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# ACTION

MEMORY LIGHTING CONTROL

OPERATOR'S HANDBOOK

Strand Lighting

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Registered in England No 68713 Registered Office 6 Connaught Place London W2 2EZ
A company within The Rank Organisation

Strand Lighting

ACTØØ Issue 1

ACTION
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OPERATOR'S HANDBOOK

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# CHAPTER 1

# INTRODUCTION

## 1.1 GENERAL

ACTION is a portable manual lighting controller with memory and special effects capabilities. The 240V model complements the ACT3 and ACT6 range of dimmers, while the 110V model complements the CD80 range of dimmers, to form portable lighting control systems. ACTION can be used with a wide range of Strand and other dimmers, directly for those accepting Strand standard multiplexed control, but dimmers requiring an analog input will need a de-multiplexer.

ACTION can control 24 lighting channels by three methods:

* Manually - using the 24 Channel faders.
* By playback of recorded memories of lighting states.
* By playback of recorded special lighting effects.

These control sources can be combined as required, the lighting achieved for a given channel being on the basis of 'highest output takes precedence'.

ACTION can record up to 99 lighting state memories, and up to 9 special lighting effects, with a maximum of 48 steps in the sequence effects. Once recorded, the memories will be retained indefinitely while ACTION is connected to a mains supply, and for more than a month if the supply is disconnected.

## 1.2 CONTROLS

ACTION controls are grouped on the panel according to function, with each grouping marked by an outline. There are 5 such areas outlined.

### 1.2.1 Manual Controls

These include the Channel faders, numbered 1 to 24. Moving a Channel fader slider between 0 and 10 varies the brightness of that channel between 0 and 100%.
The Master Fader controls the overall brightness of a scene, once set on the Channel faders.
The Flash buttons beneath the Channel faders enable that channel to be identified by flashing the channel to full or off, when pressed. The direction of flash is altered by a Flash Enable switch.

### 1.2.2 Playback

These controls drive the playback of pre-recorded lighting states. A memory number shown on a Numeric Display can be entered into one of two Preset stores, A or B, by pressing the appropriate lettered button. The scene can be faded up by using the correct Preset fader. A Sequence button enables a series of memories to be entered into the two stores alternately and a dipless crossfade be carried out by moving both Preset faders together.

A timed fade can be set with a Time Control fader, the progress of the fade being indicated on a bar LED display.

### 1.2.3 Memory Control

Memory numbers are entered on a keypad and displayed on a LED Numeric Display both in Record and Playback procedures.
A Record button records a lighting state, protection being given by a Record Lock.

### 1.2.4 Effects

Pressing the FX button labels a number shown on the Display as an effect, both for playback and recording.
The Effect Speed fader sets the rate of change of a stepped effect on playback.
The Bass, Mid and Treble controls are filter threshold controls for use in sound driven lighting effects.

### 1.2.5 Blackout Switch

This controls enables lighting control to occur in one position, and selecting the other is the quickest way to plunge the stage into darkness.

# CHAPTER 2

# INSTALLATION

## 2.1 INTRODUCTION

ACTION has been designed as a portable lighting controller, and as such does not require a complicated installation procedure. However, a planned installation will enhance the reliability of the system. The installation of the de-multiplex units and dimmers requires careful consideration particularly in respect of their connection to the mains supply and to ACTION. These parts of the overall system will be covered by the installation instructions of the items concerned but the principles are covered in Chapter 4 - Electrical Installation.

## 2.2 DELIVERY INSPECTION

Strand Lighting Ltd. take every precaution to ensure that their goods reach you in perfect condition. However, accidents can occur in transit and storage, so we recommend that a thorough visual inspection is made, against the check list below, prior to installation. Should any damage be evident, or parts missing, ensure that Strand Lighting Ltd. or their agents are informed at once.

### Package Check List

| Qty | Description |
|---|---|
| 1 | ACTION console - 240V or 120V model. |
| 1 | 3 core Mains Lead (2 metres), with rear panel connector. |
| 1 | Multiplex Cable Assembly (5 metres), 3 pin for 240V model, 4 pin for 120V model. |
| 1 | Chinagraph pencil. |
| 1 | Operator's Handbook. |

A rear panel mounted Plot Lamp is an optional extra.

## 2.3 PACKING - TRANSPORT AND STORAGE

For storage or transport, the console should be packed in its original carton and packing material.
When the console is to be part of a touring system, it is recommended that a suitable transit case be manufactured.

## 2.4 ENVIRONMENT

### 2.4.1 Locating ACTION Console

ACTION console should be placed on a flat surface within 2 metres of a mains socket outlet and so placed that the operator will have clear sight of the stage.

2.4.2 Room Lighting

If ACTION is to be located in a control room, it is suggested that the room lighting be supplied via a dimmer and turned down to a discrete level during a performance.
Alternatively, wherever located, the optional plug in Plot Lamp will provide enough light to enable the console to be used and a cue sheet to be read in otherwise blackout conditions.

2.4.3 Operating and Storage Conditions

Temperature

| | Operating | Storage |
|---|---|---|
| Maximum | 35°C. | 45°C |
| Minimum | Ø°C. | -5°C |
| Recommended Range | 15 - 25°C. | |

Humidity

| | |
|---|---|
| Maximum | 9Ø% Relative Humidity |
| Minimum | Not Specified |
| Recommended Range | 6Ø - 7Ø% Relative Humidity |
| Condensation Level | ZERO |

Note: A console transported or stored in cold conditions, then moved to warmer conditions, is likely to form condensation on internal surfaces. This will evaporate given time. This time must be allowed before applying mains power to the equipment if serious damage is to be avoided.

2.4.4 Cleanliness

Recommended 'Office Level'
Air kept reasonably free from dust.
No smoking.
No food or drink on or near the equipment.
No build up of rubbish.

Cleaning of the console should be restricted to wiping with a moist cloth to which a little detergent has been added.
DON'T USE SPRAY ON POLISHES. THEY WILL DESTROY THE FADER SLIDERS.

2.4.5 Static Electricity

Though ACTION is proof against normal 'office' levels of static, very large discharges of static can disrupt the functioning of the operating system to the detriment of a performance.
The floor covering and other furnishings within the control area must be such as to prevent a build up of static electricity on those likely to touch the console. Carpet treatment with certain anti-static preparations is an acceptable alternative provided that the manufacturer's instructions are followed regarding regular re-treatment.

## 2.5 CONNECTIONS TO ACTION

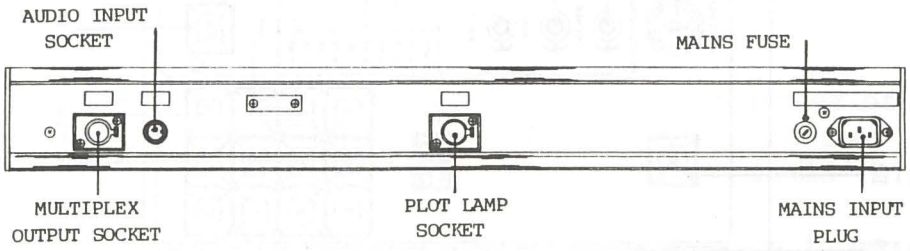



Fig. 2.1 REAR PANEL VIEW OF ACTION

### 2.5.1 Connection to the Mains

The mains connector on the mains lead supplied should be inserted in the rear panel mains socket. The free end of the cable should be fitted, wherever possible, with a 3 pin fused mains plug.
The cable wires are coloured either in the European colour code:

| | |
|---|---|
| Brown | Live line |
| Blue | Neutral line |
| Green/Yellow | Earth line |

or in the North American colour code:

| | |
|---|---|
| Black | Live line |
| White | Neutral line |
| Green | Earth line |

Fit the plug to the cable taking care that the wires have correct lengths, so that in the event of extreme strain, the earth wire will be the last to break. Make the cable clamp secure so that there is no strain on the individual wires.

Warning: Ensure that an electrical installation, as summarised in Chapter 4, has been carried out by a qualified person.

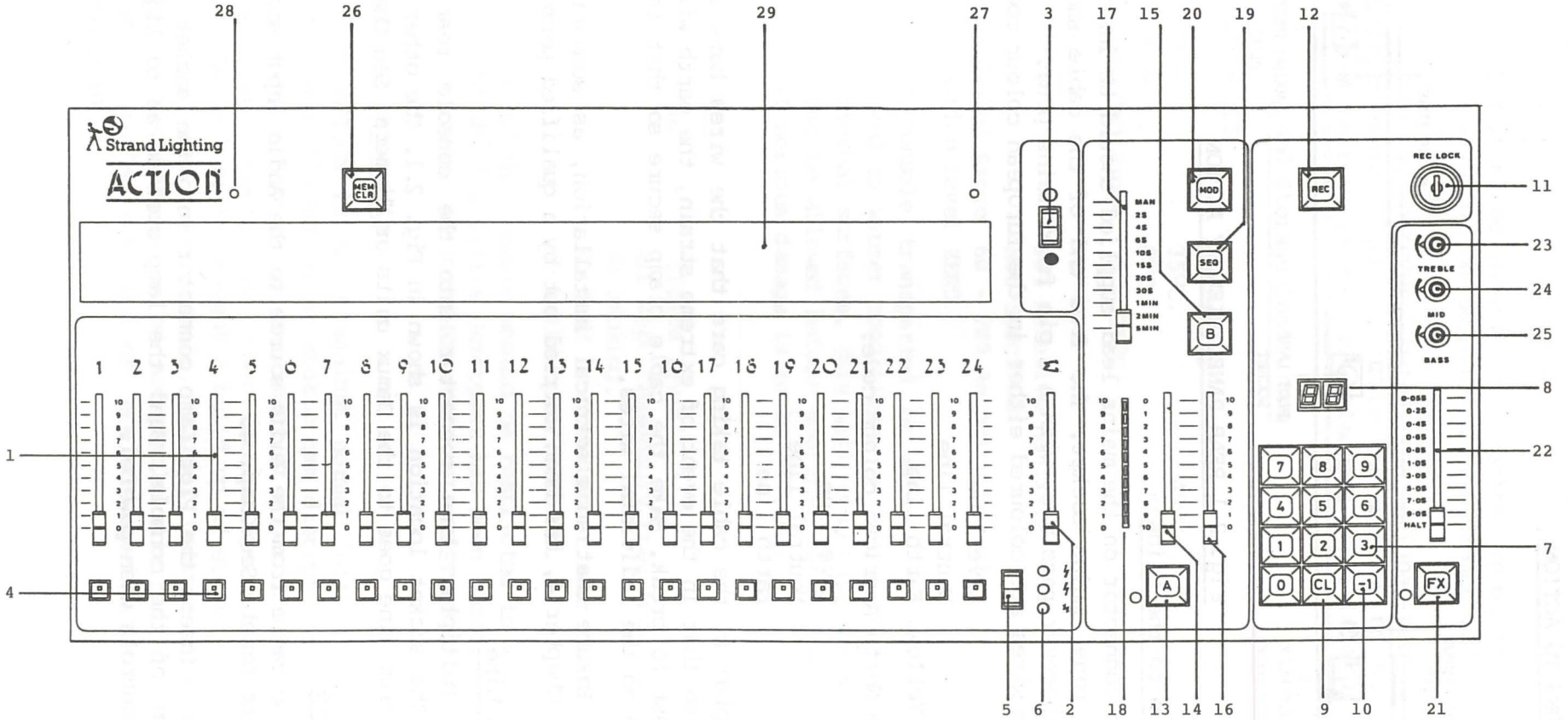
### 2.5.2 Multiplex Line

Plug the Multiplex line connector into the console rear panel socket. The socket location is shown in Fig. 2.1. The other end of the Multiplex line goes to the Demux units or dimmers. See Chap. 4.

### 2.5.3 Audio Cable

Connect the cable from the Audio source to the Audio Input socket on ACTION rear panel. See Chap. 4.

2.5.4 Plot Lamp Insert the Plot Lamp connector into the socket on the rear panel of the console. Bend the lamp stem so as to light the console controls when powered.

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# CHAPTER 3

# GETTING STARTED

## 3.1 INTRODUCTION

Operation of Action console is described below in a series of basic steps or exercises. The controls and their use are introduced in the order in which they will be met in practice. This should help the newcomer to stage lighting as well as to Action.
It is suggested that the operator carry out these steps in sequence. The suggested setting of some controls may appear arbitrary, but they are intented as a useful starting point for the beginner. The numbers in brackets refer to those on the panel layout diagram, while the symbols are those on the Action front panel itself. The reader unfamiliar with lighting control equipment should leave the notes for later reading.

## 3.2 HOW TO SWITCH THE SYSTEM ON

First ensure that a professional installation has been carried out in line with the instructions in Chapter 4. You CANNOT miss this step without risk to life, risk of injury, damage to equipment or poor performance. If damage is caused by failure to observe the recommendations, the warranty is invalidated.

The mains supply to the dimmers, Multiplex Interface modules and the Action console must be turned on before any lights can be controlled.

Power up Action itself by connecting the console to a live mains outlet with the cable supplied.
The lighting state at power up depends on the setting of the Channel Faders (1), the Master Fader (2) and the Blackout switch (3). There will be no contribution to any lighting state from the memory.

## 3.3 HOW TO LIGHT A SCENE

Bring up lights by using the Channel Faders (1). This is referred to as Manual operation of the console.

1) Set the Blackout switch to "O" (down).
2) Set the Channels Master Fader "Σ" (2) to 1Ø.
3) Set all Channel faders (1) to Ø.
4) Push the fader of the desired channel towards 1Ø until the desired light level is reached.
   As the light level rises above Ø, the LED indicator on the Flash button (4) beneath the fader will light.
5) Repeat for other channels to obtain the desired lighting state.

Control the overall brightness of the scene with the Master Fader.

## 3.4 HOW TO IDENTIFY THE CHANNEL LIGHTS - The Channel Flash Buttons

A channel with its light(s) may be identified by 'flashing' the channel, either flash ON (lights to full), or flash OFF (lights off). Use this in deciding what channel is required in setting up a lighting scene, or in altering one. To do this, press the Flash button (4) located below the fader of each channel. The direction of flash (full or off) is determined by which of the three Flash Indicator LEDs (6) is lit. At switch on, the Flash Disabled "ϟ" LED is lit. This may be changed to the Flash OFF "ϟ" or Flash ON "ϟ" lamp by pressing the 3 position, centre biassed Flash Enable switch (5), either once or twice.

## 3.5 RECORDING LIGHTING STATES

A lighting state set up using the Channel faders may be entered into a numbered location in memory for subsequent playback. The playback is identical to the original in respect of Channels ON and their individual brightness.
The memory location number, when entered using the numbered keypad (7), appears on the Numerical Display LED (8).

### 3.5.1 How to Record a Lighting State

1) Insert the key into the Record Lock (11) and turn a quarter turn clockwise, so that the arrow on the lock barrel points to the right. Action is now capable of recording.
2) Set a lighting scene as described above.
3) Allocate a number to the memory in which the lighting state is to be recorded, say 31, and call it up on the Numerical Display by pressing first 3, then 1, on the numbered keypad.
   If necessary, clear any error in entering the number by pressing CL (9), the Clear button.
4) To record the lighting state, press REC (12) Record button and release. A tone will sound briefly, the LED indicator to the left of the REC button will light for the duration of the button press, and a decimal point on the numbered display will light.
5) Set up another lighting scene, as before, and record it in memory location 32.

### 3.5.2 Sequence Recording of Lighting States

Use the SEQ (Sequence) button (19) to record a series of lighting states in consecutively numbered memories.

1) Set up the first lighting scene.
2) Press the SEQ button.
3) Select the first number of the memory sequence and enter it into the Numerical Display using the keypad.
4) Press the REC button. A tone will sound, the REC button LED indicator will light and the number in the display will be incremented by 1.

5) Set up the next lighting state, record as before and repeat as necessary.
6) End the sequence by pressing the SEQ button again. The LED indicator will go out.

Notes: If a lighting state were already recorded in a memory within such a numbered sequence, it would be over-recorded and lost.
The keypad -1 button (1Ø) can be useful here for the re-recording of a memory without having to re-select the number.

## 3.6 PLAYBACK OF LIGHTING STATE MEMORIES

Note that a memory location with recorded information has the number in the Numeric Display followed by a ".".
Such a displayed memory may be entered into either of two Preset stores, A or B, by pressing the A or B pushbutton. The output of each Preset store is governed by its own fader, which when increased from Ø to 1Ø, brings up the lighting state from zero to full. In practice however, both Preset Faders should be moved up or down together. In this manner a smooth change from one lighting scene to another can be effected using just one hand. Such a change is called a Dipless Crossfade.
The speed at which the lighting state reaches full is controlled by the speed of fader movement but also by the setting of the Time Control Fader (17).

### 3.6.1 How to Play Back a Lighting State Memory

Ensure that the LED indicators by the MOD (2Ø) and SEQ buttons are OFF. If ON, press the adjacent button to turn off.
Set the slider of the Time Control fader to MAN.

1) Recall the lighting state recorded in 3.5.1 above, by entering 31 in the Numerical Display.
2) Set both A and B Preset faders to the bottom of their travel.
3) Press B Preset button.
Its LED indicator will light.
4) Raise both Preset faders to the top of their travel.
The lighting scene previously recorded will brighten progressively as this is done.
The Flash buttons of those channels that are ON will light.

### 3.6.2 How to Crossfade Manually from One Lighting State to Another

Following on from the sequence above:

1) Enter 32 on the Numerical Display using the keypad as before.
2) Press Preset button A.
The LED indicator by the A Preset will light.
3) Move both Preset faders slowly to the bottom of their travel.
The lighting state recorded in memory 31 will be replaced progressively by that recorded in memory 32.

### 3.6.3 How to Carry Out a Sequence of Crossfades Manually

1) Clear both A and B Preset stores by pressing CL on the keypad (note that the numbered display is extinguished) and press both A and B Preset buttons in turn.
Both LED indicators will be extinguished.
2) Press the SEQ button. Its indicator will light.
3) Move both Preset faders to the bottom of their travel.
4) Enter 31 in the Numerical Display.
5) Press B Preset. Its LED indicator will light showing that memory 31 is in B Preset store.
6) Move both Preset faders to the top of their travel. The lighting state from memory 31 will fade up from zero to full, and the Numerical Display increment by 1 from 31 to 32.
7) Move both faders together to the bottom of their travel. Lighting state 31 will be replaced progressively by lighting state 32.

Note: Moving both faders to the top of their travel again, will increment the display by 1, even though no memory is recorded in location 33. In this case, lighting state 32 will be replaced by a blackout.

### 3.6.4 How to Carry Out a Timed Crossfade

1) Move the Time Control Fader from MAN to 1Ø seconds on the scale.
2) Repeat the procedures of 3.6.1 and 3.6.2 above.

The transition time from one lighting state to another will be 1Ø seconds approximately, and not be governed principally by the speed of movement of the preset faders.
The progress of the transfer will be indicated on the Fade Progress Display (18) next to the A Preset Fader.

Note: Only the A fader operates here, but it is good practise to move both faders together, as this prevents an unwanted sudden change of lighting in the event of subsequent movement of the Time Control fader to MAN.

## 3.7 SECOND THOUGHTS - Changing a Lighting State Memory

If on playback of a memory, changes are thought desirable, the memory may be altered by either of two methods: re-recording the memory, or by use of the MOD (Modify) button (22). The latter method is the more subtle. In all cases the REC LOCK must be set to the record position.

### 3.7.1 How to Change a Memory by Re-recording - Adding Channels

This method is useful for adding channels to the memory.

1) Call up the memory number on the Numerical Display, enter the memory into Preset store A and bring up the Preset Fader.
2) Add one or more channels to the scene, as desired, by bringing up the channels fader(s).

3) Record the revised scene in the original memory location (same memory number) by pressing the REC button. The original memory will be overwritten with the new.

3.7.2 How to Change a Memory by Re-recording - Rebuilding the Scene

This is clearly a drastic solution.

1) On playback, note the number of the offending memory.
2) Enter CL on the keypad, enter into the Preset store A and bring up the blackout scene on the Preset fader.
3) Rebuild the lighting scene as desired using the Channel faders.
4) Record the rebuilt scene over the original by entering the memory number on the keypad and pressing the REC button. A brief tone and the lighting of the REC indicator LED will shown that the new scene has been recorded.

3.7.3 How to Modify a Memory using the MOD button - Live

The changes can take the form of:

a) Addition of other channel(s).
b) Increase in brightness of existing channel(s).
c) Decrease in brightness of existing channel(s). If the brightness is reduced to zero, this in effect subtracts the channel.

The changes can be made, either at the time of playback (live), or prior to playback and therefore unseen (blind).

1) Call up the memory as before, enter into Preset store and bring up the lighting state on the Preset fader.
2) Press the MOD button.
3) Indicate the Channel to be modified (whether already in the memory or not) by pressing the Channel Flash button. Its LED indicator will flash and the existing channel brightness level will be indicated on the Fade Progress Display.
4) Press the centre biassed Flash Enable switch (5) either up or down. The channel brightness will go up or down accordingly and the momentary brightness level of the channel be indicated on the Fade Progress Display.
5) Other channels may be selected for modification in turn by pressing the Flash buttons.
6) Press the MOD button a second time to record the changes.

Note: If CL is pressed before step 6, the re-record action will not take place.

3.7.4 How to Modify a Memory using the MOD Button - Blind

A memory need not be recalled as a lighting state in order to modify it. It is sufficient to call up the memory location in the Numerical Display and modify it unseen; hence "blind".

1) Enter the memory number in the Numerical Display.
2) Press the MOD button. Its LED indicator will light, and the ON channels will be indicated by the lit LED indicators on the channel Flash buttons.

3) Add a channel by pressing that channel's Flash button. The button LED indicator will flash.
4) Press the Flash Enable switch up. A rising level, corresponding to the channel brightness will be seen on the Fade Progress Display.
5) Modify the brightness of an existing channel by pressing the channel Flash button. The button's LED indicator will flash, and the existing channel brightness level will be shown on the Fade Progress Display.
6) Press the Flash Enable switch up or down. The level on the Fade Progress Display, indicating the channel brightness, will rise or fall appropriately.
7) Record the modifications in the memory by pressing the MOD switch. Its LED indicator will go out, a tone will sound briefly and the modified memory will be recorded in the same numbered location as before.
8) The modification may be aborted prior to recording by entering CL on the keypad and the pressing the MOD button. The original memory will be retained.

Notes: It follows from the above that the MOD button can be used to preview a memory "blind". Enter the memory number and press the MOD button. The Flash button indicators will show the ON channels in the memory. Pressing the ON Flash buttons in turn will show the brightness levels on the Fade Progress Display.

To leave the memory unmodified, first press the CL then the MOD button.

If the memory being modified is also held in either A or B Preset, any modifications made will be copied to the memory in Preset. Thus lighting memories may be altered immediately prior to fading them to the output. By this method it is possible to make 'once only' modifications to lighting (held in Preset) during a performance or rehearsal.

## 3.8 RECORDING EFFECTS

Up to 9 separate effects can be recorded then played back alone, or in conjunction with a scene lit by manual fader settings, or from a played back memory.

The effect types are specified by the memory numbers:

1 Chase No. 1
2 Chase No. 2
3 Chase No. 3
4 Chase No. 4
5 Cycle with 99% slope
6 Random
7 Flicker
8 Audio "sound to light"
9 Chase on bass beat

### 3.8.1 How to Record a Chase Effect

A Chase Effect is a series of lighting steps executed repeatedly. Each Chase Effect can have between 2 and 48 steps, and each step can have a number of channels assigned to it. The speed of the effect may be varied when running.

1) Set the REC LOCK to Record (turn key so arrow on lock barrel points to the right).
2) Call up a number on the Numerical Display (between 1 and 4 as specified above).
3) Press the FX button. The adjacent LED will light, and any effect previously recorded in that location will begin to run.
4) Press the REC button. The adjacent LED will light and the Numerical Display indicate a flashing '1': the first step of the chase. Any effect previously recorded in that location will be deleted.
5) Choose those channels which are to be ON for the first step, by pressing their Flash buttons. The LED indicators of the chosen Flash buttons will light.
6) Record this step by pressing the Flash Enable switch UP. A tone will sound and the flashing Numerical Display will be incremented by 1.
7) Disengage those channels used only for the first step by pressing their Flash buttons, when their LED indicators will go out. Any channels not deselected will remain on in step 2.
8) Select the channels for the second step by pressing their Flash buttons. Their LED indicators will light.
9) Record as above and repeat the procedure for up to 48 steps.
1Ø) Record the last step by pressing the REC button. This records the step and ends the effects setting up sequence.

Note: If the Flash Enable switch is pressed UP prior to pressing the REC button, the last step will be found on playback to have a doubled ON time assigned to it.

### 3.8.2 How to Record a Cycle Effect

In a Cycle Effect a number of lighting channel or channels (48 max.) are faded up and then faded down, in turn, in a defined and repeated sequence. As a channel group fades down, the next in the sequence is faded up.

1) Call up 5 in the Numerical Display.
2) Press the FX button: its LED indicator will light.
3) Press the REC button. Its LED indicator will light, the Flash Indicator LEDs will go out and a flashing '1' will appear in the Numerical Display: the first step in the cycle.
4) Press the Flash button(s) of those channel(s) to be in the first step. The button LEDs will light.
5) Press the Flash Enable switch to Flash up. A tone will sound (indicating that the step is recorded) and the Numerical Display will be incremented by 1.

6) Press the Flash button(s) used in step 1 to disengage them, if desired.
7) Press the Flash buttons of those channels to be used in step 2, and record by pressing the Flash Enable switch to flash up. Repeat for up to 48 steps.
8) At the final step, do not use the Flash Enable switch, but record the step and end the setting up sequence by pressing the REC button. Both the REC and FX indicators will go out and a tone will sound.

### 3.8.3 How to Record a Random Effect

In a Random effect, a number of designated channels are switched to full, one at a time, in a random order.

1) Enter 6 into the Numerical Display.
2) Press the FX and then the REC buttons: both button LEDs will light and the Numerical Display go blank.
3) Press the Flash buttons for all channels to be used in the effect. Their LEDs will light.
4) Press the REC button to record the effect: a tone will sound and the panel display return to that as before.

### 3.8.4 How to Record a Flicker Effect

A Flicker Effect is similar to a Random effect, but the channels are switched, one at a time, to any level between off and full.

1) Enter 7 into the Numerical Display.
2) Press the FX and then the REC buttons: both button LEDs will light and the Numerical Display go blank.
3) Press the Flash buttons for all channels to be used in the effect. Their LEDs will light.
4) Press the REC button to record the effect: a tone will sound and the panel display return to that as before.

### 3.8.5 How to Record an Audio - Sound to Light Effect

In this effect, three groups of lighting channels are flashed ON by the bass, mid-frequency and treble peaks of a sound signal. The signal, such as music from a recorded source, is connected to Action through a 5 pin DIN rear panel socket.

1) Enter 8 into the Numerical Display.
2) Press the FX then the REC buttons. Both LED indicators will light, the Flash Indicator LEDs will go out and a flashing 'L' (L for low or bass frequencies) appear in the Numerical Display.
3) Select the channels to be triggered by the bass beat, by pressing their Flash buttons. Their LEDs will light.
4) Press the Flash Enable switch to Flash UP to record the step. A flashing 'C' (for centre or mid frequencies) will appear in the Numerical Display.

5) Disengage those channels already used by pressing their Flash buttons.
6) Select the channels to be lit by the mid frequencies by pressing their Flash buttons.
7) Press the Flash Enable switch to Flash UP to record the step. A flashing 'H' (for high or treble frequencies) will appear in the Numerical Display.
8) Disengage the previously used channels by pressing their Flash buttons.
9) Select the channels to be triggered by high frequencies by pressing their Flash buttons.
1Ø) Record the selection and end the setting up procedure by pressing the REC button. A tone will sound and the panel display will be as before.

### 3.8.6 How to Record a Chase on Bass Beat

Here a number of channels are lit in turn, triggered by the bass beat from a sound source, connected to Action through a 5 pin DIN rear panel socket.

1) Enter 9 into the Numerical Display.
2) Press the FX then REC button: their LEDs will light and a flashing '1' appear in the Numerical Display.
3) Select the channel(s) in the first step of the chase by pressing it's (their) Flash button(s).
4) Press the Flash Enable switch to Flash UP to record the step. The Numerical Display will be incremented by 1 and a tone will sound.
5) Disengage the channel(s) by pressing the Flash button(s).
6) Select the channel(s) for the next step as above and record as before.
7) Repeat for up to 48 steps but on the last step record and end the setting up sequence by pressing the REC button.

## 3.9 PLAYBACK OF EFFECTS

Effects may be played back alone or in combination with a scene lit by means of the channel faders, or by playback of memories. The effects referred to here are those recorded in the procedures of 3.8.

The brightness of a played back effect is set by the level of the Master Fader, which initially should be set to full.

All effects played back are subject to a fade up time determined by the setting of the Time Control Fader (17), variable from instantaneous to 5 minutes. Initially set this to MAN (the equivalent of instantaneous).

Those effects which do not involve sound are subject to the Effects Speed Fader (22), which is variable from Ø.Ø5 sec. to 9 sec. and HALT. This control sets the duration of one step in the effect. Initially set this control to Ø.2 sec.

Notes: During a fade in or fade out of an effect, the Time Control Fader may be moved to alter the fade speed.

The Effect Speed Fader may be moved at any time to alter the Effect running speed. Any change will take place on the next step of the Effect.
If a second Effect number is selected while an effect is running and the FX button is pressed, the second effect will run in place of the first. The fade times will be as set on the Time Control Fader.

### 3.9.1 How to Play Back a Chase, Cycle, Random or Flicker Effect

1) Call up the effect number on the Numerical Display.
2) Press the FX button: it's indicator will light.
The effect will now be played back. Note that the effect also appears on the Flash button LEDs.
3) Try varying in turn the Master Fader and the Effects Speed Fader. Return these controls to their initial settings.
4) Clear the effect by entering CL on the keypad and pressing the FX button.
5) Set the Time Control Fader to 1Ø sec. and call up the effect again.
6) Clear the effect as before.
7) Repeat for all the effects type 1 to 7.

### 3.9.2 How to Play Back an Audio - Sound to Light - Effect

1) Connect a sound source to the 5 pin DIN socket at the right hand end of the rear panel.
2) Set the Treble, Mid and Bass controls (23,24,25) to mid travel and increase the amplitude of the sound source until the designated channels are lit.
3) Adjust the Treble, Mid and Bass controls to give the desired effect.
4) Clear the effect by the keyboard entry of CL and pressing the FX button.
5) Set the Time Fader Control to 1Ø sec. and call up the effect as before. This demonstrates the effect fade-in.

### 3.9.3 How to Play Back a Chase to Bass Beat Effect

1) Connect a sound source as above.
2) Set the Bass control to mid travel.
3) Enter 9 on the keypad and press the FX button.
4) Adjust the source amplitude and the Bass control until the Chase effect takes place.
5) Clear the effect by entering CL on the keypad and pressing the FX button.

## 3.1Ø HOW TO BLACKOUT THE SCENE

The lit scene, however achieved, is subject to the Blackout Switch (3).
The stage can be blacked out at any time by pressing the Blackout switch to the UP position (setting the switch from "O" to "●").

## 3.11 SECOND THOUGHTS - Modification of an Effect

A recorded effect can be changed in respect of the channels allocated to a step by using the MOD button during a check playback. It is not possible to add or subtract steps by this method: to do this, the effect must be re-recorded.

### 3.11.1 How to Modify an Effect

1) Call up the effect number on the keypad.
2) Press the FX then the MOD button. Both button indicators will light and the first step of the relevant effect will flash in the Numerical Display.
3) Press the Flash Enable switch to Flash UP. The Display will indicate the next step in the effect.
4) Press the Flash Enable switch until the step to be modified is reached.
5) Add or subtract channels as desired by pressing the Flash buttons.
6) Record the change by pressing the MOD button. Both the MOD and FX indicators will go out.

## 3.12 HOW TO SAFEGUARD RECORDED MEMORIES

Once recorded, up to 99 memories and 9 effects, each of up to 48 steps, represent a sizeable investment in time at the very least! This effort may be safeguarded by using the REC LOCK keyswitch. Turn the key one quarter turn anti-clockwise, so that the arrow on the lock barrel points to the back of the unit. Then withdraw the key.

No recording can now take place until the key is re-inserted and turned one quarter turn clockwise, so that the arrow on the lock barrel points to the right.

If Action is disconnected from the mains supply, the memories will be retained intact for at least a month, stored in an integrated circuit powered by an internal battery. Beyond this time there is a risk of memory corruption, as a result of battery discharge. Connection of Action to the mains supply for a few hours will recharge the battery.

## 3.13 HOW TO ERASE MEMORIES

Memories of either lighting states or effects may be erased individually by over-recording with a blackout state, or by use of the MEM CLR (Memory Clear) button (26). Alternatively, the complete memory contents, lighting states and effects can be erased.

### 3.13.1 How to Erase an Individual Lighting State Memory - Over-record

1) Set the REC LOCK to the Record position.
2) Set a blackout scene by setting the Master fader to Ø and the Preset faders to Ø.
3) Call up the number of the individual memory on the keypad.
4) Press the REC button. A tone will sound, the button indicator will light briefly and the existing memory will be erased.

### 3.13.2 How to Erase an Individual Lighting State Memory - MEM CLR

1) Set the REC LOCK to the Record position.
2) Call up the memory number in the Numerical Display.
3) Hold down the MEM CLR and press the REC button. A tone will sound and the decimal point in the display will vanish, showing that the memory location no longer holds active channels.

### 3.13.3 How to Erase an Effects Memory - Over-record

1) Set the REC LOCK to the Record position.
2) Call up the number of the effect on the keypad.
3) Press the FX button. The recorded effect will begin to run.
4) Press the REC button. Its indicator will light and a flashing '1' or a letter will appear in the Numerical Display.
5) Ensure that no Flash buttons are depressed, i.e. no button indicator is lit.
6) Press the REC button again. A tone will sound, its indicator will go out and the effect will be erased.

### 3.13.4 How to Erase an Effects Memory - MEM CLR

1) Set the REC LOCK to the Record position.
2) Call up the Effect number on the Numerical Display.
3) Press the FX button. The effect will begin to run.
4) Hold down the MEM CLR button then press the REC button. A tone will sound and the FX indicator will go out.

### 3.13.5 How to Erase All Memories

Think carefully before trying this out!

1) Set the REC LOCK to the Record position.
2) Clear the Numerical Display.
3) Hold down the MEM CLR and press the REC button. The REC indicator will light, a tone will sound briefly and ALL memories will be erased.

## 3.14 SYSTEM RESET

It is possible that in unforeseen circumstances the memory or effects system will cease to operate as described or as designed. It will, however, be possible to light a scene by using the channel faders. Should such a system failure ever occur, recovery is possible in either of two ways.

1) Insert a narrow rod of an insulating material into the small hole (28) adjacent to the N of "ACTION", the caption at the top left hand corner of the console, and push down gently on the press switch beneath it. This will cause the system to reset.
2) Switch off the mains supply to ACTION and then switch on again.

## 3.15 THE CONTROL PANEL

This section is a reference guide to ACTION operational controls and functions. The numbering below matches that on the Control Panel Layout diagram.

1 - Channel Faders
The 24 Channel Faders form a manual control system. Each fader controls the level for a single channel.
The faders are used for the following purposes:
i) Setting up lighting states by individual adjustment prior to recording.
ii) Superimposing additional lighting during the playback of memories.
iii) As a manual "back-up" control system in the event of failure of the memory section of ACTION.

2 - Master Fader
This is an overall master control for the Channel Faders and running Effects. Memory playback of lighting states and channel Flash ON are unaffected by this control.

3 - Blackout Switch
This operates as a master blackout switch over the entire system. The switch should be in the 'down' position for normal operation.

4 - Flash Buttons and Indicators
These buttons have several functions; the standard one being to act on the corresponding channel momentarily, either raising it to FULL or dimming it to OFF, with the action dependent on which of the Flash Indicators is lit. The Indicators in the Flash buttons show, when lit, that the channel is active (not OFF).
Refer also to MOD button (2Ø) and FX button (21).

5 - Flash Enable Switch & 6 - Flash Indicators
The 3-position, centre biassed switch has several functions; the standard one being to alter the function of the Flash buttons. The current function is shown by the Flash Indicators as Flash to FULL, Flash to OFF, or Flash Disabled.
If the top of the Flash Enable switch is pressed, the indication is altered in an upwards direction. e.g. from Flash OFF to Flash FULL.
If the bottom of the Flash Enable switch is pressed, the indication is altered downwards.
Refer also to MOD button (2Ø), and FX button (21).

7 - Numerical Keyboard
This is used for entering Memory Numbers or Effects Numbers for use during Record, Playback, and Modify operations

8 - Numerical Display
This displays the number entered from the keyboard. Or, during effect recording, displays Effect step numbers.
The decimal point (to the right of the units digit) will illuminate if number entered corresponds to a recorded Memory or Effect.

9 - CL (Clear) Button
This clears the last entered number from the Numerical Display.

1Ø - -1 Button
This reduces the number in the Numerical Display by 1.
This may be useful for 'reversing' the action of automatic 'sequence' during recording or playback.

11 - REC LOCK (Record Lock) Keyswitch
When this is in the locked position (arrow on lock barrel point to the back of the console), no recording or modification of Effects or Memories is possible.
To unlock, turn the key one quarter turn clockwise.

12 - REC (Record) Button
This records the current active lighting state into the memory whose number is shown in the Numerical Display. Any information previously recorded on that number will be erased and overwritten. The tone will sound to confirm the recording, and a 'decimal point' will light in the numerical Display if the Memory Number contains active lighting levels.
Refer also to FX button (21).

13 - "A" Preset Button
This enters the lighting state, recorded in the Memory number shown in the Numerical Display, into the Preset Store.
The indicator will illuminate if the Preset has been loaded with a Memory containing active channels.

14 - "A" Preset Fader
This acts as a 'master' fader for the lighting state stored in the A Preset.
Refer also to Time Control Fader (17).
The A Preset Fader operates in an 'upside down' manner. i.e. Full output levels are achieved when the fader is fully towards the operator.

15 - "B" Preset Button
As for A Preset button (13), but for the B preset Store.

16 - "B" Preset Fader
This acts as a 'master' fader for the lighting state stored in the B Preset Store.
Refer also to Time Control Fader (17).

17 - Time Control Fader
This allows the setting of a time for the crossfade between A and B Preset Stores. Time is variable between 'Manual' (fade controlled solely by the movement of the A and B faders), and the limits of 2 seconds and 5 minutes. When the setting is for a timed fade, only the A fader need be moved to achieve the fade, although it is good practice to move also the B fader.
When Effects are run, the setting of the Time Control Fader determines both the fade up and fade down times of the Effect.
Refer also to FX button (21).

18 - Fade Progress Display
This LED column indicates the progress of a timed crossfade; the number of illuminated sections indicating the amount of elapsed fade time.
If the Time Control Fader is in the Manual position, the top and bottom segments of the display illuminate to indicate this. The display is also used to show channel levels during the modification process. Refer also to MOD button (2Ø).

19 - SEQ (Sequence) Button and Indicator
This button engages or disengages the 'Sequence' mode, as shown by the indicator. When 'Sequence' is active, any Record or 'Memory transfer to active Preset' action will cause the memory number in the Numeric Display to advance by 1.

2Ø - MOD (Modify) Button
This button is used to enter and exit from the 'Modify' state in which 'live' or 'blind' modification of a recorded Lighting State or Effect can be carried out.
A Lighting State memory may be altered in 'Modify' by adding channels and altering the brightness level of any channel in the memory.
An Effect memory may be altered in 'Modify' by adding channels to any number of steps in the effect. No steps may be added or removed using MOD.

21 - FX (Effects) Button
When this button is pressed after the entry of a number in the Numeric Display between 1 and 9, that numbered effect will begin to run or may be recorded or modified.

22 - Effect Speed Fader
The setting of this control determines the ON time of each step in a cyclic or random effect ( effects 1 to 7) and hence the speed of change of the effect.

23 - Treble & 24 - Mid & 25 - Bass
These are the Treble, Mid frequencies and Bass Audio Filter Level controls. They are used in Effect 8 (Sound to Light). Additionally, the Bass control is used similarly in Effect 9 (Chase on Bass Beat).

26 - MEM CLR (Memory Clear) Button
This button is enabled by the Record Lock Keyswitch. When used with the Record button, it will clear individually numbered Memories (entered to the Numeric Display), or Effects. When used with the REC button on a blank display, it will clear all memories. A brief tone will confirm the operation.

27 - Diagnostic Programs Switch
This switch is located beneath the panel and is accessible through a small hole. When pressed with an insulated rod, it will initiate diagnostic programs.

28 - Reset Switch
This switch is mounted similarly to the D.P switch above. When pressed, it will 'reset' the system as if ACTION mains supply had been switched off and then on again.

29 - Writing Surface
Channel identification and notes may be written on this black surface above the channel faders using the chinagraph pencil supplied or a 'dry-wipe' marker pen.

# CHAPTER 4

# ELECTRICAL INSTALLATION

## 4.1 MAINS POWER SUPPLY

The mains power required for ACTION is single phase (Live, Neutral, Earth) 12Ø or 24Ø volts AC. 5Ø/6Ø Hz. maximum current 2A.

Note: The supply voltage required for an ACTION console is fixed at time of manufacture. Care must be taken that the system is connected only to the correct supply voltage.

The mains supply must be stable and free from interference and disturbances as these may adversely affect the operational reliability of the system. It is recommended strongly that the mains supply for ACTION is not taken from the same distribution wiring as other equipment - especially 'noise' producing equipment such as electric motors or arc lamp luminaires. Whenever possible, the mains supply for ACTION should be wired from the site main intake - via a suitable protection device - directly to the control position.

### 4.1.1 Earthing

ACTION must be earthed. The Earth connection must be adequately rated to ensure proper protection against electric shock in the extremely unlikely event of any exposed metal parts becoming 'live'. The Earth must also be 'clean' i.e. it must not carry electrical noise or interference.

## 4.2 MULTIPLEXED SIGNAL CONNECTION TO DIMMERS

The dimmer control output from ACTION is 'multiplexed' (the signals for all dimmer channels are sampled on a cyclic basis and transmitted one after the other along a single cable). The connection to the dimmers must therefore involve a 'demultiplex' device. The multiplex signal specification matches the D54/AMX85 standard currently used by Strand Lighting. (Two wire for European models, four wire for USA models).

### 4.2.1 Two Wire Multiplex Systems

Three options of demultiplex device are currently available:-

#### ACT 6 Multiplex or ACT 3 Multiplex

The ACT range of portable dimmer packs, fitted with the multiplex input panel may be controlled directly from ACTION by simply connecting the multiplex control line between the dimmers and the control system. Full installation and connection instructions are included with the units.

#### Permus Demultiplex Unit

This device is suitable for interfacing ACTION to permanently installed dimmers which require the standard Strand Lighting analog

control input of Ø V = Off, -1Ø V = Full On. Full installation and connection instructions are included with the Unit.

F&D Multiplex Interface

This device is suitable for interfacing ACTION to Strand Lighting portable dimmer packs, e.g. Mini II+, Tempus; and to dimmers which require analog control inputs of other than Øv to -1Øv. (Within the range of -15v to +1Øv = Full On, Øv = Off)

Five versions are currently available:

i) -1Ø V Bleecon connectors - for direct connection to Tempus dimmer packs.
ii) -15 V Bleecon connectors
iii) -1Ø V Min D type connectors)
iv) -15 V Min D type connectors) Control cable not included
v) +1Ø V Min D type connectors)

Control cables fitted with Min D type connectors are available separately.

Where there is doubt as to which unit should be installed, Strand Lighting or their agents should be consulted.

Note: ACTION has no capability for using an input from faders. Therefore if a manual fader control system is connected to the F&D Multiplex Interface Faders input, the faders will only drive the dimmers if the ACTION is either disconnected or switched off.

Multiplex Control Cable (European Models)

Cable type must be single or twin screened microphone cable with a capacitance of less than 3ØØpF/Metre and a nominal impedance of approximately 75 Ohms.
Maximum total multiplex cable length must be 1ØØØ Metres or less.
Connections are made using 3 pin AXR style connectors:
(AXR style connectors are directly compatible with XLR style connectors).
AXR-3-12-output from ACTION.
AXR-3-11-into ACT dimmer pack, or F&D Multiplex Interface.

Pin connections are as follows:-

Pin 1 - Screen (Technical Earth)
Pin 2 - Red cable/no connection (Not used in ACTION installations)
Pin 3 - Blue cable/centre core (Multiplex signal to dimmers)

4.2.2 Four Wire Multiplex Systems

ACTION will connect directly to CD8Ø dimmer racks, or CD 8Ø portable dimmer packs. For connection to other styles of dimmers, please contact Strand Lighting for advice.

Multiplex Control Cable

Cable type must be 'Belden' type number 9156.
Maximum total multiplex cable length must be 1ØØØ Feet (3ØØ Metres), or less.

Connections are made using 4 pin AXR style connectors:
AXR-4-11-output from ACTION.
AXR-4-12-input to CD8Ø

Pin connections are as follows:-

Pin 1 - Black cable (Technical Earth)
Pin 2 - White cable (Synch -)
Pin 3 - Red cable (Analog)
Pin 4 - Green cable (Synch +)

CD8Ø dimmers supplied until recently utilise 'Switchcraft' connectors instead of AXR connectors.

Pin connections are as follows:-

Pin 1 - Synch -
Pin 2 - Synch +
Pin 3 - Technical Earth
Pin 4 - Analog

## 4.3 AUDIO INPUT

ACTION will accept input signal for use with Sound-to-Light and Chase-on-Beat Effects. The audio input circuit will accept 'line level' signals of a maximum amplitude of 5 V peak to peak. The input circuit is 'unbalanced' and presents a negligible load to the signal source.

Cable type should be screened.
No maximum length is specified - the length should be as short as possible.
Connector type is 5 pin DIN plug, 18Ø Degree style (DIN 41524).

Pin connections are as follows:-

Pin 1 - No connection
Pin 2 - Audio Ø V
Pin 3 - Audio input, Left Channel
Pin 4 - No connection
Pin 5 - Audio input, Right Channel

Note: Right and Left audio channels are 'mixed' within the ACTION audio circuitry.

## 4.4 MAINS AND SIGNAL EARTH CONSIDERATIONS

### 4.4.1 Earth Loops

When installing an ACTION, it is very important that there are no 'loops' in the Earth and Technical Earth wiring. If loops exist, electrical resonance and noise may cause unreliable system operation, or in extreme cases, overheating and burn out of the Technical Earth wiring.

The multiplex cable screen, which forms the Technical Earth conductor from ACTION, is connected to Mains Earth inside the control console. This Technical Earth must not be connected to Mains Earth at any other point.

The Dimmer Common connection is usually connected to Mains Earth inside the dimmer packs (this is almost always the case with portable dimming equipment).

Whenever possible, the connection between Dimmer Common and Mains Earth should be broken. However, with portable dimmer packs, it may be difficult to effect this disconnection, and doing so may compromise the integrity of the Protective Earth circuit.

Demultiplex devices currently supplied by Strand Lighting incorporate an input circuit which effectively isolates the demultiplex cable screen from the Dimmer Common connection (as long as the potential between the multiplex cable screen and the Dimmer Common is less than about 7 Volts AC.) This isolation circuit therefore reduces the need to disconnect the Dimmer Common from Mains Earth. Isolation input demultiplexers are, however, not always 1ØØ% successful in removing the effects of Earth loops. In cases of difficulty, Strand Lighting or their agents should be consulted.

Notes: Demultiplex devices supplied in the past by Strand Lighting may not incorporate isolation input circuitry. However, adaptor units are available to order. CDØ dimmers do not incorporate isolation input circuitry.

### 4.4.2 Earth Verification

The Earthing within an installation should be checked for Earth loops, and other problems:-

1) Fully connect the ACTION, demultiplex unit and dimmers.
2) Remove the multiplex cable from the ACTION. (All equipment turned off).
3) Connect a multi-meter between the Ø Volt pin (pin 1) of the output connector on the ACTION and the Ø Volt pin (pin 1) of the multiplex cable connector.
4) Check that there is no voltage measurable (AC or DC).
5) Set the meter to measure resistance, and check that there is a high resistance (several thousand Ohms or more) between the two points. A very low resistance reading indicates the presence of an Earth loop.
   Note: Do NOT use high voltage resistance testers.
6) Finally, set the meter to measure current. Set the range progressively more sensitive, on both AC and DC, to check that there is no significant current (less than a few micro-amps) flowing in the earth line - with all equipment turned on. Should any current register, the earthing arrangements must be checked and improved to the point where no measurable current flow is indicated.

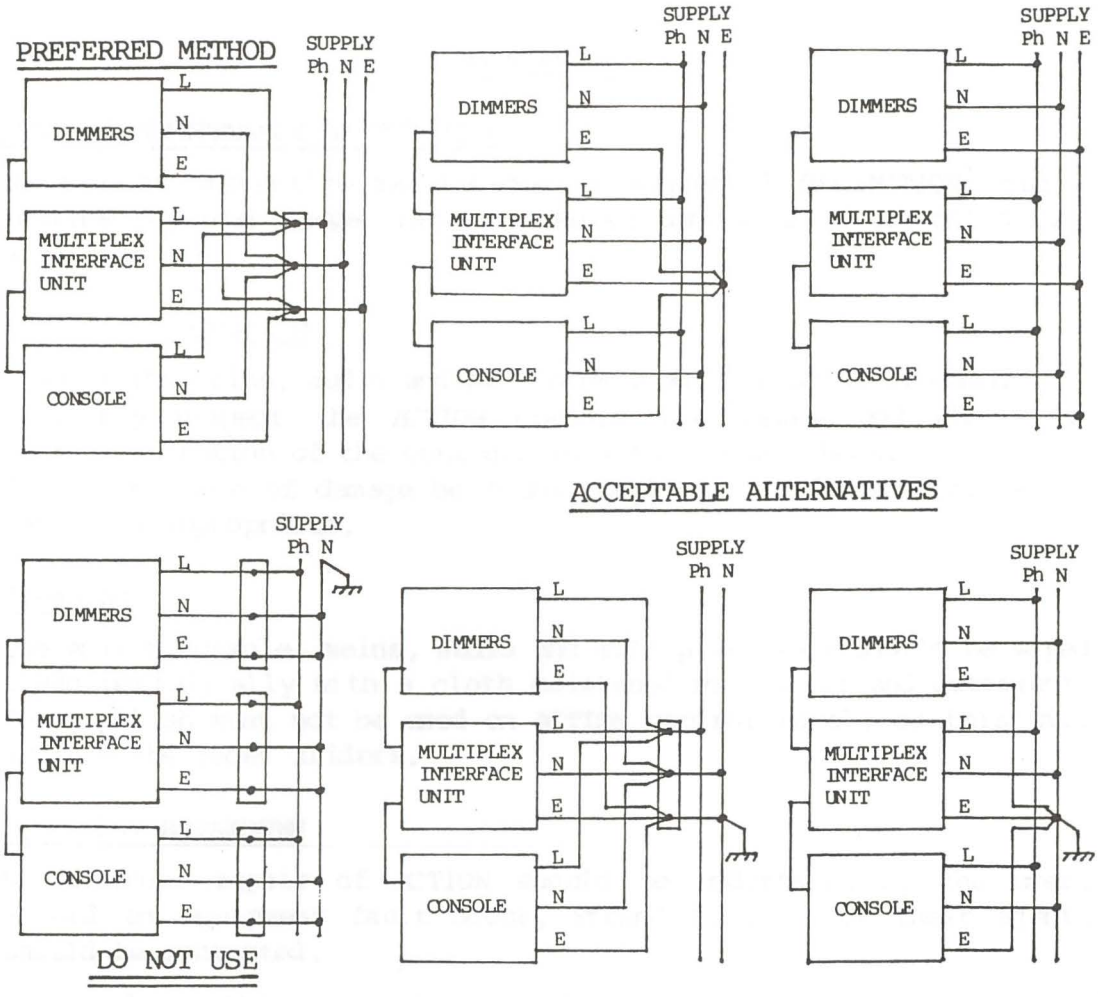


Fig. 4.1 MAINS EARTH WIRING

## 4.5 INSTALLATION DIFFICULTIES

ACTION has been designed such that its installation is straightforward. However, the same may not be true for other equipment in the installation.

In the event of incorrect operation, an appropriate procedure is to make a series of checks that all equipment is correctly installed and is operating according to its specifications.

### Installation Check List

1) Environmental conditions are within the required limits.
2) All mains wiring is correct and conforms with any relevant regulations.
3) Control cabling to dimmers and demultiplex unit is correct.
4) Earthing is correct.
5) The ACTION is fully operational.
6) All dimmers are fully operational.
7) Any additional equipment is fully operational.

If a problem cannot be resolved locally, contact Strand Lighting Ltd. or their agents.

# CHAPTER 5

# MAINTENANCE

## 5.1 ROUTINE MAINTENANCE BY THE USER

No routine preventive maintenance is suggested for ACTION, but a routine physical inspection will detect damage prior to, not during a performance.

### 5.1.1 Periodic Inspection

Inspect the mains, audio and multiplex leads for signs of damage.
Similarly inspect the ACTION console for damage and check the correct operation of the controls in a functional check.
Should evidence of damage be found, replace, repair or arrange for repair as appropriate.

### 5.1.2 Cleaning

The ACTION console, mains, audio and multiplex leads should be wiped clean periodically with a cloth moistened with water and detergent. Spray polish must not be used on ACTION control panel, as this will destroy the fader sliders.

## 5.2 EQUIPMENT BREAKDOWN

No internal repair of ACTION should be undertaken by the user. Should an equipment fault occur, Strand Lighting or their agents should be contacted.

Before doing this, a number of checks should be carried out to localise the fault, and ensure that an equipment fault is indeed present.

Check the following throughout the installation:
The position of the Blackout Switch.
Mains supply to ACTION, the demultiplex units and the dimmers.
Mains indicator lamps on demultiplex units and dimmers lit if fitted.
Integrity of all leads.
All connectors are fitted correctly and fully inserted.

### 5.2.1 Complete Breakdown

If a fault has been traced to ACTION, i.e. no lamps can be lit and all panel controls are inert, remove, check and replace, if necessary, ACTION rear panel mains fuse and the mains lead plug fuse, in turn.
The correct ACTION mains fuse is:
2A H.R.C. Type F, 20mm x 5mm for the 240V model.
3.15A H.R.C. Type F, 20mm x 5mm for the 120V model.
If this does not restore control, contact Strand Lighting or their agents.

### 5.2.2 Partial Breakdown

If a fault occurs in the memory section of ACTION, control is still possible using the Channel faders.

ACTION facilities include a Self-Test program. The results of these diagnostic tests would be useful in an initial call for repair assistance.

## 5.3 DIAGNOSTIC PROGRAM

To enter the Diagnostic Program, press the D.P. Switch (27), located beneath the control panel, using an insulated rod.
Entry into the program is indicated by the flashing, at one second intervals, of both decimal points in the LED Numerical Display. All other displays will be blank. Memory lighting control capability of ACTION will be disabled during the tests, but normal operation may be resumed by switching ACTION first off then on again. Alternatively, press the Reset button (28) beneath the panel.

There are 8 tests within the program; each of which may be initiated by entering its number on the keypad. The running of any test may be halted by pressing CL.

#### Test 1 - Displays

Enter 1 on the keypad to start.
This test switches on all indicators and display segments one at a time in rapid succession, until all are on, when the process is reversed. The test is repetitive.
Press CL to exit.

#### Test 2 - Program Checksum

Enter 2 on the keypad to start.
This test checks the ACTION program storage PROM. The arithmetic sum of all addresses is compared with the known, expected answer.
If incorrect, an error code of EØ will appear in the Numeric Display.
Press CL to exit.

#### Test 3 - Cue Data

Enter 3 on the keypad to start.
This test performs a similar operation to 2 above, but on the lighting cue storage memory.
If incorrect, an error code of E1 will be displayed. If correct, an increasing number, corresponding to the number of successful tests, will be displayed.
Press CL to exit.

#### Test 4 - Real Time Clock

Enter 4 on the keypad to start.
This test checks the accuracy of the internal timing generator, used to give ACTION its 'sense' of time.

During a successful test the display will remain blank. A failure will cause an error code of E8 to be displayed.
Press CL to exit.

Test 5 - Multiplex Output

Enter 5 to start.
This test will cause the multiplexed output line to de driven with a changing pattern of dimmer level information. This can be checked by observing a changing pattern of lighting.
Press CL to exit.

Test 6 - Contacts

Set the REC LOCK to the 'locked' position. Enter 6 to start.
This test will cause a number to appear in the Numeric Display whenever a button or switch is pressed.

| Number | Button or Switch |
|---|---|
| 1 - 24 | Flash buttons 1 - 24 |
| 25 - 48 | Not allocated |
| 49 | Number 0 |
| 50 | " 1 |
| 51 | " 2 |
| 52 | " 3 |
| 53 | " 4 |
| 54 | " 5 |
| 55 | " 6 |
| 56 | " 7 |
| 57 | " 8 |
| 58 | " 9 |
| 59 | " -1 |
| 60 | CL |
| 61 | MOD |
| 62 | REC. LOCK |
| 63 | REC. |
| 64 | SEQ. |
| 65 | FX |
| 66 | A Preset |
| 67 | B Preset |
| 68 | Flash Enable Up |
| 69 | Flash Enable Down |
| 70 | Not allocated |
| 71 | MEM CLR |

If more than one button is pressed, the display will count through the numbers of all contacts closed.
To exit, press CL twice in rapid succession.

Test 7 - Faders

This test allows the checking of faders, multiplexing electronics and analog to digital conversion electronics.
When the test is running, faders may be selected one at a time by

holding down a particular button. When selected, the fader slider may be moved over its travel and a number corresponding to its position shown on the Numeric Display. All faders except the Channel faders display Ø - 99 when their sliders are moved over their complete travel. The corresponding display for Channel faders is Ø - 82 (or greater) and all Channel faders should be consistent.

To select faders:

| Hold down Button | Fader |
|---|---|
| Flash Button 1 - 24 | Channel 1 - 24 |
| A Preset | A |
| B Preset | B |
| FX | Effects Speed |
| MOD | Time Control |
| Flash Enable (up or down) | Master |

Note: Channel faders are mastered by the Master fader.

Press 7 to start.
Hold down selecting button during a test on a fader.
Leave a test on a fader with the display at zero.
Press CL to exit.

Test 8 - Memory

This is a comprehensive test of all ACTION memory, including lighting cue storage memory.
The test will destroy all recorded memories.
To protect against unwanted erasure, the test will only run with the REC LOCK in the REC position.
Press 8 to start.

A detected failure will result in one of the following error codes being displayed.

E3 - Address line fault.
E4 - Data line fault.
E5 - Data errors in several locations.
E6 - Data errors in limited address area.
E7 - Memory locked and test aborted.

Press CL to exit.

Test Ø - Continuous Testing

This test will run one pass of the following tests, after which it will repeat.

| | |
|---|---|
| Test 1 | Display |
| Test 2 | PROM Checksum |
| Test 3 | Cue data |
| Test 4 | Real Time Clock |
| Test 8 | Memory |

Press CL to exit.

Power Up Tests

These tests are run immediately after switch on or reset. They are invisible to the user unless an error is detected, when an error code will be displayed momentarily. Normal system operation will then take place, if the failure is not such as to prevent the main lighting program from running correctly.

Tests

Check of operating system memory.
Run diagnostic tests 2, 3 and 4.

Summary of Error Codes

| | |
|---|---|
| EØ | PROM checksum error. |
| E1 | Cue data checksum error. |
| E2 | Memory fault (self test only). |
| E3 | Memory Address line fault. |
| E4 | Memory Data line fault. |
| E5 | Memory Data fault in random locations. |
| E6 | Memory Data fault in limited address area. |
| E7 | Memory locked - test aborted. |
| E8 | Real Time Clock fault. |

## 5.4 SPECIFICATION

Power Input - 19ØV-265V or 9ØV-127V according to model, 47-63 Hz.

Mains Fuse - 2A. for 24ØV model, 3.15A for 11ØV model, both HRC Type F 2Ømm x 5mm.

Console Output - Multiplexed analogue link via 2-core screened cable (24ØV model), or 4-core (11ØV model).

Construction
- Aluminium alloy base plate.
- Mild steel control panel.
- Aluminium alloy extrusions.

Finish - Mat black with blue silkscreened marking.

Dimensions
- Width - 664mm.
- Depth - 359mm.
- Height - 86mm.

Weight - 7.5 kg.

# ACTION OPERATOR'S HANDBOOK - SUPPLEMENT

## 1. Audio Input Socket

When ACTION is used in conjunction with earthed (grounded) audio equipment, i.e. an audio source is connected to the ACTION Audio Input Socket, an audio isolating transformer should be used to eliminate mains hum caused by earth loops. See section 4.3.

## 2. Momentary Display of Error Codes during Power-Up.

Error codes of E1 or E8 may be displayed momentarily on some units at power up. The error codes may be repeated if the specific diagnostic check is run.

The display of E1, which appears if an Effect has been recorded and run, is a known software limitation.

The display of E8 results from a software demand of excessive accuracy from the "Real Time Clock'.

In both cases the 'acid test' is if the console can be run normally, as indicated by completion of the power-up self checks. See section 5.3 of the handbook.

## 3. Revision of Blackout Switch Symbol

On late units of ACTION the symbol for normal operation, i.e. a lit scene with the switch in the down position, has been changed from ● to  See section 3.10.