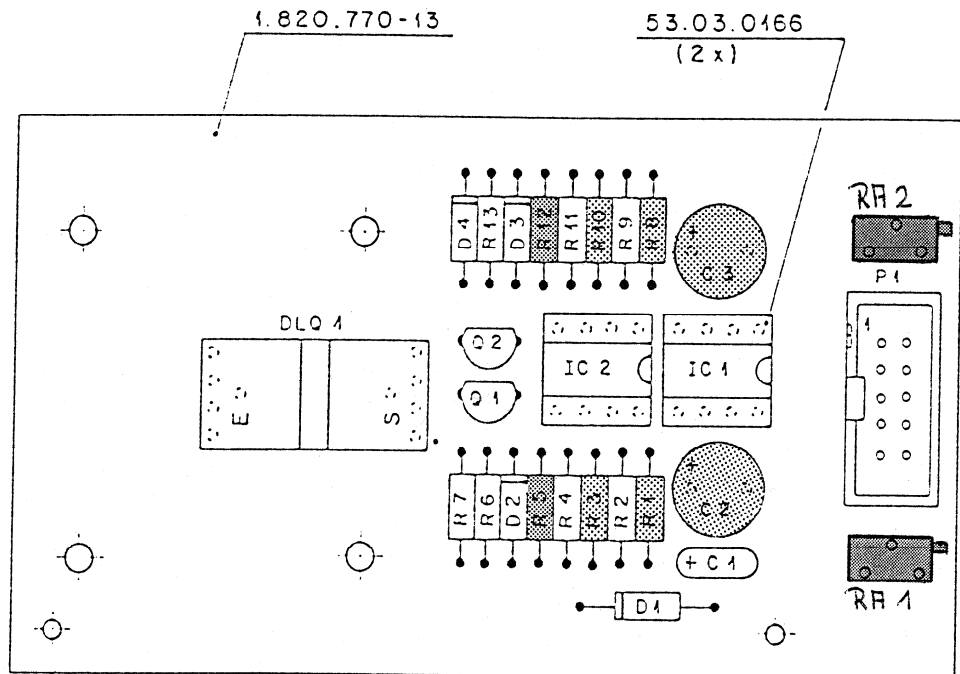
Icon	250 μA	360 μA	520 μA	720 μA	107 mA	155 mA	22 mA	31 mA	46 mA	65 mA	70
R2/R4	7k5	5k1	3k6	2k4	1k6	1k5	1k2	220	560	330	270

Motor Tacho 1.A20.771.83





Motor Tacho PCB 1.820.771.82



Move Sensor PCB 1.820.770.81