

STUDER

PROFESSIONAL AUDIO EQUIPMENT

Service Information

STUDER A827

Software-Kit 20.100.827.02 D/E
Software 04/91

SI 149A/91 Order Nr. 10.85.7251 (Ed. 0691)

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A827 SOFTWARE-KIT 20.100.827.021. ANWENDUNG

Der vorliegende Software-Umrüstsatz kann für alle A827 mit Serie-Nummern unter 1300 angewendet werden. Er ist angepasst an die Audioelektronik-Karte 1.827.715.00.

Bitte beachten:

Anwender mit A827-Geräten mit Serie-Nummern 1300 und höher oder Audioelektronik-Karten mit der Bezeichnung 1.827.710.00, oder 1.827.717.00 verwenden den Umrüstsatz 20.100.827.21.

Die Software-Umrüstung wird für alle A827 Anwender empfohlen.

2. UMRÜSTSATZ 20.100.827.02

Der Umrüstsatz besteht aus den folgenden Positionen:

1 Satz Master SW 05/91	1.827.986.23	(3-EPROMs)
1 Satz Tape Deck SW 16/91	1.820.985.27	(2-EPROMs)
1 Satz Audio SW 04/91	1.827.987.23	(3-EPROMs)
1 Aufkleber für Audio MPU-Karte	1.827.782.01	
1 Schild für Audio MPU	1.827.782.10	(Index 23)
1 Schild für Master MPU	1.827.784.10	(Index 23)
1 Schild für Tape Deck MPU	1.820.781.01	(Index 27)
1 SI 149A/91	10.85.7251	

OPTION: Software für Audioremove IF
Benützer des parallelen Audioremove Interface für Mischpulte 21.238.540.00 müssen folgende Software zusätzlich bestellen:

1 Satz Parallel Audio remote IF SW 05/91	1.827.984.22	(1-EPROM)
1 Schild für Audio Remote IF MPU	1.827.787.10	(Index 22)

Wichtig: Der vorliegende Softwarekit 20.100.827.02 ist aufgebaut auf folgenden Maschinen- und Peripherie-Softwareständen:

A827 Maschinen-Software:

- | | | |
|--|--------------|-----------|
| ■ Capstan SW 37/89 | 1.820.994.26 | (1-EPROM) |
| ■ Seriell Remote Interface
SW 41/87 | 1.820.999.23 | (1-PROM) |

Peripherie Software:

Software in der Audio-Fernsteuerung

- | | | |
|---------------------------------------|--------------|-----------|
| ■ Audio-remote controller
SW 48/89 | 1.827.988.21 | (1-EPROM) |
|---------------------------------------|--------------|-----------|

Software im Autolocator, der seriellen Fernsteuerung oder im LAP-Fernzähler.

- | | | |
|--|--------------|----------|
| ■ Serial remote/Autoloc driver
SW 29/87 | 1.328.999.22 | (1-PROM) |
|--|--------------|----------|

Software im TLS 4000 MKI

- | | | |
|--------------------------|--------------|-----------|
| ■ Interface TLS 4000 MKI | 1.812.134.23 | |
| mit SW 43/89 | 1.812.968.23 | (1-EPROM) |

Die fünf unter WICHTIG aufgeführten Software sind nicht im Softwarekit enthalten und müssen im Bedarfsfall separat bestellt werden!

3. ÜBERSICHT DER SOFTWARE-ÄNDERUNG

- Die neue Software für die A827 bietet verschiedene neue Funktionen und eine Erhöhung der Betriebssicherheit.

Laufwerk:

- GROUP SELECT (Funktion F 59) wurde umbenannt zu READY RECORD. Die Funktion bleibt jedoch gleich. READY RECORD ermöglicht einen direkten Aufnahme-Einstieg durch Drücken der READY-Taste (Direct Punch-In). Ein nochmaliges Drücken der READY-Taste setzt die Maschine auf SAFE zurück
- "COPY REP/SYN PAR A > B" (F 71/72/73) kopiert alle REPRO und SYNC-Parameter von TAPE A/ auf TAPE B. Es kann jede Geschwindigkeit einzeln kopiert werden

- BURN IN Modus ist softwaremässig abgesichert, damit die Maschine nur nach dem Einschalten in diesen Zustand gehen kann. Nachdem eine Laufwerk Funktions-Taste gedrückt oder ein Band eingelegt worden ist, wird die BURN-IN-Fuktion ignoriert bis zum nächsten Aufstarten der Tonbandmaschine
- Präzisere und selektivere Auswertung von Laufwerk-Status-Informationen damit nur echte Fehler im Service-Display angezeigt werden
- Schnelleres Durchschalten der Drop-in/Drop-out Befehle (ca. 4-5 ms)
- Die RS232 Schnittstelle arbeitet mit bereinigten und erweitertem ASCII-Protokol
- Die Kommunikation mit dem TLS4000 Synchronizer ist bedeutend schneller geworden
- Verbesserte Laufwerk-Dynamik.

Audio:

- "COPY REP/SYNC PAR A > B" implementiert (siehe unter Laufwerk)
- MUTE ALL Befehl via RS232-Schnittstelle eingeführt sowie Zuverlässigkeit für Mute/Demute Befehle erhöht
- Neue Jumper-Positionen für
 - Selektierbare Mute Zeit für SYNC-DROP-OUT
 - Bei MASTER-SYNC - kein Umschalten auf REPRO möglich

4. FUNKTIONSBESCHREIBUNG

F 59

READY RECORD Y/N

READY-RECORD: NO = Gruppenweise Aufnahme-Vorbereitung

- Während einer Aufnahme können Kanäle, welche SAFE geschaltet sind, durch Drücken der READY-Taste für eine Aufnahme vorbereitet werden. Mit einem weiteren Befehl-RECORD (REC + PLAY Taste) schalten die vorgewählten Kanäle auf Aufnahme
- Kanäle, welche in Aufnahme sind, können durch Drücken der READY-Taste aus Aufnahme geschaltet werden

- Laufwerk nimmt bei MASTER-SAFE den Aufnahme-Befehl nicht an

READY-RECORD: YES = Direct Punch-in

- Drücken einer READY-Taste während dem das Laufwerk auf Aufnahme geschaltet ist, bewirkt direkten Einstieg auf Aufnahme (Drop-In)
- Kanäle, welche in Aufnahme sind, können durch Drücken der READY-Taste aus Aufnahme geschaltet werden
- Laufwerk akzeptiert Aufnahme Befehl bei MASTER SAFE

F 71/72/73: COPY REP/SYN PAR A > B

Ein Kopieren der unter TAPE SORT A eingemessenen Wiedergabe-Parameter wie

REPRO LEVEL	/SYNC LEVEL
REPRO TREBLE	/SYNC TREBLE
REPRO BASS	/SYNC BASS
REPRO EQU	/SYNC EQU

wird durch Drücken der STORE-Taste auf TAPE SORT B ermöglicht.

Das Kopieren der Parameter von Bandsorte A auf Bandsort B muss individuell für alle drei Bandgeschwindigkeiten ausgeführt werden. Ein erfolgreicher Kopier-Vorgang wird nach dem Loslassen der STORE Taste mit der folgenden Anzeige auf dem Service-Display bestätigt:

```
REP/SYNC PARAM A --> B
SUCCESSFULLY COPIED
```

BURN-IN TEST

Der BURN-IN TEST zum Einlaufen- und Aufwärmen der Elektronik ohne Bandbewegung ist nach dem Entfernen vom Brückenstecker JS17 auf der Master MPU-Karte 1.827.784.23 (siehe Kleber) möglich. Diese Funktion wird neu nur noch unter folgender Bedingung ausgeführt:

- Nur beim Einschalten des Gerätes, wenn kein Band eingelegt ist

Wird anschliessend irgend eine Laufwerk-Funktions-Taste gedrückt, wird die BURN-IN Funktion unterbrochen und ist erst bei einem weiteren Einschalten der A827 wieder möglich. Ebenso unterbricht Abdecken der Lichtschranke oder ein Betätigen der Bandzugsensoren die BURN-IN Funktion.

ZERO LOC

Ist die Funktion SET TIMER oder SET ADDRESS aktiv so werden diese zurückgesetzt, wenn die Taste ZERO LOC betätigt wird (Analog zu LOC-Befehlen).

SYNC-REPRO-UMSCHALTUNG

Der Brückenstecker JS 16 auf der Audio-MP-Karte 1.827.782.23 bestimmt die SYNC-REPRO-Umschaltlogik:

Jumper JS 16 eingesteckt: (Standard-Bestückung)

Wenn alle Kanäle auf SYNC geschaltet werden oder bei der Anwahl von MASTER SYNC kann nicht mehr individuell auf Wiedergabe (REPRO) umgeschaltet werden. Individuell kann nur noch zwischen INPUT und SYNC ungeschaltet werden.

Aufhebung durch Drücken von MASTER REPRO.

Jumper JS 16 entfernt:

Funktion wie bisher. Es ist immer eine individuelle Anwahl von SYNC auf REPRO möglich.

SYNC DROP-OUT

Der Brückenstecker JS 10 bestimmt bei einem Aufnahmeausstieg (DROP-OUT) den Umschaltzeitpunkt, bei welchem vom INPUT - auf das SYNC Signal umgeschaltet wird.

Brückenstecker in JS 10 Position gesteckt: (SHORT DROP-OUT MUTE)

- Das Abschalten des INPUT-Signales erfolgt nicht zeitgleich mit dem Record-ausstiegs-Befehl DROP-OUT (siehe Zeit-Tabelle SHORT DROP OUT MUTE).
 - Signal C-BIASX entspricht dem DROP-OUT Befehl. Diese Tabelle zeigt eindeutig, dass das INPUT Signal länger durchgeschaltet bleibt und eine kurze Stummschaltphase zur Unterdrückung des Umschalt-Klicks von ca. 40 ms (Signal C-MUTE X) entsteht, bevor das SYNC Signal wieder hörbar wird.

Brückenstecker JS 10 in POS 10/11 (LONG DROP OUT MUTE)
(Genaue Jumper-Position auf Kleber ersichtlich)

- Das Abschalten des INPUT-Signales erfolgt zeitgleich zum Befehl RECORD-DROP-OUT, d.h. das mitgehörte Eingangssignal (INPUT) entspricht genau der Länge des auf Band aufgezeichneten Signales. Dabei muss allerdings eine längere Stummschaltphase (Mute) bis zur Durchschaltung des SYNC-Signales in Kauf genommen werden (siehe Zeit-tabelle LONG DROP-OUT MUTE).

5. UMRÜSTEN DER EINZELNEN SOFTWARE

- MASTER MPU-Print 1.827.784.22

Der Print: 1.827.784.22 ändert auf 1.827.784.23

Die Software: 1.827.986.22 03/90 wird 1.827.986.23 05/91

Bitte beachten:

- Bandzüge PLAY/WIND/EDIT/REVERSE PLAY für die Bandsorten TAPE A / TAPE B aufschreiben. Falls vorhanden, ebenso für jeden zusätzlichen Kopfträger mit anderer Spur-Konfiguration
- Software (3 IC's) wechseln
- RAM (IC 8) löschen (Kurzzeitig auf Silberpapier stecken)

■ TAPE DECK MPU-PRINT 1.820.781.25/26

Der Print: 1.820.781.25 oder Index 26
ändert auf 1.820.781.27
Die Software: 1.820.985.25 48/89 oder 1.820.985.26
02/91 wird 1.820.985.27 16/91

Mit der Tape Deck Software 02/91 kann bei einer gewissen Tastenfolge auf dem Autolocator das Band ohne Abbremsen am Bandende ausfädeln.

Bitte beachten:

- Software (2 IC's) wechseln
- RAM (IC 10) löschen (Kurzzeitig auf Silberpapier stecken)

■ AUDIO MPU-PRINT 1.827.782.22

Der Print: 1.827.782.22 ändert auf 1.827.782.23
Die Software: 1.827.987.22 16/90 wird 1.827.987.23 04/91

Bitte beachten:

- Daten auf Band abspeichern
- Software wechseln (3 IC's)
- RAM (IC 8) löschen (Kurzzeitig auf Silberpapier stecken)

- Sämtliche Software können ohne HARDWARE-Änderungen eingesetzt werden.

6. BEILAGE

1. Bestückungsplan der einzelnen MPU-Karten
2. Neuer STATUS-BAUM
3. Tabelle über zeitliche Abläufe bei SYNC-DROP-IN/DROP-OUT
4. Befehlsliste der RS232 mit ASCII-Code
Diese Liste enthält sämtliche Befehle und Rückmeldungen der Mehrkanal-Geräte

A827 SOFTWARE-KIT 20.100.827.021. APPLICATIONS

The present software-modification kit can be used for all A827 tape recorders with serial numbers below 1300. It matches to the audioelectronics PCB 1.827.715.00.

Please note:

Users of A827 tape recorders with serial numbers above 1300 or audio-electronics boards labeled 1.827.710.00 or 1.827.717.00 may use the software modification kit 20.100.827.21.

The software update is recommended for all A827 users.

2. MODIFICATION KIT 20.100.827.02

The modification kit contains:

1	Set master SW 05/91	1.827.986.23	(3-EPROMS)
1	Set tape deck SW 16/91	1.820.985.27	(2-EPROMS)
1	Set audio SW 04/91	1.827.987.23	(3-EPROMS)
1	Sticker for audio MPU-PCB	1.827.782.01	
1	Label for audio MPU	1.827.782.10	(Index 23)
1	Label for master MPU	1.827.784.10	(Index 23)
1	Label for tape deck MPU	1.820.781.01	(Index 26)
1	SI 149A/91	10.85.7251	

OPTION: Software for audio remote IF
Users of the parallel remote interface for mixing desks (21.328.540.00) **must** additionally order the following software

1	Set parallel audio-remote IF SW 05/91	1.827.984.22	(1-EPROM)
1	Label for parallel audio rem. IF	1.827.787.10	(Index 22)

Important: The present software-update kit 20.100.827.02 matches to the following tape-recorder and periphery software versions:

A827 Tape Recorder Software:

■	Capstan SW 37/89	1.820.994.26	(1-EPROM)
■	Serial remote interface SW 41/87	1.820.999.23	(1-EPROM)

Periphery Software:

- Software for the audio remote control unit:
Audio remote controller SW 48/89 1.827.988.21
(1-EPROM)
- Autolocator serial remote control - or LAP - remote counter software:
Serial remote/autoloc driver SW 29/87 1.328.999.22
(1-EPROM)
- Synchronizer software for TLS4000 MKI:
Interface TLS4000 MKI 1.812.134.23
with SW43/89 1.812.968.23 (1-EPROM)

The above five software-versions are not included in the present software kit. Should mentioned units be equipped with different software as above explained, please additionally order the required software.

3. SUMMARY OF THE SOFTWARE UPDATES

The new software for the A827 tape recorder offers a few new functions and improves the reliability.

Tape transport:

- The name GROUP-SELECT (function F 59) has been changed to READY RECORD, but the function itself remains as it was before.
- The READY RECORD-function enables a direct punch into record by pressing the ready key only. Pressing ready again causes a drop-out of record and switches the corresponding channel to SAFE
- "COPY REP/SYN PAR A > B" (F 71/72/73) copies all the REPRO-parameters from the TAPE A - into the TAPE B memory. Each speed can be copied individually
- The BURN-IN mode will only be enabled powering on the A827. Pressing a tape transport function key or loading the tape disables the BURN-IN mode, until the tape recorder will be powered-up again
- The tape status detection has been improved in order to prevent displaying non existent error messages
- Faster processing of the record-drop-in/drop-out commands (approx. 4-5 ms).

- The RS232 link works with improved and extended ASCII protocol
- The communication with the TLS4000 synchronizer is substantially faster
- Improved tape deck dynamics.

Audio:

- "COPY REP/SYNC A > B" function implemented (see above under tape-transport)
- Mute all command via RS232 implemented and improved reliability of mute switching
- New jumper positions on the MPU PCB for
 - Mute time selection of record drop-out in SYNC-mode
 - No changeover to REPRO-mode in case of MASTER SAFE

4. EXPLANATION OF NEW FUNCTIONS

F 59

READY RECORD Y/N

READY RECORD: NO = Record preselection

- Press ready key of a channel in safe mode to preselect record while the tape transport is already running in record mode. Press REC + PLAY-key again to drop into record mode on the preselected channels
- Drop-out of record mode by pressing the READY-key
- In case of MASTER-SAFE, the tape transport does not accept the record-command.

READY RECORD: YES = Direct PUNCH IN

- Just press the READY-key to punch into record while the tape transport is running in record mode
- Drop-out of record mode by pressing the READY-key again
- Tape transport accepts the record command even if none of the channels is switched to ready.

F 71/72/73

COPY REP/SYN PAR A > B

Just press the store key to copy the following audio-reproduce parameters of TAPE A into the TAPE B memory:

REPRO LEVEL	/SYNC LEVEL
REPRO TREBLE	/SYNC TREBLE
REPRO BASS	/SYNC BASS
REPRO EQU	/SYNC EQU

You have to copy the audio reproduce parameters of TAPE A into the memory of TAPE B for all three speeds individually.

After releasing the STORE key, a successful copy procedure will be indicated by the following display:

```
REP/SYNC PARAM A --> B
SUCCESSFULLY COPIED
```

BURN-IN TEST

To burn-in without tape movement, remove jumper JS 17 on master MPU PCB 1.827.784.23 (see label).

This function can be enabled under the following condition:

- Only by powering-on without a tape loaded. The burn-in test exits by pressing one of the tape transport keys.

Obstructing the light barrier or moving the tape tension sensor will also terminate the BURN-IN TEST.

ZERO LOC

Pressing the ZERO-LOC key disables the SET TIMER or SET ADDRESS-mode (same as LOC-commands).

SYNC-REPRO-Changeover

The jumper JS 16 on the audio MPU-PCB 1.827.782.23 changes the way of SYNC-RECORD switching:

Jumper JS 16 inserted: (Default setting)

In case of switching all channels into SYNC-mode, or in case of MASTER SYNC, it is no longer possible to individually change to REPRO-mode. Just individual switching between INPUT and SYNC is possible.

- Individual switching will be performed again by pressing MASTER-REPRO-key

Jumper JS 16 removed:

Individual switching between SYNC and REPRO is always possible.

SYNC DROP-OUT

The jumper JS 10 determines the punch-out timing, i.e. the time needed for switching from the INPUT-signal back to the SYNC signal.

Jumper in POSITION JS 10: (SHORT DROP-OUT MUTE)

- In order to avoid an irritating mute on the monitoring, the input signal will still be heard after the actual drop-out and switches to sync later

Please refer to the timing diagrams. The C-BIAX signal corresponds to the drop-out command. The INPUT signal will be switched through 150 ms longer than the BIAS off signal (drop-out)

Jumper JS 10 in POS 10/11: LONG DROP OUT MUTE
(for exact jumper setting see label)

- The input signal will be switched off (muted) the same time the drop-out takes place. This leads to a longer muting period.

5. SOFTWARE-UPDATES

- Master MPU-PCB 1.827.784.22

The PCB 1.827.784.22 changes to 1.827.784.23
The software 1.827.986.22 03/90 changes to 1.827.986.23 05/91

Please note:

- Write down all tape tension parameters (TAPE A and TAPE B) for PLAY/WIND/EDIT/REVERSE PLAY. If available, note tape tension also for each additional headblock.
 - Replace software (3 IC's)
 - Erase RAM IC8 (short all pins by putting it on a conducting surface).
- Tape deck MPU-PCB 1.820.781.25/26

The PCB 1.820.781.25 or Index 26
 changes to 1.820.781.27

The software 1.820.985.25 48/89 or 1.820.985.26 02/91
 changes to 1.820.985.27 16/91

In case the tape deck-software 02/91 is installed, entering a certain command combination into the autolocator keyboard causes the tape to wind out in full wind speed. (No speed reduction at the end of the tape).

Please note:

- Exchange software (2 IC's)
 - Erase RAM (IC 10) (short all pins by putting it on a conducting surface).
- Audio MPU-PCB 1.827.782.22
- The PCB 1.827.782.22 changes to 1.827.782.23
- The software 1.827.987.22 16/90 changes to 1.827.987.21 04/91

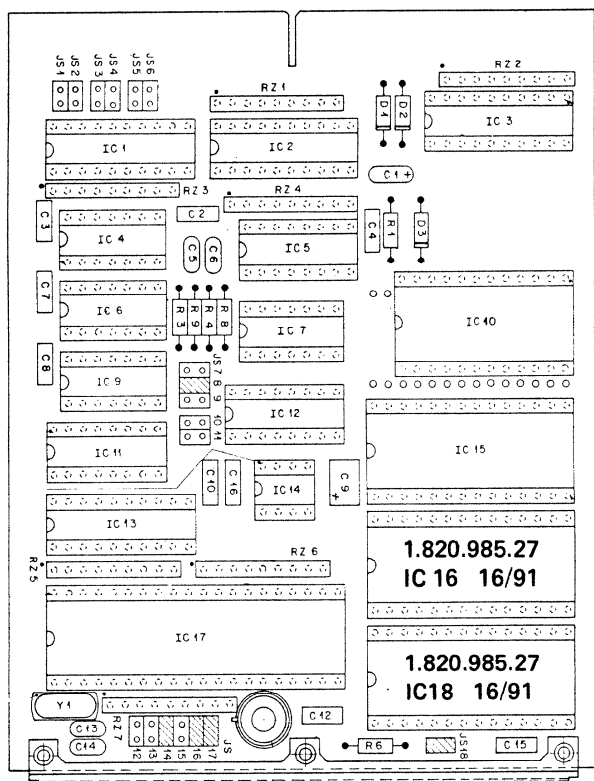
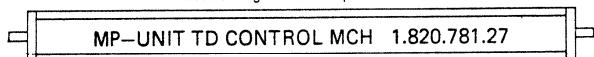
Please note:

- Store audio-alignment data onto tape
 - Exchange software (3 IC's)
 - Erase RAM IC8 (short all pins by putting it on a conducting surface).
- All these software-updates do not require any HARDWARE modification.

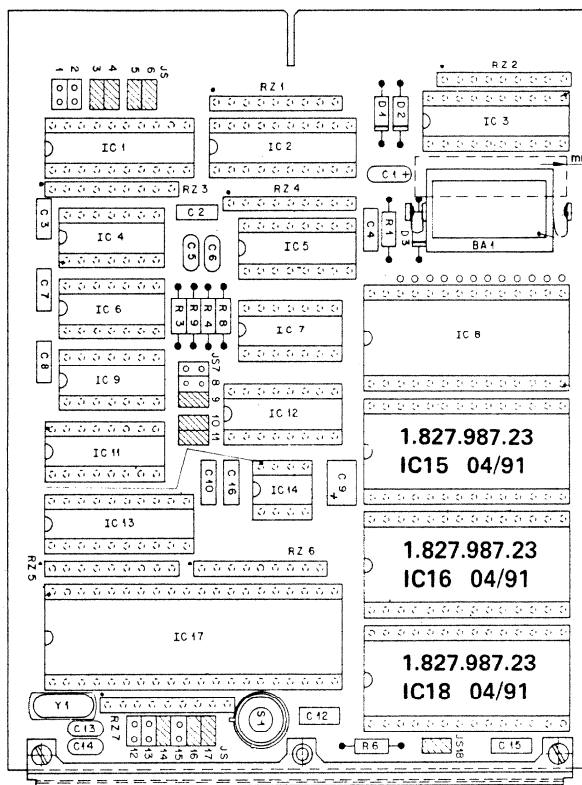
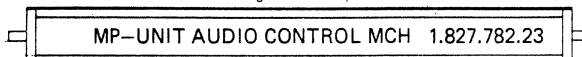
6. ENCLOSURES

1. Layout for all MPU PC-boards
2. New STATUS-TREE
3. Diagram for the SYNC-DROP-IN/DROP-OUT timing
4. List of all RS232 ASCII-commands
This list contains all commands and their responses for the multichannel tape recorders A827 and A820

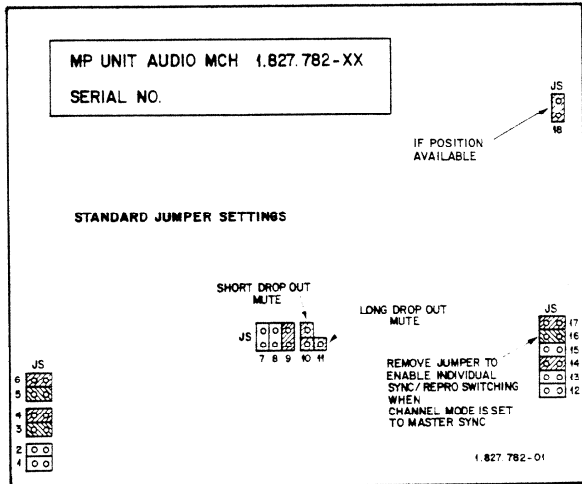
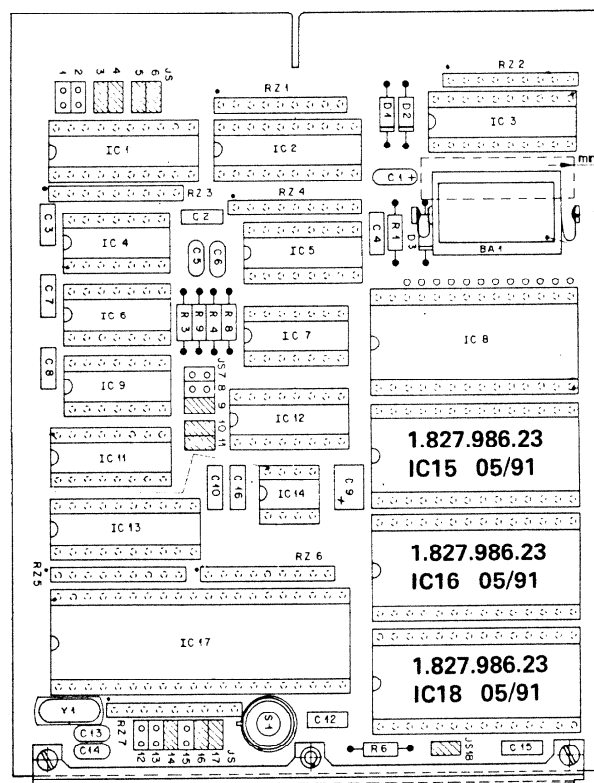
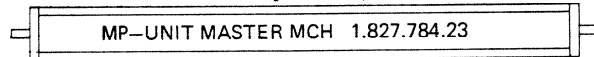
Bestückungsseite / Component Side



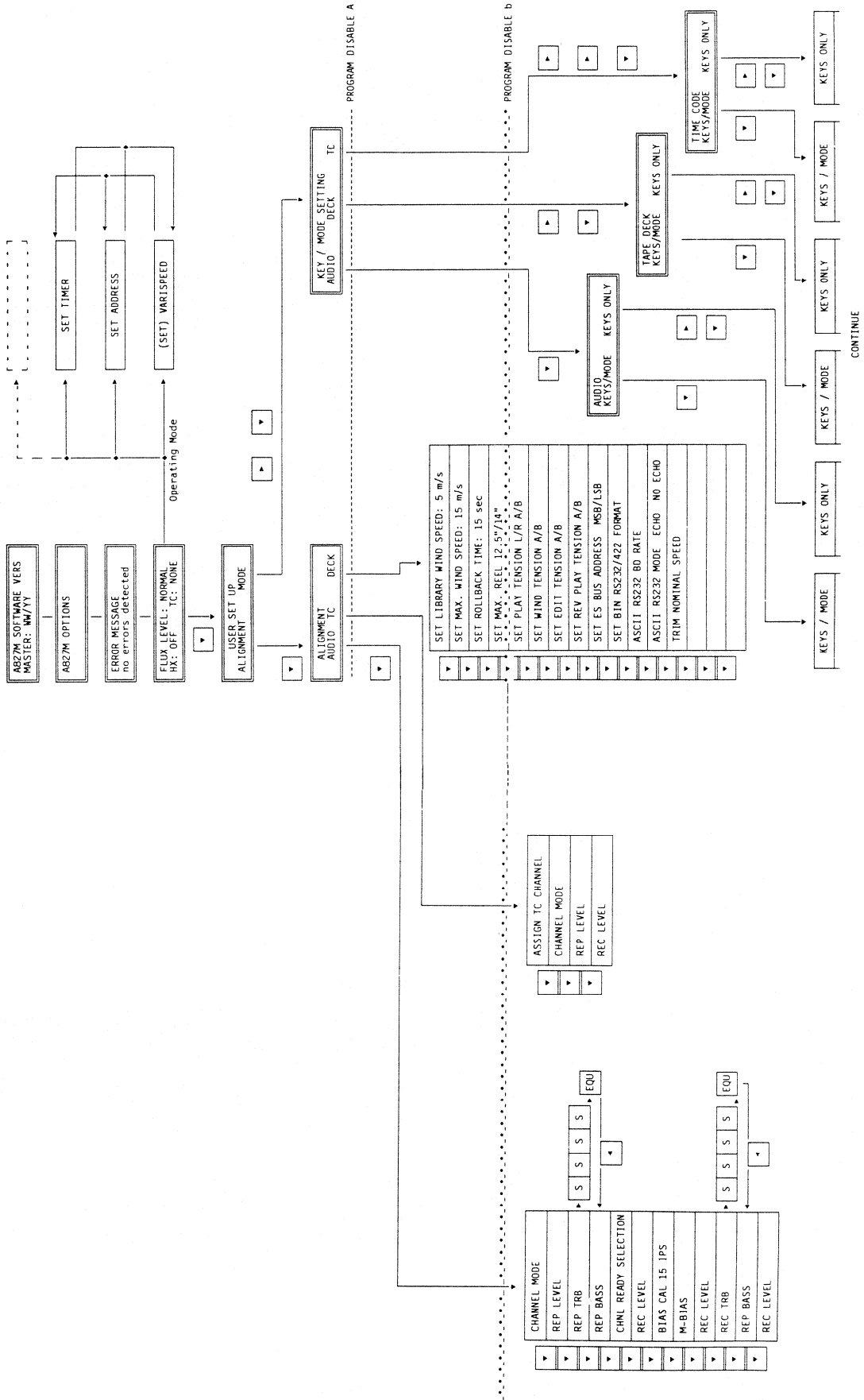
Bestückungsseite / Component Side



Bestückungsseite / Component Side



Soft Keys, Status Tree Diagram



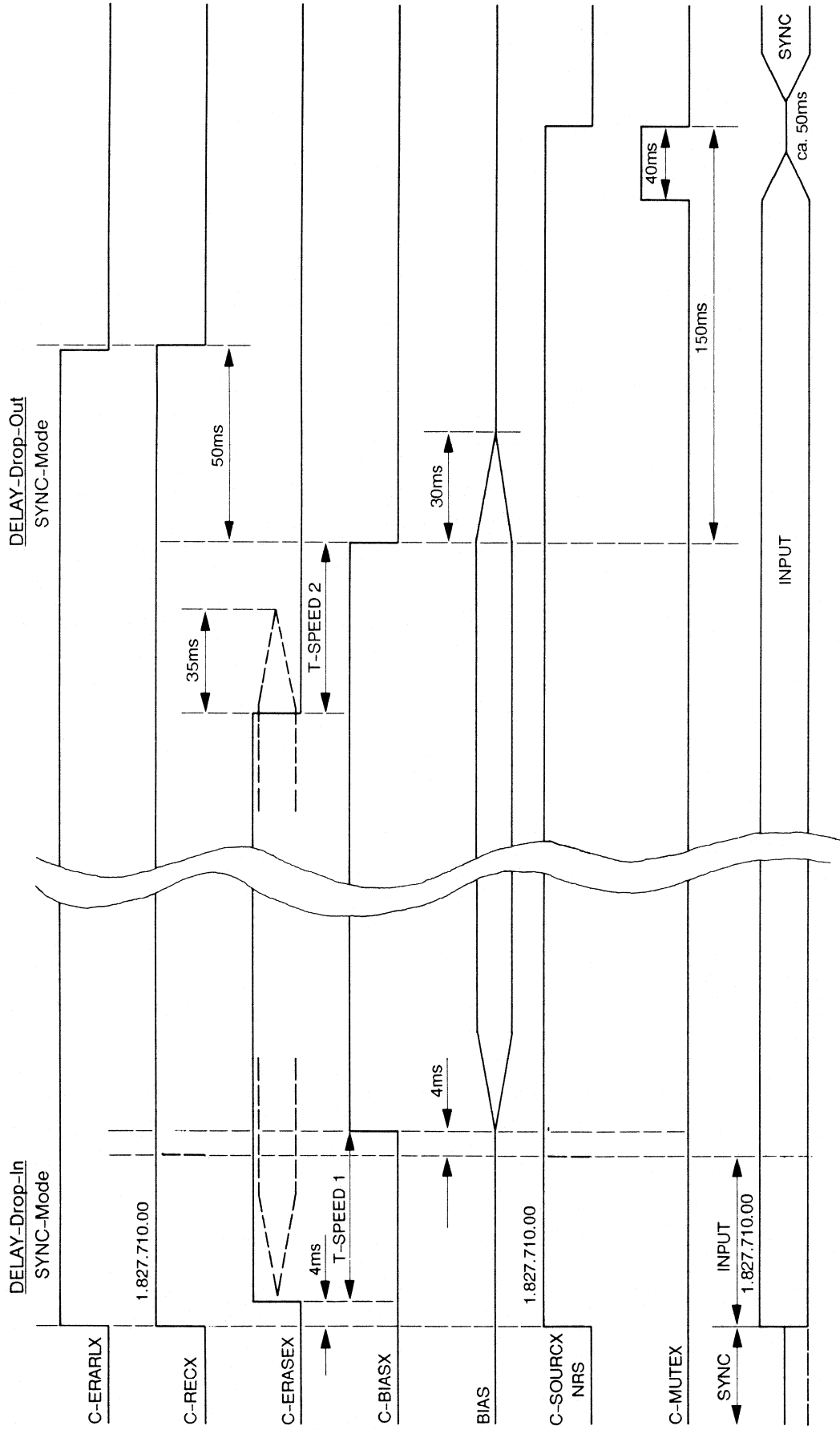
KEYS / MODE	DESCRIPTION	KEYS ONLY	TIME CODE
301	REWIND	KEYS ONLY	
302	FORWARD		
303	LIBRARY W/IND		
304	PLAY		
305	REVERSE PLAY		
306	STOP		
307	RECORD A		
308	RECORD B		
309	EDIT		
311	TRANSFER/SHIFT		
312	HOLD		
313	LOCATE 1		
314	LOCATE 2		
315	LOCATE 3		
316	LOCATE 4		
317	LOCATE 5		
318	LOCATE ZERO		
319	LOC START PLAY		
320	LOC START STOP		
321	LOC START REC		
322	ROLLBACK PLAY		
323	ROLLBACK STOP		
324	ROLLBACK REC		
325	BACKSPACE STOP		
327	TAPE DUMP A		
328	TAPE DUMP B		
329	TAPE DUMP C		
330	TAPE DUMP D		
332	LIFTER		
334	LAP/WATCH DISPLAY		
335	RESET TIMER		
336	SET TIMER		
337	SET ADDRESS		
338	SET VARISPEED		
339	VARISPEED ON/OFF		
345	REMOTE A R CTL ONLY		
346	REMOTE B REM-LOCAL		
347	SHUTTLE BAR		
348	UNLOAD		
351	NO FUNCTION		
355	SINGLE LOOP		
356	AUTO LOOP		
357	INSTANT LOOP		

TIME CODE

KEYS / MODE	DESCRIPTION
201	TAPE GUARD A Y/NO/RED
202	TAPE GUARD B NO/STOP
211	3-7.5 IPS Y/N
212	7.5 IPS Y/N
213	15 IPS Y/N
214	30 IPS Y/N
215	3-7.5/7.5 IPS
216	7.5/15 IPS
217	15/30 IPS
218	3-7.5/7.5/15 IPS
219	7.5/15/30 IPS
220	3-7.5/7.5/15/30 IPS
230	FADER MASTER ENABLE
231	FADER A Y/N
232	FADER B Y/N
233	FADER C Y/N
234	FADER D Y/N
241	VARISPEED %
242	VARISPEED HT
243	VARISPEED IPS
244	-"- %/IPS/HT/%
245	-"- IND. ENHANCED Y/N
246	SAVE KEY SETTING Y/N
247	PROGRAMM DISABLE A/B
252	SHUTTLE MODE A/B
253	WIND A/B Mode A/B
254	EDIT A/B Mode A/B
255	REC. INDIC. MODE A/B
257	LIFTER REMOTE A/B
258	LIFTER LOCAL A/B
259	SINGLE LOOP MODE A/B

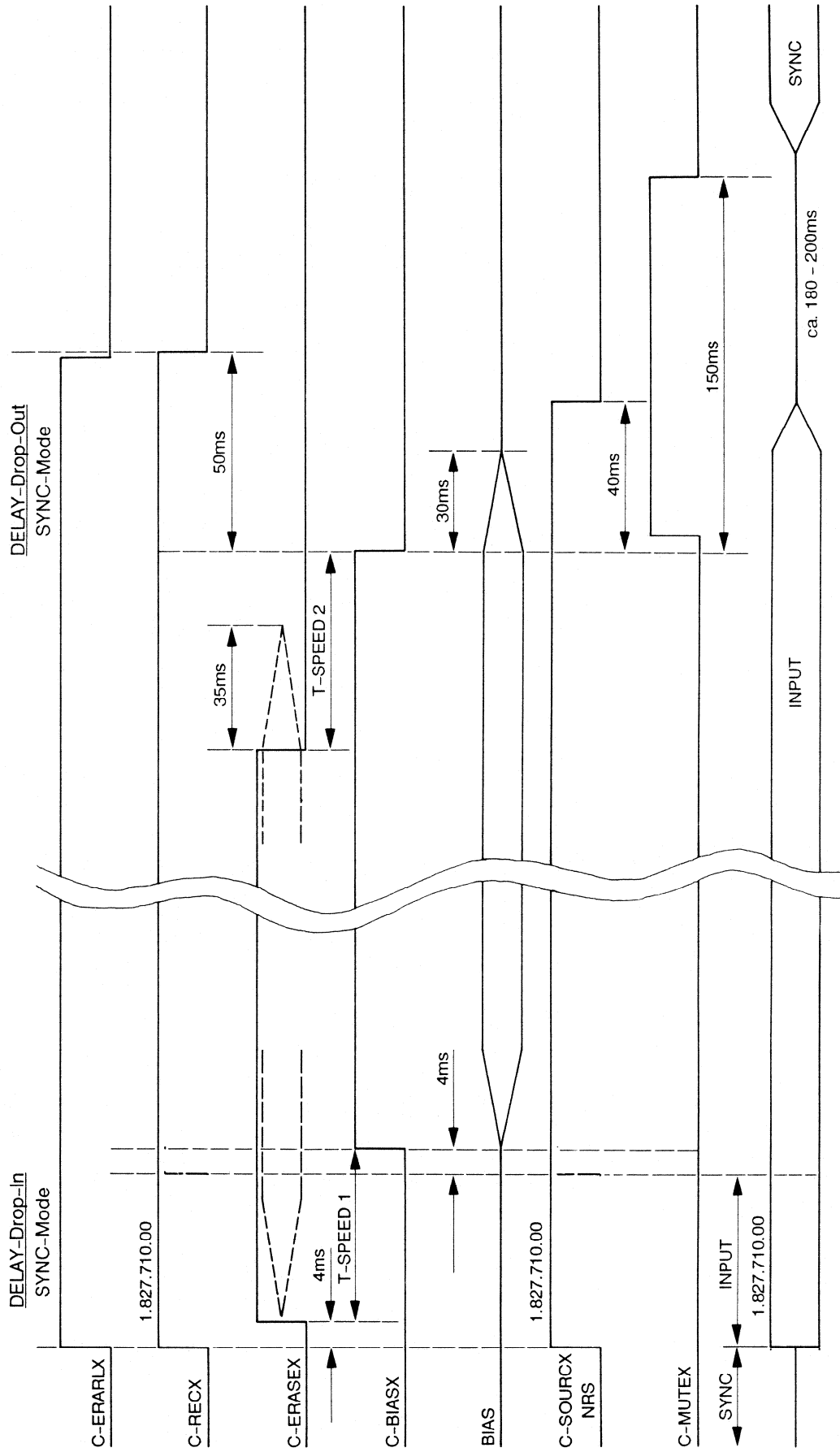
KEYS / MODE	DESCRIPTION
001	FLUX LEVEL 0/+2/+6dB
021	MASTER SAFE Y/N
022	TAPE A
023	TAPE B
024	TAPE A/B
029	CCIR
030	NAB
032	CCIR/NAB
041	AUTO MUTE ON/OFF
044	IN-OUT DEL. Y/N
047	HK PRO A/B/C/D
052	AUTO INPUT A/B
054	NRS DOLBY/TELCOM
059	READY RECORD Y/N
061	DROP-OUT DELAY Y/N
062	AUTO INPUT Y/N
071	COPY REP/SYN PAR A-B
072	COPY REP/SYN PAR 15-0
073	COPY REP/SYN PAR 30-0

SHORT DROP OUT MUTE



SOFTWARE 1.827.989.21

LONG DROP OUT MUTE



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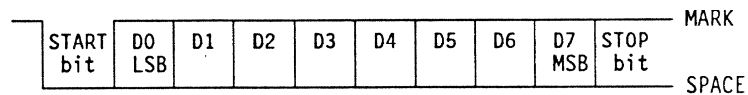
Protocol description

ASCII Protocol Specifications of RS232 Serial Interface for analog tape recorders
STUDER A820-MCH, STUDER A827-MCH

1. Communication Format

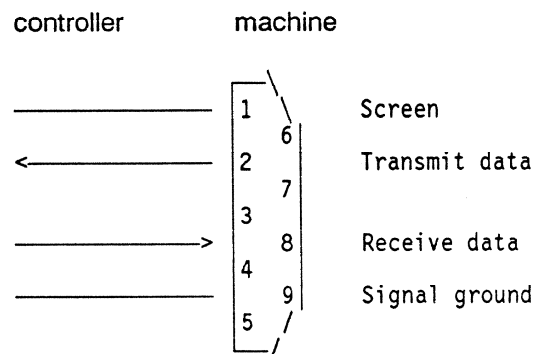
Asynchronous, bit serial signal

- according to RS232 C specifications;
- full duplex communication channel;
- data transmission rate: 9600 bauds;
- word composition as follow:
1 START bit, 8 data bits, no parity, 1 STOP bit;



Connector specifications

- 9 pin connector, D type, (SMPTE/BUS / RS232 connector);
- pin out:



2. Message Format

The communication between the STUDER machine and the controller is implemented through ASCII coded strings of not fixed length.

A message string is composed by ASCII characters:

capital letters, "?", " ", figures and the following control characters

'CR'	(0Dh)
'LF'	(0Ah)
'CX'	(18h)
'XOFF'	(13h)
'XON'	(11h)

All commands mnemonics have a length of 3 characters and are usually terminated by a 'CR'.

Only commands with parameters vary in length. The additional characters are inserted between the command and 'CR'. The parameters are separated by blanks or colons. There are some exceptions: commands which do not have termination characters. Please refer to the individual command description for the exact syntax of each command.

The STUDER machine uses the sequence 'CR LF' as acknowledge message or to terminate the answer string.

EX:

"WNF 0400" 'CR' = controlled wind forward at 4 times nominal speed

WNF = command, controlled wind forward
0400 = parameter, 0400h coded as ASCII string

The controller will send to the machine:

character	ASCII code sent
'W'	57h
'N'	4Eh
'F'	46h
' '	20h
'0'	30h
'4'	34h
'0'	30h
'0'	30h
'CR'	0Dh

The machine should answer:

'CR'	0Dh
'LF'	0Ah

The 'CX' control character is used by the controller to reset asynchronously the STUDER machine's communication port.

'XOFF' and 'XON' are used by the machine as handshake characters.

For terminal operation the machine's communication port can operate in 'echo mode'. In this mode, an echo of each character is sent back to the controller, and a prompt ('>') is sent after the answer string.

The 'echo mode' may be set via the machine menu. It should not be used for computer remote control.

3. Communication Protocol

- a) **general informations** The communication between the controller and the STUDER machine is a master-slave protocol. The controller is the master and it should take initiative in the communication. The communication has to fulfill the following specifications:
- the machine has to acknowledge a command with a 'CR LF' within 100 msec from the moment that the command's last byte is received;
 - the machine's communication port is asynchronously resetted (both receiver and transmitter) by a 'CX' sent by the controller, and it has to acknowledge it with a 'CR LF' in the specified time;
 - the machine can interrupt the controller in any moment by sending an 'XOFF?' and recover the connection sending an 'XON'. They do not have to be acknowledged by controller;
 - for the controller, there is no time specification for the interval between two bytes of a command;
 - the controller should not output the next command before receiving the machine's answer (exception: 'CX').
- b) **Error messages** If a message is not understood by the machine, it shall be acknowledged by:
- "?" 'CR LF'**
- If the machine is in 'echo mode', or with old versions of machine software, it is also possible to have:
- "INPUT FORMAT ERROR !" 'CR LF'**
- c) **Notes:**
- After power on, the machine may announce itself with a welcome message of some length;
 - After a power on or an error message, it is recommended to initialize the communication by sending 'CX'.
The communication is established as soon the machine answers with 'CR LF' within the specified time.
Then the communication can be considered restored.
 - The machine is capable to handle at least 10 commands per second without XOFF-XON interference.
 - After the reception of a command the machine should answer with an updated status.
E.g. if the command was a "PLY", the machine must answer with 'play not achieved' or 'play achieved'.
 - If a command cannot be executed, the machine may answer with a 'not achieved' status, which will be replaced by the actual machine status. E.g. sending a PLY during tapeout the machine may answer with 'play not achieved' before going back to 'tapeout'.

- A locate command has a particular option. It can be followed by a command 'play' or 'record'. This preselection means that, once the locate is terminated, the machine will go in play or record. Preselection commands (play or record) can be repeated without cancelling the execution of the locate command.

The status corresponding to a locate command is 'locate wind forward' or 'locate rewind', either 'achieved' or 'not achieved'. In addition, the machine may also answer 'play not achieved' or 'record not achieved', if play or record has been preselected.

A normal locate command is considered completed when the machine sends a stop status.

When the execution of 'locate' with a preselection of play or record is completed, the machine sends back a status of 'play achieved' respectively 'record achieved'.

- There are two exceptions to the upper description in the A810 and A807 machines. The commands 'F' and 'R' are not followed by the acknowledgement 'CR LF'. That helps to increase the data transfer rate.

Explanations to the following tables

Syntax of input/output strings

[-,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

TAPE DECK COMMAND					
sign set	machine		input	output	meaning
	820MCH	827MCH			
STP	1	1	STP [,CR]	CR LF	stop
EDI	1	1	EDI [,CR]	CR LF	edit
PLY	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)
SVP	1	1	SVP [] 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]	xx IPS CR LF xx = 3.75..7.5..15..30	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
SVS	1	1	SVS [,CR]	CR LF	varispeed on
CVS	1	1	CVS [,CR]	CR LF	varispeed off

TAPE DECK COMMAND					
sign set	machine		input	output	meaning
	820MCH	827MCH			
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
EDT	1 1	1 1	EDT [,CR]	CR LF	lifter mode on, audio not muted, audio mode override, tape on heads remark: corresponds lifter B
LFT	1 1	1 1	LFT [,CR]	CR LF	lifter mode off (tape not on heads)
LFN	1 1	1 1	LFN [,CR]	CR LF	lifter mode on, audio muted, audio mode not switched, tape on heads remark: corresponds lifter A
LOC <address>	1 1	1 1	LOC [] <(-)hh[,:/]mm[,:/] ss[,:/] x> x=dsec	CR LF	locate to address < >
LMV <address>	1 1	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	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
TM?	1 1	1 1	TM? [,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	display machine status: actual_timer..status_code.. ..status_text[_]achieved nn defined in field of 'ST?'

TAPE DECK COMMAND					
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	
				or rehearse record	
	1	1		89 = record ach or	
				rehearse rec ach	
	-	-		0A = reserved for (reh)	
				record indic B	
	-	-		8A = reserved for (reh)	
				record indic B ach	
	1	1		0B = edit	
	1	1		8B = 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 rec or	
				rehears reverse rec	
	1	1		A9 = reverse record ach	
				or reh rev rec ach	
	-	-		2A = reserved for revers	
				record indic B or	
				reh rev rec ind B	
	-	-		AA = reserved for rev	
				rec indic B ach or	
				reh rev rec ind B ach	
	1	1		40 = shuttle backward	
	1	1		C0 = shuttle backw ach	

TAPE DECK COMMAND					
sign set	machine		input	output	meaning
	820MCH	827MCH			
	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 reverse 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	
	1	1		59 = tape dump	
	1	1		D9 = tape dump achieved	
	1	1		5A = cut	
	1	1		DA = cut achieved	
	1	1		DD = burn in achieved	

TAPE DECK COMMAND					
sign set	machine		input	output	meaning
	820MCH	827MCH			
TP?	1	1	TP? [,CR]	aabbccddeeff gghhiijjkkll mmnnooppqrr 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 Adopted: 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?

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
SNB	1	1	SNB [, 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
MSN	1	1	MSN [, CR]	CR LF	master safe on
MSF	1	1	MSF [, CR]	CR LF	master safe off
SRH	1 1	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 = demute 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 = demute 1 = mute	channel 9..16 status? MSB (xx) : chnl 16 LSB (xx) : chnl 9 xx = aa .. dd

AUDIO COMMANDS					
sign set	machine		input	output	meaning
	820MCH	827MCH			
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 = demute 1 = mute	channel 17..24 status? MSB (xx) : chnl 24 LSB (xx) : chnl 17 xx = aa .. dd
REA <i>	1 1	1 1	REA [] <i> [,CR] i=1..18H or OFFH for all	CR LF	set channel i to ready
SAF <i>	1 1	1 1	SAF [] <i> [,CR] i=1..18H or OFFH for all	CR LF	set channel i to safe
INP <i>	1 1	1 1	INP [] <i> [,CR] i=1..18H or OFFH for all	CR LF	set channel i to input
SYN <i>	1 1	1 1	SYN [] <i> [,CR] i=1..18H or OFFH for all	CR LF	set channel i to synch
REP <i>	1 1	1 1	REP [] <i> [,CR] i=1..18H or OFFH for all	CR LF	set channel i to repro
MTN <i>	1 1	1 1	MTN [] <i> [,CR] i=1..18H or OFFH for all	CR LF	mute channel i
MTF <i>	1 1	1 1	MTF [] <i> [,CR] i=1..18H or OFFH for all	CR LF	demute channel i
CHN <i>	1 1	1 1	CHN [] <i> [,CR] i=1..18H or OFFH for all	CR LF	channel i on
CHF <i>	1 1	1 1	CHF [] <i> [,CR] i=1..18H or OFFH for all	CR LF	channel i off

MACHINE COMMANDS					
sign set	machine		Input	output	meaning
	820MCH	827MCH			
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
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: 00,01, '?'=mark I, 02=mark II
MT?	1	1	MT? [,CR]	aa CR LF	machine type? aa=machine type number 01=820,02=812,03=820MCH, 04=827MCH,05=807,06=816 07=810
SBA <address>	1 1	1 1	SBA [] <xxxx>	CR LF	set bus address (8280-FFFF)
BA?	1	1	BA? [,CR]	xxxx CR LF	bus address?