AMC /O

OPERATORS HANDBOOK

FOR ADVANCED MANUAL CONTROL

SYSTEM

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RANK STRAND

OPERATORS HANDBOOK

AMC/O

ADVANCED MANUAL CONTROL SYSTEM

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1 INTRODUCTION

System AMC is a three preset lighting control system, i.e. it has three faders per control channel, only one of which is normally contributing to the active lighting state, whilst the others are being set to the required levels for subsequent states. Preset identification is by three colours; usually RED, WHITE and BLUE. Each preset may be subdivided into three separate and variable groups, identified as 'A' 'B' and 'C', by a three position switch per channel, per preset. A fader lever on the manual master module, or a pair of levers on the timed master module, allow dipless crossfades between states to be performed.

The control equipment is designed for use with the standard range of Rank Strand Electric thyristor dimmers to form an AMC system.

1.1 SYSTEM DESCRIPTION

The system is modular in concept; A master module setting reference and preset master levels, and a number of channel modules with controls for individual dimmers. All inter-module connections are made by a single plug-in, flat cable known as the 'T-BUS'.

A separate power supply unit provides positive and negative voltage rails which are switched on the master module and distributed, from here, to all other modules. The power supply may be mounted in the desk, or remotely if a specific application demands an EXTRA LOW VOLTAGE control desk.

The standard desk is wood, finished in walnut veneer, with the following options available (to be specified at time of order):

a. A removable wooden shelf, with black 'formica' face.
b. A rigid tubular steel stand.
c. Plug and socket connection of dimmer control lines mounted on the stand.
d. Modules may be housed in a combination of desk and side wing if this is advantageous ergonomically.

1.2 INSTALLATION

SEE TECHNICAL HANDBOOK FOR INSTALLATION AND COMMISSIONING INFORMATION.

2. SYSTEM AMC MANUAL MASTER MODULE (Dwg No.1A18014)

2.1 MODULE FUNCTION

The purpose of this module is twofold:
Firstly to receive and switch the incoming power supplies to the system and distribute them along the inter-modular connector.
Secondly the regulation of an adjustable reference voltage for the system from which the preset masters and crossfader operate.
The module provides ten master control signals to ten lines of the T-BUS: NINE of these correspond to the NINE groups (3 presets, 3 groups per preset); the tenth signal is the inhibit level. All of these vary with the positions of the corresponding master faders.

2.2. MANUAL MASTER PANEL CONTROLS

2.2.1 DESK ENABLE SWITCH

This is a two pole key-switch whose purpose is to switch the positive and negative voltages from the power supply unit to the electronics of the master module and hence to the other modules of the system. The desk is enabled by a quarter-turn clockwise. This switch does not isolate the power supply unit and should not be used as a total system ON/OFF switch. It disables all signals to the dimmers preventing operation by unauthorised persons. The key may be removed only in the off position.

2.2.2 DESK ENABLED INDICATORS

These two indicators glow red if the master module electronics is receiving both its positive (+V) and negative (-V) power supplies.

2.2.3 MODULE BLACK-OUT (BO) SWITCH

This is a grey two position switch. In the down position it permits normal control of all channels by the respective channel-faders and masters. In the up position all preset control voltages from this module are switched to zero resulting in a dead black-out (assuming only one master module is active within the system). The only exceptions to this total black-out state are channels selected to independent, which are unaffected by the BO switch. The black-out state is maintained until the BO switch is returned to the up position.

2.2.4 GRAND MASTER FADER

This master-fader proportionally controls all the preset master

voltages from this module, thus acts as a total, proportional master over all dimmer circuits in the system. In the 10 position the grand master allows the system to function normally; the level of each channel set by the respective channel and master faders. As its level is reduced the level of each dimmer will reduce proportionally until at zero a total black-out exists. Again channels selected to IND are not affected by the fader.

2.2.5 INHIBIT MASTER (INH)

It is often desirable to inhibit a particular group of channels repeatedly during a performance, and for this reason it is possible to select channels into an inhibit group by means of the channel module function select switches (4.2.3). With the inhibit master (INH) set at 10 the dimmer levels are as set by channel and master faders, however, as the INH master is reduced, the maximum level of any channel selected to INH cannot exceed the level of the INH master. If the INH master is set at zero, any selected channels will be off. The INH master does not maintain the proportional differences between channels in any lighting scene.

This form of mastering is referred to as "BROOM-STICK" mastering as its effect can be compared to a batten of wood progressively moving down over a preset of channel-faders: at first only altering the channels at full, then progressively collecting more channels towards zero.

2.2.6 THE PRESET MASTERS AND THE CROSSFADER

The eighteen preset master faders are regarded as two sets of nine masters; the upper set being an exact duplicate of the lower. If the long crossfader is in the top position (furthest from the operator) the upper set of masters is active whilst the lower set have no effect on the stage lighting. As the crossfader is moved towards the operator, the lower nine masters become active whilst the upper set decrease in effect.

A dipless cross-fade (5.1) is achieved by setting the master level(s) for the incoming preset(s) to the required position on the non-active set of masters, then moving the long crossfader from the active end to the other at the required speed.

As both upper and lower sets of masters are identical in operation it is only necessary to describe the function of one set:- Each preset has three master faders, one for each (A, B, C,) group. Each master exercises a proportional control of the levels of channels selected to its group on that preset.

2.2.7 GROUP ACTIVE INDICATORS

When any master fader is active and set above the first division on its scale, the respective group active indicator in that preset is lit to warn the operator that raising any channel faders selected to that group will be visible.

2.2.8 GROUP BLACK-OUT SWITCHES

Each of the NINE group black-out switches is associated with the group master-fader immediately below it (both upper and lower sets of masters). These switches are two position functioning similarly to the module BO switch (2.2.3) but giving normal operation (in the down position) or hold black-out (up) of only those channels selected to that master fader (and not active on any other active preset).

4. THE CHANNEL MODULE (Dwg No.1A18013)

4.1 Each of these modules has ten columns of controls, corresponding to ten of the dimmer channels in the installation.

4.2 CHANNEL MODULE CONTROLS

4.2.1 CHANNEL FADERS

Each channel has three faders, one for each preset. Under normal operation only one of the faders is active whilst the other two are available for setting up the levels of that channel to be used in subsequent states.

The three presets are identified by colours: RED, WHITE, and BLUE.

4.2.2 GROUP SELECTION SWITCHES

Each preset has a switch per channel, marked A in the up position, B in the mid and C in the down, which selects whether a channel will be controlled by the A, B or C master fader for that preset.

4.2.3. CHANNEL FUNCTION SELECT SWITCH

It is often desirable, for a particular performance, to inhibit certain circuits (such as front of house) which are repeatedly used together: It is somewhat tiresome to repeatedly reset a group for this purpose and also complicates the operation of the system.

For this reason a "FUNCTION SELECT SWITCH" is fitted to each channel. In the up position the channel functions normally, the level to the dimmers being determined by the channel faders and the group masters.

If the function switch for a particular channel is set to the mid (INH) position the channel will operate exactly as before, however, as the INH master (2.2.5 or 3.2.5) is moved down, the output level of that channel will not exceed the level of the INH master.

The down (IND) position of the FUNCTION SELECT SWITCH changes the operation of the channel in a different way:- Any channel operating in this mode will become independent of all the master module controls (except the desk enable key switch). In addition the blue and white preset faders and group switches, and the red preset group switch become inactive for the channel.

The level of a channel selected to independent is determined solely by its red preset fader.

N.B. Care should be taken not to clear down all the red preset faders during a performance while some of them are wanted as independents.

The CHANNEL FUNCTION SELECT SWITCHES are designed to be set up at the

beginning of a performance (or may be reset during an interval). They are not intended to be changed during the running of the performance. The short lever allows the switch to be easily set with the thumb but with no danger of it accidentally being knocked.

5. SYSTEM AMC NOTES

5.1 DIPLESS CROSSFADE

An explanation of a dipless crossfade is best made by considering an example of two states set on different presets.

Channel	1	2	3	4	5	6
State 1	7	3	0	F	6	8
State 2	4	3	F	5	6	F

During the transition from state 1 to state 2 some channels will increase in level (3 and 6), some will decrease in level (1 and 4) and some will be at the same level in both states (2 and 5). It is sometimes a required effect that the lighting dips down as state 1 is removed, then raises as state 2 is added, or conversely that state 2 is added then state 1 removed to give a raise then dim. However, this is often not the case and the effect required is for the channels moving up, to progress evenly to their new levels at the same time as those moving down progress evenly to theirs. Those channels which are at the same level in both states should not change level at any stage of the transition.

This is a dipless crossfade.

5.2 "LEADING AND LAGGING" CROSSFADES

It is often necessary for all or part of an incoming lighting source to be presented or "led in" before the old lighting is faded down. This may be achieved in two ways with the AMC system, viz:

1. With the crossfader at one end, the incoming group masters are raised to the required level: the outgoing masters may then be lowered.
2. If a timed crossfade master module is fitted to the system two long crossfaders are fitted correspnding to the upper and lower sets of masters. These may be used to "lead" in the new set of masters then "lag" out the old set.

If a channel is in use in both old and new scenes its level will be determined by a highest takes precedence (PILE) principle during the fade.

6. OPERATION

6.1 SETTING UP THE SYSTEM

6.1.1 PRELIMINARY CHECKS

Before switching on power to the system, ensure that all channel faders on Red, White and Blue presets are down to zero, and that the three sets of grouping switches are in the up (A) position. The CHANNEL FUNCTION SELECT switches at the top of each channel module should be set in the unmarked, up, position for normal operation of each channel. All EIGHTEEN of the group master faders on the AMC Master module should also be set to zero.

Next check that all the dimmer racks are switched on: each rack has a neon indicator lamp to provide a quick visual check that the supply is connected. Finally switch on the mains supply to the desk power supply unit (if fed from a different source to the dimmer racks) and switch the desk enable key switch clockwise one quarter-turn.

Two red indicators marked +V and -V should light showing that the master panel is receiving the necessary voltages from the power supply unit.

IMPORTANT Failure of these indicators to light does not necessarily imply that mains is not being fed to the p.s.u. only that the low voltage d.c. is not available to the master module.

The first requirement of any new installation, or new production, is to light up the various control channels one by one to check the channel identification number, the setting and the focus of each luminair.

6.1.2 SETTING CHANNEL FUNCTION

Prior to lighting individual scenes each channel should be considered in turn as to the need for it to be an independent circuit, for example orchestra lighting, or T.V. camera headlights. Alternatively, if it is useful for it to be included in the group of lighting which may be inhibited e.g. All circuits front of house or audience floods. In either case the channel function select switch should be re-set to IND (for independent) or INH (for via inhibitor)

6.2 OPERATIONAL EFFECTS

6.2.1 BUILDING FROM BLACK-OUT

Set the master module BO switch in the down position. Raise the Σ and INH masters to full and set the crossfader to the lower end. Switch the

RED A group black-out on (down) and raise the lower RED A master to full. Now when any Red preset channel-fader is moved above zero the corresponding lighting load will change to the intensity level set on that fader. If the lever is moved rapidly the load will, in effect, be switched to that intensity: if it is moved slowly then it will be faded in.

In this way the total lighting scene is built up channel by channel and the levels can be plotted.

When the intensity levels of all channels above zero have been plotted against channel identification, establish the timing of the fade-in of this lighting collectively by using the lower RED A master. Also determine the time available before the next lighting change as this has a considerable infuence on how the next change will be executed.

6.2.2 TO FADE FROM ONE PRESET TO ANOTHER

6.2.2.1 CONTOURED FADES

Although it is usually undesirable to tie up more than one preset with active lighting (thus reducing the availability for setting subsequent scenes) it is often a necessary effect to lead in the new lighting preset before removing the old to give a build, or conversely to dim the first preset and follow with the incoming lighting. To achieve this the incoming state is set up on one of non-active presets (e.g. White). If the crossfader is still at the lower end the existing lighting will be under the control of the lower RED A master and incoming lighting controlled by the lower WHITE A master. These two masters can then be adjusted to give the desired contoured fade. Had the crossfader been at the upper end, control would have been by the upper RED A and upper WHITE A masters.

6.2.2.2 DIPLESS CROSSFADES

A full description of a dipless crossfade is given in section 5.1. The philosophy is that channels progress evenly from their level in one state to their level in the next. Any channels at the same level in both states do not change during the transition.

Continuing from above, with the initial lighting on RED A preset, the crossfader at the lower end and the lower RED A master,therefore, controlling the lighting scene. The subsequent state is set on a non-active preset (e.g. White). The WHITE A master fader is then set to the required level on the non-active (upper) set of preset masters. On cue the long crossfader is moved at the required rate from the lower

end to the upper, thereby carrying out a dipless crossfade between the state set on the RED preset to that state on the WHITE preset. The upper set of masters are now active whilst the lower set may be changed with no effect on the lighting levels.

This technique may also be used for dipless crossfades from any combination of group master settings to any combination on the other set of masters.

6.2.3 ADDITION OF A GROUP OF CHANNELS

An effect commonly used in theatre or T.V. lighting is to add a group of channels to an existing state to make a second state, for example to add cyclorama lighting to a scene being enacted down-stage. In this case it is not necessary to change the levels of channels already on, only to introduce new ones. One method would be to set up the combined state on a non-active preset and to crossfade on cue. This, however, is wasteful both in time (as the operator must duplicate the original settings) and also has tied up the second preset of the system, thus limiting the number of lighting changes he may do in quick succession.

A better technique is to switch the RED A/B/C grouping switch to B for the extra channels to be added. Having ensured that the RED B master is at zero in the active set of masters (i.e. the group active indicator for RED B is not on), the RED preset channel faders for the additional lights may be set to the required levels. On cue, the RED B master of the active set of masters is faded up to give the desired effect. This way only one preset has been used, leaving the two others which may be set up for subsequent lighting.

Although the RED preset has been chosen to explain the method of adding groups, the same system applies to both WHITE and BLUE presets.

If more than one group is to be added to a scene, once the first addition is complete (providing the A and B master faders are at the same level,) the A/B/C switches may be re-set to A. The B master can then be returned to zero and the adding procedure repeated. Alternatively the second group could be added by switching the grouping switches to C for the extra channels.

6.2.4 SUBTRACTION OF A GROUP OF CHANNELS

The procedure is basically the reverse of addition, viz:-

Match the master-fader level for an inactive group in the same preset. Switch onto this group those channels which are to be subtracted. On cue fade out the group master fader.

6.2.5 INDIVIDUAL CHANNEL ADJUSTMENTS

Such cues can be carried out at any time by moving the levers of the individual channel-faders.

6.2.6 USE OF THE INHIBITOR

The inhibit (INH) master simplifies operational procedures on occasions when a group of lights, used repeatedly together, have to be removed from whatever state may be active. By simply reducing the level of the INH master, all channels selected to INH will be faded down, overriding other master settings.

6.2.7 USE OF MODULE BO AND GROUP BO SWITCHES

See paragraphs 2.2.3 and 2.2.8 (or 3.2.3 and 3.2.10).

Either snap black-out or snap on of groups of lighting may be achieved by use of these switches. To switch on a group of channels, the particular channel faders are set on a non-active preset group. The corresponding group BO switch is set in the up position and the appropriate group master raised to the required level. On cue, the group black-out switch is returned to the 'on' position.

6.3 FLASH BOXES AND PYROTECHNIC DEVICES

NEVER attempt to fire any flash box, or similar pyrotechnic device, from a circuit which includes a dimmer of any kind. Neither should they be fired from any remotely controlled circuit but should be under the control of someone as near to the device as is practical and with direct view of it.

7. PLOTTING

7.1 GENERAL

The lighting plot must be a record of all the information needed by the operator to reproduce the lighting design finalised at rehearsal. An illegible or incomplete lighting plot is a waste of valuable rehearsal time.

7.2. STATE AND RUNNING PLOTS

There are many methods of plotting, all of them highly individual. Basically, there are two types: a 'state' plot, in which the intensity levels of all channels at the completion of each lighting change are recorded, or a 'running' plot, in which only the intensity levels that have altered since the last change are recorded. The 'state' plot has the advantage that it is practicable to reproduce the lighting for any particular moment out of sequence as is often required by directors during rehearsals. The experienced operator, familiar with both the equipment and with the working methods of the other members of the production team, can often write a 'running' plot without first writing a 'state' plot. A 'state' plot is recommended initially; a technique suited to particular circumstances will soon suggest itself. By using coloured pencils the 'state' plot can later be converted into a 'running' plot if necessary. The prudent operator will only use a pencil at the lighting rehearsal, and arm himself with a rubber, as changes of mind are not unknown.

7.3 PLOTSHEETS

To write down the intensity level of all channels is time-consuming if the channel numbers have to be written down as well. This can be avoided if the channel numbers are pre-printed or a sheet of graph paper is numbered in advance. Either method has the advantage that the intensity levels for each particular channel are in line and therefore a change is apparent.

7.4 ABBREVIATIONS

Certain abbreviations and symbols can be used to reduce still further the amount to be written. The following are recommended:

i. Only write intensity levels above zero, except when a channel previosly in use changes to zero; assume therefore that no entry equals zero.

ii. Write F for 10; it avoids confusion with 0 or 1 and is quicker to

write.

iii. Write + for 1/2; it avoids confusion with 1 or 2 and is quicker to write.

iv. When a series of consecutive channel numbers are at the same intensity level link them with a line and write the level only once.

v. For a DEAD BLACK-OUT OR GROUP BLACK-OUT OR FADE TO BLACK link all channels with a line and write DBO, BO or FB respectively once; along the line.

7.5 OTHER INFORMATION

Plot also the cue number; plot the action, for example, cross-fade or whether to lead or lag the new lighting; plot the duration of the change and, between the cue numbers, note the time available between cues.

7.6 PRE-PLOTTING

When the rehearsal time for lighting will be very limited, it is well worth considering the advantages of preparing a lighting plot at the planning stage before the lighting units are rigged and directed. The logic which determines the direction, setting and choice of colour filters for each and every lighting unit also determines the way in which the units will be used in combination with one another to provide each lighting state. Precise intensity levels cannot be pre-determined but tentative levels can be written in. The limited rehearsal time can then be used to establish precise levels and establish timing rather than be squandered on time-consuming trial and error methods. Pre-plot or not, planning is of prime importance; there are far too many variables in both stage and studio lighting for it all to be left to the inspiration of the moment.

8. TROUBLE SHOOTING

WARNING 1

ONLY A QUALIFIED ELECTRICIAN, FAMILIAR WITH THE EQUIPMENT, SHOULD REMOVE THE DIMMER RACK COVERS OR POWER SUPPLY COVER FOR FAULT FINDING OR ANY OTHER PURPOSE WHEN THE EQUIPMENT IS SWITCHED ON. ON THREE PHASE INSTALLATIONS 415 VOLTS EXISTS BETWEEN ADJACENT DIMMER MODULES.

WARNING 2

UNDER NO CIRCUMSTANCES SHOULD MODULES BE PLUGGED IN OR UNPLUGGED, OR FUSES CHANGED WHILST THE DESK POWER SUPPLY IS ON.

The information contained in this section is intended to advise persons with little or no electronic experience. Detailed circuit descriptions are given in AMC MAINTENANCE HANDBOOK. Attention is drawn to the supplements "Printed Circuit Cards" and "Regional Offices and Associated Companies".

As with all technical equipment, the advise "DO NOT ATTEMPT IT UNLESS YOU ARE SURE OF WHAT YOU ARE DOING" should be strictly observed.

8.1 BACK-UP FACILITIES

The electronics of AMC modules is designed to minimise the possibility of a fault affecting the total performance of the control desk. Each of the 10 mastering signals is buffered separately, and a failure of the crossfade electronics of the master module will almost certainly result in either the upper or lower sets of masters remaining active.

8.1.1 BACK-UP REFERENCE AMPLIFIER

In case of failure of the master reference voltage, an emergency regulator is fitted on the master module. Should all masters fail, or give full master signals when set at level three, the emergency regulator should be switched on as follows:-

1. Remove the master module fixing screws
2. Raise lower end of module a short way and slide towards the desk shelf about 15 mm.
3. Hinge the lower end of the module upwards to expose a small lever switch mounted on the edge of printed circuit board.
4. Move this switch to "EMERGENCY".
5. Refit module in desk.
6. Slide crossfader to upper end.
7. Return all FUNCTION SELECT SWITCHES set to INH to up position.

The upper set of masters should now function correctly, although the

module black-out, grand master, INH master and lower set of masters will not.

8.1.2 INDEPENDENT FACILITY (IND)

The reference voltage for channels selected to independent is regulated on each 10 way channel module. Therefore, should a fault occur on the master module which cannot be overcome by the method outlined in section 8.1.1 all the channel function select switches should be set to IND. In this way the desk will function as a single preset control and so get lights on.

8.2 FUSES

All AMC systems include the following five fuses:-

1. MAINS input fuse. 2A, 20mm anti-surge located on side of power supply unit.
2. Power supply fuses (X2). 2A, 20mm anti-surge located inside power supply unit.
3. Master module fuses (X2). 1A, 20mm anti-surge located under-side of master module.

BLOWN FUSES SHOULD ONLY BE REPLACED WITH ONES OF SIMILAR SPECIFICATION. FAILURE TO ADHERE TO THIS ADVICE INVALIDATES ANY WARRANTY OR SERVICE AGREEMENT.

8.3 POSSIBLE FAULTS

In the event of any fault, try to determine the full extent of the trouble. This provides a valuable clue to the source of the problem. Which channels are affected? Which groups or presets? Are all indicators functioning correctly?

8.3.1 BOTH +V AND -V INDICATORS ON MASTER MODULE OFF

i) Check +V and -V indicators on power supply unit, (PSU), if on check position of key switch, check master module fuses and check wiring/connector from PSU to master module. If not on, is mains indicator on PSU on?

ii) If mains indicator is on, check fuses in PSU. If mains indicator off check dimmer rack power is on and ALL phases present, and that control fuse on rack 1 has not blown.

8.3.2 EITHER ONE OF +V OR -V INDICATORS OF MASTER MODULE OFF

i) Check +V and -V indicators on PSU, if on check master module fuses and wiring/connector between master module and PSU; If off check

fuses in PSU.

8.3.3 NONE OF GROUP ACTIVE INDICATORS COME ON

i) Check DBO and group BO switches on and grand master at full.

ii) Check that crossfader is at the correct end for the set of masters being used.

iii) Fade crossfader to opposite end and try other set of masters.

iv) Unplug T-Bus and examine for damage.

v) Switch to "Emergency" voltage regulator (8.1.1) and refer to maintenance handbook or local RANK STRAND ELECTRIC agent.

8.3.4 UPPER OR LOWER SET OF MASTERS NOT WORKING

i) Check crossfader at correct end.

ii) Refer to maintenance handbook or local agent.

8.3.5 UPPER MASTERS ALWAYS ACTIVE (REGARDLESS OF CROSSFADER)

i) Check Norm/Emergency regulator switch not in "EMERGENCY" position.

ii) Refer to maintenance handbook or local agent.

8.3.6 ONE OR MORE GROUP NOT FUNCTIONING

i) Is group blackout on and crossfader at correct end?

ii) Remove T-Bus from master module. If indicator still does not light refer to maintenance handbook; If indicator does light examine T-Bus for damage and disconnect each module in turn until faulty module is located.

8.3.7 RAISING A GROUP MASTER LIGHTS MORE THAN ONE INDICATOR

i) Remove T-Bus from master module. If fault persists refer to maintenance handbook. If fault eliminated examine T-Bus and reconnect, check correct seating on every channel module. Disconnect channel modules in turn to isolate faulty one.

8.3.8 ALL LIGHTS FLICKER DURING CROSSFADE

Refer to maintenance handbook re: dismantling master module and cleaning crossfader.

8.3.9 TEN CONSECUTIVE CHANNELS NOT WORKING

i) Check circuits not set to INH with INH master down.

ii) Check T-Bus connected to relevant channel module.

iii) Check dimmer line connector seated correctly.

iv) Check each channels operation selected to IND

V) Swap with another channel module to confirm suspect module is defective. Refer to maintenance handbook.

8.3.10 ONE (OR MORE) GROUP NOT WORKING FOR 10 CHANNELS

i) Check T-Bus seated properly on suspect module

ii) Examine pins on T-Bus connector, and try swapping module. Refer to maintenance handbook.

8.3.11 MANY CHANNELS NOT WORKING

i) Check all 3 phases of mains supply present to all dimmer racks.

8.3.12 ONE CHANNEL NOT WORKING

i) Replace luminaire with one known to work

ii) Check dimmer fuse

iii) Swap channel module

iv) Check dimmer line/channel module connector.

v) Refer to experienced electrician to check dimmer module.

8.3.13 LIGHTS FLICKER AS CROSSFADER MOVED

Refer to maintenance handbook for "Cleaning the Crossfader."

8.4 DISMANTLING THE SYSTEM

BEFORE REMOVING ANY MODULE FROM THE SYSTEM POWER MUST BE TURNED OFF.

8.4.1 REMOVING A MODULE

i) Undo the module retaining screws and raise the lower end of the module a short way.

ii) Slide the module slightly towards the shelf, so that the connectors at the top of the printed circuit board clear the support rail.

iii) Hinge up the module from the bottom to reveal the underside and the connectors.

iv) Unplug both connectors and lift the module clear.

Modules are re-fitted to the desk by reversing the above instructions.

NOTE: Ensure flat cable is plugged onto the module the right way round: RED STRIPE IS LINE 20 AND SHOULD BE ON THE LEFT.

8.4.2 DISMANTLING A MODULE

i) Remove the module from the desk (8.4.1)

ii) Pull off the fader knobs by hand. Use of tools may damage the paint surface.

iii) Lay the module face down on a clean padded surface.

iv) Using an electrical screwdriver, remove the printed circuit board fixing screws and bracing bars.

v) In the case of a master module loosen the key switch packing nut and remove from the metal panel.

vi) Lift the printed circuit board from the front panel (observing advice in supplement).

vii) Re-assemble modules by following the above instructions in reverse order.

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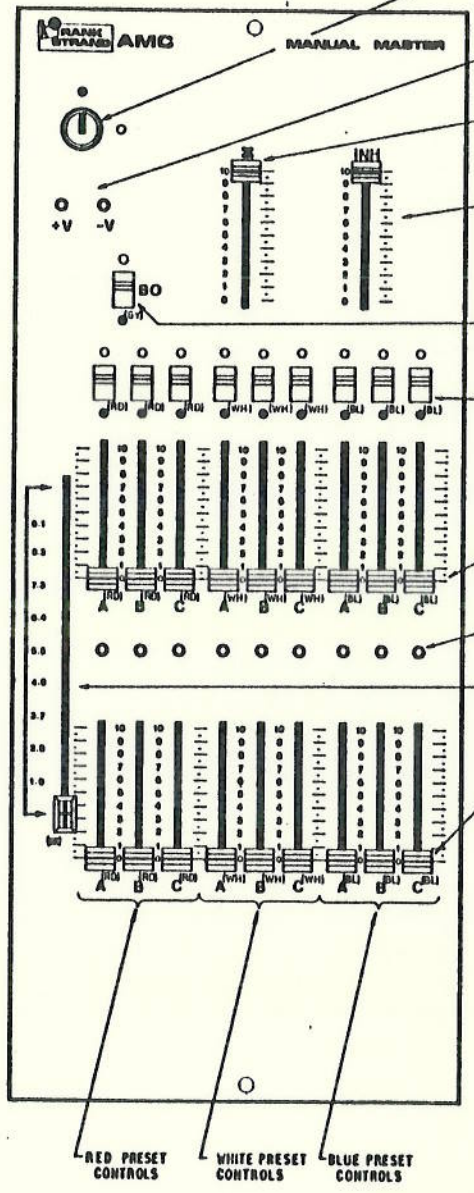

DESK ON KEYSWITCH
SWITCHES THE EXTRA-LOW VOLTAGE SUPPLIES TO THE DESK ELECTRONICS ACTIVATING THE CONTROLS. KEYSWITCH ENSURES SYSTEM ONLY OPERATED BY AUTHORISED PERSONEL

POWER O.K. INDICATORS
RED LIGHT EMITTING DIODES (LED'S) ILLUMINATE TO SHOW LOW VOLTAGE POWER AVAILABLE TO THE MASTER MODULE.

GRAND MASTER FADER (GM)
PROPORTIONALLY REDUCES THE OUTPUT OF ALL CHANNELS EXCEPT THOSE SELECTED TO INDEPENDENT (IND).

INHIBIT MASTER FADER (INH)
SETS THE MAXIMUM LEVEL THAT MAY BE OUTPUT BY ANY CHANNEL(S) SELECTED TO INHIBIT (INH) POSITION OVERRIDING OTHER MASTER SETTINGS ITS PURPOSE IS TO ALLOW A GROUP OF CHANNELS, USED REPEATEDLY TOGETHER, TO BE FADED DOWN E.G. USED FOR E.G.H. INHIBIT DURING CURTAIN CALLS.
HAS NO EFFECT ON CHANNELS NOT SELECTED TO INH.

MODULE BLACK OUT SWITCH (BO).
UP POSITION ALL MASTERS FUNCTIONS NORMALLY
DOWN POSITION SWITCHES ALL MASTER LEVELS FROM THIS MODULE TO ZERO. CHANNELS SELECTED TO INDEPENDANT ARE NOT AFFECTED.

GROUP BLACK OUT SWITCHES.
UP POSITION CORRESPONDING MASTERS FUNCTION NORMALLY
DOWN POSITION SWITCHES THE MASTER LEVEL OF ITS CORRESPONDING GROUP TO ZERO.

GROUP MASTER FADERS (UPPER SET).
ACTIVE WHEN CROSSFADER IS ON UPPER POSITION. WHEN ACTIVE EACH MASTER PROPORTIONALLY CONTROLS THE LEVELS OF THOSE CHANNELS WHICH ARE ROUTED TO THAT GROUP ON THE CORRESPONDING PRESET.

GROUP ACTIVE INDICATORS
LIGHT WHEN THE MASTER LEVEL OF ANY GROUP IS ABOVE POINT 1.

GROUP MASTER FADERS (LOWER SET)
ACTIVE WHEN CROSSFADER IS IN LOWER POSITION. WHEN ACTIVE EACH MASTER PROPORTIONALLY CONTROLS THE LEVELS OF THOSE CHANNELS WHICH ARE ROUTED TO THAT GROUP ON THE CORRESPONDING PRESET.

DIPLESS CROSSFADER.
AS THE CROSSFADER IS MOVED FROM THE BOTTOM END TO THE TOP, THE LOWER SET OF MASTERS DECREASES IN INFLUENCE WHILST THE UPPER SET INCREASES. AT THE TOP END THE LOWER SET OF MASTERS HAVE NO EFFECT ON THE LIGHTING AND VICE-VERSA. THIS ALLOWS A SINGLE FADER TO CARRY OUT THE TRANSFORMATION FROM ONE PRESET (OR COMBINATION OF PRESETS) TO ANOTHER. THE SYSTEM DESIGN CAUSES CHANNELS TO MOVE LINEARLY TO THEIR NEW SETTING, WITHOUT ANY DIP. CHANNELS WHICH ARE AT THE SAME INTENSITY IN BOTH THE NEW LIGHTING STATE AND THE OLD, DO NOT CHANGE LEVEL DURING THE CROSSFADE.

RANK STRAND ELECTRIC
A DIVISION OF
RANK AUDIO VISUAL LIMITED

TOLERANCES UNLESS OTHERWISE STATED

SCALE | DRAWN | CHECKED | APPROVED | MATERIAL

DATE

TITLE: AMC MANUAL MASTER MODULE LAYOUT (PRELIMINARY)

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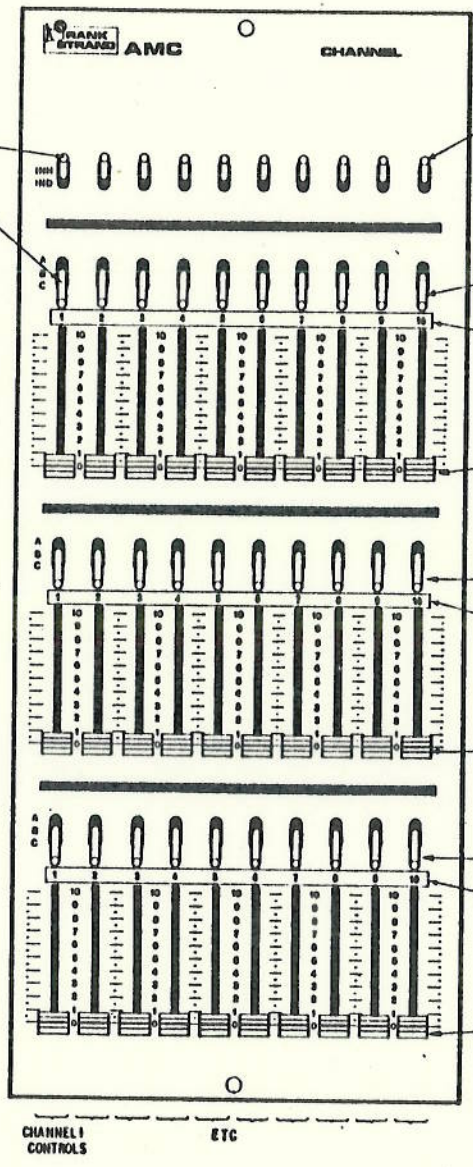

SHORT BATON SWITCH

LONG BATON SWITCH

RED PRESET CONTROLS

WHITE PRESET CONTROLS

BLUE PRESET CONTROLS

CHANNEL FUNCTION SELECT SWITCHES
ONE SWITCH PER CHANNEL. NORMALLY SET IN DESIRED POSITION PRIOR TO PERFORMANCE.
UP POSITION: CHANNEL FUNCTIONS NORMALLY
MID POSITION: CHANNEL FUNCTIONS NORMALLY WHEN INHIBIT (INH) MASTER IS AT FULL. HOWEVER, AS THE 'INH' MASTER LEVEL IS REDUCED, ALL CHANNELS SELECTED TO 'INH' WILL BE DIMMED.
DOWN POSITION: BLUE AND WHITE PRESET FADERS AND GROUPING SWITCHES ARE DISABLED ALSO THE RED PRESET GROUPING SWITCH.
THE LEVEL FOR A CHANNEL SELECTED TO 'IND'(INDEPENDANT) IS DETERMINED SOLELY BY ITS RED PRESET FADER. NONE OF THE MASTER MODULE CONTROLS (OTHER THAN THE KEYSWITCH) AFFECT THE LEVEL OF A CHANNEL SET TO 'IND'.

RED PRESET GROUPING SWITCHES
ONE PER CHANNEL. SELECT WHETHER THE CHANNEL LEVEL WILL BE CONTROLLED BY EITHER THE A,B OR C RED PRESET MASTER FADER AND SO ENABLES THE PRESET TO BE SUBDIVIDED INTO 3 DISTINCT GROUPS.

CHANNEL NUMBER IDENTIFICATION

RED PRESET CHANNEL FADERS (RED KNOBS)
CONTROLS THE CHANNEL LEVEL WHEN THE APPROPRIATE RED GROUP MASTER FADER IS ACTIVE. CALIBRATED 0-10, CORRESPONDING TO OFF AND FULL ON.
IF MORE THAN ONE PRESET IS ACTIVE AT ANY ONE TIME, THE OUTPUT LEVEL WILL BE THE HIGHEST OF THE ACTIVE PRESET LEVELS.

WHITE PRESET GROUPING SWITCHES
AS RED PRESET GROUPING SWITCHES.

CHANNEL NUMBER IDENTIFICATION

WHITE PRESET CHANNEL FADERS (WHITE KNOBS)
AS RED PRESET CHANNEL FADERS

BLUE PRESET GROUPING SWITCHES
AS RED PRESET GROUPING SWITCHES

CHANNEL NUMBER IDENTIFICATION

BLUE PRESET CHANNEL FADERS (BLUE KNOBS)
AS RED PRESET CHANNEL FADERS.

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TOLERANCES: IMPERIAL / METRIC
FRACTION ± 1/64 | 3 DEC PLACE ± 0.4mm
DECIMAL ± .015 | 2 DEC PLACE ± 0.1mm
ANGULAR ± 0.25°
UNLESS OTHERWISE STATED

SCALE | DRAWN | CHECKED | APPROVED | MATERIAL | DATE

TITLE: AMC CHANNEL MODULE LAYOUT (PRELIMINARY)

Some general instructions and useful hints to aid the technician called upon to handle or service a printed-circuit card are given below:

1. HANDLING: Always handle the boards carefully; avoid applying undue force; remember that mechanical damage to a board may cause invisible cracks in the board and consequent breaks in the printed wiring.

   Do not allow the printed-wiring, especially the plug-in terminations, to be contaminated by fumes or liquids tending to corrode the copper or cause poor plug-in connections. It is advisable to take this precaution also on boards with the wiring-area roller-tinned.

2. CIRCUIT READING: The simpler printed circuits may be 'read' by noting component terminations on one side of the boards and the wiring to these points on the reverse side. For more complicated circuits, a suggested short-cut is to place an illuminated lamp on the copper side and view through the board from the component side; it may help in some cases to have the lamp on the component side and view through the copper side.

3. INSERTION OF PLUG-IN COMPONENTS: Avoid use of excessive force tending to buckle the board.

4. TESTING OF COMPONENTS: It is often necessary to isolate one terminal of a component for test purposes. In many cases, a careful examination of the wiring will reveal that a simpler operation, such as removal of a plugged-in component or disconnecting a plug and socket interconnection, effectively isolates one lead of a component from the rest of the circuit, thereby avoiding an operation on the actual soldered joint.

5. APPLICATION OF SOLDERING IRON TO PRINTED WIRING: Avoid applying excessive heat to a soldered joint; this may cause the adjacent copper wiring to peel off the board. The heat applied must be just sufficient to melt the solder as rapidly as possible. The iron used must have a clean, well-trimmed and reasonably fine-tipped bit, and must be hot enough to avoid prolonged application to the soldered joint.

6. USE OF HEAT-SINKS: As a general rule, and especially with regard to semi-conductor components, leads-terminated components may suffer internal damage due to heat conducted via their leads. Always use a pair of pliers as a heat-sink (to hold the lead between the soldered end and component body) throughout the soldering or removing operation, till the joint cools down.

7. **REMOVAL AND REPLACEMENT OF SOLDERED COMPONENTS: Do not overheat the joint; always use a heat-sink. Check to ensure that the soldered end of the lead is free in the hole before pulling it clear off the board. Similarly ensure that the hole is free before inserting the component lead; pre-tin the component lead if necessary, before insertion.**

To remove multi-terminal components, irons fitted with solder extractors are advisable to prevent accidental short-circuiting of printed wiring by solder particles.

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