



Studer On-Air 2000

Digital Mixing Console

SW Version 3.0

Operating Instructions

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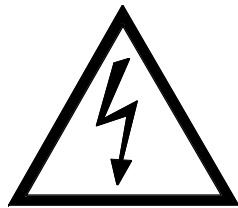
Subject to change



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'utilisateur.

Um die Gefahr eines elektrischen Schlages zu vermeiden, entfernen Sie keine Geräteabdeckungen (oder dessen Rückwand). Überlassen Sie Wartung und Reparatur qualifiziertem 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 existe à l'intérieur de l'appareil des “**tensions dangereuses**”. Ces tensions élevées entraînent 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 enthält.

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 Lithium-batterie. Nur durch den selben Typ ersetzen.

ADVARSEL:

Lithiumbatteri. Eksplosionsfare. Udskiftning må kun foretages af en sagkyndig af 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,
 - resuscitate the person if respiration is poor,
 - lay the body down, 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, toujours 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:
 - Contrôler 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:
 - 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

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.

Untersuchen Sie das Gerät und sein Zubehör auf allfällige Transportschäden.


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 von 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-Gerätedose IEC320/C13 oder IEC320/C19 und unter Berücksichtigung der einschlägigen, im jeweiligen Lande geltenden Bestimmungen angefertigt werden; siehe 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

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

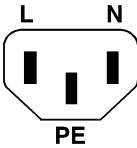
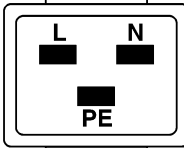
Check the equipment for any transport damage.

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.

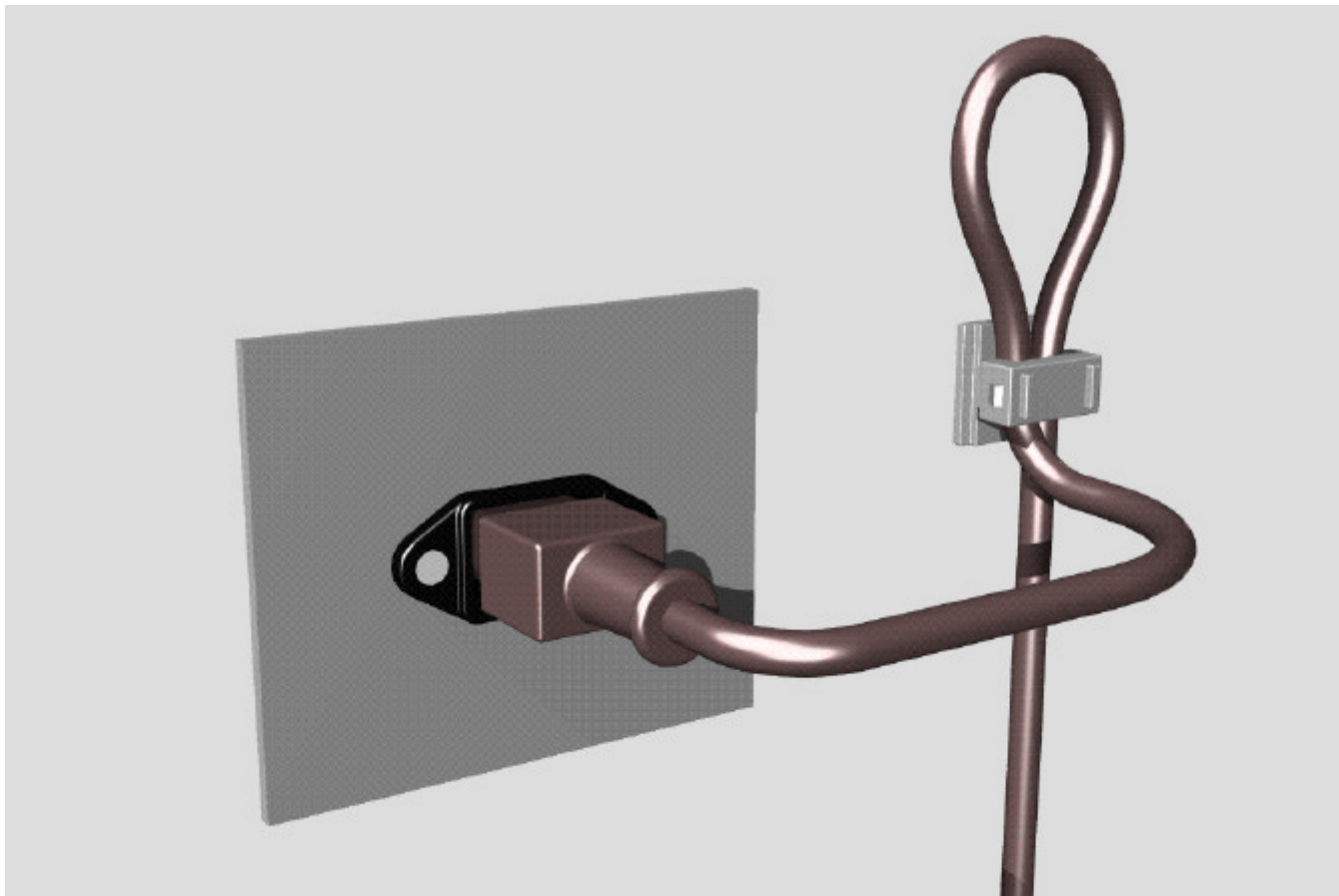
Before connecting the equipment to the AC power outlet, check that the local line voltage matches the equipment rating (voltage, frequency) within the admissible tolerance. The equipment fuses must be rated in accordance with the specifications on the equipment.

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).

 <p>IEC 320 / C13</p>	 <p>IEC 320 / C19</p>
Female plug (IEC320), view from contact side: L live; brown N neutral; blue PE protective earth; green and yellow	National American Standard: Black White green
Connecteur femelle (IEC320), vue de la face aux contacts: L phase; brun N neutre; bleu PE terre protective; vert et jaune	Standard national américain: Noir Blanc Vert
Ansicht auf Steckkontakte der Kabel-Gerätesteckdose (IEC320): L Phase; braun N Nulleiter; blau PE Schutzleiter; gelb/grün	USA-Standard: Schwarz Weiss grün

Zugentlastung für den Netzanschluss

Zum Verankern von Steckverbindungen ohne mechanische Verriegelung (z.B. IEC-Kaltgerätedosen) empfehlen wir die folgende Anordnung:



Mains connector strain relief

For anchoring connectors without a mechanical lock (e.g. IEC mains connectors), we recommend the following arrangement:

Vorgehen: Der mitgelieferte Kabelhalter ist selbstklebend. Bitte beachten Sie bei der Montage die folgenden Regeln:

1. Der Untergrund muss sauber, trocken und frei von Fett, Öl und anderen Verunreinigungen sein. Temperaturbereich für optimale Verklebung: 20...40° C.
2. Entfernen Sie die Schutzfolie auf der Rückseite des Kabelhalters und bringen sie ihn mit kräftigem Druck an der gewünschten Stelle an. Lassen sie ihn unbelastet so lange wie möglich ruhen – die maximale Klebekraft ist erst nach rund 24 Stunden erreicht.
3. Die Stabilität des Kabelhalters wird erhöht, wenn Sie ihn zusätzlich verschrauben. Zu diesem Zweck liegen ihm eine selbstschneidende Schraube sowie eine M4-Schraube mit Mutter bei.
4. Legen Sie das Kabel gemäss Figur in den Halter ein und pressen Sie die Klemme kräftig auf, bis das Kabel fixiert ist.

Procedure: The cable clamp shipped with your unit is auto-adhesive. If mounting, please follow the rules below:

1. The surface to be adhered to must be clean, dry, and free from grease, oil or other contaminants. Best application temperature range is 20...40° C.
2. Remove the plastic protective backing from the rear side of the clamp and apply it firmly to the surface at the desired position. Allow as much time as possible for curing. The bond continues to develop for as long as 24 hours.
3. For improved stability, the clamp can be fixed with a screw. For this purpose, a self-tapping screw and an M4 bolt and nut are included.
4. Place the cable into the clamp as shown in the illustration above and firmly press down the internal top cover until the cable is fixed.

Lufttemperatur und Feuchtigkeit

Allgemein

Die Betriebstauglichkeit des Gerätes oder Systems ist unter folgenden Umgebungsbedingungen gewährleistet:

EN 60721-3-3, Set IE32, Wert 3K3.

Diese Norm umfasst einen umfassenden Katalog von Parametern; die wichtigsten davon sind: Umgebungstemperatur +5...+40 °C; rel. Luftfeuchtigkeit 5...85% – d.h. weder Kondensation noch Eisbildung; abs. Luftfeuchtigkeit 1...25 g/m³; Temperatur-Änderungsrate < 0,5 °C/min. In den folgenden Abschnitten wird darauf näher eingegangen.

Unter den genannten Bedingungen startet und arbeitet das Gerät oder System problemlos. Ausserhalb dieser Spezifikationen möglicherweise auftretende Probleme sind in den folgenden Abschnitten beschrieben.

Umgebungstemperatur

Geräte und Systeme von Studer sind allgemein für einen Umgebungstemperaturbereich (d.h. Temperatur der eintretenden Kühlluft) von +5...+40 °C ausgelegt. Bei Installation in einem Schrank muss der vorgesehene Luftdurchsatz und dadurch die Konvektionskühlung gewährleistet sein. Folgende Tatsachen sind dabei zu berücksichtigen:

1. Die zulässige Umgebungstemperatur für den Betrieb der Halbleiter-Bauelemente beträgt 0 °C bis +70 °C (commercial temperature range for operation).
2. Der Luftdurchsatz der Anlage muss gewährleisten, dass die austretende Kühlluft ständig kühler ist als 70 °C.
3. Die mittlere Erwärmung der Kühlluft soll 20 K betragen, die maximale Erwärmung an den heissen Komponenten darf somit um weitere 10 K höher liegen.
4. Zum Abführen einer Verlustleistung von 1 kW bei dieser zulässigen mittleren Erwärmung ist eine Luftmenge von 2,65 m³/min notwendig.

Beispiel: Für ein Rack mit einer Leistungsaufnahme $P = 800\text{ W}$ ist eine Kühlluftmenge von $0,8 * 2,65\text{ m}^3/\text{min}$ nötig, entsprechend $2,12\text{ m}^3/\text{min}$.

5. Soll die Kühlfunktion der Anlage (z.B. auch bei Lüfter-Ausfall oder Bestrahlung durch Spotlampen) überwacht werden, so ist die Temperatur der Abluft unmittelbar oberhalb der Einschübe an mehreren Stellen im Rack zu messen; die Ansprechtemperatur der Sensoren soll 65 bis 70 °C betragen.

Reif und Tau

Das unversiegelte System (Steckerpartien, Halbleiteranschlüsse) verträgt zwar leichte Eisbildung (Reif). Mit blossen Auge sichtbare Betauung führt jedoch bereits zu Funktionsstörungen. In der Praxis kann mit einem zuverlässigen Betrieb der Geräte bereits im Temperaturbereich ab -15 °C gerechnet werden, wenn für die Inbetriebnahme des kalten Systems die folgende allgemeine Regel beachtet wird:

Wird die Luft im System abgekühlt, so steigt ihre relative Feuchtigkeit an. Erreicht diese 100%, kommt es zu Niederschlag, meist in der Grenzschicht zwischen der Luft und einer kühleren Oberfläche, und somit zur Bildung von Eis oder Tau an empfindlichen Systemstellen (Kontakte, IC-Anschlüsse etc.). Ein störungsfreier Betrieb mit interner Betauung, unabhängig von der Temperatur, ist nicht gewährleistet.

Air temperature and humidity

General

Normal operation of the unit or system is warranted under the following ambient conditions defined by:

EN 60721-3-3, set IE32, value 3K3.

This standard consists of an extensive catalogue of parameters, the most important of which are: ambient temperature +5...+40 °C, relative humidity 5...85% – i.e. no formation of condensation or ice; absolute humidity 1...25 g/m³; rate of temperature change < 0,5 °C/min. These parameters are dealt with in the following paragraphs.

Under these conditions the unit or system starts and works without any problem. Beyond these specifications, possible problems are described in the following sections.

Ambient temperature

Units and systems by Studer are generally designed for an ambient temperature range (i.e. temperature of the incoming air) of +5...+40 °C. When rack mounting the units, the intended air flow and herewith adequate cooling must be provided. The following facts must be considered:

1. The admissible ambient temperature range for operation of the semiconductor components is 0 °C to +70 °C (commercial temperature range for operation).
2. The air flow through the installation must provide that the outgoing air is always cooler than 70 °C.
3. Average heat increase of the cooling air shall be 20 K, allowing for an additional maximum 10 K increase at the hot components.
4. In order to dissipate 1 kW with this admissible average heat increase, an air flow of 2,65 m³/min is required.

Example: A rack dissipating $P = 800\text{ W}$ requires an air flow of $0,8 * 2,65\text{ m}^3/\text{min}$ which corresponds to $2,12\text{ m}^3/\text{min}$.

5. If the cooling function of the installation must be monitored (e.g. for fan failure or illumination with spot lamps), the outgoing air temperature must be measured directly above the modules at several places within the rack. The trigger temperature of the sensors should be 65 to 70 °C.

Frost and dew

The unsealed system parts (connector areas and semiconductor pins) allow for a minute formation of ice or frost. However, formation of dew visible with the naked eye will already lead to malfunctions. In practice, reliable operation can be expected in a temperature range above -15 °C, if the following general rule is considered for putting the cold system into operation:

If the air within the system is cooled down, the relative humidity rises. If it reaches 100%, condensation will arise, usually in the boundary layer between the air and a cooler surface, together with formation of ice or dew at sensitive areas of the system (contacts, IC pins, etc.). Once internal condensation occurs, troublefree operation cannot be guaranteed, independent of temperature.

Vor der Inbetriebnahme muss das System auf allfällige interne Betauung oder Eisbildung überprüft werden. Nur bei sehr leichter Eisbildung kann mit direkter Verdunstung (Sublimation) gerechnet werden; andernfalls muss das System im abgeschalteten Zustand gewärmt und getrocknet werden.

Das System ohne feststellbare interne Eisbildung oder Betauung soll möglichst homogen (und somit langsam) mit eigener Wärmeleistung aufgewärmt werden; die Lufttemperatur der Umgebung soll ständig etwas tiefer als diejenige der Systemluft sein.

Ist es unumgänglich, das abgekühlte System sofort in warmer Umgebungsluft zu betreiben, so muss diese entfeuchtet sein. Die absolute Luftfeuchtigkeit muss dabei so tief sein, dass die relative Feuchtigkeit, bezogen auf die kälteste Oberfläche im System, immer unterhalb 100% bleibt.

Es ist dafür zu sorgen, dass beim Abschalten des Systems die eingeschlossene Luft möglichst trocken ist (d.h. vor dem Abschalten im Winter den Raum mit kalter, trockener Luft belüften und feuchte Gegenstände, z.B. Kleider, entfernen).

Die Zusammenhänge sind im folgenden Klimatogramm ersichtlich. Zum kontrollierten Verfahren gehören Thermometer und Hygrometer sowie ein Thermometer innerhalb des Systems.

Beispiel 1: Ein Ü-Wagen mit einer Innentemperatur von 20 °C und 40% relativer Luftfeuchtigkeit wird am Abend abgeschaltet. Sinkt die Temperatur unter +5 °C, bildet sich Tau oder Eis.

Beispiel 2: Ein Ü-Wagen wird morgens mit 20 °C warmer Luft von 40% relativer Luftfeuchtigkeit aufgewärmt. Auf Teilen, die kälter als +5 °C sind, bildet sich Tau oder Eis.

Before putting into operation, the system must be checked for internal formation of condensation or ice. Only with a minute formation of ice, direct evaporation (sublimation) may be expected; otherwise the system must be heated and dried while switched off.

A system without visible internal formation of ice or condensation should be heated up with its own heat dissipation, as homogeneously (and subsequently as slow) as possible; the ambient temperature should then always be lower than the outgoing air.

If it is absolutely necessary to operate the system immediately within warm ambient air, this air must be dehydrated. In such a case, the absolute humidity must be so low that the relative humidity, related to the coldest system surface, always remains below 100%.

Ensure that the enclosed air is as dry as possible when powering off (i.e. before switching off in winter, aerate the room with cold, dry air, and remove humid objects as clothes from the room).

These relationships are visible from the following climatogram. For a controlled procedure, thermometer and hygrometer as well as a thermometer within the system will be required.

Example 1: An OB-van having an internal temperature of 20 °C and rel. humidity of 40% is switched off in the evening. If temperature falls below +5 °C, dew or ice will be forming.

Example 2: An OB-van is heated up in the morning with air of 20 °C and a rel. humidity of 40%. On all parts being cooler than +5 °C, dew or ice will be forming.

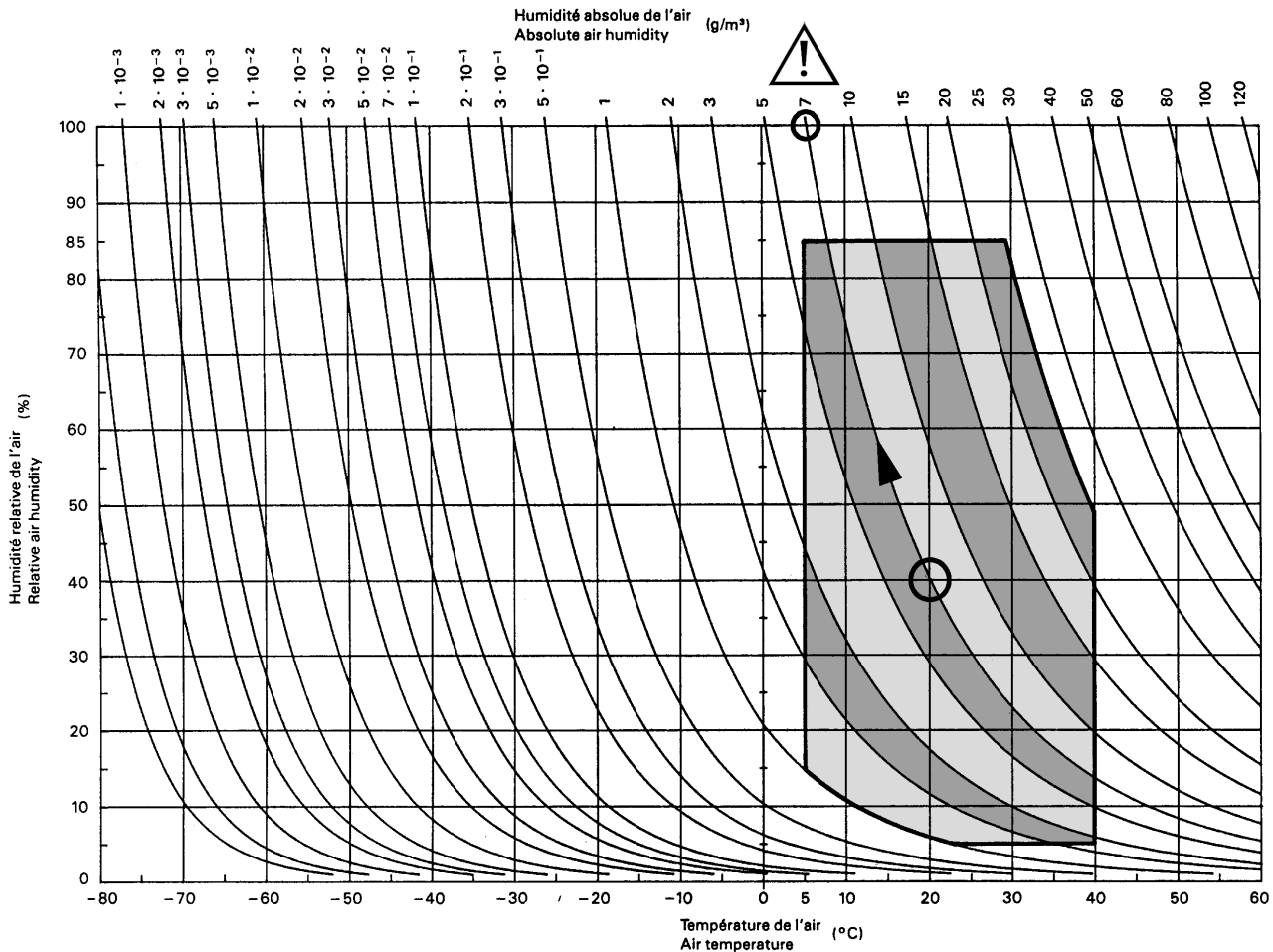


Figure B.3 – Climatogramme pour catégorie 3K3
Climatogram for class 3K3

Wartung und Reparatur

Durch Entfernen von Gehäuseteilen, Abschirmungen etc. werden stromführende Teile freigelegt. Deshalb 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 Schaltungs- teile und metallene Halbleitergehäuse weder direkt noch mit nichtisoliertem 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 ausgebildetem Fachpersonal mit den vorgeschriebenen Schutzmitteln (u.a. Schutzbrille, Handschuhe) gehandhabt werden.

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 if the equipment is disconnected from the power, parts with hazardous charges (e.g. capacitors, picture tubes) must not be touched until they have been properly discharged. Touch hot components (power semiconductors, heat sinks, etc.) only when cooled off.

If maintenance is performed on a unit that is opened and switched on, no uninsulated circuit components and metallic semiconductor housings must 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 containing liquid electrolyte.

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

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 Verpackungen gelagert und transportiert werden.
- Unverpackte, ESD-empfindliche Komponenten dürfen nur in 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 Gerät wie auch Werkzeug, 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 (Schockentladungsfahr) 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 von Spezialbauteilen finden Sie in der Serviceanleitung.

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 repair the corresponding devices should be purchased locally. The specifications of special components can be found in the service manual.

<p>Demontage/Dismounting</p>	
<p>Montage/Mounting</p>	<p>Beispiele/Examples</p>

Störstrahlung und Störfestigkeit

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

1. Vom Gerät erzeugte elektromagnetische Strahlung ist soweit begrenzt, dass 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 angemessener Wahrscheinlichkeit sowohl den Schutz der Umgebung wie auch entsprechende Störfestigkeit des Gerätes. Absolute Garantie, dass keine unerlaubte elektromagnetische Beeinträchtigung während des Betriebes 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 Betriebsanleitung, 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, wo vorgesehen. Achten Sie auf einwandfreie, grossflächige, korrosionsbeständige Verbindung der Abschirmung zum entsprechenden Steckeranschluss und dessen Gehäuse. 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 digitaler Kommunikationssignale hochfrequente Aussendungen verursachen (z.B. LS- oder HC-Logik bis 30 MHz).
- Vermeiden Sie Bildung von Masseschleifen 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 unit 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 ground 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 residen-

tial 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

Der Hersteller,

Studer Professional Audio AG,
CH-8105 Regensdorf,

erklärt in eigener Verantwortung, dass das Produkt

**Studer On-Air 2000, Digital-Mischpult,
(ab Serie-Nr. 1001),**

auf das sich diese Erklärung bezieht, entsprechend den Bestimmungen der EU-Richtlinien und 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:
Schutzklasse 1, EN 60950:1992 + A1/A2:1993
- EMV:
EN 55103-1/-2:1996, elektromagnetische Umgebungen E2 und E4.

Regensdorf, 7. Mai 1997



B. Hochstrasser, Geschäftsleiter



P. Fiala, Leiter QS

CE Declaration of Conformity

The manufacturer,

Studer Professional Audio AG,
CH-8105 Regensdorf,

declares under his sole responsibility that the product

**Studer On-Air 2000, Digital Mixing Console,
(on from serial No. 1001),**

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 1, EN 60950:1992 + A1/A2:1993
- EMC:
EN 55103-1/-2:1996, electromagnetic environments E2 and E4.

Regensdorf, May 7, 1997



B. Hochstrasser, Managing director



P. Fiala, Manager QA

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1 INTRODUCTION



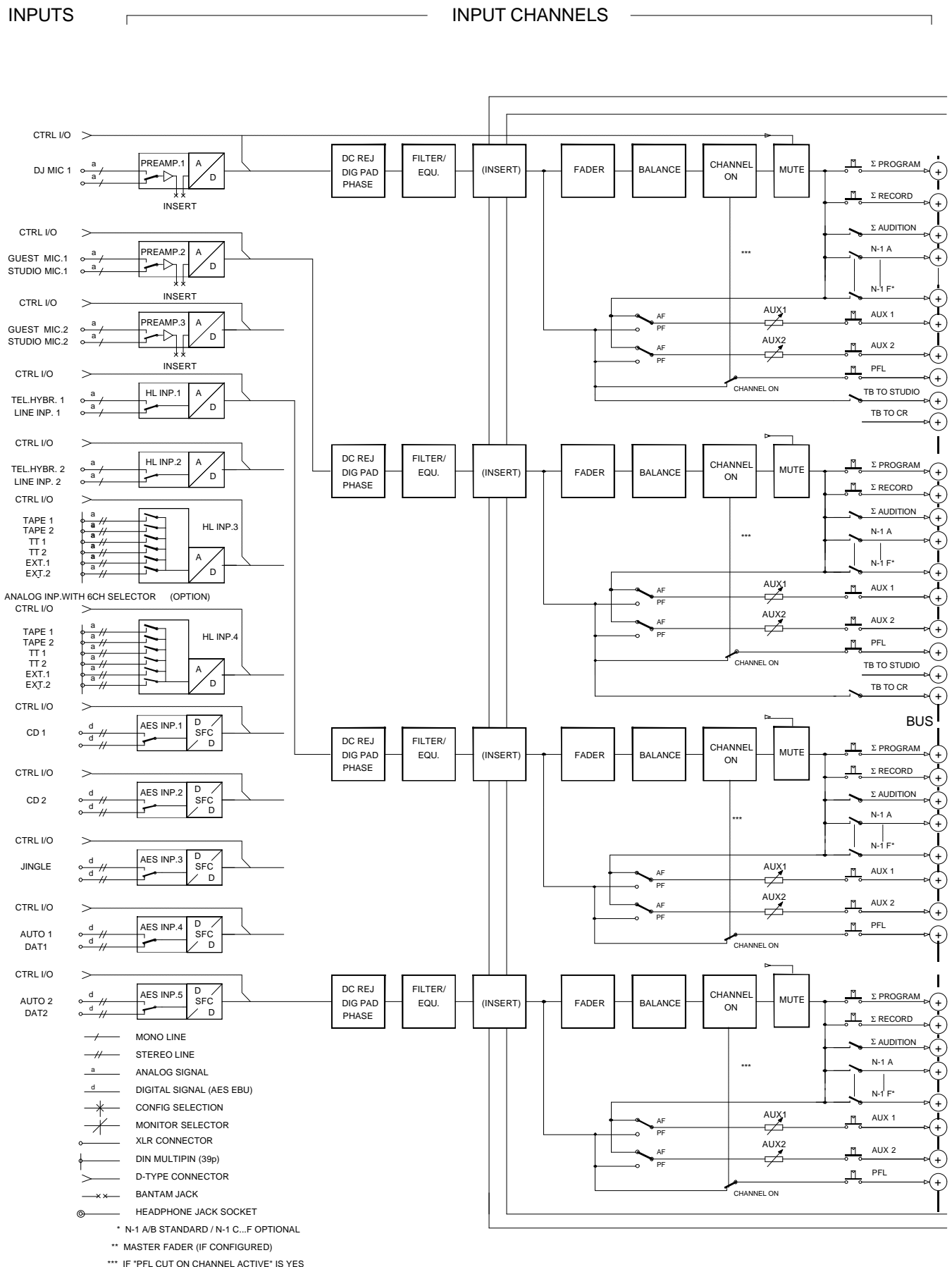
On-Air 2000 is a low-cost yet powerful digital mixing console for “on-air” and small recording and editing studio applications. It has a modularity of 6 channels; the maximum console size is limited to 24 channel strips (stereo or mono).

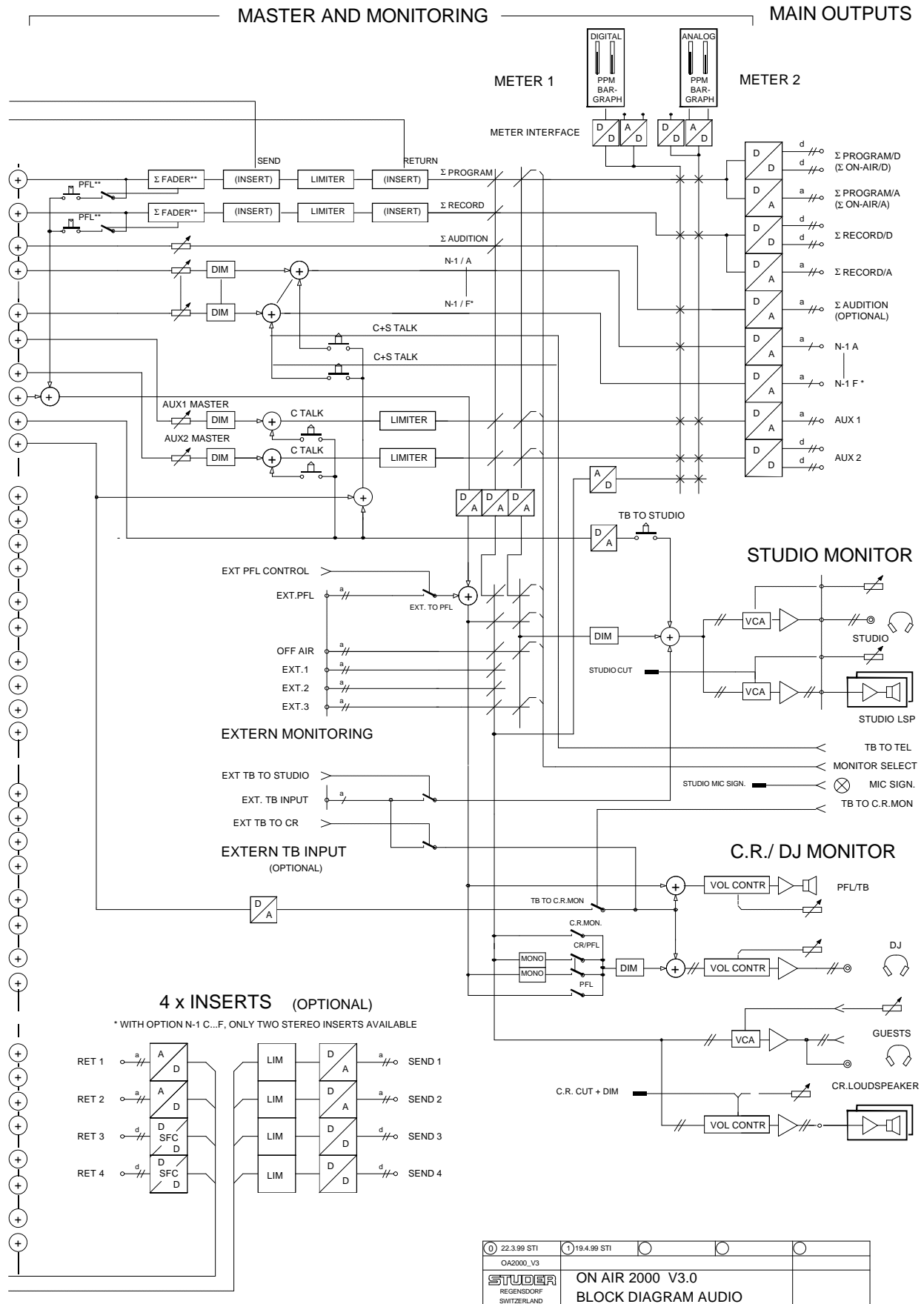
On-Air 2000 is based on a touch-screen user surface. Only the most important functions have hardware control elements. Unlike other digital mixing consoles, On-Air 2000 does not need external racks and power supply. Everything is integrated in a single, lightweight console.

Since it is fully digital, it can be adapted to the current user using snapshot automation. Extensive configuration possibilities allow On-Air 2000 to be integrated into almost any broadcast studio environment.

For an overview, please refer to the On-Air 2000 block diagram located on the following two pages.

1.1 Block diagram V3.0





2 GENERAL

2.1 Utilization for the purpose intended



The On-Air 2000 mixing console is intended for professional use. It is presumed that the unit is operated only by trained personnel. Servicing is reserved to skilled technicians.

The electrical connections may be connected only to the voltages and signals designated in this manual.

2.2 First steps

2.2.1 Unpacking and inspection

Your new mixing console is shipped in a special packing which protects the units against mechanical shock during transit. Care should be exercised when unpacking so that the surfaces do not get marred. Verify that the content of the packing agrees with the items listed on the enclosed shipping list.

Check the condition of the equipment for signs of shipping damage. If there should be any complaints you should immediately notify the forwarding agent and your nearest Studer distributor.

Please retain the original packing material because it offers the best protection in case your equipment ever needs to be transported.

2.2.2 Installation

Primary voltage: The power supply unit is auto-ranging; it can be used for mains voltages in a range of 100...240 VAC

General precautions: Do not use the unit in conditions of excessive heat or cold, near any source of moisture, in excessively humid environments, or in positions where it is likely to be subjected to vibration or dust.



Do not use any liquids to clean the exterior of the unit. A soft, dry cloth or brush will usually do.



For cleaning the touch-screen display windows, most of the commercially available window or computer/TV screen cleaners are suited. *Use only a slightly damp (never wet) cloth. Never use any solvent!*

Power connection: The attached female IEC 320/C13 mains cable socket has to be connected to an appropriate mains cable by a trained technician, respecting your local regulations. Refer to the "Installation, Operation, and Waste Disposal" section at the beginning of this manual.



Maintenance work inside the units must be performed by a trained technician.

Earthing: *This equipment must be earthed, due to the mains input filter network being connected to the mains earth.*



Some consideration should be given to the earthing arrangement of the system at the center of which is the console. The console chassis is earthed to the mains earth via the power supply. Ground loops may occur where signal processing equipment, patched to the console, has its signal earth commoned to the equipment chassis.

2.2.3 Adjustments, repair

Danger:



All internal adjustments as well as repair work on this product must be performed by trained technicians!

Replacing the supply unit:



The primary fuse is located inside the power supply module and cannot be changed. In case of failure, the complete supply unit must be replaced. Please ask your nearest Studer representative.

2.2.4 PC-card

A standard On-Air 2000 mixing console is equipped with a PC-card socket. Using the industry-standard SRAM PC-cards, the user can save important console information on a card. This information can then be used to restore the console to the same state at a later moment. Since the information stored on the card is DOS compatible, it is easily transferred to an IBM-compatible PC for data storage and backup.

Note: Although it is possible to format an SRAM card in a PC, the card must be re-formatted in the On-Air 2000; therefore, the write protect tab must be set to OFF when the card is used in the mixing console for the first time.

It is also possible for new software releases to be downloaded from an SRAM PC-card. This feature is only available for users in possession of the correct files. For more information on this subject, refer to [section 13](#).

The mixing console PC-card support is restricted to 5 V, Type 1, SRAM memory cards with a capacity of 64 kbytes to 32 Mbytes. Hot-swapping is supported, too.

2.3 Technical specifications (preliminary)

General

Level specs, digital, in dB _{FS} :	dB, referenced to full modulation (dB _{FS} , dB Full Scale)
Level specs, analog, in dBu:	0 dBu \cong 0.775 Vrms
Level specs, analog, in dBu _{FS} :	Level in dBu for full modulation (\cong 0 dB _{FS})
Sampling rate:	48 kHz \pm 100 ppm (internally synchronized)
Headroom adjustable:	0...20 dB
Default setting:	9 dB

All input faders set to their 0 dB position. External analog sources: Source impedance < 200 Ω . Frequency range: 20 Hz...20 kHz, if not stated otherwise.

Microphone inputs

Microphone input modules have A/B-switchover and are equipped with a balancing transformer. The signal is routed to an electronically balanced, analog insert point before the A/D-converter.

Input sensitivity	-60...+20 dBu _{FS} (with 9 dB headroom: -69...+11 dBu)
Gain setting	in steps of 1 dB
Phantom power, switchable	48 V
Frequency response	\pm 0.5 dB
High-pass filter (12 dB/Octave)	-3 dB @ 75 Hz \pm 5 Hz, switchable
Input impedance	> 1 k Ω
Insert level	+15 dBu _{FS} (with 9 dB headroom: +6 dBu)
A/D converter	20 bit (Delta-Sigma, 64 \times oversampling)
Dynamics	typ. 102 dB @ +15 dBu _{FS} (unweighted)
THD+N	< -85 dB _{FS} , 20 Hz...20 kHz, @ -1 dB _{FS} (+15 dBu _{FS})
THD+N	< -100 dB _{FS} , 20 Hz...20 kHz, @ -30 dB _{FS}
Noise figure	typ. < 4 dB @ max. gain, bandwidth 20 kHz, R _s = 200 Ω
Common mode rejection	> 50 dB @ 15 kHz, > 75 dB @ 50 Hz

Line level inputs

Analog line level input modules are available in three versions:

- Stereo input with A/B switching, with balancing transformer
- Stereo input with A/B switching, with electronically balanced input
- Stereo input with 6-input selector, with balancing transformer. On this module the sources are connected via a 39-pin DIN connector.

Input sensitivity	-10...+24 dBu _{FS} (with 9 dB headroom: -19...+15 dBu)
Gain setting	in steps of 1 dB
Frequency response	\pm 0.1 dB
Input impedance	> 10 k Ω
A/D converter	20 bit (Delta-Sigma, 64 x oversampling)
Dynamics	typ. 102 dB @ +15 dBu _{FS} (unweighted)
THD+N	< -94 dB _{FS} , 20 Hz...20 kHz @ -1 dB _{FS} (+15 dBu _{FS})
THD+N	< -100 dB _{FS} , 20 Hz...20 kHz @ -30 dB _{FS}
Common mode rejection	> 50 dB @ 50 Hz...15 kHz, with transformer; > 47 dB @ 50 Hz...15 kHz, electronically balanced

Digital inputs

Digital input modules are available either with A/B switching or with a 6-input selector. The module with A/B switching supports the AES/EBU (AES3-1992) and S/PDIF (IEC 958) formats. It is equipped with XLR, Cinch, and Toslink connectors.

The 6-input selector supports the AES/EBU (AES3-1992) format and is equipped with a 39-pin DIN connector for source connection.

All digital inputs are equipped with a sampling frequency converter (SFC).

SFC resolution	20 Bit
Input sampling rate	30...54 kHz
THD+N	< -105 dB _{FS} @ 1 kHz, 0 dB _{FS}
Frequency response	\pm 0.1 dB
Input impedance	110 Ω (XLR and DIN inputs); 75 Ω (Cinch input)

Analog outputs	Analog output modules are available with balancing transformer or with electronically balanced output.	
	Output level	(transformer-balanced) +4...+24 dBu _{FS} @ R _L = 100 kΩ; +4...+23 dBu _{FS} @ R _L = 300 Ω
	Output level	(electronically balanced) +4...+23 dBu _{FS} @ R _L = 100 kΩ; +4...+22 dBu _{FS} @ R _L = 300 Ω
	D/A converter	20 bit (Delta-Sigma, 128 x oversampling)
	Dynamics	typ. 101 dB (unweighted)
	THD+N	< -90 dB _{FS} @ 1 kHz, -1 dB _{FS} (+15 dBu _{FS})
	Frequency response	±0.2 dB
	Output impedance	< 40 Ω
Digital outputs	Digital output modules are equipped with two independent outputs according to the AES/EBU standard (AES3-1992). On each of these outputs, the same signal is fed to two XLR sockets with individual buffers.	
	Output level	2...5 V
	Output impedance	110 Ω
Equalizer	Treble control (High)	5 kHz/10 kHz: ±15 dB (depending on Customer Code setting; refer to 12.2.12)
	Equalizer (Mid)	200 Hz...10 kHz: ±15 dB
	Bass control (Low)	200 Hz/400 Hz: ±15 dB
Crosstalk attenuation	Between channels	> 90 dB
	Input fader attenuation	> 100 dB
Power supply	Mains voltage	100...240 V, 50/60 Hz (auto-ranging)
	Power consumption	150 VA typ. (On-Air 2000/24/4)

Note: Depending on the application, the on-air mixing consoles can have different configurations. For this reason the abovementioned values are applicable only to a typical configuration; in an individual case, the values may differ. We reserve the right to make changes as technological progress may warrant.

3 OPERATING CONCEPT

The normal operation of the console is as simple as possible. This has been achieved by reducing the number of operating elements to the minimum. Nevertheless, high flexibility has been achieved thanks to the use of touch-screen technology which just shows those operating elements which are needed at a certain time.

A channel fader and three buttons (ON, OFF, PFL) are the only hardware operating elements in a channel strip. All other functions are available through the touch-screens. To maintain a good console overview these touch-screens (channel screens) are located right above the channel strips. Symbols on the screens show the current settings on every channel. Touching one of the symbols assigns the center touch-screen (control screen) to this function. Parameters can now be entered via the four rotary encoders (e.g. equalizer parameters), or directly through the assigned touch-screen (e.g. equalizer on/off). On the screen above the channel strips, the new settings are immediately updated. The On-Air 2000 concept has all current settings for every channel visible at any time. This innovative user surface is called the “Touch’n’action” concept and is patented.

In broadcast applications many DJs and operators without a special technical education work on the same mixing console. Every DJ has his preferred console settings, mainly EQ parameters for his microphone. In the On-Air 2000, individual settings can be stored; by simply pressing a key, every operator can recall her or his particular, tailor-made setting and concentrate afterwards upon her/his essential task – presenting a radio program meeting the needs of the listeners.

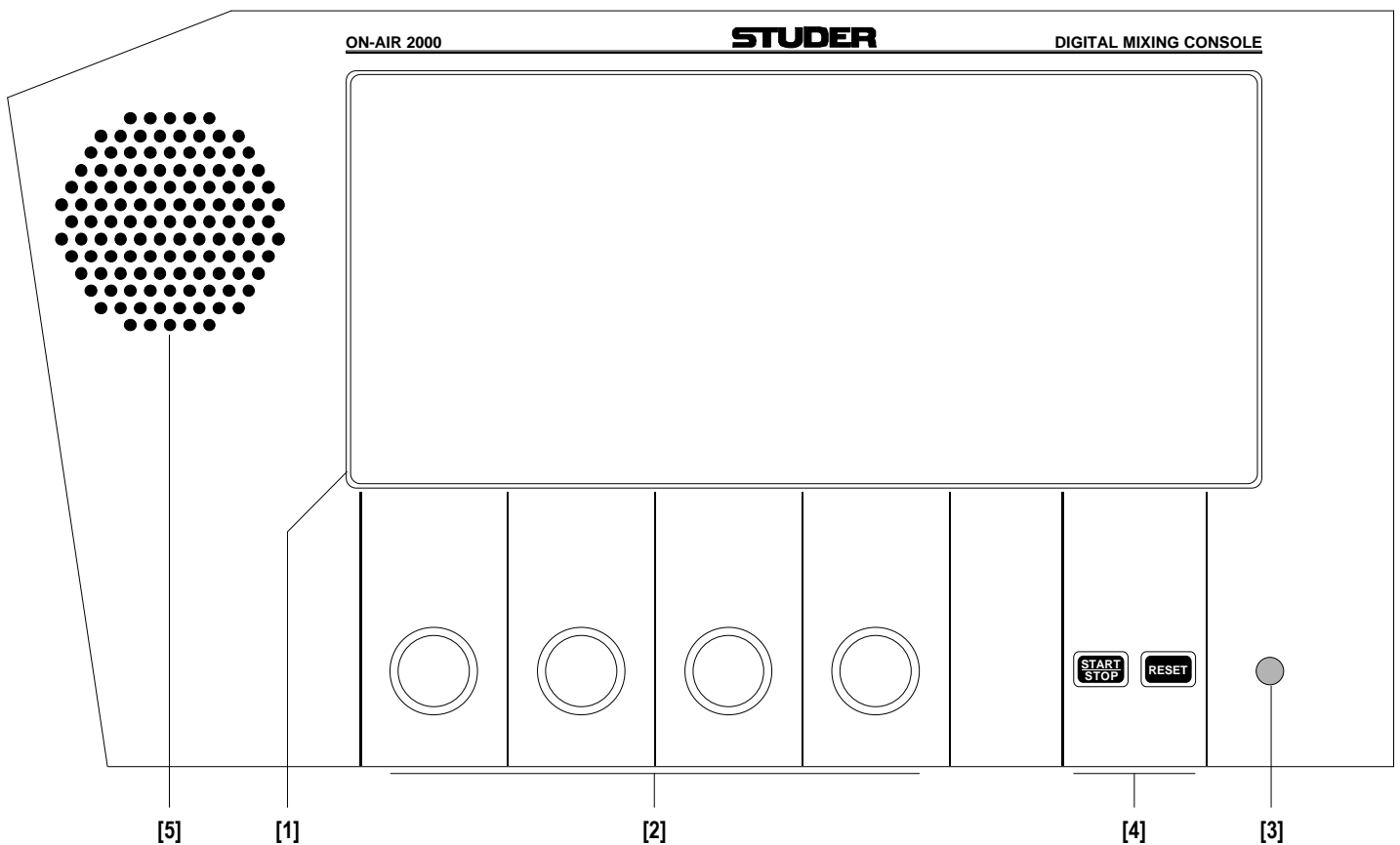
Radio stations often use the same mixing console type for on-air and production. The “Snapshot” feature easily turns the production console into an on-air console within seconds, if required.

3.1 Operating elements

3.1.1 Power switch

The power switch is located on the rear side of the console next to the power inlet.

3.1.2 Central section, display unit



[1] Central touch-screen

The central touch-screen display is used for parameter entries (refer to [sections 4, 5, 10, 12, and 13](#) for details) and always displays the current time and date in digital and analog formats. Besides, the fader stopwatch and the user stopwatch are always displayed.

[2] Rotary encoders

Depending on the current status, the rotary encoders are used for parameter settings.

[3] Contrast knob

For setting the LC display contrast, depending on the desired viewing angle and the ambient light conditions.

[4] User stopwatch control

Keys to control the user stopwatch (lower). Refer to [section 5.12](#).

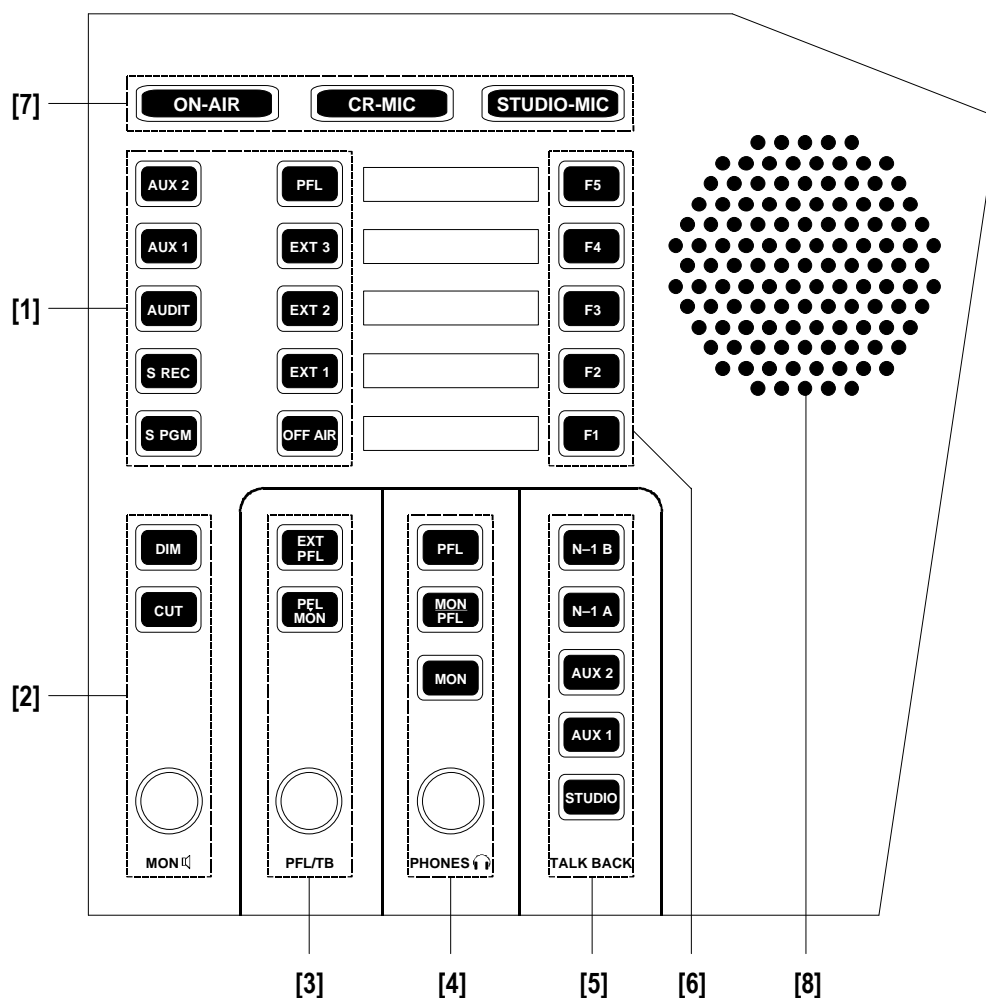
[5] Loudspeaker

for PFL and talkback signals.

3.1.3 Central section, meter unit

The central meter section allows installing four 190×40 mm meter modules. The level meters and/or groups of keys can be installed according to the customer's specification. Therefore, no universally valid statement can be given here.

3.1.4 Central section, monitoring and talkback



[1] Control room monitoring selector

Ten mutually releasing keys for selecting the control room monitoring signal from the following sources:

- AUX 2/AUX 1:** Auxiliary, general purpose output sums;
- AUDIT:** Auxiliary, general purpose output sum with configurable inputs;
- Σ REC:** Recorder output signal;
- Σ PGM:** Program (on-air) output signal;
- PFL:** PFL (pre-fader listening) sum;
- EXT 3:** External analog input signal;
- EXT 2:** External analog input signal;
- EXT 1:** External analog input signal;
- OFF AIR:** External analog input signal (tuner for off-air listening).


[2] CR monitor speaker control

MON : Monitoring volume control.

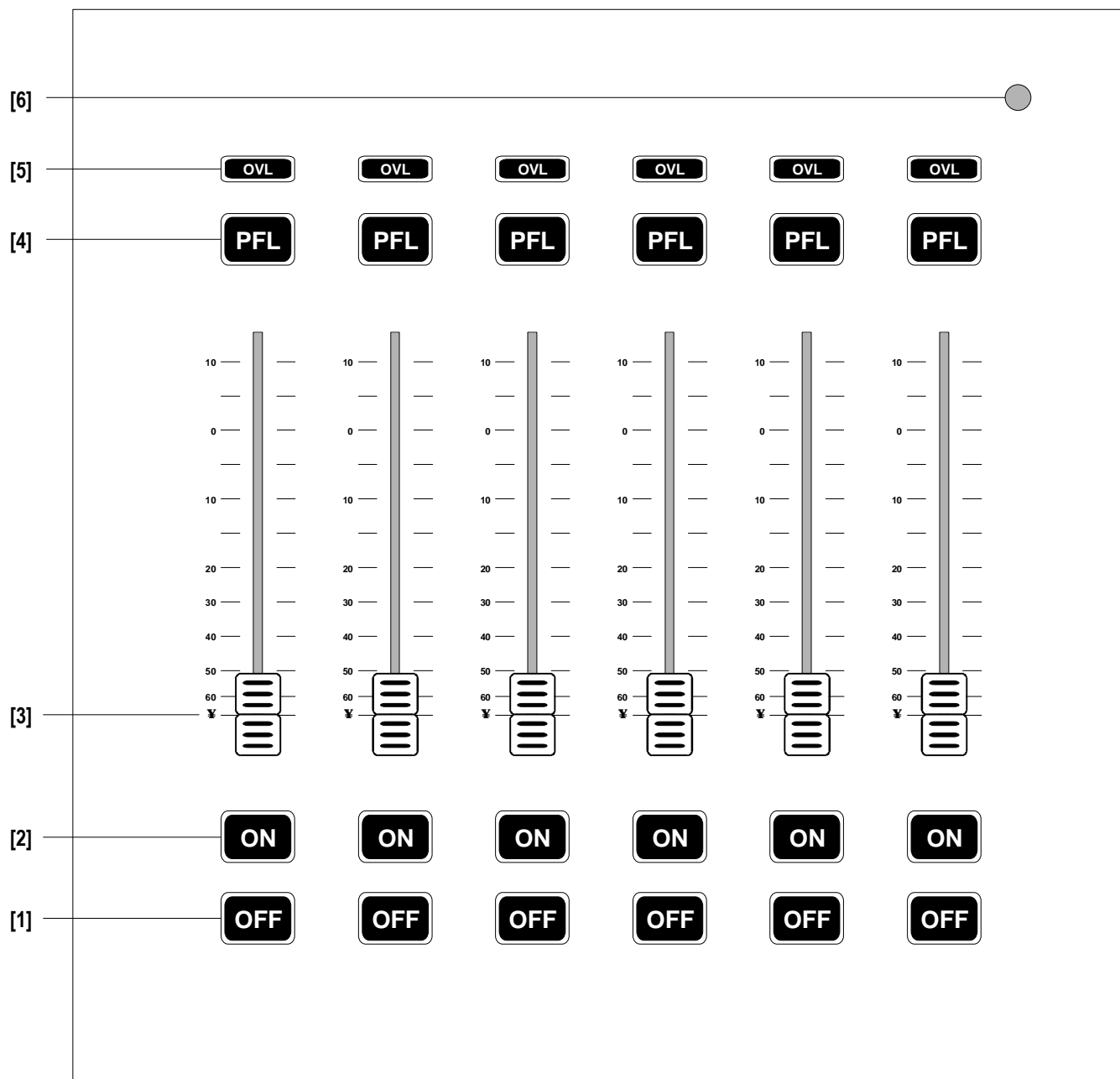
DIM: If pressed, the monitor speaker level is reduced by 20 dB.

The DIM function is activated automatically if one of the TALK BACK keys is pressed. If “CR DIM WHEN AUDITION SEL” is active (details: refer to [section 12.2.2](#)), the monitoring source is AUDIT, and the DJ microphone is on, the AUDIT level is not muted but reduced by 20 dB.

If DIM is active, the key is illuminated.

- CUT:** If pressed, the monitor speakers are muted, and the CUT key is illuminated. As long as one of the CR or DJ microphones is on, the monitor speakers are automatically muted, and the CUT key is illuminated.
- [3] PFL/TB**
- PFL/TB:** Volume control for the built-in PFL/TB speakers.
- EXT PFL:** The EXT PFL input can be used as an external PFL input to the monitoring unit. If pressed, the key is illuminated, the external signal is routed to the PFL bus, and the external PFL control output is active.
- PFL▷MON:** If PFL is active on any channel, the PFL signal is routed to the main monitor speakers. If no PFL is selected, the monitoring signal is the stereo CR signal as selected. The PFL▷MON key is illuminated if active.
- [4] Headphones**
- PHONES :** Headphones volume control. The headphones socket (6.3 mm jack) is located below the hand rest of the central console part.
- Three keys allow different monitoring modes:
- PFL:** PFL and TB signals are routed to the headphones.
- MON/PFL:** The left-channel headphones signal is the mono PFL signal, while the right-channel headphones signal is the mono CR signal as selected by the monitoring source selector [1]. If no PFL is selected, the headphones signal is the stereo CR signal as selected.
- MON:** The headphones signal is the same stereo signal as selected by the monitoring source selector [1]. It is, however, not affected by the DIM and CUT functions.
- [5] Talkback**
- Selector for five talkback destinations:
- N-1 B/N-1 A:** Connection between the DJ microphone* in the control room and the corresponding cleanfeed (N-1) bus; this allows talking e.g. to the connected telephone hybrid(s) or communication lines.
- AUX 2/AUX 1:** Connection between the DJ microphone* in the control room and the AUX 2 or AUX 1 outputs.
- STUDIO:** Connection between the DJ microphone* in the control room and the studio speakers and headphones.
- The built-in PFL/TB loudspeakers and/or the headphones are used for talkback listening in the control room.
- * If a console is equipped with an additional talkback microphone, this microphone is used instead of the DJ microphone.
- [6] F1...F5**
- Programmable function keys, e.g. for additional CR monitor selector keys (with optional Monitor Expander unit, refer to [section 12.2.11](#)).
- [7] Signaling lamps**
- ON-AIR** Is turned on by a control signal on the “SIGN.” control connector on the monitoring module.
- CR-MIC** Is on if at least one microphone in the control room is routed to the program or to the record bus (i.e. the corresponding sum is selected, the channel is ON, and the fader is opened).
- STUDIO-MIC** Is on if at least one microphone in the studio is routed to the program or to the record bus (i.e. the corresponding sum is selected, the channel is ON, and the fader is opened).
- [8] Loudspeaker** for PFL and talkback signals.

3.1.5 Fader units



[1] OFF ("key no. 3")

[2] ON ("key no. 2")

[3] Linear fader

Keys for deactivating or activating a channel. Can be reconfigured.

For details please refer to [sections 9 and 15](#).

The audio path is fully digital, therefore the signal does not pass through the fader; their stroke length is 104 mm. For details concerning fader start control please refer to [sections 9 and 15](#).

[4] PFL ("key no. 1")

Key for activating/deactivating the PFL (pre-fader listening) function.

[5] OVL

Channel overload indicator.

[6] Contrast knob

For setting the contrast of the LC display located above the fader panel, depending on the desired viewing angle and the ambient light conditions.

4 CHANNEL FUNCTIONS

On-Air 2000 is modular in groups of 6 channels; the maximum number of channels is 24. Each channel group consists of a touch-screen, 6 faders, 18 keys (3 per channel) and 6 overload indication LEDs.

4.1 Keys

The channel key functions are configurable; this configuration is valid for the whole console (and not per channel). The different configuration possibilities are:

Configuration	Key 1	Key 2	Key 3
1	PFL	ON	OFF
2	PFL	ON/OFF	LOCATE
3	PFL	ON	LOCATE
4	PFL	ON/OFF	NEXT

For details on the configuration see [section 9](#).

4.2 Faders

Since the audio path is fully digital, the signal does not pass through the faders. Therefore linear-track mono faders are used. The stroke length is 104 mm. When opening the fader, fader start or signaling commands can be released, depending on the configuration (see [section 9](#)).

Master faders: Starting with SW V3.0, any of the faders can be configured as master fader(s) for the program and/or the record bus (see [section 5.13](#)).

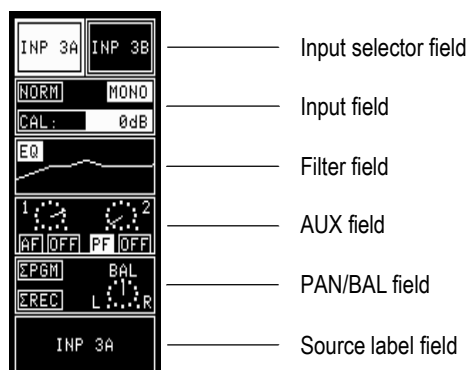
4.3 Overload indicator

A red OVL indicator per channel signalizes an overload condition anywhere within the signal processing path.

Signals in the On-Air 2000 are processed with sufficient headroom through the entire signal processing chain. Besides, most outputs (PGM, REC, AUX1, AUX2, SEND1...4) are equipped with limiters in order to prevent overloads. All limiters are set to 0 dB_{FS} with fixed attack and release times. Overload on a channel is indicated if the signal level enters the headroom range. Due to the internal headroom and the output limiters, normally distortion can be avoided in case of an overload.

4.4 Channel screen

A channel screen is located above each group of six faders. The channel screen has a touch matrix with 2×6 switch fields per channel strip as shown below.



The channel screen always maintains system overview by displaying the relevant settings of the six input channels. When touching one of the switching fields, the central control screen automatically displays the attached operating field and allows entering parameters. In the channel screen, the status display is immediately updated.



In the following sections we assume that the user has access permission to all functions, unless otherwise noted. access permission may be limited, which causes that certain screen parts are suppressed. Full access permission is in such a case only obtained when entering a password. For a description of how to set up the access permission, refer to [section 11](#).

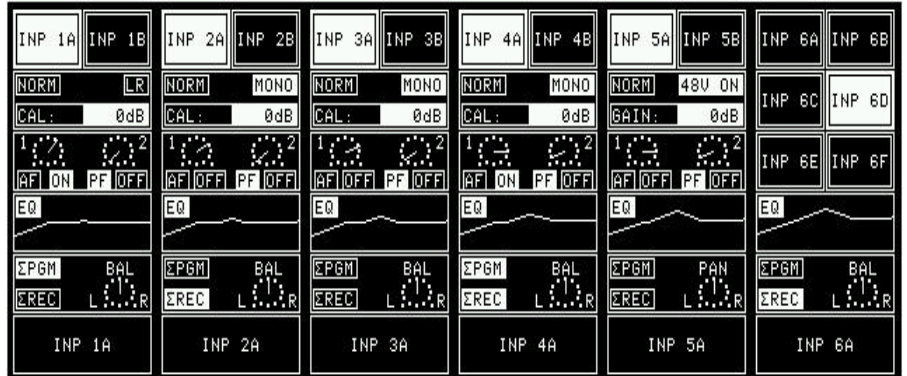
4.4.1 Channel screen fields

Input selector field:

For microphone and analog/digital line inputs, the Input selector field directly selects one of two input signal sources. The selected input is highlighted, and the source name appears in the Source label field. If the channel is active (i.e. channel ON, fader opened and output bus selected), the input selection is disabled.

If the input module for that channel is a multi-source selector for six sources, the source selection can be made in two different ways depending on the Customer Code setting ([section 12.2.12](#)):

- Customer Code 0:** When touching the input selector field, a Source Selector page appears on the central control screen and allows selecting one of the six connected sources. The input selector field displays the currently selected input of the channel (in the illustration on the previous page the channel at the far right).
- Customer Code 1:** The six input selection fields are always displayed on the channel screen; the Input and AUX fields are omitted (in the illustration below the channel at the far right).



If the channel is connected to an automation system, the input selector field shows “ON AIR” if the channel is on-air, or it shows “NEXT” if this is the next channel to be switched on-air. For more details on this topic, please refer to [section 10](#).

Input field:

The input field gives an overview of the console’s relevant front-end parameters.

For a line or digital input channel, these parameters are:

- Phase:** NORM/INV (normal, or left channel inverted).
 - Stereo mode:** LR/RL/LL/RR/MONO (normal stereo, channels swapped, left input to both outputs, right input to both outputs, or mono signal to both outputs).
 - Calibration:** ±10 dB (deviation of nominal level).
- The microphone inputs have the following parameters:
- Phase:** NORM/INV (normal or inverted).
 - Phantom power:** 48 V OFF/48 V ON.
 - Gain:** 0...+70 dB (microphone input amplifier gain).

The underlined settings are the default values. If a parameter setting is different from its default value, it is highlighted on the channel page field.

A touch on the *Input field* does not change a parameter, but opens the Channel Control page on the central control screen. Parameters can now be entered with the four rotary encoders and the control screen touch switches.

EQ/filter field:

The *EQ/filter field* is a graphical display of the equalizer setting. “EQ” is highlighted if a filter or the equalizer is on. Touching this field opens the Equalizer page on the control screen.

AUX field:

The potentiometer symbols in the *AUX field* show the auxiliary settings. Both auxiliaries can be independently set as “AF” (post-fader), “PF” (pre-fader), “ON”, or “OFF”. “PF” and “ON” are highlighted if selected. Auxiliary settings are changed on the Channel Control page on the central control screen which is opened by touching the “AUX” field.

PAN/BAL field:

The *PAN/BAL field* gives an overview of the current panorama or balance setting and shows the bus assignment. The output sum symbol (Σ) is highlighted if the channel is assigned to the programme output (Σ PGM) or to the recording output (Σ REC). The Channel Control page on the central control screen is opened by touching the PAN/BAL field.

Source label field:

The *Source label field* shows the name of the selected input channel.

“Next” function:

This function allows highlighting the source label of the channel being the next to go on-air. For this purpose just touch the desired channel's source label. Only one source label can be highlighted at a time. The tag is automatically removed when the fader of this channel is opened while the channel is ON. This function has no influence neither on control output signals nor on the internal functionality of the console.

4.4.2 Multi-Source Selector page

The Source Selection page on the central control screen is opened by touching the Input Selector field of a channel, provided the channel is equipped with a multi-source selector input module. On the Source Selector page, one of the six inputs can be selected and then becomes highlighted. The input name is shown on the channel label field on the channel page. The source selection page appears only if the hex input modules are configured for central selection (i.e. Customer Code 0).



4.4.3 Channel Control page, microphone input

The Channel Control page for a microphone input is opened if either the AUX, the PAN, or the Input field on the channel page is touched, provided that the selected input module is a mic input.



Touching the “ON” part of the PHANTOM field turns the 48 V phantom power on; a touch on the “OFF” part of the field turns it off again. The status is indicated by highlighting the corresponding field.

Phase inversion of the microphone signal is activated by touching the “INV” part of the PHASE field; “INV” is highlighted. Touching “NORM” deactivates the phase inversion.

The microphone preamp's gain is set with the first rotary encoder (in a 0...+70 dB range); the adjusted value is indicated in the GAIN field.

The AUX 1/2 “ON/OFF” fields route the channel to the corresponding auxiliary bus, if “ON” is selected (and highlighted).

The “AF/PF” field allows selection whether the signal is taken after- (AF) or pre-fader (PF). The current selections are highlighted.

The AUX levels (−∞...+10 dB; 0 dB position is marked with a dot) are adjusted with the second and third rotary encoder. The settings are shown in the fields right above the rotary encoders as well as on the corresponding symbols on the channel page.

The bus assignment is performed with the “ΣPROGRAM” and “ΣRECORD” fields.

The fourth rotary encoder positions the source within the stereo image, the PAN indicator shows the adjusted position.

4.4.4 Channel Control page, line input

The Channel Control page for a line input is opened if either the AUX, the PAN, or the Input field on the channel page is touched, provided that the selected input module is an analog line input or a digital input.



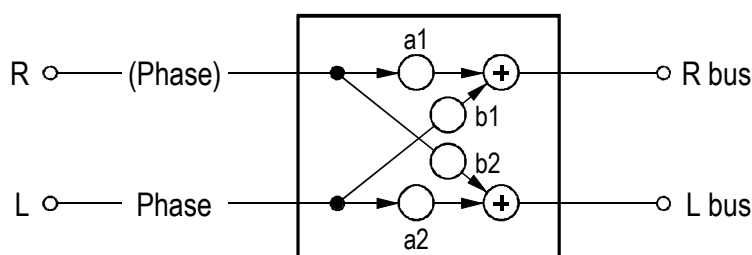
Line level inputs have a MODE field which defines whether the input is processed in “ST”(ereo) or in “MONO” mode. In mono mode the stereo input signal from the input module is added to a mono signal and attenuated by 3 dB.

Stereo signals are processed in the following modes:

- LR:** Normal stereo mode;
- RL:** Left/right channel swapped;
- LL:** Left signal on both channels;
- RR:** Right signal on both channels.

Phase inversion (*of the left-channel signal only*) is activated by touching the “INV” part of the PHASE field; “INV” is highlighted. Touching “NORM” de-activates the phase inversion. Only in the “RR” case, the phase inversion takes place in the R input path.

The following diagram shows the details:



In the CAL field, the gain deviation referred to nominal level setting is displayed; max. deviation: ± 10 dB, adjustment with the first rotary encoder.

The AUX 1/2 “ON/OFF” fields route the channel to the corresponding auxiliary bus, if “ON” is selected (and highlighted).

The “AF/PF” field allows selection whether the signal is taken after- (AF) or pre-fader (PF). The current selections are highlighted.

The AUX levels ($-\infty \dots +10$ dB; 0 dB position is marked with a dot) are adjusted with the second and third rotary encoder. The settings are shown in

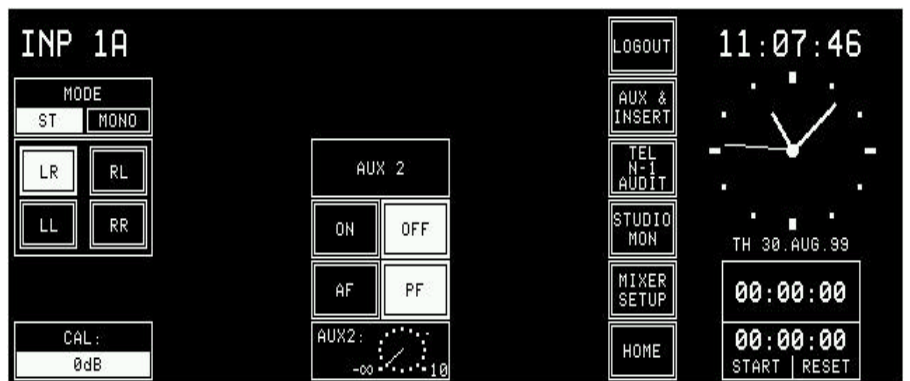
the fields right above the rotary encoders as well as on the corresponding symbols on the channel page.

The bus assignment is performed with the “ΣPROGRAM” and “ΣRECORD” fields.

The fourth rotary encoder adjusts the position of the stereo image, the BAL indicator shows the adjusted position.

Access permission: Depending on the access permission (see [section 11](#)) of the user currently logged in, the functions not available to this user will not be displayed on the Channel control page; an example is given below. This user cannot access the following parameters:

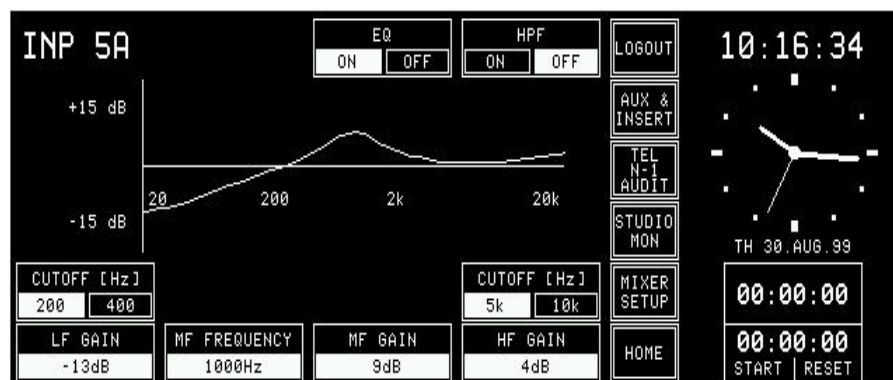
- PHASE
- AUX 1
- Output summing busses (ΣPROGRAM, ΣRECORD)
- PAN/BAL.



If the user has no access permission at all, the Channel Control page will not be displayed.

4.4.5 Equalizer control page, microphone input

The Equalizer control page for microphone inputs is opened if the EQ/Filter field of the channel page is touched, provided that the selected input module is a microphone input. If the user has no access permission to the EQ parameters, the Equalizer control page will not be displayed.



The HPF “ON/OFF” field is a high-pass filter switch. The filter is part of the analog front end and is available on microphone inputs only. “ON” is highlighted if the filter is active.

The EQ “ON/OFF” fields activate or bypass the equalizer.

If the EQ is bypassed (i.e. “OFF”), the preset frequency curve is displayed on the central control screen nevertheless. In the EQ/Filter field of the input channel, however, the current, linear frequency response is displayed.

The four rotary encoders are the control elements for the equalizer. The low-frequency section is a shelving-type filter with two selectable turnover frequencies and variable boost/cut. The frequency is selected by the left-hand “CUTOFF” touch fields, the gain is set with the leftmost rotary encoder. The next rotary encoder sets the frequency of the mid-frequency section which is a peaking-type filter. The third rotary encoder controls the mid-frequency gain. The rightmost rotary encoder controls the gain of the high-frequency section which again is a shelving-type filter with two turnover frequencies. The right-hand “CUTOFF” fields allow frequency selection of the high-frequency shelving filter. The current EQ frequency response curve is displayed on the page.

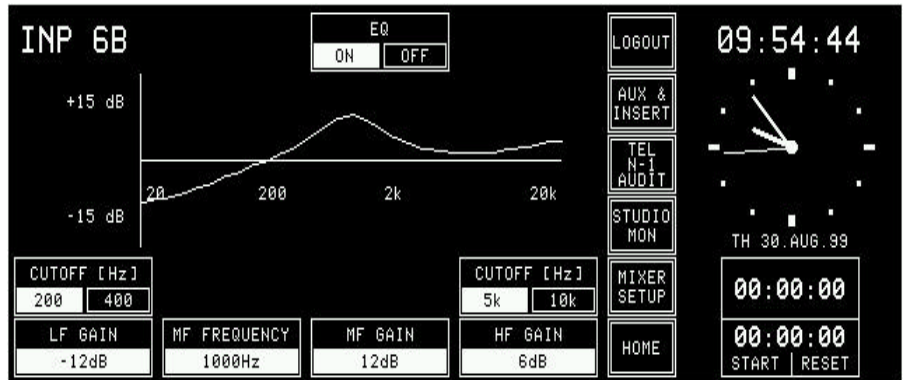
Note: The HF cutoff frequencies can be reduced by approx. one octave (resulting in an increased filter effect) when selecting Customer Code 0x00000002, refer to [section 12.2.12](#).

The equalizer has the following specs:

Filter	Mode	Frequency	Gain range	Comment
High-pass filter	HPF	-3 dB @ 80 Hz	ON/OFF	Analog, 12 dB/octave, microphone inputs only
EQ low-frequency	Shelving	200 Hz/400 Hz	-15 dB...+15 dB, 1 dB steps	-
EQ mid-frequency	Peaking	200 Hz...10 kHz, 1/6 octave steps	-15 dB...+15 dB, 1 dB steps	Q = 0.7
EQ high-frequency	Shelving	5 kHz/10 kHz	-15 dB...+15 dB, 1 dB steps	see Customer Code (12.2.12)

4.4.6 Equalizer control page, line input

The Equalizer control page for line inputs is opened if the EQ/Filter field on the channel page is touched, provided that the selected input module is an analog digital line input. If the user has no access permission to the EQ parameters, the Equalizer control page will not be displayed.



The only difference between the line and the microphone Equalizer pages is that the high-pass filter switch is not available for line inputs.

5 MASTER FUNCTIONS

Master functions are not channel-related but global functions. These are audio functions (AUX master level, studio monitoring), non-audio functions (telephone hybrid control, clock, stopwatch), snapshot management, and system configuration.

Pressing one of the keys AUX MASTER, TEL, STUDIO MON, MIXER SETUP or HOME will always lead to the corresponding page. This is important for all pages where the user usually gets out of a page by pressing the HOME key. Jumping to a different screen has the same reaction as pressing HOME.

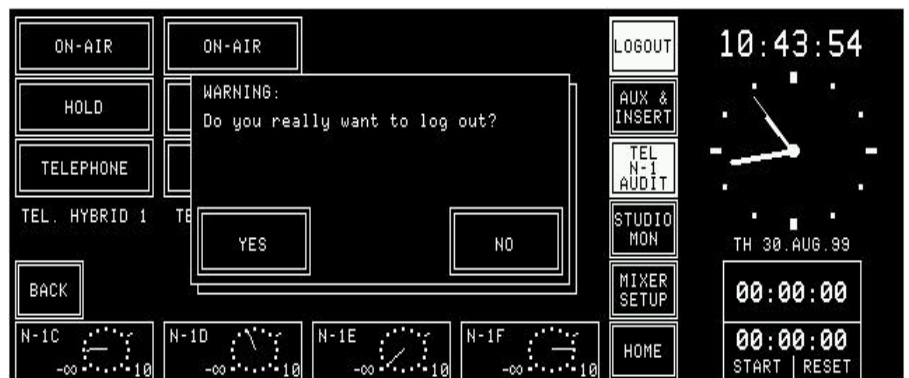
5.1 Login/logout

The console always starts up in default mode. If the user is a registered user, and if he wants to work in his own environment, he must log-in. He has to touch the LOGIN key on the Mixer Setup page. The LOGIN page will appear where the user can touch the key with his own name.



More information on the login procedure can be found in [section 11.5](#).

After having logged in, the LOGIN key changes to LOGOUT; when the user leaves the console, this key must be used. After having touched LOGOUT, a dialog box appears, asking for confirmation. This is used as a protection against logging out inadvertently.



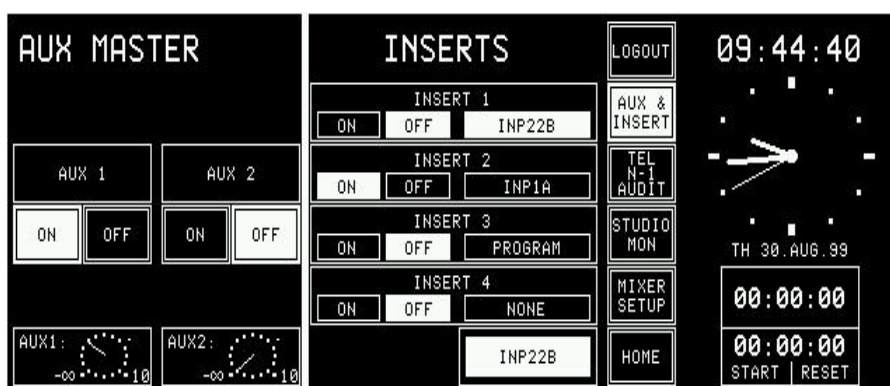
If a console is operated by one person only, the Administrator simply has to enable all access rights for the default user. This is the way the user can

control all console functions (except the administration functions) without having to log-in. A default user is always defined in the User administration table. His name is DEFAULT USER. The access permissions of this user can be edited. His record cannot, however, be deleted, and no password can be defined for him.

5.2 AUX and Insert control

The AUX MASTER/INSERTS page is entered by touching the AUX & INSERT key on the central control screen.

Access permission limitations: If the user has no access permission for the AUX and/or insert parameters, there will appear a text next to AUX MASTER and/or INSERTS, telling the user that he cannot modify the parameters.



AUX MASTER: The two rotary encoders below the AUX 1 and AUX 2 gain indication symbols are used to adjust the desired level of the corresponding AUX master. The gain can be adjusted in a range of $-\infty$ to +10 dB; the 0 dB position is marked with a dot.

ON/OFF selection of the AUX master busses is done by touching the corresponding keys on the screen. A highlighted background indicates the current status.

The AUX 1 and AUX 2 gain indication symbols are always displayed, even if no output module is installed for AUX 1 and AUX 2.

INSERTS: On the same page, the four insert points can be assigned. Assignment is possible to any of the following signals:

- CH1...CH24,
- PROGRAM bus,
- RECORD bus,
- NONE.

A channel can be assigned by touching the channel/bus label field of the insert box. If the insert is set to OFF, the channel/bus label field is highlighted by touching it, then it can be changed with the rightmost rotary encoder. If the insert is set to ON, the channel/bus label field cannot be highlighted, and the insert assignment cannot be changed.

The insert send always follows the setting as displayed on the screen; it remains active while the insert is switched OFF. If the insert is switched ON, a switchover from the internal connection to the insert return is performed.

Each signal can be assigned to one insert only. If a signal is already assigned to an insert, it will not appear in the channel/bus label field during signal selection for an other insert.

Inserts are assigned per channel and not per input. An insert assignment is valid for both inputs of the module (or for all six inputs in case of a hex input module).

The insert assignment and the insert ON/OFF setting are included in snapshots.

If an insert module is removed, the insert assignments are disconnected (OFF, NONE) and will be visible on the AUX MASTER/INSERTS page no more.

5.3 N-1/audition master and telephone hybrid control

Two clean-feeds (N-1A, N-1B) are provided; they can be used as mono outputs to telephone hybrids or line outputs. The audition bus can either be used as a special monitoring bus (all sources but the microphone channels can be heard if a microphone is open), or as a third, mono or stereo clean-feed.

Access permission limitations: If the user has no access permission for the clean-feed and/or audition bus parameters, there will appear a text next to the corresponding field, telling the user that he cannot modify the parameters.



The clean-feeds as well as the audition bus have master level controls which can be accessed if the N-1/audition master and telephone hybrid page is opened by touching the TEL/N-1/AUDIT key on the central control screen. The output levels are controlled with three of the rotary encoders; the output gain range is $-\infty \dots +10$ dB, the 0 dB position is marked with a dot.

Two telephone hybrid units to which the clean-feeds are fed can be controlled from the On-Air 2000 user surface, if an (optional) telephone hybrid control module is installed. In such a case the ON-AIR, HOLD, and TELEPHONE keys appear on this page. TELEPHONE switches the telephone line to the telephone. By touching HOLD, the telephone line is routed to the telephone hybrid unit. The return channel is connected, but the incoming channel is not connected to the console. Only when touching ON-AIR both the incoming and the return channel are connected to the console.

5.3.1 Additional N-1 outputs

Starting with SW V3.0, four additional N-1 outputs (N-1C...F) are available, if no Insert 3/4 module is installed in the console. Their respective levels are also part of a Snapshot.

Conditions:

- A standard Dual Analog Output Module must be installed in order to bring the four N-1 signals out of the console;
- Output mode must be set to “Stereo”;
- The following bus assignment is required:
OUT1 left = N-1C, right = N-1D,
OUT2 left = N-1E, right = N-1F;

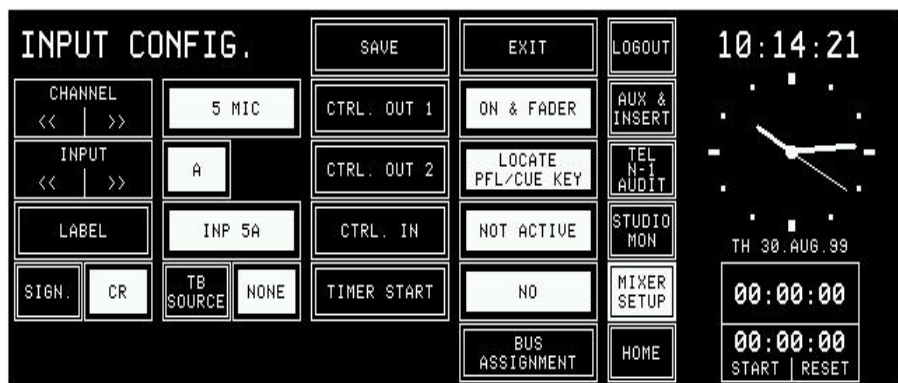
Note:

The stereo output mode selection and the bus assignment is performed with jumpers on the Dual Analog Output Module; refer to [section 15.18](#).

- When upgrading from an earlier SW version, a hardware modification is required on the DSP Board – please ask your Studer distributor for additional information.

Functionality:

Insert 3/4 Module	Insert Assignment	N-1C...F Levels	N-1C...F configuration	OUT 1/2 bus signals	TB to OUT 1/2 busses (N-1C...F)
No	No graphical user interface available, NONE/OFF	Graphical user interface available	Yes	N-1C...F	Yes
Yes	Graphical user interface available	No graphical user interface available, levels unchanged	Yes	No signal	Yes



When touching BUS ASSIGNMENT on the INPUT CONFIG. page, this page changes as follows, allowing to select the six N-1 and the audition bus assignments:



The TEL/N-1/AUDIT page allows to control the N-1 outputs A and B, and the audition output using the rotary encoders; after touching “MORE N-1”, the additional N-1 outputs (C...F) can be controlled, as shown below. With “BACK”, the previous page is displayed again.



Note: If the console is equipped with an Insert 3/4 Module, the N-1C...F outputs are not available, however talkback to the OUT1/2 busses is possible.

5.4 Studio monitoring

The STUDIO MONITORING SOURCE selector page is opened by touching the STUDIO MON key. This page allows selecting one of six signals to be routed to the studio monitoring loudspeakers and headphones. This selection can also be done via a pushbutton remote control from the studio. The currently selected signal source is highlighted.

The signal selected with the EXTERN key is the same as the one selected with EXT3 on the CR monitor selector in the central console section; this signal is fed to the console via the 39-pin EXTERN MONITOR (INPUT) connector on the monitoring module.

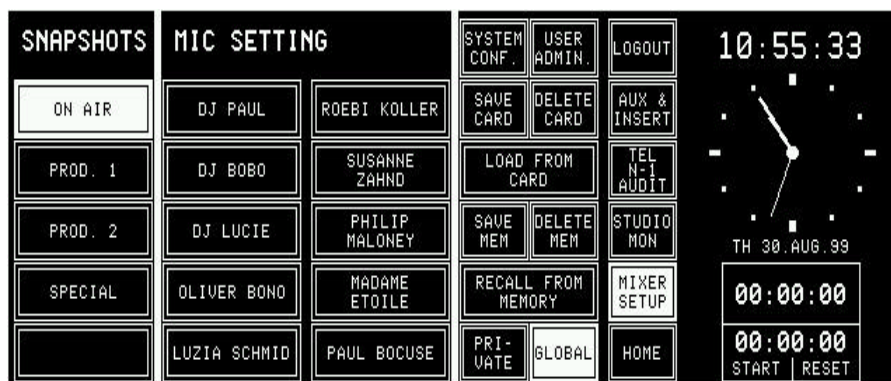


For a more detailed description of the monitoring system, refer to [section 7](#).

5.5 Mixer set-up

The Mixer set-up page gives access to five function groups used for setting the general status of the console. These are:

- Global snapshots
- Private snapshots
- Global microphone settings
- Private microphone settings
- System configuration



On the left side of the Mixer set-up page there is the SNAPSHOTS area. The five keys allow snapshot selection.

In the center of the page, up to ten MICrophone SETTINGS can be selected.

The right-hand part of the page holds various command keys:

PRIVATE/GLOBAL:
SYSTEM CONF.:

Users can select between private and global snapshot pages.

This key leads to the second level of mixer setup functions. These are accessible only for users having the corresponding parameter set in the user configuration. A new page is displayed, allowing to select from several groups of configuration parameters.

USER ADMIN.:

Only the administrator has access to the user administration page.

In the following sections, the use of snapshots and mic settings is described, followed by some information on user administration and the watch/stopwatch functions.

5.6 Snapshots

A snapshot is a copy of a momentary console setup. It contains all parameters (as input selection, input gain, phase, phantom power, balance or panorama setting, EQ settings, AUX settings), except fader positions, PFLs, and ON/OFF keys. A snapshot does not contain any parameters being part of the console configuration (channel labels, control signal functions, clean-feed bus assignment, level meter assignment, etc.).

Each user having a personal password can store up to four private snapshots (max. 20 users), and up to five global snapshots being available for every user can be stored in the console's flash memory. More snapshots can be stored on a PC-card (refer to [section 5.8](#)) and written from the card into the console's flash memory if required.

A name can be given to every snapshot which is displayed in the leftmost key column.

Also refer to [section 5.9.1](#) for information on snapshot access rights.

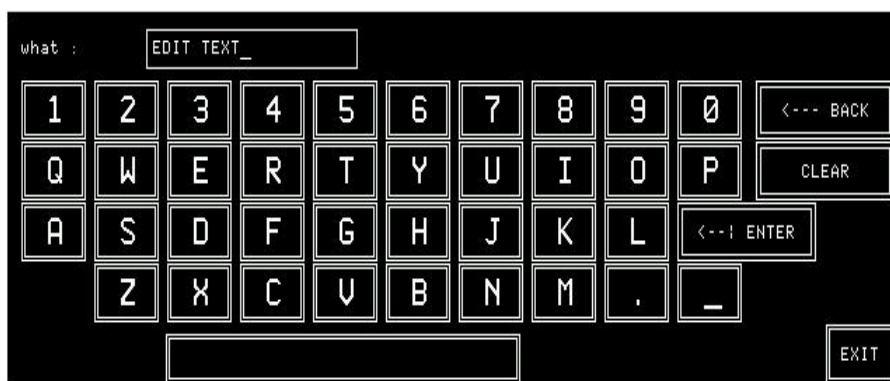
5.6.1 Recall a snapshot from memory

Select a snapshot by touching one of the name keys. The name of the selected snapshot is highlighted. When pressing the RECALL FROM MEMORY key, the snapshot will immediately be recalled from the console's internal flash memory, except if the current channel is active (switched to the program or the record bus); then the recall operation is delayed until the channel is closed.

During execution of the snapshot RECALL function, the system compares the configuration parameters of each channel (input type, number of inputs) with the configuration parameters saved together with the snapshot. If there is a mismatch, the snapshot will not be executed for this channel.

5.6.2 Save a snapshot to memory

Saving a snapshot is done by touching a snapshot key, followed by SAVE MEM. The keyboard page appears where the snapshot name can be entered or edited (max. 20 characters). If the existing name is to be kept, just touch the <---| ENTER key.



CLEAR is used to clear the EDIT TEXT field for entering a new name with the keyboard. <--- BACK is used to delete one character to the left of the cursor. EXIT is used to leave the keyboard page without saving the new name. When pressing <---| ENTER, the keyboard page is left and the snapshot data are saved.

Note: Global snapshots can be saved by the system administrator only. Logged-in users can save their private snapshots only.

5.6.3 Delete a snapshot from memory

When saving a snapshot the previously stored snapshot data are overwritten. A snapshot can be deleted, too, without overwriting it with new data. For deleting a snapshot from the console's internal flash memory, the desired snapshot has to be selected. The selected key is highlighted. After touching the DELETE MEM key a dialog box appears. If it is confirmed, the snapshot will be definitively removed from the memory and the name within the selected key is cleared.

5.7 Microphone settings

A microphone setting is a set of equalizer and gain parameters (EQ, gain, phase, phantom power) for a single microphone channel. Thus, every DJ or announcer can store his preferred microphone settings and recall them at any time. Up to four private microphone settings for each user (max. 20 users), and up to ten global microphone settings can be stored in the console's flash memory; additional microphone settings can be stored on a PC-card as well (refer to [section 5.8](#)).

Microphone settings can be named, as the snapshots; these names are displayed on the two key columns in the center of the Mixer setup page.

5.7.1 Recall a microphone setting from memory

To recall a microphone setting from the console's internal flash memory, first a microphone input channel has to be selected by pressing the MIXER SETUP key, followed by the corresponding MIC SETTING key. The name of the selected microphone setting is highlighted.

Then touch the RECALL FROM MEMORY key. The selected channel's parameters are immediately set to the values of the microphone setting.

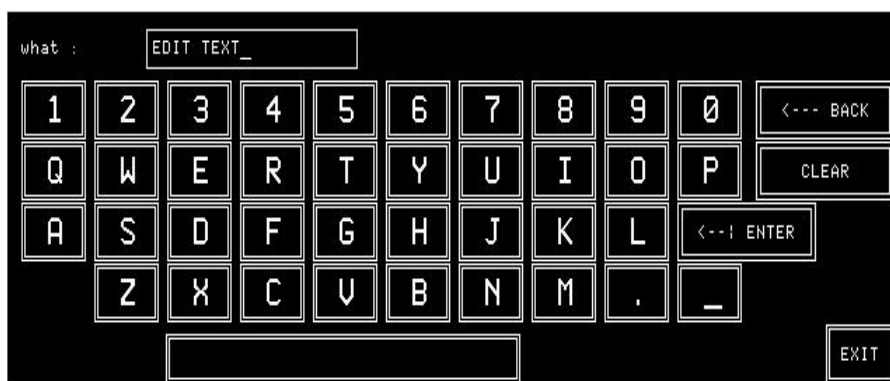
Selection of another type of input (line or digital) is treated as an error and will not be accepted by the system.



If the last modification was made on a microphone channel, this channel is automatically selected and displayed in the top line of the mixer setup page. If the user wants to change the input selection, he touches the label field of the desired channel in the channel screen. The input being currently active (A or B) of this channel is now selected and shown in the top line of the mixer setup page.

5.7.2 Save a microphone setting to memory

Creating a microphone setting means saving a set of equalizer and gain parameters for a single microphone channel under a given name into the console's internal flash memory. This is done by first selecting the microphone channel to be stored, then touching a MIC SETTING key, followed by SAVE MEM. The keyboard page appears where the microphone setting's name can be edited. Any MIC SETTING key (also one of these which have already been used and have a name assigned) can be selected. It will, however, be overwritten by the new mic setting.



Now a new name can be generated, or the already present name can be overwritten or edited. When pressing <--! Enter, the microphone setting data and its new name is saved.

5.7.3 Delete a microphone setting from memory

When saving a microphone setting the previously stored data are overwritten. A microphone setting can be deleted, too, without overwriting it with new data.

For deleting a microphone setting from the console's internal flash memory, the desired microphone setting has to be selected. The selected key is highlighted. After touching the DELETE MEM key, a dialog box will appear. If it is confirmed, the microphone setting will be definitively removed from the memory, and the text within the selected key is cleared.

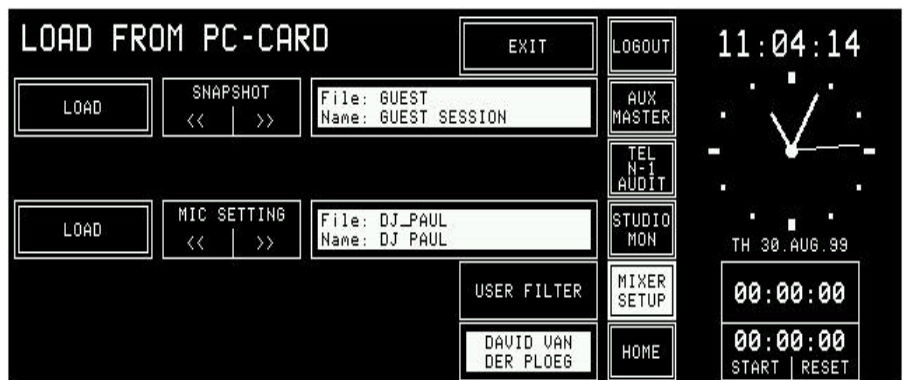
5.8 Using PC-cards

Snapshots and mic settings can also be saved to a PC-card and loading them from the card into the console's flash memory. Using PC-cards, parameter settings of a console can be copied to an other one, provided that both have the same configuration.

A PCMCIA card with a capacity of 64 kB can hold about 20 snapshots. On a 4 MB card, the complete console software and the configuration and parameter data of the console.

5.8.1 Load a snapshot/mic setting from PC-card

To load a snapshot or a microphone setting from a PC-card, LOAD FROM CARD must be pressed. The following page will be displayed:



Snapshots or mic settings can only be loaded as long as there are sufficient empty snapshots or mic settings available in the console's flash memory. They can be selected for loading by scrolling with the corresponding << or >> keys, followed by LOAD. After having loaded a snapshot or mic setting, it is not automatically active, but it is just available in the Mixer Setup page and must be recalled with RECALL FROM MEMORY, as described in [sections 5.6.1 and 5.7.1](#), respectively.

5.8.2 Save a snapshot/mic setting to PC-card

To save a snapshot or a mic setting to a PC-card, first a snapshot or a mic setting must be selected in the Mixer Setup page. Then the SAVE CARD key must be pressed. A keyboard appears for entering a file name (max. 8 characters), as described in [sections 5.6.2 and 5.7.2](#).

After confirmation with ENTER, the snapshot or the mic setting is saved on the card.

If an empty file name is entered or EXIT is pressed, the action is cancelled without saving anything to the PC-card.

Exceptions: If the file name already exists on the PC-card, the action must be confirmed before the file is overwritten.

If a user with an other password tries to store a file under an already existing file name which has not been given by him, he will not be able to overwrite this particular file (only the administrator is allowed to overwrite all files).

If the card is full, a dialog box appears, telling that the file cannot be saved.

File name extensions: The three-character DOS file name extensions on the PC-card will be generated automatically. The relationship between the file name extension and the file content is shown in the following table.

Data type	File name extension
Global snapshot	.gss
Private snapshot	.pss
Global mic setting	.mis
Private mic setting	.mip

5.8.3 Delete a snapshot/mic setting from PC-card

To delete a snapshot or a mic setting from the PC-card, DELETE CARD must be pressed. The following page is displayed:



A snapshot or a mic setting can be selected for deleting by scrolling with the corresponding << or >> keys. The selected file and the snapshot or mic setting name which is contained in this file are displayed to the right of the << / >> keys. When pressing DELETE, the file is deleted definitively; once deleted, the data cannot be recovered.

A user can only delete his own, private data from the card. The administrator, however, has access to all (global and private) files on the card. Depending on what selection the administrator has made in the Setup page, either only the global or only the private files are displayed for him.

The DELETE FROM PC-CARD page remains until either EXIT or one of the main menu keys is touched.

5.9 Administrator

5.9.1 Features

- No private snapshots for the administrator.
- The administrator has access to all private and global parameter settings.
- Only the administrator has access to the SYSTEM CONF. and USER ADMIN. keys.



The administrator's Mixer Setup page is shown above. In this case all SAVE, DELETE, RECALL, and LOAD actions correspond to *global* snapshots and mic settings.

When the administrator touches the PRIVATE key and selects one of the users, he can modify her or his private settings (see [section 5.9.2](#)).

A normal user (which is not logged in as administrator) has only access to global snapshots and mic settings and to her/his own private snapshots and mic settings.

Summary: The displayed snapshots and mic settings depend on the type of user logged-in to the console.

A user which has entered no password can access private settings, too; these will, however, not be password protected and can be overwritten by any other user *not* being logged-in to the console.

Global parameter settings can be recalled by any user but modified by the administrator only.

Access rights:

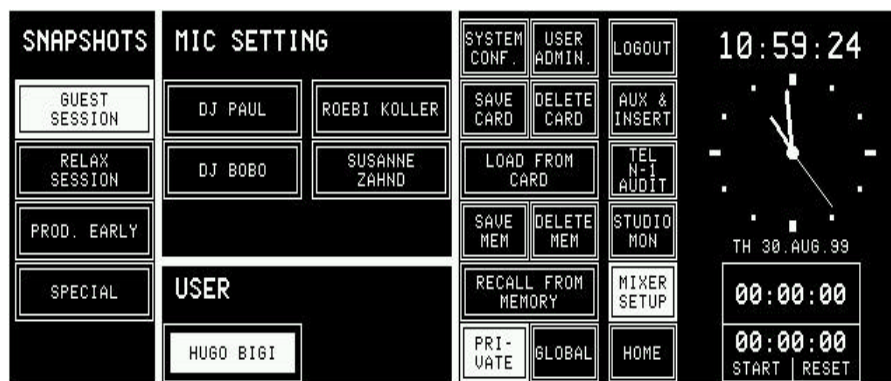
	Global snapshots	Global mic settings	Private snapshots	Private mic settings
Administrator	read/write	read/write	---	---
Administrator working with a selected user (see 5.9.2)	read/write	read/write	read/write	read/write
Logged-on user or default user	read	read	read/write	read/write

Number of parameter sets:

Data type	Number	Multiplied by	Total data records
Global snapshots	5	1	5
Global mic settings	10	1	10
Private snapshots	4 per user	20	80
Private mic settings	4 per user	20	80

5.9.2 Administrator selection of snapshots/mic settings

The administrator can display and modify the private snapshot and mic setting data. After selecting PRIVATE in the SNAPSHOTS/MIC SETTING page, the second rotary encoder from the left (the one below the users name label) allows to select the user's name. In this mode the administrator can LOAD, RECALL, SAVE, or DELETE all of the data being displayed.



This feature has been implemented in order to enable the setting of parameters in a private snapshot or mic setting to which the particular normal user has no access. All actions such as RECALL FROM MEMORY, SAVE MEM, DELETE MEM, LOAD FROM CARD, SAVE CARD, and DELETE CARD concern the selected user's data. All other actions on the console cannot be affected.

5.9.3 Users with and without a password

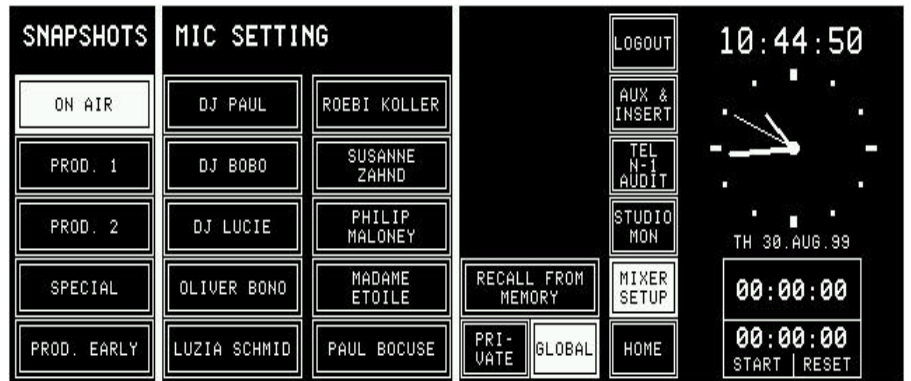
When a normal user enters the Mixer Setup page before logging-in (which means he is treated as default user), he works with the default user's data. He can LOAD, RECALL, SAVE, or DELETE all of the default user's data in the console's memory or on the PC-card. These data can, however, be used, saved, overwritten, or deleted by any other user, who is not logged-in as well.

The Mixer Setup page offers a PRIVATE key to the left of the GLOBAL key, allowing the user – after he has logged-in – to access his own, protected private snapshots and mic settings.

Should the user have access permission to the system configuration, then the SYSTEM CONF. key would be displayed, too.



A user can decide to work with the global data although he is already logged-in. If the GLOBAL key is pressed, the Mixer Setup page will look as shown below, where he can recall (but cannot modify) the global snapshots and mic settings. If the user has access permission to the system configuration, the SYSTEM CONF. key would be displayed, too.



5.10 User administration



USER ADMINISTRATION is only accessible by the administrator. Refer to [section 11](#) for details on how to set up function access permission and new user accounts.

5.11 System configuration

System configuration is a separate function group which can be accessed only by the administrator or by users having access permission. It is separately described in detail (refer to [section 12](#)).

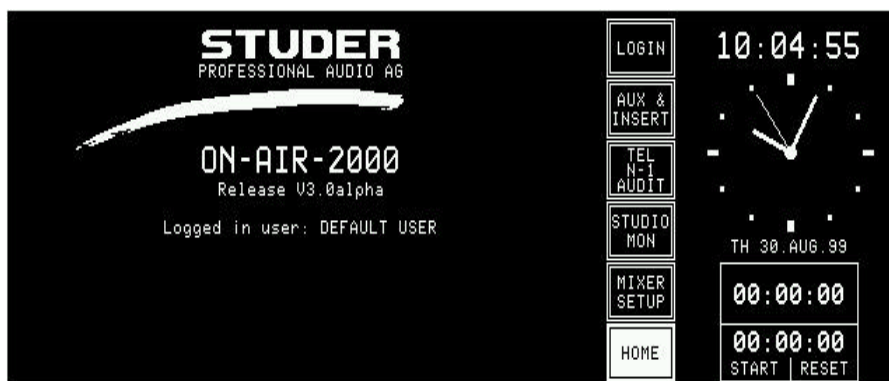
5.12 Watch and stopwatch

The watch and stopwatch functions are continuously displayed on the right-hand side of the central screen.

The term “watch” refers to the time of day in analog and digital format, the day of the week and date in an abbreviated format.

The term “stopwatch” refers to both the fader and the user stopwatches. The fader stopwatch measures the time the most recently used channel fader has been opened. The user stopwatch works like a normal stopwatch with START/STOP and RESET keys located directly below the display screen.

Below, the HOME page with the watch and stopwatch displays and functions is shown.



5.12.1 Watch

The watch gives a permanent time, day of week, and date display. The normal time reference is an internal, battery-buffered real-time clock (RTC). The RTC continues to run even when the console is switched off. Therefore it is unnecessary to set the watch at power-up. The RTC can also be synchronized by an optional TimeSync Module connected to the control module bus. If synchronization is established, the top right corner of the central screen shows an “S” (sync OK).

Changes to the internal time reference and the time and date format can be made by the administrator on the TIME page (MIXER SETUP, SYSTEM CONFIG., TIME). For details, refer to [section 12.2.5](#).

Both time and date can be displayed in two formats, as shown below:

Time format	Digital time indication
12:00 p.m.	12 hour time format
24:00	24 hour time format

Date format	Example
DD.MMM.YY	MO 20.MAR99
MMM-DD-YY	MO MAR-20-99

5.12.2 Fader stopwatch

The upper of the two stopwatches is called the fader stopwatch. It always restarts at 00:00:00 when a new input channel is activated (e.g. channel ON, fader open, and output bus selected). In other words, it displays the elapsed time of the last channel opened.

This function can be enabled or disabled for any desired channels via the MIXER SETUP/SYSTEM CONFIG./INPUT menu, item TIMER START YES/NO.

The counter stops when the channel which has started the stopwatch is switched OFF, or its fader is closed.

Note: If more than one channel have caused the fader stopwatch to restart, only the last channel's time is displayed.

5.12.3 User stopwatch

The user stopwatch is located just below the fader stopwatch. It is controlled by two keys on the console's surface located below the digits of the display. One key starts and stops the timer, the other resets the timer.

Key	Label	Description
	START	Start timer if stopped
	STOP	Stop timer if running
	RESET	Reset timer regardless whether stopped or running

5.13 Master fader for PGM and REC outputs

Starting with SW V3.0, any of the 24 faders – i.e. even faders the number of which is higher than the number of channels the console is configured for – can be configured as master fader(s) for the program and/or the record bus. This selection is performed with the two leftmost rotary encoders located below the PGM MASTER and REC MASTER fields (in the MASTER FADER ASSIGNMENT section on the COMMON SETTINGS page), followed by touching APPLY.

The corresponding input channel can still be used, however without control possibilities from the operating surface (i.e., only the external MUTE and Monitora control is available). In such a case, this channel may be used as a talkback mic input channel; please note that the TB SOURCE parameter of this input must then be set to “CR” in the INPUT CONFIG. page.

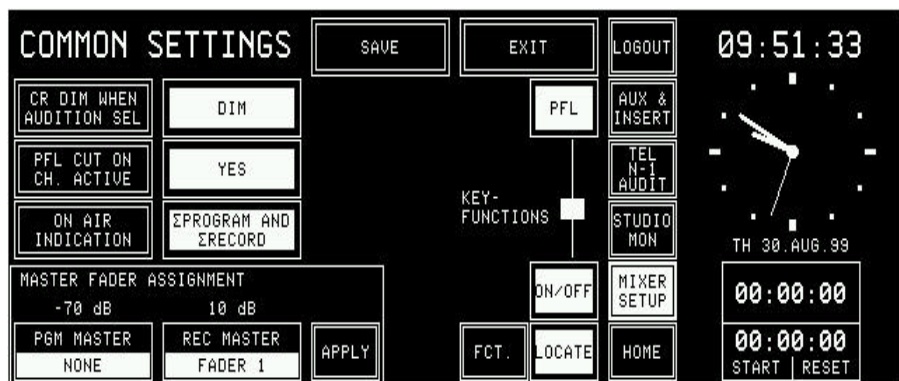
If only fixed PGM MASTER and/or REC MASTER output levels are required, it is also possible to set them once and switch back to the normal channel control afterwards – just by selecting “NONE” in the PGM MASTER and REC MASTER fields on the COMMON SETTINGS page.

Important: *When re-establishing standard console operation, please make sure that the master levels are set back to 0 dB.*

Specifications:

- In the audio path, the master fader(s) is/are located before the insert points ([also refer to the block diagram in section 1](#));
- No ON/OFF function is available for the master busses;
- PFL function is available;
- Overload indication is available;
- Master level can be controlled by Monitora extended commands;
- Signaling (ON-AIR, CR-MIC, and STUDIO-MIC) and CR/Studio CUT/DIM as well as some restrictions of the graphical user interface consider the master faders.

COMMON SETTINGS page:



Corresponding channel screen:



6 LEVEL METERS

On-Air 2000 mixing consoles can be equipped with one or two stereo level meters, according to the customer's specification.

It is configurable for both meters which signal they display; the following sources can be selected in the configuration menu and are available in analog and digital (AES/EBU) form for the meters:

Meter 1	Meter 2	Source
X	X	CR MONITOR
X	X	PROGRAM
X	X	RECORD
X	X	AUX 1
X	X	AUX 2
X		AUDIT
X		N-1 A

For configuration details refer to [section 12.2.4](#).

6.1 Standard level meters

The following level meters can be installed as standard:
















Digital	Dual bargraph, PPM, with correlator	RTW 11519D
	Stereo display, dual PM, with correlator	RTW 1069
Analog	Dual bargraph, PPM, with correlator	RTW 1119E
	Dual bargraph, PPM	Studer 1.913.111
	Dual bargraph, VU	Studer 1.913.112
	Dual 30-LED, PPM	Studer 1.913.105
	Dual 30-LED, VU	Studer 1.913.106
	Correlator, 30-LED	Studer 1.913.109
	Correlator, 30-LED, switchable to meter 1 and 2	Studer 1.913.100

7 MONITORING

7.1 Control room monitoring



The CR monitoring source selector has 10 keys to select one out of six internal and 4 analog external sources. The key of the selected source is illuminated.


The F1...F5 keys can act as additional source selectors, provided that the optional Monitor Extension 1 is installed and configured accordingly. F1...F5 then select two additional digital and three additional analog external sources. The functionality of these keys can be configured in the Monitor Expander screen.

Key	Source	Description
	Auxiliary 1	General purpose output bus. AUX2 is illuminated if selected.
	Auxiliary 2	General purpose output bus. AUX1 is illuminated if selected.
	Audition	General purpose output bus. The input channels to the audition bus are configurable. AUDIT is illuminated if selected.
	Record output	Output signal of the record master output. ΣREC is illuminated if selected.
	Program output (on-air)	Output signal of the on-air master output. ΣPGM is illuminated if selected.
	PFL	PFL sum. PFL is illuminated if selected.
	External 3	General purpose analog stereo input signal. EXT3 is illuminated if selected.
	External 2	General purpose analog stereo input signal. EXT2 is illuminated if selected.
	External 1	General purpose analog stereo input signal. EXT1 is illuminated if selected.
	Off-air	General purpose analog stereo input signal (e.g. tuner). OFF AIR is illuminated if selected.
	External 8*	General purpose digital (AES/EBU) stereo input signal. F5 is illuminated if selected.
	External 7*	General purpose digital (AES/EBU) stereo input signal. F4 is illuminated if selected.
	External 6*	General purpose analog stereo input signal. F3 is illuminated if selected.
	External 5*	General purpose analog stereo input signal. F2 is illuminated if selected.
	External 4*	General purpose analog stereo input signal. F1 is illuminated if selected.

* see Monitor Expander module configuration, [section 12.2.11](#).

Two additional keys are used to control the monitoring loudspeakers in the control room. The functions of these keys are described in the table below.

Key	Function	Description
	-20 dB	The output level to the CR monitor loudspeakers is reduced by 20 dB. DIM is illuminated if selected.
	Mute	The output to the CR monitor loudspeakers is muted. CUT is illuminated if selected.

A volume control knob (MON ) is used to set the level sent to the CR monitor speakers.




As long as one of the microphones in the control room (DJ or guest microphone) is on, the monitor speakers are muted. In this case the CUT key is illuminated.

If the monitoring source is AUDIT (audition bus), the monitor speakers are either dimmed (DIM key illuminated), muted (CUT key illuminated), or not affected at all, according to the configuration (see [section 12.2.2](#) for details). If talkback is active, the level of the monitor speaker is dimmed by 20 dB and the DIM key is illuminated.

External CR DIM: On from SW V2.02, an additional control input has been implemented, allowing to reduce the level of the CR monitor speakers by 20 dB by an external signal (see [section 15.12](#) for details).


The signal on the PFL bus is reproduced by the console's built-in speakers (mono). The same speakers are used for talkback. The volume is adjusted with the PFL/TB potentiometer.


For monitoring purposes, a headphones connector is provided below the hand rest of the central console part. Three keys allow different monitoring modes, as described below:

Key	Function	Description
	PFL	The headphones signal is the stereo PFL signal. PFL is illuminated if selected.
	PFL/CR monitor	The left headphones signal is the mono PFL signal, while the right headphones signal is the mono CR signal as selected by the monitor source selector. If no PFL is selected, the headphones signal is the stereo CR signal as selected. MON/PFL is illuminated if selected.
	CR monitor	The headphones signal is the same stereo signals as selected by the source selector for the monitor speaker. MON is illuminated if selected.

The CUT and DIM keys have no influence on the headphones signal. The headphones output is not muted if one of the control room microphones is on. The incoming talkback signal from the studio is mixed to the headphones output. For improved intelligibility, the monitoring signal is attenuated by 20 dB.

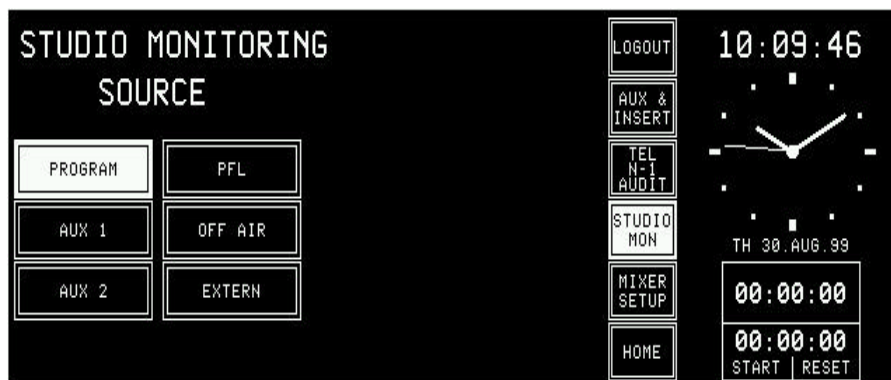
The PFL to MONITOR function feeds the PFL signal to the monitor loudspeakers if PFL is selected on any channel. The normal monitoring signal is muted until no more PFL keys are active.

Key	Function	Description
	PFL to MONITOR	The PFL signal is routed to the monitor speakers if PFL on any channel is active. If no PFL is selected, the monitoring signal is the stereo CR signal as selected. PFL > MON is illuminated if selected.

A volume control knob (PHONES ) adjusts the headphones listening level.

7.2 Studio monitoring

The built-in studio monitoring functions are based on a touch-screen menu on the control screen. The STUDIO MONITORING SOURCE selector page allows one of six sources to be selected for routing to the studio speakers and headphones.



The table below lists the available sources.

Label	Function	Description
PROGRAM	Program output (on-air)	Output signal to the transmitter. PROGRAM is highlighted if selected.
AUX 1	AUX 1	General purpose output sum. AUX1 is highlighted if selected.
AUX 2	AUX 2	General purpose output sum. AUX2 is highlighted if selected.
PFL	PFL	PFL sum. PFL is highlighted if selected.
OFF AIR	Off-air	General purpose input signal, usually from receiver. OFF AIR is highlighted if selected.
EXTERN	External	General purpose input signal. EXTERN is highlighted if selected.

As soon as one of the keys is pressed, the corresponding signal is routed to the studio, and the key is illuminated.






The monitoring source selection can be controlled from the studio via external pushbuttons thanks to the parallel interface. The monitor speaker and headphones levels can independently controlled by two potentiometers located in the studio.

The studio monitoring speakers are muted if one of the studio microphones is on. The headphones are not muted in this case.

During talkback from the CR to the studio, the volume for the studio speakers is reduced by 20 dB. The talkback signal from the CR to the studio is not reduced and has therefore the normal listening level on both the studio monitor speakers and the studio monitor headphones.

7.3 Talkback

There is a choice among five talkback destinations from the DJ microphone. A key is assigned for each destination as can be seen in the table below.

Key	Function	Description
	TB to Telephone 2	The connection between DJ mic and Cleanfeed B (N-1B, e.g. telephone 2) is established for as long as this key is pressed.
	TB to Telephone 1	The connection between DJ mic and Cleanfeed A (N-1A, e.g. telephone 1) is established for as long as this key is pressed.
	TB to Auxiliary 2	The connection between DJ mic and Auxiliary 2 is established for as long as this key is pressed.
	TB to Auxiliary 1	The connection between DJ mic and Auxiliary 1 is established for as long as this key is pressed.
	TB to Studio	The connection between DJ mic and the Studio is established for as long as this key is pressed.

The DJ microphone usually is the source for talkback from the CR. For mixing consoles with less than 24 channels, a separate talkback microphone is optionally available, including preamplifier, limiter, and A/D converter. Its main application is in production and editing control rooms where no DJ microphone is required; for details, refer to [section 15.17](#).

The parallel studio interface allows the connection of three pushbuttons for talkback destination selection. The possible destinations are: CR, Cleanfeed 1 (N-1 A), and Cleanfeed 2 (N-1 B). For talkback from the studio the studio microphones are used.

The console's built-in PFL/TB loudspeaker and the headphones are used for talkback listening in the CR, while in the studio the monitoring speakers and the headphones are used.

Any of the function keys F1...F5 can be configured as additional talkback target keys. This allows, together with the optional Monitor extension, e.g. talkback to the audition bus. This bus could therefore be used as a third cleanfeed bus (N-1 C).

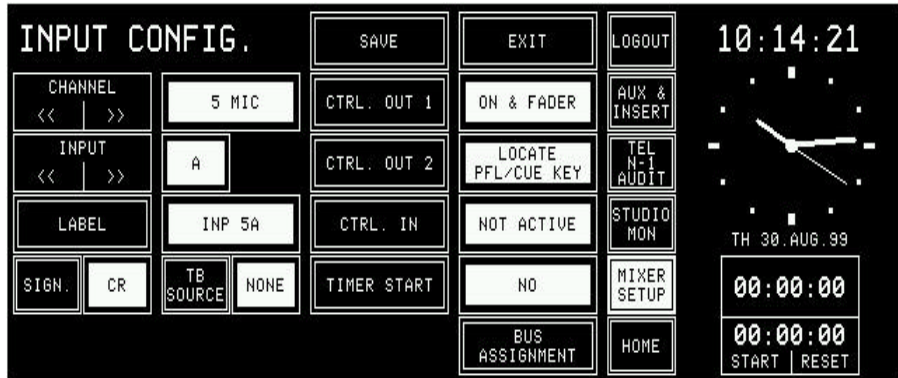
7.3.1 Additional talkback functions

The new *Monitoring Module w. TB return 1.942.180.20* as well as the new *Extended Monitoring Module w. TB return 1.942.181.20* both provide an additional TB line input (electronically balanced, on the "STUDIO MONITOR AUDIO" connector) as well as additional CR and studio control inputs (on the "EXT PFL CTRL" connector). Please refer to the pin assignment tables and the connection diagram in [section 15.12](#).

7.3.2 Talkback settings

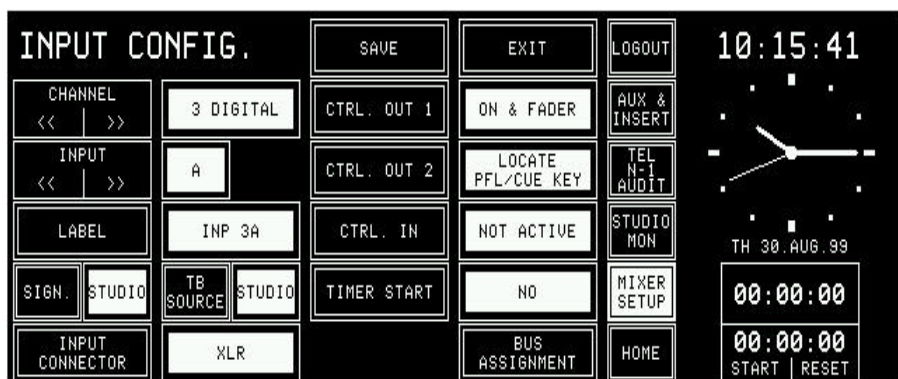
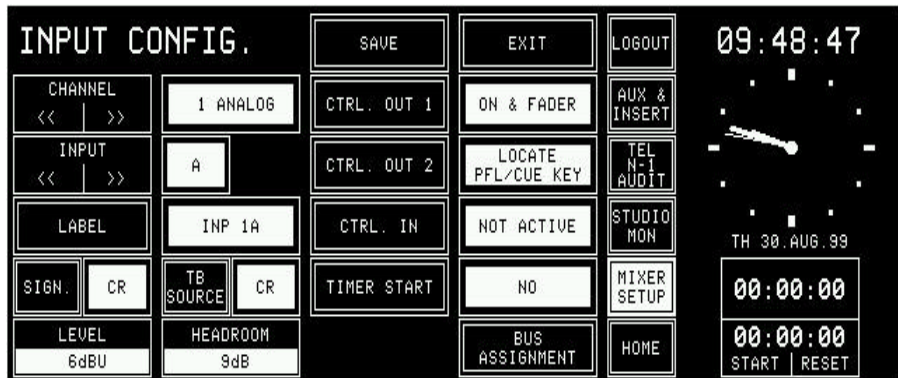
Starting with SW V3.0, talkback and signaling can be configured independently. The “SIGN.” setting (formerly labeled “MIC LOCATION”) in the INPUT CONFIG. page is used only for signaling (red light) and monitoring (cut and dim).

The additional “TB SOURCE” parameter in the INPUT CONFIG. page sets the assignment of the input to the TB bus (NONE, from CR, or from Studio).



During talkback from the Studio, the studio speakers are dimmed only if at least one input is configured as “SIGN.” = STUDIO *and* “TB SOURCE” = STUDIO. The same applies for talkback from the control room.


Note: Configuration of talkback and signaling is also possible for analog or digital line inputs, as shown by the following screenshots.



7.4 External PFL

The On-Air 2000 provides an external PFL audio input. If the EXT PFL key is pressed, the key is illuminated, and the signal at the EXT PFL input is routed to the PFL bus. A control output is activated if EXT PFL is active. In addition, the EXT PFL function can be activated by a dedicated control input (refer to [section 15.12](#)).

With this feature, the On-Air 2000 is well-suited for the cooperation with a CAB system. These systems need a separate PFL input activated by the system.

Key	Function	Description
	External PFL	Switches the EXT PFL OUT control output on and off, and routes the EXT PFL audio input signal to the PFL bus. The key is illuminated if active, or if a control signal is applied to the EXT PFL input.

8 SIGNALING

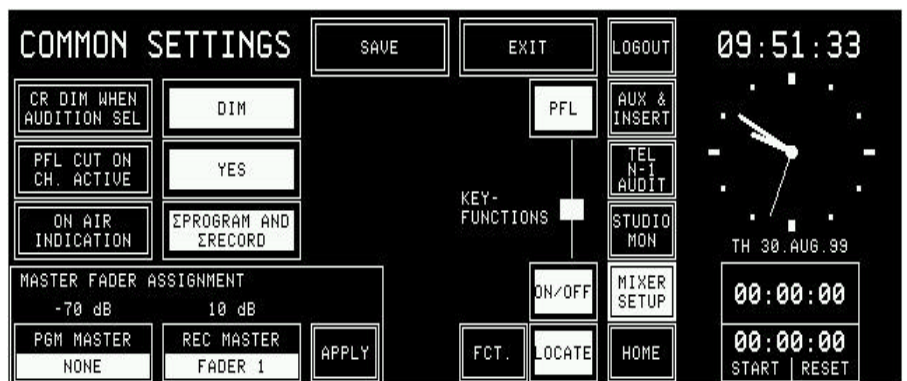
For control room and studio, signaling is provided by means of open-collector outputs (9-pin D-type connector on the Monitoring module; for connection details, see [section 15.12](#)).

One output is available for each of the following statuses:

- Control Room microphone is on-air,
- Studio microphone is on-air, and
- Any signal from the console is on-air (i.e., a fader is open, this channel's ON pushbutton is active, and its signal is routed to the PROGRAM and/or the RECORD bus).

The CR-MIC and STUDIO-MIC indicators in the central operating section of the console are illuminated when the corresponding control output is active.

SIGN. Output	Active if:
CR MIC OUT	At least one input of a CR or DJ microphone is active (channel ON, fader open, assigned to program or record bus).
STUDIO MIC OUT	At least one input of a studio microphone is active (channel ON, fader open, assigned to program or record bus).
PGM OUT	Depending on ON-AIR INDICATION condition selected on the COMMON SETTINGS page: <ul style="list-style-type: none"> • ΣPROGRAM AND ΣRECORD – at least one channel is active (channel ON, fader open, assigned to program or record bus). • ΣPROGRAM – at least one channel is active (channel ON, fader open, assigned to program bus). • ΣRECORD – at least one channel is active (channel ON, fader open, assigned to record bus).



The ON AIR INDICATION condition for the PGM OUT control signal can be set in the COMMON SETTINGS page (which is reached by pressing MIXER SETUP followed by COMMON), if access permission is available.

An additional ON AIR IN opto-coupler input on the SIGN. connector can be used for illuminating the ON-AIR indicator in the central operating section of the console.

Note: For information on the MASTER FADER ASSIGNMENT field, please refer to [section 5.13](#).

9 MACHINE CONTROL

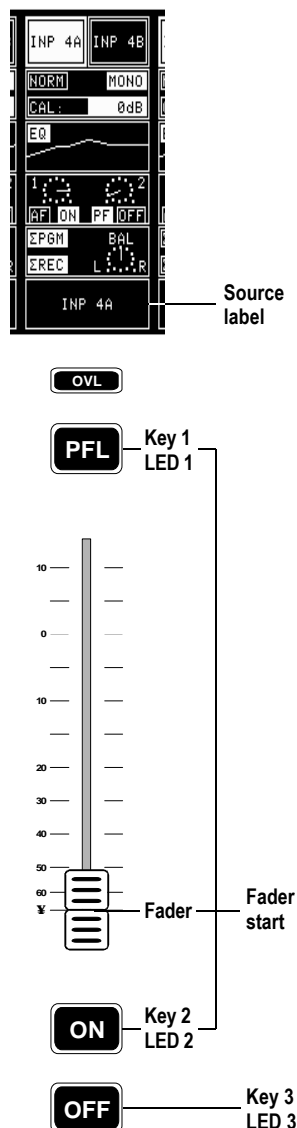
The On-Air 2000 provides different control inputs and outputs. These can be used e.g. for switching a channel on and off, or for starting, stopping, and cueing of the connected source unit (as CD players, tape recorders, or a CAB system).

Each audio input holds two control outputs and one control input on D-type connectors. The signals are:

- CTRL OUT 1 (normally used for fader start, but configurable for other functions; see [section 9.2.1](#))
- CTRL OUT 2 (configurable functions see [section 9.2.2](#))
- CTRL IN (configurable functions see [section 9.3.1](#))

The status of the output signals depends on the control elements of the channel strip (keys 1...3, fader, input selection, output routing), as well as on the console configuration.

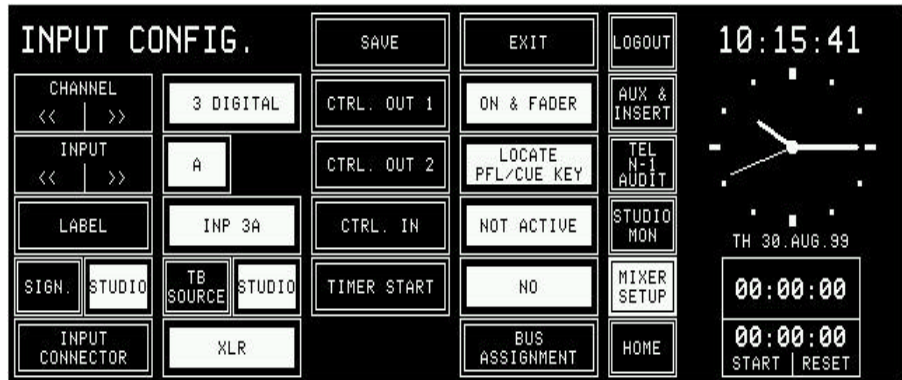
Each channel consists of either two (A/B input module) or six (hex input module) audio inputs. Each audio input has its own control input and two control outputs allowing to control every external source separately.



9.1 Keys and LEDs

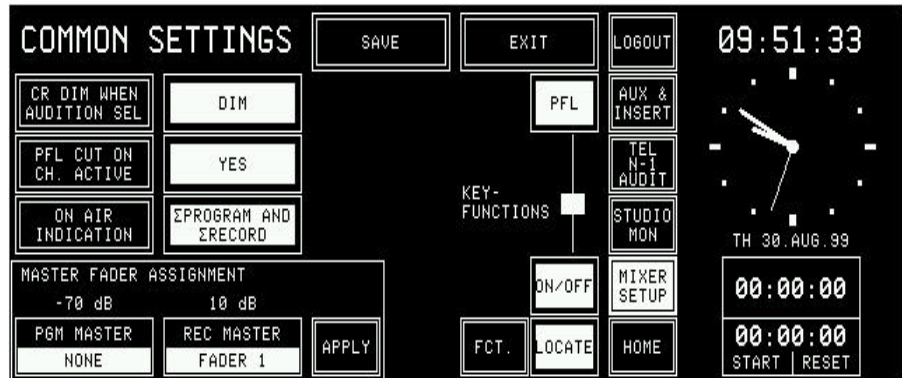
Key 1/LED 1 The first key is always used to activate/deactivate the PFL function; if active, LED 1 is illuminated.

The PFL function can affect the CTRL OUT1 and/or CTRL OUT2 control signals, depending on the configuration. This configuration is performed in the center section of the INPUT CONFIG. page and is identical for all types of input modules.



Key 2/LED 2 The second key is used either to switch the channel ON or to toggle the channel ON/OFF, depending on the configuration of key 3. This function affects the CTRL OUT1 control signal. LED 2 always indicates the channel's ON/OFF status.

Key 3/LED 3 The functionality of the third key depends on the console configuration. It can act as channel OFF key or as a LOCATE function. The key 3 functionality is set in the COMMON SETTINGS page:



Console configuration (valid for all channels):	
Key 3 ("OFF") function	Key 2 ("ON") function
(Channel) OFF	(Channel) ON
LOCATE	(Channel) ON/OFF
LOCATE	(Channel) ON *

Channel ON/OFF affects the CTRL OUT1 control signal of the selected input, and the locate function defines the status of the CTRL OUT2 control signal of the selected input.

* This additional configuration possibility has been introduced with SW V3.0; to protect a channel from being switched off inadvertently, the OFF function can be disabled. This setting is performed in the COMMON SETTINGS page; it is valid for all channels of the console simultaneously.

Note: If this setting is selected, no channel can be switched off by pressing a key – therefore, either closing the fader must do, or an external pushbutton per channel has to be added. For this purpose, a CTRL IN control input per channel is provided; please refer to [section 9.3.1](#). Select the option “CTRL. IN – EXT. ON/OFF” in the INPUT CONFIG. page.

LED 3 is illuminated if an external device indicates ready status using the CTRL IN input signal of the selected input, or if the CAB system indicates “ready for playback” using the serial remote interface (SET_FADER_START*FaderNr).

9.2 Control outputs

9.2.1 CTRL OUT1

This output is normally used to start external devices, such as CD players or a CAB system, to play the next track. On the INPUT CONFIG. page (see [section 9.1](#)), other functions can be assigned individually for each audio input.

Input configuration (for each channel individually):	
CTRL OUT1 mode	CTRL OUT1 signal
NOT ACTIVE	Output always open (inactive).
ON & FADER	Active if ON key is pressed and fader is open (standard fader start function).
PFL/ON & FADER	Active if either PFL key is pressed (independent of fader position), or if ON key is pressed and fader is open (fader start function, causing the source to be started as well when PFL key is pressed).
ON LAMP	Active if channel is ON; used as acknowledgement if the channel is remotely controlled.

9.2.2 CTRL OUT2

This output can be used to re-park an external device, such as a CD player, after cueing, or for signaling, or as an acknowledgement for ON status. It can be configured individually for each input in the INPUT CONFIG. page (see [section 9.1](#)).

Input configuration (for each channel individually):	
CTRL OUT2 mode	CTRL OUT2 signal
NOT ACTIVE	Output always open (inactive).
LOCATE KEY	Active if key 3 ("OFF", configured as LOCATE key) is pressed while the channel is closed (fader closed or channel OFF). Using this function, a source which has been pre-listened before can be reset to the start point.
PREVIEW	Active as long as key 1 ("PFL") is pressed while the channel is closed (fader closed or channel OFF). Using this function, a source can be started for pre-listening.
LOCATE PFL KEY	Active for 0.2 s when key 1 ("PFL") is switched off while the channel is closed (fader closed or channel OFF). Using this function, a source can be given a locate command to return to the start point.
LOCATE PFL / LOC KEY	Combination of LOCATE KEY and LOCATE PFL KEY functions: <ul style="list-style-type: none"> Output is active for 0.2 s when key 1 ("PFL") is switched off while the channel is closed (fader closed or channel OFF). Using this function, a source can be given a locate command to return to the start point. Output is active if key 3 ("OFF", configured as LOCATE key) is pressed while the channel is closed (fader closed or channel OFF). Using this function, a source which has been pre-listened before can be reset to the start point.
ATTENTION	Active as long as key 3 ("OFF", configured as LOCATE key) is pressed; can be used for "ready" signaling.
ON LAMP	Active if channel is ON; used as acknowledgement if the channel is remotely controlled.

9.3 Control inputs

9.3.1 CTRL IN

A CTRL IN control input is available for each audio input. This input's function can be selected in the INPUT CONFIG. page (see [section 9.1](#)).

Input configuration (for each channel individually):	
CTRL IN mode	CTRL IN signal
NOT ACTIVE	No function (input signal is ignored)
READY	Key 3 ("OFF") is illuminated as long as CTRL IN is active
EXT. MUTE	Channel is muted as long as CTRL IN is active (e.g. cough key)
EXT. ON/OFF	Toggles the channel ON/OFF; used e.g. for ON/OFF button on speaker's desk, or for remote control through CAB system

Note: An optional control interface (1.942.802) can be used for the following functions:

- Electrical isolation between CTRL OUT and the connected source (relay with make contact);
- Conversion from the continuous fader start signal to electrically isolated start and stop pulses;
- Remote control of a channel using separate ON and OFF keys, logically linked with the ON LAMP signal. The ON and OFF keys in the console remain functional;
- Remote control of a channel through a CAB system which gives a continuous signal as long as a channel must be on, logically linked with the ON LAMP signal. The external command is overridden by the ON and OFF keys in the console.

9.3.2 EXTERN PFL input

An external PFL control input is available on the monitoring module of the console (refer to [section 15.12](#)). It allows e.g. the EXTERN PFL pre-listening audio path to be opened by a CAB system.

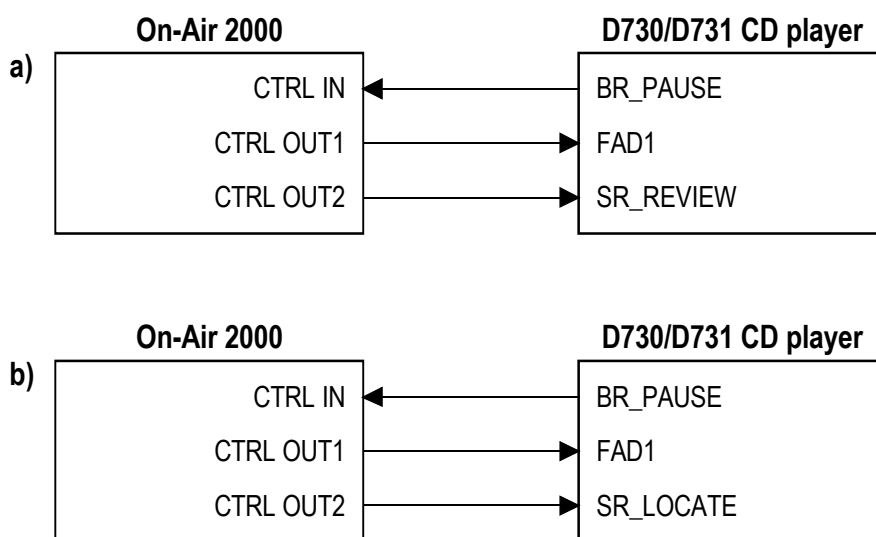
9.4 CTRL OUT1/2 & CTRL IN application examples

Application	Configuration CTRL OUT1	Configuration CTRL OUT2	Configuration of key 3 ("OFF"/LOCATE)	Connection(s) On-Air 2000 → controlled source (e.g. CD player, cart/tape recorder)
Fader start/stop with: Fader open/close, or channel ON/OFF	ON & FADER	—	—	CTRL OUT1 → remote control input "fader start"
Fader start/stop with: Fader open/close, or channel ON/OFF, or PFL ON/OFF	PFL / ON & FADER	—	—	CTRL OUT1 → remote control input "fader start"
Review function of Studer D730/D731: pre-listening with PFL and subsequent locate to the last cue address. Afterwards: PLAY with fader start; see Notes 1 and 2	ON & FADER	PREVIEW	—	CTRL OUT2 → Studer D730/D731, remote control input "SR_REVIEW"; see fig. a)
Pre-listening with PFL and subsequent locate to the start; console sends an 0.2 s locate pulse on CTRL OUT2. Afterwards: PLAY with fader start; see Note 1	PFL / ON & FADER	LOCATE PFL KEY	—	CTRL OUT1 → remote control input "fader start", CTRL OUT2 → remote control input "locate"; see fig. b)
Manual locate to the start, using OFF/LOCATE key 3; see Note 1	—	LOCATE KEY	LOCATE	CTRL OUT2 → remote control input "locate"; see fig. b)
Pre-listening with PFL and subsequent locate to the start. Manual locate also available; see Note 1	PFL / ON & FADER	LOCATE PFL / LOC KEY	LOCATE	CTRL OUT1 → remote control input "fader start"; CTRL OUT2 → remote control input "locate"; see fig. b)
Control of any external signal with key 3 ("OFF")	—	ATTENTION	LOCATE	CTRL OUT2 → any control input
Reflects the ON lamp status to CTRL OUT1	ON LAMP	—	—	CTRL OUT1 → any control input
Reflects the ON lamp status to CTRL OUT2	—	ON LAMP	—	CTRL OUT2 → any control input

Note 1: Function is available only if the corresponding console channel is *not* active; "channel active" = fader open **and** channel ON **and** channel assigned to PGM or REC bus.

Note 2: D730/D731 configuration checksum example, suited for this function: **4050631164470**. For more information on this subject, please refer to the D730/D731 operating instructions manual, order no. 10.27.1672

Note 3: Combination of different applications is possible if allowed by the CTRL OUT1/2 wiring.



10 AUTOMATION

10.1 Introduction

On-Air 2000 has no built-in automation but supports external CAB (computer-assisted broadcast) systems. With software version V2.0, also a serial interface (RS232/RS422/RS485) can be used to communicate with the CAB.

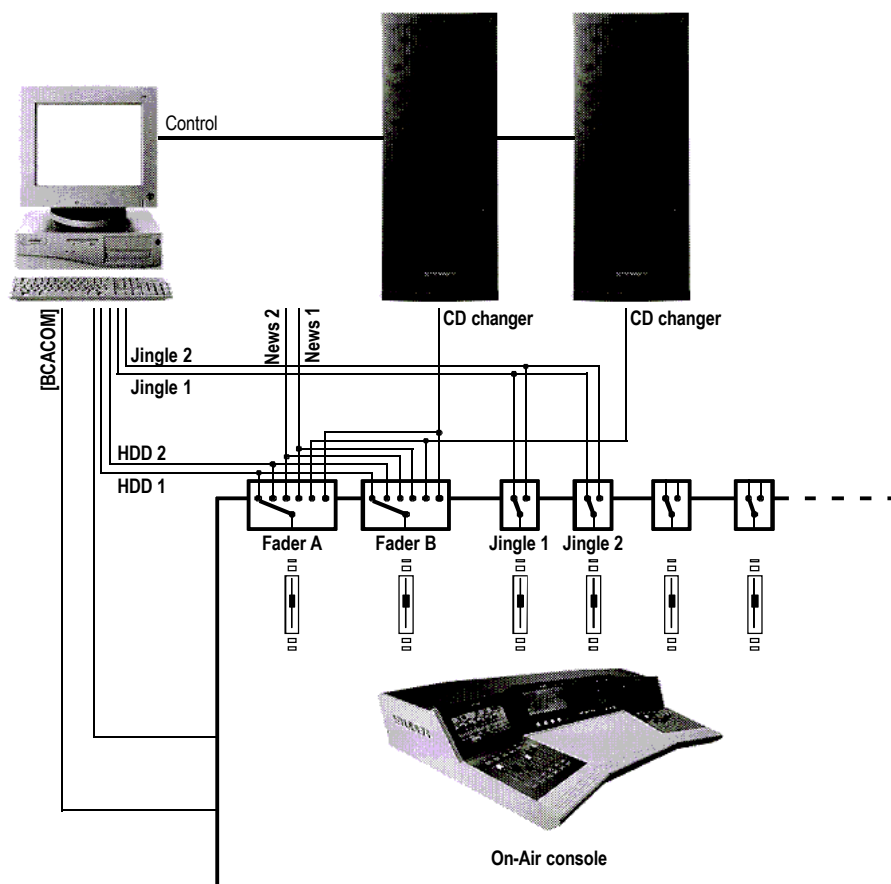
Studer Digimedia system: Information on how to connect and operate the On-Air 2000 mixing console with a Digimedia CAB system is given in the current Digimedia operating instructions.

The serial interface protocol is based on the “Schnittstellen Spezifikationen Regiepult” of DAS (Digitale Steuerungs- und Automationstechnik, Thomas Volgmann) furthermore called [MONPROT], which was defined by VCS and Siemens.

It was not the target to implement the complete [MONPROT]. The implementation in the On-Air 2000 is rather a subset of [MONPROT] to allow for the applications described in [section 10.3](#).

For detailed information on the telegrams implemented in the On-Air 2000, please refer to the “Communication Protocol for Broadcast Automation” document [BCACOM] (available on request).

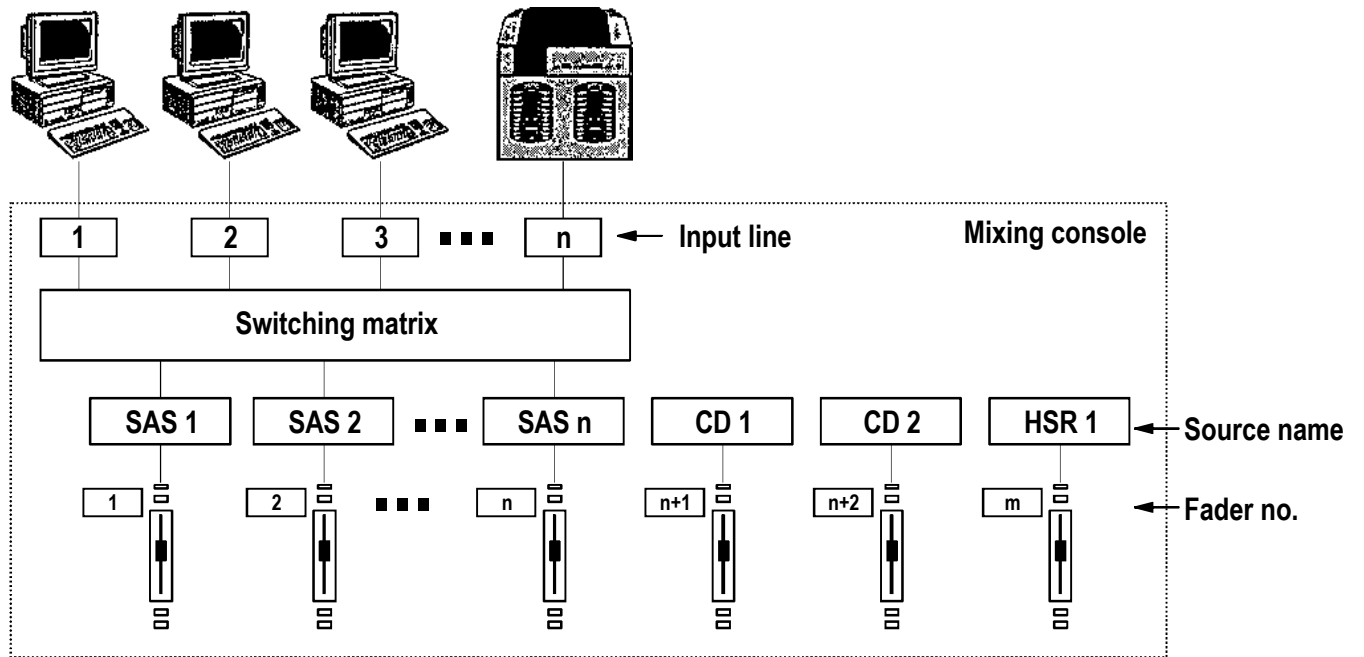
10.2 Features of the On-Air 2000 CAB support



- Serial communication interface:
Serial RS232/RS422/RS485 standard communication interface based on [MONPROT].
- 2 x 12 character text display per channel.
- Music and speech output:
The CAB can control the output assignment (program/record bus) of the currently selected input of a channel.
- 6 × 6 input routing:
The input selector of the On-Air 2000 provides an input routing, as each input can select between 2 or 6 input lines. This leads to a maximum matrix size of 6 × 6 inputs.

The On-Air 2000 does *not* support:

- Motor faders; instead, an auto take-over mode is implemented, see [section 10.3.5](#).
- Fader routing; some consoles allow for a routing between input lines and sources (“Quellname”) as well as for an assignment of a source (“Quellname”) to any fader (“Fadernummer”). In contrast to the suggestion of [MONPROT], the On-Air 2000's implementation does not allow the faders to be routed to any source.

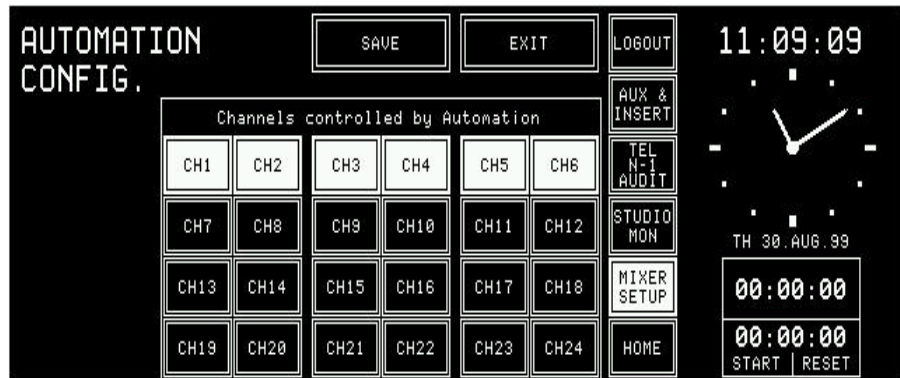


The concept as suggested by [MONPROT]

10.3 Application handling

10.3.1 Configuration for automation control

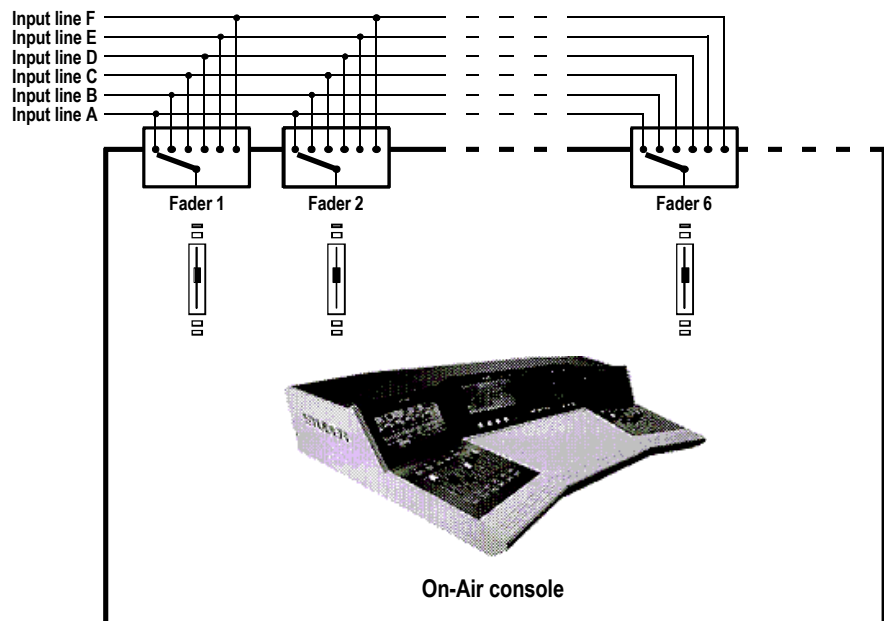
Channels must be assigned to the automation system in the configuration in order to be controlled by an external CAB system. The AUTOMATION CONFIG. page is reached from the SYSTEM CONFIG. page:



The AUTOMATION CONFIG. page allows each channel to be assigned to the CAB system.

10.3.2 Routing

As the hex input module allows selection of one input out of six, a 6 × 6 input routing is possible with six hex input modules (max. four hex modules are allowed for a 24-channel console, and six hex modules for 18-, 12-, and 6-channel consoles).



6 x 6 input routing with the On-Air 2000

Source Selection The CAB selects a source (SELECT_SOURCE*Name command) by its name (input name as configured in Input Configuration page within the On-Air 2000). On receipt of such a command, the On-Air 2000 looks for a channel providing an input signal, the input name of which matches the first eight characters of the desired name, converted into upper case. First it checks if any channel is already selected providing a signal with this name. If not, it looks for all channels not yet selected by the CAB providing a signal with this name on one of its inputs. If found, the On-Air 2000 selects this input (A...F). After that, this channel's number is communicated by the console to the CAB (SOURCE_SELECTED*FaderNr) as a handle for subsequent operations.

A channel can be selected by the CAB (SELECT_SOURCE), if the following conditions are met:

- It must be assigned to be controlled by CAB (YES) in the Automation Config. page, and
- The input module must be present.

After a channel is selected by the CAB, its behaviour changes as follows:

- Indication of "ON-AIR" or "NEXT" within input selector field;
- It accepts channel-related commands as "SET_FADER_LEVEL* FaderNr" telegram;
- It can indicate "display2" text from "SET_FADER_DISPLAY_2 *FaderNr" telegram within the source label field;
- It sends "FADERSTATUS*FaderNr, ..." to the CAB;
- It does not (de-)activate PFL on PFL key pressure, as PFL can be (de-)activated by the "SET_PRELISTEN_ON" or "SET_PRELISTEN_OFF" telegrams only.

If an input module is removed during operation, a previously selected channel will automatically be deselected.

All source selections are lost after power-off.

Input Routing With "SET_SAS_INPUTROUTING* FaderNr", the CAB can control the input selector of a channel.
Using "SET_SAS_INPUTROUTING FaderNr" does not deselect a previously selected source.*

10.3.3 Communication time-out

Every 10 seconds, the On-Air 2000 sends “GET_DEVSTATUS” to the CAB. If after 30 seconds no valid telegram is received from the CAB, the On-Air 2000 assumes that the communication is interrupted.

In this case it stops sending telegrams as “FADERSTATUS” to the CAB, and the following actions are performed:

- All channels are deselected (refer to [section 10.3.2](#));
- Source labels are re-drawn (name of selected input source will be indicated again) which might have been overwritten (refer to [section 10.3.10](#));
- A warning: “WARNG: XYZ - BCA - Communication lost” is displayed.

After the next/first telegram from CAB, communication will be re-established.

The information: “INFRM: XYZ - BCA - Communication established” is generated.

The On-Air 2000 reports to a “GET_DEVSTATUS” request from the CAB with “DEVSTATUS NO_ERROR”.

No error codes are defined.

10.3.4 Output selection

Using the “SET_ZI*FaderNr” telegram, the CAB is able to control the output assignment (program/record bus) of the currently selected input of any channel. This allows to route speech to the program output, and music to the record output.

10.3.5 Start a new title from schedule

In automatic mode, the CAB can start a new title automatically. It is also possible to start new titles manually. In this case the operator opens the fader (while the channel is already switched ON) or switches the desired channel ON (while the fader is already open).

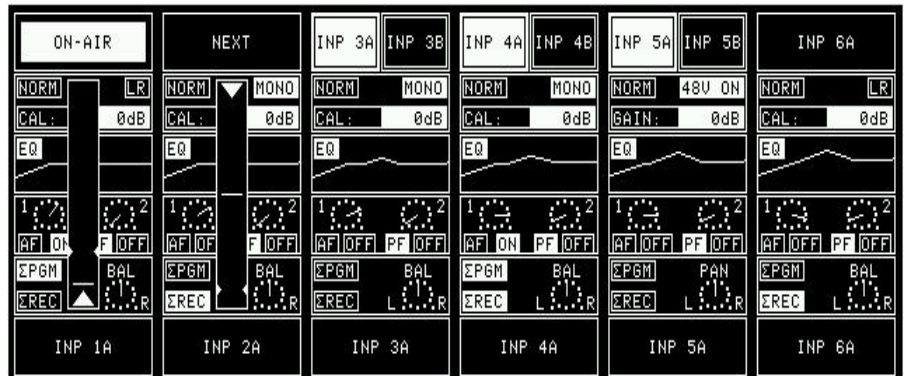
Automatic new title start: The CAB can control the console automatically. This automatic mode must be activated from within the CAB and can, for example, be used for controlling a program during the night without any assistance.

If the CAB runs in automatic mode, it starts playback of the source and sends the “SET_FADER_LEVEL*FaderNr” telegram with the desired level and fade-in time. This will send a new audio level to the DSP, and switch the channel ON in any case.

If a take ends, the CAB sends the “SET_FADER_LEVEL*FaderNr” telegram again, with a level of less than -70dB, and with the desired fade-out time. This will send a new audio level to the DSP, and switch the channel OFF in any case.

If the CAB changes the audio level, the channel changes into *auto take-over mode*. This means that the audio level (i.e. actual DSP level) and the fader level (i.e. physical position of the fader knob) differ for more than a specified auto take-over window. If the fader is moved now, nothing will change until the physical position of the fader knob is within the auto take-over window. Then the auto take-over mode is left.

Auto take-over mode is indicated on the touch screen. The operator can recognize the direction and distance to move the fader in order to leave auto take-over mode.



The large arrow at the bottom (or top) indicates the direction the fader has to be moved to leave auto take-over mode. The small horizontal line indicates the current physical fader position. It follows the fader position when the fader knob is moved towards the two small arrows at the left and right margin which indicate the current audio level.

Manual new title start: (Start a new title from schedule manually by DJ)

The “FADERSTATUS*FaderNr” telegram is sent to the CAB to start the next title from the schedule. It is used in the same way as the fader start output signal in fader start mode “ON&FADER”. This means, the channel must be ON *and* the fader must be open. “Fader open” is determined by audio level (actual DSP volume) but not the physical fader position.

Example: Assuming that a channel is playing audio from CAB (audio level “open”) and the fader is closed (fader level “closed”). This is the case after the CAB has sent the telegram “SET_FADER_LEVEL* FaderNr”, i.e. auto take-over mode. If the operator now takes control of that channel by opening the fader in order to leave auto take-over mode, the On-Air 2000 does not send any “FADERSTATUS*FaderNr” telegram, as the audio level does not change until auto take-over mode is left.

From the user's view, there exist two different methods to start new titles manually:

- Fader A-B operation, and
- Fixed source/channel assignment.

The On-Air 2000 supports both methods, as in practice, you will find a mixture of them. The selected method depends on the CAB, whether it uses the input routing facility of the On-Air 2000 for real Fader A-B operation.

Fader A-B operation: In real A-B operation the operator does not care which fader to open to start the next scheduled title. No matter which fader will be opened, the next title is played from schedule.

In this case, the CAB system uses the “SET_SAS_INPUTROUTING *FaderNr” command to change input routing before playback.

Fixed source/channel assignment: The next title is assigned to a channel by the “SELECT_SOURCE” command (refer to [section 10.3.2](#)). READY and NEXT indication is provided within the channel strip. If more than one channel is ready, the fader of the one indicated as next must be opened. Otherwise, one or more titles would be skipped in schedule.

10.3.6 Next Indication

The CAB is able to indicate on which channel the next title from schedule will be played (“SET_NEXT_BUTTON-LIGHT*FaderNr”). For that channel, the source label will be highlighted, as it is done with the NEXT function. In addition, the source selector field on the channel screen indicates “NEXT” – but only if the channel is selected by CAB (SOURCE_SELECTION). So the selection of an other input is inhibited (refer to the figure above).

This way, it is easy for the user to find the next fader to be opened, particularly if the source/fader assignment is fixed (see [section 10.3.5](#)).

Only one channel can be the next (“the last wins”).

10.3.7 Indication of the currently playing input line

As the On-Air 2000 is not equipped with motor faders, a clear indication of the channel currently “playing” is necessary.

Under the following conditions the selector field on the channel page indicates “ON-AIR” (refer to the figure above), and the selection of an other input is inhibited:

- Fader (audio level) is open;
- The channel is switched ON;
- The channel is assigned to program and/or record bus (as defined in the Common Settings page);
- The channel is selected by the CAB (SOURCE_SELECTION).

10.3.8 Ready indication

The CAB communicates to the console which input lines are ready for playback (SET_FADER_START*FaderNr). In this case, LED 3 of the corresponding channel (OFF LED) will be illuminated, the same way as it is done for READY input signals coming from the corresponding input module.

Together with Siemens CARAT, the "SET_FADER_READY* FaderNr." or "RESET_FADER_READY*FaderNr." telegrams are used to indicate the status of an input.

If the CAB releases a fader ("SET_FADER_READY*FaderNr."), the console indicates READY by illuminating LED 3. If the CAB blocks a fader ("RESET_FADER_READY*FaderNr."), LED 3 is switched off.

10.3.9 AUX mode

The CAB is able to switch AUX1 and AUX2 ON/OFF, as well as to control the AF/PF mode ("SET_FADER_AUX_MODE*FaderNr").

10.3.10 Text display

The console can display two lines of text (12 characters each) in the source label, if the channel is selected by the CAB system (SOURCE_SELECTION).

After power-on, the On-Air 2000 displays the input name of the selected source until the first "SET_FADER_DISPLAY_2" telegram is received from the CAB, which will overwrite the source label.

10.3.11 Input gain control

With "SET_FADER_INPUT_GAIN* FaderNr", the CAB is able to control the input gain of all inputs.

10.3.12 Pre-listening

Pre-listening can be activated either from the CAB or from the console (by pressing the PFL button of a channel ready for playback); refer to [section 10.3.8](#).

When pressing PFL button of a channel which has previously been selected by the CAB, the console sends to the CAB the telegram "SET_PRELISTEN_ON*FaderNr".

The CAB returns the "SET_PRELISTEN_ON*FaderNr" telegram to the console and starts playback of the corresponding channel to one of its outputs, which is connected to either a normal line input or to the external PFL input of the console.

While sending "SET_PRELISTEN_ON*FaderNr" telegram, the CAB can control the PFL function of a channel or of the Extern PFL input.

10.3.13 Billing

The On-Air 2000 console reports the status of each input line (“SOURCE_STATUS*Name”), if enabled (“SET_PROTOCOL”). This allows the CAB to generate a list containing information for program settlement.

SOURCE_STATUS*Name	Conditions
ON-AIR	Fader open Channel ON Input assigned to program/record bus *) } Channel active Console must be on-air (ON AIR input active)
ON	Fader open Channel ON Input assigned to program/record bus *) } Channel active
OFF	“Otherwise”
*) On-Air indication in COMMON SETTINGS page defines whether the SOURCE_STATUS of a channel is ON or ON_AIR, if the input is assigned only to the program bus, or if the input is assigned to the program or record bus.	

If billing is activated (“SET_PROTOCOL”), the console reports the “SOURCE_STATUS” of all the channels selected by the broadcast automation system (“SOURCE_SELECTION”).

10.3.14 Time synchronisation

The CAB is able to set the console's internal clock (time and date) if configured so in the Time & Date Format page (watch synchronization); refer to [section 12.2.5](#).

11 USER MODES

11.1 Purpose of user modes

The console is used in different studios with different working practices and different personnel structures. A large part of users in broadcast studios is not technically oriented. A mixing console meeting their requirements must be simple to use, reliable and free of “unnecessary” controls and displays. Setting of a wider range of console parameters, saving of console settings (snapshots), and modifications of the console configuration have to be left for technically more competent users (studio technicians, chief engineer). It is also necessary to protect parts of system data and give the permission to change them only to a restricted number of users. In order to satisfy these needs, the On-Air 2000 console supports individual user access rights.

Three classes of users are defined for the On-Air 2000; these are:

Default user:

- No password required;
- Private snapshots;
- Function access rights according to the configuration.

Administrator:

- Password-protected;
- Unlimited access rights to all functions;
- Defines new users;
- Defines access rights for the default user;
- Stores private snapshots for all (i.e. default and normal) users.

Normal user:

- Password-protected;
- Private snapshots;
- Function access rights according to the configuration.

The [table in section 11.2](#) shows the functions to which access is configurable in the On-Air 2000.

11.2 Access configurable functions of the console

Function description	Function name	Default user	Admini- strator	Normal user
<i>Loglist management</i>				
Accept an entry (delete entry from list)	acceptError	configurable	accessible	configurable
View the log list	showNxtError showPrevError	accessible	accessible	accessible
View the entry description and hints	<tbid>	accessible	accessible	accessible
<i>Aux Master</i>				
Inserts on AUX page	<tbid>	configurable	accessible	configurable
Aux 1 and 2 parameters	rotary function aux1on / off aux2on / off	configurable	accessible	configurable
<i>AUDIT master</i>				
AUDIT level on TEL N-1 AUDIT page	<tbid>	configurable	accessible	configurable
<i>N-1 master</i>				
N-1A and N-1B level on TEL N-1 AUDIT page	<tbid>	configurable	accessible	configurable
<i>Channel input parameters</i>				
Aux 1 parameters: Set channel input as AF for aux 1 Set channel input as PF for aux 1 Add channel input to aux 1 Remove channel input from aux 1 Aux 1 level	chAux1AF chAux1PF chToAux1On chToAux1Off rotary function	configurable	accessible	configurable
Aux 2 parameters: Set channel input as AF for aux 2 Set channel input as PF for aux 2 Add channel input to aux 2 Remove channel input from aux 2 Aux 2 level	chAux2AF chAux2PF chToAux2On chToAux2Off rotary function	configurable	accessible	configurable
Phase parameters: Set phase to invert Set phase to normal	phaseInv phaseNorm	configurable	accessible	configurable
Phantom parameters: Set phantom to ON Set phantom to OFF	phantomON phantomOFF	configurable	accessible	configurable
Stereo mode parameters: Set channel to stereo mode Set channel to mono mode Set stereo mode to LR Set stereo mode to LL Set stereo mode to RL Set stereo mode to RR	stereoMode monoMode stereoLR stereoLL stereoRL stereoRR	configurable	accessible	configurable
Gain/cal parameters:	rotary function	configurable	accessible	configurable
Pan/balance parameters:	rotary function	configurable	accessible	configurable
Sum selection: Add/remove chn to/from ON-AIR bus Add/remove chn to/from RECORD bus	toOnAir toRecord	configurable	accessible	configurable

Function description	Function name	Default user	Admini- strator	Normal user
EQ parameters: Switch EQ for this channel input on Switch EQ for this channel input off Set EQ high shelving corner freq. to low Set EQ high shelving corner freq. to high Switch high-pass filter off Switch high-pass filter on Set EQ low shelving corner freq. to low Set EQ low shelving corner freq. to high Switch phantom power off Switch phantom power on Set the low filter gain Set the peak filter corner frequency Set the peak filter gain Set the high filter gain	eqOff eqOn hiCutOffLowFreq hiCutOffHiFreq hpfOff hpfOn lfCutOffLowFreq lfCutOffHiFreq phantomOff phantomOn rotary function rotary function rotary function rotary function	configurable	accessible	configurable
<i>Channel common parameters</i>				
Input selection	displaySourcePageA/B selection	configurable	accessible	configurable
All other parameters		accessible	accessible	accessible
<i>Mixer setup</i>				
Delete selected global snapshot	deleteSnap	–	accessible	–
Create global snapshot/mic setting	readSnapName	–	accessible	–
Recall global snapshot/mic setting	recallSnapSett	accessible	accessible	accessible
Delete selected private snapshot	deleteSnap	–	accessible	accessible
Create private snapshot/mic setting	readSnapName	–	accessible	accessible
Recall private snapshot/mic setting	recallSnapSett	–	accessible	accessible
<i>User administration</i>				
Enter user administration		–	accessible	–
<i>System configuration</i>				
Display system configuration page	showSysConfPage	configurable	accessible	configurable

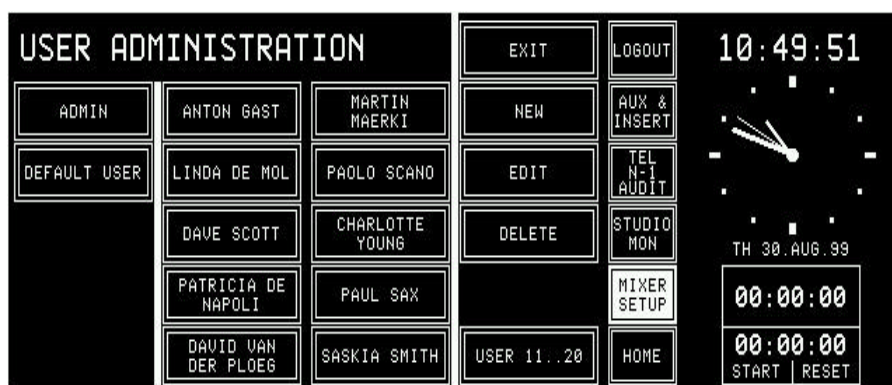
11.3 User administration

The described access permissions allow different functionality ranges to important console functions for each user. By assigning an appropriate access permission to each user, it is possible to fit the On-Air 2000 console to very different working environments.

This user administration is done with the help of a User Administration table that is part of the console configuration. This table can be edited by the Administrator only.

The users supposed to use the console with basic functionality do not need an account. To adjust the console to differently trained staff, it is possible to change the access permissions of the default user.

A user who wants to store his own, private data (snapshots/mic settings) must have an account containing his name, his access permission table and an optional password.

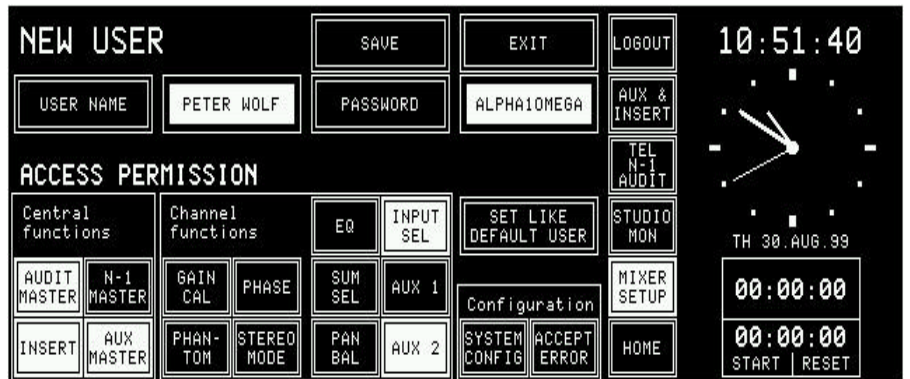


The USER ADMINISTRATION page can only be opened by the administrator, by touching USER ADMIN in the Mixer Setup page. ten users will be listed. With the USER 22..20 key, the administrator can list the remaining users. When the second block of users is displayed, the USER 22..20 key changes to USER 2..20.

11.4 Administration functions

By the administrator, a user record can be created (NEW), changed (EDIT), or deleted (DELETE).

Create user record: To create a new user record, touch NEW. The NEW USER page appears with empty input fields:



The USER NAME and PASSWORD fields are filled in, using the KEYBOARD page. The maximum length of the password is 22 characters. The user name may exist of up to 20 characters. If the new user is not accepted (e.g. because the user name already exists), an error message tells the administrator that the new user will not be registered. A name can be entered without a password, too.

Access permission is configured by touching the corresponding function keys on the NEW USER page. With SET LIKE DEFAULT USER, the access permission setting of the default user is copied to the user currently being edited and can subsequently be edited again. The new user record is stored with SAVE.

Two users are already predefined: the default user and the administrator; the can only be edited but not created or deleted.

Change user record: A user record is selected by touching the appropriate name key, followed by EDIT. The USER EDIT page, containing the user's individual data, appears. The data can be edited in the same way as described above, except that the user name is displayed but cannot be modified. The only way to rename a user while preserving his snapshots and mic settings is to save them to a PC-card, delete the user, create a new one with the desired name, and then reload the snapshots and mic settings from the card. After pressing SAVE the old record is replaced by the new one. This procedure has to be performed this way in order to avoid name conflicts in the console's memory and on the PC-card.

When editing the default user, the USER EDIT page looks similar except that no password field and key are displayed.

When editing the administrator, the USER EDIT page neither displays the access permission keys nor the USER NAME field and key, but the password field and key is enabled.

Delete user record: To delete a user record from the user administration table a record must be selected by touching the desired name key. A dialog box appears; if deleting the user is confirmed there, the selected user is definitively removed from the memory, and the user record disappears from the USER ADMINISTRATION page.

11.5 Log-in procedure and defaults

The console always starts up in default mode. If the user is a registered user, and if he wants to work in his own environment, he must log-in. He has to touch the LOGIN button on the Mixer Setup page. The LOGIN page will appear where the user can touch the button with his own name.



The system checks whether a password is defined for this user. If this is the case, he has to enter his password on the Keyboard page. If the password is correct, the system automatically returns to the page on which the user pressed the LOGIN button. If the password is not valid, a dialogbox will appear on the Login page telling the user that the password was not correct. The user can leave the Login page via the EXIT button which brings him back to the Mixer Setup page.

If no password is defined for a user, the system does not show the keyboard page after a touch on a name field in the Login page. The system directly jumps back to the page where the LOGIN button was touched. As the system does not check for a password in this case, any other user can access a user's private data which are not password-protected.

If a console is operated by one person only, the Administrator simply has to enable all access rights for the default user. This is the way the user can control all console functions (except the administration functions) without having to log-in.

A default user is always defined in the User administration table. His name is DEFAULT USER. The access permissions of this user can be edited, but the record cannot be deleted, and no login code can be defined for this user.

12 CONFIGURATION

In order to meet the requirements for different studio environments, the On-Air 2000 is highly configurable.

Depending on the connected audio equipment, different input and output modules must be installed. Some optional modules (Time Sync, RS232/422, Clock Sync, etc.) can also be installed to allow for extended functionality. All these hardware modules are automatically detected by the On-Air 2000 software.

According to the installed hardware modules, the system offers corresponding software configuration options. This software configuration is described in this chapter.

A configuration is “static”, which means that it cannot be changed during normal operation. Although snapshots rely on a certain configuration, the configuration data are not stored together with the snapshots. Therefore, snapshots can not change the console configuration.

12.1 Configuration handling

At system startup, each installed module is identified. The list of detected modules is compared with the list of modules which had been installed at the last power-down. If a hardware configuration change is found, a message is displayed in the central screen. This is very important, since e.g. snapshots may not be compatible if the type of an input module has changed.

Hardware configuration can only be changed if the console is switched off. *Modules must not be replaced or added while the console is running; “hot-patching” of modules will make the system hang.*

Software configuration can be changed by the administrator, or by any user with access right to the SYSTEM CONFIG. page. Software configuration includes data for:

- Channel labels
- Control signal modes
- Nominal input levels
- Level meter assignment, etc.

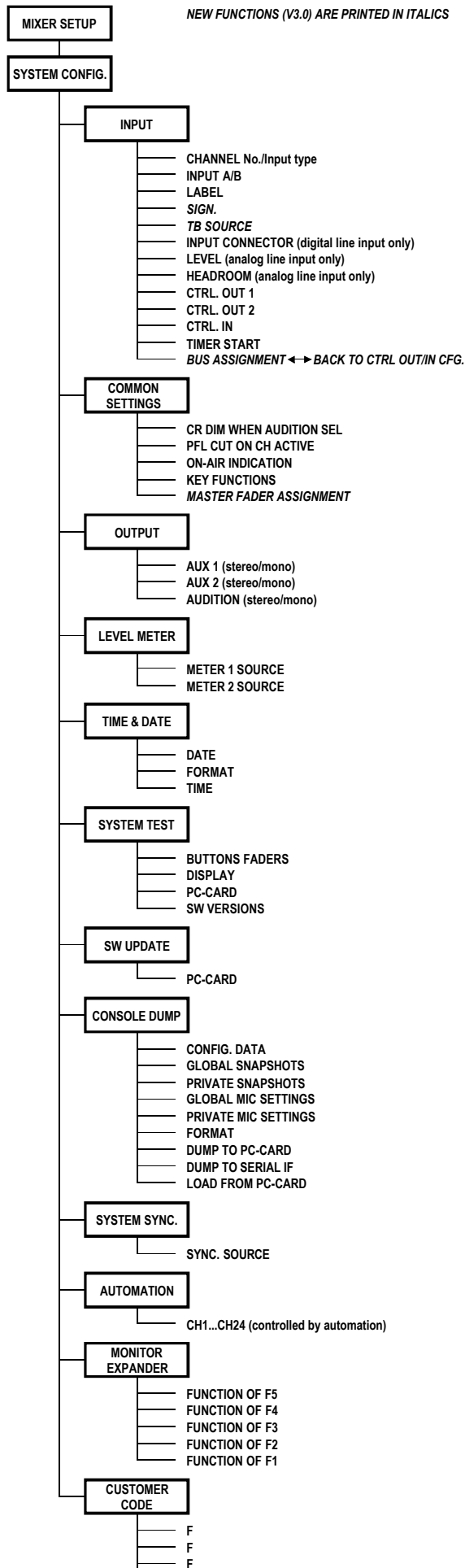
An On-Air 2000 configuration can be stored on a PC-card, or loaded from the PC-card into the console.

12.2 Configuration procedure



Configuration of a console can be changed in the SYSTEM CONFIG. page. The SYSTEM CONFIG. page can be reached from the Mixer Set-up page by an operator with an administrator permission.

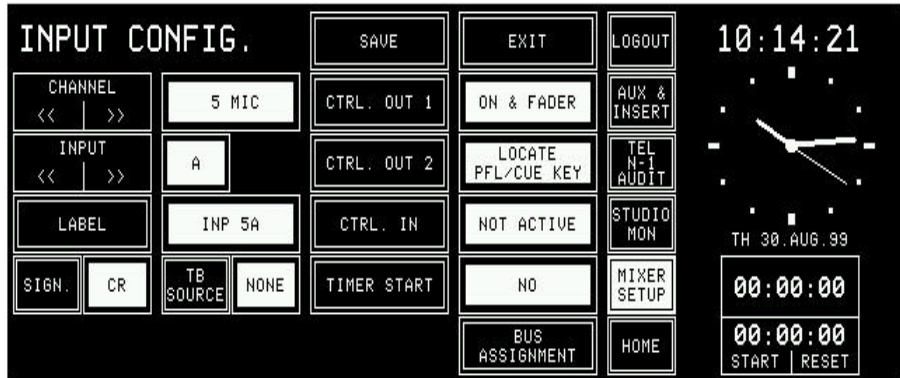
The configuration parameters are subdivided in groups. Each group can be edited on a separate page accessed from this page.



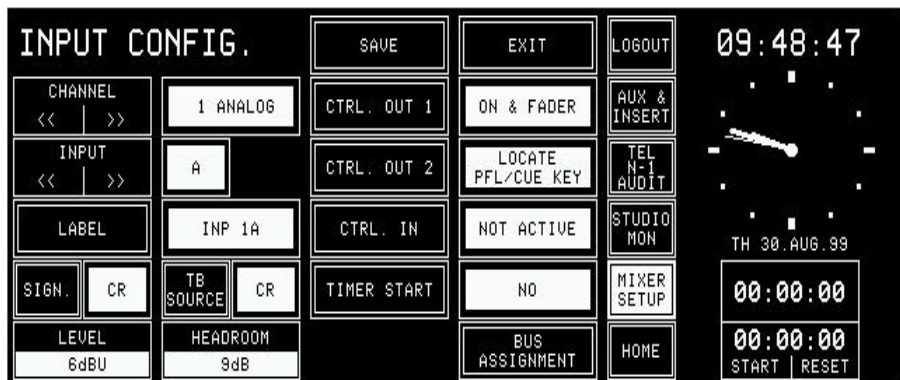
12.2.1 Input

There are three slightly different INPUT CONFIG. pages for editing input configurations depending on the type of input module identified by the hardware. The pages for microphone, analog line, and digital line input types are shown below.

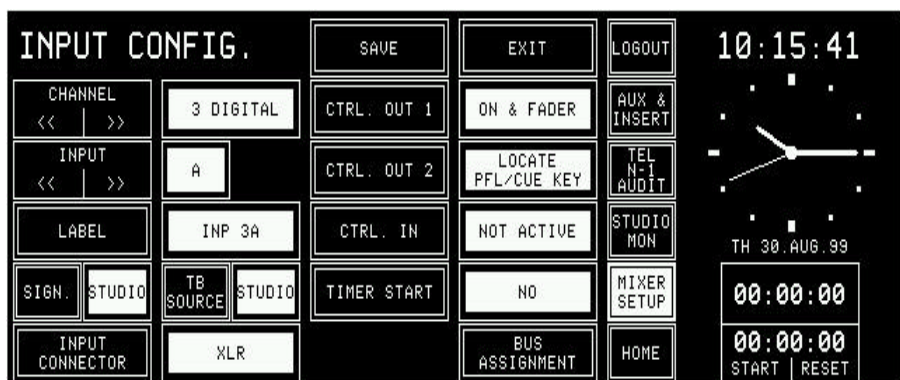
Microphone input



Analog line input



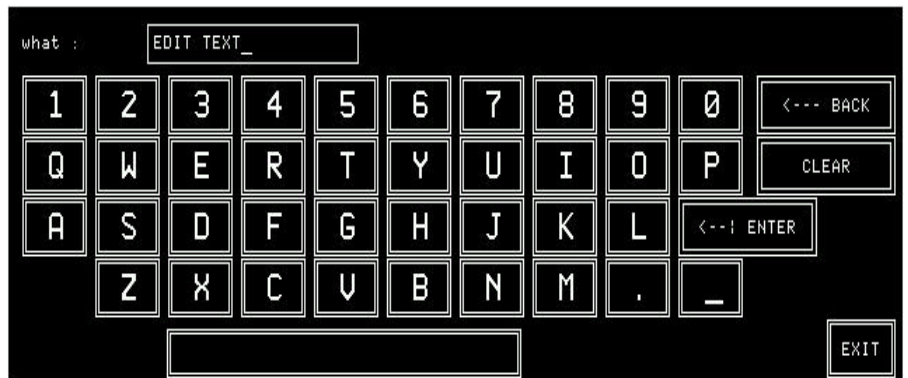
Digital line input



Channel and input are selected with the CHANNEL and INPUT forward (>>) and backward (<<) buttons. Channel and input can also be selected by touching the Label field of a channel. The display will show the current configuration data for the selected input and channel. For changing a parameter the corresponding button must be pressed; it will change to the next possible value. Consecutive pressing toggles through the available options.

Exceptions from this rule are the LABEL, LEVEL, and HEADROOM fields. Pressing the LABEL button will open the KEYBOARD page where an input label can be edited; the values in the LEVEL and HEADROOM fields (analog line inputs only) can be adjusted with the rotary encoders next to these fields.

LABEL: The LABEL field is used for giving a name to a channel. Touching this field, the keyboard screen opens.



The source label field on the channel screen can display long labels (up to 12 characters), while the input selector fields can display only short labels (up to 6 characters).

The following rules apply to the display of the labels in the buttons:

The upper line contains the first word plus every following word which completely fits into the field. If the first word is longer than 6 or 12 characters, it is cut after 6 or 12 characters. The lower line is filled up with as many characters (6 or 12) as possible, i.e. the last word is cut if it does not fit completely into the button. The separation character is the space character. If the label consists of one long word only, it is cut after 6 or 12 characters and displayed on one single line. The following table illustrates the different possibilities:

Name	Short label	Long label
ABC 12	ABC 12	ABC 12
ABC 1234	ABC 1234	ABC 1234
ABCDEFGH 1234567	ABCDEFGH 123456	ABCDEFGH 1234567
ABCDEFGH 1234567 ABC	ABCDEFGH 123456	ABCDEFGH 1234567 ABC
ABC EFGHIJK MN 1234	ABC EFGHIJ	ABC EFGHIJK MN 1234
ABC EFGHIJKLMN 1234	ABC EFGHIJ	ABC EFGHIJKLMN 1

When completed, press ENTER followed by SAVE (to keep the changes) or EXIT (to cancel without changes).

SIGN. / TB SOURCE: Starting with software version V3.0, talkback and signaling can be configured individually. In earlier versions, these settings were allowed for microphone inputs only (there, this function was called “MIC LOCATION”). SIGN. is used for signaling (red light) and monitoring (cut and dim), the available options are NONE, CR, and STUDIO.

The TB SOURCE parameter in the INPUT CONFIG. page sets the assignment of the input to the TB bus (NONE, from CR, or from STUDIO).

During talkback from the studio, the studio speakers are dimmed only if at least one input is configured as SIGN. = STUDIO and TB SOURCE = STUDIO. The same applies for talkback from the control room.

INPUT CONNECTOR: (Digital input modules only)
Each (A and B) input of a digital input module has three different input connectors (XLR, RCA/Cinch, and optical/TOSLINK). This option selects which connector is used for the A and the B inputs independently.

LEVEL: (Analog line input modules only)
“Level” is the nominal studio level expressed in dBu.

HEADROOM: (Analog line input modules only)
“Headroom” is the difference between the A/D converter's clipping level and the nominal studio level.

Example: An input with a level setting of +6 dBu and a headroom setting of 9 dB will accept a +15 dBu signal before the A/D converter comes into overload.

CTRL. OUT 1/2: Please refer to [section 9](#) for more information on this subject.

CTRL. IN: Please refer to [section 9](#) for more information on this subject.

TO N–1 A/B, TO AUDIT: By setting these fields to ON, the input signal is routed to the corresponding N–1 (A and/or B) or audition bus. The audition bus is similar to the N–1 busses, but it is a stereo bus which can be selected as a monitoring source in the control room.

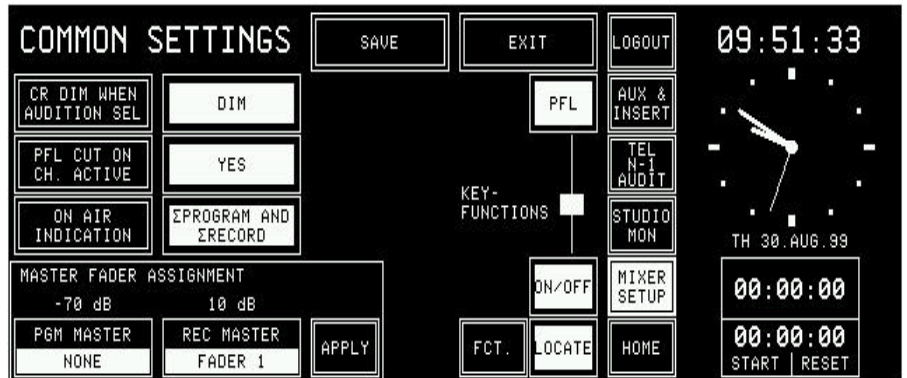
Talkback to the audition bus is possible only on the analog outputs of the optional monitoring extension.

Configuration for N–1A, N–1B, or AUDIT:

Setting	Meaning
NEVER	The channel is never routed to N–1 or AUDIT
WHEN PG/REC	The channel is routed to N–1 and/or AUDIT if the channel is either assigned to the program or to the record bus
WHEN PGM	The channel is routed to N–1 and/or AUDIT if the channel is assigned to the program bus
WHEN REC	The channel is routed to N–1 and/or AUDIT if the channel is assigned to the record bus
ALWAYS	The channel is always routed to N–1 and/or AUDIT, regardless of the bus assignment

TIMER START: If TIMER START is set to YES, the fader stop watch will be started/reset by the corresponding fader, if the channel is ON and the fader is opened.

SAVE / EXIT: The Input Configuration must be saved for each channel. If the user switches to a different channel, a dialog box will call her/his attention to the fact that the changes will be cancelled if she/he does not save the current Input Configuration. The program remains in the Input Configuration page when saving a channel. Changes which have been saved once will not be cancelled when leaving the Input configuration page with EXIT.



12.2.2 Common settings

The COMMON SETTINGS page contains the following configuration possibilities:

CR DIM WHEN AUDITION SEL: When the Audition bus is selected as a CR monitoring source, and a CR microphone channel is ON, the CR monitor speaker level will be attenuated (DIM), muted (CUT), or nothing happens at all (DON'T CARE).

PFL CUT ON CH. ACTIVE: If YES is selected, the signal of a channel is taken off the PFL bus when the channel is ON, although the PFL function is active (the PFL function remains active).

ON AIR INDICATION: Three possibilities are available: ΣPROGRAM, ΣRECORD, or ΣPROGRAM AND ΣRECORD. The ON-AIR signaling is only active if at least one channel is ON, if this channel's fader is open, and if this channel is assigned to the selected bus (ΣPROGRAM, ΣRECORD, or either of them). In conjunction with automation, ON-AIR is indicated in the input selection field of the channel selected by the automation system. FADERSTATUS is ON-AIR if the input is assigned to the selected bus (ΣPROGRAM, ΣRECORD, or either of them). SOURCE_STATUS is ON or ON-AIR, respectively, if the input is assigned to the selected bus (ΣPROGRAM, ΣRECORD, or either of them).

KEY FUNCTIONS: Functions of the channel keys labeled ON and OFF. The ON key either switches the channel ON or has an ON/OFF toggle function, depending on the function selected for the OFF key.

If the OFF function is selected for the OFF key, the channel is switched off by pressing this key; if LOCATE is selected, the ON key function automatically changes to a channel ON/OFF toggle function (also refer to [sections 9.2 and 9.3](#)).

Note: For information on the MASTER FADER ASSIGNMENT field, please refer to [section 5.13](#).

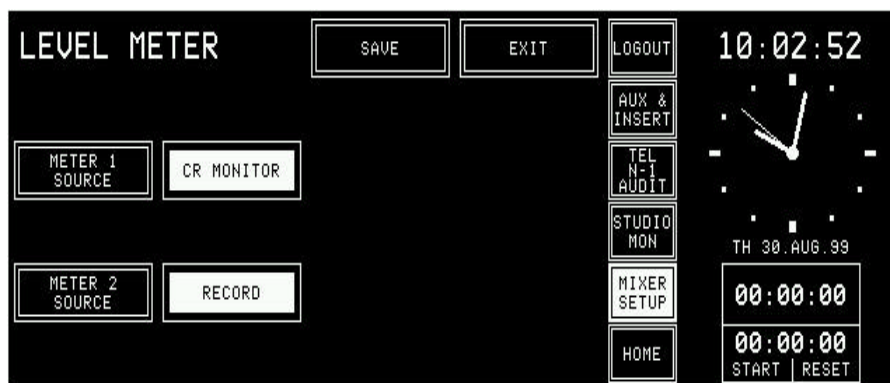
12.2.3 Output

On the OUTPUT CONFIG. page the types of the output signals on the AUX 1, AUX 2, and AUDITION busses can be set.



12.2.4 Level meter

The LEVEL METER configuration page defines the signal sources for the level meters no. 1 and no. 2.



The available signal sources are:

METER 1 SOURCE CR MONITOR, PROGRAM, RECORD, AUX 1, AUX 2, AUDIT, N-1 A.

METER 2 SOURCE CR MONITOR, PROGRAM, RECORD, AUX 1, AUX 2.

12.2.5 Time & date

The watch gives a permanent time, day of week, and date display. The normal time reference is an internal battery-buffered real-time clock (RTC). The RTC continues to run even when the console is switched off. Therefore it is unnecessary to set the watch at power-up. The RTC can also be synchronized by an optional TimeSync Module connected to the control module bus, or to the automation input using an RS232C line. If the synchronization is established, the top right corner of the central screen shows an “S” (sync OK).

Changes to the time or date settings are made on the TIME page. Access permission to the SYSTEM CONFIG. page is required.

From the HOME page, this page is found by selecting MIXER SET-UP, followed by SYSTEM CONFIG., TIME & DATE, and TIME.

An example of the TIME page is given below.



The hours, minutes, and seconds are adjusted with three of the rotary encoders. By touching the “SAVE” button, the parameters are updated. If they are invalid, the parameter changes are ignored.

The DATE page is shown below. This page is displayed by touching the “DATE” button on either the TIME or the FORMAT page.



The day of the week, month, and year is adjusted with three of the rotary encoders. By touching the “SAVE” button, the parameters are updated. If they are invalid, the parameter changes are ignored.

The watch configuration is done in the TIME & DATE FORMAT page. This page is displayed after touching the “FORMAT” button on either the TIME or the DATE page.



Both time and date can be displayed in two formats (select with TIME FORMAT or DATE FORMAT, respectively), as shown below:

Time format	Digital time indication
12:00 p.m.	12 hour time format
24:00	24 hour time format

Date format	Example
DD.MMM.YY	MO 20.MAR.95
MMM-DD-YY	MO MAR-20-95

TIME SYNC. defines the means to set and maintain time and date. The following settings are available:

Time sync	Sync reference	Date setting	Time setting
INTERNAL	Internal quartz	By user	By user
TIME SYNC. MODULE	Internal quartz, periodically updated by the time reference signal	By user, periodically reset by ext. time reference (century never overwritten by ext. sync module)	By user, periodically reset by external time reference
AUTOMATION	Internal quartz, periodically updated by automation time reference	By user, periodically reset by automation time reference	By user, periodically reset by automation time reference

Time sync selection is always possible, even if no Time Sync module is installed. In this case the RTC will simply never receive a sync command.

The time zone offset can always be set, regardless whether it makes sense to set an offset in conjunction with the time sync source or not.

Offset	Watch function
-12:00 ... +12:00 (resolution: 1 hr)	Compensates the sync time by the given offset before setting (synchronizing) the internal watch.

12.2.6 System test

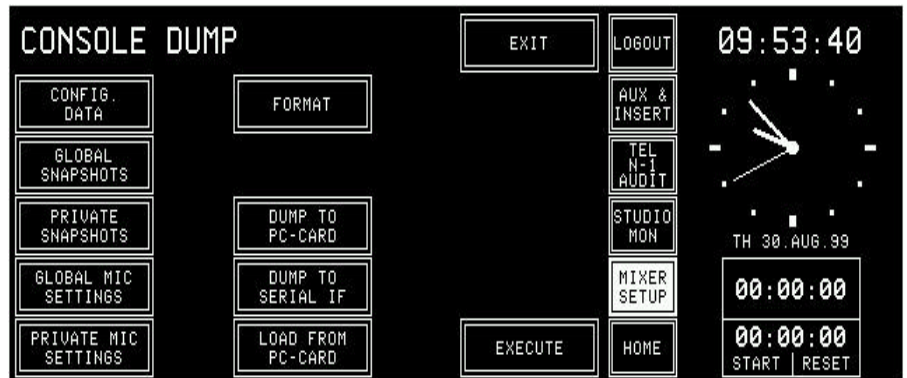
More information on this subject can be found in [section 14](#).

12.2.7 Software update

More information on this subject can be found in [section 13](#).

12.2.8 Console dump

A “console dump” consists of configuration data (CONFIG. DATA), snapshots (global and private), and mic settings (global and private).



The CONSOLE DUMP page allows the user to store mixer set-up data on a PC-Card, to send them to the serial port, or to load mixer set-up data from a PC-Card. This feature can be used for back-up purposes, for copying data from one console to another, or for diagnostics. A PC-Card can contain one console dump only. It is possible to dump or to load the mixer set-up data completely or partially only. The selection is done with the CONFIG. DATA, GLOBAL and PRIVATE SNAPSHOTs, GLOBAL and PRIVATE MIC SETTINGS buttons. The function can then be selected with the buttons in the center of the page and is executed by touching the EXECUTE button.

Before dumping any data, the PC-Card has to be formatted. This can be done in the lower one of the two slots (slot 0). Touch FORMAT followed by EXECUTE. A dialog box appears where the user can confirm the formatting (i.e. erasing the card completely). While formatting, the FORMAT button flashes.

When loading data from the PC-Card, the console data will be overwritten. Therefore this procedure has to be confirmed in a dialog box.

The EXIT button returns to the SYSTEM CONFIG. page.

A configuration is loaded into the console by selecting CONFIG. DATA, LOAD FROM PC-CARD, and EXECUTE.

An error message is displayed if the configuration cannot be loaded completely (e.g. Channel Type Mismatch).

Snapshots are loaded into the console by selecting GLOBAL (or PRIVATE) SNAPSHOTs, LOAD FROM PC-CARD, and EXECUTE. Snapshots existing in the console will be overwritten.

Microphone settings are loaded into the console by selecting GLOBAL (or PRIVATE) MIC SETTINGS, LOAD FROM PC-CARD, and EXECUTE. Mic settings already existing in the console will be overwritten.

12.2.9 System synchronization

On this page the system synchronization is configured. The synchronization source can be internal or external; for an external source the sync signal type must be defined.



All possible sync modes are listed below. If the optional clock sync module is not installed, only INTERNAL can be selected.

Sync source	Sampling rate
INTERNAL 48 kHz	48 kHz \pm 100 ppm default, or 48 kHz, precision adjustable on sync module (if installed); adjustment range approx. \pm 1000 ppm
WORDCLOCK 32/44.1/48 kHz	32/44.1/48 kHz
AES/EBU 32/44.1/48 kHz	32/44.1/48 kHz
VIDEO 25 FRM/S 48 kHz	48 kHz
VIDEO 30 FRM/S 48 kHz	48 kHz
VIDEO 29.97 FRM/S 47.952 kHz	47.952... kHz
VIDEO 29.97 FRM/S 48 kHz	48 kHz

Note: The On-Air 2000 is designed to run at a sampling rate of 48 kHz. Due to this fact, filter parameters are accurate at 48 kHz only. If the console is synchronized to 44.1 kHz, the actual center and takeover frequencies of the EQ are lower by 8.125 %; if the clock frequency is 32 kHz, the frequencies will be lower by approx. 33.3 %.

If the console is synchronized to an external signal, a message box is displayed if synchronization is lost; a “Missing External Clock” warning is added to the error list.

If the console was synchronized to either WORDCLOCK or AES/EBU and a “no sync” condition is detected, the console automatically selects the INTERNAL mode; however, the external clock selection in the SYSTEM SYNC page is not changed. As soon as a valid external clock signal is available, the console will be re-synchronized.

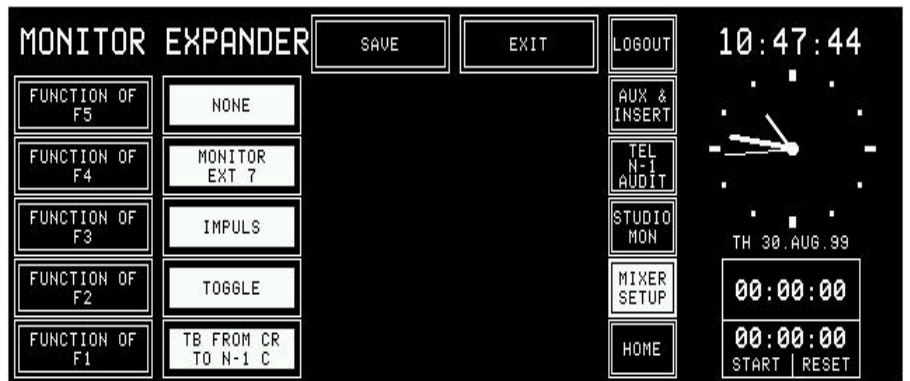
If synchronization to a video source is lost, only a message box is displayed. The sync source remains in VIDEO mode.

If the Clock Sync module is removed, sync source selection changes to INTERNAL mode, and no other sync source can be selected.

12.2.10 Automation

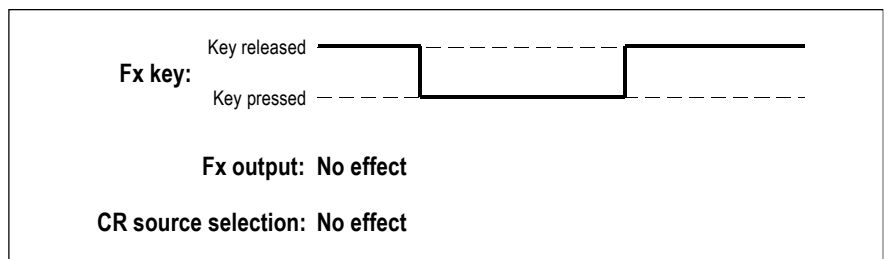
More information on this subject can be found in [section 10](#).

12.2.11 Monitor expander (optional)

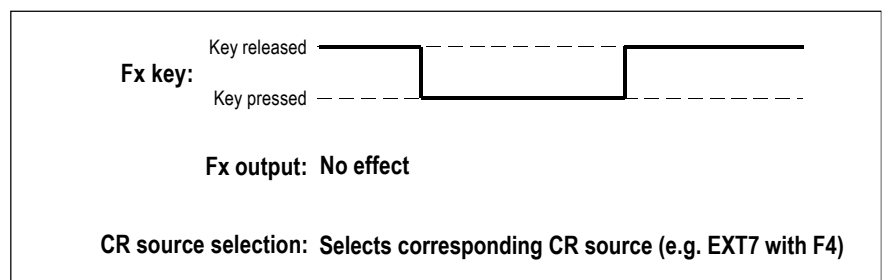


The MONITOR EXPANDER page allows to configure the functionality of the F1...F5 keys. The different possible functions are described below and refer to the screenshot above. *Additional information on the monitor expander can be found in the block diagram, see [section 15.13](#).*

NONE If one of the F1...F5 keys is configured to NONE, pressing this key has no effect at all – neither for the F1...F5 output, nor for the CR source selection. The key LED is not illuminated unless the system is in test mode.

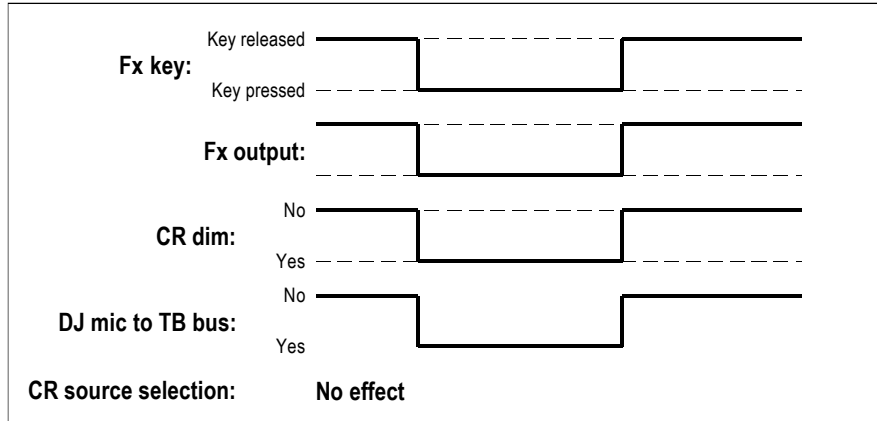


MONITOR EXT 7 According to the first table in [section 7](#), each of the F1...F5 keys is related to one of the external control room monitoring inputs. In our example, F4 is configured to act as CR monitoring selector with EXT7 being the corresponding input. The key LED is on if the corresponding source is selected.

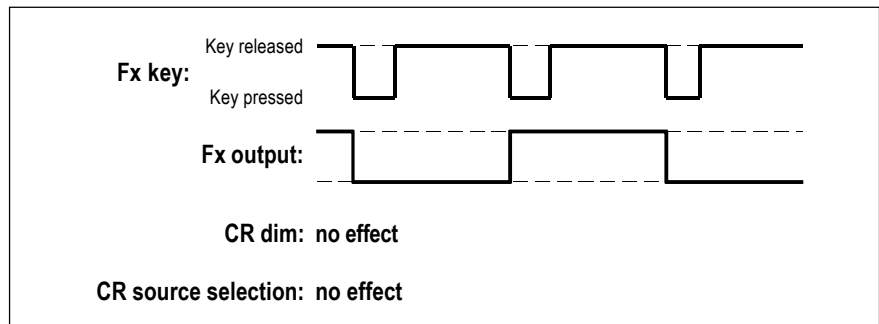


The relationship between the F1...F5 keys and the EXT4...8 inputs is given through hardware wiring. The table in [section 7](#) gives information on the default wiring.

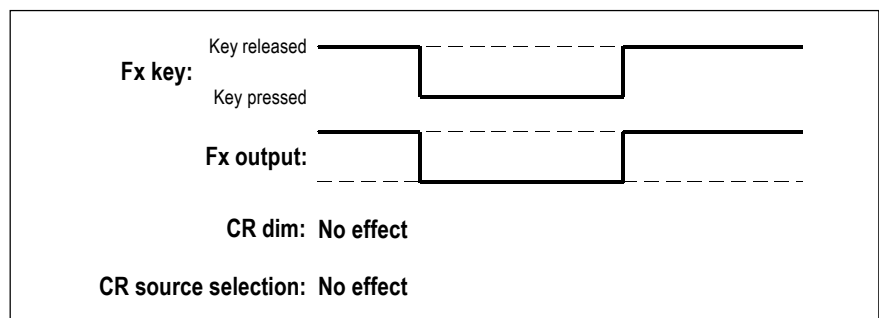
TB FROM CR TO... If an F1...F5 key is configured as «TB FROM CR TO...», the output is active as long as the key is pressed, the CR monitor speakers are dimmed, and all microphone inputs with mic location equal to DJ mic are routed to the TB bus. The key LED is on as long as the key is pressed.



TOGGLE If an F1...F5 key is configured as «TOGGLE», the output changes its status each time the key is pressed. Neither the CR monitoring level nor the CR source selection are affected. The key LED is on for as long as the output is active.



IMPULS If an F1...F5 key is configured as «IMPULS», the output is active for as long as the key is pressed. Neither the CR monitoring level nor the CR source selection are affected. The key LED is on for as long as the key is pressed.



12.2.12 Customer code

Starting with software version 2.0.1, there is a possibility to activate optional, customer-specific functions as, for instance, the hex source selector fields on the touch-panel of the channel strip. For this purpose, a feature called Customer Code is used.

Customer Code: 0x000000 – default setting

Customer Code: 0x000001 – permanent hex input selection

For permanent display of the hex input selection field in the channel screen, refer to [section 4.4.1](#).

Customer Code: 0x000002 – high shelving filter modification

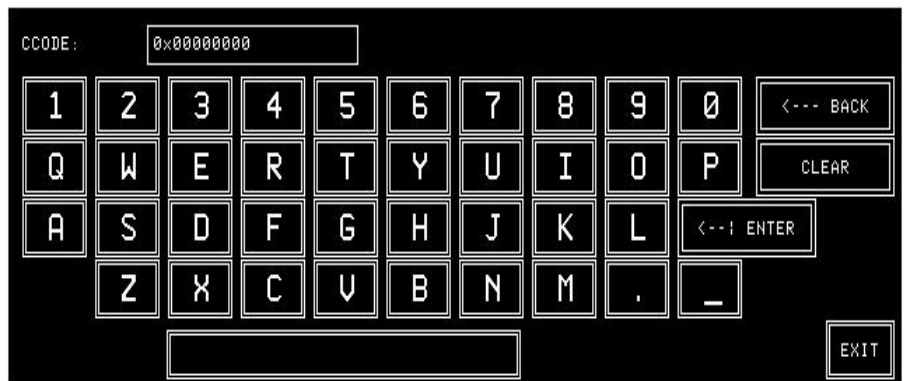
When selected, the turnover frequency of the high-shelving filter is reduced by approx. one octave, resulting in increased filter effect. For more information on the equalizer and the filters, please refer to [sections 4.4.5 and 4.4.6](#).

Customer Code: 0x000004 – external CR DIM function

The spare control input on the Monitoring Module (“SIGN.” connector P4, 9-pin D-type) can be used as CR DIM control input. If activated by an external control signal, the CR monitor speakers are attenuated by 20 dB.

Please refer to the pin assignment table and connection diagram in [section 15.12](#).

Setting: After touching CUSTOMER CODE on the SYSTEM CONFIG. page, the KEYBOARD page appears where the new code can be entered.



After confirmation with ENTER, the following dialog box appears. Now, you can either re-boot the system (REBOOT) which is necessary for the new code to become active, or continue and ignore the code modification (CONT.):



Customer Code combinations: If more than one of the Customer Code functions is desired, the corresponding codes can be accumulated by entering the sum of the code numbers. For entering, e.g., activation of the hex source selection on the channel screen (code 0x00000001) and the external CR DIM function (code 0x00000004), enter a Customer Code sum of 0x00000005.

13 SW UPDATE

13.1 Software structure

The On-Air 2000 software consists of the following packages:

- CPU software
- DSP software
- Peripheral modules and surface control software.

13.1.1 The CPU software package

Boot software

The boot software part is installed in an EPROM and consists of:

- Hardware initialization
- Elementary hardware tests
- Start-up (or loading) of the application.

Application software

The application part of the software package covers the remaining console functions. Program and data (current status, snapshots, configuration...) remain stored in memory after power-off, so that neither program nor data have to be loaded during normal operation. This is achieved by using a Flash memory.

The application software is loaded at the first start-up of the console (in the factory), and afterwards due to new releases and upgrades only. Program and data are installed in a Flash memory.

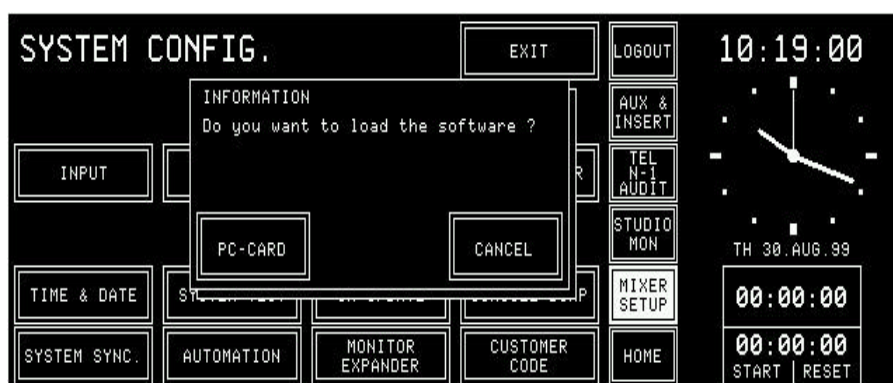
The application software is loaded from PC-Cards. For this purpose, read-only cards can be used.

13.1.2 DSP software package

The DSP software package is treated the same way as the CPU software package (application software).

13.2 SW update procedure

After touching the SW UPDATE button in the SYSTEM CONFIG. page, a dialog box appears, where the user can decide whether he wants to load the software (PC-CARD), or whether he wants to stop the software update procedure (CANCEL). When cancelling the software update, the program returns to the SYSTEM CONFIG. page.



After touching the PC-CARD button in the dialog box, the next dialog box appears.



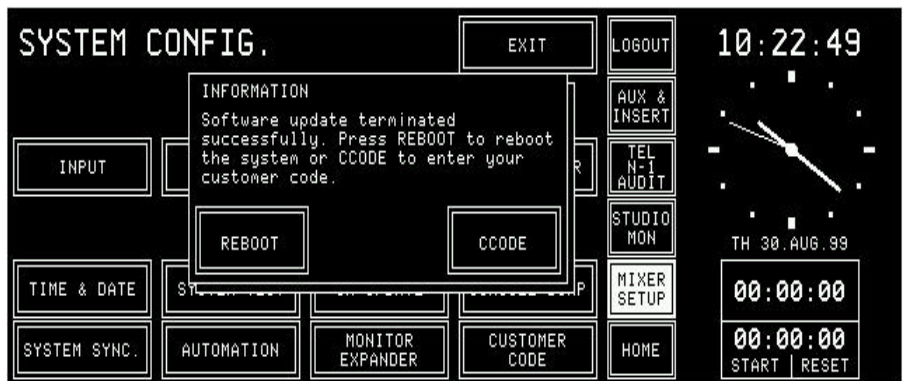
As soon as the software has detected a PC-Card in slot 0, the card is checked. If the PC-Card contains valid code, the software download procedure starts. In a first step, the previous program of the console is erased.



After some seconds the new software is copied from the PC-Card into the console's Flash EPROM. This will take several minutes.

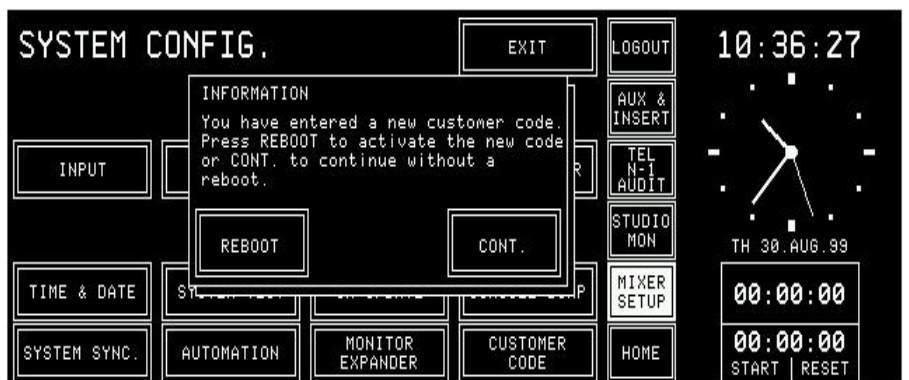


Finally the last dialog box appears. The system can now be re-booted (REBOOT) with the new software, or, if required and available, an optional customer code (CCODE) can be entered.



Any customer code will be reset to the default value (0x00000000) when updating the system software. This means that if your system had a customer code before, you should enter it again in order to have the particular features again. If in doubt, please consult your Studer distributor.

After having entered a customer code (see [section 12.2.12](#)), the following page appears where it is possible to re-boot the system (REBOOT) or to continue without re-booting (CONT.):



13.2.1 Error handling PC-Card update

If the software update is interrupted by any reason, the system has to be rebooted. Afterwards, a message box appears with the message that the system software has to be updated.



Should the PC-Card not contain valid code, the following dialog box appears. The system returns to the SYSTEM CONFIG. page after touching the OK field.



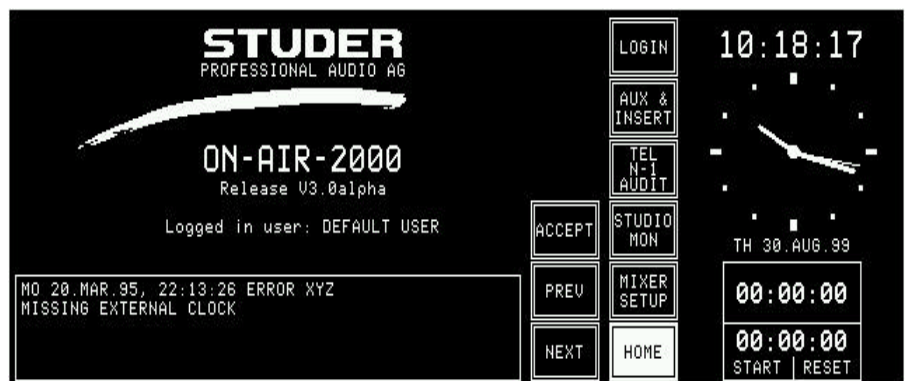
14 SYSTEM DIAGNOSTICS AND ERROR HANDLING

The On-Air 2000 error system concept consists of three topics:

- | | |
|--|---|
| System diagnostics and error handling | The system diagnostics software works completely in background. The user takes notice of the diagnostics only in case of an irregularity. The system diagnostics consists of finding out the console's hardware configuration and detecting discrepancies to the system configuration. It also effects a hardware performance check during power-up. The error handling describes indications and actions on occurrence of errors and irregular behaviour of the console detected by the system diagnostics software. |
| Indication on failure of restricted functions | Most of the On-Air 2000's functions do not have any restriction. However, there exist several functions which are restricted in some situations, e.g. loading a snapshot into a console the channel types of which do not match the ones of the snapshot (Mic/Line Inputs). The behaviour of the console in case of restrictions is defined at the place where the function is described. The way the user is told about failures is defined globally in the following. |
| System tests | They are executed on the service engineer's demand to run some specific performance controls, e.g. to check the function of touch fields and faders. The console is switched to a special test mode for this purpose. |

14.1 Error, warning, and information messages

A message bar on the HOME page is used by the system diagnostics software to indicate any messages. This indication is available in all four modes.



There are three types of messages: *Errors*, *Warnings*, and *Information*.

- | | |
|--------------------|--|
| Errors | are serious problems detected by the diagnostics software. Error messages are generated if a problem prevents the console from normal operation. In case of an error, the error handler cannot solve the problem. |
| Warnings | are given to the user if the action required by the occurrence of a problem automatically changes any settings of the console so that operation is no longer the same, e.g. if the input type of a channel has changed since last power-off. |
| Information | An Information type message is used by the system diagnostics telling the user that an action required by any conflict automatically changes console |

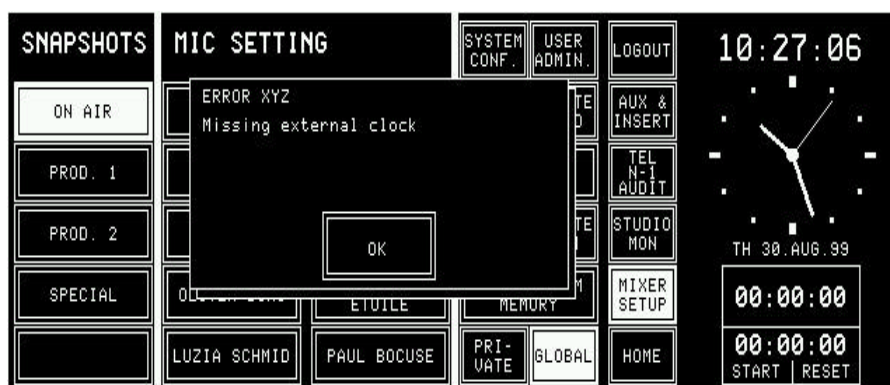
settings, but the console can at least be operated as it could before (e.g. if a 6-channel module has been added).

As more than one system message can occur at the same time, the diagnostics software manages a Log List containing one entry for each system message, completed by time and date of occurrence. If the Log List contains more than one entry, the PREV and NEXT fields appear on the central screen. This allows scrolling through different messages.

The Log List will be lost on power-down.

Warning and information messages can be acknowledged by the user, provided she/he has got access permission. This causes the diagnostics software to remove the message from the Log List.

Some entries in the Log List need to be indicated to the user immediately on their occurrence. A dialog box does this, regardless of the currently selected central screen.



System diagnostics is performed during power-up as well as during operation. For more information see [sections 14.1.1 and 14.2](#).

14.1.1 System diagnostics

- Hardware Performance Control** On power-up the diagnostics software executes some hardware device checks which may result in conflicts.
- Communication Check** On power-up the diagnostics software tries to establish communication to other microprocessors. If communication fails, an error message is displayed.
- Configuration Check** On power-up the diagnostics software finds out the current physical hardware configuration. Any difference to the hardware configuration before the last power-down (missing or additional options) results in a warning or information.

Diagnostics and Error Handling – System Configuration Detection				
Error ID	Type	Indication	Diag. Box	Error Text (Conflict)
000	Information	no	no	Module for Channels [n] - [m] installed!
001	Information	yes	no	Module for Channels [n] - [m] added!
002	Warning	yes	no	Module for Channels [n] - [m] removed!
003	Information	no	no	Central Module installed!
004	Information	no	no	Central Module added!
005	Error	yes	yes	No communication to Central Module!
006	Information	no	no	Input Module for Channel [n] installed!
007	Information	yes	no	Input Module for Channel [n] added!
008	Warning	yes	no	Input Module for Channel [n] removed!
009	Information	yes	no	Channel [n] Input Type changed to Mic Input!
010	Information	yes	no	Channel [n] Input Type changed to Analog Line Input!
011	Information	yes	no	Channel [n] Input Type changed to Digital Line Input!
012	Information	yes	no	Channel [n] Input Selector changed to A/B!
013	Information	yes	no	Channel [n] Input Selector changed to 1/2/3/4/5/6!
014	Information	no	no	Digital Output Module for [output] installed!
015	Information	yes	no	Digital Output Module for [output] added!
016	Warning	yes	no	Digital Output Module for [output] removed!
017	Information	yes	no	Insert [n/m] Input Type changed to Analog Line Input!
018	Information	yes	no	Insert [n/m] Input Type changed to Digital Line Input!
019	Information	no	no	Monitoring Module installed!
020	Information	yes	no	Monitoring Module added!
021	Error	yes	yes	No communication to Monitoring Module!
022	Information	no	no	Time Sync Module installed!
023	Information	yes	no	Time Sync Module added!
024	Warning	yes	no	Time Sync Module removed!
025	Information	no	no	Insert [n/m] Module installed!
026	Information	yes	no	Insert [n/m] Module added!
027	Warning	yes	no	Insert [n/m] Module removed!
028	Information	no	no	Sync Module installed!
029	Information	yes	no	Sync Module added!
030	Warning	yes	no	Sync Module removed - Now Running on 48 kHz internal Clock Reference!
031	Information	no	no	Telephone Hybrid Control Module installed!
032	Information	yes	no	Telephone Hybrid Control Module added!
033	Warning	yes	no	Telephone Hybrid Control Module removed!
034	Information	no	no	Channel DSP for Channel [m/n] installed!
035	Information	yes	no	Channel DSP for Channel [m/n] added!
036	Warning	yes	yes	No communication to Channel DSP for Channel [m/n]!
038	Information	yes	no	Number of Channels increased to [n]!
039	Warning	yes	no	Number of Channels decreased to [n]!
040	Information	no	no	Profanity Delay Module installed!
041	Information	yes	no	Profanity Delay Module added!
42	Warning	yes	no	Profanity Delay Module removed!
043	Information	no	no	Sum DSP installed!
044	Warning	yes	yes	No communication to Sum DSP!
045	Information	no	no	Insert DSP installed!
046	Warning	yes	yes	No communication to Insert DSP!
047	Information	no	no	Aux DSP installed!
048	Warning	yes	yes	No communication to Aux DSP!

Diagnostics and Error Handling – Hardware Performance				
Error ID	Type	Indication	Diag. Box	Error Text (Conflict)
051	Warning	yes	yes	Watch RTC Failure! - RTC Device Missing - Device Faulty - Battery Low
052	Warning	yes	no	Missing External Clock - Now Running on 48 kHz internal Clock Reference!
053	Warning	yes	no	Missing External Video Clock

Diagnostics and Error Handling – Flash Checksum Tests				
Error ID	Type	Indication	Diag. Box	Error Text (Conflict)
56	Warning	yes	yes	Flash Verification - Console Configuration corrupted!
57	Warning	yes	yes	Flash Verification - Current Console State corrupted!
58	Warning	yes	yes	Flash Verification - Snapshot Block Checksum Verification Failure! [n] of [m] Global Snapshots loaded.
59	Warning	yes	yes	Flash Verification - Mic Setting Block Checksum Verification Failure! [n] of [m] Global Mic Settings loaded.

Diagnostics and Error Handling – PC-Card Battery Tests				
Error ID	Type	Indication	Diag. Box	Error Text (Conflict)
060	Information	yes	yes	PC-Card Slot [%] – Card battery low. Replace battery immediately!
061	Warning	yes	yes	PC-Card Slot [%] – Card battery dead. Replace battery immediately!

Diagnostics and Error Handling – Flash Checksum Tests				
Error ID	Type	Indication	Diag. Box	Error Text (Conflict)
62	Warning	yes	yes	Flash verification – Snapshot Block Checksum Verification failure! [n] of [m] Private Snapshots loaded.
63	Warning	yes	yes	Flash verification – Snapshot Block Checksum Verification failure! [n] of [m] Private Mic Settings loaded.

Configurator				
Error ID	Type	Indication	Diag. Box	Error Text (Conflict)
064	Information	yes	yes	Load Configuration Failure due to channel type mismatch! Channel [n] input parameters not reconfigured.
065	Information	yes	yes	Load Configuration Failure due to missing Channel Data in Configuration File! Channel [n] - [m] not reconfigured.
066	Information	yes	yes	Load Configuration Failure due to missing Input Data in Configuration File! Channel [n] Input 3 - 6 not reconfigured.
067	Information	yes	yes	Restore Configuration Failure due to channel type mismatch! Channel [n] not restored during EXIT.
068	Information	yes	yes	Restore Configuration Failure due to number of channels mismatch! Channel [n] - [m] not restored during EXIT.
069	Information	yes	yes	Restore Configuration Failure due to number of inputs mismatch! Channel [n] Input 3 - 6 not restored during EXIT.

Snapshot Controller				
Error ID	Type	Indication	Diag. Box	Error Text (Conflict)
080	Information	yes	yes	Snapshot Recall not completed due to missing Input Data in Snapshot! Channel [n] Input 3 - 6 not recalled.
081	Information	yes	yes	Snapshot Recall not possible due to corrupted Snapshot Data!
096	Information	yes	yes	Not enough memory to load all Presets into Console - [n] of [m] Presets loaded!
097	Information	yes	yes	Not enough memory to load all Global Snapshots into Console - [n] of [m] Global Snapshots loaded!
098	Information	yes	yes	Not enough memory to load Private Snapshots into Console - [n] of [m] Private Snapshots loaded!
099	Information	yes	yes	Snapshot Recall Failure due to channel type mismatch! Channel [n] not recalled.
100	Information	yes	yes	Snapshot Recall not completed due to missing Channel Data in Snapshot! Channel [n] - [m] not recalled.
101	Information	yes	yes	Not enough memory to load all Mic Settings into Console - [n] of [m] Presets loaded!
102	Information	yes	yes	Mic Setting not created - Input must be of type microphone!
103	Information	yes	yes	Mic Setting not recalled - Input must be of type microphone!
104	Information	yes	yes	Mic Setting not recalled due to corrupted Mic Setting Data!
105	Information	yes	yes	Snapshot not loaded because user [%s] (owner of the Snapshot) is not defined on this mixing console!
106	Information	yes	yes	Mic Setting not loaded because user [%s] (owner of the Mic Setting) is not defined on this mixing console!
107	Information	yes	yes	Not enough memory to load all Private Mic Settings into console - [n] of [m] Private Mic Settings loaded!
108	Information	yes	yes	Recall not possible as selected Snapshot is not defined!
109	Information	yes	yes	Recall not possible as selected Mic Setting is not defined!
110	Information	yes	yes	Snapshot recall failure - channel [n] not available for insert assignment! Insert [m] not recalled.

PC-Card Controller				
Error ID	Type	Indication	Diag. Box	Error Text (Conflict)
113	Information	yes	yes	PC-Card Slot [%] - Empty!
114	Information	yes	yes	PC-Card Slot [%] - Card not supported!
115	Information	yes	yes	PC-Card Slot [%] - Card not formatted!
116	Information	yes	yes	PC-Card Slot [%] - File not found!
117	Information	yes	yes	PC-Card Slot [%] - Card already formatted!
118	Information	yes	yes	PC-Card Slot [%] - Card write protected!
119	Information	yes	yes	PC-Card Slot [%] - Please wait, formatting in progress!
120	Information	yes	yes	PC-Card Slot [%] - Card formatted!
121	Information	yes	yes	PC-Card Slot [%] - Card write error, IFX errorcode = [n]
122	Information	yes	yes	PC-Card Slot [%] - Card read error, IFX errorcode = [n]
123	Information	yes	yes	PC-Card Slot [%] - Volume not mounted, no IFX workspace.
124	Information	yes	yes	PC-Card Slot [%] - Volume not mounted, bad BIOS Parameter Block.
127	Information	yes	yes	PC-Card Slot [%] - File Empty!
128	Information	yes	yes	PC-Card Slot [%] - Snapshot Block Checksum Failure! [n] of [m] Snapshots loaded.
129	Information	yes	yes	PC-Card Slot [%] - Mic Setting Block Checksum Failure! [n] of [m] Mic Settings loaded.
130	Information	yes	yes	PC-Card Slot [%] - Configuration Checksum Failure! Configuration not loaded.
131	Information	yes	yes	PC-Card Slot [%] - Snapshot Block Software Version mismatch!
132	Information	yes	yes	PC-Card Slot [%] - Mic Setting Block Software Version mismatch!
133	Information	yes	yes	PC-Card Slot [%] - Configuration Software Version mismatch!
134	Information	yes	yes	PC-Card Slot [%] - SW Update Prolib Version mismatch! SW not loaded.

Flash Programming				
Error ID	Type	Indication	Diag. Box	Error Text (Conflict)
144	Error	yes	yes	Flash: Sector is protected. AMD error code = [n]
145	Error	yes	yes	Flash: Programming failure. Addr = [adr], prevData = [x], newData = [y], AMD error code = [n]
146	Error	yes	yes	Flash: Erase failure. AMD error code = [n]
147	Error	yes	yes	Flash: Odd address invalid with word access
148	Error	yes	yes	Flash: Memory access failed at address = [adr]
149	Error	yes	yes	Flash: AMD error code = [n]

User Interface				
Error ID	Type	Indication	Diag. Box	Error Text (Conflict)
176	Information	yes	no	Due to insufficient memory the first 10 messages ave been removed from the loglist

Automation Interface				
Error ID	Type	Indication	Diag. Box	Error Text (Conflict)
192	Warning	yes	no	Communication to Broadcast Automation lost!
193	Information	yes	no	Communication to Broadcast Automation established!

14.2 Indication on failure of restricted functions

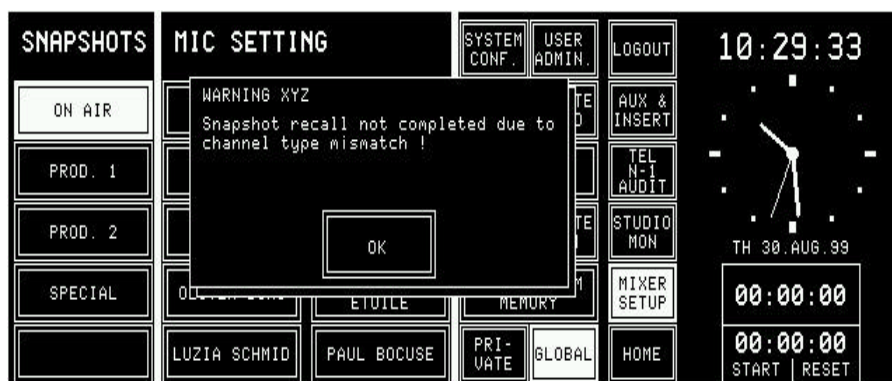
Usually, there is no indication of any error or warning if the execution of functions is prohibited in case of restrictions, because the user immediately notices whether the desired function is performed correctly. Nevertheless, some warnings need to be indicated to the user as a feedback, e.g. if a complete console dump fails because of a write-protected memory card.

The means to indicate to the user a failure during function execution is a dialog box appearing always at the same position on the central screen. It displays a system message and will disappear when the user acknowledges the message by touching the "OK" field in the box.

Each of these system messages is also entered to the Log List. To be removed from the Log List, it has to be acknowledged by the user.

To prevent from annoying the user with lots of warning and error message dialog boxes, they are generated only where it is not possible to notice function execution failure. In these cases an error message is generated if the function execution fails completely. A warning is given to the user if a function might be executed partially only.

Example: The snapshot recall function could not set all channels due to different input types:



The user has to acknowledge the dialog box before any other action on the Central screen will be accepted. Touching the Channel screens which would lead to a different page on the Central screen will also be ignored as long as the dialog box has not been acknowledged.

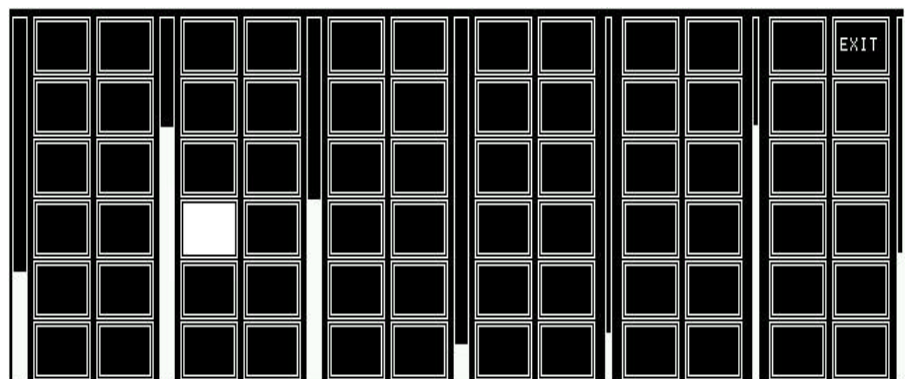
14.3 System test

The system test can be activated in service mode by touching the “SYSTEM TEST” field on the system configuration page. The SYSTEM TEST selection page appears on the central screen:



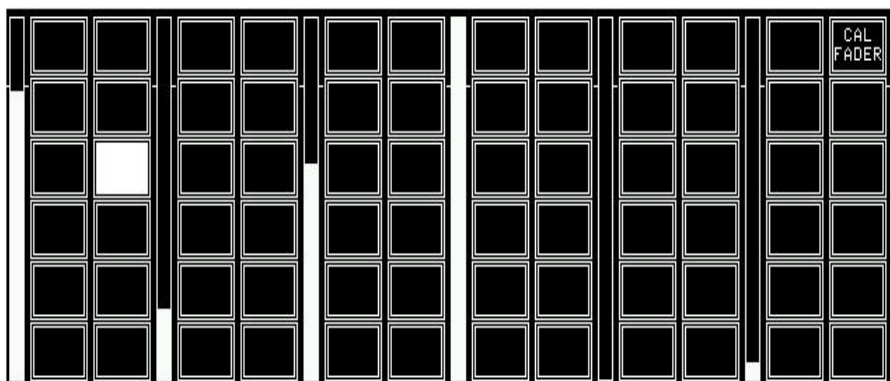
14.3.1 Buttons/faders

Selecting the buttons/faders test brings the console into a mode where the controls of the console can be checked. To return to the system test selection page, the EXIT field has to be touched.



If a field is touched on the screen, it is highlighted.

If the rotary encoder is turned clockwise, the bargraph next to the rotary encoder increases. The three narrow bargraphs in the right-hand part of the screen are used for the MON, PFL/TB, and PHONES knobs. The full length of the bargraph corresponds to a complete turn of the rotary encoder.



If a field is touched on a channel screen, it is highlighted. Also the PFL, ON, and OFF keys can be checked. If one of these keys is pressed, the corresponding LED lights; if PFL is pressed, also the OVL LED is on together with the LED in the PFL key.

The bargraphs indicate the fader positions.

14.3.2 Fader calibration

SW V1.0 through 2.01:

For calibrating the fader's zero position, set all fader knobs to their "0" mark and press the CAL FADER field (see screenshot above).

SW V2.02 and up:

After having upgraded the channel front board software 1.942.920.21, it might be possible that fader start is always active. In such a case, the fader start trigger point needs to be calibrated. Please proceed as follows:

Fader calibration: Enter the SYSTEM CONFIG. - SYSTEM TEST - BUTTONS/FADERS menu (if using the service terminal, *enter the commands printed in italics*).

0 dB point: (always required!)

- Move all faders not to be calibrated to their -20 dB position (this position is ignored during calibration).
- Move the fader(s) to be calibrated to the 0 dB position.

Note: We strongly recommend to perform this adjustment for all the faders at the same time.

- Touch CAL or, on the service terminal (only V2.0.1 and up), enter: *call all <return>*.

Fader start trigger point:

The fader start trigger point must be calibrated only for two reasons:

1. If using the optional kit from Penny&Giles (allows a mechanical detent when the fader is closed), or
2. In case of problems with the fader start control output signal, i.e. if fader start is active even if the fader is completely closed.

- Move all faders not to be calibrated to their -20 dB position (this position is ignored during calibration).
- Move the fader(s) to be calibrated, starting from the lower end, and set them to a position about 1...2 mm above the lower end (or just above the mechanical detent, if installed). This will be the point where the fader start output gets active after calibration.

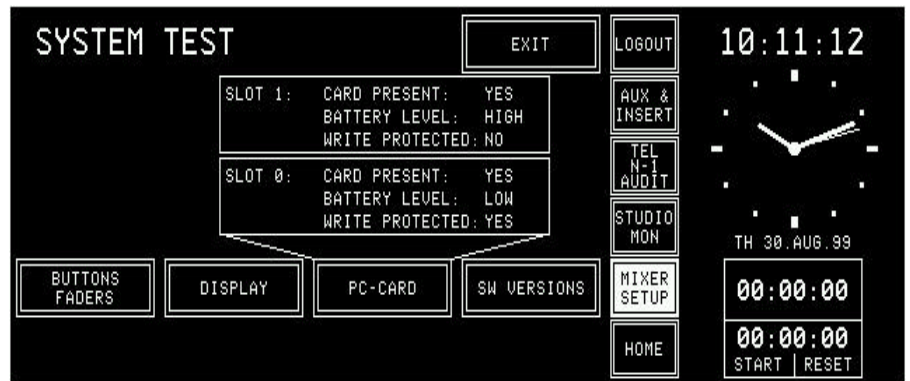
Note: We strongly recommend to perform this adjustment for all the faders at the same time.

- Touch CAL or, on the service terminal (only V2.0.1 and up), enter:
call all <return>.
- Close the fader(s) which just has/have been calibrated; the corresponding fader bar(s) on the channel screen should disappear.

14.3.3 Display

Selecting DISPLAY generates a test pattern on all available pages allowing to check for faulty LCD pixels. This mode remains until the central screen is touched.

14.3.4 PC-Card



Two types of PC-Cards are used by the console:

- Program card, used for software upgrade
- Data card, used for storing and recalling console configuration, snapshot data, and microphone settings

When having pressed PC-CARD, the inserted PC-Card is checked for battery voltage and write protection.

14.3.5 SW versions

When having pressed SW VERSIONS, the current software versions are displayed for every module.

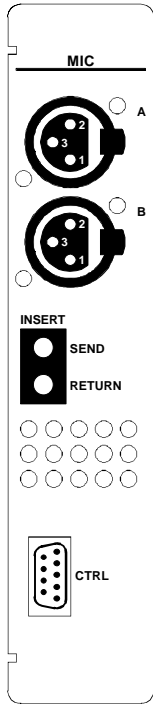


With the PREV and NEXT fields, all available pages can be browsed.

15 HARDWARE MODULES

15.1 Mic input module

1.942.220



Pin assignments:

Module with two inputs and A/B switchover. Inputs A and B are transformer-balanced mono microphone inputs. The maximum input level is such that also mono line level signals can be processed if required.

The analog path has an insert point right after the preamplifier stage. Both the insert send and return signals are electronically balanced. The nominal send and return levels are +6 dBu, with 9 dB headroom for 0 dB_{FS}.

The module address depends on the position of the module within the console. It must be set with a DIP switch; refer to [section 15.18](#).

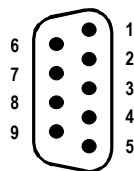
Microphone inputs A/B (XLR, 3pin, female):

Pin	Signal
1	Chassis
2	Input +
3	Input -

INSERT connectors (Bantam jacks):

Pin	Signal
T	Signal +
R	Signal -
S	Chassis

CTRL connector (D-type, 9pin, male):



Pin	Signal	Pin	Signal
1	CTRL OUT 1A	6	COMMON
2	+5 V SUPPLY	7	CTRL OUT 2B
3	CTRL OUT 2A	8	CTRL IN B
4	CTRL IN A	9	GND
5	CTRL OUT 1B		

Two control outputs (CTRL OUT xA/B) are available for each individual input, which can be used to start and/or cue external devices such as CD players, R-DAT units, or a radio automation system, or for redlight signaling. The control signals can be triggered by various functions and depend on the selected fader start mode (INPUT CONFIG. page). For details please refer to [section 9](#).

For CTRL OUT 1A/B, four operating modes are available:

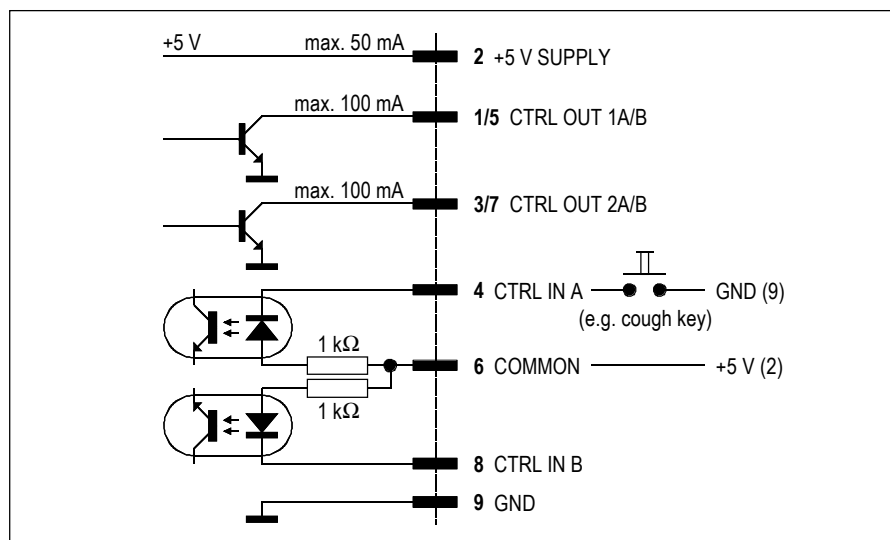
- NOT ACTIVE** Output is always open.
- ON & FADER** Output is closed (i.e. pulled to GND) if ON key is pressed *and* fader is open.
- PFL/ON & FADER** Output is closed if *either* PFL is active (independent of the fader position), *or* ON key is pressed *and* fader is open.
- ON LAMP** Output is closed while the ON lamp is illuminated.

For CTRL OUT 2A/B, seven operating modes are available:

- NOT ACTIVE** Output is always open.
- LOCATE KEY** Output is closed (i.e. pulled to GND) if the OFF key is pressed and the channel is active.
- PREVIEW** Output is closed if the PFL key is active and the PREVIEW function has been activated; the channel must be switched off.
- LOCATE PFL KEY** Output produces a pulse if the PFL key is deactivated (LOCATE function is activated).
- ATTENTION** Output is closed as long as the OFF key is pressed, independent of whether the channel is open or closed.
- ON LAMP** Output is closed while the ON lamp is illuminated.
- LOCATE PFL/LOC KEY** Combination of the LOCATE KEY and LOCATE PFL KEY functions. For details please refer to [section 9](#).

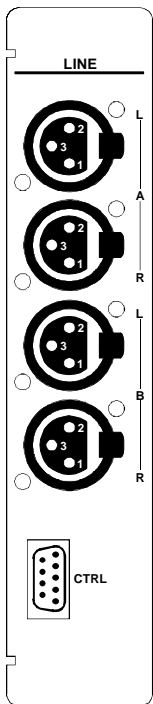
The CTRL IN A/B can be used for muting the channel, for remote control of the ON/OFF key or for entering ready status. Four operating modes are available:

- NOT ACTIVE** Input is inactive.
- READY** Acknowledgement of a ready signal.
- EXT. MUTE** Channel is muted (e.g. cough key).
- EXT. ON/OFF** External ON/OFF switchover.



Notes: “COMMON” can be wired either to “+5 V SUPPLY” or to an external power supply (max. +15 V_{DC}). An active low control signal is connected between “CTRL IN A” or “CTRL IN B” and “GND”. The inputs are optocoupler inputs with internal 1 kΩ current limiting resistors. All outputs are open-collector outputs. Small loads such as LEDs, optocouplers, or relays can be driven directly. Maximum current per open-collector output must *not* exceed 100 mA. The “+5 V” output can supply up to 50 mA for opto-couplers or relays. *The sum of all “+5 V” outputs for all input modules of a complete console must not exceed 800 mA!*

15.2 Analog line input module 1.942.230 (w. transformer); 1.942.232 (transformerless)



The analog line input module has an input selector for two stereo input sources (A and B). Inputs A and B are equivalent.

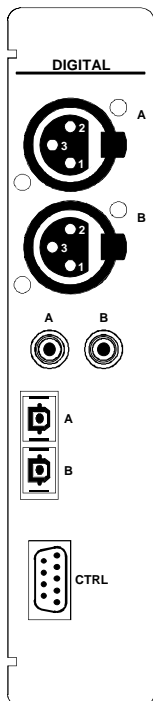
The module address depends on the position of the module within the console. It must be set with a DIP switch; refer to [section 15.18](#).

Pin assignments: Line inputs A/B (XLR, 3pin, female):

Pin	Signal
1	Chassis
2	Input +
3	Input -

CTRL connector (D-type, 9pin, male): Please refer to [section 15.1](#) for details.

15.3 Digital input module 1.942.240



The digital input module has an input selector for two digital signals A and B. Each of the inputs has all connectors (XLR, Cinch, Toslink) required for supporting the AES/EBU and S/PDIF standards.

The most important C-bits (Professional, Audio, Emphasis, Sampling rate, Stereo) are read on the interface and transferred to the host controller. Audio and Emphasis bits are processed. The digital source needs not being synchronized to the console since the digital input module is equipped with a 20 bit sampling frequency converter (SFC).

The module address depends on the position of the module within the console. It must be set with a DIP switch; refer to [section 15.18](#).

Pin assignments: AES/EBU inputs A/B (3pin, female):

Pin	Signal
1	Chassis
2	Input +
3	Input -

S/PDIF connectors A/B (RCA/Cinch):

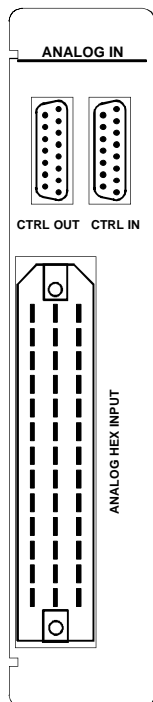
Pin	Signal
Inner	Input
Outer	GND

Optical connectors A/B (TOSLINK): For optical-fibre cables.

CTRL connector (D-type, 9pin, male): Please refer to [section 15.1](#) for details.

15.4 Analog hex input module (optional)

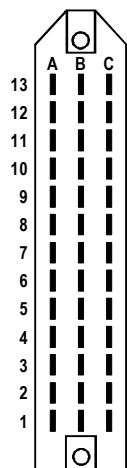
1.942.245



The analog hex line input module has an input selector for six stereo input sources (A...F). All inputs A...F are equivalent.

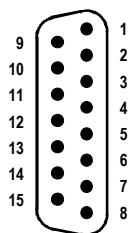
The module address depends on the position of the module within the console. It must be set with a DIP switch; refer to [section 15.18](#).

Pin assignments: ANALOG HEX INPUT (Siemens, 39pin, male):



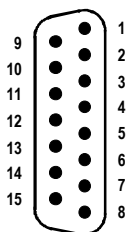
Pin	Signal	Pin	Signal	Pin	Signal
1A	Input A + left	1B	Input A – left	1C	Chassis
2A	Input A + right	2B	Input A – right	2C	Chassis
3A	Input B + left	3B	Input B – left	3C	Chassis
4A	Input B + right	4B	Input B – right	4C	Chassis
5A	Input C + left	5B	Input C – left	5C	Chassis
6A	Input C + right	6B	Input C – right	6C	Chassis
7A	Input D + left	7B	Input D – left	7C	Chassis
8A	Input D + right	8B	Input D – right	8C	Chassis
9A	Input E + left	9B	Input E – left	9C	Chassis
10A	Input E + right	10B	Input E – right	10C	Chassis
11A	Input F + left	11B	Input F – left	11C	Chassis
12A	Input F + right	12B	Input F – right	12C	Chassis
13A	n.c.	13B	n.c.	13C	n.c.

CTRL IN (D-type, 15pin, male):



Pin	Signal	Pin	Signal	Pin	Signal
1	+5 V SUPPLY	6	n.c.	11	CTRL IN E
2	COMMON	7	n.c.	12	CTRL IN D
3	n.c.	8	GND	13	CTRL IN C
4	n.c.	9	n.c.	14	CTRL IN B
5	n.c.	10	CTRL IN F	15	CTRL IN A

CTRL OUT (D-type, 15pin, male):

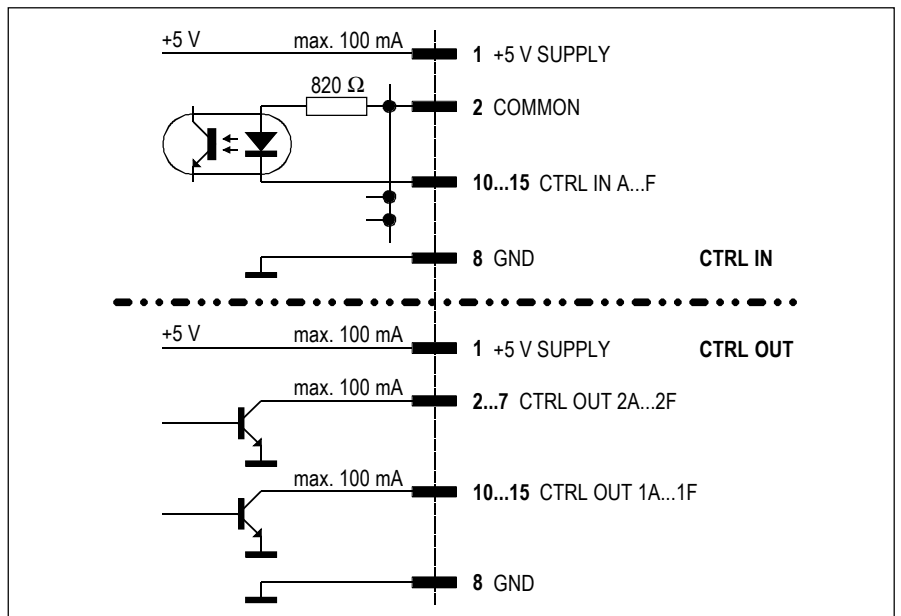


Pin	Signal	Pin	Signal	Pin	Signal
1	+5 V SUPPLY	6	CTRL OUT 2B	11	CTRL OUT 1E
2	CTRL OUT 2F	7	CTRL OUT 2A	12	CTRL OUT 1D
3	CTRL OUT 2E	8	GND	13	CTRL OUT 1C
4	CTRL OUT 2D	9	n.c.	14	CTRL OUT 1B
5	CTRL OUT 2C	10	CTRL OUT 1F	15	CTRL OUT 1A

The inputs are opto-coupler inputs with internal 820 Ω current limiting resistors.

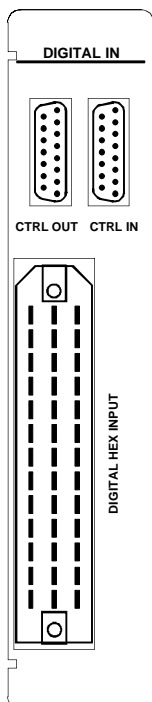
All outputs are open-collector outputs. Small loads as LEDs, opto-couplers, or relays can be driven directly. Maximum current per open-collector output must *not* exceed 100 mA.

The “+5 V” output can supply up to 100 mA for opto-couplers or relays. *The sum of all “+5 V” outputs for all input modules of a complete console must not exceed 800 mA!*



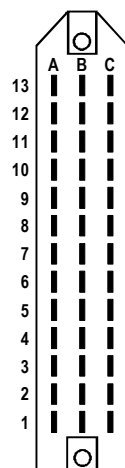
15.5 Digital hex input module (optional)

1.942.250



Pin assignments:

DIGITAL HEX INPUT (Siemens, 39pin, male):



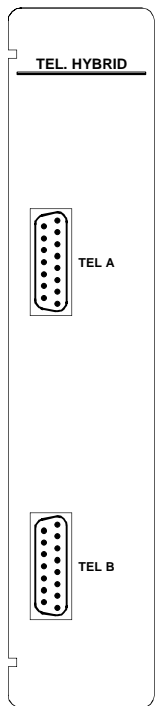
Pin	Signal	Pin	Signal	Pin	Signal
1A	Input A +	1B	Input A -	1C	Chassis
2A	Input B +	2B	Input B -	2C	Chassis
3A	Input C +	3B	Input C -	3C	Chassis
4A	Input D +	4B	Input D -	4C	Chassis
5A	Input E +	5B	Input E -	5C	Chassis
6A	Input F +	6B	Input F -	6C	Chassis
7A	n.c.	7B	n.c.	7C	Chassis
8A	n.c.	8B	n.c.	8C	Chassis
9A	n.c.	9B	n.c.	9C	Chassis
10A	n.c.	10B	n.c.	10C	Chassis
11A	n.c.	11B	n.c.	11C	Chassis
12A	n.c.	12B	n.c.	12C	Chassis
13A	n.c.	13B	n.c.	13C	n.c.

The input impedance is 110 Ω. The input also accepts S/PDIF signals. A 240 Ω resistor in parallel to the input pins may be required to adjust the input impedance to 75 Ω as defined by the S/PDIF standard.

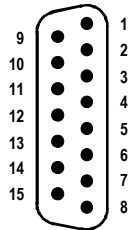
CTRL IN (D-type, 15pin, male), **CTRL OUT** (D-type, 15pin, male):
Please refer to [section 15.4](#).

15.6 Telephone hybrid module (optional)

1.942.140



Pin assignment:

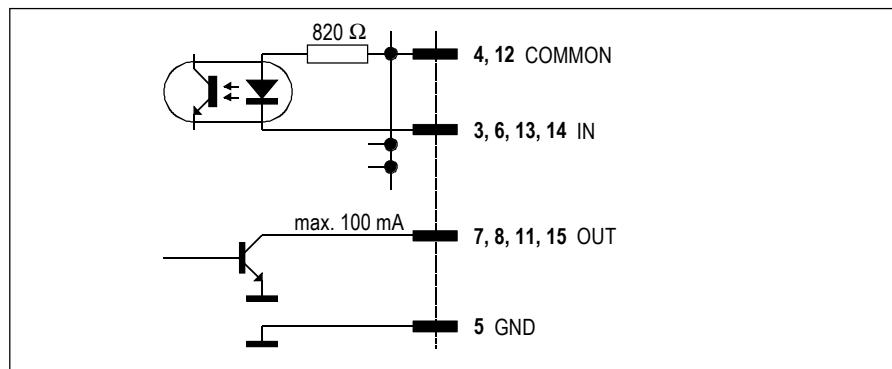


The telephone hybrid module is used to control two telephone hybrids from the console.

The module address *must always be set to the same value* by means of DIP switch; refer to [section 15.18](#).

TEL A/B (D-type, 15pin, male):

Pin	Signal	Pin	Signal	Pin	Signal
1	n.c.	6	Hold IN	11	Spare OUT
2	n.c.	7	Studio OUT	12	COMMON
3	Spare IN	8	Tel OUT	13	Tel IN
4	COMMON	9	n.c.	14	Studio IN
5	GND	10	n.c.	15	Hold OUT

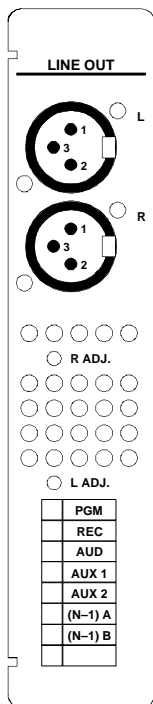


The inputs are opto-coupler inputs with internal 820 Ω current limiting resistors.

All outputs are open-collector outputs. Small loads as LEDs, opto-couplers, or relays can be driven directly. Maximum current per open-collector output must *not* exceed 100 mA.

15.7 Analog output module

(with balancing transformers) 1.942.120



The analog output module provides a stereo or mono output signal (selectable with a jumper) which is transformer-balanced.

The output signal selection is performed on the PCB by means of labeled jumpers.

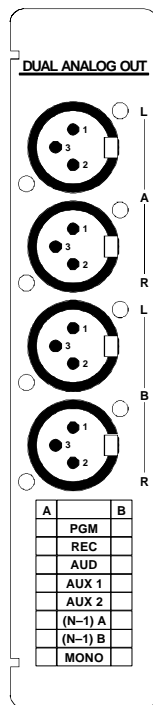
Note: In mono mode, the output signals of the stereo DAC are added in the analog domain to increase the converters' dynamic range. Therefore, if the DAC input signal is a stereo signal, the resulting mono output level is increased by 3 dB referred to the stereo output, and if the DAC input signal is a mono signal, the resulting mono output level is increased by 6 dB. These level differences have to be compensated by adjusting the output level with the two trimmer potentiometers "R ADJ." and "L ADJ." accessible from the rear of the module.

Pin assignment: Line output (XLR, 3pin, male):

Pin	Signal
1	Chassis
2	Output +
3	Output -

15.8 Dual analog output module

(with balancing transformers) 1.942.121



The dual analog output module provides a dual stereo or mono output signal (selectable with a jumper) which is transformer-balanced.

The output signal selection is performed on the PCB by means of jumpers; refer to [section 15.18](#).

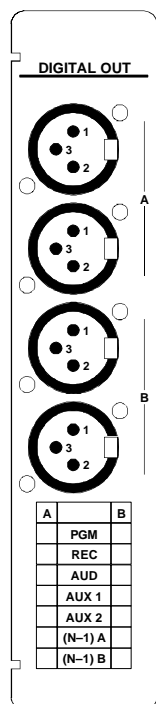
Note: In mono mode, the output signals of the stereo DAC are added in the analog domain to increase the converters' dynamic range. Therefore, if the DAC input signal is a stereo signal, the resulting mono output level is increased by 3 dB referred to the stereo output, and if the DAC input signal is a mono signal, the resulting mono output level is increased by 6 dB. These level differences have to be compensated by adjusting the output level with trimmer potentiometers located on the PCB; refer to [section 15.18](#) for component locations.

Pin assignment: Line outputs A/B (XLR, 3pin, male):

Pin	Signal
1	Chassis
2	Output +
3	Output -

15.9 Digital output module

1.942.124



Each digital output module delivers two independent AES/EBU output signals. The most important C-bits (Professional, Audio, Emphasis, Sampling rate, Stereo) are set by the host controller. The output sampling rate is that of the console.

A pair of XLR connectors with separate signal drivers are provided for each of the two AES/EBU output signals.

The output signal selection is performed on the PCB by means of jumpers; refer to [section 15.18](#).

Pin assignment: AES/EBU outputs A/B (XLR, 3pin, male):

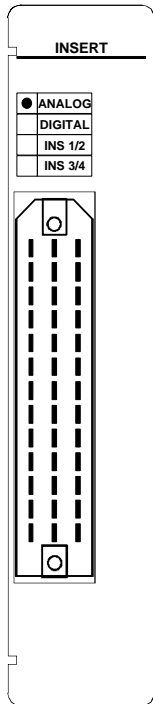
Pin	Signal
1	Chassis
2	Output +
3	Output -

C-bits: The abovementioned C-bits are set as follows:

- Professional: PRO
- Audio: AUDIO
- Emphasis: NO EMPHASIS
- Stereo: depending on output configuration
- Sampling rate: According to the internal sampling rate measurement.

15.10 Analog insert module (optional)

1.942.160



The analog insert module has two electronically balanced, stereo insert sends and returns, which can be assigned to any of the input channels, or to the program or the record bus.

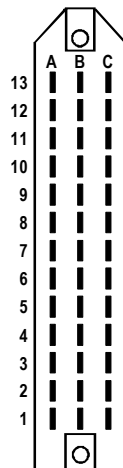
Selection of the channel to be assigned to the insert is performed on the AUX MASTER/INSERT page by means of the fourth rotary encoder. Selection is possible only if the corresponding insert is set to OFF (i.e., the return signal is not routed to the output).

The insert send is always active; the return, however, is only active if the ON field of the corresponding insert (on the AUX MASTER/INSERT page) is activated.

The sends are equipped with an internal limiter which is located before the D/A converter to avoid overloads. Nominal insert level is +6 dBu with 9 dB headroom (i.e. maximum level is +15 dBu for 0 dB_{FS}).

Up to two insert modules (analog, digital, or mixed) can be installed in a console. The insert 1/2 (1st module) or insert 3/4 (2nd module) selection is performed with a DIP switch for each module; refer to [section 15.18](#).

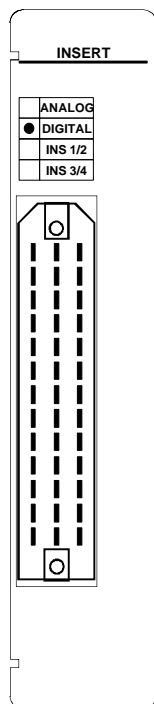
Pin assignment: INSERT (Siemens, 39pin, male):



Pin	Signal	Pin	Signal	Pin	Signal
1A	Send 1/3 + left	1B	Send 1/3 – left	1C	Chassis
2A	Return 1/3 + left	2B	Return 1/3 – left	2C	Chassis
3A	Send 1/3 + right	3B	Send 1/3 – right	3C	Chassis
4A	Return 1/3 + right	4B	Return 1/3 – right	4C	Chassis
5A	Send 2/4 + left	5B	Send 2/4 – left	5C	Chassis
6A	Return 2/4 + left	6B	Return 2/4 – left	6C	Chassis
7A	Send 2/4 + right	7B	Send 2/4 – right	7C	Chassis
8A	Return 2/4 + right	8B	Return 2/4 – right	8C	Chassis
9A	n.c.	9B	n.c.	9C	Chassis
10A	n.c.	10B	n.c.	10C	Chassis
11A	n.c.	11B	n.c.	11C	Chassis
12A	n.c.	12B	n.c.	12C	Chassis
13A	n.c.	13B	n.c.	13C	n.c.

15.11 Digital insert module (optional)

1.942.165



The digital insert module has two transformer-coupled AES/EBU insert sends and returns, which can be assigned to any of the input channels, or to the program or the record bus.

Selection of the channel to be assigned to the insert is performed on the AUX MASTER/INSERT page by means of the fourth rotary encoder. Selection is possible only if the corresponding insert is set to OFF (i.e., the return signal is not routed to the output).

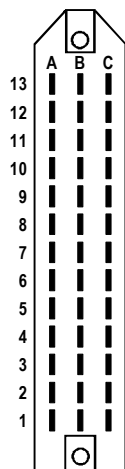
The insert send is always active; the return, however, is only active if the ON field of the corresponding insert (on the AUX MASTER/INSERT page) is activated.

The sends are equipped with an internal limiter which is located before the AES/EBU driver stage in order to avoid overloads. Nominal insert level is 9 dB below full modulation (0 dB_{FS}).

The sends are synced to the console's clock, while the returns are equipped with sampling frequency converters.

Up to two insert modules (analog, digital, or mixed) can be installed in a console. The insert 1/2 (1st module) or insert 3/4 (2nd module) selection is performed with a DIP switch for each module; refer to [section 15.18](#).

Pin assignment: INSERT (Siemens, 39pin, male):



Pin	Signal	Pin	Signal	Pin	Signal
1A	Send 1/3 +	1B	Send 1/3 –	1C	Chassis
2A	Return 1/3 +	2B	Return 1/3 –	2C	Chassis
3A	Send 2/4 +	3B	Send 2/4 –	3C	Chassis
4A	Return 2/4 +	4B	Return 2/4 –	4C	Chassis
5A	n.c.	5B	n.c.	5C	Chassis
6A	n.c.	6B	n.c.	6C	Chassis
7A	n.c.	7B	n.c.	7C	Chassis
8A	n.c.	8B	n.c.	8C	Chassis
9A	n.c.	9B	n.c.	9C	Chassis
10A	n.c.	10B	n.c.	10C	Chassis
11A	n.c.	11B	n.c.	11C	Chassis
12A	n.c.	12B	n.c.	12C	Chassis
13A	n.c.	13B	n.c.	13C	n.c.

15.12 Monitoring module

1.942.134/1.942.180

The monitoring module is a (mainly analog) monitoring unit. It has five external analog inputs in addition to the console's internal busses. In addition it provides analog output signals for headphones and loudspeakers in the control room and the studio.

The new *Monitoring Module w. TB return 1.942.180.20* provides an additional TB line input as well as additional CR and studio control inputs.

For details refer to the [block diagram in section 1](#), which is an overview over the complete signal processing functionality.

The module has a parallel interface "STUDIO MON CTRL" (25-pin D-Type, male) allowing the construction of a studio monitoring unit. The signals on this interface are:

- 6 × monitor source selector in (opto-coupler inputs)
- 3 × talkback destination in (opto-coupler inputs)
- 6 × source selector feedback out (open collector outputs)

The monitor sources and the talkback destinations are described in [section 7](#), "Monitoring".

One of the external analog inputs on the module is used as a PFL input provided for a radio automation system.

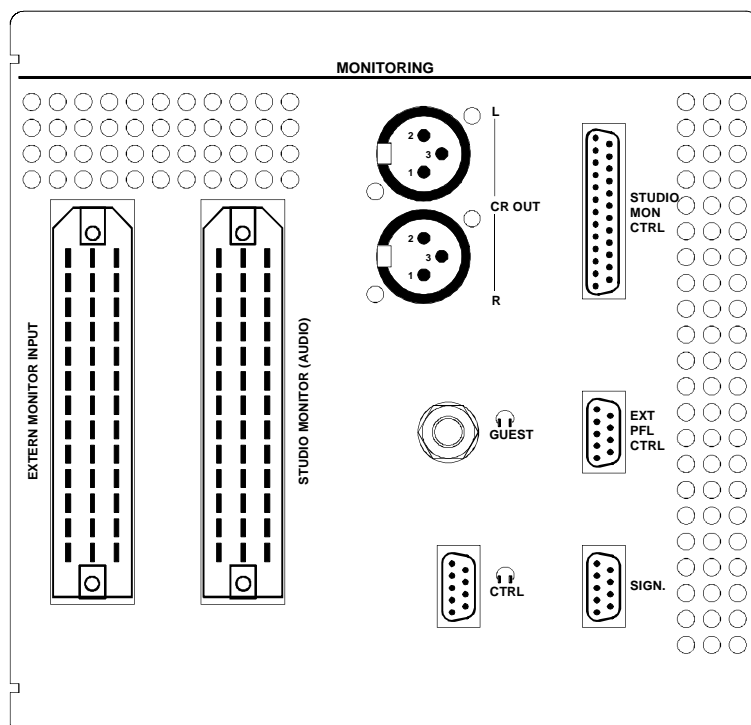
The following control signals are available for this purpose:

- 1 × external PFL in (opto-coupler input)
- 1 × external PFL out (open-collector output)

The "EXT PFL CTRL" D-Type connector (9-pin, male) is used for the control signals to the radio automation system.

If "external PFL IN" is activated, the "EXT PFL" audio signal on the "EXTERN MONITOR INPUT" connector is routed to the PFL bus.

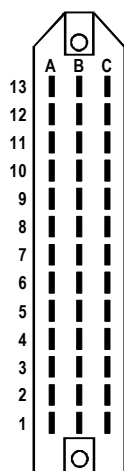
When pressing the "EXT PFL" key in the monitoring section, the "External PFL OUT" control signal on the "EXT PFL CTRL" connector is active, and the "EXT PFL" audio signal on the "EXTERN MONITOR INPUT" connector is routed to the PFL bus as well.



Pin assignments: CR OUT L/R (XLR, 3pin, male):

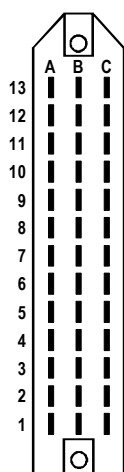
Pin	Signal
1	Chassis
2	Output +
3	Output -

EXTERN MONITOR INPUT (39-pin Siemens, male):



Pin	Signal	Pin	Signal	Pin	Signal
1A	EXT1 + left	1B	EXT1 - left	1C	Chassis
2A	EXT1 + right	2B	EXT1 - right	2C	Chassis
3A	EXT2 + left	3B	EXT2 - left	3C	Chassis
4A	EXT2 + right	4B	EXT2 - right	4C	Chassis
5A	OFF AIR + left	5B	OFF AIR - left	5C	Chassis
6A	OFF AIR + right	6B	OFF AIR - right	6C	Chassis
7A	EXT3 + left	7B	EXT3 - left	7C	Chassis
8A	EXT3 + right	8B	EXT3 - right	8C	Chassis
9A	EXT PFL + left	9B	EXT PFL - left	9C	Chassis
10A	EXT PFL + right	10B	EXT PFL - right	10C	Chassis
11A	n.c.	11B	n.c.	11C	Chassis
12A	n.c.	12B	n.c.	12C	Chassis
13A	n.c.	13B	n.c.	13C	n.c.

STUDIO MONITOR (AUDIO) output (39-pin Siemens, male):



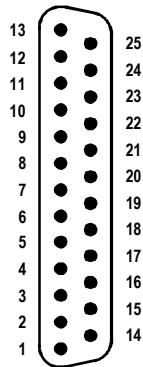
Pin	Signal	Pin	Signal	Pin	Signal
1A	Phones left	1B	GND	1C	Chassis
2A	Phones right	2B	GND	2C	Chassis
3A	Loudspeaker + left	3B	Loudspeaker - left	3C	Chassis
4A	Loudspeaker + right	4B	Loudspeaker - right	4C	Chassis
5A	n.c.	5B	n.c.	5C	Chassis
6A	n.c.	6B	n.c.	6C	Chassis
7A	n.c. / Ext. TB in + (note 3)	7B	n.c. / Ext. TB in - (note 3)	7C	Chassis
8A	n.c.	8B	n.c.	8C	Chassis
9A	Phones volume pot, wiper (note 1)	9B	n.c.	9C	Chassis
10A	+5 V (note 2)	10B	GND	10C	Chassis
11A	Speakers volume pot, wiper (note 1)	11B	n.c.	11C	Chassis
12A	+5 V (note 2)	12B	GND	12C	Chassis
13A	n.c.	13B	n.c.	13C	n.c.

Note 1: 10 kW lin. volume control potentiometers connected between +5 V and GND. Volume is maximum if wiper voltage is +5 V.

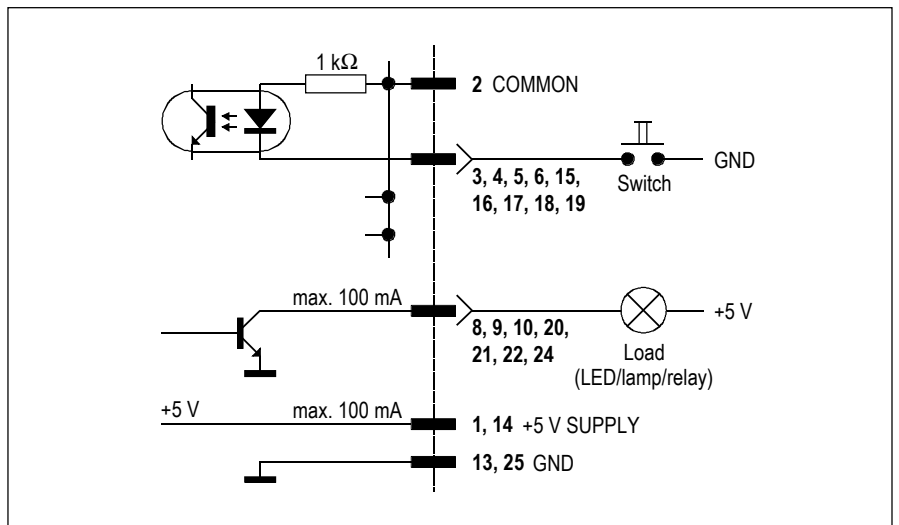
Note 2: 100 W series resistors provided internally for short-circuit protection.

Note 3: Electronically balanced audio input available on 1.942.180 and 1.942.181 only.

STUDIO MON CTRL (D-type, 25 pin, male):

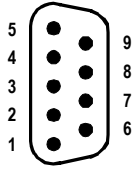


Pin	Signal	Pin	Signal	Pin	Signal
1	+5 V SUPPLY	10	Lamp EXTERN	19	Switch TB TO TEL2
2	COMMON	11	Spare OUT2	20	Lamp PGM
3	Switch AUX1	12	n.c.	21	Lamp AUX2
4	Switch OFF AIR	13	GND	22	Lamp PFL
5	Switch EXTERN	14	+5 V SUPPLY	23	Spare OUT1
6	Switch TB TO TEL1	15	Switch PGM	24	Lamp STUDIO MIC ON
7	n.c.	16	Switch AUX2		
8	Lamp AUX1	17	Switch PFL	25	GND
9	Lamp OFF AIR	18	Switch TB TO CR		



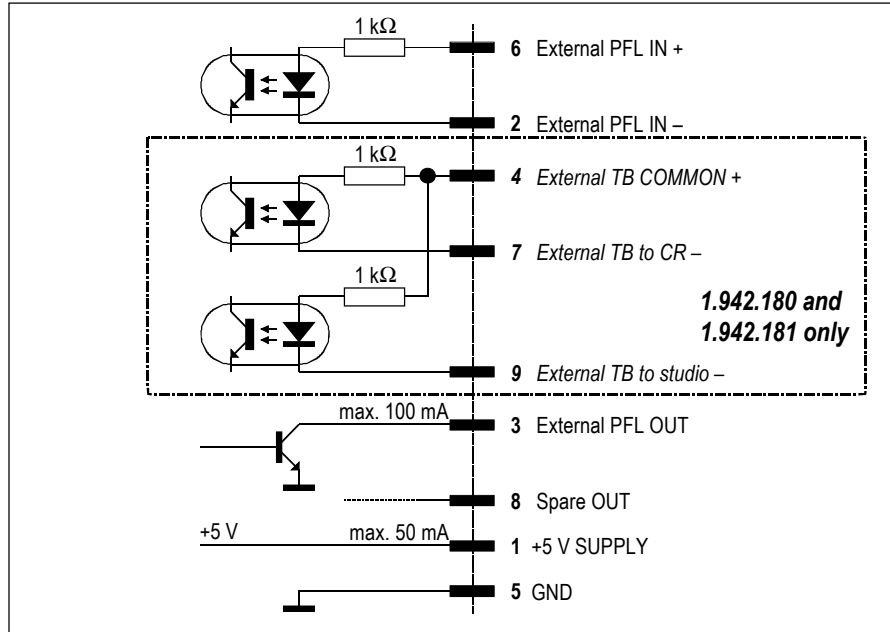
Notes: “COMMON” can be connected either to “+5 V SUPPLY” or to an external power supply (max. +15 V_{DC}). An active-low control signal is, for example, connected between “Switch AUX1” and “GND”. The Switch inputs are opto-coupler inputs with an internal 1 kΩ current limiting resistor each. The outputs are open-collector outputs; small loads, such as LEDs, opto-couplers, or relays, can be driven directly. *The current must not exceed 100 mA per output.* The “+5 V” supply current for LEDs or relays must not exceed 100 mA in total.

EXT PFL CTRL (D-type, 9 pin, male):



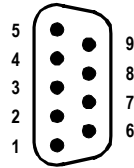
Pin	Signal	Pin	Signal
1	+5 V SUPPLY	6	External PFL IN +
2	External PFL IN -	7	n.c. / External TB to CR - (note 1)
3	External PFL OUT	8	Spare OUT
4	External TB COMMON + (note 1)	9	n.c. / Ext. TB to Studio - (note 1)
5	GND		

Note 1: Available on 1.942.180 and 1.942.181 only.

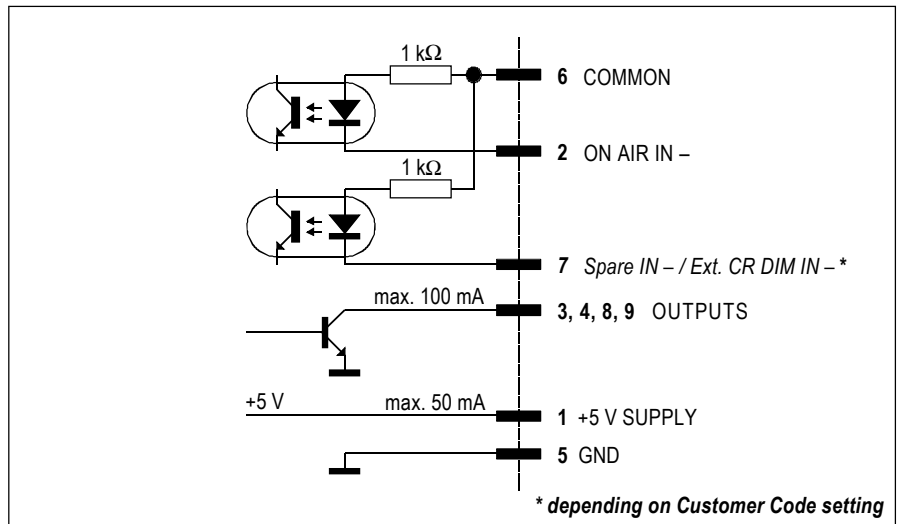


Notes: “External PFL IN +” and/or “External TB COMMON” can be connected either to “+5 V SUPPLY” or to an external power supply (max. +15 V_{DC}). A pushbutton or an active-low control signal from a radio automation system is connected between the „ - ” control inputs and “GND”. The inputs are opto-coupler inputs with internal 1 kΩ current limiting resistors. The “External PFL OUT” output is an open-collector output; small loads, such as an LED, an opto-couplers, or a relay can be driven directly. *The current must not exceed 100 mA.* *The “+5 V” supply current for an opto-coupler or a relay must not exceed 50 mA.*

SIGN. (D-type, 9 pin, male):



Pin	Signal	Pin	Signal
1	+5 V SUPPLY	6	COMMON
2	ON AIR IN –	7	Spare IN – or Ext. CR DIM IN – *
3	CR MIC OUT	8	STUDIO MIC OUT
4	PGM OUT	9	Spare OUT
5	GND	* depending on Customer Code setting	



The “ON AIR IN –” signal turns on the “ON AIR” lamp on the console's monitoring section.

The “CR MIC OUT” output is active if any microphone in the control room is on (i.e. fader open, ON pushbutton active, signal routed to the PROGRAM or RECORD bus).

The “STUDIO MIC OUT” output is active if any microphone in the studio is on (i.e. fader open, ON pushbutton active, signal routed to the PROGRAM or RECORD bus).


The “PGM OUT” output is active if any input channel is on (i.e. fader open, ON pushbutton active, signal routed to the PROGRAM or RECORD bus).

If set with the Customer Code (refer to [section 12.2.12](#)), an external control signal at the “Ext. CR DIM IN –” input reduces (dims) the level of the CR monitor speakers by 20 dB.

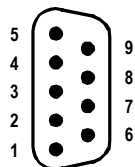
Notes: “COMMON” can be connected either to “+5 V SUPPLY” or to an external power supply (max. +15 V_{DC}). Active-low control signals are connected between the control inputs and “GND”. The inputs are opto-coupler inputs with internal 1 kΩ current limiting resistors.

The outputs are open-collectors; small loads, such as LEDs, opto-couplers, or relays can be driven directly. *The current must not exceed 100 mA per output.*

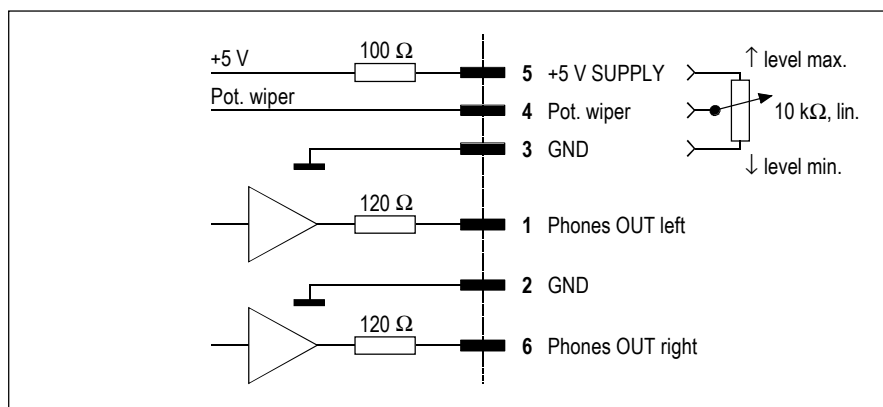
The “+5 V” supply current must not exceed 50 mA.

 **CTRL** (D-type, 9 pin, male):

This connector provides all the signals required for a guest headphone. The “Phones OUT” signal is the same as the one on the GUEST jack socket on the same module.



Pin	Signal	Pin	Signal
1	Phones OUT left	6	Phones OUT right
2	GND	7	n.c.
3	GND	8	n.c.
4	Potentiometer wiper	9	n.c.
5	+5 V SUPPLY		



Notes: A linear 10 kΩ volume control potentiometer can be connected between “+5 V SUPPLY” and “GND”. The volume is maximum if the wiper voltage is at +5 V.
The signal on pins 1 and 6 is the same as the one on the GUEST headphones jack socket.

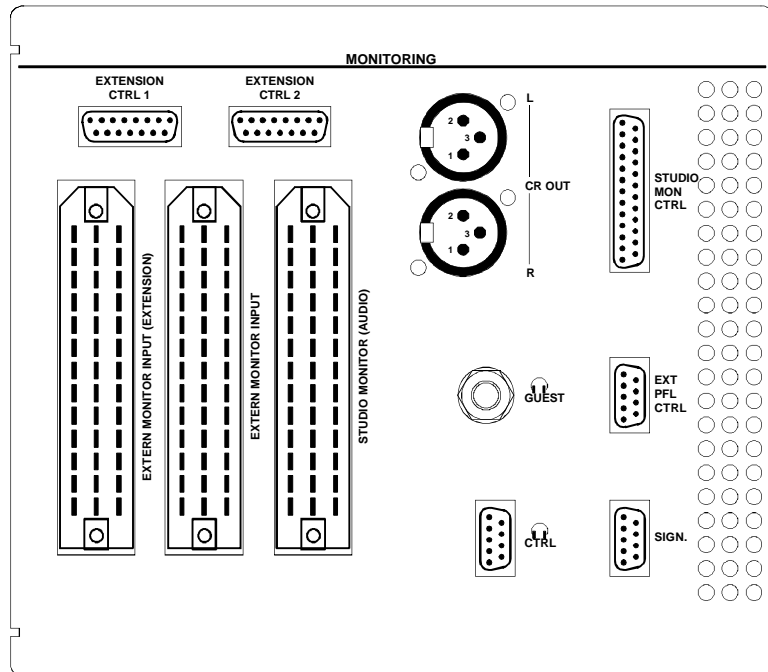
15.13 Monitoring module w. extension (optional)

1.942.138/1.942.181

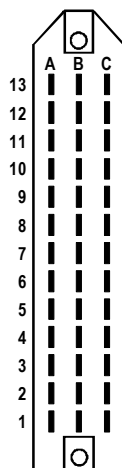
The monitoring module can be extended in two stages; in both cases, the same basic functions of the monitoring module as described in [section 15.12](#) will be maintained. The basic unit can be extended by one or two PCBs; besides, a modified connector panel is required as well.

Monitor extension 1: The extension 1.942.136 allows five more sources to be monitored, two of them being digital. Selection is made with the mutually releasing spare keys F1...F5 in the monitoring section or by external control signals via optocouplers. Depending on the configuration, these keys can control other functions, too, such as relays or signaling functions etc. Two summing amplifiers and two relays used with the monitor extension 1+2 complete the functionality.

Monitor extension 1+2: All functions mentioned above are included; in addition, two VCA modules, two electronically balanced line outputs, a D/A converter and two relays are installed on one more PCB (1.942.137). These components allow the implementation of customer-specific circuits.

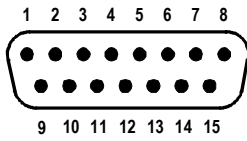


Pin assignments: **EXTERN MONITOR INPUT (EXT.)** (39-pin Siemens, male):

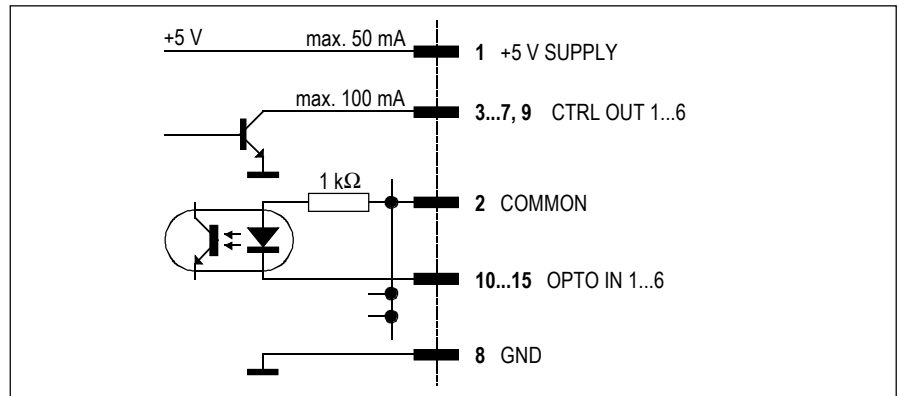


Pin	Signal	Pin	Signal	Pin	Signal
1A	EXT1 IN + left	1B	EXT1 IN - left	1C	Chassis
2A	EXT1 IN + right	2B	EXT1 IN - right	2C	Chassis
3A	EXT4 IN + left	3B	EXT4 IN - left	3C	Chassis
4A	EXT4 IN + right	4B	EXT4 IN - right	4C	Chassis
5A	EXT5 IN + left	5B	EXT5 IN - left	5C	Chassis
6A	EXT5 IN + right	6B	EXT5 IN - right	6C	Chassis
7A	EXT6 IN + left	7B	EXT6 IN - left	7C	Chassis
8A	EXT6 IN + right	8B	EXT6 IN - right	8C	Chassis
9A	EXT7 IN + (digital)	9B	EXT7 IN - (digital)	9C	Chassis
10A	EXT8 IN + (digital)	10B	EXT8 IN - (digital)	10C	Chassis
11A	EXT OUT + left	11B	EXT OUT - left	11C	Chassis
12A	EXT OUT + right	12B	EXT OUT - right	12C	Chassis
13A	n.c.	13B	n.c.	13C	n.c.

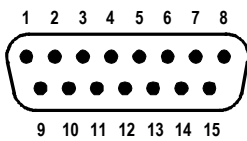
EXTENSION CTRL 1 (D-type, 15pin, male):



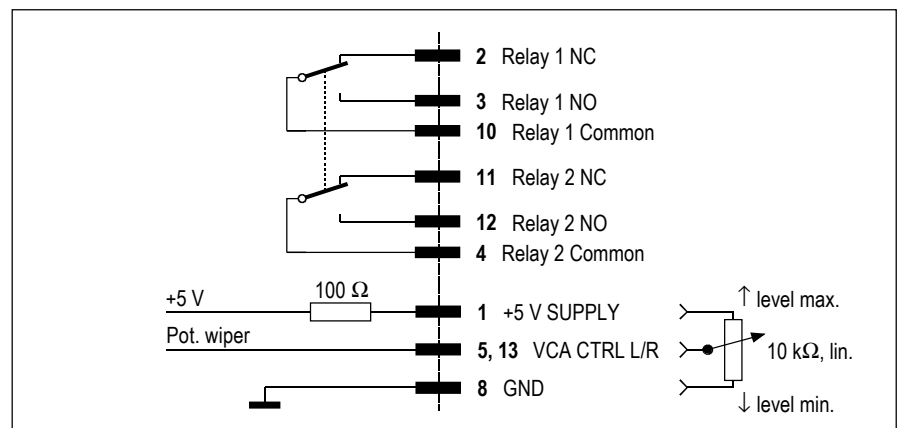
Pin	Signal	Pin	Signal	Pin	Signal
1	+5V SUPPLY	6	CTRL OUT 4	11	OPTO IN 2
2	COMMON	7	CTRL OUT 5	12	OPTO IN 3
3	CTRL OUT 1	8	GND	13	OPTO IN 4
4	CTRL OUT 2	9	CTRL OUT 6	14	OPTO IN 5
5	CTRL OUT 3	10	OPTO IN 1	15	OPTO IN 6



EXTENSION CTRL 2 (D-type, 15pin, male):



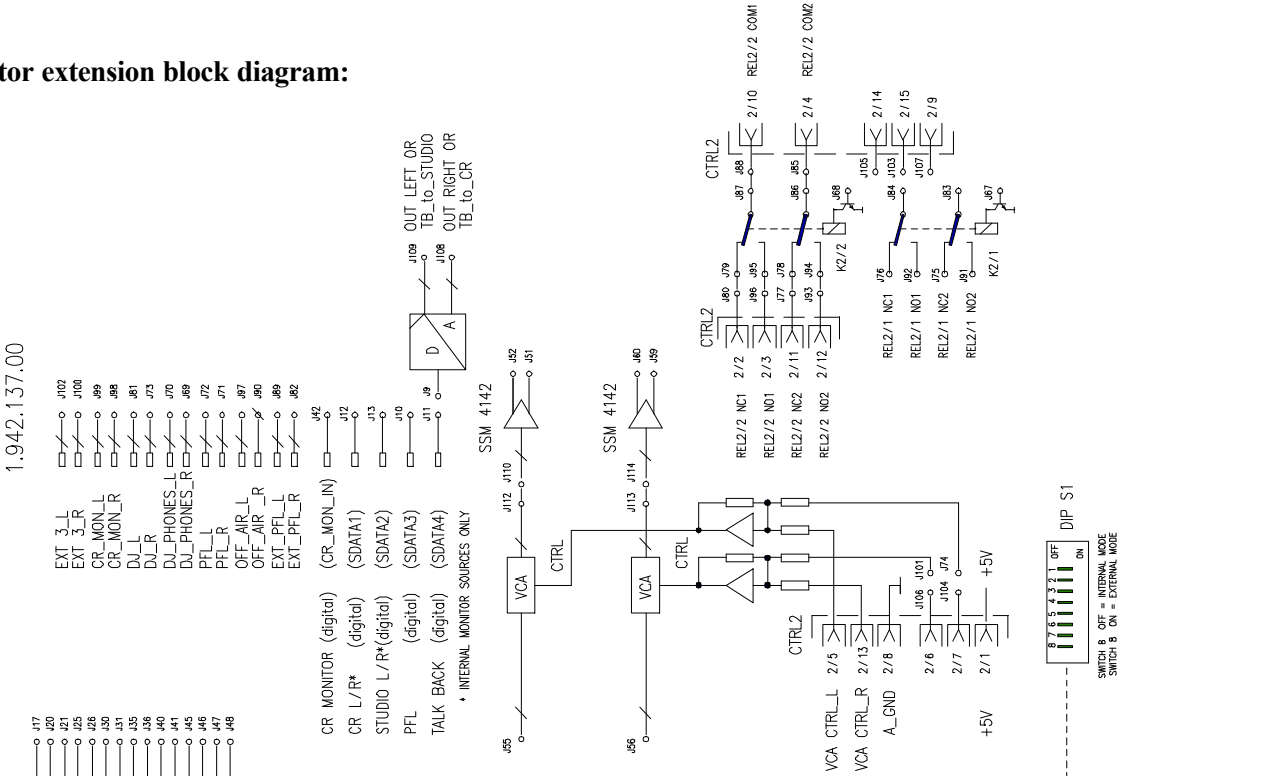
Pin	Signal	Pin	Signal	Pin	Signal
1	+5V SUPPLY	6	n.c.	11	Relay 2 NC
2	Relay 1 NC	7	n.c.	12	Relay 2 NO
3	Relay 1 NO	8	GND	13	VCA CTRL R (pot. wiper)
4	Relay 2 COMMON	9	n.c.	14	n.c.
5	VCA CTRL L (pot. wiper)	10	Relay 1 COMMON	15	n.c.



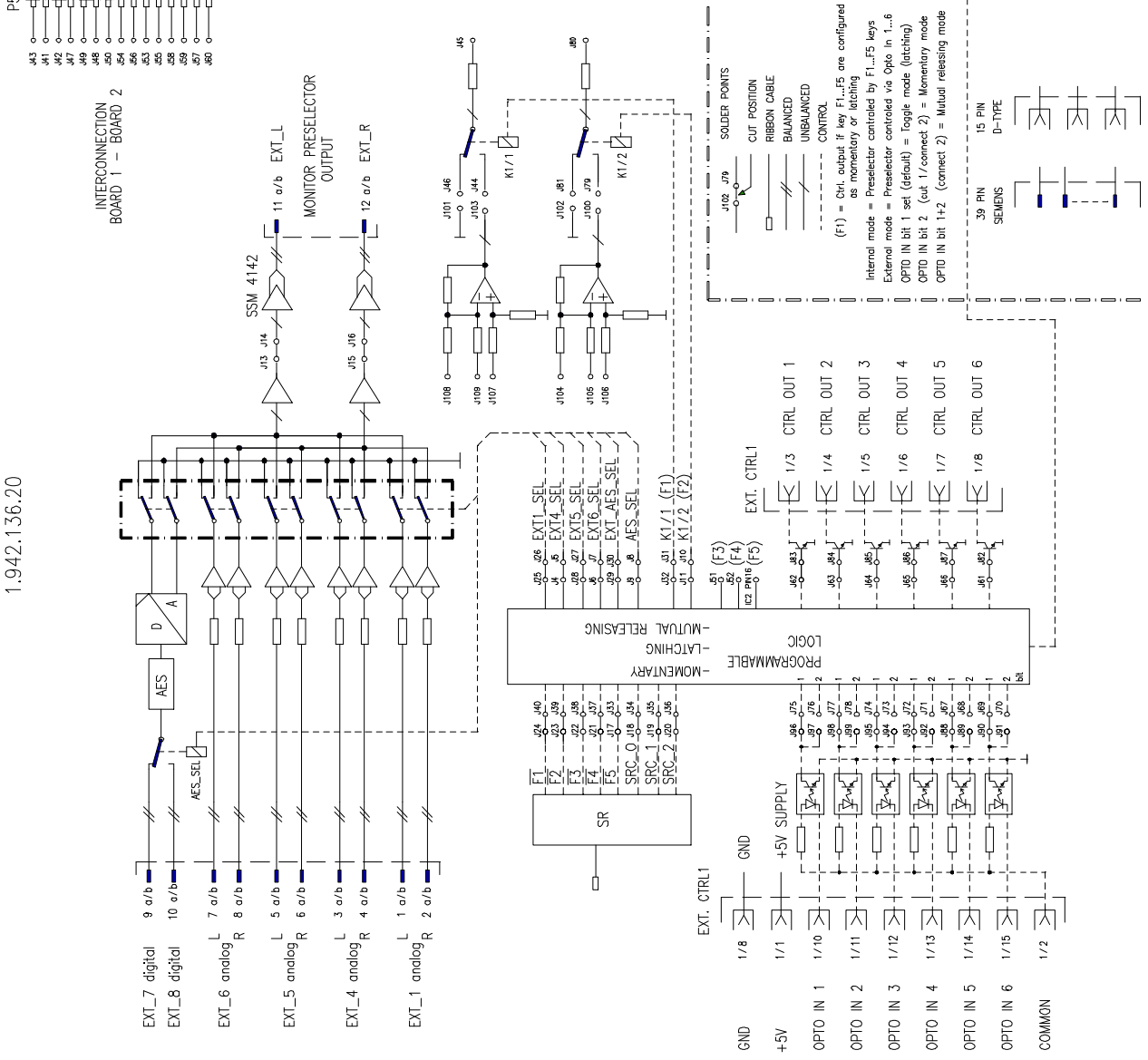
Note: The EXTENSION CTRL 2 connector is active for the monitor extension 1+2 only.

Monitor extension block diagram:

MONITOR EXPANDER BOARD 2
1.942.137.00

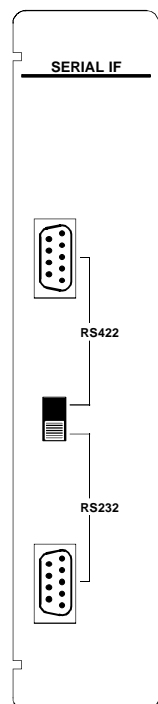


MONITOR EXPANDER BOARD 1
1.942.136.20



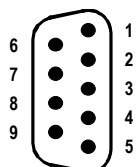
15.14 Serial interface module (optional)

1.942.145



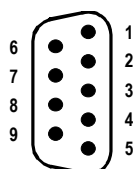
This module provides a serial communication link according to either RS232 or RS422 specification (switch-selectable). It is used for the connection to and communication with a computer-assisted broadcasting system (CAB); for details on CAB systems refer to [section 10](#).

Pin assignments: RS422 (D-type, 9 pin, male):



Pin	Signal	Pin	Signal
1	GND	6	n.c.
2	RX + (PC to console)	7	RX - (PC to console)
3	TX - (console to PC)	8	TX + (console to PC)
4	n.c.	9	n.c.
5	n.c.	TX: transmit; RX: receive	

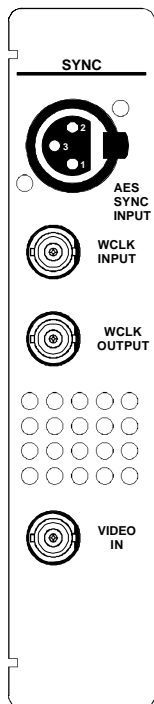
RS232 (D-type, 9 pin, male):



Pin	Signal	Pin	Signal
1	DCD (Note 1)	6	DSR (Note 1)
2	TX (console to PC)	7	RTS (Note 2)
3	RX (PC to console)	8	CTS (Note 2)
4	DTR (Note 1)	9	n.c.
5	GND	TX: transmit; RX: receive	
Note 1: DCD, DTR, and DSR are connected internally			
Note 2: RTS and CTS are connected internally			

15.15 Clock sync module (optional)

1.942.135



AES/EBU
Word clock
Video sync

The On-Air 2000 console can be equipped with a clock sync module which allows the console to be synchronized to external clock sources. Synchronizing to the following external signals is provided:

AES/EBU 32 kHz, 44.1 kHz, 48 kHz;

Word clock 32 kHz, 44.1 kHz, 48 kHz;

Video sync 25 frames/s, 29.97 frames/s, 30 frames/s. The termination is jumper-selectable, refer to [section 15.18](#).

If synchronized to video sync, the sampling rate is either 48 kHz or, for 29.97 fr/s, 47.952 kHz.

If no clock sync module is installed or no valid external clock signal is available, the console runs from its own internal 48 kHz clock reference.

Pin assignments:

AES SYNC INPUT (3pin, female):

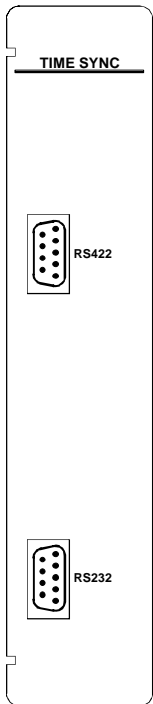
Pin	Signal
1	Chassis
2	Input +
3	Input -

WCLK INPUT, WCLK OUTPUT, VIDEO IN (BNC, 75 Ω):

Pin	Signal
Inner	Input
Outer	GND

15.16 Time sync module (optional)

1.942.150

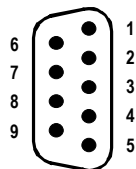


With a time sync module, the console's internal clock can be synchronized to an external time reference unit, such as a DCF77 or GPS receiver, or a Motabtime clock providing a serial output signal. The current software of the module supports AFNOR and Seiko protocols as well as SMPTE bi-phase timecode (Leitch).

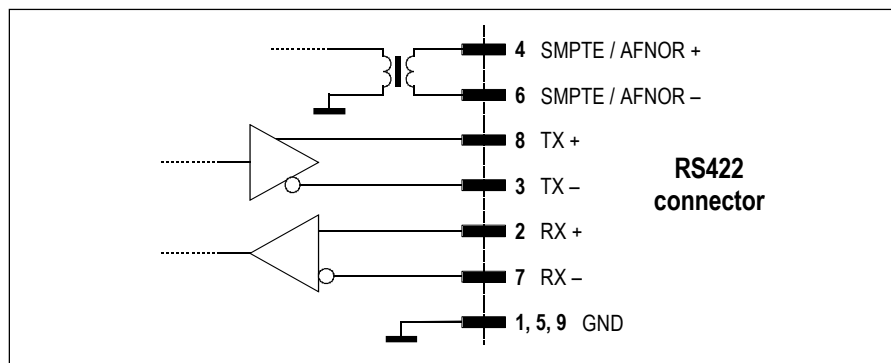
For either of these time reference units (except AFNOR and SMPTE) the connector labeled RS232 is used. For ANOR and SMPTE signals, a transformer-balanced input is available on the RS422 connector. Please note the configuration ([section 12.2.5](#)) and the DIP switch and jumper setting ([section 15.18](#)), depending on the type of reference unit being used.

Note: The Time Sync Module software version is completely independent of the console software; this means that a Time Sync Module with the most recent software version supports all time sources available, even if installed in a console with the earliest software version.

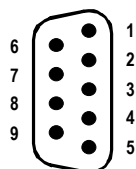
Pin assignments: RS422 (D-type, 9 pin, male):



Pin	Signal	Pin	Signal
1	GND	6	SMPTE/AFNOR -
2	RX + (unit to console)	7	RX - (PC to console)
3	TX - (console to unit)	8	TX + (console to PC)
4	SMPTE/AFNOR +	9	GND
5	GND	TX: transmit; RX: receive	



RS232 (D-type, 9 pin, male):

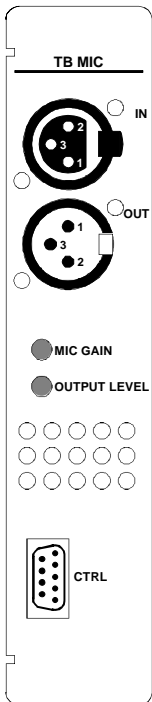


Pin	Signal	Pin	Signal
1	+12 V (Note 1)	6	+12 V (Note 1)
2	RX (unit to console)	7	-12 V (Note 1)
3	TX (console to unit)	8	-12 V (Note 1)
4	+12 V (Note 1)	9	n.c.
5	GND	TX: transmit; RX: receive	

Note 1: These voltages are available if jumpers 12-13 and 10-11 are inserted. These outputs are very high-Z and must not be used, except for the specified DCF77 and MOBA receivers only!

15.17 TB mic input module (optional)

1.942.219



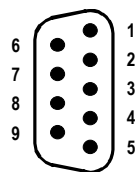
The TB Mic Input Module is used for connecting an internal or external talkback microphone. It offers a supply voltage for the internal unbalanced goose-neck electret microphone (order no. 1.942.218.00), and a transformer-balanced XLR input for an external mic with jumper-selectable 48 V phantom power. The balanced input is available on a 3-pin AMP connector on the PCB as well. The input gain is set with a jumper (LO/HI) and is adjustable with a rear-panel trimmer potentiometer. An on-board limiter protects the output from an accidental overload.

The analog TB output is transformer-balanced and fed to an XLR (at the rear panel) and an AMP connector (on the PCB); an unbalanced AMP output is available on the PCB. The level of both outputs is adjusted with a rear-panel trimmer potentiometer.

Pin assignments: TB mic IN/OUT (XLR, 3pin, female/male)

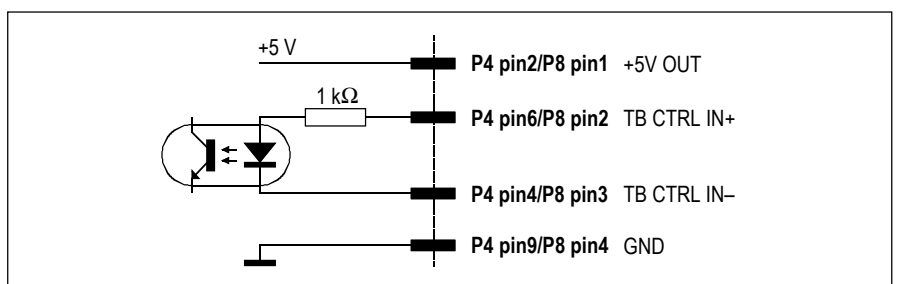
Pin	Signal
1	Chassis
2	Input +/Output +
3	Input –/Output –

CTRL connector P4 (D-type, 9pin, male), P8 (AMP, 4pin, male)



P4, pin	P8, pin	Signal	P4, pin	P8, pin	Signal
1	-	n.c.	6	2	TB CTRL IN +
2	1	+5 V OUT	7	-	n.c.
3	-	n.c.	8	-	n.c.
4	3	TB CTRL IN –	9	4	GND
5	-	n.c.			

Control input: If a control signal is applied to “TB CTRL IN+” and “TB CTRL IN–”, the EXT TB MIC OUTPUT is activated.



Notes: “TB CTRL IN +” can be wired either to “+5 V OUT” or to an external supply (max. +15 V_{DC}). An active low control signal is connected between “TB CTRL IN –” and “GND”. The input is an opto-coupler input with an internal 1 kΩ current limiting resistor. The “+5 V OUT” output can supply up to 50 mA.

Installation: **TB Mic Input:** Normally the TB Mic Input Module is installed in an empty slot of the center section at the rear of the console. If all slots of the center section should be occupied, the TB Mic Input Module can also be installed instead of the blank panel at the far right of the console's input section (rear view). *The TB Mic Input Module must never be installed at the far left of the input section – danger of a short between the PCB and the chassis!*



TB mic: There are two possible locations for the internal electret type TB mic (1.942.218.00): Either in the center section on the front panel of the monitoring and talkback unit (mounting hole is provided), or – if there is room available – in the level meter section on a matching blank panel.

External TB mic: The TB Mic Input Module is equipped with a balanced mic input (XLR 3m) for the connection of an external microphone. Selection of internal/external TB mic is done with a jumper on the PCB.

Console configuration: If installing the TB Mic Input Module in an On-Air 2000 console, the console configuration must be updated.

6-channel console:

- Configure as 12-channel console (on DSP Board: only CFG1 inserted).
- Connect the module to IMB2 of the DSP Board; any desired board address can be selected; *factory jumper setting is IN1 (see Note 1).*
- For SW V3.0 only:
Select MIXER SETUP / SYSTEM CONFIG. / INPUT, select CHANNEL 7, and set TB SOURCE to CR.

12-channel console:

- Configure as 18-channel console (on DSP Board: only CFG0 inserted).
- Connect the module to IMB3 of the DSP Board; any desired board address can be selected; *factory jumper setting is IN1 (see Note 1).*
- For SW V3.0 only:
Select MIXER SETUP / SYSTEM CONFIG. / INPUT, select CHANNEL 13, and set TB SOURCE to CR.

18-channel console:

- Configure as 24-channel console (on DSP Board: neither CFG0 nor CFG1 inserted).
- Connect the module to IMB4 of the DSP Board; any desired board address can be selected; *factory jumper setting is IN1 (see Note 1).*
- For SW V3.0 only:
Select MIXER SETUP / SYSTEM CONFIG. / INPUT, select CHANNEL 19, and set TB SOURCE to CR.

Note 1: The IN2 jumper position is related to one of the 6-channel sections of the console, as shown in the table:

Jumper position on TB Mic Input Module	IN1	IN2	IN3	IN4	IN5	IN6
On 6-ch console, select channel no.	7	8	9	10	11	12
On 12-ch console, select channel no.	13	14	15	16	17	18
On 18-ch console, select channel no.	19	20	21	22	23	24
factory setting						

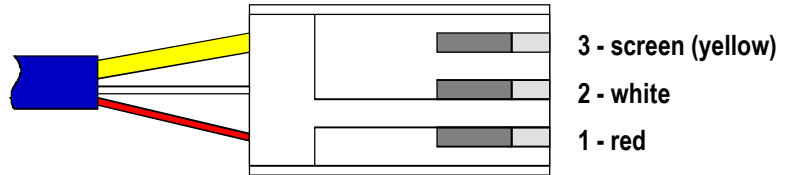
24-channel console:

- One of the already installed input modules must be sacrificed when installing a TB Mic Input Module. It is connected to the same daisy-chain connector as the removed input module was connected to.
- Make sure that the correct address is set on the TB Mic Input Module; i.e. if the removed input module was no. 6 (or 12, or 18, or 24), setting the jumper to position “IN6” is correct.
- For SW V3.0 only: Select MIXER SETUP / SYSTEM CONFIG. / INPUT, select CHANNEL “x”, and set TB SOURCE to CR (“x” is the number of the replaced Input Module).

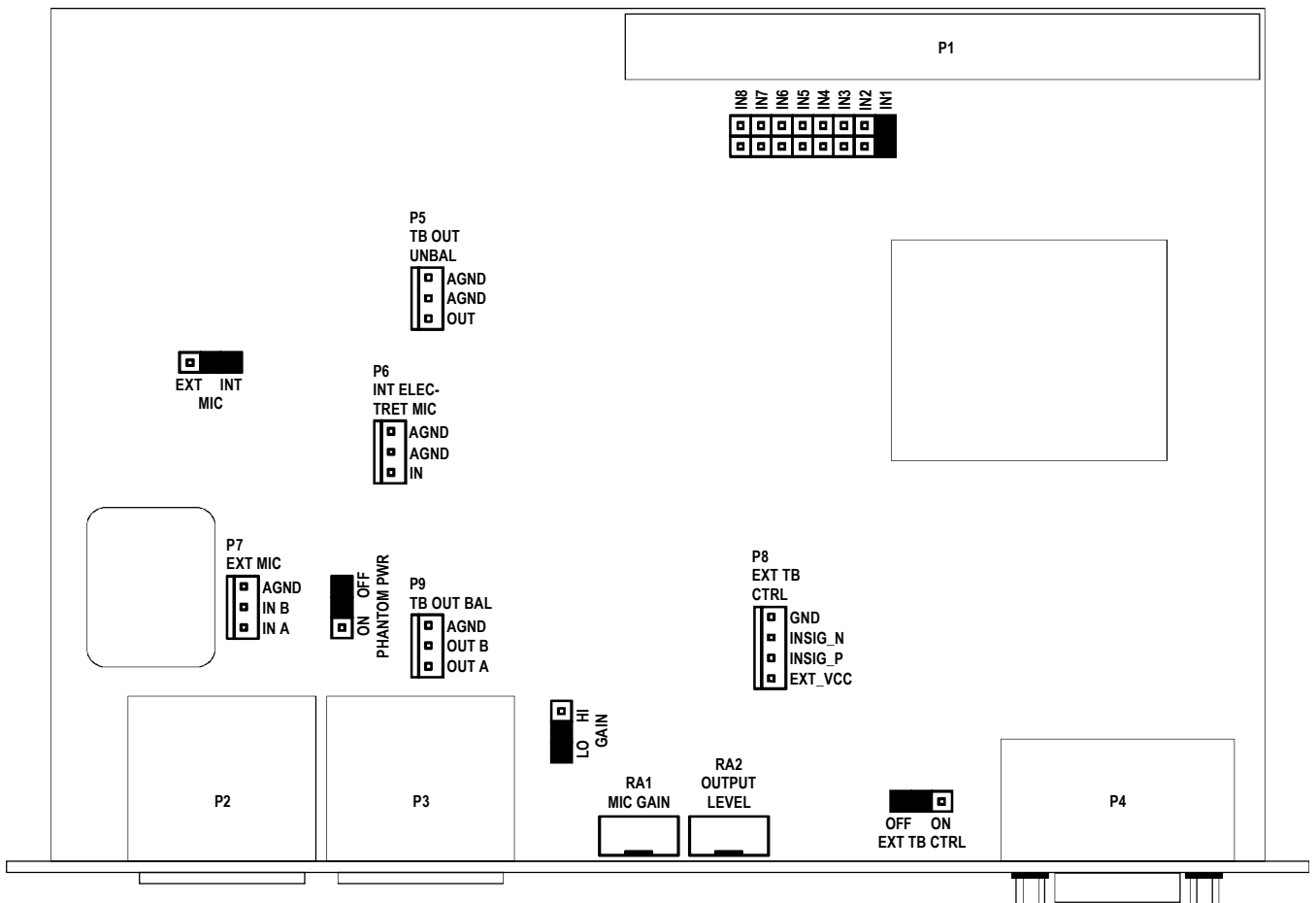
Connections:

TB Mic Input Module: Connect the flat cable to the IMB connector on the DSP Board which corresponds to the selected console configuration. In a 24-channel console the TB Mic Input Module is connected to the same daisy-chain connector as the removed input module was connected to.

TB mic: Insert the contacts of the microphone cable into the AMP connector housing contained in the set, and make sure that the contact retaining springs engage:



Then plug the AMP connector to P6 of the TB Mic Input Unit.



- PCB connectors:**
- P6** Internal electret TB mic input (unbalanced)
 - P7** External, transformer-balanced mic input (parallel to P2)
 - P5** Unbalanced TB output
 - P9** Transformer-balanced TB output (parallel to P3)
 - P8** External TB control input (parallel to P4)

- Adjustments:**
- RA1** MIC GAIN; the factory setting is performed for the electret TB mic. The integrated limiter just starts limiting at input levels above -60 dBu (GAIN jumper in LO position).
 - RA2** OUTPUT LEVEL; the factory setting corresponds to the customer-specified line level (adjustment range $-10...+14$ dBu).

15.18 DIP switches & jumpers

Input modules:

For every input module, the module address must be set with DIP switches; the address depends on the position of the module within the console.

Module address (hex)	for faders no.:			
0x81	1	7	13	19
0x82	2	8	14	20
0x83	3	9	15	21
0x84	4	10	16	22
0x85	5	11	17	23
0x86	6	12	18	24

Module address (hex)	DIP switch no.:							
	1	2	3	4	5	6	7	8
0x81	OFF	ON	ON	ON	reserved for Mic input gain setting			OFF
0x82	ON	OFF	ON	ON				OFF
0x83	OFF	OFF	ON	ON				OFF
0x84	ON	ON	OFF	ON				OFF
0x85	OFF	ON	OFF	ON				OFF
0x86	ON	OFF	OFF	ON				OFF

Besides, the default gain setting of microphone input modules can be set with the DIP switches 5, 6, and 7. Therefore, if a one of the microphone inputs is used as a talkback input, its gain can be matched to the microphone used.

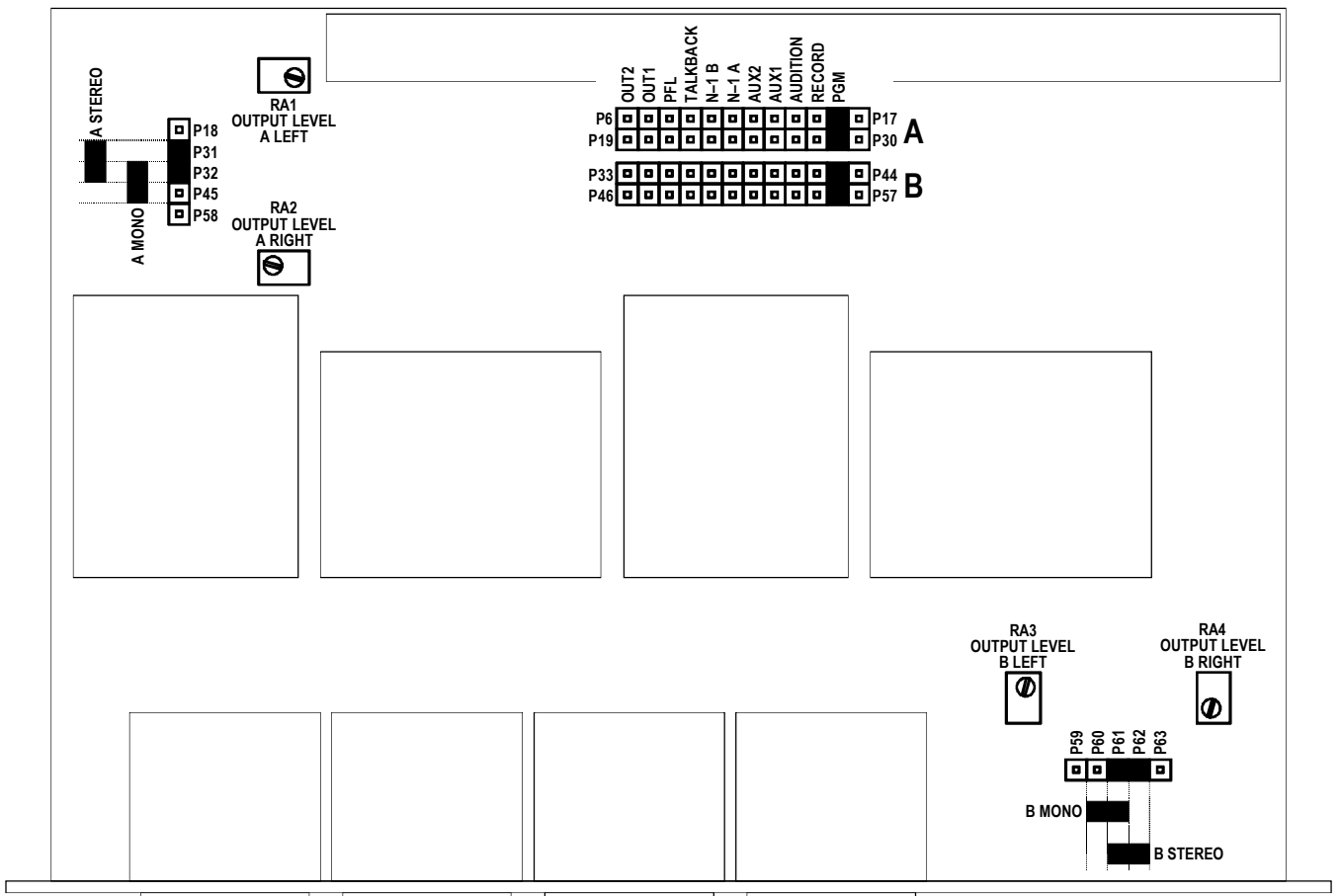
Mic input gain [dB]	Input level [dBu] for 0 dB _{FS}	DIP switch no.:							
		1	2	3	4	5	6	7	8
70	-55	Address setting				OFF	OFF	OFF	Addr
67	-52					ON	OFF	OFF	
64	-49					OFF	ON	OFF	
61	-46					ON	ON	OFF	
58	-43					OFF	OFF	ON	
55	-40					ON	OFF	ON	
52	-37					OFF	ON	ON	
-5	20					ON	ON	ON	

Analog output module:

The analog output module has labeled jumpers located on the PCB for mono/stereo selection and selecting the desired output signal.

Dual analog output modules:

Dual analog output modules have jumpers for mono/stereo selection and for selecting the desired output signal, individually for each output A and B.



Digital output module:

Digital output modules have two DIP switches (A and B) for selecting the desired output signal for each of the two independent outputs. Selection is done according to the following table:

Output signal	Module address (hex)
PROGRAM (PGM, ON-AIR)	0x86
RECORD (REC)	0x87
AUDITION (AUD)	0x88
(N-1) A	0x89
(N-1) B	0x8A
AUX 1	0x8B
AUX 2	0x8C

Module address (hex)	DIP switch no.:							
	1	2	3	4	5	6	7	8
0x86	ON	OFF	OFF	ON	Not used			
0x87	OFF	OFF	OFF	ON				
0x88	ON	ON	ON	OFF				
0x89	OFF	ON	ON	OFF				
0x8A	ON	OFF	ON	OFF				
0x8B	OFF	OFF	ON	OFF				
0x8C	ON	ON	OFF	OFF				

Analog/digital insert module:

The insert 1/2 or 3/4 address selection is performed with a DIP switch:

Module address (hex)	DIP switch no.:							
	1	2	3	4	5	6	7	8
0x84 (for insert 1/2)	ON	ON	OFF	ON	ON	ON	ON	OFF
0x85 (for insert 3/4)	OFF	ON	OFF	ON	ON	ON	ON	OFF

Telephone hybrid control:

The telephone hybrid control module must always be set to address 0x83.

Module address (hex)	DIP switch no.:							
	1	2	3	4	5	6	7	8
0x83	OFF	OFF	ON	ON	ON	ON	ON	OFF

Time sync module:

DIP switch:

The time source for the time sync module is selected with a DIP switch:

Time source	DIP switch no.:							
	1	2	3	4	5	6	7	8
NONE	ON	ON	ON	ON	ON	ON	ON	ON
AFNOR NFS87-500	OFF	ON	ON	ON	ON	ON	ON	ON
DCF77 (expert mouse clock)	ON	OFF	ON	ON	ON	ON	ON	ON
MOBATIME (IF482; 9600 baud)	OFF	OFF	ON	ON	ON	ON	ON	ON
GPS (NMEA 0183 V1.5, V2.0; 4800 baud)	ON	ON	OFF	ON	ON	ON	ON	ON
Seiko serial clock (RS485; 2400 baud)	OFF	ON	OFF	ON	ON	ON	ON	ON
RCC 8000A (9600 baud)	ON	OFF	OFF	ON	ON	ON	ON	ON
Hopf 6021 telegram (9600 baud)	OFF	OFF	OFF	ON	ON	ON	ON	ON
Leitch (SMPTE bi-phase TC)	ON	OFF	ON	OFF	ON	ON	ON	ON
Reserved for future use	all remaining combinations							

Jumper setting:

IF type	Jumper setting	Used for:
RS232C	8-9, 5-6	DCF77, Hopf, MOBA, RCC8000A, Seiko
RS422/485	7-8, 4-5	GPS, Leitch (SMPTE TC), AFNOR
Supply (high-Z)	10-11, 12-13	DCF77 or MOBA only!

Clock sync module:

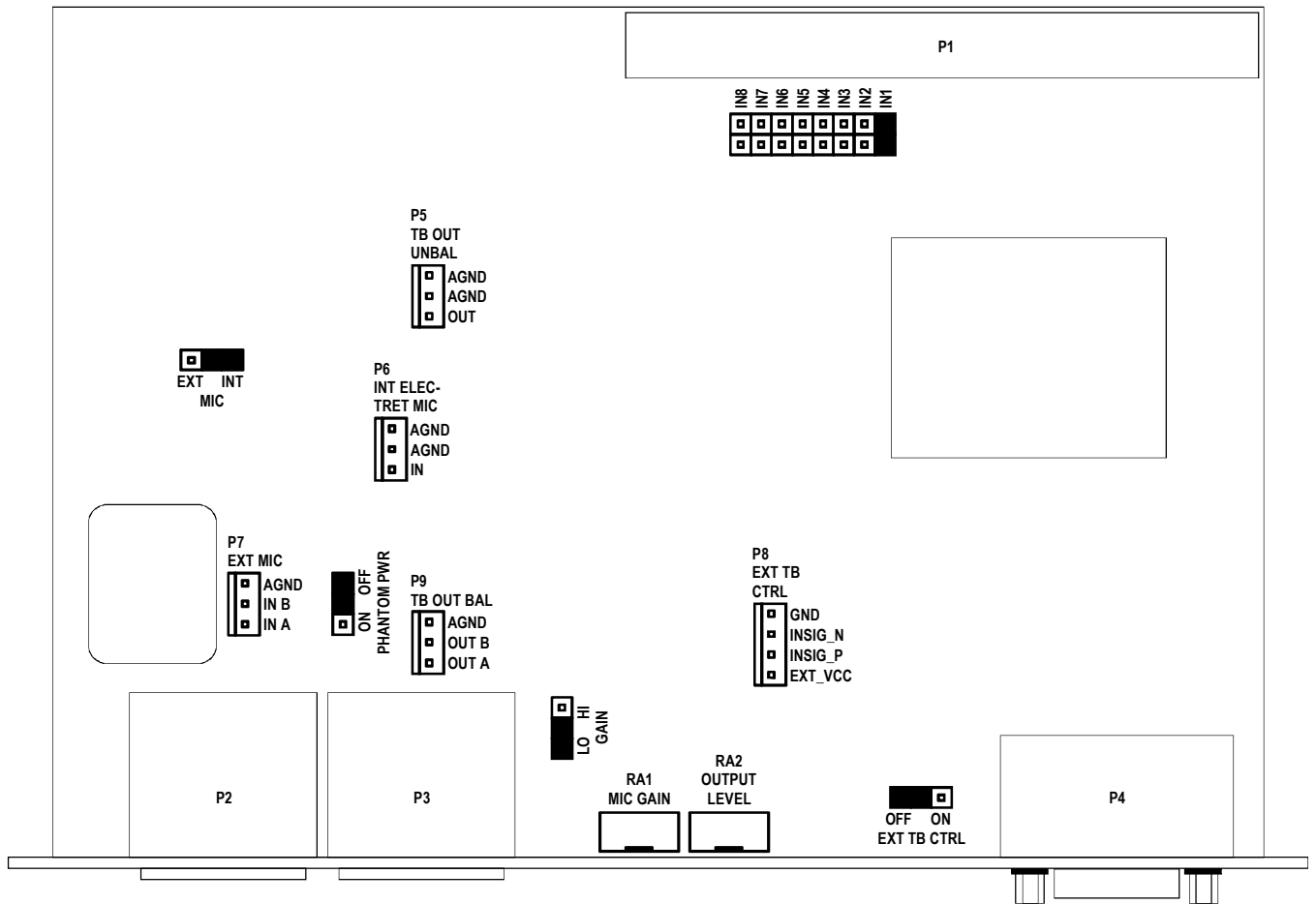
If P7 and P8 are connected with a jumper, the 75 Ω termination of the VIDEO IN input is active. If this jumper is removed, the input is terminated with 110 Ω .

Desk size selection:

The desk size must be set with the two jumpers CFG0 and CFG1 on the DSP board (1.942.102).

Console size	CFG0 inserted	CFG1 inserted
6 channels	yes	yes
12 channels (or 6 ch with TB Mic Input Unit option)	no	yes
18 channels (or 12 ch with TB Mic Input Unit option)	yes	no
24 channels (or 18 ch with TB Mic Input Unit option)	no	no

TB Mic Input Module:



- Jumper setting: MIC INT/EXT:** Input selection – either internal unbalanced microphone (i.e. the standard electret TB mic with fixed supply voltage), connected to P6, or external balanced microphone with switchable phantom power, connected to P2 or P7.
- PHANTOM PWR ON/OFF:** Selection of 48 V phantom power for the balanced mic input (P2 or P7).
- GAIN HI/LO:** For the internal standard electret TB mic, the LO position (nominal input level: –60 dBu) is used. In HI position, the mic input gain is increased by 20 dB, i.e. nominal input level –80 dBu.
- EXT. TB CTRL ON/OFF:** Activates or deactivates the external TB control input on P4 or P8.
- IN1...8:** Address selection – refer to the [“Console configuration” paragraph in section 15.17](#); factory setting: IN1.