STUDER

A820

OPERATING INSTRUCTIONS

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Technical Documentation
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CAUTION
RISK OF ELECTRIC SHOCK DO NOT OPEN
ATTENTION
RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR
ACHTUNG
GEFAHR: ELEKTRISCHER SCHLAG NICHT ÖFFNEN

To reduce the risk of electric shock, do not remove covers (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.

Afin de prévenir un choc électrique, ne pas enlever les couvercles (où l'arrière) de l'appareil. Il ne se trouve à l'intérieur aucune pièce pouvant être réparée par l'usager.

Um die Gefahr eines elektrischen Schlages zu vermeiden, entfernen Sie keine Abdeckungen (oder Rückwand). Überlassen Sie die Wartung und Reparatur dem qualifizierten Fachpersonal.

This symbol is intended to alert the user to presence of uninsulated "**dangerous voltage**" within the apparatus that may be of sufficient magnitude to constitute a risk of electric shock to a person.

Ce symbole indique à l'utilisateur qu'il existent à l'intérieur de l'appareil des "**tensions dangereuses**". Ces tensions élevées entrainent un risque de choc électrique en cas de contact.

Dieses Symbol deutet dem Anwender an, dass im Geräteinnern die Gefahr der Berührung von "**gefährlicher Spannung**" besteht. Die Grösse der Spannung kann zu einem elektrischen Schlag führen.

This symbol is intended to alert the user to the presence of **important instructions** for operating and maintenance in the enclosed documentation.

Ce symbole indique à l'utilisateur que la documentation jointe contient **d'importantes instructions** concernant le fonctionnement et la maintenance.

Dieses Symbol deutet dem Anwender an, dass die beigelegte Dokumentation **wichtige Hinweise** für Betrieb und Wartung beinhaltet.

CAUTION:	Lithium Battery. Danger of explosion by incorrect handling. Replace by battery of the same make and type only.
ATTENTION:	Pile au lithium. Danger d'explosion en cas de manipulation incorrecte. Ne remplacer que par un modèle de même type.
ACHTUNG:	Explosionsgefahr bei unsachgemässem Auswechseln der Lithiumbatterie. Nur durch den selben Typ ersetzen.
ADVARSEL:	Lithiumbatterei. Eksplosinsfare. Udskinftning ma kun foretages af en sagkyndig of som beskrevet i servicemanualen (DK).

FIRST AID
(in case of electric shock)

1. Separate the person as quickly as possible from the electric power source:
- by switching off the equipment
- or by unplugging or disconnecting the mains cable
- pushing the person away from the power source by using dry insulating material (such as wood or plastic).
- After having sustained an electric shock, always consult a doctor.

WARNING!

DO NOT TOUCH THE PERSON OR HIS CLOTHING BEFORE THE POWER IS TURNED OFF, OTHERWISE YOU STAND THE RISK OF SUSTAINING AN ELECTRIC SHOCK AS WELL!

2. If the person is unconscious
- check the pulse,
- reanimate the person if respiration is poor,
- lay the body down and turn it to one side, call for a doctor immediately.

PREMIERS SECOURS
(en cas d'électrocution)

1. Si la personne est dans l'impossibilité de se libérer:
- Couper l'interrupteur principal
- Couper le courant
- Repousser la personne de l'appareil à l'aide d'un objet en matière non conductrice (matière plastique ou bois)
- Après une électrocution, consulter un médecin.

ATTENTION!

NE JAMAIS TOUCHER UNE PERSONNE QUI EST SOUS TENSION, SOUS PEINE DE SUBIR EGALEMENT UNE ELECTROCUTION.

2. En cas de perte de connaissance de la personne électrocutée:
- Controller le pouls
- Si nécessaire, pratiquer la respiration artificielle
- Placer l'accidenté sur le flanc et consulter un médecin.

ERSTE HILFE
(bei Stromunfällen)

1. Bei einem Stromunfall die betroffene Person so rasch wie möglich vom Strom trennen:
- Durch Ausschalten des Gerätes
- Ziehen oder Unterbrechen der Netzzuleitung
- Betroffene Person mit isoliertem Material (Holz, Kunststoff) von der Gefahrenquelle wegstossen
- Nach einem Stromunfall sollte immer ein Arzt aufgesucht werden.

ACHTUNG!

EINE UNTER SPANNUNG STEHENDE PERSON DARF NICHT BERÜHRT WERDEN. SIE KÖNNEN DABEI SELBST ELEKTRISIERT WERDEN!

2. Bei Bewusstlosigkeit des Verunfallten:
- Puls kontrollieren,
- bei ausgesetzter Atmung künstlich beatmen,
- Seitenlagerung des Verunfallten vornehmen und Arzt verständigen.

Installation, Betrieb und Entsorgung

Vor der Installation des Gerätes müssen die hier aufgeführten und auch die weiter in dieser Anleitung mit ⚠ bezeichneten Hinweise gelesen und während der Installation und des Betriebes beachtet werden.
Das Gerät und sein Zubehör ist auf allfällige Transportschäden zu untersuchen.
Ein Gerät, das mechanische Beschädigung aufweist oder in welches Flüssigkeit oder Gegenstände eingedrungen sind, darf nicht ans Netz angeschlossen oder muss sofort durch Ziehen des Netzsteckers vom Netz getrennt werden. Das Öffnen und Instandsetzen des Gerätes darf nur vom Fachpersonal unter Einhaltung der geltenden Vorschriften durchgeführt werden.

Falls dem Gerät kein konfektioniertes Netzkabel beiliegt, muss dieses durch eine Fachperson unter Verwendung der mitgelieferten Kabel-Gerätesteckdose IEC320/C13 oder IEC320/C19 und unter Berücksichtigung der einschlägigen, im geweiligen Lande geltenden Bestimmungen angefertigt werden; siehe Bild unten.
Vor Anschluss des Netzkabels an die Netzsteckdose muss überprüft werden, ob die Stromversorgungs- und Anschlusswerte des Gerätes (Netzspannung, Netzfrequenz) innerhalb der erlaubten Toleranzen liegen. Die im Gerät eingesetzten Sicherungen müssen den am Gerät angebrachten Angaben entsprechen.
Ein Gerät mit einem dreipoligen Gerätestecker (Gerät der Schutzklasse I) muss an eine dreipolige Netzsteckdose angeschlossen und somit das Gerätegehäuse mit dem Schutzleiter der Netzinstallation verbunden werden (Für Dänemark gelten Starkstrombestimmungen, Abschnitt 107).

Installation, Operation, and Waste Disposal

Before you install the equipment, please read and adhere to the following recommendations and all sections of these instructions marked with ⚠.

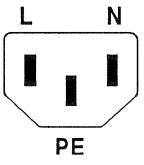
Check the equipment for any transport damage.

A unit that is mechanically damaged or which has been penetrated by liquids or foreign objects must not be connected to the AC power outlet or must be immediately disconnected by unplugging the power cable. Repairs must only be performed by trained personnel in accordance with the applicable regulations.

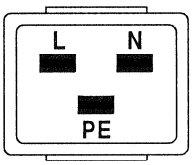
Should the equipment be delivered without a matching mains cable, the latter has to be prepared by a trained person using the attached female plug (IEC320/C13 or IEC320/C19) with respect to the applicable regulations in your country - see diagram below.

Before connecting the equipment to the AC power outlet, check that the local line voltage matches the equipment rating (voltage, frequency) within the admissible tolerance. The equipment fuses must be rated in accordance with the specifications on the equipment.

Equipment supplied with a 3-pole appliance inlet (equipment conforming to protection class I) must be connected to a 3-pole AC power outlet so that the equipment cabinet is connected to the protective earth conductor of the AC supply (for Denmark the Heavy Current Regulations, Section 107, are applicable).



IEC 320 / C13



IEC 320 / C19

Female plug (IEC320), view from contact side:

L ..... live; brown	National American Standard: black
N ..... neutral; blue	white
PE ... protective earth; green and yellow	green

Connecteur femelle (IEC320), vue de la face aux contacts:

L.....phase, brun	Standard National Américain: noir
N.....neutre, bleu	blanc
PE....terre protective; vert et jaune	vert

Ansicht auf Steckkontakte der Kabel-Gerätesteckdose (IEC320):

L.....Polleiter, braun	USA-Standard: schwarz
N.....Neutralleiter, hellblau	weiss
PE....Schutzleiter, gelb/grün	grün

Bei der Installation des Gerätes muss **vermieden** werden, dass:
- das Gerät Regen, Feuchtigkeit, direkter Sonneneinstrahlung oder übermässiger Wärmestrahlung von Wärmequellen (Heizgeräte, Heizungen, Spotlampen) ausgesetzt wird
- die für den Betrieb des Gerätes benötigte Luftzirkulation beeinträchtigt und dadurch die zulässige maximale Lufttemperatur der Geräteumgebung überschritten wird (Wärmestau)
- die Belüftungsöffnungen des Gerätes blockiert oder abgedeckt werden.

Das Gerät und seine Verpackung darf nur sachgerecht entsorgt werden. Alle Teile des Gerätes, die gefährliche Stoffe (Quecksilber, Cadmium) enthalten, müssen als Sondermüll behandelt werden.

Verbrauchte Batterien und Akkus müssen dem Hersteller zur Entsorgung zurückgegeben oder entsprechend den spezifischen Bestimmungen Ihres Landes fachgerecht entsorgt werden.

Wartung und Reparatur

Durch Entfernen von Gehäuseteilen, Abschirmungen etc. werden stromführende Teile freigelegt. Aus diesem Grund müssen u.a. die folgenden Grundsätze beachtet werden:
Eingriffe in das Gerät dürfen nur von Fachpersonal unter Einhaltung der geltenden Vorschriften vorgenommen werden.
Vor Entfernen von Gehäuseteilen muss das Gerät ausgeschaltet und vom Netz getrennt werden.
Bei geöffnetem, vom Netz getrenntem Gerät dürfen Teile mit gefährlichen Ladungen (z. B. Kondensatoren, Bildröhren) erst nach kontrollierter Entladung, heiße Bauteile (Leistungshalbleiter, Kühlkörper etc.) erst nach deren Abkühlen berührt werden.

Bei Wartungsarbeiten am geöffneten, unter Netzspannung stehenden Gerät dürfen blanke Schaltungsteile und metallene Halbleitergehäuse weder direkt noch mit einem nichtisolierten Werkzeug berührt werden.
Zusätzliche Gefahren bestehen bei unsachgemässer Handhabung besonderer Komponenten:
- **Explosionsgefahr** bei Lithiumzellen, Elektrolyt-Kondensatoren und Leistungshalbleitern
- **Implosionsgefahr** bei evakuierten Anzeigeeinheiten
- **Strahlungsgefahr** bei Lasereinheiten (nichtionisierend), Bildröhren (ionisierend)
- **Verätzungsgefahr** bei Anzeigeeinheiten (LCD) und Komponenten mit flüssigem Elektrolyt.

Solche Komponenten dürfen nur von dafür ausgebildetem Fachpersonal unter Verwendung von vorgeschriebenen Schutzmitteln (u.a. Schutzbrille, Handschuhe) gehandhabt werden.

The equipment installation **must satisfy** the following requirements:
- Protection against rain, humidity, direct solar irradiation or strong thermal radiation from heat sources (heaters, radiators, spotlights).
- Unobstructed air circulation so that the maximum air temperature in the equipment environment will not be exceeded (no heat accumulation).
- Ventilation louvers of the equipment must not be blocked or covered.

The equipment and its packing materials should ultimately be disposed off in accordance with the applicable regulations only. All parts of the equipment that contain hazardous substances (mercury, cadmium) must be treated as toxic waste.
Weak batteries or exhausted rechargeable batteries must be returned to the manufacturer for competent disposal or must be disposed of in accordance with the environmental protection regulations applicable for your country.

Maintenance and Repair

The removal of housing parts, shields, etc. exposes energized parts. For this reason the following precautions should be observed:
Maintenance should only be performed by trained personnel in accordance with the applicable regulations.
The equipment should be switched off and disconnected from the AC power outlet before any housing parts are removed.
Even after the equipment has been disconnected from the power, parts with hazardous charges (e.g. capacitors, picture tubes) should only be touched after they have been properly discharged. Hot components (power semiconductors, heat sinks, etc.) should only be touched after they have cooled off.

If maintenance is performed on a unit that is opened and switched on, no uninsulated circuit components and metallic semiconductor housings should be touched neither with your bare hands nor with uninsulated tools.
Certain components pose additional hazards:
- **Explosion hazard** from lithium batteries, electrolytic capacitors and power semiconductors
- **Implosion hazard** from evacuated display units
- **Radiation hazard** from laser units (non-ionizing), picture tubes (ionizing)
- **Caustic effect** of display units (LCD) and such components containig liquid electrolyte.

Such components should only be handled by trained personnel who are properly protected (e.g. by goggles, gloves).

Für Wartung und Reparatur der sicherheitsrelevanten Teile des Gerätes darf nur Ersatzmaterial nach Herstellerspezifikation verwendet werden.

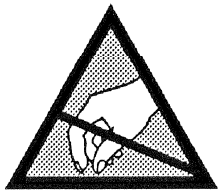
Das Gerät muss ordnungsgemäss und regelmässig gewartet und somit in sicherem Zustand erhalten werden. Bei ungenügender Wartung oder bei Änderungen der sicherheitsrelevanten Teile des Gerätes erlischt die entsprechende Produktehaftung des Herstellers.

For maintenance work and repair on components that influence the equipment safety, only replacement material conforming to the manufacturer's specifications may be used.

The equipment should be properly serviced in regular intervals and be maintained in safe operating condition. If the equipment is not properly maintained or if any modifications are made to components that influence safety, the manufacturer's product liability gets void.

Elektrostatische Entladung (ESD) bei Wartung und Reparatur

Electrostatic Discharge (ESD) during Maintenance and Repair



ATTENTION: **Observe precautions for handling devices sensitive to electrostatic discharge!**

ATTENTION: **Respecter les précautions d'usage concernant la manipulation de composants sensibles à l'électricité statique!**

ACHTUNG: **Vorsichtsmassnahmen bei Handhabung elektrostatisch entladungsgefährdeter Bauelemente beachten!**

Viele ICs und andere Halbleiter sind empfindlich gegen elektrostatische Entladung (ESD). Unfachgerechte Behandlung von Baugruppen mit solchen Komponenten bei Wartung und Reparatur kann deren Lebensdauer drastisch vermindern.
Bei der Handhabung der ESD-empfindlichen Komponenten sind u.a. folgende Regeln zu beachten:

- ESD-empfindliche Komponenten dürfen ausschliesslich in dafür bestimmten und bezeichneten Verpakkungen gelagert und transportiert werden.
- Unverpackte, ESD-empfindliche Komponenten dürfen nur in den dafür eingerichteten Schutzzonen (EPA, z.B. Gebiet für Feldservice, Reparatur- oder Serviceplatz) gehandhabt und nur von Personen berührt werden, die durch ein Handgelenkband mit Serienwiderstand mit dem Massepotential des Reparatur- oder Serviceplatzes verbunden sind. Das gewartete oder reparierte Gerät wie auch Werkzeuge, Hilfsmittel, EPA-taugliche (elektrisch halbleitende) Arbeits-, Ablage- und Bodenmatten müssen ebenfalls mit diesem Potential verbunden sein.
- Die Anschlüsse der ESD-empfindlichen Komponenten dürfen unkontrolliert weder mit elektrostatisch aufladbaren (Gefahr von Spannungsdurchschlag), noch mit metallischen Oberflächen (Schockentladungsgefahr) in Berührung kommen.
- Um undefinierte transiente Beanspruchung der Komponenten und deren eventuelle Beschädigung durch unerlaubte Spannung oder Ausgleichsströme zu vermeiden, dürfen elektrische Verbindungen nur am abgeschalteten Gerät und nach dem Abbau allfälliger Kondensatorladungen hergestellt oder getrennt werden.

Many ICs and semiconductors are sensitive to electrostatic discharge (ESD). The life of components containing such elements can be drastically reduced by improper handling during maintenance and repair work.

Please observe the following rules when handling ESD sensitive components:

- ESD sensitive components should only be stored and transported in the packing material specifically provided for this purpose.
- Unpacked ESD sensitive components should only be handled in ESD protected areas (EPA, e.g. area for field service, repair or service bench) and only be touched by persons who wear a wristlet that is connected to the ground potential of the repair or service bench by a series resistor. The equipment to be repaired or serviced and all tools, aids, as well as electrically semiconducting work, storage and floor mats should also be connected to this ground potential.
- The terminals of ESD sensitive components must not come in uncontrolled contact with electrostatically chargeable (voltage puncture) or metallic surfaces (discharge shock hazard).
- To prevent undefined transient stress of the components and possible damage due to inadmissible voltages or compensation currents, electrical connections should only be established or separated when the equipment is switched off and after any capacitor charges have decayed.

SMD-Bauelemente

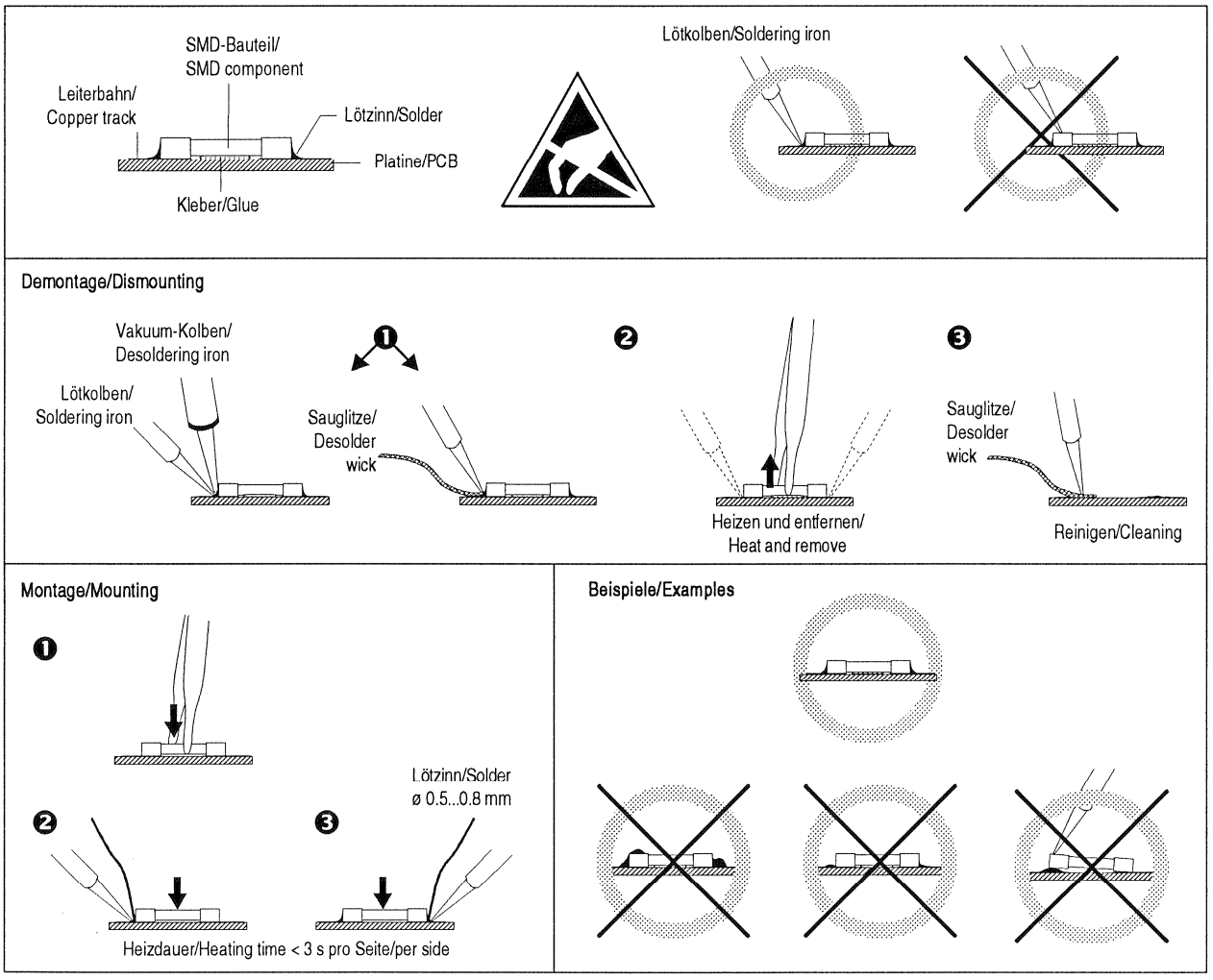
Der Austausch von SMD-Bauelementen ist ausschliesslich geübten Fachleuten vorbehalten. Für verwüstete Platinen können keine Ersatzansprüche geltend gemacht werden. Beispiele für korrekte und falsche SMD-Lötverbindungen in der Abbildung weiter unten.

Bei Studer werden keine handelsüblichen SMD-Teile bewirtschaftet. Für Reparaturen sind die notwendigen Bauteile lokal zu beschaffen. Die Spezifikationen aller Komponenten finden Sie in den Positionslisten im Schemateil.
Spezialkomponenten sind in der Positionsliste mit einer Artikelnummer versehen und können bei Studer unter dieser Nummer bezogen werden.

SMD Components

SMDs should only be replaced by skilled specialists. No warranty claims will be accepted for circuit boards that have been ruined. Proper and improper SMD soldering joints are depicted below.

Studer does not keep any commercially available SMDs in stock. For repairs the corresponding devices should be purchased locally. The specifications of all components can be found in the parts lists in the diagram section.
Special components having a part number in the parts list can be ordered from Studer by specifying this number.



Störstrahlung und Störfestigkeit

Das Gerät entspricht den Schutzanforderungen auf dem Gebiet der elektromagnetischen Phänomene, die u.a. in den Richtlinien 89/336/EWG und FCC, Part 15, aufgeführt sind :

1. Die vom Gerät erzeugten elektromagnetischen Aussendungen sind soweit begrenzt, dass ein bestimmungsgemässer Betrieb anderer Geräte und Systeme möglich ist.
2. Das Gerät weist eine angemessene Festigkeit gegen elektromagnetische Störungen auf, so dass sein bestimmungsgemässer Betrieb möglich ist.

Das Gerät wurde getestet und erfüllt die Bedingungen der im Kapitel "Technische Daten" aufgeführten EMV-Standards. Die Limiten dieser Standards gewährleisten mit einer angemessenen Wahrscheinlichkeit sowohl einen Schutz der Umgebung wie auch entsprechende Störfestigkeit des Gerätes. Eine absolute Garantie, dass keine unerlaubte elektromagnetische Beeinträchtigung während des Gerätebetriebes entsteht, ist jedoch nicht gegeben.

Um die Wahrscheinlichkeit solcher Beeinträchtigung weitgehend auszuschliessen, sind u.a. folgende Massnahmen zu beachten:

- Installieren Sie das Gerät gemäss den Angaben in der Bedienungsanleitung, und verwenden Sie das mitgelieferte Zubehör.
- Verwenden Sie im System und in der Umgebung, in denen das Gerät eingesetzt ist, nur Komponenten (Anlagen, Geräte), die ihrerseits die Anforderungen der obenerwähnten Standards erfüllen.
- Sehen Sie ein Erdungskonzept des Systems vor, das sowohl die Sicherheitsanforderungen (die Erdung der Geräte gemäss Schutzklasse I mit einem Schutzleiter muss gewährleistet sein), wie auch die EMV-Belange berücksichtigt. Bei der Entscheidung zwischen stern- oder flächenförmiger bzw. kombinierter Erdung sind Vor- und Nachteile gegeneinander abzuwägen.
- Benutzen Sie abgeschirmte Kabel für die Verbindungen, für welche eine Abschirmung vorgesehen ist. Achten Sie auf einwandfreie, grossflächige, korrosionsbeständige Verbindung der Abschirmung zum entsprechenden Steckeranschluss bzw. zum Steckergehäuse. Beachten Sie, dass eine nur an einem Ende angeschlossene Kabelabschirmung als Sende- bzw. Empfangsantenne wirken kann (z.B. bei wirksamer Kabellänge von 5 m oberhalb von 10 MHz), und dass die Flanken der digitalen Kommunikationssignale hochfrequente Aussendungen verursachen (z.B. LS- oder HC-Logik bis 30 MHz).
- Vermeiden Sie Bildung von Stromschleifen oder vermindern Sie deren unerwünschte Auswirkung, indem Sie deren Fläche möglichst klein halten und den darin fliessenden Strom durch Einfügen einer Impedanz (z.B. Gleichtaktdrossel) reduzieren.

Electromagnetic Compatibility

The equipment conforms to the protection requirements relevant to electromagnetic phenomena that are listed in the guidelines 89/336/EC and FCC, part 15.

1. The electromagnetic interference generated by the equipment is limited in such a way that other equipment and systems can be operated normally.
2. The equipment is adequately protected against electromagnetic interference so that it can operate correctly.

The equipment has been tested and conforms to the EMC standards applicable to residential, commercial and light industry, as listed in the section "Technical Data". The limits of these standards reasonably ensure protection of the environment and corresponding noise immunity of the equipment. However, it is not absolutely warranted that the equipment will not be adversely affected by electromagnetic interference during operation.

To minimize the probability of electromagnetic interference as far as possible, the following recommendations should be followed:

- Install the equipment in accordance with the operating instructions. Use the supplied accessories.
- In the system and in the vicinity where the equipment is installed, use only components (systems, equipment) that also fulfill the above EMC standards.
- Use a system grounding concept that satisfies the safety requirements (protection class I equipment must be connected with a protective ground conductor) that also takes into consideration the EMC requirements. When deciding between radial, surface or combined grounding, the advantages and disadvantages should be carefully evaluated in each case.
- Use shielded cables where shielding is specified. The connection of the shield to the corresponding connector terminal or housing should have a large surface and be corrosion-proof. Please note that a cable shield connected only single-ended can act as a transmitting or receiving antenna (e.g. with an effective cable length of 5 m, the frequency is above 10 MHz) and that the edges of the digital communication signals cause high-frequency radiation (e.g. LS or HC logic up to 30 MHz).
- Avoid current loops or reduce their adverse effects by keeping the loop surface as small as possible, and reduce the noise current flowing through the loop by inserting an additional impedance (e.g. common-mode rejection choke).

Class A Equipment - FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide a reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution:
Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment. Also refer to relevant information in this manual.

CE-Konformitätserklärung

Wir,

Studer Professional Audio AG,
CH-8105 Regensdorf,

erklären in eigener Verantwortung, dass das in dieser Anleitung beschriebene Produkt

Studer A820, Professionelles Tonbandgerät (ab Serie-Nr. 2611),

auf das sich diese Erklärung bezieht, entsprechend den Bestimmungen der EU-Richtlinien und deren Ergänzungen

- Elektromagnetische Verträglichkeit (EMV):
  89/336/EWG + 92/31/EWG + 93/68/EWG
- Niederspannung:
  73/23/EWG, 93/68/EWG

mit den folgenden Normen und normativen Dokumenten übereinstimmt:

- Sicherheit:
  Class I, EN 60065/1993 (IEC 65/1985)
- EMV:
  EN 50081-1/1992; EN 50082-1/1992

Regensdorf, 20. November 1995

B. Hochstrasser, Geschäftsleiter

P. Fiala, Leiter QS

CE Declaration of Conformity

We,

Studer Professional Audio AG,
CH-8105 Regensdorf,

declare under our sole responsibility that the product described in this manual

Studer A820, professional tape recorder (from serial No. 2611 and up),

to which this declaration relates, according to following regulations of EU directives and amendments

- Electromagnetic Compatibility (EMC):
  89/336/EEC + 92/31/EEC + 93/68/EEC
- Low Voltage (LVD):
  73/23/EEC + 93/68/EEC

is in conformity with the following standards or other normative documents:

- Safety:
  Class I, EN 60065/1993 (IEC 65/1985)
- EMC:
  EN 50081-1/1992; EN 50082-1/1992

Regensdorf, November 20, 1995

B. Hochstrasser, Managing Director

P. Fiala, Manager QA

1 GENERAL INFORMATION

CONTENTS

1 GENERAL INFORMATION

1.1 QUICK-REFERENCE DESCRIPTION

Because of its compact and highly stable design, its system flexibility and the exceptional operating convenience made possible by multiple microprocessors, the STUDER A820 tape recorder is universally suited for all applications in broadcast or television studios, in music recording studios, for theaters, the film industry, or scientific institutes.

Some of its outstanding features are:

- Rigid die-cast aluminium alloy chassises for tape transport, head block, pinch roller unit, and other assemblies.
- Hall-commutated, brushless DC capstan motor with quartz reference and capacitive speed and rotation direction sensing for highly accurate tape speed and high acceleration and braking coefficients.
- Fast tape transport that allows high spooling speeds combined with gentle tape handling by means of electronically controlled tape tension, based on servo-controlled DC motors with disc type rotors and photoelectrical speed and rotation direction sensing, and non-contacting tape tension sensors. Switched spooling motor control for minimum power dissipation.
- Accurate electronic tape counter with real-time indication; photoelectric scanning of the guide roller rotation by means of optoswitches.
- Simple editing: variable spooling speed; the high end of the frequency response is deemphasized during cueing in fast-wind mode. The tape tension control loop is also active in the STOP position. Manual shuttling of the tape is possible in both directions on either reel.
  Built-in tape scissors; automatic positioning at the scissors of the tape address that is located in front of the reproduce head gap.
- Monitor speaker in the VU-meter overbridge. In versions without overbridge the speaker is built into the tape transport cover.
- Manual control of the head shield in front of the record and reproduce head; can remain closed during spooling functions.

The excellent system flexibility means that a suitable A820 configuration is available for any application:

- The basic model is available as a mono, 2-channel or stereo version (with center-track time code channel on request) for 1/4 inch tape, with or without VU-meter overbridge, or as a 2-channel/stereo version for 1/2 inch tape with VU-meter overbridge.
- Operates in horizontal or inclined position (±7,5° or ±15°). Maintenance position +60°.
- Four tape speeds (3.75 / 7.5 / 15 / 30 ips) programmable. (Operation with time code is not possible at 3.75 ips).
- Inputs and outputs are balanced and floating, configurable with or without input/output transformers.
- Selector switch for NAB or CCIR equalization (for 7.5 and 15 ips).
- Tape selector for two types of tape with different calibration data.
- Zero locator and transfer locator for max. 5 addresses as standard feature.
- Output selector buttons on VU recorders: INP (input), REP (reproduce), and SYNC (playback via record head).
- VU-meter panel with SAFE/READY selector, level controls for record and reproduce mode, buttons for bypassing the level controls (calibrated, with line level).
  Level indication internally selectable: VU or PPM characteristic.
- Voltage selector: 100 to 140 V / 200 to 240 V ±10 %, 50 to 60 Hz.
- Connectors for fader start circuit, parallel and serial remote control.

The following features are available as options:

- Mono/stereo selector for stereo and 2-channel versions.
- Test generator (60, 125 Hz, 1, 10, 16 kHz)
- Interface for serial port: either RS232 interface and storage of the audio parameters (e.g. on tape) for quick recalibration of the tape recorder, or RS232 interface and SMPTE/EBU bus interface.

Maximum operating convenience by means of multiple microprocessors:

- The last operating state of the tape recorder is saved when the machine is switched off: tape counter, locator addresses, audio parameters, speed. The machine switches automatically to STOP and SAFE when the power is switched on again.
- Record drop-in by pressing the REC key in reproduce mode (internally programmable).
- Record drop-out by pressing the PLAY key in record mode.
- Reduced spooling speed (LIBRARY WIND): a lower (programmable) spooling speed can be selected for producing library tape pancakes.
- Zero locator: automatic search of the tape address (counter reading) 0.00.00.0 with the push of a button.
- Transfer locator LOC 1 to LOC 5: for automatic storage and searching of 5 tape addresses. The stored addresses can be read out without executing the command.
- Programmable function keys ("soft keys"): any of a repertory of approximately 100 functions can be easily assigned to each function key, e.g.
  - REVERSE PLAY (playback in opposite tape direction).
  - FADER (local keys are disabled, only fader start possible)
  - TAPE DUMP (take-up motor is switched off)
  - REM CONTR (local keys are disabled, operating only via remote control)
  - REHEARSE (simulation of electronic editing)
  - SPOT ERASE (activation of the erase circuit without tape movement, tape can be transported by hand)
  - AUTO MUTE (automatic muting of the audio channels during spooling), etc.

  These keys have special recesses into which self-adhesive labels can be inserted.
- Internal standard test system for the main functions with error diagnostics:
  automatic power-on self test, repeated in periodic intervals.

- Audio alignments via microprocessor. With the SET/CUE-wheel functioning as a "potentiometer" the following audio parameters can be programmed (for two tape types, four tape speeds, and NAB and CCIR equalizations each):
  - Reproduction/Sync: LEVEL, TREBLE, BASS, EQUALIZATION
  - Recording: LEVEL, TREBLE, BIAS, EQUALIZATION
  Resolution 256 steps each, hexadecimal representation on the service display.

  The audio parameters remain stored even when the recorder is switched off. The data can be saved by copying them via the serial interface to an external storage medium and reading them back in (also possible with the A820 tape recorder itself); automatic recalibration of the A820 tape recorder is, therefore, possible.

1.2 STANDARD VERSIONS

FULL-TRACK VERSIONS — A820-1

A820-1 Article No. 60.118.20011
- Recorder for 1/4" tape.
- Mono with full-track erase head.
- Without channel mode selector.
- Monitor speaker built into tape transport cover.
- Input and output equipped with transformers.
- Built-in tape scissors.
- Maximum reel diameter 317,5 mm (12,5").
- Three of four tape speeds (3.75; 7.5; 15 ips) selectable with push buttons.
- Chassis version.

A820-1 VU Article No. 60.118.20012
- Recorder for 1/4" tape.
- Mono with full-track erase head.
- Overbridge with:
  - VU-meter unit and channel mode selector (INPUT / SYNC / REP // READY / SAFE)
  - Monitor speaker.
- Transformerless input and output.
- Built-in tape scissors.
- Maximum reel diameter 355.6 mm (14").
- Four tape speeds (3.75; 7.5; 15; 30 ips) selectable with push buttons.
- Chassis version.

STEREO VERSIONS — A820-0.75

A820-0.75 Article No. 60.118.20021
- Recorder for 1/4" tape.
- Stereo with 0.75 mm track separation, full-track erase head.
- Without channel mode selector.
- Monitor speaker built into tape transport cover.
- Input and output equipped with transformers.
- Built-in tape scissors.
- Maximum reel diameter 317,5 mm (12,5").
- Three of four tape speeds (3.75; 7.5; 15 ips) selectable with push buttons.
- Chassis version.

A820-0.75 VU Article No. 60.118.20022
- Recorder for 1/4" tape.
- Stereo with 0.75 mm track separation, overlapping erase head.
- Overbridge with:
  - VU-meter units and channel mode selectors (INPUT / SYNC / REP // READY / SAFE)
  - Monitor speaker.
- Transformerless inputs and outputs.
- Built-in tape scissors.
- Maximum reel diameter 355.6 mm (14").
- Four tape speeds (3.75; 7.5; 15; 30 ips) selectable with push buttons.
- Chassis version.

A820-2 F Article No. 60.118.20030
- Recorder for 1/4" tape.
- Stereo with 2.0 mm track separation, full-track erase head.
- Without channel mode selector.
- Monitor speaker built into tape transport cover.
- Input and output equipped with transformers.
- Built-in tape scissors.
- Maximum reel diameter 317,5 mm (12,5").
- Three of four tape speeds (3.75; 7.5; 15 ips) selectable with push buttons.
- Chassis version.

TWO-TRACK VERSIONS — A820-2

A820-2 Article No. 60.118.20033
- Recorder for 1/4" tape.
- 2-Track/stereo with 2 mm track separation, with two-track erase head (no time code erasing).
- Without channel mode selector.
- Monitor speaker built into tape transport cover.
- Input and output equipped with transformers.
- Built-in tape scissors.
- Maximum reel diameter 317,5 mm (12,5").
- Three of four tape speeds (3.75; 7.5; 15 ips) selectable with push buttons.
- Chassis version.

A820-2 VU Article No. 60.118.20034
- Recorder for 1/4" tape.
- 2-Track/stereo with 2 mm track separation, with two-track erase head (no time code erasing).
- Overbridge with:
  - VU-meter units and channel mode selectors (INPUT / SYNC / REP // READY / SAFE)
  - Monitor speaker.
- Transformerless inputs and outputs.
- Built-in tape scissors.
- Maximum reel diameter 355.6 mm (14").
- Four tape speeds (3.75; 7.5; 15; 30 ips) selectable with push buttons.
- Chassis version.

A820-2/2 VU Article No. 60.118.20032

- Recorder for 1/4" tape.
- 2-Track/stereo with 2 mm track separation, with overlapping erase head.
- Overbridge with:
  - VU-meter units and channel mode selectors (INPUT / SYNC / REP // READY / SAFE)
  - Monitor speaker.
- Transformerless inputs and outputs.
- Built-in tape scissors.
- Maximum reel diameter 355.6 mm (14").
- Four tape speeds (3.75; 7.5; 15; 30 ips) selectable with push buttons.
- Chassis version.

TWO-TRACK VERSIONS WITH TIME CODE A820-2 TC

A820-2 TC Article No. 60.118.20041

- Recorder for 1/4" tape.
- 2-Track/stereo with 2 mm track separation, time code center track, and two-track erase head.
- Overbridge with:
  - Channel control units (INPUT / SYNC / REP // READY / SAFE)
  - Time code channel mode selector unit (INPUT / SYNC / REP // READY / SAFE) with additional CODE indicator lamp
  - Monitor speaker.
- Inputs and outputs equipped with transformers.
- Built-in tape scissors.
- Maximum reel diameter 355.6 mm (14").
- Three tape speeds (7.5; 15; 30 ips) selectable with push buttons.
- Chassis version.

A820-2 TC VU Article No. 60.118.20042

- Recorder for 1/4" tape.
- 2-Track/stereo with 2 mm track separation, time code center track, and two-track erase head.
- Overbridge with:
  - VU-meter units and channel mode selectors (INPUT / SYNC / REP // READY / SAFE)
  - Time code channel mode selector unit (INPUT / SYNC / REP // READY / SAFE) with additional CODE indicator lamp
  - Monitor speaker.
- Transformerless inputs and outputs.
- Built-in tape scissors.
- Maximum reel diameter 355.6 mm (14").
- Three tape speeds (7.5; 15; 30 ips) selectable with push buttons.
- Chassis version.

HALF-INCH VERSION A820-2/2-1/2" VU

A820-2/2-1/2" VU Article No. 60.118.20052

- Recorder for 1/2" tape.
- 2-Track/stereo with 2-track erase head.
- Overbridge with:
  - VU-meter units and channel mode selectors (INPUT / SYNC / REP // READY / SAFE)
  - Monitor speaker.
- Transformerless inputs and outputs.
- Built-in tape scissors.
- Maximum reel diameter 355.6 mm (14").
- Three tape speeds (7.5; 15; 30 ips) selectable with push buttons.
- Chassis version.

1.3 OPTIONS

Mono/stereo switch Part No. 20.820.340.00

Mono/stereo switch and test generator Part No. 20.820.341.00

RS 232 interface (for serial remote control) Part No. 20.820.342.00
9-pin connector, type D, screw fastening Part No. 20.020.303.07

SMPTE / EBU interface (RS 422 and RS 232) Part No. 20.820.343.00
9-pin connector, type D, screw fastening Part No. 20.020.303.07

Interface for noise reduction system (for 2 channels) Part No. 20.820.344.00
15-pin connector, type D, screw fastening Part No. 20.020.303.08

Interface for remote counter, serial remote control, and autolocator Part No. 20.820.345.00

Mechanical operating hours meter Part No. 20.820.351.00

1.4 ACCESSORIES

Bypacked accessories Part No. 20.020.302.30

1 Allen screwdriver 1,5 mm	Part No.	26.06.1015
1 Allen screwdriver 2,0 mm	Part No.	26.06.1020
1 Allen screwdriver 2,5 mm	Part No.	26.06.1025
1 Allen screwdriver 3,0 mm	Part No.	26.06.1030
1 Allen screwdriver 4,0 mm	Part No.	26.06.1040
1 Allen screwdriver 5,0 mm	Part No.	26.06.1050
1 Allen screwdriver 6,0 mm	Part No.	26.06.1060
1 Stud driver 2,5 mm	Part No.	10.258.003.09
1 Stud driver 3,0 mm	Part No.	10.258.003.10
1 Lamp extractor	Part No.	10.338.001.00
1 Keytop extractor	Part No.	10.338.002.00
1 Keytop extractor RAFI	Part No.	55.03.0359
6 LEDs yellow, diffused, dia. 3 mm	Part No.	50.04.2130
3 Bulbs T5.5, 24 V, 40 mA	Part No.	51.02.0145
2 Fuses 5x20 mm, T 2,5 A SLOW	Part No.	51.01.0121
4 Fuses 5x20 mm, T 5 A SLOW	Part No.	51.01.0124
4 Fuses 5x20 mm, T 6,3 A SLOW	Part No.	51.01.0125
6 Fuses 5x20 mm, T 10 A SLOW	Part No.	51.01.0126
1 Button label "LIFTER"	Part No.	1.011.210.07
1 Button label "LOC START"	Part No.	1.011.210.08
1 Button label "FADER"	Part No.	1.011.210.09
1 Button label "VARISPEED"	Part No.	1.011.210.10
1 Button label "REM CONTR"	Part No.	1.011.210.11
1 Button label "TAPE DUMP"	Part No.	1.011.210.13
1 Button label "RESET TIMER"	Part No.	1.011.210.14
1 Button label "ZERO LOC"	Part No.	1.011.210.15
1 Button label "LOC 1"	Part No.	1.011.210.17
1 Button label "LOC 2"	Part No.	1.011.210.18
1 Button label "LOC 3"	Part No.	1.011.210.19
1 Button label "LOC 4"	Part No.	1.011.210.20
1 Button label "LOC 5"	Part No.	1.011.210.23
1 Button label "TRANS"	Part No.	1.011.210.25
1 Button label "CUT"	Part No.	1.011.210.26
1 Button label "REV PLAY"	Part No.	1.011.210.28
1 Button label "ROLLBACK"	Part No.	1.011.210.29
1 Button label "RLB PLAY"	Part No.	1.011.210.30
1 Button label "RLB REC"	Part No.	1.011.210.31
1 Button label "SET ADDR"	Part No.	1.011.210.32
1 Button label "SET VARISP"	Part No.	1.011.210.33
1 Button label "REHEARSE"	Part No.	1.011.210.35
1 Button label "LIBR WIND"	Part No.	1.011.210.41
1 Button label "SPOT ERASE"	Part No.	1.011.210.42
1 Button label "FADER START	Part No.	1.011.210.43
1 Button label "LAP"	Part No.	1.011.210.44
1 Button label "BACK SPACE"	Part No.	1.011.210.45
1 Status indicator label	Part No.	1.820.012.01
1 Label set	Part No.	1.820.090.25
1 Power cord 2.5 m, EU appl. inlet	Part No.	10.223.001.01
2 Ciné adapters (for 1/4" versions only)	Part No.	1.013.326.00
2 NAB adapters (for 1/2" version only)	Part No.	1.013.345.00
1 Audio connector set (per channel)	Part No.	20.020.302.02

Consoles

A820 consoles are supplied with wooden side panels. The following operating positions can be established with the tilting mechanism built into the tape transport chassis: horizontal, forward/backward inclination by 7.5° or 15°, backward inclination by 60° (maintenance position).

Consoles with traverse:

■ Height 780 mm, with floor slides	Part No.	20.020.204.00
■ Height 840 mm, with floor slides	Part No.	20.020.204.01
■ Height 900 mm, with floor slides	Part No.	20.020.204.02
■ Height 840 mm, with castors	Part No.	20.020.204.05
■ Height 900 mm, with castors	Part No.	20.020.204.06
■ Height 960 mm, with castors	Part No.	20.020.204.07

Consoles with pedestal rack (19"/3 U):

■ Height 780 mm, with floor slides	Part No.	20.020.204.10
■ Height 840 mm, with floor slides	Part No.	20.020.204.11
■ Height 900 mm, with floor slides	Part No.	20.020.204.12
■ Height 840 mm, with castors	Part No.	20.020.204.15
■ Height 900 mm, with castors	Part No.	20.020.204.16
■ Height 960 mm, with castors	Part No.	20.020.204.17

Overbridge with shelf, for A820-1, A820-0.75 und A820-2 Part No. 20.820.348.00

Overbridge with shelf and monitor speaker, for A820-1, A820-0.75 and A820-2 Part No. 20.820.349.00

Housing for TLS4000 local control unit Part No. 20.820.350.00

Pedestal rack (19", 3 U, for retrofit instead of traverse) Part No. 1.058.004.00

Filler panels for pedestal rack:

■ Height 1 U	Part No.	1.918.001.00
■ Height 2 U	Part No.	1.918.002.00
■ Height 3 U	Part No.	1.918.003.00

Screws for 19" rack mounting:

■ M6 x 12	Part No.	21.99.0164
■ M6 x 16	Part No.	21.99.0167

Remote controls and remote counters

Parallel tape transport remote control, table cabinet, with 15 m cable Part No. 20.820.366.00

Varispeed kit, for installation into table cabinet of parallel remote control Part No. 21.328.253.00

Secondary (pass-through) 25-pin D connector for installation into table cabinet of parallel remote control Part No. 21.328.254.00

Parallel tape transport remote control, STUDER standard module, 1 unit wide, with 15 m cable Part No. 20.820.367.00

Serial remote counter with timer and lap mode display, for installation only, with 15 m cable (option 20.820.345.00 required) Part No. 20.820.368.00

Serial remote controller with timer and lap mode display, table cabinet with 15 m cable (option 20.820.345.00 required) Part No. 20.820.369.00

Serial remote controller with timer and lap mode display, STUDER standard module, 5 units wide, with 15 m cable (option 20.820.345.00 required) Part No. 20.820.370.00

Adapters

Professional NAB adapter, 1/4"	Part No.	1.013.344.00
Professional NAB adapter, 1/2"	Part No.	1.013.345.00
DIN Adapter, 1/4"	Part No.	1.013.343.00
Reel flange for DIN adapter, 1/4"	Part No.	1.013.328.00
Ciné adapter, 1/4"	Part No.	1.013.326.00

REVOX tape splicing kit

Comprising a cutting and splicing block, a cutting blade, splicing tabs, and grease pen. Part No. 10.030.452.40

STUDER cleaning kit in case

Contains 1 bottle of head cleaner, 1 bottle of aluminite cleaner, lint-free nonwoven fleece sheets, buckskin.
Part No. 10.496.010.00

Head cleaner, replacement bottle Part No. 10.496.021.00
Head cleaner, 1 litre Part No. 10.496.022.00
Aluminite cleaner, repl. bottle Part No. 10.496.025.00
Aluminite cleaner, 1 litre Part No. 10.496.026.00

Transport case

On request

Plastic dust covers

For recorders **without** overbridge Part No. 1.058.001.10

For recorders **with** overbridge Part No. 1.058.001.11

Conversion kits

Conversion kit 1/4" -> 1/2" Part No. 21.820.499.00

Conversion kit 1/2" -> 1/4"-2/2 Part No. 21.820.498.00

Conversion kit 1/2" -> 1/4"-0.75 Part No. 21.820.497.00

Splicing block

slides over service display Part No. 20.820.382.00

Maintenance aids

Tool case (basic kit) with soldering iron and demagnetizing choke for 110 V Part No. 20.020.001.20

Tool case (basic kit) with soldering iron and demagnetizing choke for 220 V Part No. 20.020.001.21

Supplementary tool kit A820 Part No. 20.020.001.36

Extender board, 39-pin, for audio and logic modules
Part No. 1.820.799.00

Extender board, 64-pin, for logic modules
Part No. 1.228.324.81

Additional manuals

Operation and maintenance manual, German
Part No. 10.27.0110

Operation and maintenance manual, English
Part No. 10.27.0230

1.5
TECHNICAL SPECIFICATIONS A820

Tape speeds:

30 - 15 - 7.5 - 3.75 ips
(76.2 - 38.1 - 19.05 - 9.525 cm/s)

All tape speeds can be selected at the front panel (depending on the programming of the keys, either one, two, three, or four speeds can be made directly selectable).
Nominal speed adjustable ±0.2% in 0.025% steps.

Variable tape speed:

±7 semitones from nominal speed (+54%, -35%), displayed in %, HT (half tones) or IPS; programmable.

Tape speed deviation:

max. ±0.2%

Tape slip:

max. 0.1%

Tape reels:

NAB, CINÉ, DIN
max. diameter 356 mm (14 "), broadcast version 318 mm (12.5 ")
min. hub diameter 45 mm (1.77")

Tape width:

6.35 mm (1/4")
12.7 mm (1/2"), convertible, with automatic switchover of tape tensions and audio alignment

Wow and flutter:
Peak weighted according to DIN 45507 or IEC Publ. 386, respectively. Ambient temperature 0 - 40° C (32 - 104° F)

30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
max. 0.03%	max. 0.04%	max. 0.06%	max. 0.1%

Start time:

approx. 0.5 s at 15 ips (38 cm/s) and 1000 m tape on DIN hub or 2500 ft (762 m) tape on NAB reel
(to attain double value of flutter specification)

Tape timer:

6-digit LED, indicating hours, minutes, and seconds for all tape speeds. Counts past zero with leading negative sign.
Range: -9 h 59 min 59.9 s to 23 h 59 min 59.9 s.

Winding speed:

programmable, 4 - 590 ips (0.1 - 15 m/s)
automatic speed reduction at the tape end.

Winding time:

approx. 90 s for 1000 m tape;
approx. 55 s for 2500 ft (762 m) tape

Stopping time form spooling:

approx. 4 s with full 1000 m-reel (tape width 1/4")
from maximum winding speed

Tape tension (measured with Tentelometer directly at the left reel):

- 1/4" version:
  - Reproduce and record:
    0.7 N (70 p) nominal, adjustable 0.5 - 1.8 N
    (50 - 180 p)
  - Winding:
    0.8 N (80 p) nominal, adjustable 0.5 - 1.7 N
    (50 - 170 p)
- 1/2" version:
  - Reproduce and record:
    1.2 N (120 p) nominal, adjustable 0.5 - 1.8 N
    (50 - 180 p)
  - Winding:
    0.9 N (90 p) nominal, adjustable 0.5 - 1.7 N
    (50 - 170 p)

Inputs:

- Balanced and floating, with input transformer
  Impedance ≥ 10 kΩ, 30 Hz ... 20 kHz

or

- electronically balanced, without input transformer
  - Impedance ≥ 20 kΩ, 30 Hz ... 20 kHz (with balanced input signal)
  - Impedance ≥ 10 kΩ, 30 Hz ... 20 kHz (with unbalanced input signal)

Input level:

- nominal input level relative to reference magnetic flux:
  +6, +10, +14, +16 dBm; programmable
- nominal input level relative to operating level (according to NAB):
  0, +4, +8, +10 dBm; programmable

(adjustment of the operating magnetic flux with above input levels: 100 - 1000 nWb/m)

Recorders with VU-meter panel and input/output level controls:
max. 10 dB increase in input sensitivity with input level control in uncalibrated mode.

Maximum input level:
- with input transformer: +24 dBm
- without input transformer: +28 dBm (+26 dBm, if the nominal input level relative to operating level is set to 0/6 dBm)

Outputs:

- balanced and floating, with output transformer
  Impedance ≤ 50 Ω, 30 Hz ... 20 kHz
  Load ≥ 200 Ω

or

- electronically balanced, without output transformer
  Impedance ≤ 30 Ω, 30 Hz ... 20 kHz
  Load ≥ 200 Ω

Output level:

- nominal output level relative to reference magnetic flux:
  +6, +10, +14, +16 dBm; programmable
- nominal Output level relative to operating level (according to NAB):
  0, +4, +8, +10 dBm; programmable

(adjustment range of reproduce gain for operating magnetic flux of 100 - 1000 nWb/m)

Recorders with VU-meter panel and input/output level controls:
max. 10 dB increase in reproduce gain with output level control in uncalibrated mode.

Maximum output level:
- with output transformer: +24 dBm (load ≥ 200 Ω)
- without output transformer:
  - balanced load ≥ 200 Ω: +26 dBm
  - unbalanced load ≥ 200 Ω: +24 dBm
  - balanced load ≥ 600 Ω: +30 dBm (+26 dBm, if the nominal output level relative to operating level is set to 0/6 dBm)
  - unbalanced load ≥ 600 Ω: +24 dBm

Equalizations:

NAB and CCIR, switch-selectable

Equalization time constants:

	30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
CCIR	17.5/∞ µs (AES)	35/ ∞ µs	70/ ∞ µs	90/3180 µs
NAB	17.5/∞ µs (AES)	50/3180 µs	50/3180 µs	90/3180 µs

Frequency response record/reproduce:

	30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
±2 dB	40 Hz ... 22 kHz	30 Hz ... 20 kHz	30 Hz ... 16 kHz	30 Hz ... 10 kHz
±1 dB	60 Hz ... 20 kHz	30 Hz ... 18 kHz	30 Hz ... 12 kHz	30 Hz ... 8 kHz

Frequency response SYNC reproduction (from record head)
- Amplifier programmed for "narrow band":

	30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
±2 dB	60 Hz ... 12 kHz	30 Hz ... 12 kHz	30 Hz ... 8 kHz	------- -------

- Amplifier programmed for "wide band":

	30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
±2 dB	60 Hz ... 20 kHz	30 Hz ... 18 kHz	30 Hz ... 12 kHz	------- -------

Signal-to-noise ratios record/reproduce

CCIR [Equalization according to CCIR, or AES at 76 cm/s (30 ips), respectively. Measured with tape AGFA PER 528, BASF LGR 50 or equivalent type for 1/4" versions, with tape SCOTCH 3M 226 or equivalent type for 1/2" versions]

1/4" full track (320 nWb/m; 3.75 ips = 250 nWb/m), track width 6.3 mm

	76 cm/s 30 ips	38 cm/s 15 ips	19 cm/s 7.5 ips	9.5 cm/s 3.75 ips
Linear, RMS, 30 Hz - 20 kHz	63 dB	62 dB	61 dB	58 dB
Quasi-peak, weighted acc. to CCIR 468-2 (DIN 45405)	54 dB	53 dB	51 dB	48 dB
RMS, A weighted acc. to DIN 45633 as per IEC Publ. 179	68 dB	66 dB	64 dB	62 dB

1/4" stereo (510 nWb/m; 3.75 ips = 400 nWb/m), track width 2.75 mm

	76 cm/s 30 ips	38 cm/s 15 ips	19 cm/s 7.5 ips	9.5 cm/s 3.75 ips
Linear, RMS, 30 Hz - 20 kHz	65 dB	64 dB	62 dB	59 dB
Quasi-peak, weighted acc. to CCIR 468-2 (DIN 45405)	56 dB	54 dB	52 dB	50 dB
RMS, A weighted acc. to DIN 45633 as per IEC Publ. 179	69 dB	67 dB	65 dB	63 dB

1/4" two-track (510 nWb/m; 3.75 ips = 400 nWb/m), track width 2.0 mm

	76 cm/s 30 ips	38 cm/s 15 ips	19 cm/s 7.5 ips	9.5 cm/s 3.75 ips
Linear, RMS, 30 Hz - 20 kHz	63 dB	62 dB	60 dB	57 dB
Quasi-peak, weighted acc. to CCIR 468-2 (DIN 45405)	54 dB	52 dB	51 dB	48 dB
RMS, A weighted acc. to DIN 45633 as per IEC Publ. 179	68 dB	66 dB	64 dB	61 dB

1/2" two-track (510 nWb/m), track width 5.0 mm

	76 cm/s 30 ips	38 cm/s 15 ips	19 cm/s 7.5 ips	9.5 cm/s 3.75 ips
Linear, RMS, 30 Hz - 20 kHz	70 dB	70 dB	67 dB	-----
Quasi-peak, weighted acc. to CCIR 468-2 (DIN 45405)	65 dB	65 dB	62 dB	-----
RMS, A weighted acc. to DIN 45633 as per IEC Publ. 179	74 dB	73 dB	70 dB	-----

NAB [Equalization according to NAB, or AES at 30 ips (76 cm/s), respectively. Measured with tape SCOTCH 3M 226 or equivalent type)

1/4" full track (1040 nWb/m; 3.75 ips = 510 nWb/m), track width 6.3 mm

	30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
linear	75 dB	72 dB	74 dB	65 dB
RMS, weighted acc. to ASA-A	78 dB	76 dB	77 dB	69 dB

1/4" stereo (1040 nWb/m; 3.75 ips = 510 nWb/m), track width 2.75 mm

	30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
linear	72 dB	69 dB	70 dB	62 dB
RMS, weighted acc. to ASA-A	75 dB	73 dB	74 dB	65 dB

1/4" two-track (1040 nWb/m; 3.75 ips = 510 nWb/m), track width 2.0 mm

	30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
linear	70 dB	68 dB	69 dB	60 dB
RMS, weighted acc. to ASA-A	75 dB	72 dB	73 dB	64 dB

1/2" two-track (1040 nWb/m), track width 5.0 mm

	30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
linear	74 dB	72 dB	73 dB	-----
RMS, weighted acc. to ASA-A	77 dB	75 dB	76 dB	-----

Signal-to-noise ratios record/SYNC reproduction

Amplifier programmed for "narrow band":

NAB [Equalization according to NAB, or AES at 30 ips (76 cm/s), respectively. Measured with tape SCOTCH 3M 226 or equivalent type)

1/4" full track (1040 nWb/m), track width 6.3 mm

	30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
linear	75 dB	72 dB	74 dB	-----
RMS, weighted acc. to ASA-A	78 dB	76 dB	77 dB	-----

1/4" stereo (1040 nWb/m), track width 2.75 mm

	30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
linear	72 dB	69 dB	70 dB	-----
RMS, weighted acc. to ASA-A	75 dB	70 dB	74 dB	-----

1/4" two track (1040 nWb/m), track width 2.0 mm

	30 ips 76 cm/s	15 ips 38 cm/s	7.5 ips 19 cm/s	3.75 ips 9.5 cm/s
linear	70 dB	68 dB	69 dB	-----
RMS, weighted acc. to ASA-A	75 dB	72 dB	73 dB	-----

Distortion: (Record/reproduce, 1 kHz, measured with tape AGFA PER 528)

	76 cm/s 30 ips	38 cm/s 15 ips	19 cm/s 7.5 ips	9,5 cm/s 3.75 ips
CCIR, full track (320 nWb/m)	≤ 1,0 %	≤ 1,0 %	≤ 1,5 %	≤ 2,0 %
CCIR, stereo and 2-track (510 nWb/m)	≤ 1,0 %	≤ 1,0 %	≤ 1,5 %	≤ 2,0 %

Distortion: (Record/reproduce, 1 kHz, measured with tape SCOTCH 3M 226)

	30 ips 76 cm/s (510 nWb/m)	15 ips 38 cm/s (510 nWb/m)	7.5 ips 19 cm/s (510 nWb/m)	3.75 ips 9,5 cm/s (400 nWb/m)
NAB, full track	≤ 0,5 %	≤ 0,5 %	≤ 0,5 %	≤ 0,5 %
NAB, stereo/2-track	≤ 0,5 %	≤ 0,5 %	≤ 0,5 %	≤ 0,5 %

Cross-talk attenuation: (at 1 kHz, according to DIN 45521)

Stereo recorders: ≥ 55 dB
Two-track recorders: ≥ 65 dB

Erase efficiency: at 1 kHz and 510 nWb/m, 15 ips (38 cm/s)

Stereo recorders with full-track erase head: ≥ 80 dB
Two-track recorders with overlapping erasure: ≥ 75 dB

Erase and bias frequency:

153.6 kHz for all tape speeds

VU-meter:

Switchable between VU indication (according to IEC recommendation 268, Part 10, Section 4) and PPM (peak programme meter; according to IEC recommendation 268, Part 10, Section 3, except for 24, 1, scale division)

Power supply: (switch selectable)

100 V - 140 V or 200 V - 240 V; ±10% ; 50 or 60 Hz

Power consumption (at nominal voltage):

Stop (no tape loaded):	80 W
Recording on 2 channels, without TC:	130 W
Spooling:	160 W
Max. power consumption:	450 W

Disturbed operation: (transient line voltage failure)

Operating status unaffected by line voltage failures up to 100 ms

Ambient temperatures:

0° C ... +40° C (+32° F ... +104° F)

Relative humidity:

20% ... 90%, non-condensing

Safety standard:

According to IEC recommendation, publication 65, degree of protection I (line filter, power switch, power fuse, power transformers and line voltage selector conform to type I and II).

Weight:

- 1/4" versions:
  net: 53 kg ... 91 kg, depending on configuration
  gross: 73 kg ... 119 kg, depending on configuration (air freight)
  73 kg ... 119 kg, depending on configuration (sea freight)
- 1/2" versions:
  net: 53 kg ... 91 kg, depending on configuration
  gross: 73 kg ... 119 kg, depending on configuration (air freight)
  73 kg ... 119 kg, depending on configuration (sea freight)

TECHNICAL SPECIFICATION OF THE TIME CODE CHANNEL

The time code channel conforms to IEC publication 461, DIN 45511, part 7.

Track width/location:

0.38 mm, center of tape

Code format:

SMPTE/EBU 80 bits address code (selectable 24/25/29.97/30 frames/second)

Tape speeds:

30 - 15 - 7.5 ips
(76.2 - 38.1 - 19.05 cm/s)

Magnetic flux of the time code track:

729 nWb/m pp ±3 dB

Time code channel line input:

balanced and floating, with transformer.
Input impedance ≥ 10 kΩ

Input level:

nom.: 2 V pp
min.: 0.25 V pp
max.: 4 V pp

Time code channel line output:

balanced and floating, with transformer
Output impedance ≤ 40 Ω

Output level:

2 V pp, load ≥ 200 Ω

Cross talk attenuation code channel to audio:

≥ 90 dB for all components of the time code signal, relative to 510 nWb/m magnetic flux of audio track.

Tape travel time compensation electronics (TIME CODE DELAY UNIT):

switchable tape travel time compensation for:
- coincident time code and audio channel recording and reproducing, resp., at 24/25/29.97/30 frames/second
- M15A-TC compatible time code and audio channel recording and reproducing, resp., at 24/25/29.97/30 frames/second

Coincidence error between code and audio t ck: (if TIME CODE DELAY UNIT in coincident mode)

max. ±2 ms at 15 ips (38 cm/s)

1.5.1
Dimensions (in mm)

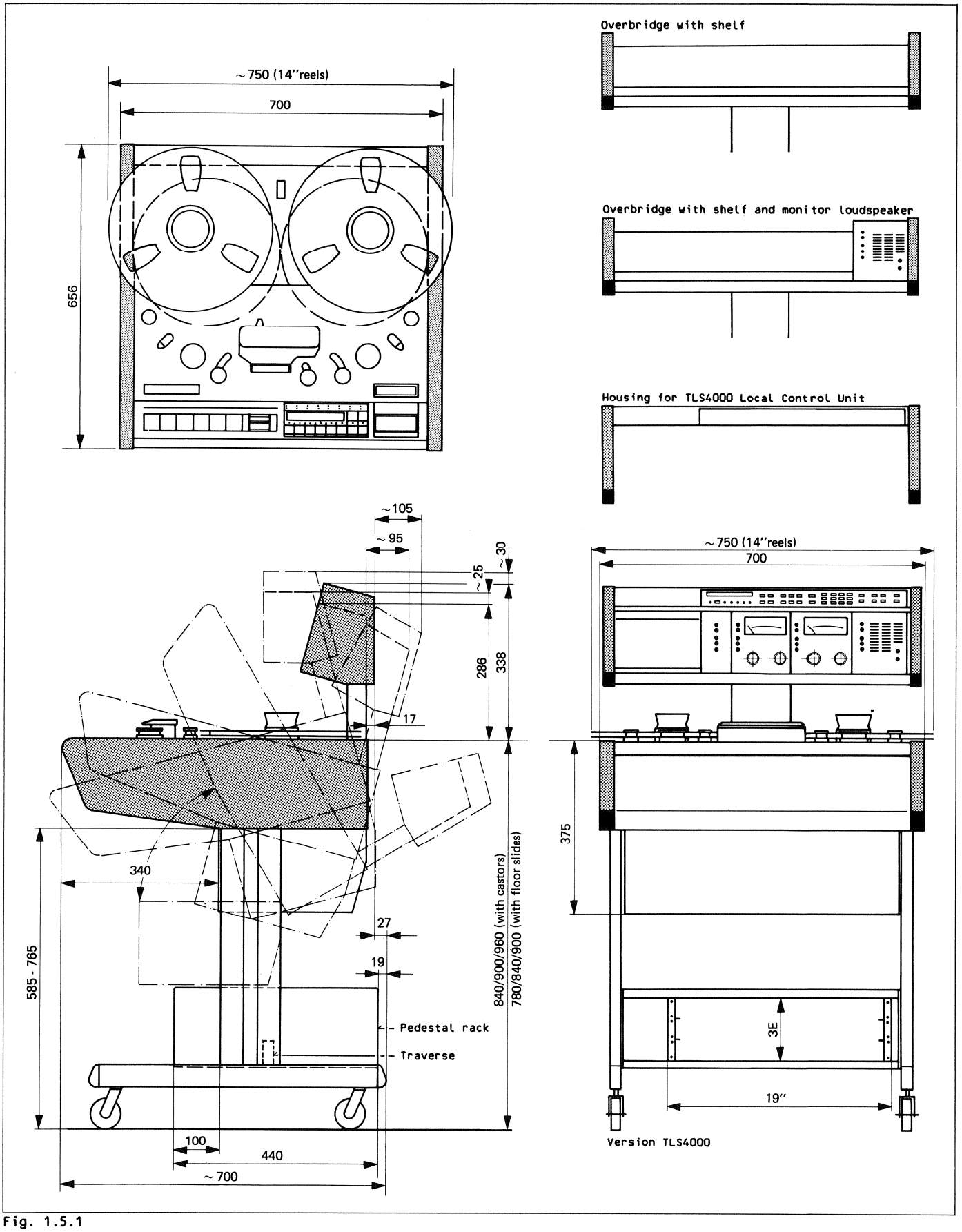


Fig. 1.5.1

1.5.2 Packing

Recorders with VU-meter panel:
Carton 82 x 84 x 120/126/132 cm (depending on console height)

Recorders without VU-meter panel:
Carton 82 x 84 x 93/99/105 cm (depending on console height)

Gross weight: 73 kg - 119 kg (depending on configuration)

1.5.3 Level diagrams

Refer to Section 7 (diagrams audio).

1.6 STANDARD CALIBRATION DATA

These data are values that are transferred from the ROM into the RAM and the latches of the audio amplifiers in the event that the RAM data are lost. These values ensure that the recorder can still be used despite this loss of data, albeit possibly with a minor degradation in audio quality. They are not intended as a substitute for individual calibration through which component and manufacturing tolerances can be compensated.

The data are represented as hexadecimal numbers, i.e. in the same form they also appear on the service display.

These data apply to 2 mm 2-channel machines, reference level (operating level) 320 nWb/m (or 257 nWb/m for 3.75 ips), tape type 3M 226.

Speed	Mode	Equal.	Level	Treble	Bass	Equal.
3.75	REPRO		82	70	90	95
3.75	RECORD		26	B0	30	BB
3.75	SYNC		00	00	00	00
7.5	REPRO	CCIR	66	39	80	87
7.5	RECORD	CCIR	30	A0	3E	75
7.5	SYNC	CCIR	62	50	96	87
7.5	REPRO	NAB	66	39	80	61
7.5	RECORD	NAB	30	A0	3E	99
7.5	SYNC	NAB	62	50	96	61
15	REPRO	CCIR	66	30	6A	44
15	RECORD	CCIR	30	54	46	BA
15	SYNC	CCIR	62	50	88	44
15	REPRO	NAB	66	30	6A	61
15	RECORD	NAB	30	54	46	99
15	SYNC	NAB	62	50	88	61
30	REPRO		66	38	48	26
30	RECORD		30	1B	50	DE
30	SYNC		62	50	60	26
Speed	Mode	Equal.	Level	Treble	Bass	Equal.

1.7 MAINTENANCE HINTS FOR THE SERVICE PERSONNEL

1.7.1 Abbreviations

A	assembly
ANT	antenna
B	bulb
BA	battery, accumulator
BR	optocoupler (bulb --> LDR)
C	capacitor
D	diode, DIAC
DL	LED
DLQ	optocoupler (LED --> phototransistor)
DLR	optocoupler (LED --> LDR)
DLZ	LED array, 7 segment display
DP	photodiode
DZ	rectifier
E	electronic part
EF	headphones
F	fuse
FL	filter
H	head (sound-, erase-)
HC	hybrid circuit (thick/thin film)
HE	hall element
IC	integrated circuit
J	jack (female)
JS	jumper
K	relay, contactor
L	inductor
LS	loudspeaker
M	motor
ME	meter
MIC	microphone
MP	mechanial part
P	plug (male)
PU	pick up
Q	transistor, FET, thyristor, TRIAC
QP	phototransistor
QPZ	phototransistor array
R	resistor
RP	light depending resistor (LDR)
RT	temperature sensitive resistor
RZ	resistor array
S	switch
T	transformer
TL	delay line
TP	test point
W	wire, stranded wire
X	socket, holder
XB	lamp socket
XF	fuse holder
XIC	IC-socket
Y	quartz, piezoelectric element
Z	network, array

These abbreviations may be combined (max. 3 characters).

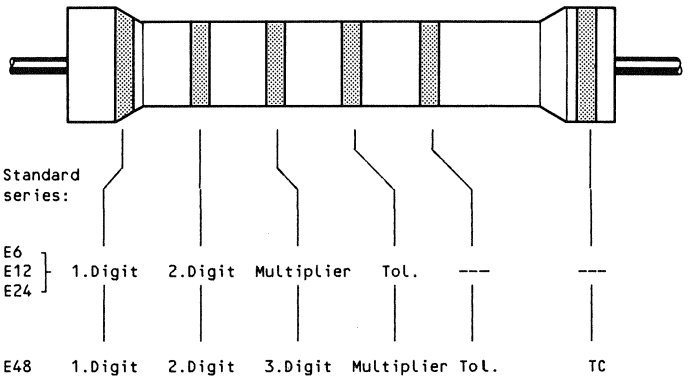
1.7.2 Powers of ten

Name	Abbreviation	Value
Tera-	T	10**12
Giga-	G	10**9
Mega-	M	10**6
Kilo-	k	10**3
Milli-	m	10**-3
Mikro-	µ	10**-6
Nano-	n (mµ#)	10**-9
Pico-	p (µµ#)	10**-12
Femto-	f	10**-15

frequently used in the United States

1.7.3 Code letters and colors

Resistors



Color	Digit	Multiplier	Tolerance	Temp.-coefficient
gold	-	0,01	5 %	-
silver	-	0,1	10 %	-
black	0	1	-	-
brown	1	10	1 %	100 * 10 ** -6 / K
red	2	100	2 %	50 * 10 ** -6 / K ##
orange	3	1 k	-	15 * 10 ** -6 / K
yellow	4	10 k	-	25 * 10 ** -6 / K
green	5	100 k	0,5 %	-
blue	6	1 M	0,25 %	-
violet	7	10 M	0,1 %	-
grey	8	-	-	-
white	9	-	-	-

either no mark for temperature coefficient, or red

Capacitors

The tolerance category is sometimes specified by a letter after the rated capacitance.

D = 0,5 %
F = 1 %
G = 2 %
J = 5 %
K = 10 %
M = 20 %

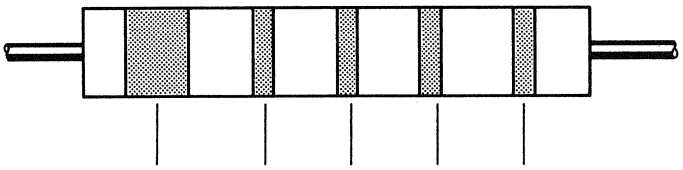
Inductors, transformers

Molded RF coils

A wide silver-colored ring and 4 thin, differently colored rings identify molded RF coils. The wide silver ring indicates the start of the counting direction. The second, third, and fourth ring indicate the inductance in micro Henry (µH), where two of the three rings represent the numeric value, the third one either a multiplier or the decimal point. In the latter case it has a golden color. The fifth ring identifies the tolerance in percent (±).

Color	Digit	Multiplier	Tolerance
black	0	1	-
brown	1	10	1 %
red	2	100	2 %
orange	3	10**3	-
yellow	4	10**4	-
green	5	10**5	0,5 %
blue	6	10**6	-
violet	7	10**7	-
grey	8	10**8	-
white	9	10**9	-
gold	,	-	5 %
silver	-	-	10 %
any (nat).	-	-	20 %

Examples:



silver gold* brown green silver = 0,15 µH 10%

silver red gold* violet --- = 2,7 µH 20%

silver grey red brown** gold = 820 µH 5%

* Decimal point
** Multiplier

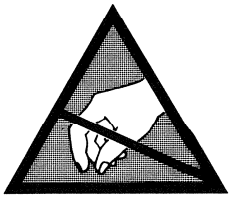
Inductors, transformers on ferrite cores

Inductors and transformers on ferrite cores are marked with three colored dots (for color codes, refer to the table in the section "Resistors", the two left-hand columns). These dots represent the last three digits of the STUDER standard number, the largest of them identifying the start. The first digits of the standard number (1.022.---) are always the same.

E.g.: Driver Transformer, 150 kHz.
Standard number: 1.022.211
Color code: red (large dot), brown, brown

Terminal 1 of the winding form is usually identified by a lobe; if not the winding form features a yellow dot near terminal No. 1.

1.7.4 Electrostatically sensitive semiconductor devices



MOS (Metal oxide semiconductor) devices are very sensitive to electrostatic charges. The following precautions should, therefore, be observed:

1. Electrostatically sensitive semiconductor devices and assemblies are stored and shipped in protective packing material. This protective packing is identified with the label illustrated above.
2. Strictly avoid contact of the connector pins with plastic bags and foils or other statically chargeable materials.
3. Ensure that your wrist is grounded before touching the connector pins.
4. Use a grounded, conductive plastic pad as a work surface.
5. Never unplug or insert printed circuit boards while the equipment is under power! The equipment must have been switched off for at least 5 seconds before any PCBs are pulled out or inserted!

2 INSTALLATION, OPERATING

CONTENTS

2. INSTALLATION, OPERATING

2.1 UNPACKING AND TESTING

The A820 tape recorder is delivered in special packing material which protects it from damage in transit. Care should be exercised when unpacking the recorder so that the equipment surfaces will not become marred.

Compare the content with the packing slip to ensure that the equipment is complete. Save the original packing material since it provides the best protection for your recorder for subsequent shipment.

Examine the complete content for possible transit damage. The forwarding company and the nearest STUDER dealer should be notified immediately in the event of damage.

2.2 PLACE OF INSTALLATION

The A820 tape recorder should be installed in a well ventilated location that is as dust-free as possible. The recorder specifications are guaranteed for ambient temperatures ranging from 0 to 40°C. The relative humidity (non condensing) should range between 20 and 90%.

Install the recorder in such a place that there is sufficient space for unrestricted ventilation. Particularly when a recorder is installed in a recess, localization of heat can occur. The air circulation zone should not be used as a storage area for manuals etc. when the recorder is being used.

The recorder must not be placed in close proximity to strong electromagnetic fields. General sources of such interference are: strong load fluctuations on adjacent power lines, high-power transformers, elevator motors, as well as nearby radio and television transmitters.

The back of the recorder should remain accessible for maintenance purposes. If the recorder is installed in a recess, sufficient clearance for shifting the recorder should remain even after the cables are attached.

2.3 INSTALLING THE TAPE RECORDER

The equipment specifications are guaranteed for any operating position between horizontal or ±7.5°and ±15° inclination.

2.3.1 Installation of console

The recorder is shipped in the disassembled condition. First the console side panels with mounted rollers or floor slides are to be screwed (Allen key 5 mm) to the traverse (or the rack base) after which the tape deck can be placed on top and fastened (Allen key 6 mm). Secure the wooden side panels with 4 screws each (Allen key 4 mm).

CAUTION !
DURING FAST WIND OPERATIONS THE CONSOLE TILTING MECHANISM MUST NOT BE ACTUATED - TAPE, REELS, REEL ADAPTORS, AND TAPE TRANSPORT COVER MAY BE SERIOUSLY DAMAGED AS A RESULT OF THE HIGH GYRO FORCES !

2.4
CONNECTOR PANEL

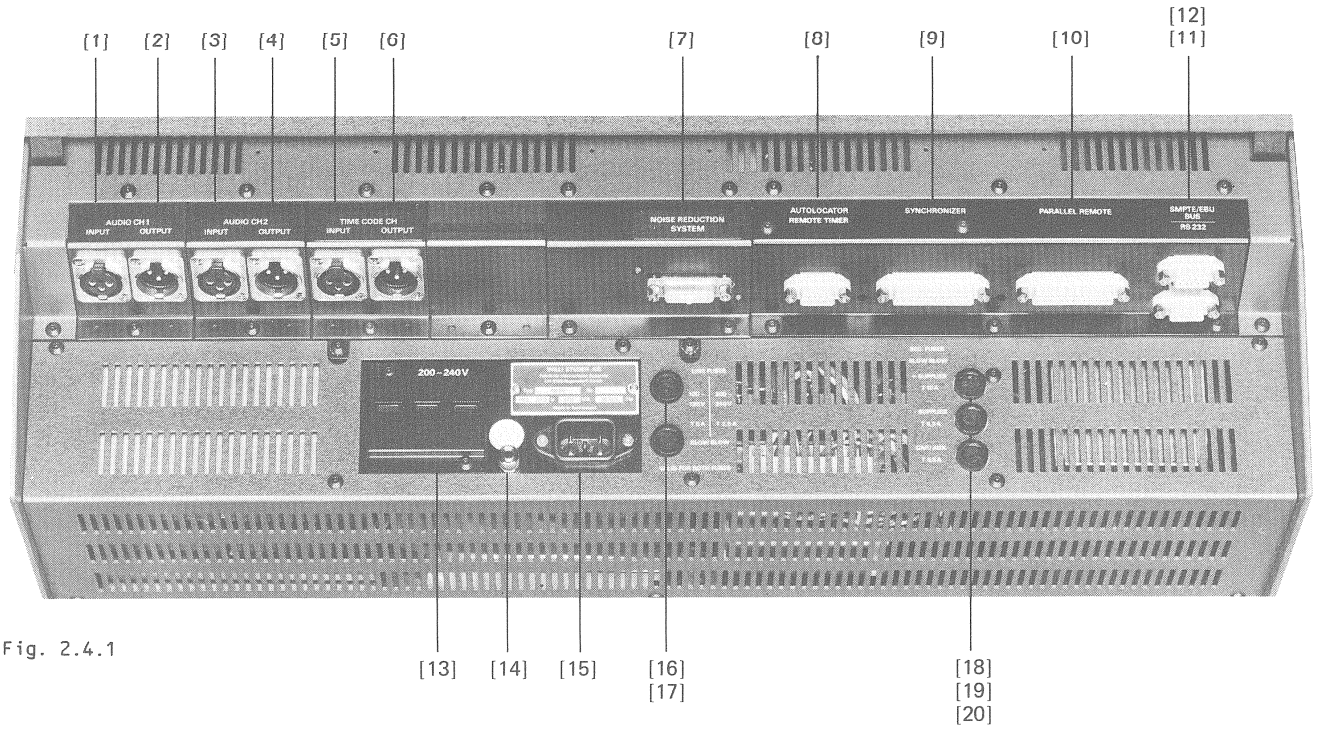


Fig. 2.4.1

[1], [2] CH1 line in- and output
[3], [4] CH2 line in- and output
[5], [6] Time code channel line in- and output
[7] Socket for noise reduction system (option)
[8] Socket for serial remote control, remote counter and autolocator (option)
[9] Socket for synchronizer (only for TC versions)
[10] Socket for parallel remote control
[11], [12] Parallel-connected terminals for SMPTE/EBU bus, RS232 interface or data back-up on external medium (option)
[13] Line voltage selector
[14] Ground terminal
[15] AC power connection (appliance inlet)
[16] Primary fuse (audio)
[17] Primary fuse (tape transport)
[18] Secondary fuse, +power supply
[19] Secondary fuse, -power supply
[20] Secondary fuse, capstan motor

2.4.1 AC power, voltage selector

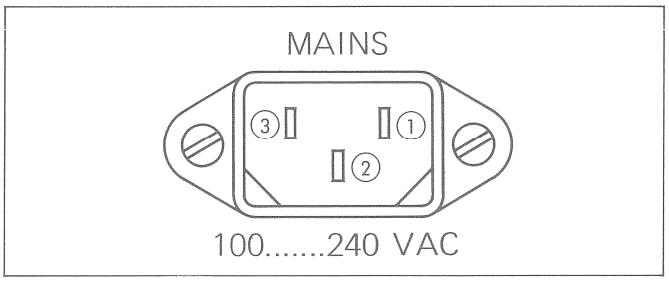


Fig. 2.4.2

No. 1 Phase
No. 2 Protector ground
No. 3 Neutral

Caution

Before the recorder is connected for the first time, verify that the setting of the voltage selector on the rear panel of the recorder matches the local line voltage. The following line voltages can be set: 100...140 or 200...240 VAC, ±10%.

Disconnect the recorder from the AC supply before making any changes! Unfasten the cover of the voltage selector (2 screws, Allen key No. 2.5), change over three switches and reinstall the cover, rotated by 180°.

After the voltage selector setting has been changed, the power fuses have to be replaced with those of the correct rating.

100...140 VAC: T 5 A (slow)
200...240 VAC: T 2.5 A (slow)

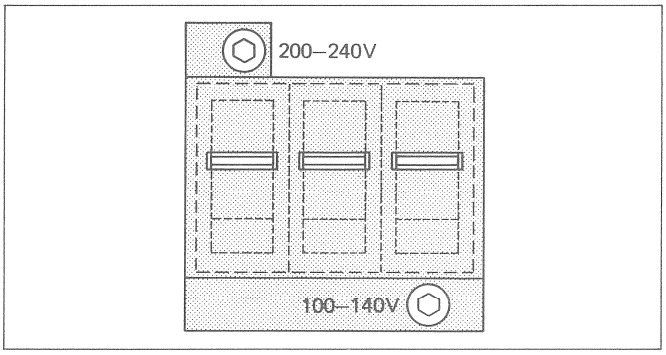


Fig. 2.4.3

2.4.2 Line input and output

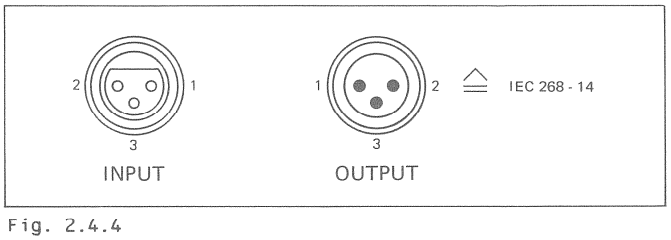


Fig. 2.4.4

The balanced inputs and outputs are terminated on XLR male or female sockets (described in the IEC recommendation 268-14).

No. 1 Audio ground
No. 2 A-line (hot) *
No. 3 B-line (cold)
* The A-line is hot if the recorder is connected to an unbalanced source.

2.4.3 Remote control connectors

Connector PARALLEL REMOTE CONTROL

A 25-pin connector (female, type D) permits connection of a parallel remote control with the following features:
- Remote control of tape transport functions with acknowledgment (<, >, PLAY, STOP, REC)
- RESET TIMER (resetting of the tape counter)
- ZERO LOC (automatic searching of the tape counter address 0.00.00.0)
- LOC START (automatic searching of the tape counter address at which the last PLAY command was entered)
- LIFTER (cancellation of the tape lift during spooling for as long as the key is pressed)
- FADER (enabling of fader start circuit)
- VARISPEED (variable tape speed)

Connector set	Part No. 20.020.303.16
Connector housing, 25-pin	Part No. 54.13.7022
Connector, 25-pin, coded	Part No. 10.217.001.06

Pin assignment of the PARALLEL REMOTE CONTROL connector:

Pin	Signal name		Designation
01	+0.0		Ground
02	BR-REW	*	Acknowledgment lamp, REWIND
03	BR-FORW	*	Acknowledgment lamp, FORWARD
04	BR-VRSPD	*	Acknowledgment lamp, VARISPEED (if active, alternating LOW and HIGH)
05	SR-VRSPD	+	Switch for VARISPEED command
06	SR-FADRY	+	Switch for FADER START READY command
07	BR-LOCST	*	Acknowledgment lamp LOC START
08	BR-FADRY	*	Acknowledgment lamp FADER START READY
09	BR-REC	*	Acknowledgment lamp RECORD
10	SR-RESET	+	Switch for RESET TIMER command
11	FAD1		Input FADER START command, line A
12	FAD2		Input FADER START command, line B (FADER START active if 5 to 24 V AC or DC between pins 11 and 12)
13	IR-REFEX		Input for ext. capstan PLL reference (nominal 9.6 kHz, TTL level recommended; max. input voltage = +10 V)
14	SR-OLOC	+	Switch for ZERO LOC command
15	BR-PLAY	*	Acknowledgment lamp, PLAY
16	BR-STOP	*	Acknowledgment lamp, STOP
17	SR-LIFT	+	Switch for LIFTER command
18	SR-LOCST	+	Switch for LOC START command
19	SR-REC	+	Switch for RECORD command
20	SR-REW	+	Switch for REWIND command
21	SR-FORW	+	Switch for FORWARD command
22	SR-PLAY	+	Switch for PLAY command
23	SR-STOP	+	Switch for STOP command
24	KEY		Coding
25	+24.0		Supply +24 V (300 mA max.)

* Open collector output, active LOW. No internal pull-up resistor, max. HIGH level = 30 V. Sink current 200 mA max., internal current limit resistor 22 Ω.
+ Switch input, LOW level activates command. Internal pull-up resistor 4.7 kΩ connected to +24 V, max. HIGH input level = 30 V. Logic levels: LOW: 0 V to 4 V; HIGH: 7.5 V to 30 V.

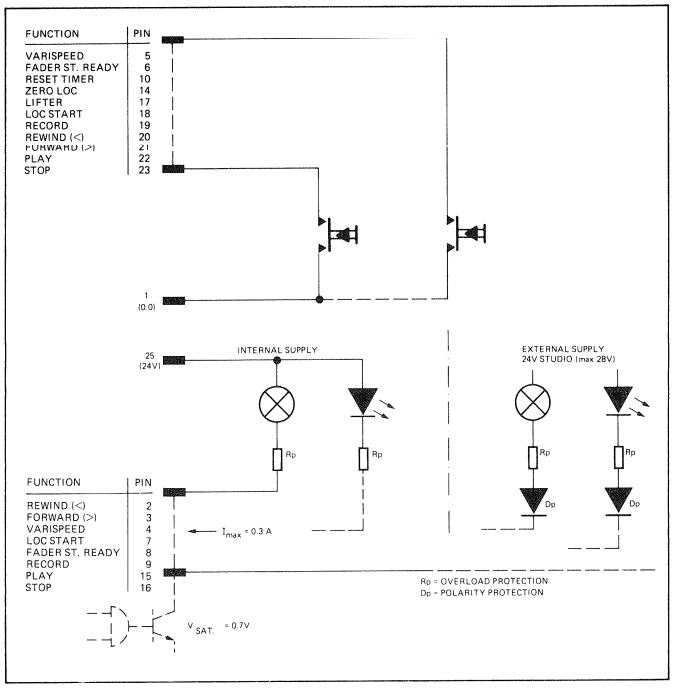


Fig. 2.4.5 REMOTE CONTROL CIRCUIT

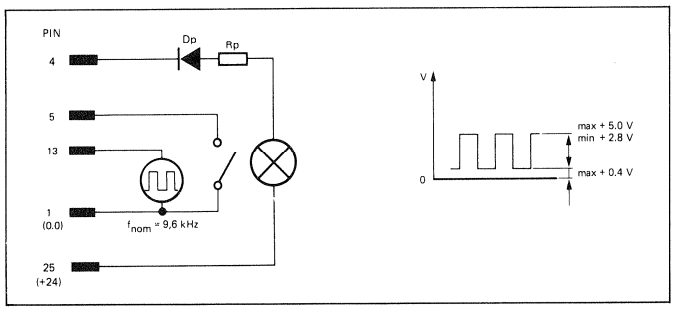


Fig. 2.4.6 VARISPEED CONTROL CIRCUIT

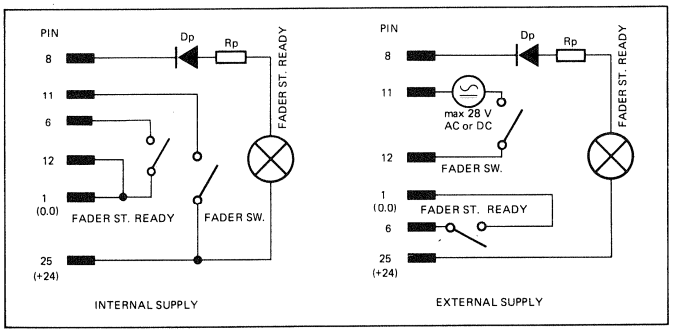


Fig. 2.4.7 FADER START CIRCUIT

Caution!
If light bulbs are used as acknowledgment lamps, their inrush current must not exceed 0.3 A.

Connector EXTERNAL SYNCHRONIZER

A 25-pin connector (female, type D) is available for connecting an external synchronizer.

Only for time code versions.

Connector set	Part No. 20.020.303.15
Connector housing, 25-pin	Part No. 54.13.7022
Connector, 25-pin, coded	Part No. 10.217.001.05

Pin assignment of the EXTERNAL SYNCHRONIZER connector:

Pin	Signal name		Designation
01	+0.0		Ground
02	BR-REW	*	Acknowledgment lamp, REWIND
03	BR-FORW	*	Acknowledgment lamp, FORWARD
04	BR-VRSPD	*	Acknowledgment lamp, VARISPEED (if active, alternating LOW and HIGH)
05	SR-VRSPD	+	Switch for VARISPEED command
06	SR-REHSL	+	Switch for REHEARSAL command
07	OR-MVCLK	*	Output for TAPE MOVE CLOCK signal (512 pulses/15", on/off ratio 50 %)
08	KEY		Coding
09	BR-REC	*	Acknowledgment lamp RECORD
10	OR-MVDIR	*	Output for signal TAPE MOVE DIRECTION (Rewind = LOW, forward = HIGH)
11	OR-CMCLK	*	Output f. signal CAPST. M. MOVE CLOCK (1200 pulses/sec. @ 7.5 ips)
12	OR-SYENB		Output for signal SYNCHRONIZER ENABLE (LOW if tape loaded & recorder ready; HIGH if tape not tensioned)
13	IR-REFEX		Input for ext. capstan PLL reference (nominal 9.6 kHz, TTL level recommended; max. input voltage = +30 V)
14	+0.0		Ground
15	BR-PLAY	*	Acknowledgment lamp, PLAY
16	BR-STOP	*	Acknowledgment lamp, STOP
17	SR-LIFT	+	Switch for LIFTER command
18	SR-MUTE	+	Switch for MUTE command (TC channel not affected)
19	SR-REC	+	Switch for RECORD command
20	SR-REW	+	Switch for REWIND command
21	SR-FORW	+	Switch for FORWARD command
22	SR-PLAY	+	Switch for PLAY command
23	SR-STOP	+	Switch for STOP command
24	KEY		Coding
25	+24.0		Supply +24 V (300 mA max.)

* Open collector output, active LOW. No internal pull-up resistor, max. HIGH level = 30 V. Sink current 200 mA max., internal current limiting resistor 22 Ω.

\+ Switch input, LOW level activates command. Internal pull-up resistor 4.7 kΩ connected to +24 V, max. HIGH input level = 30 V. Logic levels: LOW: 0 V to 4 V; HIGH: 7.5 V to 30 V.

Connector for RS232 interface and SMPTE/EBU BUS, or RS232 interface and data save

This 9-pin connector (female, type D) permits connection of either a terminal with RS232 interface (ASCII protocol) or a tape recorder for saving the Audio parameters (option 1.810.751.00), or of a terminal with RS232 interface (binary protocol) or the SMPTE/EBU bus (RS422) (option 1.820.751.20).

Connector set part No. 20.020.303.07

- Pin assignment of the RS232 or SMPTE/EBU bus connector (option 1.820.751.00)

RS232	
Pin	Signal name
01	SHIELD
02	---
03	RX
04	0.0 V
05	---
06	0.0 V
07	TX
08	---
09	SHIELD

RS422	
Pin	Signal name
01	SHIELD
02	TRANSMIT A
03	RECEIVE B
04	RECEIVE COM.
05	---
06	TRANSMIT COM.
07	TRANSMIT B
08	RECEIVE A
09	SHIELD

- Pin assignment of the RS232 or data save connector (option 1.810.751.00)

Pin	Signal name
01	FRMGND
02	TRANSA
03	RECEIVB
04	FRMGND
05	SPARE
06	TRANSCM
07	TRANSB
08	RECEIVA
09	FRAMGND

Connector AUTOLOCATOR/REMOTE TIMER

The 9-pin connector (female, type D) permits connection of a serial remote control, of a remote counter, or an autolocator.

The keys of the serial remote control can be programmed by the user as desired. All functions can be operated with the remote control that are available on the local keyboard. The functions programmed for the serial remote control do not necessarily have to be the same as those on the local keyboard!

Pin assignment of the AUTOLOCATOR/REMOTE TIMER connector:

Pin	Signal name
01	SHIELD
02	N.C.
03	TR-A
04	KEY
05	+0.0
06	N.C.
07	TR-B
08	SIG.GND
09	+REMSUP

Connector NOISE REDUCTION SYSTEM

The 15-pin connector allows the remote control of the record/reproduce switchover of a two-channel noise reduction system (DOLBY <R> or TELCOM <R>).

Connector set part No. 20.020.303.08

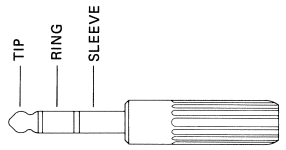
Pin assignment of the NOISE REDUCTION SYSTEM connector:

Pin	Signal name	Designation
01	B-BDY-01 *	Control signal for DOLBY system, CH1
02	B-BDY-02 *	Control signal for DOLBY system, CH2
03	N.C.	
04	N.C.	
05	N.C.	
06	N.C:	
07	N.C.	
08	N.C.	
09	N.C.	
10	N.C.	
11	B-TCL-01 +	Control signal for TELCOM system, CH1
12	N.C.	
13	B-TLC-02 +	Control signal for TELCOM system, CH2
14	+24.0	
15	+0.0	

* Open collector output, active LOW. No internal pull-up resistor. Max. HIGH level 30 V, max. current 200 mA.
\+ Open collector output, as above, but active HIGH.

2.4.4 Headphones socket

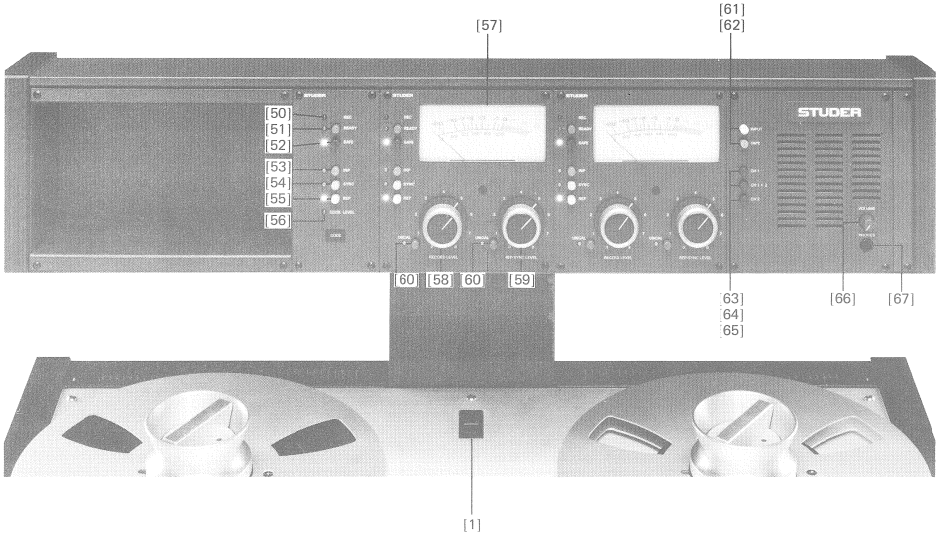
TIP = left-hand
RING = right-hand
SLEEVE = ground

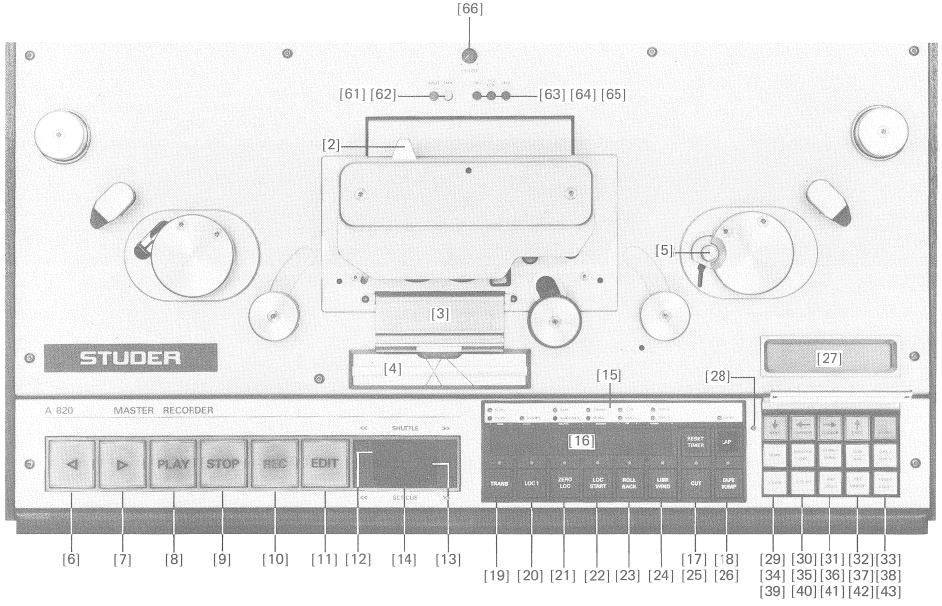


STEREO PLUG

Fig. 2.4.8

2.5 OPERATING INSTRUCTIONS





There are four standard versions with differently programmed (and correspondingly labeled) key sets which in the following are referred to with the letters A...D.

Version A

Recorder types: A820-0.75, A820-2, A820-2 F, A820-1

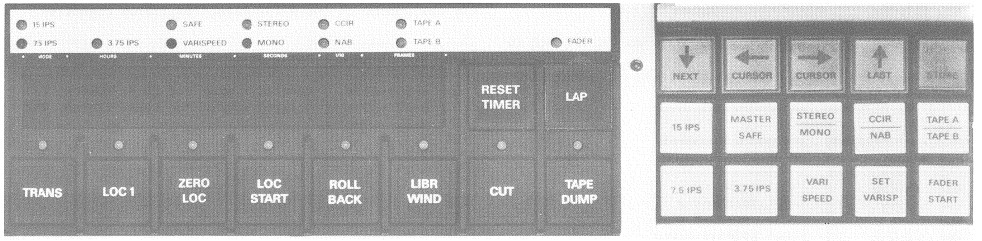


Fig. 2.5.1

Version B

Recorder types: A820-0.75 VU, A820-2/2 VU, A820-2 VU, A820-1 VU

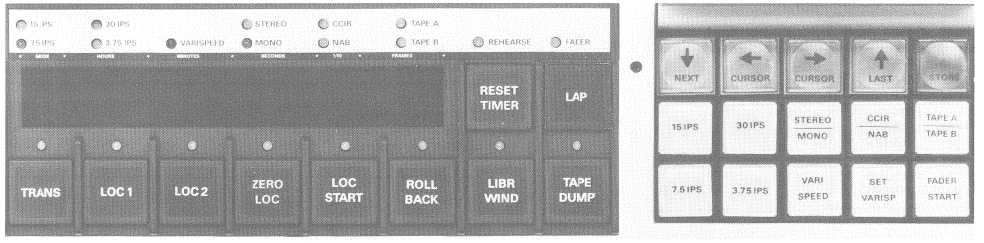


Fig. 2.5.2

Version C

Recorder types: A820-2 TC, A820-2 TC VU

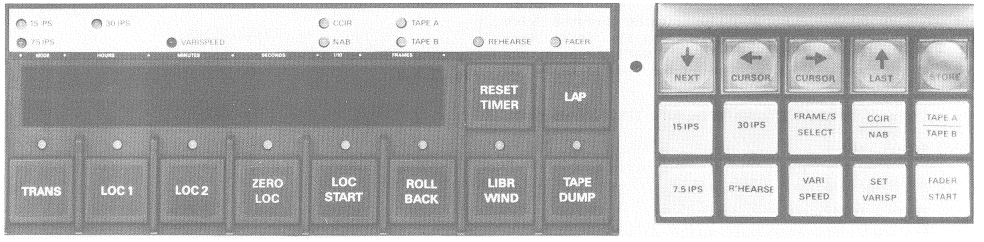


Fig. 2.5.3

Version D

Recorder type: A820-2/2-1/2" VU

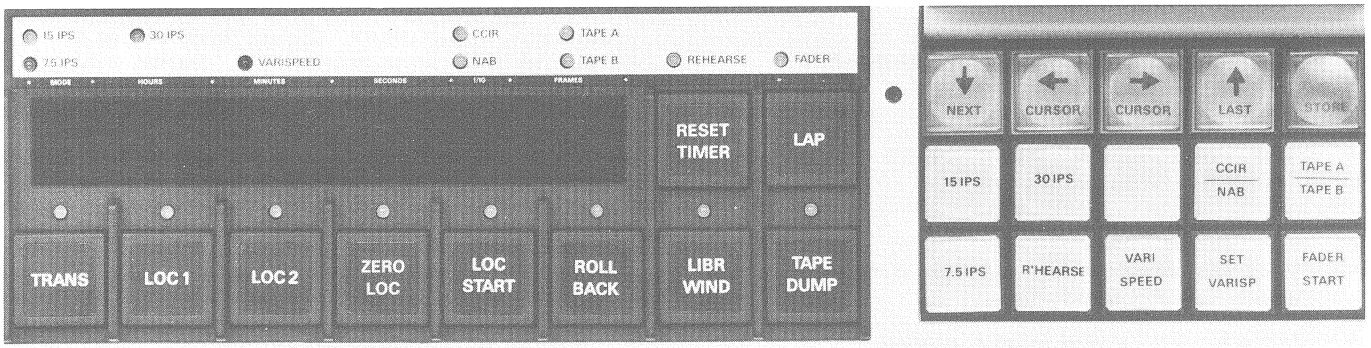


Fig. 2.5.4

A self-adhesive status indication label with the complete labeling is bypacked in the accessories. It can be used if the keys need to be assigned differently than has been programmed for the standard version.

After the existing status indication label has been removed, the still vacant lamp sockets can be fitted with the bypacked LEDs after which the new status indication label can be glued on and the recorder programmed as desired.

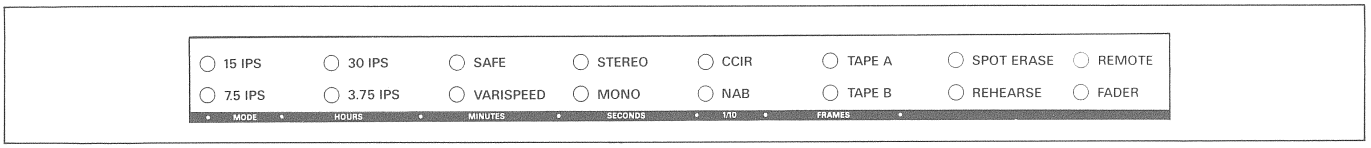


Fig. 2.5.5

2.5.1 Controls

[1] Power switch
[2] Tape lift slider
[3] Head shield, can be closed or opened manually
[4] Splicing block
[5] Tape scissors

Main key field:
[6] <: Rewind key
[7] >: Fast forward key
[8] PLAY: reproduce key
[9] STOP: has priority over all tape command keys and cancels a synchronizer loop.
If STOP is pressed together with LOC START or LOC1...5, the stored locator addresses will be displayed.
Certain function keys (e.g. STEREO/MONO, CCIR/NAB, TAPE A/TAPE B, FRAME/S SELECT, OFFSET ON/OFF) can only be operated if STOP is pressed simultaneously.
[10] REC: record key, only effective together with PLAY. In reproduce mode it is possible to switch directly to record (RECORD B) by pressing REC, or by pressing PLAY + REC (RECORD A), depending on the programming.
[11] EDIT: editing function, activates the SET/CUE wheel. On the other hand, the position of the anti-scrape flutter roller is adjusted in a way that the tape can easily be gripped on the left-hand side of the head block.
[12] SHUTTLE wheel: permits positioning of the tape with continuously variable speed. Center position = STOP, left-hand limit position = maximum SHUTTLE rewind speed, right-hand limit position = maximum SHUTTLE fast forward speed.
[13] SHUTTLE BAR: bar between SHUTTLE wheel [12] and SET/CUE wheel [14]. The spooling speed selected with the SHUTTLE wheel can be stored by pressing the SHUTTLE BAR.
[14] SET/CUE wheel: multifunction wheel:
- In conjunction with EDIT [12] key: permits positioning of the tape; the tape moves in synchronism with the SET/CUE wheel. In the case of a time code version, the code is read generally with the right-hand code head and without delay compensation as long as EDIT is active.
- In conjunction with the service display [27] and cursor keys [28] through [32]: either for "paging" in the menu or as a potentiometer knob for adjusting the audio and several tape transport parameters.
- In conjunction with the VARISPEED function: knob for adjusting the desired tape speed.
- In conjunction with the functions SET ADDRESS and SET TIMER for entering the locator addresses and for setting the tape counter display.

Secondary key field:
[15] Display field for keys [33] through [42].
[16] LED tape counter display. Real-time indication for all tape speeds in hours, minutes, seconds, and tenths of seconds; switchable to indication of a second counter with arbitrarily selectable reference.
[17] RESET TIMER: reset button for tape counter display [16].
[18] LAP: switch for changing over the (main) tape counter to a second counter with arbitrarily selectable reference. As long as the content of the second counter is indicated, the display shows an "L".
[19] TRANS: The momentary tape address is stored (transferred) in the corresponding memory location. The actual tape address is stored by pressing one of the keys LOC1 through LOC5.
Pressed together with PLAY: reproduction in reverse direction.
[20] LOC1: the address stored with [19] is searched automatically. The LOCATE address is displayed for as long as this key is pressed. The internal memory is referred to the tape position, i.e. if the tape counter is set to zero with the RESET TIMER button, the new LOCATE address is automatically calculated.
[21] ■ LOC ZERO (version A): the tape address corresponding to the counter reading 0.00.00.0 is searched automatically. Is referred in normal tape counter mode as well as in LAP mode to the current zero position.
■ LOC2 (versions B, C, D): analogous to LOC1 [20].
[22] ■ LOC START (version A): automatically searches the tape address at which the last PLAY command was entered during standstill of the tape, followed by STOP (function LOC START STOP), PLAY (function LOC START PLAY) or RECORD (function LOC START REC).
Default programming: LOC START PLAY.
■ LOC ZERO (versions B, C, D): see [21].
[23] ■ ROLLBACK (version A): rewinds the tape by a programmable distance from 1 to 59 seconds. Default value: 15 sec. Followed by three programmable possibilities: STOP (ROLLBACK-A), PLAY (ROLLBACK-B) or RECORD (ROLLBACK-C).
Default: ROLLBACK-B.
[24] ■ LIBRARY WIND (version A): Reduced spooling speed for library tapes. Preselection key, activates spooling with reduced speed together with one of the spooling keys [6] or [7]. Pressing the LIBRARY WIND button a second time cancels the function.
Programmable from 0.1 to 15 m/s in steps of 0.1 m/s.
Default value 5 m/s.
■ ROLLBACK (versions B, C, D): see [23]
[25] ■ CUT (version A): positions the tape address that is currently located in front of the reproduce head gap to the tape scissors.
■ LIBRARY WIND (versions B, C, D): see [24].
[26] TAPE DUMP: waste basket mode. Four programmable possibilities: TAPE DUMP-A, tape counter enabled; TAPE DUMP-B, tape counter disabled; TAPE DUMP-C, waste basket mode is prepared by pressing the TAPE DUMP key, start with PLAY, interruption with STOP, tape counter enabled; TAPE DUMP-D, same as TAPE DUMP-C, tape counter disabled.

[27] LCD service display; alphanumeric display for indicating the software status, speed deviations in varispeed mode, error messages, programming of audio and tape transport parameters, etc.

Function and programming key field (below cover):
[28] Switch for activating the programming key field (to protect the functions and parameters from being altered inadvertently this key field is controlled with an Allen key No. 2.5).
Screw in the counterclockwise limit position: programming enabled, screw in the clockwise limit position: programming disabled. Only the first six tape deck parameters (hub diameter left/right, reduced spooling speed, maximum spooling speed, ROLLBACK time, and maximum reel diameter) can be altered and stored. The audio parameters can be modified but not stored. I.e. after switching the recorder off and on again, the previous audio parameters are loaded.
The acknowledgement of receipt of an error messages is possible by pressing STORE.

[29] ↓/NEXT: ┐
[30] CURSOR/←: │ keys for paging through the menu and for moving the cursor on the service display
[31] CURSOR/→: │
[32] ↑/LAST: ┘

[33] STORE: button for storing a changed audio or tape transport parameter, for changing over a function that is not assigned to a specific key, for reprogramming a push button function (when pressed together with the corresponding button) or for acknowledging receipt of an error message.

[34] 15 IPS: speed selection (15 ips, 38 cm/s).

[35] ▪ MASTER SAFE (version A): record inhibition for recorders without SAFE/READY switch.
▪ 30 IPS (versions B, C,D): speed selection (30 ips, 76 cm/s).

[36] ▪ STEREO/MONO (versions A, B): Stereo/mono selector (only together with STOP!).
▪ FRAMES/S SELECT (only version C): selection of time code type (24/25/29.97/30 frames/s). Only together with STOP!
▪ --- (version D): "no function" key, key not assigned.

[37] CCIR-NAB: Selector for equalization standard (only together with STOP!).

[38] TAPE A - TAPE B: selector for two tape types (only together with STOP!).

[39] 7.5 IPS: speed selection (7.5 ips, 19 cm/s).

[40] ▪ 3.75 IPS (versions A, B): speed selection (3.75 ips, 9.5 cm/s).
▪ REHEARSE (versions C, D): simulation of electronic editing. After record mode has been activated, the channels with SYNC status are automatically switched to INPUT (Prerequisite: function IN-OUT DEL = ON, refer to 2.6.3).

[41] VARISP. ON/OFF: on/off switch for variable tape speed.

[42] SET VARISP.: enables VARISPEED input through SET/CUE wheel.

[43] FADER: disables the local keyboard, fader start circuit is given prioritity. Four programmable possibilities:
▪ FADER A: FADER START without enable key. After FADER START has been performed, the local keyboard is disabled and the built-in monitor speaker (but not the headphones socket) is muted. When the fader is restored (= no voltage on the remote control socket), the recorder switches to STOP, muting of the monitor speaker is only cancelled when the tape stands still.
▪ FADER B: FADER START with enable key (FADER START READY), local keyboard remains active when FADER START is enabled. After FADER START has been performed, the local keyboard is disabled; default programming.
▪ FADER C: same as FADER START B, however local keyboard is disabled when FADER START is enabled.
▪ FADER D: FADER START with enable key (FADER START READY), the local keyboard remains active even when FADER START is enabled. After FADER START has been performed, the built-in monitor speaker (however not the headphones socket) is muted. If after FADER START has been performed one of the buttons of the local keyboard is pressed in PLAY mode, muting of the monitor speaker is cancelled. If FADER START is not enabled, actuation of the FADER switch does not change the operating state of the tape recorder.

If the tape should be torn during FADER START mode, the tape trasnport has to be reactivated with the FADER switch.

Controls in the overbridge (if configured):

[50] REC: record indicator lamp; turned on when the channel is switched to record.

[51] SAFE: channel disabled for recording.

[52] READY: channel ready for recording.

[53] INP: input signal is connected to the output.

[54] SYNC: sync signal is connected to the output

[55] REP: reproduce signal is connected to the output.

[56] CODE LEVEL (on code channel control only): time code indication; turns on when the time code is reproduced from the tape or when the time code level on the input of the recorder is large enough (depending on the setting of the input selector INP/SYNC/REP).

[57] Output meter: VU meter or PPM instrument, internally switchable.

[58] RECORD LEVEL: level control for record mode.

[59] REPRO/SYNC LEVEL: level control for reproduce or sync reproduce mode.

[60] UNCAL: activates the level control. Switched off: calibrated line level.

Controls for the monitor speaker (in overbridge or in the tape transport cover):

[61] INPUT: the input signal of the recorder can be heard via the monitor speaker.

[62] TAPE: the output signal of the recorder can be heard via the monitor speaker.

[63] CH1: Channel 1 is connected to the monitor speaker.

[64] 1+2/CUE: the sum of both channels (or the CUE channel, for TC versions only) is connected to the monitor speaker. Function programmable with jumpers.

[65] CH2: Channel 2 is connected to the monitor speaker.

[66] VOLUME: volume control for the monitor speaker.

[67] PHONES: headphones socket (on versions with overbridge = adjacent to the monitor speaker, on versions without overbridge = on the left-hand side above the flap of the amplifier bay).

2.5.2 Power switch

CAUTION!

Before switching on the recorder for the first time, check that the setting of the AC voltage selector on the back of the recorder matches the local line voltage. If the setting of the AC voltage selector is changed, check also the rating of the power fuse. The power switch is located at the top edge of the tape transport cover.

The last operating state is automatically reestablished and indicated after the power is switched on.

Exceptions: the recorder always enters STOP mode (the STOP button flashes if no tape is mounted or if the tape is mounted loosely). Recorders equipped with a SAFE/READY switch are switched to SAFE; the function MASTER SAFE is not affected.

When the recorder is switched on, the microprocessor automatically tests the main functions; any error is indicated on the service display.

2.5.3 Pilot lamps

During the power-on sequence, i.e. while the processor is *being started, certain keys and indicator lamps may* turn on, i.e. also READY and REC. However, the record function is electronically inhibited during this time. After power-on the following keys or pilot lamps (LEDs) turn on and indicate the current operating state of the recorder:

- STOP: the STOP function is active. If this key flashes this means that both tape tension sensors are in their limit positions (no tape, or tape mounted loosely).
- CCIR or NAB: indication of the selected equalization.
- STEREO or MONO
- TAPE A or TAPE B: indication of the selected tape type.
- Tape speed: indication of the selected tape speed, e.g. 15 or 7.5 ips (38 or 19 cm/s).

Depending on the configuration of the tape recorder, the following may also turn on:
- Level meters
- On the track selector: SAFE
- UNCAL (if the button is pressed).
- On the output selector, the selected signal (INP, SYNC, or REC) connected to the output is indicated.

For a few seconds, the service display indicates the software status of the tape recorder (creation date of the master software, calendar week / year), followed by a list of options with which the recorder can be equipped plus possible error messages in plain text, or the message "no errors detected" and subsequently the current machine status (line level, for TC versions also offset and selected time code type).

On the right above the amplifier bay, six green LEDs indicate that the supply voltages are available (+5.6 V, +24 V, +15 V, -15 V, +26 V, -26 V). The three secondary fuses are also checked. If they are in order, one green LED each (+SUPPLIES, -SUPPLIES, CAP./AUX) is turned on.

2.5.4 Mounting the tape

Adapters for three-pronged (ciné) reels and for DIN hubs are engaged in the spindle mounting; adapters for NAB reels or hubs are inserted in the spindle mounting and secured by pressing on the round button in the center of the adapter. All adapters can be released by lightly pressing against the rim of the spindle.

Three-pronged reel with flange: (DIN 45514, 45517)

Mount adapter for three-pronged reels. Mount reels on the spindles. Pull out the three-pronged guide and lock it by rotating it 60°.

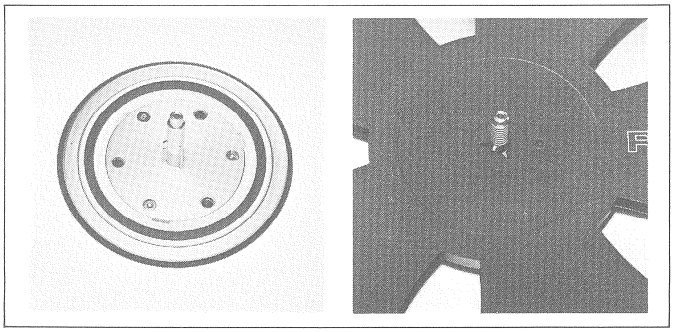


Fig. 2.5.6

NAB reel:

Mount NAB adapter. **LOCK THE ADAPTERS BY PRESSING THE ROUND BUTTON IN THE CENTER !** Use NAB reel or, if self-supporting pancakes are used, place an NAB hub on the adapter and turn the upper section of the adapter clockwise until it engages.

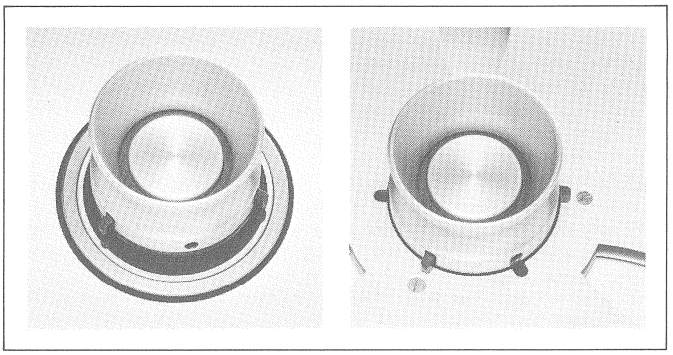


Fig. 2.5.7

Self-supporting pancakes:

(Hub according to DIN 45515)
Mount DIN adapter, place pancake platters on the adapters and engage the driving lugs of the platter in the holes of the adapter.

Mount the pancake and the pancake platter in a way that the white driving lugs engage. Lift the flap and rotate it by 90° until it rests on the white driving lugs.

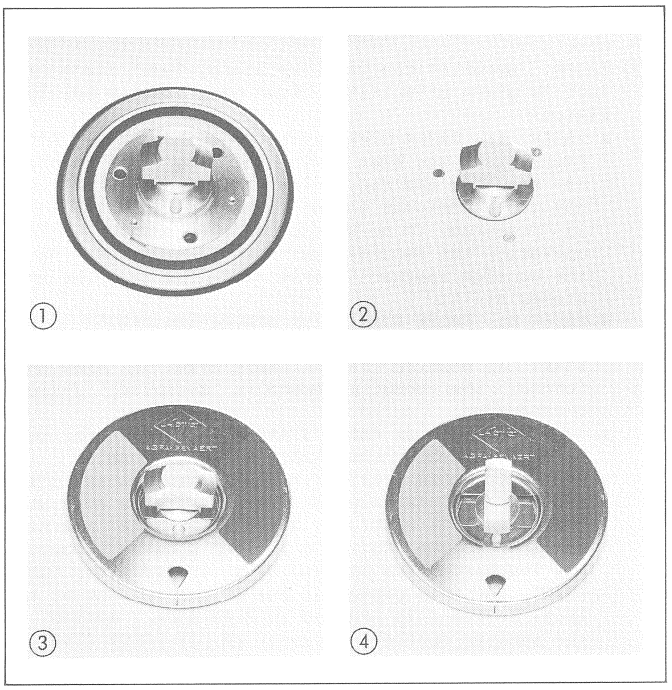


Fig. 2.5.8

Threading the tape

Important!
The shield of the soundheads must be opened before the tape is threaded.

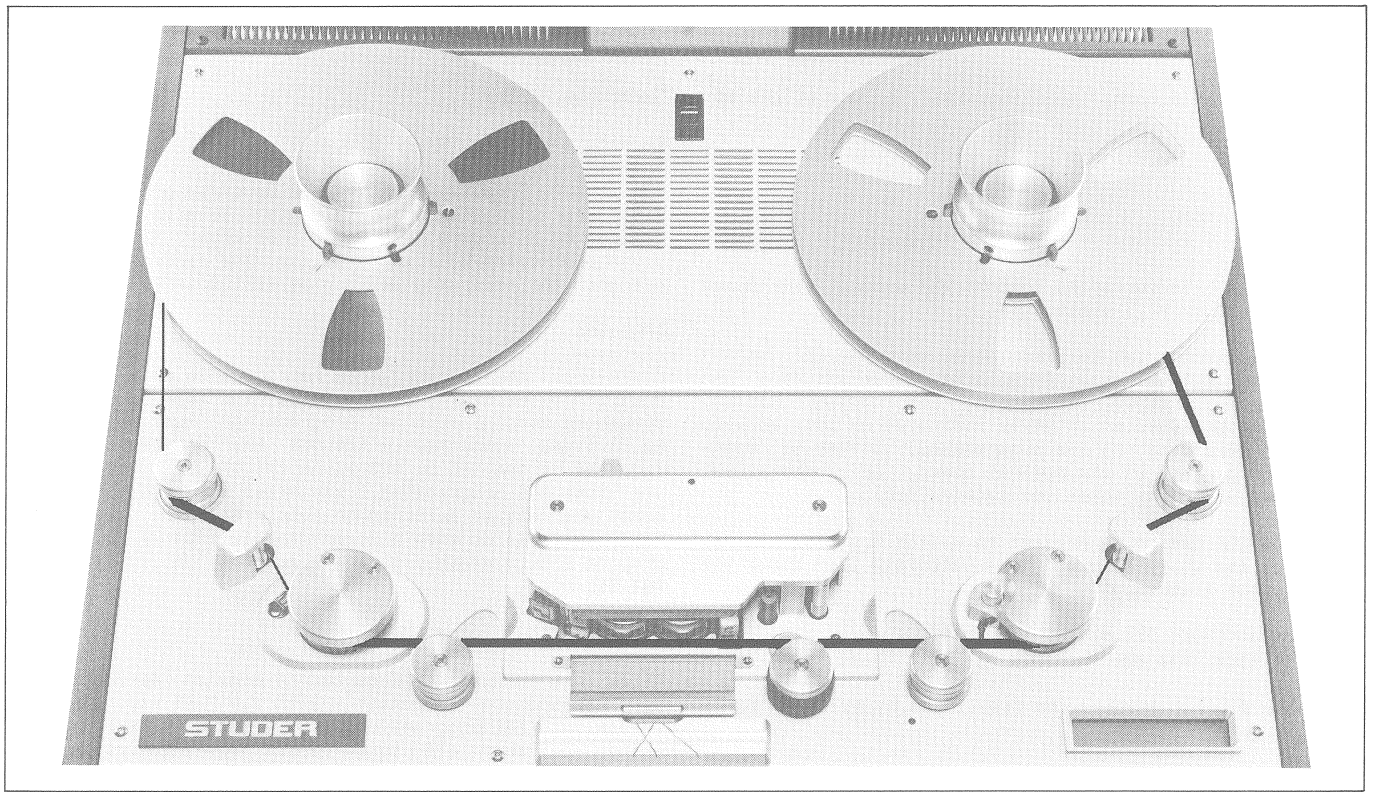


Fig. 2.5.9

Thread the tape as shown in the illustration. The leading end of the tape is placed on the empty reel and secured with a few counterclockwise rotations. As soon as the tape is tensioned, the tape transport starts up and the STOP key flashes. When one of the tape command keys is pressed, the tape tension circuit is enabled and the A820 is ready for operation.

Set tape counter to zero by pressing the RESET TIMER key. Also raise the shield over the soundheads if necessary.

2.5.5 Tape speeds

Up to four tape speeds are available; various versions are programmed for the three most frequently used tape speeds (e.g. the lowest tape speed is not programmed for the time code versions, because time code operation with 3.75 ips is not possible).

The tape speed is selected by pressing the corresponding speed button below the hinged cover. The corresponding pilot lamp turns on.

2.5.6 Play mode

The recorder is switched to PLAY mode either with the built-in PLAY key, the PLAY key on a remote control, or a fader start device. The PLAY button turns on.

The PLAY function can be cancelled by pressing the STOP key.

If PLAY is pressed while a recording is in progress, the recorder switches to PLAY mode immediately. If PLAY is pressed during spooling, braking will be initiated, the PLAY functions is preselected, and the PLAY key flashes. As soon as the tape has reached the nominal speed, the recorder switches automatically to reproduce mode and the light in the PLAY key is steady.

It is possible to switch from reproduce mode directly to spooling mode or a locator function.

2.5.7 Reverse play

A tape location can be searched by switching the recorder to REVERSE PLAY by pressing TRANS and PLAY together. If programmed, the same function is activated by the REVERSE PLAY key.

From reverse play mode it is possible to switch directly to normal reproduction, spooling, EDIT, or one of the locator functions.

2.5.8 Varispeed control

With the built-in varispeed control the nominal tape speed can be varied by ±7.5 semitones.

The speed change can be preselected with the SET VARISP key and the SET/CUE wheel (the latter functions as a potentiometer), without influencing the current nominal speed. The preselected speed is indicated on the service display, depending on the programming, either in semitones, in percent of the nominal speed, or as the actual tape speed value in inches per second (ips).

The VARISPEED button is pressed to switch from the nominal speed to the changed speed - the VARISPEED lamp above the tape counter flashes.

If the functions SET VARISP and VARISPEED are active at the same time, the speed change is implemented immediately

(with the SET/CUE wheel). The result can be heard directly during playback.

The time-delay compensation for record drop-in and drop-out (refer to 2.5.9) is adjusted for nominal speed only. When recording in VARISPEED mode corresponding displacements occur.

2.5.9 Recording

The A820 is put into record mode by simultaneously pressing PLAY and REC. The lamps above these two keys turn on.

If PLAY and REC are pressed during spooling, braking of the tape is initiated. The record function is preselected and the REC and PLAY keys flash. As soon as the tape has reached the nominal speed, the A820 automatically enters record mode and the illumination of the two keys is steady.

It is possible to switch from record mode directly to spooling or a locator function.

Recorders with SAFE/READY keys:

Recording on the corresponding channel can be disabled by pressing the SAFE key. The yellow SAFE lamp turns on. When PLAY and REC are subsequently pressed, the tape transport starts, however, the audio signals recorded on the the track protected with SAFE are retained and can be monitored (REP or SYNC).

In order to prepare a channel for a recording, the corresponding READY key must be pressed. The green pilot lamp turns on. When the recording function is activated with PLAY and REC, the red REC lamp turns on and signals that recording mode has been activated.

During a recording the channels can be protected directly with SAFE. In order to reenable them for recording, the READY buttons must be pressed first; after the READY lamps turn on, either the PLAY and the REC keys or only the REC key must be pressed, depending on the internal programming.

On 2-channel recorders the internal programming determines whether the channel mode selectors work on both channels in parallel or separately for each channel (function CH CONTR PAR/INDIV).

Recorders with MASTER SAFE key:

The MASTER SAFE function is used as erase protection for recorders without SAFE/READY keys. It also can be programmed on recorders with SAFE/READY keys. Then it is an erase protection with top priority. The recorder cannot be prepared for recording as long as MASTER SAFE is active.

Drop-in:

Click-free change-over from reproduction or sync reproduction to recording is possible. Two methods can be implemented through internal programming: PLAY and REC must be pressed concurrently (RECORD A), or the recording function is enabled by REC alone (RECORD B). Depending on the internal programming, the erase head and the record head are either switched on concurrently or the record head switches on with a speed-dependent delay so that the drop-in occurs exactly at the same location (function IN-OUT DEL Y/N).

Drop-out from record mode:

Click-free change-over from record mode to reproduction or sync reproduction is possible with the PLAY key. Depending on the internal programming, the erase and the record are either switched off concurrently or the record head switches off with a speed-dependent delay so that the drop-out occurs exactly at the same tape location (function IN-OUT DEL. Y/N).

Drop-out with STOP or SAFE always switches record and erase heads off concurrently.

Overlapping drop-in, mechanical (FADE IN/FADE OUT):

If, for example, an applause is to be faded in at the end of a production, the tape can be lifted off the record head and the erase head with the tape lift slider [2]. The A820 is subsequently started in record mode. When the slider is slowly released, the tape contacts the record head first; the new modulation is added to the existing signals (e.g. end of a music selection). After the music selection has faded out, the tape lift slider is to be released completely so that the tape comes in contact with the erase head. Unwanted noise will be erased and only the applause is recorded.

2.5.10 Sync reproduction

Sync reproduction is activated by pressing the SYNC key. In this mode the tape induces an audio signal in the record head. This signal is amplified and equalized in the reproduce amplifier. Accurate drop-in is possible in sync reproduction mode since there is no speed-dependent time offset between the record and the reproduce head.

Sync reproduction is not advisable at a speed of 3.75 ips (quality generally inadequate!). For this reason all sync audio parameters for this speed have been set to 00. However, it is still possible to calibrate the tape recorder also for 3.75 ips and sync reproduction if the user is willing to accept the degraded quality.

The reproduce bandwidth in sync mode is limited to approximately 12 kHz. For special mixdowns the bandwidth can be extended to 20 kHz (refer to Section 4.9.2). At frequencies above 12 kHz, strong cross talk from the recording channel to the sync reproduction channel must, however, be expected.

Sync preselection:
Sync reproduction mode can be preselected on a channel switched to record mode. If the SYNC button is pressed during a recording, the output of the corresponding channel is connected to the input (INP). This channel is automatically switched to sync reproduction when the recording mode is canceled (PLAY, SAFE, STOP).

2.5.11 Spooling mode

Fast forward or rewind is activated by pressing > and <. The recorder spools with the programmed speed (max. 15 m/s). The corresponding pilot lamp turns on.

The spooling functions are canceled by STOP, PLAY, REC+PLAY, SHUTTLE, LOC functions, CUE, and by spooling in the opposite direction.

Direct change-over from rewind to fast forward and vice versa or from playback or recording to spooling is possible.

It is possible to switch from spooling mode directly to record and play. The pilot lamp of the preselected function flashes, the tape is braked, and the new function is activated as soon as the tape travels at the nominal speed.

Tape lift off:

During spooling the tape is automatically lifted off the soundheads in order to reduce the wear on the soundheads.

The tape transport assembly can be engaged by pressing the LIFTER button.

> CAUTION !!
> DURING FAST WIND OPERATIONS THE CONSOLE TILTING MECHANISM MUST NOT BE ACTUATED - TAPE, REELS, REEL ADAPTORS, AND TAPE TRANSPORT COVER MAY BE SERIOUSLY DAMAGED AS A RESULT OF THE HIGH GYRO FORCES !!

2.5.12 LIBRARY WIND (reduced spooling speed)

The reduced spooling speed available with the LIBRARY WIND function is intended for tapes that are to be stored in a library. The speed ranges between 0.1 and 15 m/s and can be programmed in increments of 0.1 m/s (default: 5 m/s). Spooling with reduced speed is initiated by pressing the LIBRARY WIND key and one of the spooling keys < or >.

This function is stopped by pressing LIBRARY WIND a second time.

2.5.13 Stop mode

The STOP key has top priority and cancels all other operating modes such as reproduction, recording, spooling, and autolocator. After this key has been pressed, the STOP pilot lamp turns on and tape braking is initiated; the STOP key flashes until the tape stands still after which the illumination of the STOP key becomes steady.

When the tape stands still the tape tension control loop, however, is active (exception: tape torn or unthreaded). This makes it easier to shuttle the tape by hand for editing purposes.

Any new operating mode entered while the tape is being decelerated will be stored and activated as soon as the tape reaches the nominal speed.

If STOP is pressed and (while STOP is held) also one of the keys LOC1...LOC5, the corresponding locator addresses are displayed on the tape counter.

Some of the function keys can only be used if they are pressed together with STOP (e.g. tape type selection (TAPE A/TAPE B), equalization selection (CCIR/NAB), mono/ stereo changeover (STEREO/MONO), switchover of the time code standard (FRAMES/S and OFFSET ON/OFF)).

2.5.14 Locator

The following modes are supported by the Locator function:

- ZERO LOC: zerolocator. This key initiates a rewind (or fast forward) to the tape address that corresponds to the counter reading 0.00.00.0, as well for the main or the second counter display.
- LOC START (programmable): this key initiates a rewind (or fast forward) to the tape address at which the last play command was entered during standstill of the tape. Depending on the programming either STOP (function LOC START STOP), reproduce (function LOC START PLAY) or recording (function LOC START REC) is activated. Default programming: LOC START PLAY.
- LOC1...LOC5 (programmable): transfer locator. Up to five tape positions can be stored and automatically searched in spooling mode by pressing one of these keys.

The locate procedure can be interrupted with: <, >, STOP, EDIT, or 2 x PLAY.

Programming:

Search the desired tape address and press the TRANS key when the approximate position has been reached. The address can be stored as long as the TRANS pilot lamp is on. As soon as the exact position has been found, press one of the corresponding LOC keys. The TRANS pilot lamp turns off to acknowledge that the address has been transferred into memory. The TRANS key must be pressed again before a new address can be stored.

Reading out an address:

During a LOC operation: by pressing the corresponding LOC button again. In STOP mode: press STOP and corresponding LOC button.

PLAY or REC preselection:

If the PLAY key is pressed (or PLAY + REC) while a locate function is in progress (ZERO LOC, LOC START, LOC1...5), the recorder switches automatically to reproduction or to recording after the corresponding tape address has been found.
All locate addresses are retained in memory even after the recorder has been switched off.

CAUTION!

Since the stored tape addresses relate to the actual tape positions, any undesirable offsets can occur if the RESET TIMER button is pressed inadvertently!

2.5.15 Tape counter

The electronic tape counter always displays the real time in hours, minutes, seconds, and tenths of seconds, regardless of the selected nominal speed.

The display capacity is −9 h 59 min 59.9 s to 23 h 59 min 59.9 s. Values outside the display capacity are indicated with "U" (underflow) and "O" (overflow) in the tens-of-hours position; e.g. O4.00.00.0 or U9.59.58.0. Fractional tenths of seconds are rounded to the nearest second. The timer can be reset to 0.00.00.0 by pressing the RESET TIMER key.

When the end of the tape is reached or if a tape tears, the tape counter is automatically stopped. In dump edit mode (TAPE DUMP) the tape counter is either stopped automatically or it continues to count, depending on which of the four TAPE DUMP modes has been programmed (standard programming: TAPE DUMP A, the counter continues to count with the information obtained from the capstan motor tacho).

2.5.16 LAP mode

By pressing the LAP key the tape counter display can be switched over from the main counter to indication of a second tape counter with arbitrarily selectable reference. An "L" appears in the first position of the display.

The second counter can be set to zero at any tape address (with RESET TIMER button) and can, for example, be used for measuring the exact playing time of a selection without having to compute the difference between the starting and the ending time.

The display is switched back to normal mode by pressing the LAP key a second time. The "L" in the first position disappears.

Locator addresses are referred to the tape positions and are preserved when switching to LAP mode (and back to normal tape counter mode).

2.5.17 Remote controls

The following functions can be activated from the parallel remote control: reproduction, recording, spooling, stop, RESET TIMER, ZERO LOC, LOC START, RECAP (rewind for as long as this key is pressed, followed by PLAY) or LIFTER (canceling of the tape lift during spooling), and FADER (FADER START ready).

It is possible to assign all the functions to the keys of the serial remote control that can be programmed for the local keyboard, but independent of the programming of the local keyboard. I.e. on the serial remote control there may be programmed different key functions as on the local keyboard. In addition the serial remote control features a tape counter and a SHUTTLE wheel. The programming of the key functions is executed in the same way as for the local keyboard.

- Operation with programmable function REMOTE A:
  When the REMOTE key is pressed, the corresponding pilot lamp turns on and the local keyboard is disabled. When the REMOTE key is pressed a second time, the local keyboard is reenabled and the pilot lamp turns off. In the latter condition the keys on the remote control have no effect.

- Operation with programmable function REMOTE B:
  When the REMOTE key is pressed, the corresponding pilot lamp turns on; the remote control buttons and the local keys have the equal priority. When the REMOTE key is pressed a second time, only the local keys are active and the pilot lamp turns off. In the latter condition the keys on the remote control have no effect.

- Operation without the functions REMOTE A and REMOTE B:
  The REMOTE LED always turned on, the keys on the local and on the remote keyboards are always active.

With the fader start circuit the tape recorder can be switched to reproduction from the remote control device. The FADER START mode can be prepared (FADER START READY) by a switch that interconnects contact 6 (signal SR-FADRY) and contact 1 (ground). Applying an AC or DC voltage from 5 V to 24 V to contacts 11 and 12 switches the tape recorder to reproduce mode. This preparation can also be made with the programmable FADER key on the local keyboard or the serial remote control, or with the FADER key on the parallel remote control. The same function as is related to the local FADER key - FADER A, B, C, or D - is activated.

- Operation with the programmable function FADER A:
  FADER START without preparation key. After the FADER START has been performed, the local and the remote control keyboards are disabled; the built-in monitor speaker (but not the headphones socket) is muted. When the fader is retracted (fader switch opens), the recorder is switched to STOP, however, muting of the monitor speaker is only canceled when the tape has come to a standstill.

- Operation with the programmable function FADER B: FADER START with enable key (FADER START READY). The local and the remote control keyboards are also active when FADER START is enabled. After the fader start has been performed, the local keyboard is blocked, = default programming.

- Operation with the programmable function FADER C: Same as FADER START B, but in this function the local and the remote control keyboards are disabled when FADER START is enabled.

- Operation with the programmable function FADER D: FADER START with enable button (FADER START READY), the local and the remote control keyboard are also active when FADER START is enabled. After the FADER START has been performed, the built-in monitor speaker (but not the headphones socket) is muted. Muting of the monitor speaker is canceled, if, after FADER START, one of the buttons of the local or remote keyboard is pressed. If FADER START is not enabled, actuation of the fader switch does not change the operating state of the recorder.

2.5.18 VU-meter panel

The level indicator can be switched internally to function as a peak program meter (PPM) or a VU-meter.

UNCAL: when this key is pressed, the corresponding level control is activated and the pilot lamp turns on. When the UNCAL key is released, the level control is bypassed and the input or the output level is set to line level.

Output selector:

INP: connects the input signal to the output and to the VU-meter of the recorder.

SYNC: connects the sync reproduction signal (from the record head) to the output and the VU-meter of the recorder. This mode can be preselected for the record function. (As long as the corresponding channel is in record mode it is switched to INPUT because reproduction with the record head is not feasible during a recording. SYNC reproduction is automatically activated as soon as the channel is switched to READY or SAFE).

REP: connects the reproduce signal to the output and the VU-meter of the recorder.

Source/tape monitoring can be conveniently activated during recording by pressing the INP and REP keys.

INP, SYNC and REP always cancel each other.

In 2-channel models the operating procedure is determined by internal programming, i.e. it affects either both channels together or each individual channel (function CH CONTR PAR/INDIV).

2.5.19 Monitor speaker

In models without overbridge, the monitor speaker is built into the tape transport cover, in models with overbridge it is built into the monitor panel. On models with overbridge the headphones socket is located on the monitor panel, on models without overbridge it is located on the left above the amplifier bay.

With the (mutually releasing) switches INPUT and TAPE the operator can switch between the input and the output of the recorder (before the corresponding level controls).

Monitoring of channel 1 (CH 1) and channel 2 (CH 2) is possible. In addition either the sum of both channels or the CUE channel (time code) can be monitored (1+2/CUE), depending on the position of the jumpers on the monitor amplifier. Refer to section 4.9.6. When the jumpers on the monitor amplifier are plugged into the CUE position, the sum of both channels can still be monitored by simultaneously pressing the keys CH1 and CH2.

The volume can be adjusted with the VOLUME knob.

2.5.20 Mono/stereo switch (option)

Stereo recorders can be configured with a mono/stereo switch. This switch is also retrofittable. The last operating mode will be automatically reestablished and indicated after the recorder is switched on.

Simultaneous pressing of STOP and STEREO/MONO switches from stereo to mono mode and vice versa.

If the mono/stereo module is not installed, the corresponding pilot lamps STEREO and MONO remain dark.

2.5.21 Test generator (option)

The controls for the test generator are located on the front edge of the test generator module. For operating the generator it is necessary to open the flap of the amplifier bay!

The test generator is switched on by pressing the upper key (REF lamp turns on, i.e. the reference frequency, normally 1 kHz, is selected). Repetitive pressing of this key changes over the frequencies as follows:
- 60 Hz - 125 Hz - REF - 10 kHz - 16 kHz - OFF - REF - 60 Hz - etc.

With the lower button the generator level can be switched over from nominal level to nominal level -10 dB. If -10 dB is selected, the gain in the reproduce branch of the mono/stereo switch is automatically boosted by 10 dB; this means that the reference value of the VU-meter display is again 0 dB for measurements with tape.
The lower button is only enabled if the test generator has previously been switched on with the upper button. After switching the generator off and on again with the upper button always nominal level is present at its output.

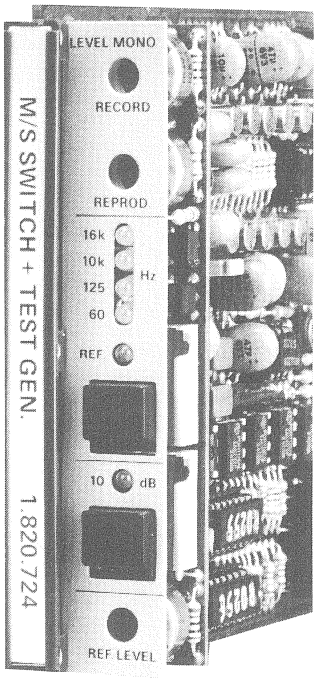


Fig. 2.5.10

2.5.22 Time code channel (only for TC versions)

Time code recording

Press the READY button on the time code channel control unit; the READY lamp turns on. Start the A820 in record mode with REC and PLAY; the REC lamp turns on. Or, while a recording is in progress, press READY and, depending on the programming, press REC + PLAY or just REC.

Time code reproduction

Press REP or SYNC and start the A820 in record mode by pressing PLAY.

Depending on the position of the input selector the green CODE LEVEL lamp turns on if a time code signal is available on the TC line input (INPUT position) or read from the tape (REP or SYNC), respectively.

2.5.23 Editing, tape splicing

Searching a tape location with spooling:

If the desired tape address is approximatively known (e.g. the beginning or the end of a selection), it can be approached with the spooling function. Press the programmable LIFTER key so that the tape lift pin is pushed behind the soundheads and the modulation can be cued. As soon as the cue point is reached, the tape can be fine-positioned by repeatedly pressing < and >, by actuating the SHUTTLE wheel or by pressing EDIT and turning the SET/CUE wheel. Press STOP and bring the tape by hand in the exact splicing position by carefully rotating one of the two reel flanges by hand.

Search with PLAY:

If certain segments with unknown locations are to be cut out of a program, they can be searched with normal PLAY mode. When one of these segments has been located, press the STOP key and position the tape into the correct cutting position by carefully rotating one of the two reel flanges by hand.

Search with autolocator

The tape address 0.00.000 can be automatically searched with the spooling function. The start of a program is programmatically stored in memory and can be automatically searched with the LOC START key if the recording has not been interrupted.

While a program is being recorded, 1 to 5 tape addresses can be stored directly, depending on the programming of the recorder, by pressing TRANS and LOC1 (...5) in the desired tape position. When the corresponding LOC button is pressed, the desired tape address is automatically searched; the exact editing position can now be adjusted manually.

Cutting with built-in tape scissors (only 1/4" versions)

Pressing the programmable CUT key positions the location in which the tape is to be cut exactly to the built-in scissors. The tape is cut by pressing a button. By pressing the TAPE DUMP key a segment of tape that is to be discarded can be played into the waste basket (see TAPE DUMP mode).

Cutting at the reproduce head

With magnetically neutral scissors that tape can be easily lifted off the reproduce head and cut in front of the head gap (center of head face).

Marking the tape, cutting in splicing block

Mark the center of the reproduce head face on the tape with the aid of a soft pencil or a grease pencil.

The marked position is placed into the splicing block (in front of the headblock) and cut with a razor blade.

Splicing the tape

Place the two tape segments with the marked side facing upward into the splicing block. Butt the two ends together (without overlapping!) and secure it with an approximately 20 mm long 1/4" (or 1/2", resp.) wide piece of adhesive tape.

2.5.24 Dump edit mode

In dump edit mode the right-hand spooling motor is switched off. Unwanted tape segments can be played into the waste basket by activating this mode.

When the TAPE DUMP key is pressed, the recorder switches either to PLAY, or TAPE DUMP mode is preselected - see below. The right-hand spooling motor remains switched off. Four versions of this mode are available:

- TAPE DUMP A (default programming for all four standard versions): tape counter active, function to be canceled with STOP or by pressing TAPE DUMP again.
- TAPE DUMP B: same as TAPE DUMP A, however the tape counter is blocked.
- TAPE DUMP C: pressing TAPE DUMP preselects dump edit mode; activation by pressing PLAY, interruption only in STOP mode, by pressing TAPE DUMP again.
- TAPE DUMP D: same as TAPE DUMP C, however the tape counter is blocked.

Winding up a loose piece of tape

In the event that too much tape is played into the waste basket in tape dump mode it is not necessary to laboriously rewind the tape by hand. Simply thread the tape (or let it be threaded) as illustrated in Fig. 2.5.11 and carefully tension the loose tape end with two fingers. Keep the rewind key pressed: the left-hand (supply) reel turns clockwise and rewinds the tape. This operation can be canceled by releasing the REWIND key.

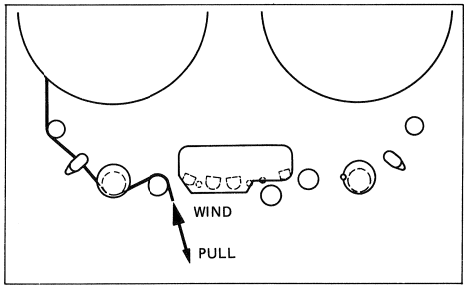


Fig. 2.5.11

The torque of the motor is limited and controlled in such a way that the tape can be easily braked by hand. If you let loose of the tape end, the motor turns very slowly. Its speed can be increased by lightly pulling on the tape.

The same applies analogously to winding a piece of tape with the right-hand (take-up) motor. The only thing that is important is that the tape segment to be wound is threaded around the tape tension sensor and its adjacent guide rollers to ensure that the tape tension control loop can function correctly.

Playing a dumped tape segment

After some editing work it may happen that many individual tape segments have been dumped into the waste basket but the operator is not sure whether or not they contain any usable audio material. Such tape sections can easily be played with the A820 without having to be spliced first and wound onto a reel.

Procedure: Press EDIT button, the tape transport and the pinch roller start up. The EDIT button turns on, STOP flashes. Thread the tape segment according to Fig. 2.5.12.

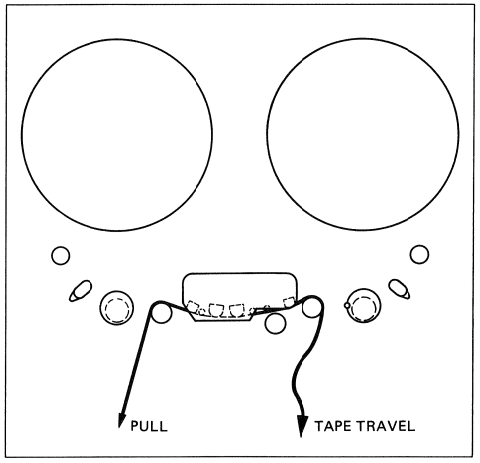
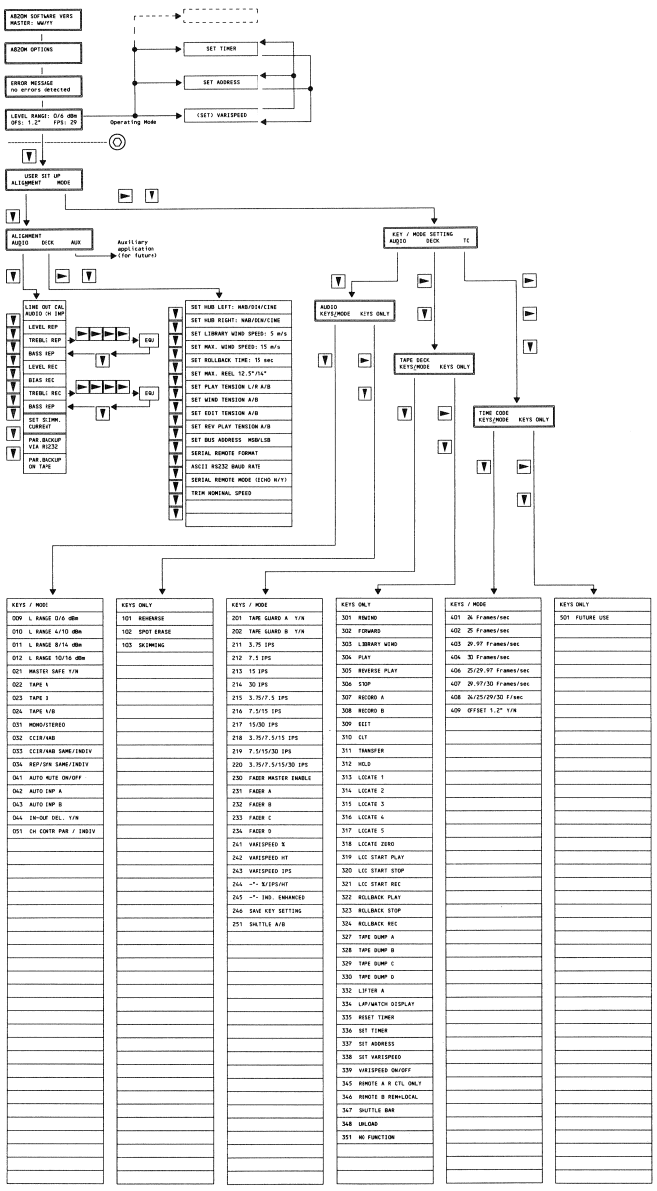


Fig. 2.5.12

With your left hand lightly tension the tape segment on the left-hand side of the headblock. The tape is cued by running over the reproduce head. If a small amount of backtension is produced with the left hand, the contact between tape and head is improved (better reproduction) and the tape is cleaned from possible dust particles that may have been picked up in the waste basket.

Pressing EDIT interrupts the procedure. To cancel the function press STOP.

STATUS TREE DIAGRAM (enlarged view at the end of this Section)



2.6 SOFT KEYS

Except for the four blue keys and the red key of the function and programming key field below the hinged cover, all operating keys of the A820 tape recorder can be assigned to any of some 100 possible functions or operating modes. There are two types of functions/operating modes, referred to as "KEYS ONLY" or "K", and "KEYS/MODE" or "K/M". "KEYS ONLY" stands for functions to be operated only if assigned to a key. Operating modes labeled "KEYS/MODE" may be activated not only by a key but also by the programming key field without a key being allocated to the operating mode.

This function assignment procedure is simplified by the service display [27] (alphanumeric LC display, on the right front of the tape transport) as well as by the top-down tree structure diagram illustrated on the opposite page.

This diagram consists of **blocks** and **setting positions**

Programming examples: see 2.6.4 .
Caution: Programming is not possible if the recorder is switched to VARISPEED mode !

After the recorder has been switched on, the first four (or possibly five) blocks appear consecutively on the service display for a few seconds each:

```
A820M SOFTWARE VERS
MASTER: WW/YY
```

Creation date of the software of the MASTER MPU, calendar week/year.

```
A820M OPTIONS
```

List of the options with which the recorder has been configured.

```
╔ = = = = = = = = = = = ╗
‖    DEFAULT AUDIO     ‖
‖  PARAMETERS LOADED   ‖
╚ = = = = = = = = = = = ╝
```

If this message is displayed, the standard audio parameters are loaded after a RAM error. These parameters can differ slightly from the recorder-specific parameters. Operation of the recorder is possible, certain deviations from the optimum specifications must, however, be expected. If the recorder-specific parameters have been written down or stored on tape they can be reentered or loaded, respectively.

```
ERROR  LIST:EXX
```

Possible error messages resulting from the automatic test, either in plain text or the message "no errors detected", and

```
L RANGE 0/6 dBm
OFS: . "  FPS:
```

Line level with which the recorder is operating. The second line of the display is only used if the recorder is equipped with a time code headblock assembly; OFS = offset between time code and audio channel in inches, FPS = number of frames per second.

The sequence stops here. In normal operating mode, the above four (or five) blocks can be retrieved by pressing ↑/LAST.

If the programming enable switch [28] is closed (actuated with Allen screwdriver No. 2.5, clockwise limit position), the STORE key is disabled for certain operations. E.g. the audio parameters can be modified but not stored, after switching the recorder off and on again the previous parameters are written into the registers of the audio amplifiers. The following tape deck parameters can be modified and stored: Hub diameter left/right, reduced and maximum spooling speed, ROLLBACK time, and maximum reel diameter. The acknowledgement of error messages (if any) is also permitted if the programming enable switch is closed.
Reprogramming of the keys is not possible when the switch is in the disable position; should any attempt be made, the message "program mode not enabled" will appear on the service display.
Opening the programming enable switch: turn the screw 2...3 turns counterclockwise.

With the keys ↓/NEXT, ←/CURSOR, →/CURSOR, and ↑/LAST it is possible to move up and down in the tree diagram. In branching points the cursor is positioned under the desired menu.

2.6.1 Numbering of the keys

The operating keyboard is designed as a matrix consisting of five rows of up to 10 keys.

Numbering:

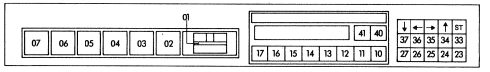


Fig. 2.6.1

2.6.2
Available functions

No.	Function	Typ	Standard programming: No. of key at version: A	B	C	D
009	L RANGE 0/ 6 dBm Y/N	K/M	---	---	---	---
010	L RANGE 4/10 dBm Y/N	K/M	---	---	---	---
011	L RANGE 8/14 dBm Y/N	K/M	---	---	---	---
012	L RANGE 10/16 dBm Y/N	K/M	---	---	---	---
021	MASTER SAFE Y/N	K/M	36	---	---	---
022	TAPE A	K/M	---	---	---	---
023	TAPE B	K/M	---	---	---	---
024	TAPE A/B	K/M	33	33	33	33
031	MONO/STEREO	K/M	35	35	---	---
032	CCIR/NAB	K/M	34	34	34	34
033	CCIR/NAB SAME/INDIV	K/M	---	---	---	---
034	REP/SYN SAME/INDIV	K/M	---	---	---	---
041	AUTO MUTE ON/OFF	K/M	---	---	---	---
042	AUTO INP A	K/M	---	---	---	---
043	AUTO INP B	K/M	---	---	---	---
044	IN-OUT DEL. Y/N	K/M	---	---	---	---
051	CH CONTR PAR/INDIV	K/M	---	---	---	---
101	REHEARSE	K	---	---	26	26
102	SPOT ERASE	K	---	---	---	---
103	SKIMMING	K	---	---	---	---
201	TAPE GUARD A NO/RED	K/M	---	---	---	---
202	TAPE GUARD B NO/STOP	K/M	---	---	---	---
211	3.75 IPS	K/M	26	26	---	---
212	7.5 IPS	K/M	27	27	27	27
213	15 IPS	K/M	37	37	37	37
214	30 IPS	K/M	---	36	36	36
215	3.75/7.5 IPS	K/M	---	---	---	---
216	7.5/15 IPS	K/M	---	---	---	---
217	15/30 IPS	K/M	---	---	---	---
218	3.75/7.5/15 IPS	K/M	---	---	---	---
219	7.5/15/30 IPS	K/M	---	---	---	---
220	3.75/7.5/15/30 IPS	K/M	---	---	---	---
231	FADER A	K/M	---	---	---	---
232	FADER B	K/M	23	23	23	23
233	FADER C	K/M	---	---	---	---
234	FADER D	K/M	---	---	---	---
241	VARISPEED %	K/M	---	---	---	---
242	VARISPEED HT	K/M	---	---	---	---
243	VARISPEED IPS	K/M	---	---	---	---
244	VARISPEED %/IPS/HT	K/M	---	---	---	---
245	VARISPEED IND. ENH.	K/M	---	---	---	---
246	SAVE KEY SETTING Y/N	K/M	---	---	---	---
301	REWIND (<)	K	07	07	07	07
302	FORWARD (>)	K	06	06	06	06

No.	Function	Typ	Standard programming: No. of key at version: A	B	C	D
303	LIBRARY WIND	K	12	11	11	11
304	PLAY	K	05	05	05	05
305	REVERSE PLAY	K	---	---	---	---
306	STOP	K	04	04	04	04
307	RECORD A	K	03	---	---	---
308	RECORD B	K	---	03	03	03
309	EDIT	K	02	02	02	02
310	CUT	K	11	---	---	---
311	TRANSFER	K	17	17	17	17
312	HOLD	K	---	---	---	---
313	LOC1	K	16	16	16	16
314	LOC2	K	---	15	15	15
315	LOC3	K	---	---	---	---
316	LOC4	K	---	---	---	---
317	LOC5	K	---	---	---	---
318	LOC ZERO	K	15	14	14	14
319	LOC START PLAY	K	14	13	13	13
320	LOC START STOP	K	---	---	---	---
321	LOC START REC	K	---	---	---	---
322	ROLLBACK PLAY	K	13	12	12	12
323	ROLLBACK STOP	K	---	---	---	---
324	ROLLBACK REC	K	---	---	---	---
327	TAPE DUMP A	K	10	10	10	10
328	TAPE DUMP B	K	---	---	---	---
329	TAPE DUMP C	K	---	---	---	---
330	TAPE DUMP D	K	---	---	---	---
332	LIFTER A	K	---	---	---	---
334	LAP/WATCH DISPLAY	K	40	40	40	40
335	RESET TIMER	K	41	41	41	41
336	SET TIMER	K	---	---	---	---
337	SET ADDRESS	K	---	---	---	---
338	SET VARISPEED	K	24	24	24	24
339	VARISPEED ON/OFF	K	25	25	25	25
345	REMOTE A R.CTL ONLY	K	---	---	---	---
346	REMOTE B REM+LOCAL	K	---	---	---	---
347	SHUTTLE BAR	K	01	01	01	01
351	NO FUNCTION	K	---	---	---	36
401	24 FRAMES/SEC	K/M	---	---	---	---
402	25 FRAMES/SEC	K/M	---	---	---	---
403	29.97 FRAMES/SEC	K/M	---	---	---	---
404	30 FRAMES/SEC	K/M	---	---	---	---
406	25/29.97 FRAMES/SEC	K/M	---	---	---	---
407	29.97/30 FRAMES/SEC	K/M	---	---	35	---
408	24/25/29/30 F/SEC	K/M	---	---	---	---
409	OFFSET 1.2" Y/N	K/M	---	---	---	---

2.6.3 Description of functions

L RANGE 0/ 6 dBm Y/N	(No. 009) KEYS/MODE
L RANGE 4/10 dBm Y/N	(No. 010) KEYS/MODE
L RANGE 8/14 dBm Y/N	(No. 011) KEYS/MODE
L RANGE 10/16 dBm Y/N	(No. 012) KEYS/MODE

Setting of the line level at which the recorder operates. The first of the two level indications of every function is used when the VU-meters are programmed for VU characteristic, the second for PEAK indication.
The range between the two indications is used when the line level used in the studio deviates from the four existing gradations.
In this case the value should be selected that comes closest to the line level used in the studio and the internal record and reproduce levels are to be adjusted in such a way that the recorder operates with the desired magnetization. (Example: see 4.2.6).

MASTER SAFE Y/N	(No. 021) KEYS/MODE

Record inhibition for recorders without SAFE/READY switch, or higher ranking SAFE key for recorders with SAFE/READY switch.

TAPE A Y/N	(No. 022) KEYS/MODE
TAPE B Y/N	(No. 023) KEYS/MODE
TAPE A/B	(No. 024) KEYS/MODE

Tape type selector, either two individual, mutually canceling keys (functions 022 and 023), or a changeover key.
The last selected tape type is automatically selected when the recorder is switched on.
The keys can only be operated when pressed together with STOP.

MONO/STEREO	(No. 031) KEYS/MODE

Mono/Stereo changeover.
On stereo recorders the last existing status is reactivated when the recorder is switched on.
This key can only be operated together with STOP.

CCIR/NAB	(No. 032) KEYS/MODE

Equalization changeover. When the recorder is switched on, the following are established, depending on the version:
CCIR for: A820-1, -0.75, -2/2, -2/2 TC.
NAB for: A820-1 VU, -0.75 VU, -2/2 VU, -2/2 TC VU.
For all other versions the status is reactivated that existed before the recorder was switched off.
This key can only be operated together with STOP.

CCIR/NAB SAME/INDIV	(No. 033) KEYS/MODE

Changeover to same audio parameters for both equalization standards.
If for both standards the same parameters are required, page to the desired parameter and press STORE; the parameter is automatically copied for the second equalization standard.
Exceptions: Record and reproduce time constants (EQU REC and EQU REP).

REP/SYN SAME INDIV	(No. 034) KEYS/MODE

Changeover to same audio parameters for normal and sync reproduction. The process is identical with that of function 033. This function is at present not implemented!

AUTO MUTE ON/OFF	(No. 041) KEYS/MODE

Automatic muting in spooling mode (exception: tape lifter engaged for cueing) and during the start phase (until nominal speed is attained).
Default: OFF.

AUTO INP A	(No. 042) KEYS/MODE
AUTO INP B	(No. 043) KEYS/MODE

Selection of the function AUTO INPUT. All channels in SYNC (AUTO INP A) or in SYNC and READY (AUTO INP B) status are switched to INPUT in the operating modes STOP, REWIND, FORWARD, LOC and ROLLBACK functions.
Default: AUTO INP B.

IN-OUT DEL. Y/N	(No. 044) KEYS/MODE

Time delay compensation. Delayed ON/OFF switching (with respect to erase head) of the record head during drop-in and drop-out.
IN-OUT DEL. = ON (i.e. YES) is a precondition for the REHEARSE function.
Default: YES.

CH CONTR PAR/INDIV	(No. 051) KEYS/MODE

For stereo recorders: the channels can either be operated in parallel or individually from either of the two channel mode selectors.
Default: INDIV.

REHEARSE	(No. 101) KEYS ONLY

Simulation of electronic cutting. The PLAY and the REC keys flash in reproduce mode. When REC + PLAY are selected, SYNC is switched over to INPUT at the correct time, however, recording mode is not activated. Pressing PLAY switches back to SYNC.
Preconditions for REHEARSE: the corresponding channel must be switched to SYNC and READY, and IN-OUT DEL = ON (function 044).
Canceling the function: by pressing REHEARSE again.

SPOT ERASE	(No. 102) KEYS ONLY

NOT IMPLEMENTED YET !

SKIMMING	(No. 103) KEYS ONLY

NOT IMPLEMENTED YET !

TAPE GUARD A NO/RED	(No. 201) KEYS/MODE

Reduction of the spooling speed shortly before the tape is unthreaded.
From the speed difference between the two reels the recorder can detect that the corresponding supply reel contains only a small amount of tape. The spooling speed is reduced under the following conditions:
- The hub diameters in the ALIGNMENT DECK block are defined correctly (refer to 2.6.4, example 2)
- The function TAPE GUARD A is switched on.

The function can be suppressed by pressing < or > continuously.

TAPE GUARD B NO/STOP	(No. 202) KEYS/MODE

STOP shortly before the tape is unthreaded.
From the speed difference between the two reels the recorder can detect that the corresponding supply reel contains only a small amount of tape. STOP is activated under the following conditions:
- The hub diameters in the ALIGNMENT DECK block are defined correctly (refer to 2.6.4, example 2)
- The function TAPE GUARD B is switched on.

The function can be suppressed by pressing < or > continuously.

3.75 IPS	(NO. 211) KEYS/MODE
7.5 IPS	(NO. 212) KEYS/MODE
15 IPS	(NO. 213) KEYS/MODE
30 IPS	(NO. 214) KEYS/MODE
3.75/7.5 IPS	(NO. 215) KEYS/MODE
7.5/15 IPS	(NO. 216) KEYS/MODE
15/30 IPS	(NO. 217) KEYS/MODE
3.75/7.5/15 IPS	(NO. 218) KEYS/MODE
7.5/15/30 IPS	(NO. 219) KEYS/MODE
3.75/7.5/15/30 IPS	(NO. 220) KEYS/MODE

Speed changeover keys. It is possible to program either one key for each desired speed (functions 211...214) or combination keys (changeover whenever a key is pressed (functions 215...217), or "ring keys" (whenever the key is pressed it advances by one position, functions 218...220).

FADER A	(No. 231) KEYS/MODE
FADER B	(No. 232) KEYS/MODE
FADER C	(No. 233) KEYS/MODE
FADER D	(No. 234) KEYS/MODE

With the fader start circuit it is possible to switch the recorder remotely to reproduce mode. FADER START mode can be prepared (FADER START READY) with a switch that interconnects pin 6 (signal SR-FADRY) with pin 1 (ground) of the parallel control socket. An AC or DC voltage from 5 V to 24 V can be applied to pins 11 and 12; the recorder is switched to reproduce mode. Preparation is also possible with the programmable FADER key on the local keyboard or on the serial remote control, or with the FADER key on the parallel remote control.

Four programmable possibilities:
- FADER A:
  without preparation key (FADER START READY). The local keyboard is disabled with the exception of the speed selection keys. After unthreading the tape the FADER switch must be activated again.
- FADER B:
  FADER START with enable key (FADER START READY), local keyboard also active as long as FADER START enabled. The local keyboard will be disabled after FADER START; default programming.
- FADER C:
  Same as FADER START B, except local keyboard disabled when FADER START enabled.
- FADER D:
  FADER START with enable key (FADER START READY), local keyboard also active when FADER START enabled. After the FADER START, the built-in monitor speaker (however not the headphones socket) is muted. If one of the local keys is operated in PLAY mode after the FADER START operation has been performed, muting of the monitor speaker is canceled. If FADER START is not enabled, actuation of the FADER switch does not change the operating mode of the recorder.
  During recording neither the enable key nor the FADER switch can influence the tape transport.

VARISPEED %	(No. 241) KEYS/MODE
VARISPEED HT	(No. 242) KEYS/MODE
VARISPEED IPS	(No. 243) KEYS/MODE
VARISPEED %/IPS/HT	(No. 244) KEYS/MODE

Keys for defining the VARISPEED display format. Indication of the deviation in percent of the nominal speed or in semitones, or of the actual tape speed in inches per second. Either an individual key (functions 241...243) or a "ring key" (advances one step whenever the key is pressed, function 244) can be programmed for each format.
Input of the desired variable tape speed and switching VARISPEED on/off: see functions No. 338, 339.

VARISPEED IND. ENH.	(No. 245) KEYS/MODE

If desired, flashing of the spooling keys < and > in VARISPEED mode can be selected with this function.

SAVE KEY SETTING Y/N	(Nr. 246) KEYS/MODE

When converting the recorder (e.g. from 1/4" to 1/2" tape) the programming of the keys is adapted automatically if function No. 246 is switched off, i.e. "NO". If the specific programming of the keys is to be preserved, the function must be switched to "YES".

REWIND (<)	(No. 301) KEYS/MODE

Rewind with maximum (programmed) spooling speed.
Selecting the function: from FORWARD, STOP, PLAY/RE SHUTTLE stored, all LOC functions, and CUT.
Canceling the function: by pressing FORWARD, STOP, PLAY, SHUTTLE, SHUTTLE BAR, all LOC functions; in synchronizer mode by pressing LOCK.
The spooling speed can be defined in the ALIGNMENT DECK block; default: 15 m/s.

FORWARD (>)	(No. 302) KEYS ONLY

Fast forward with maximum (programmed) spooling speed.
Selecting/canceling conditions: same as REWIND.

LIBRARY WIND	(No. 303) KEYS ONLY

Preselection of this function causes, in conjunction with FORWARD or REWIND, spooling with reduced, defined speed (preselectable from 0.1 to 15 m/s, in steps of 0.1 m/s).
Canceling the function: by pressing LIBRARY WIND again.
The reduced spooling speed can be defined in the ALIGNMENT DECK block; default: 5 m/s.

PLAY	(No. 304) KEYS ONLY

Playback with the selected tape speed.
Canceling the function: by REC+PLAY, FORWARD, REWIND, STOP, SHUTTLE, SHUTTLE BAR, all LOC functions.

REVERSE PLAY	(No. 305) KEYS ONLY

Playback in reverse direction.
Selecting the function: either with a key that has been programmed with this function, or by simultaneously pressing TRANS and PLAY.
Canceling the function: see PLAY.

STOP	(No. 306) KEYS ONLY

All tape transport functions are canceled by this function.

RECORD A	(No. 307) KEYS ONLY

Record mode, only possible in conjunction with PLAY.
Selection of the function: by simultaneously pressing REC and PLAY.
Canceling the function: see PLAY, drop-out by pressing PLAY also possible (recorder reenters PLAY mode without interruption).
Function is not activated and illumination of the key is inhibited if:
- MASTER SAFE is switched on,
- No HF driver is installed,
- On versions with SAFE/READY switches if none of the channels is switched to READY.

RECORD B	(No. 308) KEYS ONLY

Record mode, only possible in conjunction with PLAY. Analogous to RECORD A, except: if the recorder is already in reproduce mode, recording can be activated by pressing only REC.

EDIT	(No. 309) KEYS ONLY

Activation of the SET/CUE wheel. With the SET/CUE wheel the tape can be fine-positioned by means of the spooling motors.
Selecting the function: from STOP, FORWARD, REWIND, PLAY.
Canceling the function: with STOP, FORWARD, REWIND, PLAY, CUT, SET TIMER, SET ADDR, SET VARISPEED, SHUTTLE BAR, all LOC functions.
When the tape is unthreaded in EDIT mode, the tape guide assembly remains in the EDIT position. When the STOP key flashes after power-on, the tape guide assembly can be moved into the EDIT position by pressing the EDIT key. The EDIT position is reached by pressing EDIT regardless of whether the tape is threaded or not.
(See "Playing a dumped tape segment", 2.5.24).

CUT	(No. 310) KEYS ONLY

Automatic positioning of the tape address located at the CUE point (reproduce head gap) to the position of the scissors. The tape is held tight between the pinch roller and the inoperative capstan shaft. After having cut the tape with the built-in tape scissors, the recorder enters STOP mode. If, however, the tape is not to be cut at this position, the CUT function can be cancelled by either pressing STOP. The recorder automatically enters STOP mode if any cut has ben performed during approx. 10 seconds.
Selecting the function: from STOP or EDIT.
Canceling the function: by pressing STOP, by cutting the tape (tape out), or automatically after approx. 10 seconds.

TRANSFER	(No. 311) KEYS ONLY

Multifunction key.
- Preparation for storing the current tape counter address. The buffered tape address is transferred into the corresponding LOC memory by pressing one of the keys LOC1...5, independent of which tape counter display mode (normal or LAP mode) is selected.
  Selecting the function: possible at any time.
  Canceling the function: by storing in the LOC memory or by pressing TRANSFER again.
- Pressed together with PLAY: reproduce mode in opposite direction, see REVERSE PLAY.

HOLD	(No. 312) KEYS ONLY

Key for "freezing" the current tape counter reading in any condition (also functions when the tape counter is switched to LAP mode). The frozen counter reading can be transferred into one of the LOC memories by pressing one of the keys LOC1...5. The counter continues to advance. By pressing the same LOC key again the tape is positioned at the stored address.
If the TRANSFER key is pressed after HOLD, and subsequently one of the keys LOC1...5, the tape counter reading remains frozen (as if only HOLD would have been pressed).
Canceling the function: by pressing HOLD again, or storing in LOC1...5.

LOC1	(No. 313) KEYS ONLY
LOC2	(No. 314) KEYS ONLY
LOC3	(No. 315) KEYS ONLY
LOC4	(No. 316) KEYS ONLY
LOC5	(No. 317) KEYS ONLY

Automatic searching of the stored address in spooling mode; preselection of PLAY or PLAY + REC is possible (keys of the preselected function flash for as long as the LOC process is not yet terminated).
Indication of target address: in STOP status by simultaneously pressing STOP and the corresponding LOC key; during a LOC operation: by continuously pressing the corresponding LOC key.
All LOC addresses remain stored even after the recorder has been switched off!
Selecting the function: from PLAY/REC, REWIND, FORWARD, LOC, SHUTTLE, EDIT.
Canceling the function: with STOP, LOC, REWIND, FORWARD, SHUTTLE, SHUTTLE BAR.

LOC ZERO	(No. 318) KEYS ONLY

Automatic searching of the tape address 0.00.00.0 in spooling mode; preselection of PLAY or PLAY + REC possible.
Selecting/canceling the function: see LOC1...LOC5.

LOC START-PLAY	(No. 319) KEYS ONLY
LOC START-STOP	(No. 320) KEYS ONLY
LOC START-REC	(No. 321) KEYS ONLY

Automatic searching of the tape address where the last PLAY command (during standstill of the tape) was given.
The LOC START address is stored automatically at any PLAY command if the tape does not move (only PLAY is accepted, but not PLAY+REC).
PLAY or STOP or RECORD is automatically initiated when the target address is reached.
Selecting/canceling the function: see LOC1...LOC5.

ROLLBACK-PLAY	(No. 322) KEYS ONLY
ROLLBACK-STOP	(No. 323) KEYS ONLY
ROLLBACK-REC	(No. 324) KEYS ONLY

Recorder spools automatically backward by a preselectable amount. ROLLBACK always relates to the current tape counter reading (also in other indication modes).
PLAY or STOP or RECORD is automatically initiated after the target address has been reached.
Selecting the function: from STOP, PLAY, RECORD, EDIT.
Canceling the function: by pressing STOP, REWIND, FORWARD, PLAY, PLAY + REC, SHUTTLE, SHUTTLE BAR, all LOC functions.
The ROLLBACK time can be defined in the ALIGNMENT DECK block.

TAPE DUMP A	(No. 327) KEYS ONLY
TAPE DUMP B	(No. 328) KEYS ONLY

Dump edit mode, take-up motor stopped. Tape counter active and supplied with information by the tacho of the capstan motor (TAPE DUMP A), or tape counter blocked (TAPE DUMP B).
Selecting the function: only possible from STOP or EDIT mode.
Canceling the function: by pressing TAPE DUMP a second time or with any tape transport command.

TAPE DUMP C	(No. 329) KEYS ONLY
TAPE DUMP D	(No. 330) KEYS ONLY

Tape dump mode with preparation, take-up motor stopped. Tape counter active and supplied with information by the tacho of the capstan motor (TAPE DUMP C), or tape counter blocked (TAPE DUMP D).
Selecting the function: only possible from STOP or EDIT mode. Preparation by means of TAPE DUMP, start of tape dump mode with PLAY, interruption with STOP.
Canceling the function: by pressing TAPE DUMP a second time (only possible in STOP mode).

LIFTER A	(No. 332) KEYS ONLY

During spooling causes resetting of the tape lift pins and engagement of the tape guide assembly so that the tape is pressed against the reproduce head and the modulation becomes audible. Momentary push button. If AUTO MUTE is selected, muting will be canceled for as long as the tape is in contact with the head.
Selecting the function: during REWIND, FORWARD, LOC and ROLLBACK functions.
Canceling the function: by releasing the LIFTER key.

LAP/WATCH DISPLAY	(No. 334) KEYS only

Changeover of tape display to a second counter which (like the normal tape counter) is supplied with pulses from the tacho roller. When LAP/WATCH is active, an "L" is shown in the first position of the tape counter display.
The LAP counter, too, is reset to zero with RESET TIMER. In LAP/WATCH mode, LOC ZERO relates to the zero position of the LAP/WATCH counter.
Canceling the function: by pressing LAP/WATCH a second time.

RESET TIMER	(No. 335) KEYS ONLY

Key for resetting the tape counter display or the LAP/WATCH display. Only the counter reading shown on the display will be set to zero. The corresponding counter reading remains at zero until the key is released.

SET TIMER	(No. 336) KEYS ONLY

When this key is pressed the momentary content of the tape counter (or of the second counter, refer to LAP/WATCH, function 334) is transferred into a buffer. With the CURSOR keys the display position (h, min, s, 1/10 s) is selected which can subsequently be increased or decreased continually by turning the SET/CUE wheel clockwise or counterclockwise respectively. When STORE is pressed the changed counter reading is transferred to the tape counter.
Canceling the function: by pressing SET TIMER a second time or with SET ADDR, SET VARISP, or VARISPEED.

SET ADDRESS	(No. 337) KEYS ONLY

Setting locator addresses:
- When this key is pressed the momentary content of the tape counter (or of the second counter, refer to LAP/WATCH, function 334) is transferred into a buffer. With the CURSOR keys the display position (h, min, s, 1/10 s) can be selected which can subsequently be continually increased or decreased by turning the SET/CUE wheel clockwise or counterclockwise respectively. The set address is stored in a LOC register by pressing TRANSFER and one of the LOC keys. The originalcontent of the tape counter reappears when the store function has been completed.
- It is also possible to transfer a locator address to the tape counter display by pressing SET ADDRESS, and STOP together with one of the LOC-keys afterwards. Then, the address can be modified as described above, and stored again with TRANS and one of the LOC keys.

Canceling the function (only if store function has not been performed): by pressing SET ADDRESS a second time, a LOC or ROLLBACK function, SET TIMER, SET VARISPEED.

SET VARISPEED	(No. 338) KEYS ONLY

Input of varispeed. Switches the service display over to VARISPEED indication. The deviation from the nominal speed is indicated in the desired format. The indicated value can be varied with the SET/CUE wheel. The format is entered with one of the VARISPEED DISPLAY functions 241...245.
SET VARISPEED is not possible during audio alignment (SET/CUE wheel is needed for alignment).
Canceling the function: by pressing SET VARISPEED a second time, or by pressing SET TIMER.

VARISPEED ON/OFF	(No. 339) KEYS ONLY

Activates the variable tape speed. Switches the service display over to VARISPEED indication. The deviation of the nominal tape speed is indicated in the desired format.
The VARISPEED feedback lamp flashes.
The display format is input with one of the VARISPEED DISPLAY FORMAT functions No. 241...245.
If SET VARISPEED is selected at the same time, the tape speed can also be varied during playback by means of the SET/CUE wheel.
If EDIT is also selected it is no longer possible to vary the speed with the SET/CUE wheel because the function of the SET/CUE wheel is required for the EDIT function.
Canceling the function: by pressing VARISPEED ON/OFF a second time.

REMOTE A R. CTL ONLY	(No. 345) KEYS ONLY

Activates the parallel and/or serial remote control; the local keyboard is disabled.
Selecting the function: only from STOP mode, if the STOP key does not flash.
Canceling the function: by pressing the key again, or by switching off the recorder.
If neither REMOTE A nor REMOTE B are assigned to a key, the local and the remote keyboards are equivalent, corresponding to "REMOTE B active".

REMOTE B REM+LOCAL	(No. 346) KEYS ONLY

Activates the parallel and/or serial remote control. The local keyboard remains enabled.
Selecting the function: only from STOP mode, if the STOP key does not flash.
Canceling the function: by pressing the key again, or by switching off the recorder.
If neither REMOTE A nor REMOTE B are assigned to a key, the local and the remote keyboards are equivalent, corresponding to "REMOTE B active".
Default setting.

SHUTTLE BAR	(No. 347) KEYS ONLY

Key for storing a SHUTTLE speed that has been selected with the SHUTTLE wheel.
Selecting the function: while actuating the SHUTTLE wheel (if the SHUTTLE wheel is in its center position: SHUTTLE BAR equals STOP).
Canceling the function: with all tape transport commands, LOC and ROLLBACK functions.

UNLOAD	(No. 348) KEYS ONLY

Key for resetting the tape guide assembly.

NO FUNCTION	(No. 351) KEYS ONLY

"Function" for programming a blank key without function.

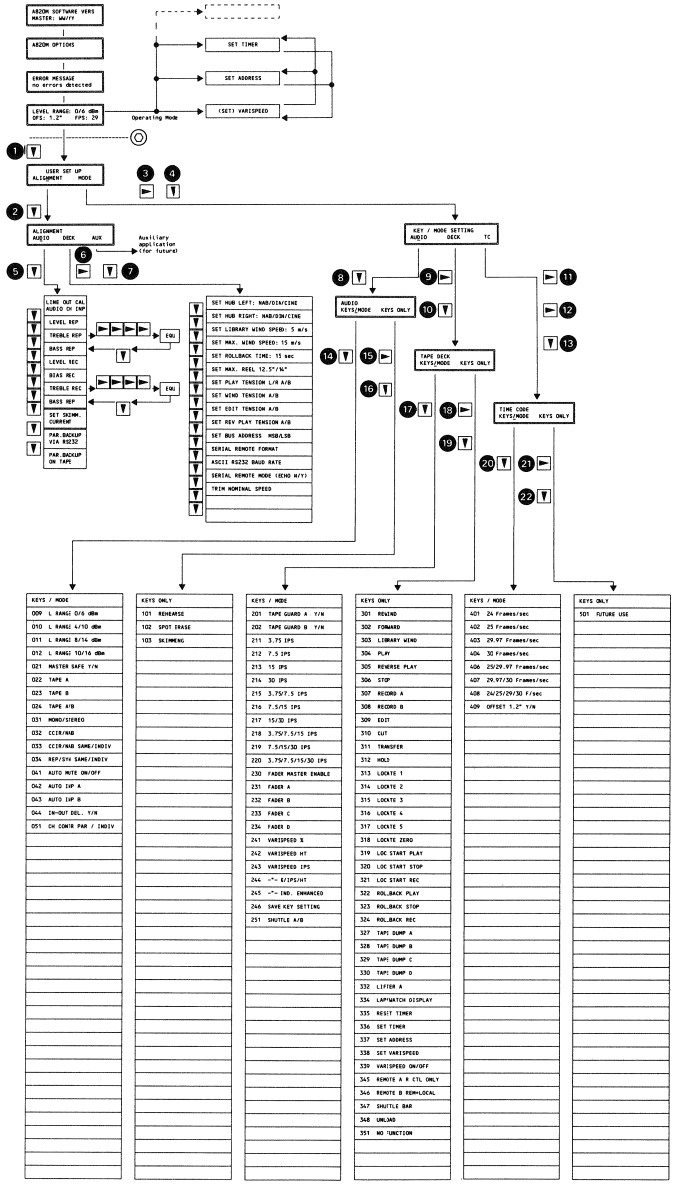
24 FRAMES/SEC	(No. 401) KEYS/MODE
25 FRAMES/SEC	(No. 402) KEYS/MODE
29.97 FRAMES/SEC	(No. 403) KEYS/MODE
30 FRAMES/SEC	(No. 404) KEYS/MODE
25/29.97 FRAMES/SEC	(No. 406) KEYS/MODE
29.97/30 FRAMES/SEC	(No. 407) KEYS/MODE
24/25/29.97/30 F/SEC	(No. 408) KEYS/MODE

Changeover of the time code standard (only for time code versions). Either one specific key for each standard (functions 401...404) or combination keys (changeover each time the key is pressed, functions 406 and 407) or a "ring key" (advances one step each time the key is pressed, function 405) can be programmed.

OFFSET 1/2" Y/N	(No. 409) KEYS ONLY

ON/OFF key for adjusting the internal time offset to a different standard (only for time code versions).
Normal situation: no offset ("electrically in line").

2.6.4
Programming examples



Example 1:
Setting the audio parameter level reproduce, tape speed 7.5 ips, CCIR equalization, tape type A, channel 2:

	Action	Service display indic.
	Turn programming enable switch [28] to counterclockwise stop (Allen key No. 2.5)	
	Recorder in STOP mode	L RANGE ./. dBm
1	↓/NEXT	USER SET UP ALIGNMENT MODE
2	↓/NEXT	ALIGNMENT AUDIO DECK AUX
5	↓/NEXT	LINE OUT CALIBRATION AUDIO CHANNELS INPUT
	↓/NEXT	LVL REP 15.0 CCIR A CH1 72 CH2 72
	Press speed selector key 7.5 ips	LVL REP 7.5O CCIR A CH1 66 CH2 66
	>/CURSOR (switchover to CH 2)	LVL REP 7.5O CCIR A CH1 66 CH2 66
	Select desired level with SET/CUE wheel (indication in HEX)	LVL REP 7.5O CCIR A CH1 66 CH2 E9
	Save with STORE	
	Press ↑ four times	L RANGE ./. dBm
	or:	or:
	with ↓ to the next setting	TRB REP 7.5O CCIR A CH1 39 CH2 39

Example 2:
Setting the hub diameter of the take-up reel to 50 mm (Cine B):

	Action	Service display indic.
	Turn programming enable switch [28] to counterclockwise stop (Allen key No. 2.5)	
	Recorder in STOP mode	L RANGE ./. dBm
1	↓/NEXT	USER SET UP ALIGNMENT MODE
2	↓/NEXT	ALIGNMENT AUDIO DECK AUX
6	>/CURSOR	ALIGNMENT AUDIO DECK AUX
7	↓/NEXT	HUB DIAMETER LEFT SET: NAB (118mm)
	↓/NEXT	HUB DIAMETER RIGHT SET: NAB (118mm)
	Set desired diameter with SET/CUE wheel	HUB DIAMETER RIGHT SET: CINE B (O5Omm)
	Save with STORE	
	Press ↑ four times	L RANGE ./. dBm
	or:	or:
	with ↓ to the next setting	SET LIBR WIND SPEED 08.0 m/s

Example 3:
Switching the AUTO MUTE function (No. 041) on without a key being assigned:

	Action	Service display indic.
	Turn programming enable switch [28] to counterclockwise stop (Allen key No. 2.5)	
	Recorder in STOP mode	L RANGE ./. dBm
1	↓/NEXT	USER SET UP ALIGNMENT MODE
3	>/CURSOR	USER SET UP ALIGNMENT MODE
4	↓/NEXT	KEY / MODE SETTING AUDIO DECK TC
8	↓/NEXT	AUDIO KEYS/MODE KEYS ONLY
14	↓/NEXT	FOO9 1/O no key LEV.RANGE O/6dBm Y/N
	Page with SET/CUE wheel to function O41	FO41 O/1 no key AUTO MUTE ON/OFF
	Change over with STORE	FO41 1/O no key AUTO MUTE ON/OFF
	press ↑ four times	L RANGE ./. dBm

Example 4:
Reprogramming of the FADER START key (key No. 23, function No. 231) to AUTO MUTE function (function No. 041):

	Action	Service display indic.
	Turn programming enable switch [28] to counterclockwise stop (Allen key No. 2.5)	
	Recorder in STOP mode	L RANGE ./. dBm
1	↓/NEXT	USER SET UP ALIGNMENT MODE
3	>/CURSOR	USER SET UP ALIGNMENT MODE
4	↓/NEXT	KEY / MODE SETTING AUDIO DECK TC
8	↓/NEXT	AUDIO KEYS/MODE KEYS ONLY
14	↓/NEXT	FOO9 1/O no key LEV.RANGE O/6dBm Y/N
	Page with SET/CUE wheel to function O41	FO41 O/1 no key AUTO MUTE ON/OFF
	Press STORE	FO41 PRESS 2nd KEY AUTO MUTE ON/OFF
	Continue to hold down STORE, and in addition press START	FO41 key assigned AUTO MUTE ON/OFF
	Change keytop label	
	press ↑ four times	L RANGE ./. dBm

Example 5:
Reprogramming the RESET TIMER key (key 41, function No. 335) to REVERSE PLAY function (function No. 305):

	Action	Service display indic.
	Turn programming enable switch [28] to counterclockwise stop (Allen key No. 2.5)	
	Recorder in STOP mode	L RANGE ./. dBm
1	↓/NEXT	USER SET UP ALIGNMENT MODE
3	>/CURSOR	USER SET UP ALIGNMENT MODE
4	↓/NEXT	KEY / MODE SETTING AUDIO DECK TC
9	>/CURSOR	KEY / MODE SETTING AUDIO DECK TC
10	↓/NEXT	TAPE DECK KEYS/MODE KEYS ONLY
18	>/CURSOR	TAPE DECK KEYS/MODE KEYS_ONLY
19	↓/NEXT	F301 LO7,R27 REWIND
	Page with SET/CUE wheel to function 305	F305 no key REVERSE PLAY
	Press STORE	F305 PRESS 2nd KEY REVERSE PLAY
	Continue to hold down STORE, and in addition press RESET TIMER	F305 key assigned REVERSE PLAY
	Change keytop label	
	press ↑ four times	L RANGE ./. dBm

2.7 DEGRADED OPERATION

This Section describes the extent to which the A820 tape recorder can still be operated in the event of a malfunction in an individual assembly.

2.7.1 Error messages of the service display

The errors are classified in three categories:

- **Errors of the first category** are the ones preventing a normal operation of the recorder (above all hardware errors). A corresponding error message can be cancelled only by switching off the recorder for 10 seconds at least and then on again. If the error message reappears the malfunction must be repaired. Else, the tape recorder can be operated again.
- **Errors of the second category** can affect the operation of the recorder, however degraded operation is possible. Corresponding error messages are held in the display for information, even if the source of error should disappear. The message can be cancelled by acknowledgement (pressing the STORE key). If the source of error still exists, the message will reappear and can be cancelled again as above, if required. Apart from that, the recorder can be operated.
- **Category three errors** also can affect the operation. The error message will be cancelled automatically if the source of error disappears. If the LC Display should be used for another purpose (e.g. VARISPEED display) the error message can be cancelled by pressing STORE. The source of error might, however, be persisting.

Error messages of the first category:

```
ERR: SUPPLY
     VOLTAGE
```

RECORDER: Switches to STOP, no reaction if keyboard is operated.
CAUSE: At least one of the supply voltages is missing.
ACTION: The FUSE/SUPPLY VOLTAGE FAILURE DETECTOR indicates which voltage(s) is/are missing.
- Switch recorder off.
- Check secondary fuses and replace them if necessary.
- Repair or replace SWITCHING STABILIZER PCB.

```
ERR: DATA
     LOST
```

CAUSE: Audio and tape deck data lost.
ACTION:
- Switch recorder off and on again. The standard parameters are loaded, the error message disappers.
- Check buffer battery on MASTER MPU, replace it if necessary !
- Either go on working with standard data (minor deviations from the optimum frequency response must be accepted), or
- Reload stored parameters (on tape or floppy disk) via RS232 interface, or
- Reload parameters put down in a protocol, or
- Recalibrate the tape recorder.

```
ERR: EPROM 1
```

```
ERR: EPROM 2
```

```
ERR: EPROM 3
```

CAUSE: Error in one of the three EPROMs on MASTER MPU.
ACTION:
- Switch recorder off and on again. If the message does not reappear, the recorder can operated again.
- Replace software.

```
ERR: MOVE-SENSOR
     HARDWARE
```

RECORDER: switches to STOP.
CAUSE: MOVE SENSOR PCB defective, or too many direction changes detected.
ACTION: Replace, repair or readjust.

Error messages of the second category:

```
ERR: POWER
     DROP OUT
```

RECORDER: switches to STOP.
CAUSE: Short power line failure ≥ 100 ms.
ACTION: Acknowledge with STORE.

```
ERR: AUDIO
     CHANNEL 1
```

```
ERR: AUDIO
     CHANNEL 2
```

CAUSE: Error in one of the audio channels (e.g. RECORD AMPLIFIER not inserted, HF DRIVER defective or not inserted, excessive erase current because wrong type of erase head is mounted). **Reproduction with the concerned channel is, however, possible !!**
ACTION:
- Insert or replace the concerned audio assemblies (recorder switched off !)
- Check erase head.

Error messages of the third category:

```
ERR: MOTOR SUPPLY
     VOLTAGE LOW
```

CAUSE: Spooling motor supply voltage is missing.
ACTION: Wait for 10 seconds. If the message is still present:
- Switch recorder off.
- Check the lower one of the two primary fuses, replace it if necessary.
- Repair or replace SPOOLING MOTOR SUPPLY or SPOOLING MOTOR DRIVE AMPLIFIER(s).

ERR: NO COMMUNICAT. MASTER-TAPE DECK

CAUSE:
- No reply to status request.
- Software of MASTER MPU and TAPE DECK MPU incompatible.

ACTION:
- Replace MASTER SERIAL INTERFACE and/or TAPE DECK SERIAL INTERFACE.
- Replace software.

ERR: TACHO SENSOR

RECORDER: switches to STOP.
CAUSE: No output signal of one of the three tacho sensors (spooling motors, move sensor), or different sense of rotation of the three sensors, or no spooling motor tacho signal while the the spooling motor supply current exceeds 4 A.
ACTION:
- Check flat cable connectors on the tacho sensors.
- Check tacho sensors, replace if necessary.
- Check the tape spindles as well as the move roller for free rotation.

ERR: TAPE TENSION CONTROL

CAUSE: Difference between actual and nominal tape tension too large for more than 1 second.
ACTION: Check tape path and tape spindles for excessive friction.

ERR: NO COMMUNICAT. CAPSTAN-TAPE DECK

RECORDER: switches to STOP.
CAUSE:
- No data transfer via the parallel interface of the CAPSTAN INTERFACE.
- Capstan processor does not start up.

ACTION: Replace CAPSTAN INTERFACE.

ERR: INCORRECT RADIUS MEASUREMENT

RECORDER: switches to STOP.
CAUSE:
- Computed radius of the tape rolls beyond permitted limits.
- Tacho sensors defective.

ACTION:
- Switch recorder to PLAY for several seconds (with tape). In general the error message disappears as soon as enough tacho pulses are present to compute the tape roll radii.
- Check tacho sensors, repair or replace.

ERR: SHUTTLE VALUE INVALID

CAUSE: During the start-up period the SHUTTLE potentiometer delivered wrong values.
ACTION:
- SHUTTLE wheel may not be deflected during the start-up period.
- Readjust SHUTTLE potentiometer.

ERR: PINCH ROLLER SLIPPING

RECORDER: switches to STOP.
CAUSE: Pinch roller has excessive slip, capstan speed does not correspond with the tape speed.
ACTION:
- Clean pinch roller and capstan shaft, replace pinch roller if necessary.
- Readjust pinch force correctly.

ERR: INCORRECT INERTIA

RECORDER: switches to STOP.
CAUSE: The three last computations of the tape roll inertia did not produce any admissible results.
ACTION: Check all rollers and motors as well as the tape path for low friction.

WARN: REFERENCE FREQUENCY WRONG

RECORDER: Cannot reach the requested nominal speed in PLAY.
CAUSE: The external varispeed reference frequency is outside of the permissible range (6.4 kHz to 14.4 kHz), or the signal is missing.
ACTION: Correct or connect the reference signal.

ERR: NOT IDENTIFIED

CAUSE: Unidentifiable error.
ACTION:
- Switch recorder off and on again. If the message does not reappear, the recorder can be operated.
- Unplug the RAM on the MASTER MPU an reinsert it.
  CAUTION: The audio and tape deck parameters are lost, the standard parameters are reloaded instead !
  - Either work on with standard data (minor deviations from the optimum frequency response must be accepted), or
  - Reload stored parameters (on tape or floppy disk) via RS232 interface, or
  - Reload parameters that have been put down in a protocol, or
  - Recalibrate the tape recorder.

Internal error messages:
The following messages are warnings that exist for the internal status field only and are not displayed:

WARN: HUB DIAMETER SETTING TOO HIGH

CAUSE: Computed hub diameter diverges from the programmed value.

WARN: REEL DIAMETER SETTING TOO SMALL

CAUSE: Computed reel diameter diverges from the programmed value.

THE LIST ABOVE CLAIMS NOT TO BE COMPLETE AND CAN BE ENLARGED AS REQUIRED.

2.7.2 Additional messages of the service display

After having converted the recorder (e.g. from 1/4"-mono to 1/2"-2 channel) the recorder automatically changes its audio and tape tension parameters. The programming of the keys is also adapted. The display indicates:

```
WARN: DEFAULT
      KEYS LOADED
```

If the programming of the keys is to be preserved, the function No. 246 "SAVE KEY SETTING" must be switched on, i.e. "YES".

After a data loss (message: "ERR: DATA LOST", see above) and the consecutive switching off and on again the following message is displayed:

```
WARN: DEFAULT KEYS
& PARAMETER LOADED
```

The recorder can be operated with standard parameters (or it has to be recalibrated) as described above.

- After having reprogrammed one of the key functions this message is modified to:

```
WARN: DEFAULT
PARAMETER LOADED
```

- After having reprogrammed one of the parameters, this message is modified to:

```
WARN: DEFAULT
      KEYS LOADED
```

2.8 OPERATION WITH SERIAL INTERFACE

Two different interface types are available:
Version 1.810.751 is designed for operation with a terminal (RS 232, ASCII format) or for storing the audio parameters for backup purposes on an external storage medium such as tape or a Personal Computer.
Version 1.820.751 is designed for operation with a terminal (RS 232, binary format) or for connection to an SMPTE/EBU bus according to the SMPTE standard.

2.8.1 SMPTE/EBU bus

The SMPTE/EBU bus is a facility for transmitting data and permits interconnection of several individual units to a flexible and powerful system (for example remote control of several recorders).

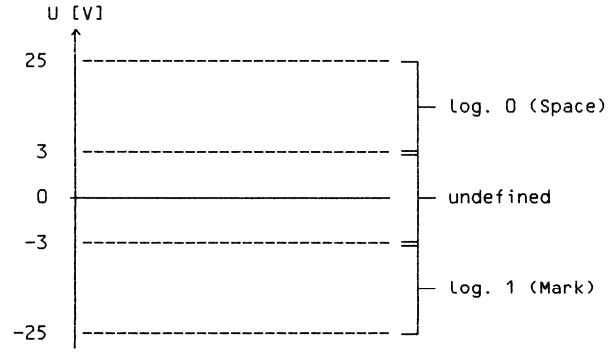
2.8.2 Data backup

The audio parameters stored in RAM can be copied to tape or to a Personal Computer via the 9-pin connector of the serial interface 1.810.751, or new audio parameters can be loaded into the tape recorder (see Section 4.8).

2.8.3 RS 232 interface standards

The term "RS232" defines a connection between a "terminal" and a "modem". In addition this standard defines the:
- electrical characteristics (level, lines),
- mechanical characteristics (connectors),
- signal descriptions, and
- standard connections.

The interface operates with data rates up to 20 kbit/s and a cable length of up to 15 m.
The signal levels are defined as follows:



The 25-pin connector supports diverse interface structures, however, full utilization of all the pins is found rarely today. Modern systems frequently use the minimum structures illustrated in Fig. 2.8.1 for the connection between terminal and mode or terminal and terminal.

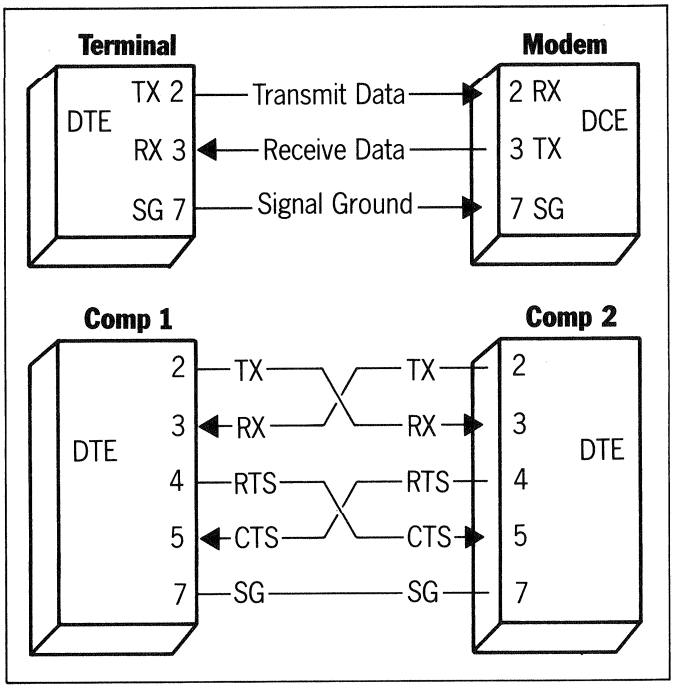


Fig. 2.8.1

All extensions (e.g. baud rate, code, synchronous/asynchronous connection, number of start/stop bits, parity, hardware/software handshake) are defined by the corresponding manufacturer.

2.8.4 The serial ASCII interface of the A820

The serial interface of the A820 recorder uses a 9-pin connector according to SMPTE instead of the 25-pin connector. The user can decide by means of an adapter cable whether the unit is to be a terminal or a modem.

Recorder 9-pin		Terminal 25-pin		Modem 25-pin	
Signal	Pin No.	Signal	Pin No.	Signal	Pin No.
SNDATA	2	Trans.Data	2	Trans.Data	3
RCVDATA	8	Rec. Data	3	Rec. Data	2
GROUND	9	Sig. Ground	7	Sig. Ground	7

No additional handshake lines are used. A software handshake (X ON/X OFF protocol) is implemented for all baud rates, however only required for 9.6 kbaud.

X ON = 0001 0001 (ASCII DC1) ≙ continue

X OFF = 0001 0011 (ASCII DC3) ≙ interrupt

After reception of X OFF the recorder transmits no more than 2 additional characters. After the recorder has transmitted X OFF, it can still receive five characters without losing an instruction.

The following data are fixed:
- 1 Start bit
- 1 Stop bit
- 8 Data bits
- No parity bit.

The following baud rates can be set: 300, 1200, or 9600.

Only ASCII characters are accepted as data.

2.8.5 Putting the serial interface 1.810.751 of the A820 into operation

- Adjust Personal Computer or terminal as follows: 1 start bit, 8 data bits, 1 stop bit (no parity bit), baud rate 300, 1200 or 9600. No echo mode. Connect handshake lines CTS and RTS to "LOW".
- SERIAL REMOTE CONTROLLER 1.810.751: The PCB contains receiver and the driver for the STUDER interface for data backup on tape or on a Personal Computer and the RS232 interface. Switchover by means of a jumper JS1, (position X: switchover with DIL switch 2, OFF = RS232) or automatically (position H). The automatic switchover is implemented, therefore the jumper should be in position H.
  Insert the PCB, switch the LED monitor display on with DIL switch 1; both LEDs RX and TX are illuminated.
- Connect the Personal Computer or the terminal with an adapter cable to one of the two nine pole connectors RS232. If the connection works, both LEDs RX and TX become dark.
- Program the baud rate according to the Personal Computer or the terminal.

After a RESET (switch the A820 off and on again) the screen indicates:

********** A820 MONITOR **********
****** ALL PROCESSES STARTED *******

Now the desired commands (see list below) can be entered via the keyboard of the Personal computer or the terminal. Commands are executed after having pressed ENTER or LINE FEED, respectively.

Instruction set

TAPE DECK COMMANDS

Command (_ = blank, / = CR, * = blank or CR)	Answer of the tape recorder	Meaning
STP*	<CR><LF>	Stop
RWD*	<CR><LF>	Rewind
FWD*	<CR><LF>	Fast forward
PLY*	<CR><LF>	Play
REC*	<CR><LF>	Record (directly, without preceding PLAY command)
EDI*	<CR><LF>	Edit
SSA*	<CR><LF>	Set speed to 3,75 ips (9,5 cm/s)
SSB*	<CR><LF>	Set speed to 7,5 ips (19 cm/s)
SSC*	<CR><LF>	Set speed to 15 ips (38 cm/s)
SSD*	<CR><LF>	Set speed to 30 ips (76 cm/s)
WNR_<XXXX>	<CR><LF>	Rewind with selectable speed (0 ≤ XXXX ≤ 5FFF)
WNF_<XXXX>	<CR><LF>	Forward wind with selectable speed (0 ≤ XXXX ≤ 5FFF)
NS?*	3.75 IPS <CR><LF>, or 7.5 IPS<CR><LF>, or 15 IPS<CR><LF> or 30 IPS<CR><LF>	Request for nominal speed
VEN*	<CR><LF>	Vari-Speed external on
VEF*	<CR><LF>	Vari-Speed external off
FEN*	<CR><LF>	FADER START ENABLE on
FEF*	<CR><LF>	FADER START ENABLE off
LOC_<address>	<CR><LF>	Wind to <(-)hh(:)( )mm(:)( )ss(:)( )n> (n = 1/10 seconds) e.g. LOC_01:20:15:0 LOC_-00_35_25_1
LMV_<move roll pulse count>	<CR><LF>	Fast wind to move roll pulse count <XXXXXXXX> 4 bytes HEX e.g. LMV_00AE4F00
MV?*	XX XX XX XX <CR><LF> 4 bytes HEX	Request for move roll pulses count
STM_<address>	<CR><LF>	Set timer to <(-)hh(:)( )mm(:)( )ss(:)( )nnn> (nnn = milli seconds) (-9:59:59:999 ≤ address ≤ 23:59:59:999) e.g. STM_01_20_15_000 STM_-00:35:25:125
TM?*	_hh:mm:ss:z <CR><LF>, or _-hh:mm:ss:z <CR><LF> z = 1/10 sec	Tape timer request
DST*	<CR><LF><_hh:mm:ss:z_Y_XXXXXXXXXXXXXXX> z = 1/10 sec. Y= status, 1 byte HEX X = status in clear, e.g. PLAY ACHIEVED	Display machine status on the screen, will be repeated (cancel with CTRL X)

continued on next page

TAPE DECK COMMANDS (continued)		
Command (_ = blank, / = CR, * = blank or CR)	Answer of the tape recorder	Meaning
ST?*	X<CR><LF> X = 1 byte HEX X = 01 X = 81 X = 02 X = 82 X = 03 X = 83 X = 04 X = 84 X = 05 X = 85 X = 06 X = 86 X = 07 X = 87 X = 08 X = 88 X = 89 X = 8A X = 0B X = 8B X = C0 X = C1 X = 42 X = C2 X = 43 X = C3 X = C4 X = C5 X = C6 X = C7 X = C8 X = C9 X = 59 X = D9 X = 5A X = DA	Status request e.g.: TAPE OUT TAPE OUT ACHIEVED STOP NOT ACHIEVED STOP ACHIEVED REWIND NOT ACHIEVED REWIND ACHIEVED FORWARD NOT ACHIEVED FORWARD ACHIEVED PLAY NOT ACHIEVED PLAY ACHIEVED PLAY VARISPEED NOT ACHIEVED PLAY VARISPEED ACHIEVED PLAY INT. REF. NOT ACHIEVED PLAY INT. REF. ACHIEVED PLAY EXT. REF. NOT ACHIEVED PLAY EXT. REF. ACHIEVED RECORD ACHIEVED REVERSE PLAY ACHIEVED EDIT NOT ACHIEVED EDIT ACHIEVED SHUTTLE REVERSE ACHIEVED SHUTTLE FORWARD ACHIEVED LOCATE WIND REVERSE LOCATE WIND REVERSE ACHIEVED LOCATE WIND FORWARD LOCATE WIND FORWARD ACHIEVED LOCATE PLAY REVERSE ACHIEVED LOCATE PLAY FORWARD ACHIEVED CUEING REVERSE ACHIEVED CUEING FORWARD ACHIEVED POSITION PLAY REVERSE ACHIEVED POSITION PLAY FORWARD ACHIEVED TAPE DUMP TAPE DUMP ACHIEVED CUT WITH DISTANCE NOT ACHIEVED CUT WITH DISTANCE ACHIEVED

AUDIO COMMANDS		
Command (_ = blank, / = CR, * = blank or CR)	Answer of the tape recorder	Meaning
SMN* SST*	<CR><LF> <CR><LF>	Set MONO mode (if MONO/STEREO SWITCH present) Set STEREO mode (if MONO/STEREO SWITCH pres.)
SNB* SCR*	<CR><LF> <CR><LF>	Set NAB equalization Set CCIR equalization
STA* STB*	<CR><LF> <CR><LF>	Set tape type A Set tape type B
MSN* MSF*	<CR><LF> <CR><LF>	MASTER SAFE on MASTER SAFE off
SRH* CRH*	<CR><LF> <CR><LF>	REHEARSAL mode on REHEARSAL mode off
DDN* DDF*	<CR><LF> <CR><LF>	Drop in/out delay on Drop in/out-delay off
REA_i/ SAF_i/ INP_i/ SYN_i/ REP_i/ MTN_i/ MTF_i/	<CR><LF> <CR><LF> <CR><LF> <CR><LF> <CR><LF> <CR><LF> <CR><LF>	Channel i READY (i = 1, 2, 3, or F) Channel i SAFE (i = 1, 2, 3, or F) Channel i INPUT (i = 1, 2, 3, or F) Channel i SYNC (i = 1, 2, 3, or F) Channel i REPRO (i = 1, 2, 3, or F) Channel i MUTE (i = 1, 2, or F) Channel i MUTING OFF (i = 1, 2, or F) (F = all channels)
SAP_i_j_k*	<CR><LF>	Set D/A converter j, channel i, to k (i = 1 or 2; j = 0: LEVEL REPRO 1: TREBLE REPRO 2: BASS REPRO 3: EQUALISATION REPRO 4: LEVEL RECORD 5: TREBLE RECORD 6: BIAS 7: EQUALISATION RECORD; k = 2 digits HEX, corresponds to the number appearing on the service display during audio adjustments) e.g. SAP_1_0_FF

AUDIO COMMANDS (continued)		
Command (_ = blank, / = CR, * = blank or CR)	Answer of the tape recorder	Meaning
AP?_i,j*	XX<CR><LF> XX=1 byte HEX	Request for audio parameter, channel i, D/A converter j (i = 1 or 2; j = 0: LEVEL REPRO j = 1: TREBLE REPRO j = 2: BASS REPRO j = 3: EQUALIZATION REPRO j = 4: LEVEL RECORD j = 5: TREBLE RECORD j = 6: BIAS j = 7: EQUALIZATION RECORD

MACHINE AND TAPE DECK COMMANDS		
Command (_ = blank, / = CR, * = blank or CR)	Answer of the tape recorder	Meaning
LCE* LCD* RME* RMD*	<CR><LF> <CR><LF> <CR><LF> <CR><LF>	Local keyboard enabled Local keyboard disabled Remote keyboard enabled Remote keyborad disabled
TDN* TDF*	<CR><LF> <CR><LF>	Time code delay on Time code delay off (bypass)
TH?*	0<CR><LF>, or 1<CR><LF>, or 2<CR><LF>, or 3<CR><LF>	Request for time code source (0 = left head; 1 = right head wide; 2 = right head narrow; 3 = line input
SBA_<address>	<CR><LF>	Set bus address to <XXXX> (4 digits HEX, 82FF ≤ XXXX ≤ FFFF)
BA?*	<XXXX><CR><LF>	Display bus address

SPECIAL COMMANDS		
Command (_ = blank, / = CR, * = blank or CR)	Answer of the tape recorder	Meaning
D108_227*	see examples	Display RAM content on screen
UAP_<HEX addr, data>*	see examples	Update audio parameter

The above list is not completed and will be enlarged as required.

Examples:

- FWD* = Fast forward
- LOC_-01:43:00:8 = Autolocator to address - 1.43.0.8
- SAF_3/ = Time code channel SAFE (Recording inhibited)
- AP?_1_4* = Request for audio parameter channel 1, D/A converter 4 (LEVEL RECORD); answer of the recorder e.g. A9 HEX
- SAP_1_4_A3* = Set audio parameter channel 1, D/A converter 4 (LEVEL RECORD); new value A3 (old value A9 from the foregoing example will be overwritten!)
  CAUTION! All other parameters such as SYNC or REPRO, tape speed, tape type, equalization, must be selected on the recorder's controls!

- D108_227* = All audio and tape tension parameters are displayed on the terminal in hexadecimal format, e.g.

```
     0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
0100 xx xx xx xx xx xx xx xx 82 70 90 95 26 B0 30 BB  ... ........&00;
0110 00 00 00 00 00 66 39 80 87 30 A0 3E 75 62 50 96 87  .....9..0 >..P..
0120 66 39 80 61 .. .. .. .. .. .. ..
0130 .. .. .. .. .. .. ..
.... .. ..
....
```

The address of a parameter can be computed as a decimal value by means of the formula below (and must subsequently be translated to a hexadecimal value!):

RADR = ARAM-12 + IDAC + ISYNC*8 + CCAB*12 + SPEED*24 + CHNL*72 + TAPE*144

where:
- RADR = address of the parameter (in decimal form)
- ARAM = 264 (108 hex), start address of the parameter range in the RAM
- IDAC = 0 for LEVEL REPRO
  = 1 for TREBLE REPRO
  = 2 for BASS REPRO
  = 3 for EQUALIZATION REPRO
  = 4 for LEVEL RECORD
  = 5 for TREBLE RECORD
  = 6 for BIAS RECORD
  = 7 for EQUALIZATION RECORD
- ISYNC = 0 for REPRO MODE
  = 1 for SYNC MODE
- CCAB = 0 for CCIR equalization (automatically = 0 at 30 ips)
  = 1 for NAB equalization (automatically = 1 at 3.75 ips)
- SPEED = 0 for 3.75 ips (9,5 cm/s)
  = 1 for 7.5 ips (19 cm/s)
  = 2 for 15 ips (38 cm/s)
  = 3 for 30 ips (76 cm/s)
- CHNL = 0 for channel 1
  = 1 for channel 2
- TAPE = 0 for tape type A
  = 1 for tape type B

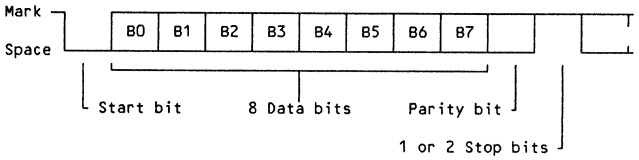
The address of TREBLE REPRO, SYNC, NAB, 15 ips, channel 1, tape type A is thus computed as follows:

264-12 + 1 + 1*8 + 1*12 + 2*24 + 0*72 + 1*144 = 465 = 01D1 (hex)

- UAP_01D1_5C = Update above parameter to 5C

2.8.6 Putting the serial interface 1.820.751 of the A820 into operation

Hardware definitions:
- Electrical standards according to RS232C or RS422A (adaptable by means of jumpers).
- Full duplex
- Asynchronous data transfer, bit and word serial according to the following diagram:



Odd or even parity as well as the number of stop bits (1 or 2) are programmable.
- For RS232 as well as RS422, the baud rates are programmable to 9600 or 1200 Baud. For operation with an SMPTE bus it is fixed to 38.400 kBaud.
- Standard factory adjustments:
  - RS232C
  - 1 Start bit
  - 8 Data bits
  - even Parity
  - 1 Stop bit
  - 9600 Baud.

Pin assignment:

Pin	RS232	RS422
1	SHIELD	SHIELD
2	---	TRANSMIT A
3	RX	RECEIVE B
4	0,0 V	RECEIVE COMMON
5	---	---
6	0,0 V	TRANSMIT COMMON
7	TX	TRANSMIT B
8	---	RECEIVE A
9	SHIELD	SHIELD

Jumpers:

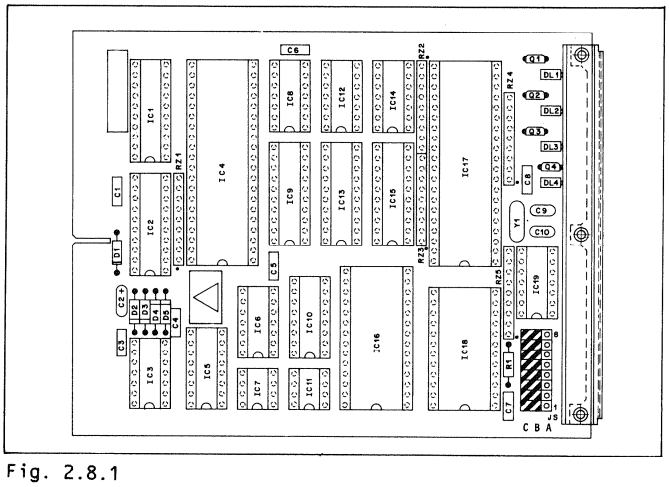


Fig. 2.8.1

- Switchover of operating modes and of electrical configurations:

	J8	J7	J6	J5	J4	J3	J2	J1
SMPTE BUS	BC	BC	BC	BC	BC		BC	BC
SERIAL RS232	AB	AB	AB	AB	AB		AB	AB
SERIAL RS422	AB	BC	BC	BC	AB		BC	BC

- Selecting the baud rates:

		J3
SMPTE BUS	38,4 kBd	BC
RS232/RS422	9600 Bd	BC
	1200 Bd	AB

- Standard adjustments:

	J8	J7	J6	J5	J4	J3	J2	J1
SMPTE BUS	BC	BC	BC	BC	BC	BC	BC	BC
SERIAL RS232 9600 Baud	AB	AB	AB	AB	AB	BC	AB	AB

Pilot lamps

The four LEDs on the front bracket of the assembly 1.820.751 are used for different purposes depending on if the assembly is configured as a serial interface (RS232/RS422) or as a SMPTE/EBU bus interface (programmable with jumpers, see above).

SMPTE/EBU-Bus: | PCB | RS232/RS422:

INTERFACE SELECTED — o — RX ACTIVE
Is on as long as the interface receives a SEL ADDR and as long as it is in the SELECT status. | Is on as soon as the interface receives STX (control byte) or a message.

INTERFACE POLLED — o — TX ACTIVE
Is on when the interface receives a POLL ADDR and as long as it is in the POLL status. | Is on as long as the interface sends a message.

INTERFACE IDLE/ACTIVE — o — INTERFACE ACTIVE
Is on as long as the interface is waiting for a BREAK signal or for its own address. | Is on as long as the interface waits for STX (control byte).

FIFO TX/RX ACTIVE — o — FIFO TX/RX ACTIVE
Is on as long as the interface receives or sends data from or to the FIFO. | Is on as long as the interface receives or sends data from or to the FIFO.

Software protocol:

The control system can transmit commands (function or parameter commands) or status requests to the A820.
The A820 acknowledges the commands and transmits status reports on request.

- Commands from the control system to the A820:

STX	BC	CB	CC	CPs....	CS

  - STX is a control character transmitted as start signal (according to SMPTE proposal: STX = 02_H).
  - BC (Byte Count): contains the number of the following bytes without checksum.
  - CB (Control Byte):

```
Bit No. 7 6 5 4 3 2 1 0
                    |  1 = message for MASTER
                    |  1 = message for TAPE DECK
                    |  1 = message for AUDIO
                    |  1 = message for int. synchronizer
                0 X |  message without status request
```

  - CC (Command Code): function or parameter command; refer to the instruction set.
  - CP (Parameter Bytes): for parameter commands only; in case of several parameters the MSB is transmitted first.
  - CS (Checksum): two's complement of the sum of all the transmitted data before the checksum except STX.

- Status requests from control system to A820:

STX	BC	CB	SBA	SBC	CS

  - STX is a control character transmitted as start signal (according to SMPTE proposal: STX = 02_H).
  - BC (Byte Count): = 3 (fixed).
  - CB (Control Byte):

```
Bit No. 7 6 5 4 3 2 1 0
                    |  1 = message from MASTER
                    |  1 = message from TAPE DECK
                    |  1 = message from AUDIO
                    |  1 = message from int. synchronizer
                1 0 |  unconditional status request (immediately)
                1 1 |  conditional status request (only when status is changed)
```

  - SBA, SBC (Status request bytes): SBA contains the basic address, SBC contains the number of bytes of the desired status.
  - CS (Checksum): two's complement of the sum of all the transmitted data before the checksum except STX.

- Acknowledgments and status reports from A820 to control system:
  After having sent a block of commands and before sending the next, the control system has to wait for an acknowledgment of the A820.
  This acknowledgment can consist of a control character or of a status report.
  If any acknowledgment arrives during a "time-out" the control system considers the data transmission faulty.
  Possible acknowledgments:
  - Acknowledgment after faultless data transmission, or conditional status request (status report only if status changes) but unchanged status:

ACK	(= 04_H according to SMPTE proposal)

- Acknowledgment after the following errors:
  - Transmission errors (Framing, Parity Overrun)
  - Invalid command codes
  - Time-out (2 s) during transmission of the command

NAK	(= 05_H according to SMPTE proposal)

- Status report as acknowledgement of:
  - unconditional status request
  - conditional status request, and changed status

STX	BC	CB	SBA	SBC	STATUS	CS

STX: is a control character transmitted as start signal (according to SMPTE proposal: STX = 02_H).
BC (Byte Count): contains the number of the following bytes without checksum.
CB (Control Byte):

Bit No. 7 6 5 4 3 2 1 0

- 1 = message from MASTER
- 1 = message from TAPE DECK
- 1 = message from AUDIO
- 1 = message from int. synchronizer
- 1 0 — unconditional status request (immediately)
- 1 1 — conditional status request (only when status is changed)

SBA, SBC (Status request bytes): SBA contains the basic address, SBC contains the number of bytes of the desired status.
STATUS: Table with the desired status bytes.
CS (Checksum): two's complement of the sum of all the transmitted data before the checksum except STX.

■ Instruction set
IN PREPARATION.

2.9 MAINTENANCE HINTS

Daily care is limited to cleaning the soundheads, the capstan shaft, and the tape guidance elements.

Dust and oxide particles from the magnetic tape coating tend to accumulate on the soundheads and the tape guidance elements. This can lead to so-called dropouts in recording mode.

Cleaning should be performed daily or more frequently if contamination is visible.

Cleaning is best performed with a STUDER cleaning kit (part No. 10.496.010.00). It contains all necessary utensils and a special soundhead cleaning fluid as well as aluminite cleaner.

Procedure

Moisten the yellow cloth with cleaning fluid and clean all tape guidance elements. Subsequently dry the cleaned parts with a dry section of the yellow cloth.
The grooves of the right-hand time code head can be cleaned preferably by means of a hard paint-brush whose bristles are cut to a length of approx. 5 mm.
The capstan normally stands still if the recorder is not switched to PLAY. A special function activates the capstan for cleaning purposes. The tape has to be unthreaded, then press PLAY.

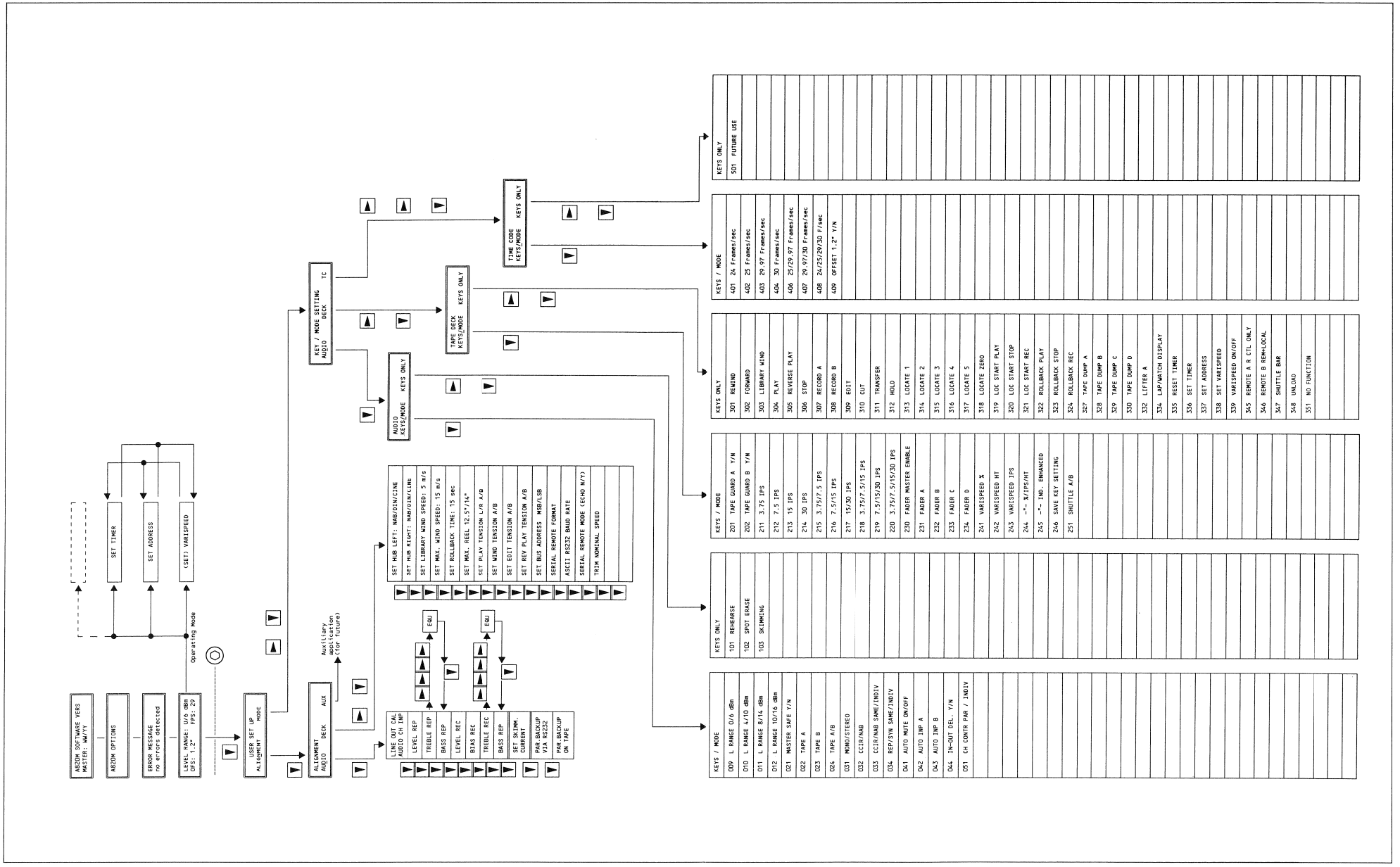
Caution!

Ensure that no cleaning fluid drips into the bearing when cleaning the capstan! The cleaning fluid can damage the windows of the VU-meters!

Lubricating the capstan bearing

The capstan motor is carefree; to increase its service life, lubricating the capstan bearing once a year is recommended. For this purpose, apply one drop of oil (type PDP 65, order No. 20.020.401.04).

STATUS TREE DIAGRAM



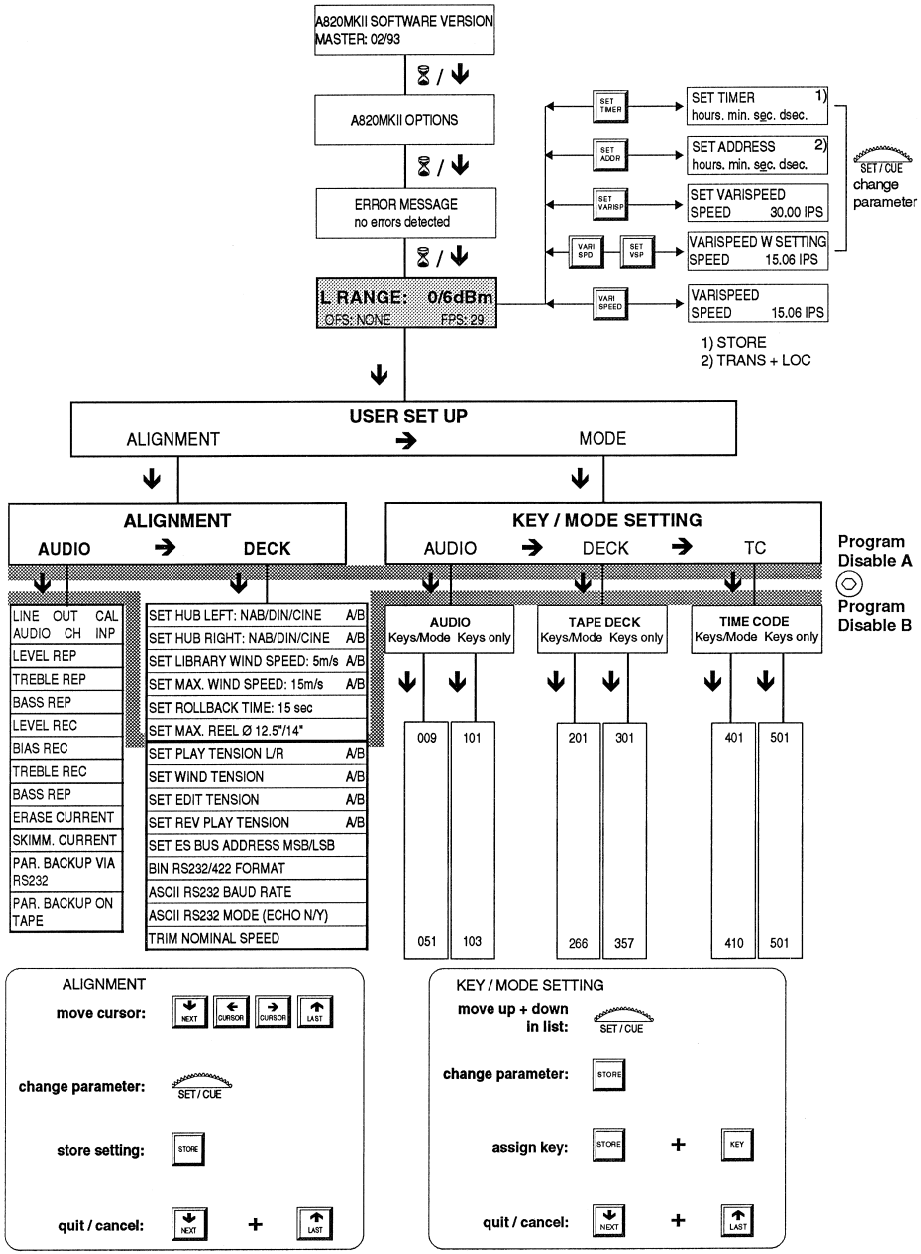
Up-date to the operating manual A820-2CH

Operation

1 Menu tree for the latest software version 02/93.

2 Description of new functions.

Menu tree for A820-2CH software version 02/93



Audio Keys/Mode

009	LEVEL RANGE 0/6 dBm	Y/N
010	LEVEL RANGE 4/10 dBm	Y/N
011	LEVEL RANGE 8/14 dBm	Y/N
012	LEVEL RANGE 10/16 dBm	Y/N
021	MASTER SAFE	Y/N
022	TAPE A	Y/N
023	TAPE B	Y/N
024	TAPE A/B	
031	MONO/STEREO	
032	CCIR/NAB	
033	CIRR/NAB PAR SAME/INDIV	
034	REP/SYNC PAR SAME/INDIV	
041	AUTO MUTE	ON/OFF
042	AUTO INPUT A	Y/N
043	AUTO INPUT B	Y/N
044	IN/OUT DELAY	Y/N
045	DOLBY HX PRO	ON/OFF
046	AUTO LOW PASS	Y/N
051	CH CONTROL PAR/INDIV	

Audio Keys only

101	REHEARSE
102	SPOT ERASE
103	SKIMMING

Time Code Keys/Mode

401	24 FRAMES/SEC	Y/N
402	25 FRAMES/SEC	Y/N
403	29.97 FRAMES/SEC	Y/N
404	30 FRAMES/SEC	Y/N
406	25/29.97 FRAMES/SEC	
407	29.97/30 FRAMES/SEC	
408	24/25/29/30 FRAMES/SEC	
409	OFFSET 1.2"	Y/N
410	TC MODE	NORM/SPEC

Time Code Keys only

501	FUTURE USE

Tape Deck Keys/Mode

201	TAPE GUARD A	NO/RED
202	TAPE GUARD B	NO/STOP
211	3.75 IPS	Y/N
212	7.5 IPS	Y/N
213	15 IPS	Y/N
214	30 IPS	Y/N
215	3.75/7.5 IPS	
216	7.5/15 IPS	
217	15/30 IPS	
218	3.75/7.5/15 IPS	
219	7.5/15/30 IPS	
220	3.75/7.5/15/30 IPS	
230	FADER MASTER ENABLE	Y/N
231	FADER A	Y/N
232	FADER B	Y/N
233	FADER C	Y/N
234	FADER D	Y/N
241	VARISPEED %	Y/N
242	VARISPEED HT	Y/N
243	VARISPEED IPS	Y/N
244	VARISPEED % / IPS / HT -"-	
245	VS IND. ENHANCED -"-	Y/N
246	SAVE KEY SETTING	Y/N
247	PROGRAM DISABLE	A/B
250	SHUTTLE IN PLAY	Y/N
251	SHUTTLE MODE	A/B
252	CAPSTAN MODE	A/B
253	WIND MODE	A/B
254	EDIT MODE	A/B
255	REC INDIC MODE	A/B
259	SINGLE LOOP MODE	A/B
265	AUTO LOAD ENABLE	Y/N
266	QUICK START	Y/N

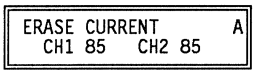
Tape Deck Keys only

301	REWIND	
302	FORWARD	
303	LIBRARY WIND	
304	PLAY	
305	REVERSE PLAY	
306	STOP	
307	RECORD A	
308	RECORD B	
309	EDIT	
310	CUT	
311	TRANSFER	
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 RECORD	
325	BACKSPACE STOP	
326	BACKSPACE PLAY	
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 REM CTL ONLY	
346	REMOTE B REM+LOCAL	
347	SHUTTLE BAR	
348	UNLOAD	
351	NO FUNCTION	
355	SINGLE LOOP	
356	AUTO LOOP	
357	INSTANT LOOP	

EDITION: 12. November 1993

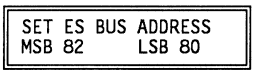
2 Beschreibung neuer Funktionen ab Software 02/93

2.1 Menü "Alignment - Audio"

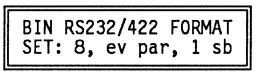


Anwahl der **Löschstrom** Einstellung für Bandsorte A, Kanal 1 bzw. 2.

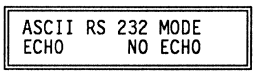
2.2 Menü "Alignment - Deck"



Setzen der SMPTE/EBU-Busadresse.
Zur Adressierung der A812MKII in einem Verbundsystem mit der SMPTE/EBU Bus Option 1.820.751.XX.

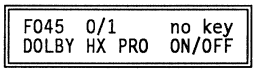


Setzen des BINÄR CODE FORMATS für die Option SMPTE/EBU Schnittstelle 1.820.751.XX.
8 = 8 bit code
ev par = even parity (gerade)
odd par = odd parity (ungerade)
1 sb = 1 stop - bit

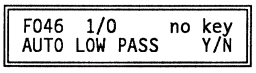


Setzen der ECHO oder NO-ECHO Funktion der Option RS 232 1.810.751.XX mit ASCII Protokoll.

2.3 Menü "Audio - Keys / Mode"



ON: Dolby HX PRO ist eingeschaltet.
OFF: Dolby HX PRO ist ausgeschaltet.



Y: Die automatische Höhenabsenkung beim Umspulen ist aktiert. Die Parameter der Tonhöhenwiedergabe werden zum Schutz der Monitorlautsprecher auf Null (00) gesetzt.
N: Die automatische Höhenabsenkung beim Umspulen ist nicht aktiv.

2.4 Menü "Tape Deck - Keys / Mode"

```
F247 1/0      no key
PROGRAM DISABLE A/B
```

A: Die geschlossene Programmiersperre (Freigabeschraube [28] auf S. D/6) erlaubt kein Zugriff in das Menü.
B: Die geschlossene Programmiersperre (Freigabeschraube [28] auf S. D/6) erlaubt folgende Menüzugriffe:

- SET HUB DIAMETER LEFT
- SET HUB DIAMETER RIGHT
- SET LIBRARY WIND SPEED
- SET MAX. WIND SPEED
- SET ROLLBACK TIME
- SET MAX. REEL DIAMETER

Es ist nicht möglich, eine Tastenfunktion zu programmieren, solange die Programmiersperre geschlossen ist. Ein allfälliger Versuch wird auf dem Service-Display mit der Meldung "program mode not enabled" angezeigt. Zum öffnen der Programmiersperre muss die Freigabeschraube gedreht werden.

```
F250 1/0      no key
SHUTTLE IN PLAY  Y/N
```

Y: Das SHUTTLE-Rad ist auch im Play Betrieb aktivierbar.
N: Das SHUTTLE-Rad ist im Play Betrieb nicht aktivierbar

```
F252 0/1      no key
CAPSTAN MODE    A/B
```

A: Capstan dreht im Stop-Modus nicht. PLAY oder RECORD Befehl aktiviert den Capstan erst, nachdem die Andruckrolle das Band gegen die Capstanachse gedrückt hat (Bandschonung).
B: Capstan dreht immer bei eingelegtem Band (schnelleres Startverhalten).

```
F253 0/1      no key
WIND MODE A/B
```

A: Der Bandabhebebolzen hebt das Band während dem Umspulen von den Audioköpfen ab.
B: Das Band berührt den Bandabhebebolzen während dem Umspulen nicht (Bandschonend). Andruckaggregat ganz ausgefahren.

```
F254 1/0      no key
EDIT MODE A/B/C
```

Mit der Funktion F254 EDIT A/B/C kann die Logik der Bandzugsensorblockierung gewählt werden.

EDIT A: Keiner der beiden Bandzugsensoren blockiert.
EDIT B: Linker Bandzugsensor blockiert, ideal für Editieren mit dem rechten Bandteller.
EDIT C: Rechter Bandzugsensor blockiert, ideal für Editieren mit dem linken Bandteller.

```
F255 1/0      no key
REC INDIC MODE A/B
```

A: Aufnahmerückmeldung der Laufwerktaste [10] ist nur aktiv, wenn mindestens 1 Kanal auf Aufnahme geschaltet ist.
B: Aufnahmerückmeldung auf der Laufwerktaste [10] ist unabhängig vom Aufnahmezustand des Audioteils.
Anwendung: "Follow external Record" mit TLS 4000.

```
F259 1/0      no key
SINGLE LOOP MODE A/B
```

Für LOOP-Betrieb ohne numerische Eingabe einer Endadresse.
A: Die SINGLE LOOP Taste **auf dem Autolocator** funktioniert als Instant Loop.
B: Die SINGLE LOOP Taste **auf dem Autolocator** funktioniert als Single Loop.

Erklärung Single Loop Eine einzelne auf dem Autolocator angewählte Schleife wird gefahren.

Erklärung Instant Loop Drücken der Taste INSTANT LOOP bestimmt eine Endlosschleife zwischen dem angezeigten Zählerstand und der in LOC 1 abgespeicherten Bandposition. Dabei gilt der kleinere Wert als Startadresse.

```
F265 0/1        no key
AUTO LOAD ENABLE Y/N
```

AUTO LOAD dient zum automatischen Programmieren der Punch-In und Punch-Out Adressen auf dem Autolocator im AUTOREC Modus. Die Adressen werden durch Drücken von REC bzw. PLAY eingegeben.

Y: Die Taste mit der TRANS Funktion **auf dem Autolocator** bekommt die AUTO LOAD Funktion.

B: Die ursprüngliche Funktion TRANSFER (Rückmelde LED blinkt) ist wieder auf der TRANS/REV PLAY-Taste des Autolocators programmiert.

```
F266 0/1        no key
QUICK START       Y/N
```

Neu ist bei 1/4"-Ausführungen die Funktion Nr. 266, "Quick Start Yes/No", mit Default auf "No" implementiert. Voraussetzung für Quick Start ist, dass 12,5"-Spulen eingelegt und nicht 30ips Nominalgeschwindigkeit eingestellt sind, so dass sich der Algorithmus zur Trägheitsmessung vereinfacht. Der aktivierte Quick Start Modus wird irreversibel ausgeworfen, wenn der Spulendurchmesser im Menü "Tape Deck Alignment" auf 14" umprogrammiert wird oder wenn man auf die Nominalgeschwindigkeit von 30ips per Taste umschaltet. Der Operator muss bewusst per Tastendruck Quick Start reaktivieren, nachdem die Voraussetzungen wiederhergestellt sind. Ausserdem kann in der Quick Start Betriebsart weder irgendein Varispeed Modus (inkl. Setting) ein- oder ausgeschaltet noch der Capstan Modus von B nach A umgeschaltet werden.

Der Quick Start Modus bleibt **als Vorwahl** auch dann gespeichert, wenn auf eine unzulässige Nominalgeschwindigkeit oder einen unzulässigen Kerndurchmesser umgeschaltet wird. Ein- und Ausschalten des Quick Start Modus sind nur bei zulässigen Randbedingungen erlaubt, um sofortige Quittierung zu gewährleisten.

Varispeed ist bei Quick Start unter allen Bedingungen ausgeschlossen.

2.5 Menü "Tape Deck - Keys only"

```
F305            no key
REVERSE PLAY
```

Wiedergabe in Rückwärtsrichtung. Funktioniert auch mit der Taste HOLD und PLAY gleichzeitig gedrückt.

```
F325            no key
BACKSPACE STOP
```

Mit dieser Vorlauffunktion kann das Band mit Kopfkontakt und vierfacher PLAY-Geschwindigkeit zurückgespult werden. Funktioniert nur solange die Taste gedrückt wird.

```
F326            no key
BACKSPACE PLAY
```

Mit dieser Vorlauffunktion kann das Band mit Kopfkontakt und vierfacher PLAY-Geschwindigkeit zurückgespult werden. Nach dem Loslassen der BACKSPACE PLAY Taste geht die Maschine in den PLAY Zustand.

F327 Loc.k10 TAPE DUMP A

F328 no key TAPE DUMP B

F329 no key TAPE DUMP C

F330 no key TAPE DUMP D

Mit den Funktionen F327–F330 können folgende Modi angewählt werden:

Papierkorb Betriebsarten (F327–F330):	**A** **F327**	**B** **F328**	**C** **F329**	**D** **F330**
Direkte Anwahltaste TAPE DUMP (Abbrechen mit STOP oder TAPE DUMP)	■	■		
Vorbereitungstaste TAPE DUMP Aktivieren durch PLAY (unterbrechen mit STOP)			■	■
Bandzähler aktiv	■		■	
Bandzähler abgeschaltet		■		■

F348 no key UNLOAD

Schaltet die Wickelmotorsteuerung aus. Das Band wird entlastet. Funktion nur in STOP.

2.6 Menü "Time Code – Keys / Mode"

F410 1/0 no key TC MODE NORM/SPEC

Aktivieren der Zeitcodeaufnahme bzw. Wiedergabe bei 3 3/4 ips.
NORM: Keine Zeitcode-Aufnahme bzw. Wiedergabe bei 3 3/4 ips möglich.
SPEC: Freigabe der Zeitcode-Aufnahme bzw. Wiedergabe bei 3 3/4 ips.

Hinweis: Bei dieser Bandgeschwindigkeit ist mit erhöhter drop-out Rate zu rechnen. Der Zeitcode-Aufnahmepegel R2 ist für 3 3/4 und 7 1/2 ips zu verwenden. Es wird empfohlen, den Pegel für die gebräuchlichere Anwendung zu optimieren.

2.7 Allgemeine Geräte-Funktionen

Faderstart

Der Anschluss eines Fader-READY-Schalters soll als Impulstaste gemäss folgenden Varianten erfolgen:

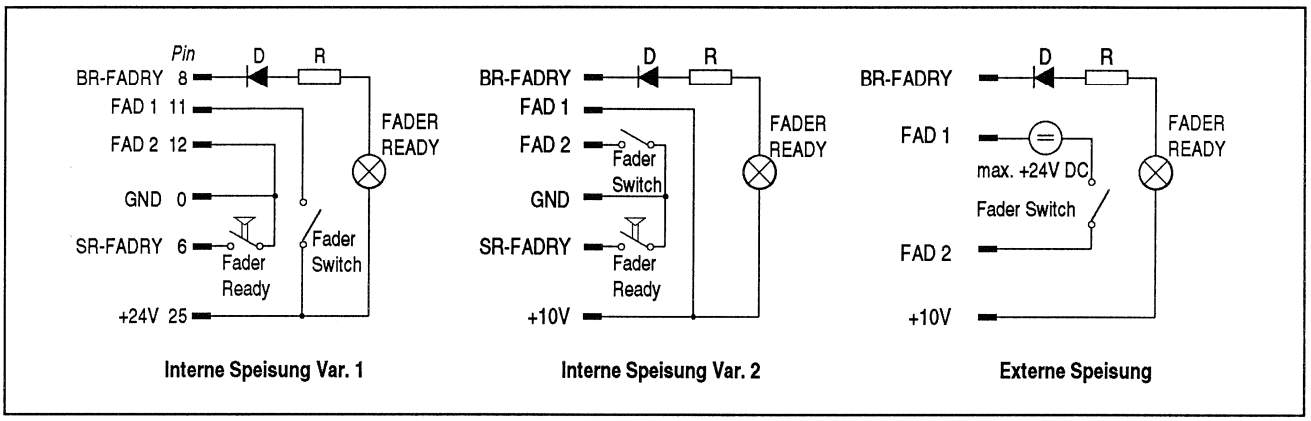


Fig. 1.13 FADER START-Funktion mit interner oder externer Speisung am Anschluss PAR. REM. CTRL.

Locator-Adressen

Da die Adressen von Loc Start, AREC Punch In und Punch Out auf die Bandpositionen bezogen sind, werden bei versehentlichem Betätigen der Zähler-Rückstelltaste RESET TIMER **keine** unerwünschten Verschiebungen auftreten!

Autolocator

Autolocator-Tasten sind keine "Soft-Tasten" und nicht frei programmierbar. (Nur bedingt über lokales LCD mit veränderter Funktionalität: siehe Funktionen im Menü!)

Dokumentation

Ausführliche Beschreibungen der seriellen Schnittstelle sind in Englisch unter folgenden Bestellnummern erhältlich.

Protokoll der RS232-Schnittstelle	Best. Nr. 10.85.1330
Studer ATR ES-Bus-Protokoll	Best. Nr. 10.85.1350

2 Description of new functions Software 02/93 and up

2.1 Menu "Alignment - Audio"

```
ERASE CURRENT        A
  CH1 85   CH2 85
```

Selects the **erase current** alignment for tape type A, channel 1 or 2.

2.2 Menu "Alignment - Deck"

```
SET ES BUS ADDRESS
MSB 82      LSB 80
```

Sets the SMPTE/EBU bus address.
For addressing the A812 MKII operating in an interlinked system in conjunction with the SMPTE/EBU option 1.820.751.XX.

```
BIN RS232/422 FORMAT
SET: 8, ev par, 1 sb
```

Sets the BINARY CODE FORMAT for the optional SMPTE/EBU interface 1.820 751.XX.
8 = 8-bit code
ev par = even parity
odd par = odd parity
1 sb = 1 stop bit

```
ASCII RS 232 MODE
ECHO       NO ECHO
```

Sets the ECHO or NO ECHO function of the RS232 option 1.810.751.XX with ASCII protocol.

2.3 Menu "Audio - Keys / Mode"

```
F045  0/1      no key
DOLBY HX PRO   ON/OFF
```

ON: Dolby HX PRO switched on.
OFF: Dolby HX PRO switched off.

```
F046  1/0      no key
AUTO LOW PASS    Y/N
```

Y: Automatic treble attenuation during fast wind is active. The parameters for high frequency reproduction are set to zero (00) for protection of the monitor speakers.
N: Automatic treble attenuation during fast wind is not activated.

2.4 Menu "Tape Deck - Keys / Mode"

```
F247 1/0      no key
PROGRAM DISABLE A/B
```

A: The closed programming lock (enable screw [28] on page E/6) prevents access to the menu.

B: The closed programming lock (enable screw [28] on page E/6) allows the following menu accesses:

- SET HUB DIAMETER LEFT
- SET HUB DIAMETER RIGHT
- SET LIBRARY WIND SPEED
- SET MAX. WIND SPEED
- SET ROLLBACK TIME
- SET MAX. REEL DIAMETER

It is not possible to program a key function as long as the programming lock is closed. Any attempt will be rejected with the message "program mode not enabled" on the service display. For opening the programming lock, the enable screw [28] on page E/6 must be turned.

```
F250 1/0      no key
SHUTTLE IN PLAY  Y/N
```

Y: The SHUTTLE wheel can also be activated in play mode.

N: The SHUTTLE wheel cannot be activated in play mode.

```
F252 0/1      no key
CAPSTAN MODE    A/B
```

A: The capstan does not turn in stop mode. PLAY or RECORD activates the capstan only when the pinch roller presses the tape against the capstan shaft (more gentle tape handling).

B: The capstan always turns when the tape is inserted (faster acceleration behavior).

```
F253 1/0      no key
WIND MODE A/B
```

A: The tape lift pin lifts the tape off the soundhead in spooling mode.

B: The tape does not contact the tape lift pin in spooling mode (gentle tape handling). The pinch roller assembly is fully disengaged.

```
F254 1/0/0    no key
EDIT MODE A/B/C
```

With function F254 EDIT A/B/C the ogic of the tape tension sensor arrest can be selected.

EDIT A: Both tape tension sensors free.

EDIT B: Left-hand tension sensor arrested (blocked). Ideal for cueing and editing by manipulating the right hand reel.

EDIT C: Right-hand tension sensor arrested (blocked). Ideal for cueing and editing by manipulating the left hand reel.

```
F255 1/0      no key
REC INDIC MODE A/B
```

A: Record indication on the tape deck key [10] is only active if at least 1 channel is switched to record.

B: Record indication on the tape deck key [10] is independent of the audio section status.
Application: "Follow external record" with TLS 4000.

F259 1/0 no key SINGLE LOOP MODE A/B

For LOOP mode without numeric input of an end address.
A: The SINGLE LOOP key **on the autolocator** functions as an instant loop.
B: The SINGLE LOOP key **on the autolocator** functions as a single loop.

Explanation of single loop

One individual loop as selected on the autolocator is performed.

Explanation of instant loop

When the INSTANT LOOP key is pressed, a loop between the displayed counter address and the tape address stored in LOC 1 is performed endlessly. The lower of the two values is taken as the starting address.

F265 0/1 no key AUTO LOAD ENABLE Y/N

AUTO LOAD is used for automatic programming the punch-in and punch-out addresses on the autolocator in AUTOREC mode. The addresses are entered by pressing REC or PLAY respectively.
Y: The key with the TRANS/REV PLAY function **on the autolocator** determines the AUTO LOAD function.
B: The original function TRANSFER (LED flashes) is again assigned to the TRANS/REV PLAY key function **on the autolocator.**

F266 0/1 no key QUICK START Y/N

A new feature of the 1/4" version is the function No. 266 "Quick Start Yes/No". The default setting is "No". A precondition for quick start is that 12.5" reels are mounted and that the 30 ips speed is deselected in order to simplify the algorithm for inertia measurement. The activated Quick Start mode is irrevocably rejected if the reel diameter in the "Tape deck alignment" menu has been reprogrammed to 14", or if the 30 ips nominal speed is selected. The operator must activate the Quick Start function explicitly by pressing this key after these preconditions have been established. In Quick Start mode neither a Varispeed mode (incl. setting) can be activated or deactivated, nor can the capstan mode be changed from mode B to A.

The Quick Start mode remains preselected even if an inadmissible nominal speed has been activated or if an inadmissible reel diameter has been selected. The Quick Start mode can only be deactivated if all required operating conditions exist. This will be acknowledged immediately.

Varispeed is precluded under all conditions if Quick Start is active.

2.5 Menu "Tape Deck - Keys only"

F305 no key REVERSE PLAY

Playback in reverse direction. The function can also be activated by simultaneously pressing the HOLD and PLAY keys.

F325 no key BACKSPACE STOP

With this spooling function the tape can be rewound at four times the PLAY speed with tape-head contact. This function remains only active for as long as this key is pressed.

F326 no key BACKSPACE PLAY

With this spooling function the tape can be rewound at four times the PLAY speed with tape-head contact. When the BACKSPACE key is released, the machine switches to PLAY mode.

F327 Loc.k10
TAPE DUMP A

F328 no key
TAPE DUMP B

F329 no key
TAPE DUMP C

F330 no key
TAPE DUMP D

With the functions F327–F330 the following modes can be selected

Dump edit modes (F327–F330):	A F327	B F328	C F329	D F330
Direct selection key TAPE DUMP (cancel with STOP or TAPE DUMP)	■	■		
Preselection key TAPE DUMP activate with PLAY (cancel with STOP)			■	■
Tape timer active	■		■	
Tape timer switched off		■		■

F348 no key
UNLOAD

Key for retracing the tape guide assembly. Spooling motor control switched off. Effective in STOP only.

2.6 Menu "Time Code - Keys / Mode"

F410 1/0 no key
TC MODE NORM/SPEC

Activates the time code recording or reproduction at 3 3/4 ips.
NORM: No time code recording or reproduction at 3 3/4 ips.
SPEC: Enables time code recording or reproduction at 3 3/4 ips.

Note: At this tape speed one has to expect a higher drop-out rate. The time code record level R2 has to be used for 3 3/4 and 7 1/2 ips. It is recommended to optimize the level for the more frequently used speed.

2.7 General equipment functions

Faderstart

A Fader READY switch must be connected as a momentary action push button according to one of the following versions:

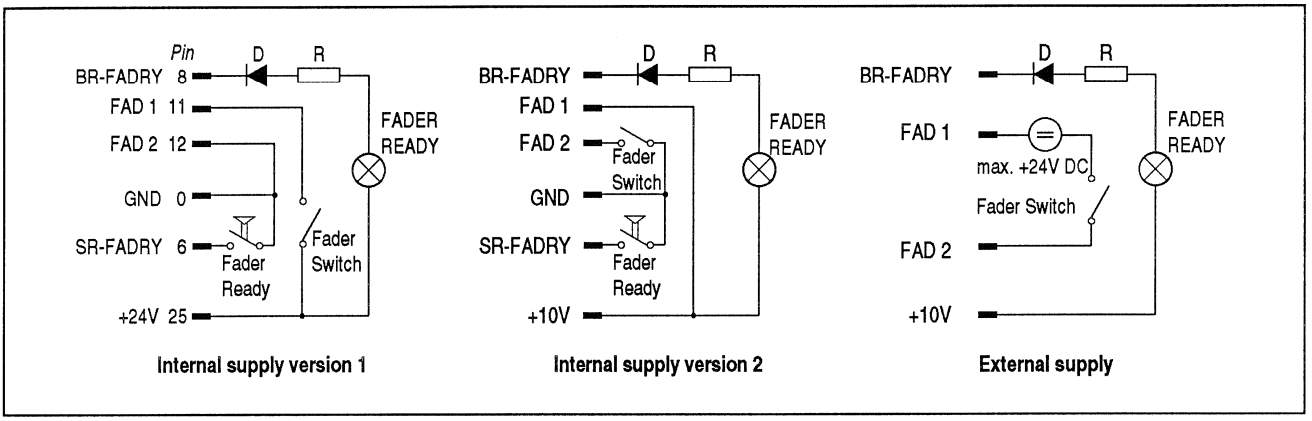


Fig. 1.13 FADER START function with internal or external supply at the PAR. REM. CTRL. terminal.

Locator addresses

Since the Loc Start, AREC punch in and punch out addresses relate to the actual tape positions, no unwanted offsets occur if the RESET TIMER key is inadvertently pressed!

Autolocator

Autolocator keys do not function as soft keys and are not freely programmable. (Only subject to certain restrictions via a local LCD with changed functionality: see menu functions!)

Documentation

A detailed English description of the interface can be ordered under the following publication numbers:

Protocol of the RS232 interface	Order No. 10.85.1330
Studer ATR ES bus protocol	Order No. 10.85.1350