

adt-audio

BC
TV & Radio

Installation
+
Configuration

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Preface

You receive this handbook before the delivery of your mixer. It is part of the operating instructions and contains the information that you require in order to prepare the assembly of your mixer and to plan the installation and to carry out before the delivery. To this purpose, we assembled here the information, that you must know over the connections, whose situation and occupancy require and the most favourable connection procedures for the different devices. Furthermore this handbook contains some information on the assembly of the mixer, that are however for you only then of importance, if the unit is not delivered, not mounted and is not taken in operation by ADT.

Please, read the following sides attentively. At many points we reprimand at frequent mistakes and give type to its avoidance. You save time if you read this short information carefully and unnecessary initial difficulties with more expense.

The first part of this handbook contains information about the power supply units and the realisation of the power connections.

You find some references about the realisation of the audio-installation as well as the connection occupancies in the frame of the mixer in the second part.

Part 3 contains general references to the assembly of the mixing console, that are for you only then of importance, if the delivery is not undertaken by ADT.

Important instruction:

**This manual treats the stereo-realization of the series
BC3 – revision 2 – 2002**

1. Power supply

1.1 Power supply units

The power supply unit is adapted to the equipment and size of the frame. Two different power supply types of different achievement are available. Both types are normally not cooled by a fan and fundamentally for the installation into 19"-racks suited, sufficiently they are stably to carry the device.

Alternatively the devices also can be set up freely. The width of the front panel is general 483 mm, the actual devices width 448 mm. The devices without connector are approximately 210 mm deep. The connections are at the back



Abb. 1 - Power Supply Units UPS600 a. UPS1000

of the devices. Beside the power supply connection there is a 20pol. female strip, at which the connection cable are connected to the mixing console.

The type UPS600 is sufficiently for all realizations of mixers with up to 24 canals. Larger frames with more than 24 modules and 8 groups are equipped as a rule with an UPS1000. The actual power requirement depends in addition to the canal amount and also of the incorporated module types. In especially critical situations (voltage variations, long supply lines), it is advisable to use the next larger power supply device

1.1.1 Security for breakdown of a power supply unit

If an failsave operation is required also in loss of the power supply unit (for example in broadcast business), a second identical power supply unit can be delivered additionally that becomes connected over a crossover-unit. If one power supply unit fails, the second unit takes its function without switching. Herewith it is indifferent whether a power supply unit precipitates completely or if only a single supply voltage fails. The type suitable for both power supply units is the power supply crossover unit C1000. This device is as a 19" unit, 3 units height, with an installation depth of 320 mm.

1.2 Assembly and installation of the power supply units

Because all devices don't need a fan unit, it is to be paid attention in the installation to good warmth removal. **The cool areas on the sides of the power supply units must be ventilated.** An installation in a closed rack is not recommended. On basis of the natural convection, cold air from below must be able to approach at the cool profiles. Furthermore the heated air must be able to

TYP	Power Consumption	Nominal Current of the Main Voltages	Usage with Consoles up to	Height & Depth
UPS600	600VA	3 A	24 in 8	220 x 210 mm
UPS1000	1000VA	5 A	48 in 8	220 x 210 mm

emerge towards the top, without that a warmth obstruction forms itself. If in the rack, in that the power supply unit should be incorporated additional to other devices with strong warmth development, there must be kept unconditionally a sufficient interval between the devices (3 to 6 heights units, according to warmth development). At the ground of the rack no device may be incorporated.. Also here 3 heights units must be free to enable the access of cool air.

If the power supply unit will stretch freely set up of a rack, it must be respected that it does not stand directly on the ground, because then no air can circulate through the device and the components in the power supply unit cannot take away emerging heat.

For this case, there are distance pieces, which must be given under the power supply unit, available. In the emergency, also two wood slats of at least 5 cm or 4 hulks do it. The least interval between power supply unit and ground should amount to 5 cm. Natural a larger interval is not injurious. In assembly at a wall or in a corner, one should keep also an interval of at least 5 cm in all respects. This applies naturally also to one panel mounted on the power supply unit, that we recommend in free assembly. Is it on the basis of the given place ratios not possible to fulfil these conditions, there are a row of possibilities, that are described in the following

1.2.1 Ventilation by fan unit in the rack

This results meaningful manner with one or two fan units. If only one fan unit is available, this should stretched in the rack above incorporated, so that it extracts the heated air out of the rack. A second fan unit should be incorporated below and stretched blow in fresh air in the rack. This fan unit should be equipped with a dust filter, therewith not other dives, through the taken in air, in the course of the time, becomes polluted totally. Because in such an arrangement the function is given only then, if fan units are in order, it is very meaningfully to use always 2 or 3 fan units so that in loss of one unit there is no fail function.

1.2.2 Ventilation by fan unit in the power supply unit

It is possible that all power supply units, in corresponding with order, are equipped with fans. So finished power supply units enable a business under impeded conditions. They cause a reduction of the cool body temperature of about 10 to 20 degrees. Because of the more uniform effect, the fan units in the racks are to prefer.

1.2.3. Stronger Power Supply unit

A power supply unit with more capacity reduces the warming of the cool bodies. However always the same warmth quantity is released in the end. This procedure cannot be used therefore in warmth obstruction because there is only a slower up heating. Only where the convection is unfavourable, this solution is meaningful.

1.3 Controlling of installation

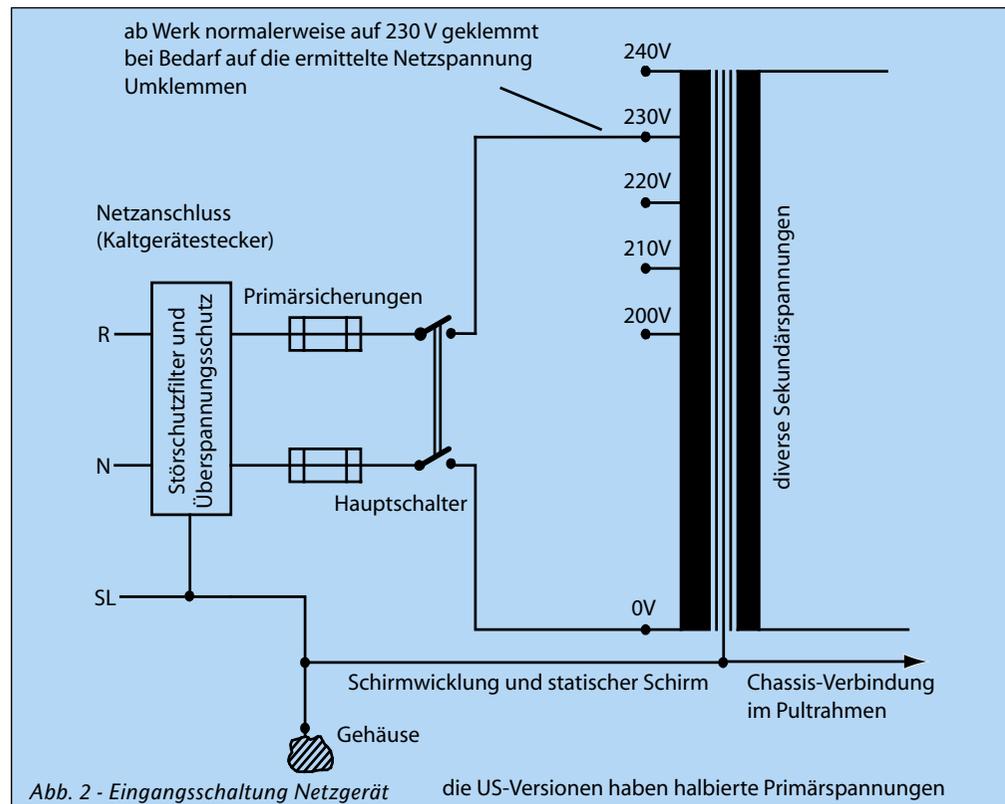
A good method for inspection of the installation is the measurement of the cool body temperature. First of all must be guaranteed that the adjustment of the power voltage is done correctly, described in the following. If the temperature exceeds after a time of a few hours is higher as 60 °, the cooling must be improved. The simplest procedure of measuring is to control in with your hand. According to experience the warmth feeling will be sufficiently exact for such a judgment. 60 ° perceives one as hot, so that one immediately back point, while 50 ° is perceived as very warm.

1.4. Power voltage

The power supply units are designed for a power voltage of 230 V. The transformer of the unit has connections on the primary side in 200, 210, 220, 230 and 240 V so that there is an exact conformity to the local power voltage. These connections are accessible by decreasing of the cover sheet metal and are inscribed at the clamps of the power transformer. A voltage adaptation results through connect a wire to another clamp. Obviously the power supply unit must be separated previously by the power voltage. The more exactly the conformity to the local power voltage results, so more slighter is the warmth development of the power supply unit. Simultaneous there is also the rule reserve

slighter against break-ins in the power voltage. Because in the rarest falling a long-term clerk to the ascertainment of the power voltage over a longer period can be used, the power voltage should be measured with a multi meter at any days in intervals of one or two hours and these voltages should be noted, especially if doubt exists the stability of the power voltage. According to the ratios at the place, there arise typical break-ins. In residential areas, the mostly break-ins are on at the late morning. The power voltage should be pinched then on that littlest measured value. After that the cool body temperature should be tested again after working of some hours.

Versions for US-Voltages are available.



1.5 Audio-network

With respect to the power supply of the total studio, many problems can be avoided if from the beginning there is done the correct installation in the studio. In this manner the problematic of noise interferences by other devices can be diminished and also the variations of the power voltage. Additional in the studio there is a clean separation of the different consumer circles is possible. A correct ground of all studio equipment prefaces a correct power voltage installation.

1.5.1 Power supply wiring

In the optimal case, the studio is furnished by a separate three-phase current line. This line should be cabled separately from the central grounding node of the house with a sufficient cross-section (z. B. 4 x 10 mm²). It ends in a separate distribution in the studio itself. By the cabling at the house connection and a separate line it is prevented that other devices, which are also connected to this line, bring in interferences into the network.

By a separate wiring with a separate studio distribution, it is in addition possible to control the problems caused by the protection line. Usually the risers to the separate distributions are carried out only with 4-conductors (3 phases and neutral conductor) At the house connection there is always, a potential balance to water direction, heating and so on, available. At this point, in all rule it exists a very low ground resistance. If you have not a separate cabling of neutral conductor and protective-conductor, you have the more problems the larger the distance to the main connection is. Because in almost all practical situations the three-phase current network is not burdened symmetrical, there always an usually considerable balance current is flowing over the neutral conductor to the main connection. This current produces a voltage drop at the resistance of the wiring, that can become considerably large. For example if sub-distribution installed with 6 mm² at the main connection with a cable length of 30 m, so the internal resistance of this line and the contact resistance at the clamps are together approximately 0,1 Ohm. If it is connected to on phase an electric fan fire with 2 kVA and a water heater with also 2 kVA, and the power voltage is 230 V, the current is approximately 18 A. This current produces a voltage drop of 1.8 V between main connection and sub dis-

tribution at the neutral conductor.

This potential difference, that naturally is a 50-Hz-alternating voltage, can be the reason for considerable interference signals in the studio installation, if there is only a single connection within the studio at another earth potential.

In the optimal case with one additional earth connection cable with a very large cross-section (16 mm² or more), that is installed parallel to the actual cable, it is possible, that within the complete installation there flows no current in the protection leaders anymore and also no potential difference can appear. This separate installed protective-conductor is not connected with the protective-conductor in the sub distribution. The security remains guaranteed, because the protective-conductor in each case has sufficiently a very low resistance to release the fuse, if there is a fault. Therefore in the studio the protection conductor is studio or operational earth. This procedure proved itself in the practice, because there are practically no humming noises and there are also no objections with respect to the security and the VDE-directions. If needed it is possible to fuse the power supply wiring by a fault current relay (FI) It will be the best if the different devices are divided in separate fused current circuits. If this meaningfully appears, the audio equipment may be wired with a main switch, so that the complete studio can be turned off and on with one switch. In this case it is very important the strict separation of the current circuits, which are components of the audio equipment, the light circles and all other devices.

Obviously such an unit may be installed only by an electrician. On no case, you yourself may undertake changes at the electric unit.

1.5.2 Phases coordination

Never the three phases should be divided more or fewer accidentally on the devices. It is better to summarize the complete audio equipment, as well as various plug sockets in the studio and in the production control room, for the connection of devices and accessories, on a phase. These freely accessible plug sockets must be unconditionally correspondingly marked in order to guarantee that the audio equipment which will be flying installed, then are also really connected to the audio phase and not on the circuit for vacuum cleaner

and coffee machines. If necessary these devices are distributed to several fuses, which are connected together to one phase in a sub distribution A subdivision, similarly the overleaf drawing, in circuit for the mixing console, tape machine circuit and circuit for effect units, is usually meaningful. Monitoring equipment with large power amplifiers, should be installed at a further circuit. Both remaining phases serve can be used for light equipment and other devices as well as photocopy units (which mostly produces extreme interferences), coffee machine etc. Hereby it is guaranteed, that the interferences coming by these devices, cannot affect the phase of the audio equipment. Moreover it is possible, if there are unfavourable total ratios in the house, the 'softest' phase for the audio equipment can be chosen by changing of the phases.

1.5.3 Switching-on current

Because the switching-on current of the studio equipment is very high, there must be done corresponding measures for the fuse of the power supply circuits. Therefore the actual switching-on current of the power transformer is not very important. Because in the stabilization units and in the complete equipment itself there are considerable stand and store capacities which are naturally unloaded in the moment of the turning on, the complete equipment is in the moment of the turning on for the power supply practically a short circuit. Through the choice of a suitable, slow fuse, these difficulties can be gone around. We think, that a conventional limitation of the switching-on current outside the power supply units is not meaningful because these switching circuits are designed for switching of inductive devices and fail for that purpose by using after a short time, and therewith naturally a total fail is caused. For an UPS600 or an UPS1000, a circuit with a slow fuse of 16 A in each case suffices.

1.6. Connection power supply unit - mixing console

1.6.1 The connection

The power supply unit is connected to the mixing console with a standardized multiple cable, which consists on both endings 20pin connectors. The connectors are equipped with an encoding. Please only turn on the power supply unit if the cable is connected between power supply unit and mixing console.

The connection for the power supply cable is situated on the connection unit behind the master section

1.6.2 Important reference

Please avoid to connect the cable if the power supply unit is already turned on. In that case nothing becomes broken, however the protection logic of the power supply unit in this case can register an overload, which can causes a down adjustment of one or several supply voltages. Should this happen, please turn off the power supply unit and after about a half minute turn on again. In the meantime please connect the power supply unit with the mixing console.

1.6.3 Length of the connection cables

Usually used cables are cables with conductors for power- and control signals, without cable screen, with 18 cores, each core with a cross-section of 1.5 mm². These can be used for lengths up to 15 m. If there are longer cableways, it is not possible only lengthen the cable. Simultaneously the cross-section must be corresponding increased. By using of a 4 mm² cross-section lengths up to 25 m can be realize. Larger cable lengths with greater cross-section are general possible, but not recommended.

Not all cores in the multi-core cable have the same load. Therefore for a longer cable only 8 cores are needed with a 4mm² cross-section, other 8 cores need only a cross-section of 1,5mm² and for the remaining cores 2,5mm² are recommended. It is difficult to buy cables with greater cross-sections than 1,5mm² and greater core numbers. If it is possible, then mostly only complete coils of 50 or 100m can be delivered. For the case the connection cable with larger

b = - a = +



POWER CONNECTORS IN CONSOLE, POWER-SUPPLY AND CROSS-OVER UNITS

20 Pin DIN 41622 Connector
Female in Power Supply - Male in Console Frame

VOLTAGE IN CONSOLE-FRAME **MAXIMUM OUTPUT CURRENT IN UNIT**
MINIMUM MAXIMUM
(Minimum Voltage ist needed for Headroom + 26 dBu Voltage may not exceed Maximum)
UPS600 UPS1000

10	AUDIO +	24.0 V	25.5V	3 A	5A
9	AUDIO -	24.0 V	25.5V	3 A	5A
8	RELAIS	24.5 V	26.5V	3 A	5A
7	EXT-CTRL	23.5 V	24.5V	1 A	1 A
6	METER	23.5 V	25.5V	3 A	5 A
5	SPEAKER	18.0 V	20.0V	1.5 A	1.5 A
4	LOGIC	15.0 V	16.0V	3 A	5A
3	P48	47.5 V	48.5V	0.1 A	0.1 A
2	nc				
1	CHASSIS / SL				

ALL SUPPLY VOLTAGES ARE FULLY FLOATING IN THE POWER SUPPLY UNIT AND THE CROSSOVER UNIT!
 ALL VOLTAGES ARE MEASURED IN CONSOLE-FRAME
 THE VOLTAGES IN THE POWER UNIT DEPEND ON CABLE LENGTH AND CURRENT CONSUMPTION OF THE CONSOLE

lengths are inevitable, please ask us. We will name you, based on the exact equipment of the mixing console, what cross-section is required.

1.6.4 Construction of the connections between power supply unit and mixing console

The diagram shows the pinning of the power supply connector

2. Audio-installation

2.1 Grounding systems

Before start the installation of the mixing console, some problems, that appear automatically by installation of complex audio-systems, must be considered. An undisturbed operation of a studio directly depends of the care used by the installation. Herewith not alone care stands for the orderly execution of the soldered joints, but rather also for the just as important realisation of the earth connections between the single installations devices.

An essential part of the problematic nature in the installation exists by realisation of the earth connections between the single components of the studio equipment. To discuss this subject in all aspects would exceed the scope of these operating instructions. Therefore here only the essential.

Proves and certainly works following grounding system

All screens of the wires are connected only at a side. In this manner over the screens no uncontrolled earth connection between the devices can emerge. Because all connection sockets of your BC3-mixing console are connected with the so named connector-ground, the simplest way to the realisation of this earth system is to connect all screens at the mixing console and don't connect them at the other end.

Also other procedures are obvious possible, for example. Always in signal direction (therefore at the input of a device) or to put on against the signal direction (therefore at the output of a device) In critical installations, it recommends itself, to connect the screens for HF-voltages on both sides. This is done with a condenser of about 10 nF, ceramic type, in row with the screen and connected on the side, at which normally no screen is connected.

If the screen is only connected on one side, there is no uncontrolled earth-connection possible. This principle is only then correct, if it is sure, that all audio devices are connected to the same earth potential. To this, all audio devices must be connected individually with a cable with large cross-section (at least 4 mm², better however 10 mm²) with a central ground point. For that the mixing console is equipped with a clamp for potential balance, which is connected to audio-ground. It recommends to install from this point, over a distributor, separate earth cables to the single devices of the studio. If this procedure is carried out consistently, it is an excellent base for an undisturbed operation.

1.The procedure power wiring, described above in, is used.

2.If there are reasons that such a realisation is not possible, there is a second, reliable possibility to isolate the complete power system for studio audio equipment with a large isolation transformer of the main power system. By using an isolation transformer it is no more galvanic connection with the main power system. It is no reference of the phases against earth on the secondary side of this isolating transformer. In such an arrangement the earth potential can be selected freely. Simultaneously there are the safety aspects considered because the power voltage has no more reference against the earth. In this case, the central earth point should be connected with at least 16 mm² with „earth“. Earth in this case is named for example the waterline, the heating or better an earth spike in damp ground. This procedure naturally prefaces that the selected earth is „clean“ - therefore there cannot arrive any new interferences over the selected earth point into the equipment. Furthermore must be respected unconditionally that there will be no connection over each wiring to the protection conductor. With a single connection, the total expense can be made to nothing. According to the difference of the potential between earth point, the protection conductor and the central connection point of the audio equipment, at which there is the connection, it is possible the effect reversed. Popular hidden earth connections result for example over antenna-connections at tuners or video recorders, which are connected with the audio equipment.

Computers connected to the audio system, which are also connected via network cable with the house network, are also a popular source for earth connections and can cause, sometimes only temporarily, suspicious interferences. Further only care help. First if it is proved by measurements of resistance, that the-

re are really no earth connections anymore, it is sure, of this side no interferences are to be expected.

3. The third possibility exists therein that a bad protection conductor is replaced by a fix mounted with high quality, connected to each power plug. Such an earth-conductor must have however, in order to suffice the safety requests, sufficiently low impedance, in order to release in the mistake case the fuse of the current circuit.

Unfortunately, this procedure has some security-technical problems which are caused by the grounding system prescribed in the FRG. The touchable parts of all electric devices become - provided that no other permissible protection procedure is applied - with the so named ,protection conductor‘ (ground-wire - identifying colour green yellow) connected. If tension gets by a mistake to a touchable part, this is short-circuited against the ground wire and the fuse is released. The ground wire too is connected to the zero potential. Because it is separated from the neutral conductor only from the last sub distribution, a considerable potential difference exists to the real earth’s potential (e.g., of the waterworks) mostly. We have implemented these problems already farther at the top by the discussion of the mains connection.

As a lot of devices do not keep the ground wire, the chassis and the zero potential of the audiocircuit apart, the ground wire’s potential is brought into the earth’s system of the studio. According to the amount of the potential difference and to the type of the disturbances this can lead to problems which can be avoided, however, by the technology described at the top. In the simple variant a humming voltage to is located on the ground wire.

The safest way to avoid these problems is to keep the protection conductor strictly separate from the audio ground and connect it only at one place. However, this is very difficult to realize for several reasons. The VDE (or similar) safety rules **MUST** be observed. Moreover, devices which do not have a power supply section with a facilities to separate the different grounds need to be installed via an isolating transformer. The second problem is that most of the devices to not allow the separation of the electrical ground from the chassis. By the mechanical attachment of such a device in a rack a ground loops appears.

In each case, such an electric installation must be done by an expert with corresponding experiences. In order to guarantee the security of the equipment, the whole equipment may only be started, if the pertinent safety regulations are fulfilled.

2.2 Cable material

The cable material which is used for the audio-installation is decisively for the function security of the equipment and for the working expense - and therefore for the costs. Normally there are used for most connections multi-core cables. At the market there are row of different types of these cables available. Because of the construction of the most connections on 30poligen strips, which can carry maximally 10 symmetrical audio lines, it is recommended the use of a cable with 10 pairs. In reference to the screen of the cables, it is urgently recommended to use no cables with foil screen. Normally they have no separate isolation for each pairs. Through the anodized aluminium foil, the screens are principle separated. By manufacturing of the cables it could be, that the single screens are not isolated from each other. For that, the single pairs must be isolated with a shrinking tube and this needs a very time. If on single pairs single connectors(XLR, jacks, etc) must be soldered, it is necessary to take care, that in any case the isolation of the screen is correct. Otherwise there will be some troubles with strange earth on the screen, caused simply because the screens get contact with the rear panels of the devices. These problems can be gone easily around by using of multi core cables with which pair has its own isolation. These cables are available with and without common screen.

If each single pair has its own screen mostly it is not necessary to have a common screen. Just as it for an usual studio installation is not required to use a cable with especially stable outside isolation. These cables have rather the disadvantage of a larger diameter and are not so flexible. The construction of the screen and the isolation of the pairs are of importance for the working expense by the manufacturing. Rational working is only possible if the coat of the cable can be removed with a simply stripping pliers, without it exists the danger, that the internal cores are damaged at the same time.

The internal cores should have a sufficiently thick, heat steady isolation. If the isolation is too thin, it exists the danger, by removal of the outside isolation and the screen the isolation could be damaged. This place remains undetected, there is a very unpleasant mistake source, that is to be found later very

hard. Because of the large breach danger, the using of massive wire should be avoided. If there are difficulties with the procurement of a suitable cable, ADT names gladly corresponding reference sources and types.

2.3 Planning of the installation

A good first planning for the installation saves much effort and annoyance, that appears, if later turns out, what was forgotten and what not meaningfully was carried out of practice. Therefore such a planning should be done. The largest part of this expense is not the actual mixing console, because here the connections practically are fixed. Differently it looks in the effect devices, instruments and microphones. For microphones there should exist connection panels in the studio. Just as there must be available in the studio connection possibilities for directly adapted music instruments in sufficient amount. Because frequently such instruments also are used in the production control room, in this area also corresponding connections with the necessary connectors are needed or also special adapter cables. For the effect devices, the planning of the patches is very important. Hereby there are a great number of symmetrical and asymmetrical devices with different plugs und clamps. Furthermore very important is the layout planning of the rack for the effect devices, also the position of the power transformers in the effect devices and the susceptibility to interferences. Because here exist no standardizations or at least agreements between the manufacturers, many devices have its power supply right, others left, and others the power supply is on the front side and again others on backside. If possible devices with sensitive inputs or outputs should not so mounted, that devices, which are mounted under or over have there their power connections. Mysterious humming noises or other interferences, coming from for example LCD-displays, which are incorporated in the devices, can arise, if these rules are not considered. Furthermore the factor warmth development cannot be neglected. If there are too many devices without sufficient ventilation in a rack, it is possible that there can be considerable temperature increases within the devices, and that can cause fails. Finally also the problematic of the earth wiring is to be considered, that generally not uniformly is treated in the devices.

If you feel overcharges with this problematic nature, you should decide for that to delegate the planning and realisation of the installation to a qualified firm. Even if the sum to be spent for this quite highly appears to you - it is always yet little vis-à-vis the costs, that occur for the removal by problems and the there-

with connected extra expenses (look for mistakes instead of producing). ADT can name you, if you wish it, gladly corresponding firms, for the realisation of your installation, without running danger, to have later problems. If you decide for that way, you simply can skip the following sides because you have to do nothing with the subjects described here now in detail.

2.4 Realisation of the installation

Most work in the realisation of the installation consists in the confection of the needed cables.

This work prefaces a few things at practice. Furthermore appropriate tool should be available. At least moreover a test instrument is required, with which the cables can be tested afterwards.

Of the processing quality of the cables, it depends the function security of the studio. Corresponding care is here unconditionally required.

There are different mistakes, which can causes temporarily errors in a studio, without a single device has a mistake. For example that can be intermittent contacts, contact possibilities between cores and screen, dry joints that lead to the breaking of a core, insufficient cable fixings and many others.

Furthermore the cables absolutely must be tested on short circuits between the cores, pinning-mistakes, phase shift etc.

Later, such mistakes can cause, if they are in the installation and the complete audio system is in function, to curious effects, that appear often only in certain connection constellations, and first after weeks if such a constellation appears.

These naturally appear in a production and are very difficult to be later reconstructed.

2.5 The connection of effect devices

The connections of the effect devices should by done like the following principle:

1. All effect units should be cabled basically symmetrical
2. The screens should be always connected at the plugs of the mixing console, and not at the effect devices.

3. If it is used a symmetrical effect device, both cores must be connected.

4. If it is used an asymmetrical effect device, core a (+/hot) must be connected at input and output and core b (-/cold) to the earth of the effect device.

By using of this connection principle, the risk of a humming noise is reduced to a minimum. By this way the earth symmetrical input of the mixing console receives the output voltage of the effect unit between the audio core and the earth of this device. So the humming noise is not part of the audio-signal. In the same way there is the connection of input of the devices.

3. Frames

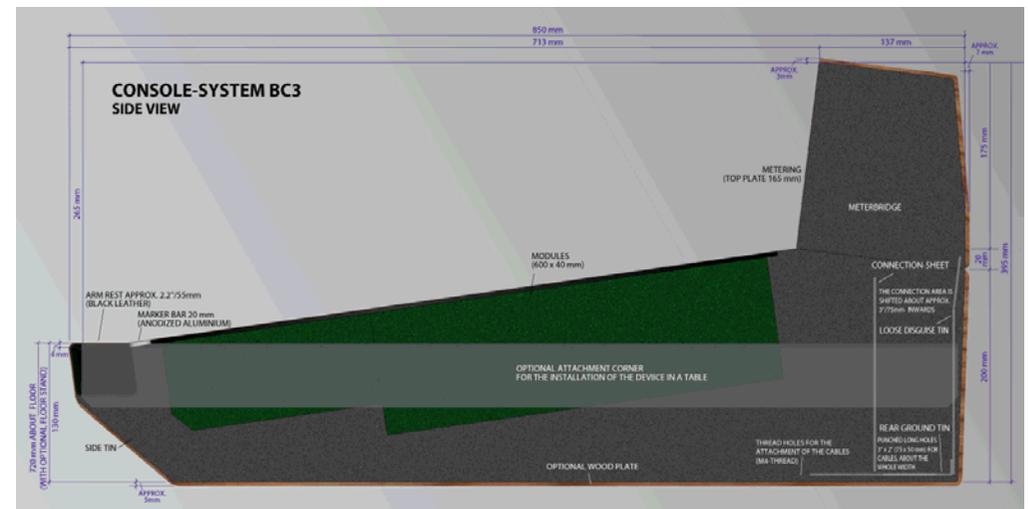
3.1 General informations

There are a lot of different types of frames of the mixing console series BC3 available. It depends of number of inputs- and groups modules and also if the mixing console should be used as a version in a desk or as a stand-alone unit.

3.2 Dimensions

3.2.1 Side view

The side view shows are all dimensions of the different frames. The using height of the stand-alone unit is determined by the height of the feet and can be heighten by adapters up to 50 mm.

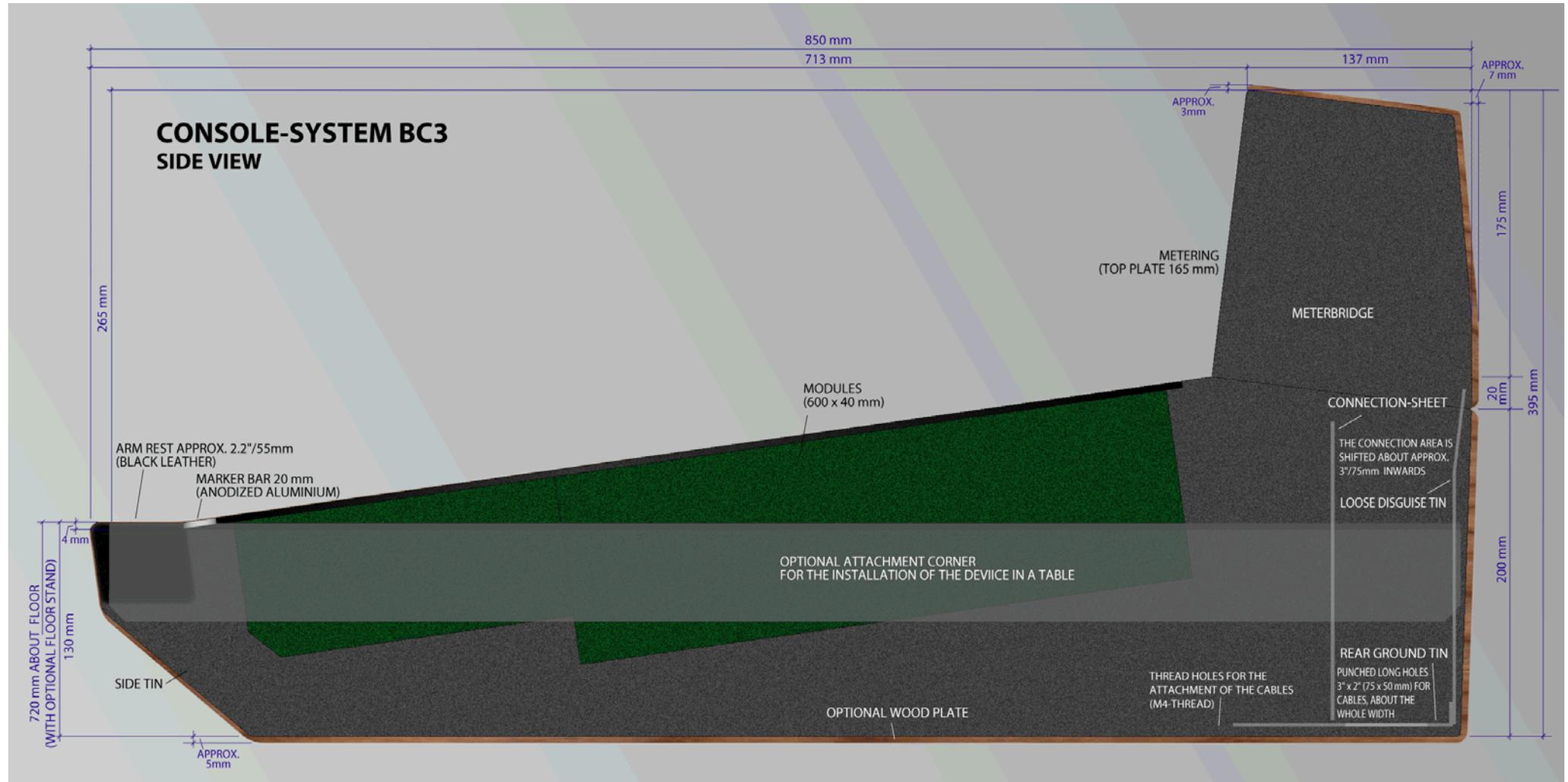


3.2.2 Width of the frame

The width of the frames depends of the number of modules. The module standard dimension of series BC3 is 40mm. The frames are organized in a division of always 4 modules. Frames are available in each width, which can be divided

through $4 \times 40 = 160\text{mm}$. The smallest frame for 4 Input channels and the master section therefore has an internal width of 320mm . There are also versions with an internal width of 3.040mm available. This is a version for 76 modules

and so for example for 64 input modules, 8 groups and the master section with 4 modules. Frames within these dimensions are available.



3.2.3 Equipment

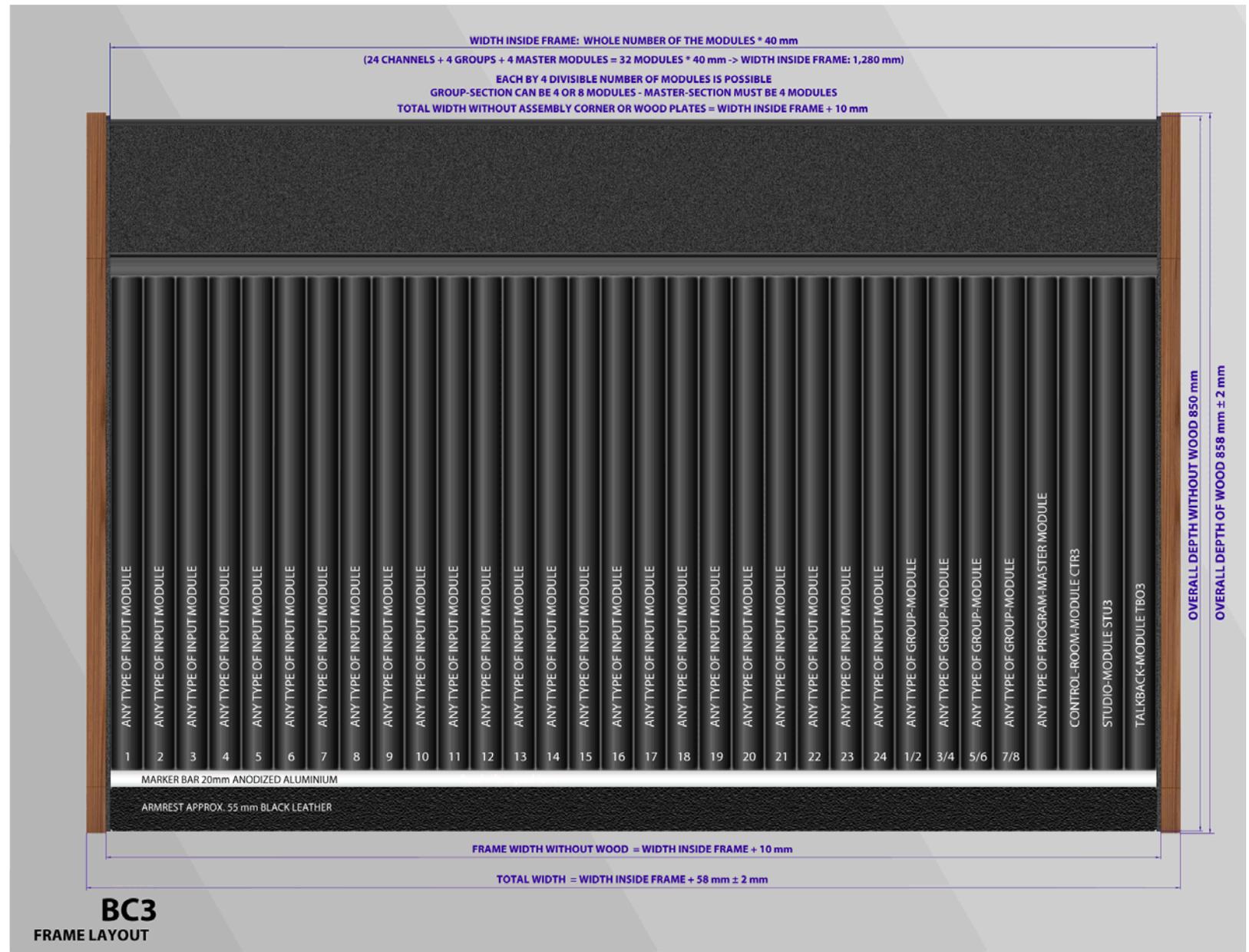
3.2.3.1 Master section

Each BC3-mixer must be equipped with a 4-module places wide master section. As a minimum there must also be a PGM master module and a monitoring module for the principle function. Additional it can be equipped a playback and a talkback module. The place of the master section can be selected within a division always of 4 module places. The wished position of the master section must be defined by ordering. Chancing afterwards is not simple and must be done in the factory.

3.2.3.2 Groups

It is possible to dedicate 0, 4, 8, 12 or 16 module places to equip with group modules. All input modules can be connected to the groups. There are also special input modules with routing for 12 or 16 groups. If more than 8 groups are installed, these input modules are needed.

The group modules can be realized as a mono or a stereo version. There are also versions available to mixed operation of mono and stereo group modules. The assignment of the groups to



the places for the modules is done at the wiring boards of the group module places. So always it is possible to change it by soldering. Every module place for a group module can be connected with every mono or stereo group line.

The spatial arrangement of the group module within the frame can be freely selected within always section of 4 modules. Like the master section the distribution must be indicated by ordering, because afterwards a changing is not easy and must be done in the factory.

3.2.3.3 Input modules

The wired places for input modules are compatible for all module versions. So it is not necessary to define which type of input module is used. This can be done every time with a jumper in the module, because all connections at all module places are identical.

3.2.3.4 Blindpanels, dummy, letter areas

Within a section of always 4 modules it can be introduced dummies or letter areas at any place. These can be realised in width of 160 mm, 320 mm, 480 mm and 640 mm or also equipped with single dummies of 40mm. Additional it can be used letter areas with a width by 320 mm or 480 mm with the working area parallel to the ground.

Places, equipped with dummies can be realised with or without wiring. If they are wired, consisting of wiring boards and connectors, later it is possible to equip modules very easy. It is also possible to change modules and dummies, also beside the grid of 4 modules.

3.2.4 Variantes

The frames are available for installation into a special desk, for installation on a desk and also with a special foot construction as a standing version.

All frames are always accommodated with all perforations and threads, which are needed for the different variants. A version, which is installed on a desk, later can also be used as a unit in a desk or as stand-alone device.

3.2.4.1 Desktop versions

This version has on both side's boards of wood and so it is suited for the assembly on a sufficiently stable table. The ground of the mixer is equipped with 4 stable boards of rubber.

3.2.4.2 Floor standing version

The desktop version can be also used with a special foot stand as a floor standing version. There are different constructions available. Normally the using height is 720mm upon the floor and can be heighten by adapters up to 50 mm.

3.2.4.3 Version to integrate the mixing console in a desk

In this variant the frames are not equipped with boards of wood. At both sides there are mounted angle plates. The installation can be done into a board of a desk or in a frame of metal. The desk or frame must be very stabile to hold the weight of the console. The dimension of the cuts for the installation are shown in the drawing.

3.2.4.4 19 Inch frame

Additional there is also a 19-inch frame available, which is used for the installation into standard racks. This frame is constructed for the place for 11 modules, with a width of 440 mm. The common width of the frame is 448 mm, so that the installation in standard frames with a width of a minimum of 450 mm is possible. The frames are equipped with 19-inch angle plates. The total width is 483 mm and the distance between the fixing holes is 465 mm.

The wiring of a frame is always done for installation of 8 input modules. Alternative it is possible to install 6 input modules and 2 group modules. The remaining 3 module places are used for the program-master-module, the monitoring module and optional the talkback-module. In that frame version an installation of a black-back module is not possible.

3.3 Meterbridge

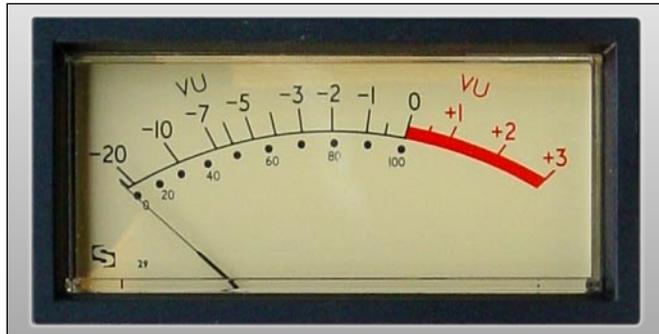
All frames for the BC3 series are equipped with a meter-bridge as a standard.

The connections to the meters in the over bridge is done by flat cables to wiring boards. To equip meters later is possible to every time. The power supply voltage for all meters is 24 V. The Power supply unit is equipped with a separate voltage for all meters, this voltage is always wired into the meter bridge. The types and number of the meters can be freely selected and is realized like the order.

3.3.2 Versions

3.3.2.1 VU-Meter

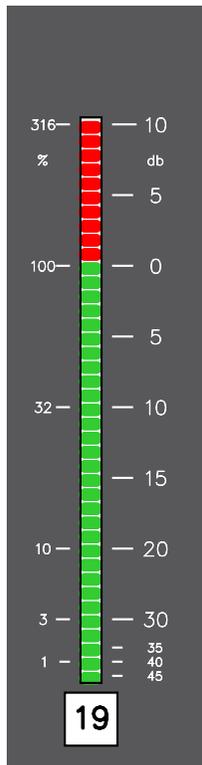
There are used VU meter of SIFAM. Built-up and built-down time of these meters are approximately 300 ms.



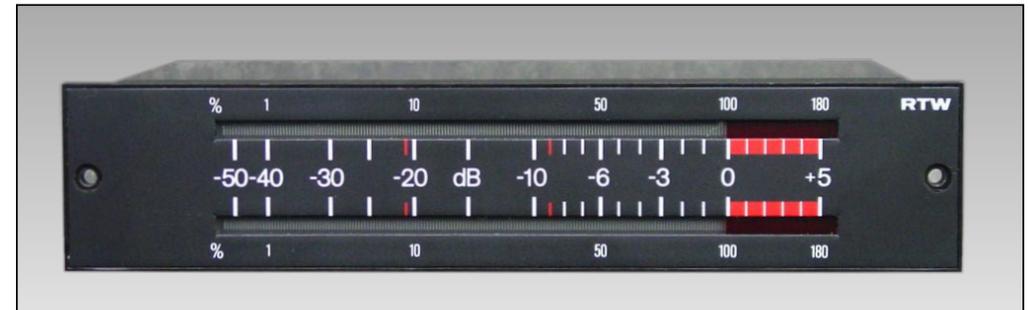
The VU meters have a leave of 4 dB as a standard. In standard nominal level +6 dBu there is 100% = 0dB indication of the VU meter at level +2 dBu. But there are also other settings possible.

3.3.2.1 Ledmeter

It is possible to install LED meter type SG-LED. This LED meter system consists of single printed circuit boards. Each board is equipped with one complete LED meter channel with 40 LEDs-. The built-up time can be adjusted to 10 ms with a jumper according to IRT standards, or to a value < 1 ms. The reverse time can be adjusted by 2 trimmers to 1,5 s per 20 dB. The indication display stretches from -40 dB up to +10 dB. The steps between +10dB and -20dB are 1 dB. The level for working is to select in a long-range and is normally +6dBu. The meters have an indication level in accordance with DIN 45405 (peak value rectifier quasi peak) with error of polarity reversal maximal 0,5dB.



The LED meter can be installed in a grid of 20mm. It is therefore possible to install 2 separate meters for stereo input channels and stereo group channels for both stereo channels directly over the modules.



3.3.2.2 RTW-Peakmeter

Different versions of RTW types of peakmeters can be implemented. Devices in standard cassettes 190 x 40 mm (type 1113, 1115 or 1119) must be installed horizontally. A maximum of 3 devices, one over the other can be equipped. For the installation of these devices there are front panels in width for 5 or 6 module places and for 1, 2 or 3 devices available

Type series 1000 uses cassettes with dimension 144 x 40mm (type 1001-40). These devices can be vertically equipped, also directly over input or group modules.

3.3.3 Loudspeakers

For use as PFL and talkback loudspeaker there are active loudspeakers for the installation into the over bridge available. The monitoring module CTR3 consists a select and control unit for this system. This unit can be configured for 1 or 2 loudspeakers. If there are 2 loudspeakers, one left and one right in the over bridge installed, it is possible to hear PFL-master also in stereo.

The loudspeakers are equipped with coax wide-band systems. There are used 8W power amplifiers. The supply is done by a separated voltage of power supply unit of the mixing console. This voltage is developed for maximal 2 loudspeakers, which need 4 module places in the meterbridge.

3.3.4 Additional devices

For additional devices there are different front panels and adapters available.

For this purpose a supply voltage of 24V and a supply current of 1A is planned and can be used.

4. Technical data

The characteristic data of all audio input and output modules are identical.

4.1 Level

Standard level for the system is +6dB. If the adjustment of the power supply off all audio parts is correct, the modulation range, within and outside of the system, is as a minimum of +22dBu. That applies for loads, which are greater or identical of the rated dummy load. For the whole system the diagram of the level is very flat. The input level is amplified by input amplifiers to the level of working. Then this level is the same for all other elements in the working like insert points, summery amplifiers and master output. But it is also possible, to use other working levels than +6dB. Therefore it must only be changed the adjustment of the program meters.

4.2 Frequency range

All components of the system are developed for the transmission of audio frequencies between 40Hz and 15kHz. This band is called in the following as transmission band. Variations in amplitude-frequency response correspond to the specifications of IRT standard 3/5. That also applies for the frequency response in subsonic and HF-band.

4.3 Inputs

4.3.1 Microphone inputs

All inputs for microphones are generally realized balanced and floating. The impedance of the inputs in band of frequency is $> 1\text{k}\Omega$, without switched attenuation and with it $> 2\text{k}\Omega$. The transformers for the inputs are designed for level of 0dB and frequencies $\geq 40\text{Hz}$ without attenuation. The input balance correspond to the specifications of IRT standard is $> 70\text{dB}$ and frequencies $\leq 15\text{kHz}$.

4.3.2 Line inputs

Alle Hochpegeleingänge des Anlagensystems sind in erdsymmetrischen oder symmetrisch-erdfreien Versionen ausführbar. Hierbei entscheidet die Verwendung der entsprechenden Modulversion über die Anschlussart. Die folgenden Daten gelten für alle Linien-Eingänge sowie Einschleif-Eingänge in Eingangsmodulen und Gruppen, Abhöreingänge usw..

4.3.2.1 Electronically balanced line inputs

nominal level	+ 6 dBu
maximum level in the transmission band	$\geq +22$ dBu
Input impedance in the transmission band	> 5 kOhm
Common mode rejection ratio (according to IRT rules)	> 40 dB, typical 50 dB in the transmission band

4.3.2.2 Line inputs with transformer (balanced and floating)

nominal level	+ 6 dBu
maximum level in the transmission band	$\geq + 22$ dBu
Input impedance in the transmission band	> 5 kOhm
Common mode rejection ratio (according to IRT rules)	> 60 dB in the transmission band
Torodial transformer, make Hauffe, most used type RK269	

4.4 Outputs

Nearly all outputs of the mixer are available in a grounded or an ungrounded balanced version. Only a few auxiliaries are earth-balanced. There are two different versions of input, group and master modules available. One with electronically balanced outputs and the other equipped with transformers. The following data counts for all channel outputs, for insert outputs, master outputs etc.

4.4.1 Electronically balanced outputs

nominal level	+ 6 dBu
maximum level in the transmission band	$\geq + 22$ dBu an ≥ 600 Ohm
Source impedance of the output in the transmission band	≥ 60 Ohm
Common mode rejection ratio of the output (according to IEC)	> 36 dB, typical 46 dB
Level error by using the output in unbalanced mode with core a or core b connected to ground	> 0.3 dB
Load resistance in unbalanced operation for a maximum level of + 22 dBu	≥ 1200 Ohm
The output driver DRV134 of Burr-Brown is used.	

4.4.2 Transformer balanced outputs (balanced and floating)

nominal level	+ 6 dBu
maximum level in the transmission band	$\geq + 22$ dBu an ≥ 300 Ohm
Source impedance of the output in the transmission band	≥ 40 Ohm
Common mode rejection ratio according to IEC	> 40 dB, typical 50 dB
Common mode rejection ratio according to IRT	> 60 dB, typical 70 dB
Torodial transformer, make Haufe, most used type RK 286/1 or transformers Lundahl LL1539/LL1582	

5. Connectors

5.1 General comments

5.1.1 Three versions of the connector panel

The connections for each module type of series BC3 are standardized. There are 3 types of connecting panels. Type 1 for the using of all types of input modules in the input section of the mixer. Type 2 for the using of all types of group modules in the group section of the mixer and type 3 is connection panel for the master section. One must be available in the mixer. Here there are also all connections, which are required for all module versions.

5.1.2 The arrangement in the frame

The frames of series BC3 are realized always in a grid of 4 module places. In this system there are also all connection panels designed. The arrangement within the frame can be freely selected within always a grid of 4 modules. There is no limit regarding the place for the equipment of input channels, group channels or the master section. The definition of the position of input channels, group channel and master section defines the position of the connection panels automatically, because the all connections always must be behind the modules.

5.1.3 Definition of the functions in the sections of the frame

5.1.3.1 Input channels

The connections of the input channels are compatible. Within the frame on all places, which are designed for inputs, all types of modules can be equipped. Depending of the equipped input module it change the functions of the connections at this module place.

5.1.3.2 Group channels

Also the group modules places for are compatible for all group module types. So there can be used all versions of stereo or mono group modules on all places. Also depending of the equipped module it change the functions of the connections at this module place.

IMPORTANT

To the difference of the section for input channels for the group section the group lines at module places must be defined.

This definition is done by soldering at the wiring boards at the group module places. This coordination must correspond to the wished arrangement of the groups and also there must 2 places in the frame with stereo groups be connected to two group lines (for example group 1 and 2). The places for mono groups are connected only to one group line.

5.1.3.3 Master section

In the master section the places for the modules are fixed, because the pinning of the connectors is very different. This distribution is:

PGM – CTR – STU – TBO

The first place of the master section can be equipped with all versions of program master module (PGM3 or PGM4). The second place is for all 3 versions of monitoring module CTR3.

As the minimum for the main functions of the mixer, there must be equipped the PGM and the CTR module. Module STU and TBO are an option. If they are not equipped naturally also its functions are missing. No functions are missing however within the stereo-master or the monitoring section. These two

modules are special necessary in mixing consoles with on air functions and a separated studio, for all communication between studio and mixer (talkback, playback, telephone etc.)

Not necessary are these two modules for edit studios with recording and reproducing equipment with monitoring.

As an option the playback module for the studio must be equipped at place 3 in the master section. It can be used the versions STU3a, STU3b or STU3c.

Also as an option the talkback and oscillator module TBO3 must be equipped at place 4 in the master section. It can be used the versions TBO3a, TBO3b or TBO3c.

5.2 Pinning of the connectors

For audio connections there are used 3pin XLR and 25pin SubD plugs. For the connection of an earphone additionally a ¼” bantam jack is used. The pinning of the connections is, if technically practical, always the same and the international standard. The opposite picture shows the pinning for the XLR plugs and the ¼” bantam jacks. In the mixer there are general used XLR female for the inputs and XLR male for the outputs.

The pinning of the 25pin SubD plug corresponds to the pinning of „TEAC“. At such one plug there are wired 8 balanced audio signals. The opposite picture shows the general system. The pinning of the single plugs is described in the following in the details. In the mixer for all audio lines with SubD-plugs with female contacts and UNC thread are used.

5.2.1 Screening

Within the frame of the mixer all screen contacts are connected to the ground. This counts for pin1 of the XLR plug and also for all screen-pins of the SubD-plugs. Which system for screen wiring in the studio is used is fixed by the user. Corresponding to the used screen system the screens must be connected in the plugs or not connected.

For the screen contacts within the frame of the mixer there is wired a separate earth line. This “CONNECTOR-GROUND” (ConnGnd) connects all screens

STANDARD AUDIO CONNECTORS



3-PIN XLR - MALE

2 OUTPUT + / Phase a / hot

3 OUTPUT - / Phase b / cold

1 SCREEN connected to Ground



3-PIN XLR - FEMALE

2 INPUT + / Phase a / hot

3 INPUT - / Phase b / cold

1 SCREEN connected to Ground

ALL SCREENING PINS ARE CONNECTED TO CONSOLES CONNECTOR-GROUND

1/4"/6.3 mm JACK - USED FOR PHONES



TIP LEFT OUTPUT

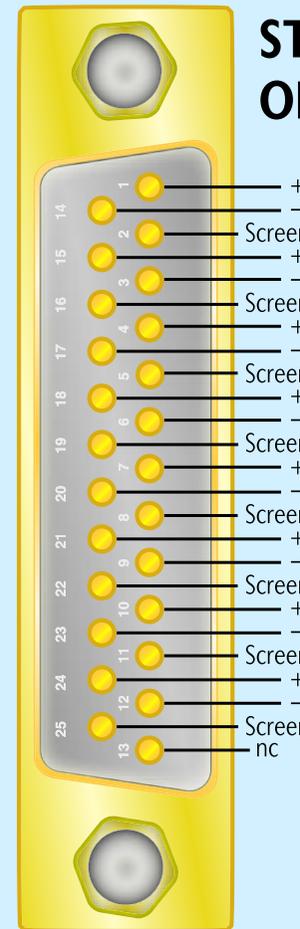
RING RIGHT OUTPUT

SLEEVE COMMON / GROUND

of the plugs together and is, within the frame with the internal potential-compensation, grounded. With this principle external grounds over screens can not be compensated over the grounds of the modules. So the master lines are extensively protected of humming noises.

- ¹ Connector-Ground: seperated ground system for all the screen connection of the audio lines
- ² Audio-Ground: internal electrical reference ground of the console

STANDARD AUDIO LINES ON SubD-25 CONNECTORS



14	+	AUDIO 8
15	-	Screen
16	+	AUDIO 7
17	-	Screen
18	+	AUDIO 6
19	-	Screen
20	+	AUDIO 5
21	-	Screen
22	+	AUDIO 4
23	-	Screen
24	+	AUDIO 3
25	-	Screen
	+	AUDIO 2
	-	Screen
	+	AUDIO 1
	-	Screen
	nc	

SubD-25 Connector
Female in Console Frame

5.3 Connector Panels

All connecting panels are realized for always 4 module places

5.3.1 Input channels

The connecting panel for the input channels consists 4 XLR females, 2 XLR males and 2 SubD females for each channel.

The 3pin XLR plugs are named with A to F. Its function changes with the module type incorporated at the respective frame place. The description of the functions of the 3 most important module versions is printed at the connec-

Reference:

It is also possible to cut the connector-ground from the earth and to connect it by a low resistor for example 4,7 Ohm. By this way interferences, caused by, can be reduced or prevented. This system should only then be used, if there is no possibility to eliminate a mistake in the installation.

Reference:

It is possible that microphone inputs with phantom supply have local interferences, if the connector-ground* with earth connections in the installation, is strongly polluted. In the versions of input modules with microphone amplifiers it can be selected with a jumper, whether the screen contact of microphone input plug is connected to connector-ground or to audio-ground**. If this screen contact is connected to audio-ground**, it must be the guarantee, that the screen of the connected microphone line has at no place contact with another electric or mechanical earth. For example this is possible at connecting units, patch panels, routing systems etc. In that case it can be a ripple voltage and with it interferences in groups or masters.

tion panel. The distribution of connector A to F for the single types of modules is described in detail in the quick-ref-brochure. Therefore here the 3 basis types.

5.3.1.1 Input modules

5.3.1.1.1 Mono input modules with mic and line input Typen IM3(s) oder IM4(s)

Connector A – CH-OUT

XLR-plug (male) standard pinning

1 = screen, 2 = core a / +, 3 = core b / -

The channel output (CH-OUT) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer). Nominal output level is +6dBu. It is possible to connect other signals than the output behind the fader to this plug, controlled by the switching functions of the module. The electronically balanced versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.

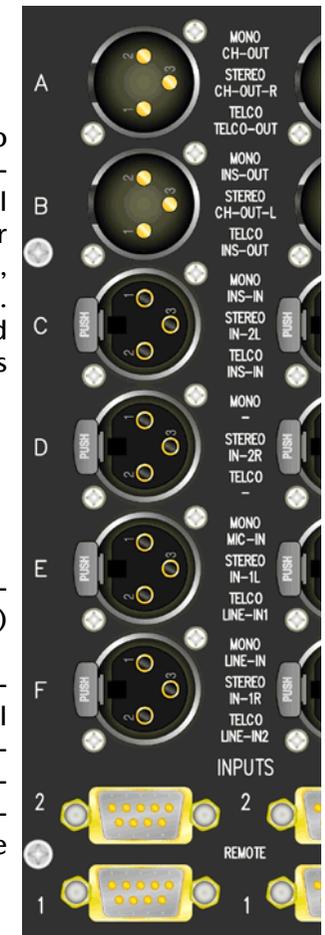
Connector B – INS-OUT

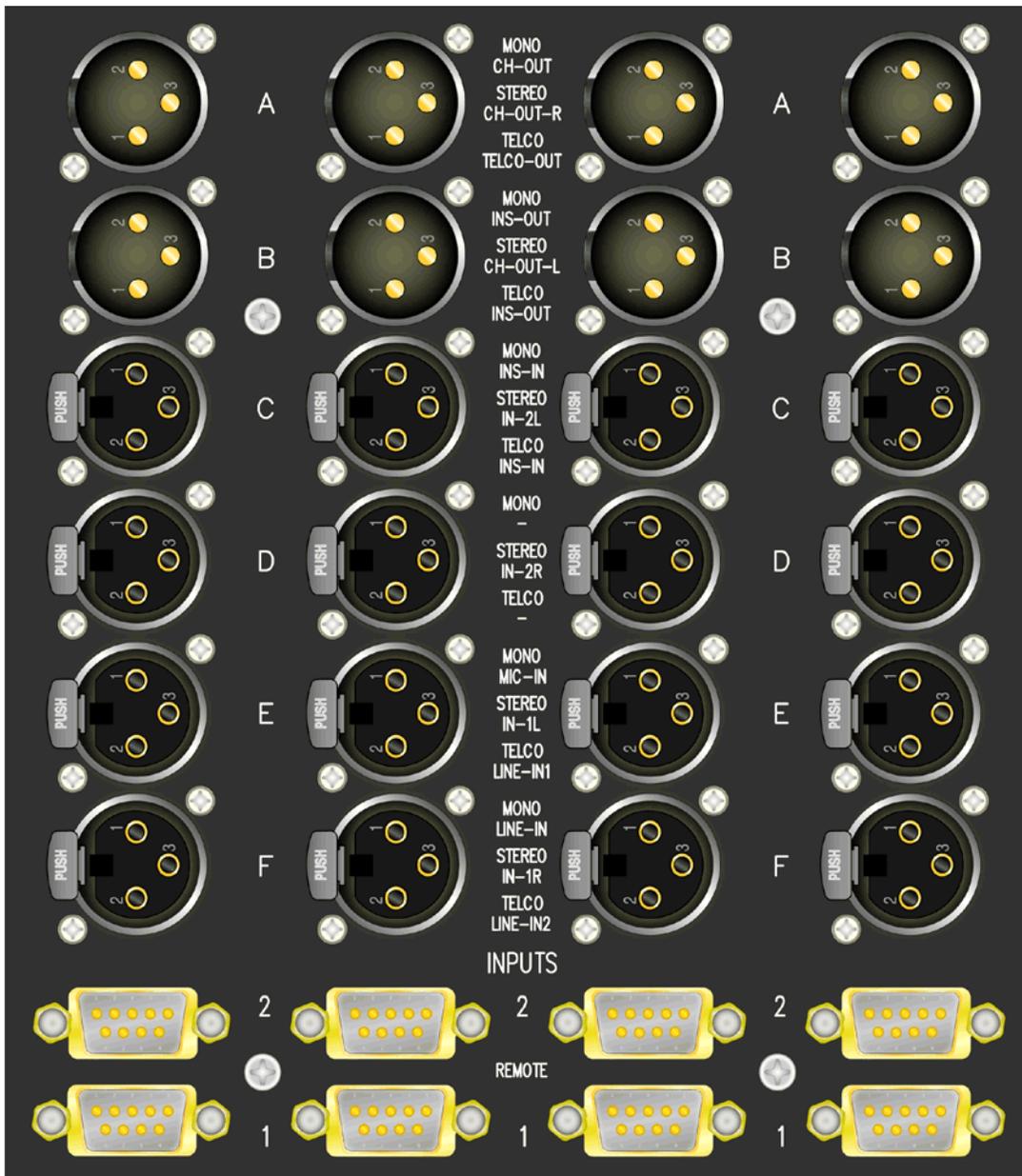
XLR-plug (male) standard pinning

1 = screen, 2 = core a / +, 3 = core b / -

The insert output (INS-OUT) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer).

The level of the output is +6dBu. The output is buffered – a short circuit does not matter the input channel itself. The insert output has also a signal, when the insert point in the module is not switched free. The electronically balanced versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.





Connector C – INS-IN

XLR-plug (male) standard pinning

1 = screen, 2 = core a / +, 3 = core b / -

The insert input (INS-IN) can be according to module version earth balanced (electronically balanced) or balanced earth free (with transformer). The nominal input level is +6dBu. For switching the insert input of the module the button INS must be pressed.

Connector D – not used

Connector E - MICROPHONE INPUT

XLR-plug (male) standard pinning

1 = screen, 2 = core a / +, 3 = core b / -

The microphone input is always balanced earth free (input transformer) Input resistance is > 1 k Ohm without and > 2 k Ohm with attenuation. In the module there is the possibility to switch a phantom supply to the input.

Connector F – LINE-IN

XLR-plug (male) standard pinning

1 = screen, 2 = core a / +, 3 = core b / -

The line input (LINE-IN) can be according to module version earth balanced (electronically balanced) or balanced earth free (with transformer). Nominal input level is +6dBu.

The input select switch of the module determines whether the microphone or the lines input is active. Couple to this switch there is also the remote control interface. If microphone input is selected remote is 1 active, if lines input than remote is 2 active.

5.3.1.1.2 Stereo input modules with 2 stereo line inputs, Types IS3(s) oder IS4(s)

Reference:

Stereo input modules with AES-EBU inputs and outputs are described

in detail in the quick-ref-brochure.

Connector A – CH-OUT-R
XLR-plug (male) standard pinning
1 = screen, 2 = core a / +, 3 = core b / -

The channel output right (CH-OUT-R) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer). Nominal output level is +6dBu. It is possible to connect other signals than the output behind the fader to this plug, controlled by the switching functions of the module. The electronically balanced versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.

Connector B – CH-OUT-L
XLR-plug (male) standard pinning
1 = screen, 2 = core a / +, 3 = core b / -

The channel output left (CH-OUT-L) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer). Nominal output level is +6dBu. It is possible to connect other signals than the output behind the fader to this plug, controlled by the switching functions of the module. The electronically balanced versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.

Connector C – LINE-IN 2 L
XLR-plug (female) standard pinning
1 = screen, 2 = core a / +, 3 = core b / -

Connector D – LINE-IN 2 R
XLR-plug (female) standard pinning
1 = screen, 2 = core a / +, 3 = core b / -

Connector E – LINE-IN 1 L
XLR-plug (female) standard pinning
1 = screen, 2 = core a / +, 3 = core b / -

Connector F – LINE-IN 1 R
XLR-plug (female) standard pinning
1 = screen, 2 = core a / +, 3 = core b / -

The stereo line input (LINE-IN) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer). Nominal input level is +6dBu. Each module consists of two stereo channels, which channel is active can be switched by an input select switcher.

With this switch there is also switched the remote control interface. If input LINE-IN 1 is selected remote is 1 active, if input LINE-IN 2 than remote is 2 active.

**5.3.1.1.3 Mono telco module with 2 line inputs,
Types IT3(s) oder IT4(s)**

Connector A – TELCO-OUT
XLR-plug (male) standard pinning
1 = screen, 2 = core a / +, 3 = core b / -

The output for the telephone hybrid (TELCO-OUT-R) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer). Nominal output level is +6dBu. It is possible to connect other signals than the output behind the fader to this plug, controlled by the switching functions of the module. The electronically balanced versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.

Connector B – INS-OUT
XLR-plug (male) standard pinning
1 = screen, 2 = core a / +, 3 = core b / -

The insert output (INS-OUT) can be according to module version earth balanced (electronically balanced) or balanced earth free (with transformer). The level of the output is +6dBu. The output is buffered – a short circuit does not matter the input channel itself. The insert output has also a signal, when the insert point in the module is not switched free. The electronically balanced versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.

Connector C – INS-IN
XLR-plug (male) standard pinning
1 = screen, 2 = core a / +, 3 = core b / -

The insert input (INS-IN) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer). The nominal input level is +6dBu. For switching the insert input of the module the button INS must be pressed.

Connector D – not used

Connector E – LINE-IN 1
XLR-plug (male) standard pinning
1 = screen, 2 = core a / +, 3 = core b / -

Connector F – LINE-IN 2
XLR-plug (male) standard pinning
1 = screen, 2 = core a / +, 3 = core b / -

The line inputs (LINE-IN 1 and LINE 2) can be according to module version earth balanced (electronically balanced) or balanced earth free (with transformer). Nominal input level is +6dBu. The input select switch of the module determines additional the remote control interface. If input LINE-IN 1 is selected remote is 1 active, if input LINE-IN 2 than remote is 2 active.

5.3.1.2 The remote control interfaces

Each module is equipped with 2 remote control connectors. These connectors are used on the one hand to the remote control of audio and telephone equipment and on the other hand, additional to the microphones, for the needed signals and switching units.

ded signals and switching units.

The remote control interfaces are realized with 9pin SubD female. One female for the needed connections for an audio or telephone device and the other for the microphone signals. Additional these females have also +24V to supply for relay, optical isolators, lamps etc.

Of the two remote control interfaces there is only one active. The switching of the remote controls is done by the input select switch. If in the mono input channel the microphone input is selected, than the remote control interface 1 is active. Is the line input selected than interface 2. The interface, which is not active, automatically switches off all relays, functions of buttons and signals.

5.3.1.2.1 Functions by using microphones

By the using of microphones, there is always remote control interface 1 active.

Outputs

Two signal outputs are existing. These outputs are active, when the microphone input is selected. Therefore always the Channel On button must be pushed. Additional the fader of the channel must be open (level normally greater than -30dB). The signal output 1 is a relay changeover contact, ungrounded. The operating contact is connected to pin 2, the back contact to pin 3 and the common contact to pin 7.

The relay can be differently used. The contacts are developed for currents up to 100 mA and a voltage up to 30 V. If there are higher currents or voltages the relay could be destroyed and there could be also interferences in the audio.

The signal output 2 is useful for the connection of a lamp, a LED or a relay for the control of light signals. A voltage of +24V (over a resistor of 47 Ohm) is con-



nected to pin 8 and Pin 7 is open collector output, protected with a resistor of 47 Ohm. The no-load voltage is 24 V. The output is designed for a current of 50 mA. So normal lamps, LED or relays for 24 V can be directly wired.

Additional there are two inputs for buttons. COUGH, connected to pin 4, is used for the wiring of a cough-button, with which it is possible to switch off the microphone. With TALKBACK, connected to pin 5, it is possible for the speaker to give commandos from the studio into the control room. The exact requirements for both functions can be configured in the input modules. For both functions buttons with one operating contact. The contacts must connect the switching input to relay ground (pin 6). The switching current of the input is approximately 1 mA. If for the signalling of this function there are used lamps or LED, they can be directly connected between +24 V (pin 1) and operating contact (pin4 or 5).

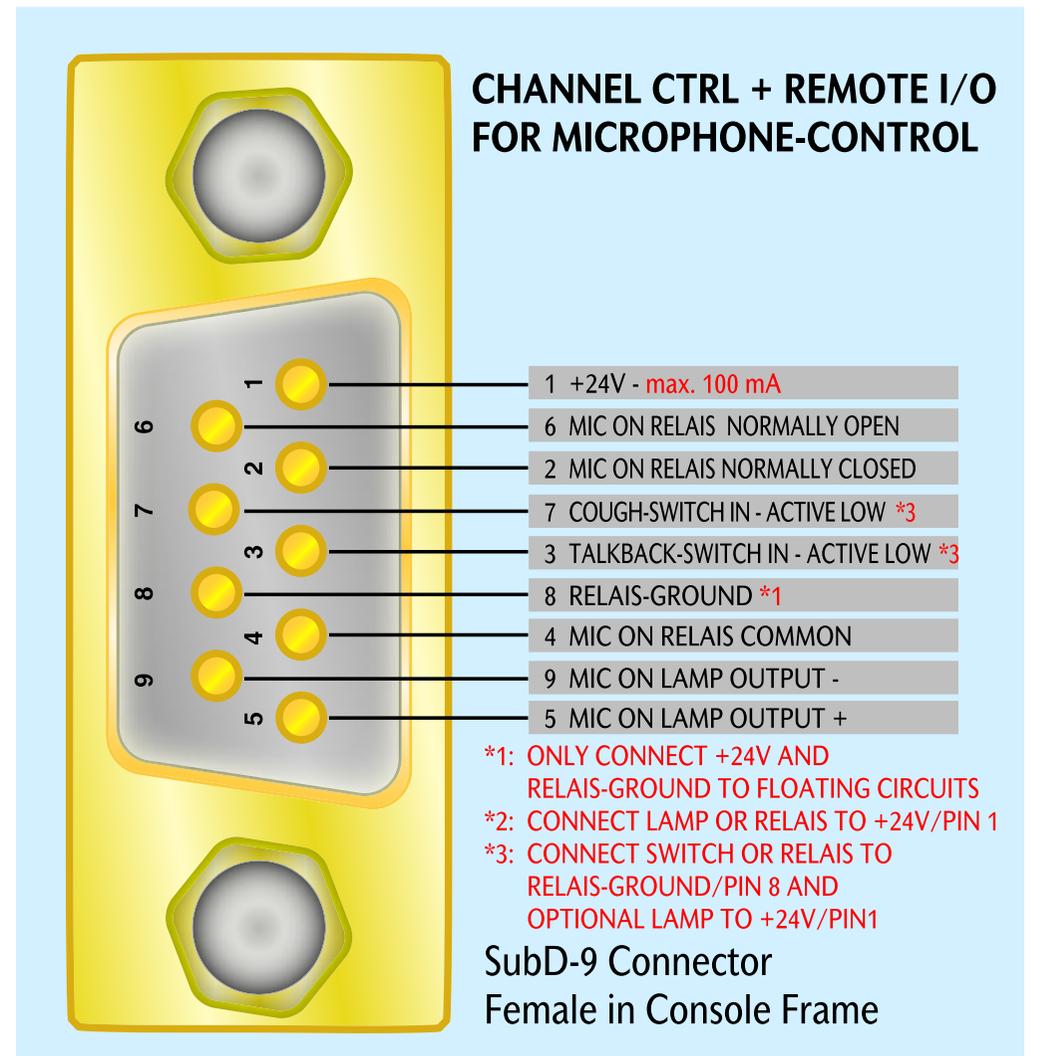
There is also a power supply of relays, buttons and lamps there is a 24V supply, maximal 100 mA. The plus pole of this voltage is connected to pin 1, the accompanying ground (relay ground) at pin 6. The voltage is fused by Polymer fuses and additional with protective resistors. So a short circuit for a longer time does not destroy components in the module. But it can be necessary that it is possible to switch off the mixer and to pull out the module and afterwards to put it in.

5.3.1.2.2 Functions for the using of remote control and telephone

If in the mono input channel there is selected a line input, than remote control interface 2 is active. In Stereo input modules both remote interfaces for the remote are used. It depends of the input selection LINE 1 / LINE 2 of the module, whether the interface 1 or 2 is active. Likewise there is the working of the TelCo modules.

The remote control interface consists of 2 relays, an input for the return signalisation with a lamp or LED, the button START (HYBRID) and the current for the supply. For all versions of line inputs and all telephone modules there is the same hardware and the pinning of the connectors.

The signal output 1 is a relay changeover contact, ungrounded. The operating contact is connected to pin 2, the back contact to pin 3 and the common



contact to pin 7. Relay 2 has an ungrounded operating contact connected between pin 4 and 5. Both relays are realized for currents up to 100 mA and voltages up to 30 V.

The functions of both relays are determined by the configuration of the chan-

nel. The function of the relays can be switch to impulse- or to static- working. If impulse-working is selected and remote control is active there is an impulse of relay 1 of about 100 ms, is remote control switched of there is also an impulse of 100 ms but of relay 2. The time of the impulse can be changed in the module if it needed. If impulse-working is selected, relays 1 is so long active, so long remote control on is switched. Relay 2 has the inverse function. It is so long active, so long remote control on is switched off.

Remote control active can be started with Channel On button, the contact of the fader or a combination of both.

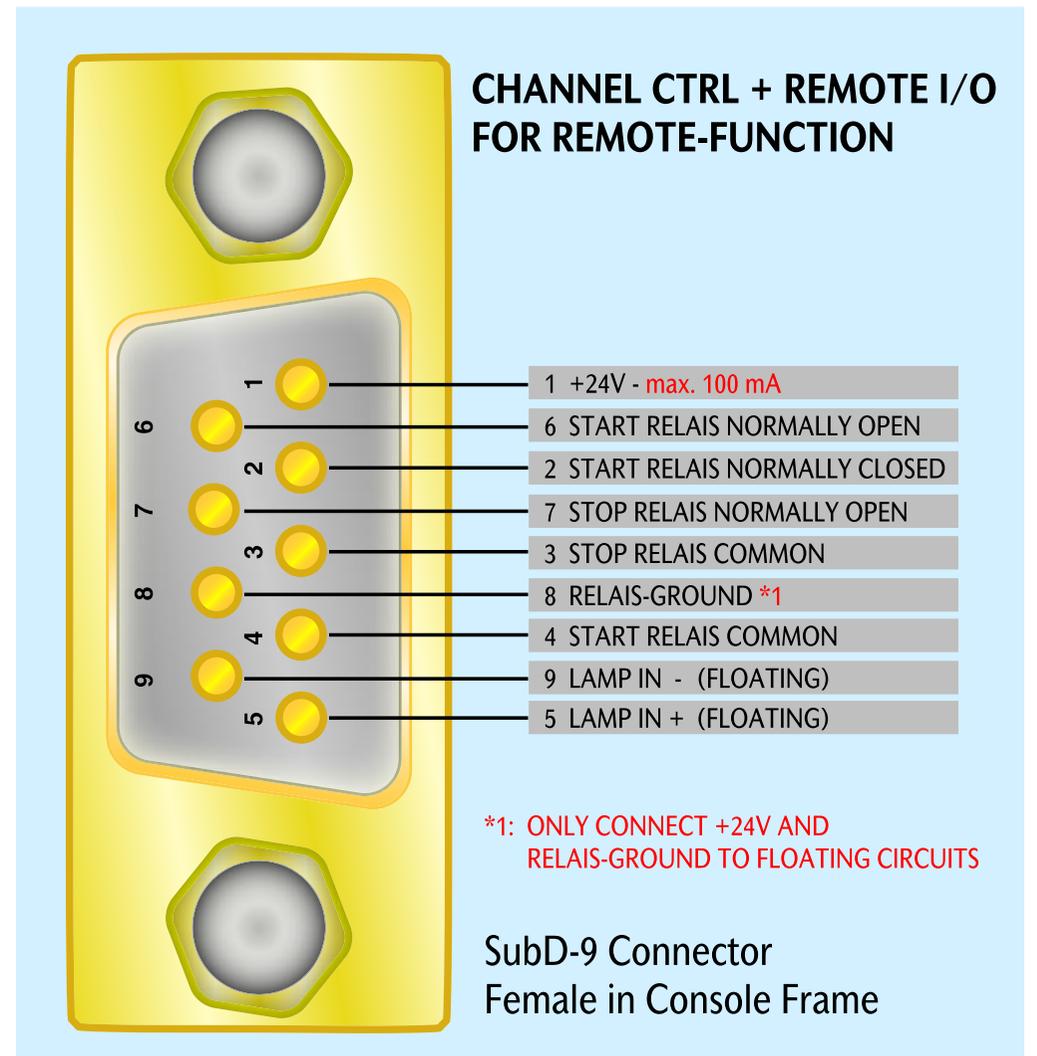
The input LAMP-IN can be used for a return signal of the remote function from device or hybrid. Here is the connection for the lamp or LED of button START or HYBRID. The input is separated by an optical isolator and has an input resistance of approximately 2 k Ohm. It can be used for voltages between approximately 9 up to 30 V. For working with a voltage of 5 V it is possible to change the resistors of the optical isolator in the module. The plus pole is connected to pin 9 and the minus pole to pin 8.

There is also a power supply of relays, buttons and lamps there is a 24V supply, maximal 100 mA. The plus pole of this voltage is connected to pin 1, the accompanying ground (relay ground) at pin 6. The voltage is fused by Polymer fuses and additional with protective resistors. So a short circuit for a longer time does not destroy components in the module. But it can be necessary that it is possible to switch off the mixer and to pull out the module and afterwards to put it in.

5.3.1.3 Interferences

As far as this is possible there are done all precautions, which are necessary in the construction of the remote control interfaces, to avoid interferences.

There may be some troubles caused by over-load of contacts or of the power supplies. Also higher voltages or currents can cause clicks in the audio. It is unconditionally to avoid to use alternating voltages in the relays. This can cause humming noises. If with the voltages of the remote control interfaces there are switched relays in external devices, in which there are no measures against bouncing, return currents etc., it is possible that the interferences of these de-



vices are also in the modules. In each case it is to be advised to use switching currents at the interfaces as slightly as possible. The voltages and currents of the external devices should have suppression of interferences. High interactions of humming voltages or HF-interferences can cause high, prolonged impulse interferences at the control lines. Often it is the best way to install an

external, isolated relay directly at the external device.

5.3.2 Groups

The connecting panel for the group channels consists 2 XLR females and 3 XLR males for each channel.

The 3pin XLR plugs are named with A to G. Its function changes with the module type incorporated at the respective frame place. The description of the functions of both most important module versions is printed at the connection panel.

The distribution of connector A to G for the single types of modules is described in detail in the quick-ref-brochure. Therefore here the both most important types.

5.3.2.1 Mono group modules Types MG3(s) oder MG4(s)

Connector A – not used

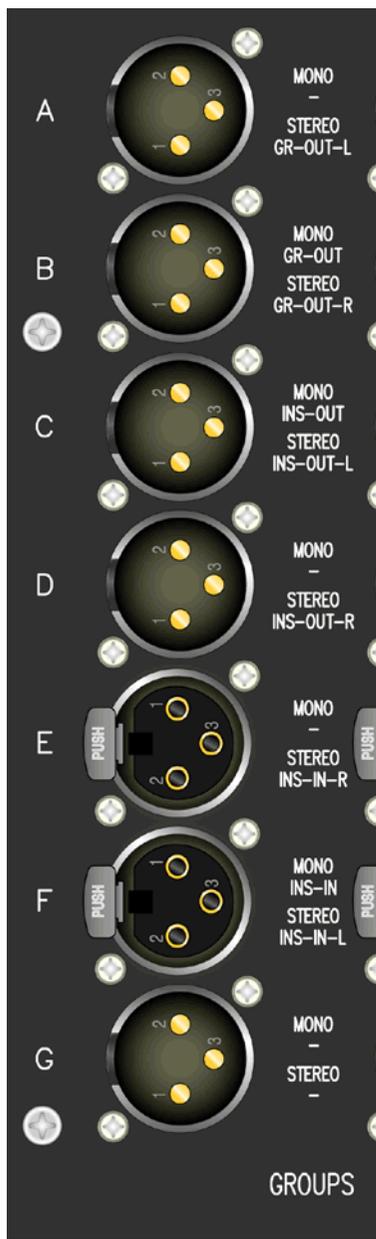
Connector B – GR-OUT
XLR-plug (male) pinning standard
1 = screen, 2 = core a / +, 3 = core b / -

The group output (GR-OUT) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer).The level of the output is +6dBu. It is possible to connect other signals than the output behind the fader to this plug, controlled by the switching functions of the module. The electronically balanced versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.

Connector C – INS-OUT
XLR-plug (male) pinning standard
1 = screen, 2 = core a / +, 3 = core b / -

The insert output (INS-OUT) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer).The nominal input level is +6dBu.The output is buffered – a short circuit does





not matter the input channel itself. The insert output has also a signal, when the insert point in the module is not switched free. The electronically balanced versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.

Connector D – not used

Connector E – not used

Connector F – INS-IN

XLR-plug (female) pinning standard

1 = screen, 2 = core a / +, 3 = core b / -

The insert input (INS-IN) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer). Nominal input level is +6dBu. The insert input in the module is than switched, when button INS is pressed.

Connector G – not used

Connector G is used for AES/EBU output in the digital version of this module.

5.3.2.2 Stereogruppenmodule, Typen SG3(s) oder SG4(s)

Connector A – GR-OUT-L

XLR-plug (male) pinning standard

1 = screen, 2 = core a / +, 3 = core b / -

The group output left (GR-OUT-L) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer).The level of the output is +6dBu. It is possible to connect other signals than the

output behind the fader to this plug, controlled by the switching functions of the module. The electronically balanced versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.

Connector B – GR-OUT-R

XLR-plug (male) pinning standard

1 = screen, 2 = core a / +, 3 = core b / -

The group output right (GR-OUT-R) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer).The level of the output is +6dBu. It is possible to connect other signals than the output behind the fader to this plug, controlled by the switching functions of the module. The electronically balanced versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.

Connector C – INS-OUT-L

XLR-plug (male) pinning standard

1 = screen, 2 = core a / +, 3 = core b / -

The insert output left (INS-OUT-L) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer).The nominal input level is +6dBu.The output is buffered – a short circuit does not matter the input channel itself. The insert output has also a signal, when the insert point in the module is not switched free. The electronically balanced versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.

Connector D – INS-OUT-R

XLR-plug (male) pinning standard

1 = screen, 2 = core a / +, 3 = core b / -

The insert output right (INS-OUT-R) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer).The nominal input level is +6dBu.The output is buffered – a short circuit does not matter the input channel itself. The insert output has also a signal, when the insert point in the module is not switched free. The electronically balanced

versions can be also used unbalanced. Therefore one of the both output cores must be connected with screen ground.

Connector E – INS-IN-L
XLR-plug (female) pinning standard
1 = screen, 2 = core a / +, 3 = core b / -

The insert input left (INS-IN-L) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer). Nominal input level is +6dBu. The insert input in the module is than switched, when button INS is pressed.

Connector F – INS-IN-R
XLR-plug (female) pinning standard
1 = screen, 2 = core a / +, 3 = core b / -

The insert input right (INS-IN-R) can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer). Nominal input level is +6dBu. The insert input in the module is than switched, when button INS is pressed.

Connector G – not used

Connector G is used for AES/EBU output in the digital version of this module

5.3.3 Master section

The connecting panel for the master section consists all inputs and outputs, which are needed for all versions of series BC3. The most important inputs and outputs are wired to XLR-plugs. Additional there are 10 25pin SubD-plugs for other audio inputs and outputs and 2 25pin SubD-plugs for control functions.

In the summary connecting panel there is also the connection for the power supply unit and a clamp for potential equalization. A few connections are only active, if defined modules or module versions are real equipped. Some connections have different functions in different module versions. These different functions are described subsequent in detail.

5.3.3.1 XLR connectors

On 3pin XLR-plugs there are wired the outputs of stereo master PGM, of auxiliary and Cue masters and of the monitoring loudspeakers, always XLR standard pinning. Additional here is also the output of the audio oscillator wired at 1 3pin XLR and 4 3pin XLR-female for the external monitoring inputs 9 and 10, controlled by the monitoring crossbar in module CTR3.

Connectors PGM-L, PGM-R, PGM-MNO
XLR-plug (male) pinning standard
1 = screen, 2 = core a / +, 3 = core b / -

On these connectors there is the signal of stereo master (program master) behind the broadcast switch (output switch). PGM-MNO is the mono-output, as the result of the left and the right master channel by a matrix. The outputs of the modules can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer).The nominal input level is +6dBu.

Connectors CUE-L, CUE-R, AUX1 bis AUX4
XLR-plug (male) pinning standard
1 = screen, 2 = core a / +, 3 = core b / -

On these connectors there are the outputs of the sub masters Cue (stereo) and auxiliary (4x mono). The outputs of the modules can be according to module version earth balanced (electronically balanced) or balanced floating (with transformer).The nominal input level is +6dBu.

Connectors SPK-L und SPK-R
XLR-plug (male) pinning standard
1 = screen, 2 = core a / +, 3 = core b / -

On these connectors there are the monitoring outputs of the loudspeakers of the control room module CTR3. The outputs of the modules can be according to module version earth balanced (electronically balanced) or balanced earth free (with transformer).The nominal input level is +6dBu.

Connector OSC

XLR-plug (male) pinning standard

1 = screen, 2 = core a / +, 3 = core b / -

On these connectors there is the output of the audio oscillator, equipped in module TBO3. This output is active, when the audio oscillator is switched on. It does not depend of the output distribution of the oscillator in the module TBO3. Naturally for this function the module must be available in the mixer.

Connectors EXT9-L, EXT9-R, EXT10-L, EXT10R

XLR-plug (female) pinning standard

1 = screen, 2 = core a / +, 3 = core b / -

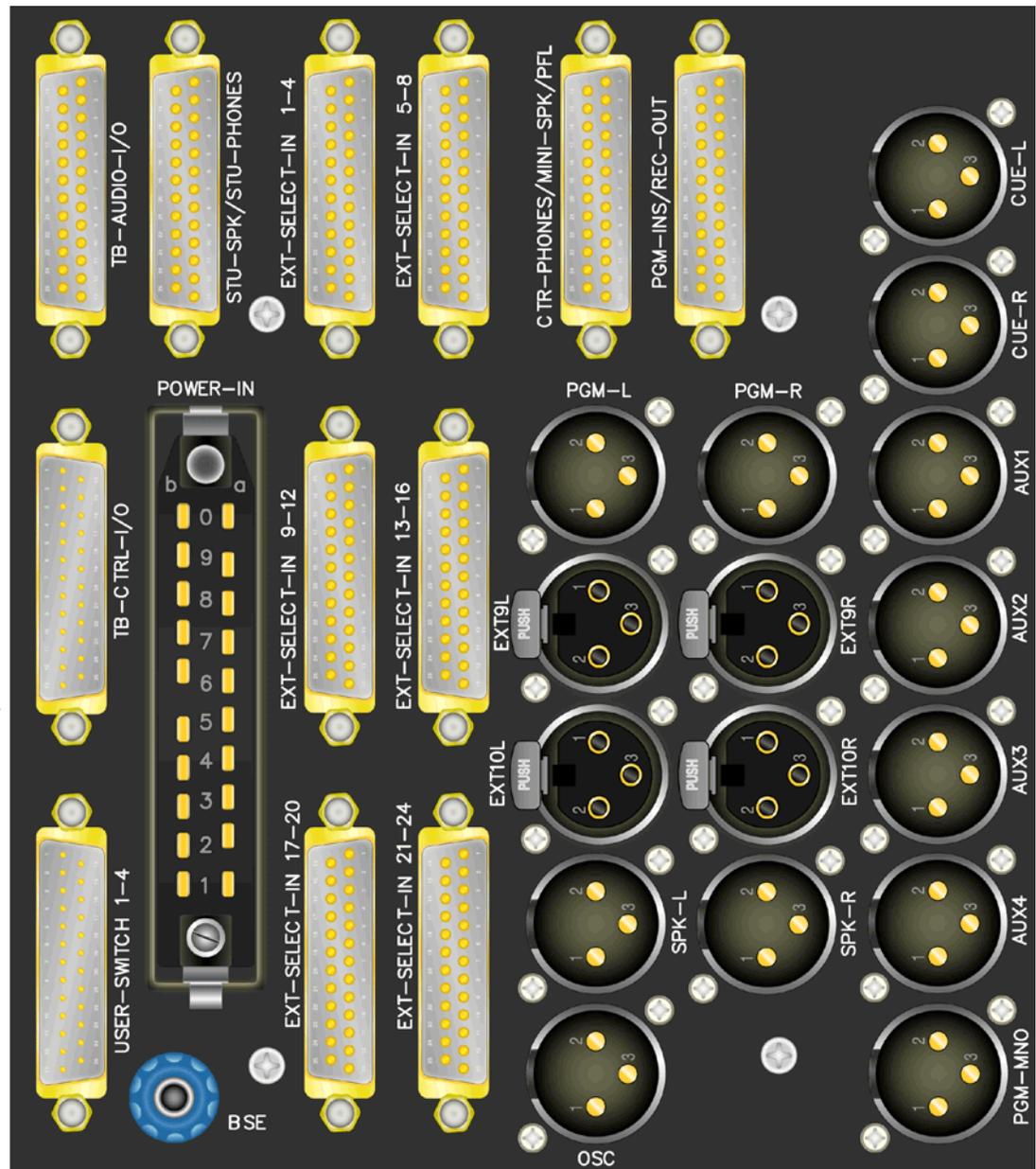
On these connectors there are the inputs 9 and 10 of the monitoring section EXTERN, equipped in monitoring module CTR3. The inputs of the modules can be according to module version earth balanced (electronically balanced) or balanced earth free.

In the frame of the mixer these inputs are connected with the connectors for the optional additional monitoring of modules STU3b and TBO3b. If these module versions are not equipped it is possible, to connect external sources to monitor input 9 and 10 directly. If module STU3 and / or TBO3 are equipped, each of these modules has 8 additional monitoring inputs. The outputs of these extensions can be selected for module STU3b by button EXT9 and for module TBO3 by button EXT10. In that case the outputs of this additional monitoring are connected to the SubD-females.

5.3.3.2 SubD25 connectors for audio signals

In total there are 10 25polige SubD- females available. These females are summarized to function groups and consists all connections for a certain purpose. The pinning of the single plugs is shown in the images on these sides.

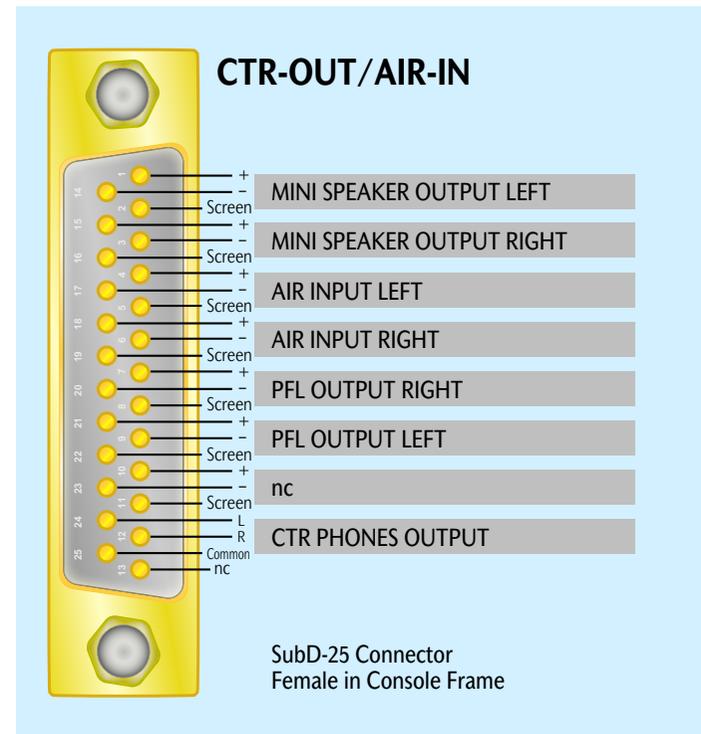
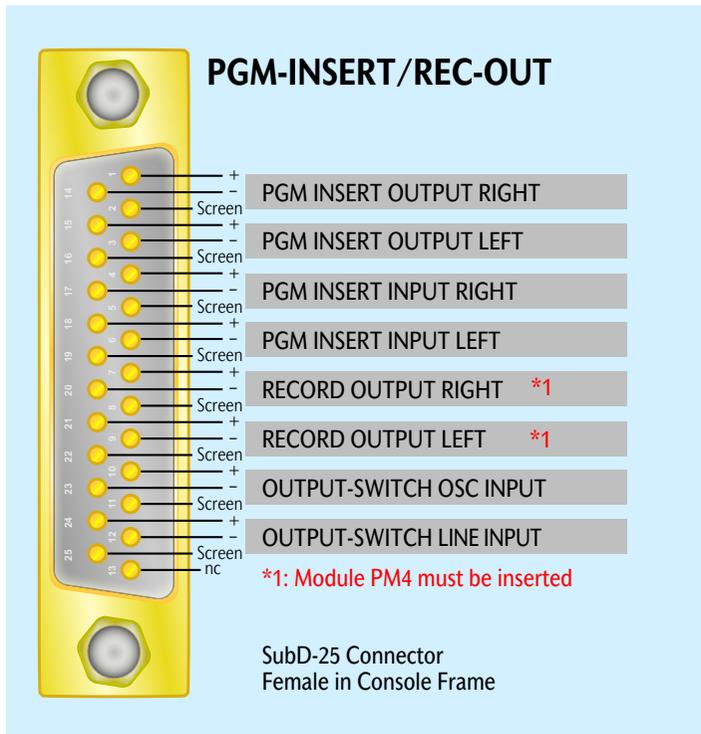
According to module version the connections of the inputs and out-



puts are electronically balanced or balanced earth free.

PGM-INS/REC-OUT

At this female there are all stereo inserts of the master PGM. Here there are also the additional inputs of the broadcast switch LINE and OSC. Module PM4 is equipped with an additional output for recording with select buttons. The outputs of this unit are also connected on this female.



impedance are used. If this is not the case it can appear strong volume differences.

On the connectors PFL-out left and PFL-out right there are the unregulated outputs of stereo-PFL-master of the system for external use.

The inputs AIR-IN are wired over input amplifier in the monitoring module to the monitoring button AIR. They conduct the connection of a tuner for monitoring behind the transmitter.

CTR-PHONES/MINI-SPK/PFL

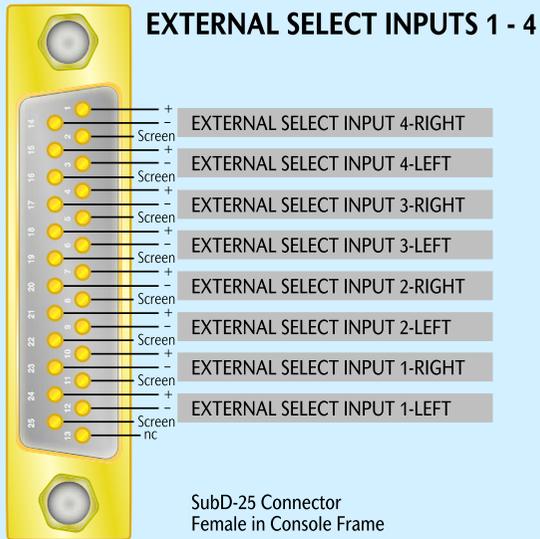
The outputs mini speaker left and right are wired to the meter bridge of the frame and are used for the connection of additional loudspeakers for PFL and talkback. It is possible to have 1 loudspeaker for mono or 2 for stereo. In the monitoring module it can be selected between mono or stereo use. These connectors are necessary for the connection of external active loudspeakers.

Output CTR-phones out is parallel output for earphones in the control room. This output is wired to a jack in the meter bridge. The headphone amplifier is designed to drive more earphones parallel. With this connector it is possible to connect additional earphones. The pinning of this output is different to the standard. Pin 24 is used for output left, pin 12 for output right and the common ground is pin 25. It is important that if more earphones with approximately the same

EXT-SELECT-IN 1-4, 5-8, 9-12, 13-16, 17-20 und 21-24

On these females there are the external monitoring sources. The plugs EXT-SELECT-IN 1-4 and EXT-SELECT-IN 5-8 are always wired and are connected to the select buttons of monitoring EXTERN in monitoring module CTR3. If module STU3 or TBO3 in version b are installed then the additional 4 females are in function. These module versions are equipped with an additional button set of 8 select buttons. The outputs of these button sets are connected to select button EXT9 and EXT10 of the external button set of the monitoring module (see also XLR-connectors EXT-9+10, L + R)

The females EXT-SELECT-IN 9-12 and EXT-SELECT-IN 13-16 are connected to the additional buttons of module STU3b. The females EXT-SELECT-IN 17-20



and EXT-SELECT-IN 21-24 are used for the connection of the additional buttons in module TBO3b.

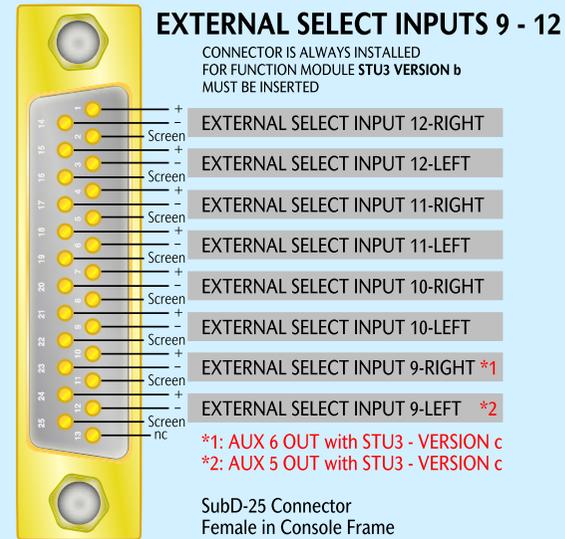
According to the installed version of the optional modules there are different functions of the females EXT-SELECT-IN 9-12 and EXT-SELECT-IN 21-24. In the versions of module STU3a and TBO3a these females have no functions.

The module versions STU3c and TBO3c are necessary for input modules with 8 auxiliaries, because in that versions there are also equipped the master amplifiers for auxiliary master 5 – 8. In these versions the outputs of the master amplifiers of module STU3c for aux 5 and aux 6 are situated at female EXT-SELECT-IN 9-12.

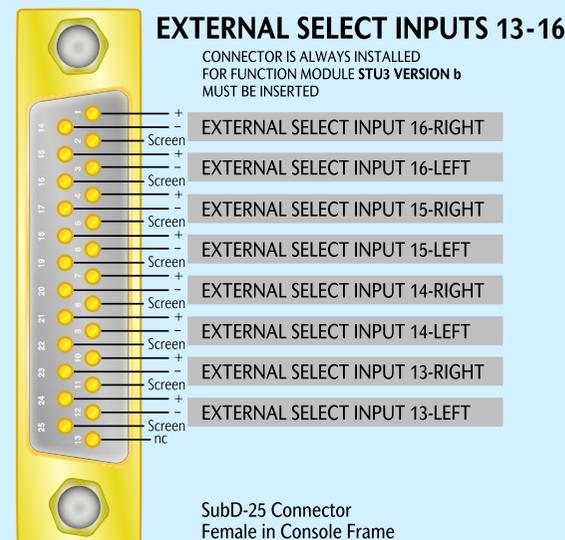
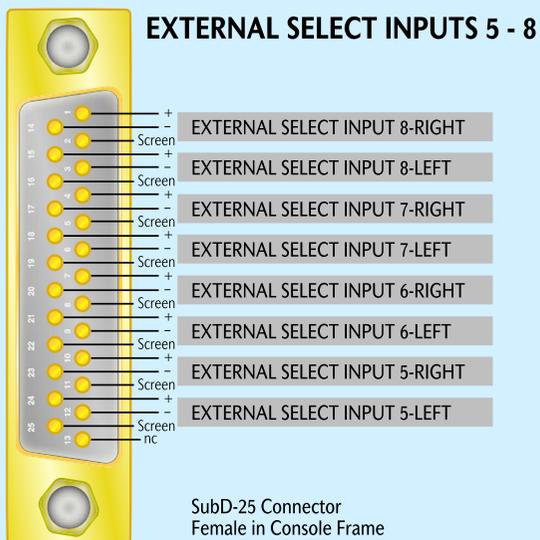
The outputs of the master amplifiers of module TBO3c for aux 7 and aux 8 are situated at female EXT-SELECT-IN 17-20.

STU-SPK/ STU-PHONES

Here there are the outputs of the optional module STU3. The module is equipped with 4 playback sections. Three of them



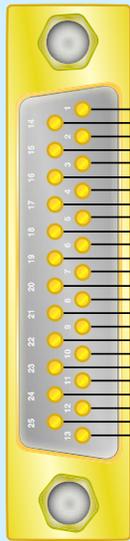
are used for earphones, one for the connection of loudspeakers in the studio. All 8 outputs are connected to this female. The pinning of the headphones is not a standard, it is shown in the image. All outputs for earphones are designed for parallel use of more earphones. Because herewith there can appear relevant currents, for that connections there are used always 2 cores parallel. It is important that if more earphones are used parallel they should have approximately the same impedance and sensitivity. If this is not the case it can appear strong volume differences.



TB-AUDIO-I/O

On this female there are the outputs of the audio oscillator and inputs and output of talkback and listen. All functions are active when module TBO3 is equipped. The connection OSCILLATOR-DIRECT-OUTPUT is parallel to XLR-plug OSC-OUT. Here is always a signal when the oscillator in the module is switched on. The output OSCILLATOR SWITCHED OUTPUT is switched by button OSC-ON.

To the extension of the talkback system there is the input EXTER-



EXTERNAL SELECT INPUTS 17-20

CONNECTOR IS ALWAYS INSTALLED FOR FUNCTION MODULE TBO3 VERSION b MUST BE INSERTED

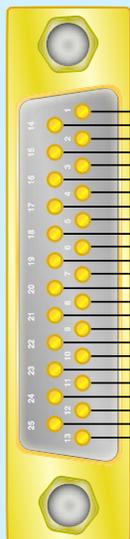
- Screen + EXTERNAL SELECT INPUT 20-RIGHT
- Screen + EXTERNAL SELECT INPUT 20-LEFT
- Screen + EXTERNAL SELECT INPUT 19-RIGHT
- Screen + EXTERNAL SELECT INPUT 19-LEFT
- Screen + EXTERNAL SELECT INPUT 18-RIGHT
- Screen + EXTERNAL SELECT INPUT 18-LEFT
- Screen + EXTERNAL SELECT INPUT 17-RIGHT *1
- Screen + EXTERNAL SELECT INPUT 17-LEFT *2
- nc

*1: AUX 8 OUT with TBO3 - VERSION c
*2: AUX 7 OUT with TBO3 - VERSION c

SubD-25 Connector
Female in Console Frame

NAL-TALKBACK-MIC INPUT. It is for the connection of an external talkback microphone or of a line signal from an external talkback unit. The configuration is done within the module TBO3. The external talkback signal can be switched by control elements at the front panel of the module. Additionally the mixing ratio between internal and external microphone can be controlled by 2 potentiometers. The input is designed in 0-Ohm technique and must be equipped with external resistors. With this technique it is possible to mix more sources to one input, by connecting of the single sources with single resistors. The resistors must be symmetrical and have for both cores exact the same value. For microphone level this value is 2x 470 Ohm and for line level 2x 100 k Ohm. The changes of the resistors also changes the amplifying of the input.

There are 2 external inputs for the extension of the talkback way LISTEN, which can be mixed with the internal listen-bus. This listen bus is controlled by the buttons of the speaker microphones. For the mixing there are single potentiometers and enable buttons at the front panel of the module TBO3.



EXTERNAL SELECT INPUTS 21-24

CONNECTOR IS ALWAYS INSTALLED FOR FUNCTION MODULE TBO3 VERSION b MUST BE INSERTED

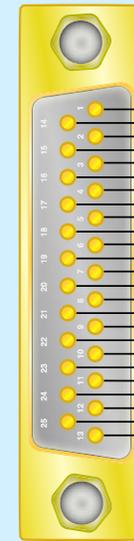
- Screen + EXTERNAL SELECT INPUT 24-RIGHT
- Screen + EXTERNAL SELECT INPUT 24-LEFT
- Screen + EXTERNAL SELECT INPUT 23-RIGHT
- Screen + EXTERNAL SELECT INPUT 23-LEFT
- Screen + EXTERNAL SELECT INPUT 22-RIGHT
- Screen + EXTERNAL SELECT INPUT 22-LEFT
- Screen + EXTERNAL SELECT INPUT 21-RIGHT
- Screen + EXTERNAL SELECT INPUT 21-LEFT
- nc

SubD-25 Connector
Female in Console Frame

Input EXTERNAL LISTEN MIC INPUT is exact equal realized as the previously described input EXT TALKBACK MIC INPUT. Input EXTERNAL LISTEN LINE INPUT is a normal high level input, electronically balanced. This input is additionally equipped with a threshold value switch, which can be switched by the button DETECT at the front panel of the module. The switching of the input to the listen-bus than is automatically when the threshold value switch is active.

The output of the listen-system of series BC3 is wired within the monitoring module to a mini loudspeaker-system and so it can be monitored. For the external use of this output it is wired parallel to the connector LISTEN OUTPUT.

For the connection to an external talkback system there are the outputs EXTERNAL TALKBACK OUTPUT 1 and EXTERNAL TALKBACK OUTPUT 2. The outputs are switched by talkback button EXT1 and EXT2. The talkback output EXT1 can be additionally

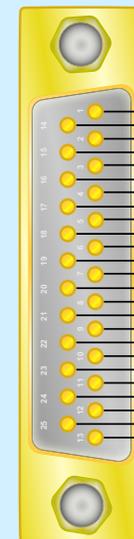


STUDIO-PHONES + SPEAKERS

CONNECTOR IS ALWAYS INSTALLED FOR FUNCTION MODULE STU3 MUST BE INSERTED

- Screen + STUDIO SPEAKER OUTPUT RIGHT
- Screen + STUDIO SPEAKER OUTPUT LEFT
- Screen + STUDIO PHONES 1 OUTPUT RIGHT
- Screen + STUDIO PHONES 1 OUTPUT LEFT
- Screen + STUDIO PHONES 2 OUTPUT RIGHT
- Screen + STUDIO PHONES 2 OUTPUT LEFT
- Screen + STUDIO PHONES 3 OUTPUT RIGHT
- Screen + STUDIO PHONES 3 OUTPUT LEFT
- nc

SubD-25 Connector
Female in Console Frame



TB-AUDIO I/O

CONNECTOR IS ALWAYS INSTALLED FOR FUNCTION MODULE TBO3 MUST BE INSERTED

- Screen + OSCILLATOR DIRECT OUTPUT
- Screen + OSCILLATOR SWITCHED OUTPUT
- Screen + EXTERNAL LISTEN LINE INPUT
- Screen + LISTEN OUTPUT
- Screen + EXTERNAL LISTEN MIC INPUT
- Screen + EXTERNAL TALKBACK MIC INPUT
- Screen + EXTERNAL TALKBACK OUTPUT 1
- Screen + EXTERNAL TALKBACK OUTPUT 2
- nc

SubD-25 Connector
Female in Console Frame

configured for the playback at the broadcast output. This configuration is possible in the master module PM3 or PM4. If EXT1 is switched for this function and the broadcast switch in the position TB, is this way connected to all master outputs (PGM-L, PGM-R and PGM-MNO).

5.3.3.3 SubD25-connectors for control

There are 2 25pin SubD plugs (male) for the control connections of talkback, listen and signal functions within the studio area. Additional there are 4 earth free buttons or switcher for special applications of the customer. The pinning of the single plugs is shown in the images on these sides. Both connectors require the installation of the talkback module TBO3.

TB-CTRL-I/O

On this plug there are all signal functions of the talkback and listen unit and also the inputs and outputs for the control of the function DIM and ON-AIR. All control inputs are separated by an optical isolator and can be used for voltages between approximately 9 up to 30V. The input resistance is 1,5 k Ohm. For the control with a voltage of 5 V it is possible to change the range of the voltage by changing the resistors in the module TBO3. All outputs are earth free contacts of relays.

The outputs are realized with an operating contact for currents up to maximal 50 mA and direct voltages up to maximal 30V. Only "clean" direct voltages may be used. If there are switched alternating voltages or direct voltages with strong humming noises or HF-superimpositions, there can be interferences in the audio system. (See also remote control connections of the input modules – interferences).

With the input EXTERNAL LISTEN CTRL INPUT it is possible to switch to the extension line input of the listen-system. It is also possible to switch this input by a threshold value switch depending of the audio signal.

The input EXTERNAL LISTEN MIC CTRL INPUT is used for the switching of the extension input EXTERNAL-LISTEN-MIC-INPUT. The input can be released by the control input or perpetually active, selected by the configuration of the module TBO3.

The input EXTERNAL TALKBACK MIC CTRL INPUT is used for the switching of the extension input EXTERNAL-TALKBACK-MIC-INPUT. The input can be released by the control input or perpetually active, selected by the configuration of the module TBO3.

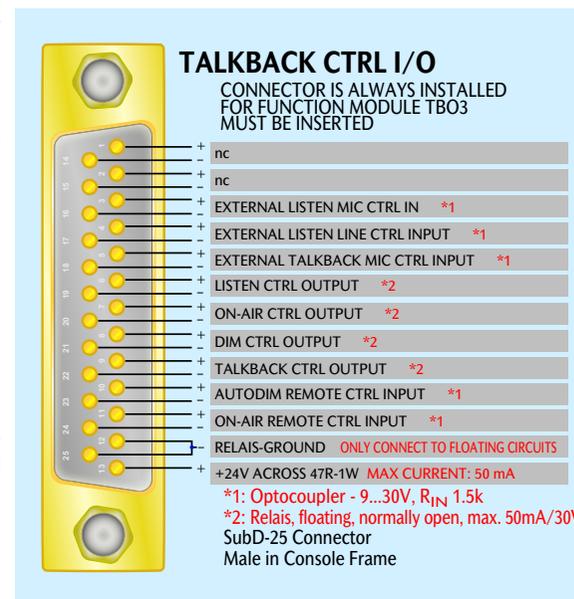
With input AUTODIM REMOTE CTRL INPUT it is possible to activate the DIM-function for the monitoring loudspeakers. This function is very important when there is used an external talkback system.

With the input ON-AIR REMOTE CTRL INPUT it is possible to remote control the internal ON-AIR logic of the system. So the studio loudspeakers are switched off and other functions are active (see descriptions of the modules).

Always the LISTEN-CTRL-OUTPUT is active, when the listen-system of the mixer is in function. Herewith it is indifferent whether the function intern or extern is released.

Always the DIM-CTRL-OUTPUT is active, when the auto-dim-function of the mixer is activated. Herewith it is also indifferent whether the function intern or extern is released.

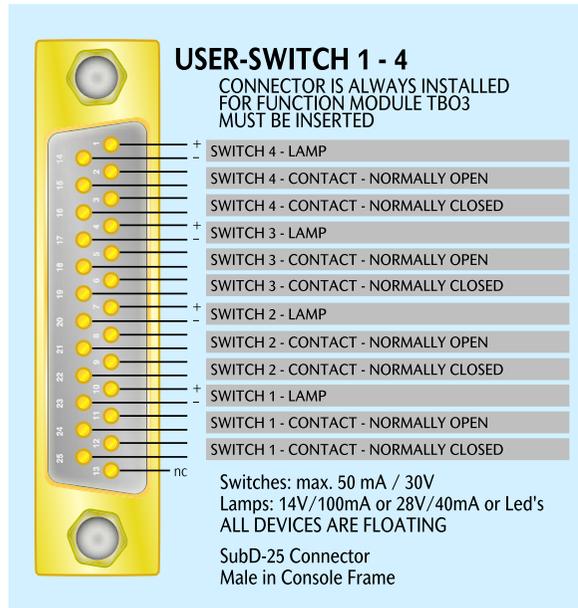
The ON-AIR-CTRL-OUTPUT reports the broadcast status of the mixer. It is activated by the configuration of different modules with microphone inputs. The output is active, when the status is activated by a signal from the remote control inputs.



The TALKBACK-CTRL-OUTUT is active, when one of the talkback buttons is pressed or there is a significant talkback signal.

USER-SWITCH 1-4

For freely use by the user there are 4 additional buttons. These buttons can have snap-in or impulse contacts and consists always an operating and a break contact and also a connection for a lamp. The operating and the break contact are separated wired. The connection for the lamp is connected to the socket of the buttons. This socket is for the using of a lamp or multi-LED type Midget-Groove T1³/4. Lamps for voltages between 6 and 28V are available, multi-LED for 12V or 24V. There are many colours for the caps of the buttons, the inscription is done like the wishes of the users.



All connections of these buttons are free of earth and have low- bouncing and low-level contacts for direct voltages up to maximal 30V and direct currents up to maximal 50 mA.

Only “clean” direct voltages may be used. If there are switched alternating voltages or direct voltages with strong humming noises or HF-superimpositions, there can be interferences in the audio system. (See also remote control connections of the input modules – interferences).

6. The installation of the mixer

This chapter is important only if the console is not delivered and installed by us. In this case you receive the console by a forwarding agency. Then it is packed in several wooden boxes. These boxes contain the mixer as well as the power supply unit, cable connection and other accessories. To hold the weight of the main box as slightly as possible, this contains only the real mixer. As a rule the unloading of a truck of the forwarding agency will prepare difficulties. We give by the dispatch in every case order that you are informed in time about the moment of the delivery, so that you can meet precautionary measures to the discharge. The main box has a weight(importance) from - according to size and assembly of the mixer - approximately 70 kgs (16 channel) to 250 kgs (56 channel). The dimensions are approximately 15 cms everywhere than the main frame itself. All additional boxes are essentially lighter and smaller and transportable with two people.

6.1 Unpacking

They need the following tools and aids for unpacking:

- 1 19th of ring or open ended spanner,
in order to solve the screws in the transportation box and to
Attachment of the mixer feet in the frame
- 1 10th of ring - or open ended spanner,
for the attachment of the arm rest and wood parts
- 1 philips screwdriver size 1,
for the attachment of the wood parts of the VU bridge and to
dismantle from front plates and cappings

6.2 Packagings

Provided that the device is not delivered by us, it is packed in the factory in a wooden box. In this connection, the main frame, the power supply, floor stand and the timber claddings are packed separately. A cardboard contains the required small parts. The main frame is screwed by the bottom of the box here with 2 planks. The device can be removed only on unscrewing these screws from the box.

After the decreasing of the box lid the packaging material should be taken first and be brought aside. Now the fixing bolts (key width 19) are removed. Now when required the side parts of the wooden box can be removed, so that the mixing desk can be removed now with the box ground.

The remaining devices and individual parts are in the different other boxes and now should be unpacked first.

6.3 Attachments of the optional floor stand

The floor stand for the mixer arrangements of the BC3 are screwed on the flange plates on the left and on the right outside. The attachment takes place where the main frame is screwed on the transportation box.

Put the mixing desk's stands possibly in the required distance on the ground. Lift the mixer on the floor stands and allow to protect it of 2 persons against falling down. Adjust now the stands on the threads and screw now on the provided screws stands and mixer with each other. At last tighten all screws.

6.4 Wood parts

As a rule the wood parts are not mounted to the avoidance by damages during the transportation and the installation in the factory.

The timber claddings - provided that your mixer version is supplied with timber claddings - are packed separately in plastic foil. To assemble it you must remove 2 modules on the right and on the left outside of the frame. The plates are screwed by holes in the side tins of the mixer frame.

The screws holes are visible in the side tins. The wood parts have some tolerance and can be aligned so that they curved with the side part. The small wood plates must be fastened to the side parts of the VU bridge with 2 screws. Moreover two backpanels of the VU meter bridge must be removed.

6.5 Alignments

All front plates are screwed in sliding nuts. If modules have been removed with the transportation, the front plates should be aimed before screwing on a new.

Each module is 0.25 mm smaller than the slot width of the frame. In the simple it is to allow to stand the first module completely on the left in the side tin and to screw on. Then the next module is pressed after interlaying by two foils stripes of foil of the strength 0.25 mms against module 1 and is also screwed on. So one farther proceeds.

6.6 Arm rest

Normally the mixers are supplied with mounted arm rest. If this is for any reasons not the case by your device, the arm rest must be fastened as follows:

Remove the modules on the frame slots 2 and 3, 5 and 6 etc and put these modules aside. Two people must hold the arm rest to the front of the mixer and align it by height and to the side. Screw now the arm rest from inside on the provided key screws.

6.7 Scratches

During the transportation of the mixer to the installation place and during installation, smaller scratches in the frame parts and the disguise tins are not always to be avoided - even if you be very careful. If these happen and the scratches are covered later by wood parts or by the arm rest, they must not be repaired, because a damage by corrosion is not possible by the fact that all frame parts, apart from some disguise tins, are made from aluminum alloy. However, at visible places should be a repair carried out - already for reasons of the optics - a repair. Small amounts of the applied lacquer also belong to the optional accessories set, therefore. The frame parts and module front plates will have done with „Alexit mircoeffekt lacquer“, anthracite-gray - RAL 7016 varnishes, if there was not ordered a special color. This lacquer is a 2-components lacquer. You must mix a small amount of the lacquer in the relation of approximately 6 to 1 with the provided hardener (6 parts lacquer on 1 part hardener). After mixing use a hard brush and dab the lacquer on to the damaged places. The repaired places are hardened after approximately 12 hours and have the same durability like the original lacquer. The pot life of the mixed lacquer is about 4 hours. It can be diluted if required with normal thinner. The separate components remain usable for several years.

6.8 Connections of the power supply

After you have set up the power supply, connect it to the mains and turn on shortly. All light-emitting diodes on the front side must light up. Switch off first again and move the provided cable of the power supply to the mixing desk. Attach the cable into the connectors of the power supply and in the mixer.

Read the chapter about the mains installation and consider the indications done there for the installation of the mains appliance, the ventilation and the voltage adaptation.

6.9 Connections of a Crossover unity

If you have ordered a fail save device (crossover unit) you get to power supply units and a crossover unit as well as other cable connections. After the installation of the three devices connect the outputs of both power supplies to the two inputs of the crossover unit. For this connections use the short cable connections with 20-pole plugs. Then connect the output of the crossover unit to the power connector of the mixer. You can not mix up any connection, because all cables are implemented as an extension cord with a male and a female plug. Therefore, you can attach without use of force the cables only correctly. Both inputs of the Crossover unit are equivalent. Which of both power supplies you put on which connection, is indifferent. The failure fuse of the crossover unit works also if the device itself is not connected to the power. The power supply of the device affects only the function of the failure message. If you have ordered it a remote display and a buzzer is installed in the console. The lamp in the push button of this unit shines if one of the outputs of one power supply device fails. At the same moment the buzzer is turned on. You can switch off the buzzer by pressing the pushbutton.

Important note:

Supply both power supplies about separated electric circuits and separated fuses!

7. Operation conditions

7.1 Environments

The conditions of environments are most essential for the reliability and dependability for a very long time.

7.2 Temperature

If the mixer is not installed in a room with balanced temperature, it is recommended to let the mixer permanently turned on. In the operation of the mixer, the internal temperature can raise itself to about 15 degrees over room temperature. When in the night the room is not heated it can appear a high difference of the internal temperature in the mixer and so it can arise condensation water and also corrosion of contacts. There may be also some troubles with the different thermic co-efficient of expansion of the different materials. Continuous operation is not required, if there are no differences in temperature greater than 15 degrees. During the first weeks of working, the mixer should not run in continuous operation. Failure of IC, electrolytic capacitor and other components are most probably in the first weeks.

The acceptable environment temperature is between 10 and 45 degree.

7.3 Soiling

Dust and soiling should be kept away above all by all connectors. If drinks are poured into the mixer, the concerned modules must be immediately removed and a cleaning must be tried (for example with isopropyl alcohol). There are also cleansers for stuck leavings of Cola available, without damaging the module. Such a cleaning can also be done by ADT, very quickly in an ultrasonic bath, without threat of the modules.

In the rule there are no consequential losses to be feared, if the cleaning is quickly.

8. Maintenance, services

A BC3-mixer requires no regular maintenance. A service is then required if really a mistake appears and a repair is necessary. But there are also some additional possibilities to extend the operating life substantially.

8.1 Use the mixer

In the mixer there is a very large number of components, whose proficiency of the functions exist remains, in that they simultaneously clean itself during the use. For example so each switch activity removes oxide, resinifications and soiling at the contacts. In normal operation of the mixer there are not always used all buttons and potentiometers. All 2 or 3 months all buttons should be pressed and all potentiometers should be turned. By using of these simple preliminaries, buttons and potentiometers will work without failures for many years.

8.2 Test of the mixer

From time to time (for example each year) all functions of the mixer should be tested, specially all equalizers, each aux-send, the gain-fader, all buttons and switches. If there are some failures, they should be noticed to find them later. These should be removed then if it is enough time. Additional each failure and problem during the working should be noticed in a, for this designed, book. If all failures and problems are stored a new mistake is quickly recognized and the mixer will be o.k. for many years with little expense and slight costs. The greater the mixer and so more modules are equipped, the more important is this point. In a small mixer with only a few functions failures can easy be reproduced, but in a system with for example 72 channels this is only than possible, when all failures are exactly noticed. Most important is the constellation with which the problem is appeared. Many of the appearing failures are failures of connections, of the using or of the configuration. The precise there are all notices, the more precise is it later to reproduce this problem and to remove it.

8.3 Cleaning

When the mixer should be cleaned, some different cleanser can be used. For all parts isopropyl alcohol is suitable. In very tenacious soiling, anodized front

panels of the faders can also be cleaned with a soft chlorinated hydrocarbon cleanser, for example Trichloräthan (Chlorothene NU) or Freon TMS. At first the front panels should be dust off with a rag. Contact of this cleanser with plastic parts must be avoided, they could be destroyed. Nextel-varnish endures these cleansers for a short time. Varnish and lettering endures also a normal nitrous cleanser for a short time. This does not apply however to the plastic parts - therefore for knobs and key buttons. If once such a cleaning is necessary, it should be used only so few cleanser like possible. It is the best to plaster the cleanser to the polluted places by a Q-tip and than to polish with a cellulose cloth.

There will be the best results by using isopropyl alcohol, which don't attack plastic and fly away by room temperature very quickly.

8.4 Potentiometers and push buttons

After a use of approximately 10 years there begin - depending on the environment conditions – the greases, which are needed in some components to resinify.

This can be noticed, that the turning of the potentiometers becomes heavier and there are also contact problems in the push buttons, which cannot be eliminated by multiple activity.

The heaviness of the potentiometers causes by a resinification of the greases between axle bearing and axle. This heaviness can be eliminated with a creeping oil between axle and axle bearing and turning the potentiometer at the same time. By this way the potentiometers become again smoothly for many years.

Please, use only a little oil, otherwise it could be little oil pools within the potentiometer, which could change its functions.

Contact problems in the push buttons are normally caused, that the fat, which is used by the production of the buttons, also after years resinified and than there is an isolation in the contact area. But normally push buttons with 7,5 µm gold-plated contacts are also after more than 10 years yet o.k.

The cleaning of push buttons can be done with CFC-3-36 (a spray of contact chemistry).

To that the demounted module must be situated on a desk with its button side towards the top. The spray tube of the spray is held over the opening of the plastic cover of the push button. Then a modicum of the cleanser is sprayed into this opening. Most simply it is by easy pressing at the knob of the spray to produce a spray-applied foam, that then of alone creeps into the push button. Alternative it is also possible to fill the cleanser into a jab, which can be scrapped after use. Then the cleanser is filled into the opening directly with this jab. It is important that after some minutes the push buttons are activated between 5 and 20 times.

The cleanser consists of a non-permanent component, which disintegrate the resinified fat and evaporated. Additional it is a very good contact oil. After the bringing in of the cleanser the resinified fat is removed by pressing of the buttons. The new contact oil protects the contact area of the button against new resinification and oxidation. Normally such a clean reaches a faultlessly function for years. Afterwards this procedure must be done again.

Push buttons which don't work after this procedure can be tentatively handled with the cleanser contact 60 of contact chemistry. Please use Contact 60 only then, if CRC-3-36 was not successful. Only a very little quantity should be used and all of this should be filled only into the button. The residua are corrosive! If these residua are outside of the button, it must be immediately removed and these places should be sprayed with CRC-3-36.

After the filling of the button with contact 60 this button must be pressed about 10 times and then the button must be handled with enough CRC-3-36. Without this additional cleaning with CRC-3-36 it will be only a short success, because contact 60 cleans contacts, but if it is in the button for a longer time the buttons are irreparably destroyed.

Never mediums like Vaseline or similar, past-like fats are allowed! It is also not allowed to dip complete modules into cleaning baths.

8.5 Screws

After a period of about 5 years, the power supply unit should be opened and

all screws of the transformer and the prints should be retorqued.

In the power supply units there is a great thermal pollution and so it is possible, that the screws can be a little longer after some years and so there may be some contact problems.

It is the same after a period of about 10 years, all screws within the frame of the mixer and within the modules should be also retorqued.