

TEMPUS M24

USERS' GUIDE



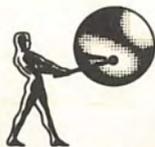
Foreword

The design of a system to wire up an installation is the designer's job. The system is designed to meet the needs of the user. The system is designed to be flexible and to be able to handle any situation that may arise. The system is designed to be easy to use and to be able to handle any situation that may arise.

Tempus M24

Memory Lighting
Control System

USERS' GUIDE



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Foreword

This booklet is intended to serve as an introduction to the principles and practice of memory lighting control with the Tempus M24 system. It is not a definitive guide to all of the functions and facilities of the M24 - this is provided by the accompanying Operators' Handbook. Rather, it gives a structured, step-by-step guide to the basic operation of the system for those with limited lighting, and particularly memory lighting, experience.

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Introduction

General

The Tempus M24 is a new lighting control system which makes the very best use of microprocessor technology to provide a range of sophisticated features previously found only on much larger and more expensive systems. It is intended primarily for use in situations which would otherwise have been served by a manual installation, and makes available to such users all the advantages inherent in lighting with a memory system. Careful consideration of the needs of potential users has resulted in a design which has the added bonus that the M24 can often be incorporated into an existing manual system with the minimum of rewiring, and without the need to discard existing control equipment.

In spite of the fact that the M24 offers a considerable degree of sophistication, we at Rank Strand recognise that it will often be operated by people with experience only in the use of manual systems, and sometimes even by those with little or no experience in operating lighting control systems of any kind. Consequently, we offer this introduction which assumes no previous experience, and provides a step-by-step guide to the basic operation of the system.

The M24 is simple to operate, flexible and for its size very powerful - a combination which allows a complete beginner to use it while at the same time offering experienced users everything they need for professional lighting design. Above all, the M24 offers the prospect of more creative lighting than is possible with manual controls, once the principles of operating a memory system have been grasped. We hope that this introduction will assist with that process.

Organisation

The material in this introduction is arranged in four distinct sections. First, there is an outline of what the M24 can do. Then we introduce just a few basic terms and concepts applicable to both manual and memory lighting - if you already

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know lighting, you can safely ignore this bit. After that there is the main section which explains how to switch the system on, and how to operate it. Finally, there is a recap of control functions. You can, of course, read through this first if you want to, but don't worry if you don't fully understand what the controls are for from these brief descriptions - they are really intended to serve as an aide-memoire after you've worked through the main body of the text.

Where you are required to perform specific operations during the course of this introduction, you'll find instructions printed in heavy type to distinguish them from the explanatory text. If you come across a term which you don't understand, there is a glossary given with the basic terms and concepts as a quick reference.

M24 Facilities

We won't attempt at this point to tell you all of the things the M24 can do because they're quite numerous, but a basic outline of the main features to give you an idea of the system's capabilities might prove useful. All facilities are fully explained in the remainder of this introduction and in the accompanying Operators' Handbook.

Channel Control

Depending on the specific version of the system that you have, it can provide control of between 12 and 120 lighting channels. Channels can be controlled singly, or in groups of any combination. Control can be applied by means of the endless fader wheel, or by direct entry of levels on the keypad.

Provision is made for connecting a manual fader wing or the M24 FX effects unit, and for the output of this unit to contribute to the channel levels on a highest-takes-precedence basis.

Scene Storage

Each scene is stored in a separate memory. Most systems have capacity for 199 scenes, though some 60-channel systems can store only 185 scenes and some with 72-channels only 155 scenes. Details of fade types and durations are contained in the memory along with the levels of contributing channels.

Scenes set up on a connected manual wing or effects unit can be recorded in exactly the same manner as those constructed on the M24 itself.

Scenes are normally set up on stage and then recorded. However, provision is made for blind recording - that is recording a scene which is not contributing to the light levels at the time.

Memory Playback

Memories can be recalled in one of three modes - by individual selection, sequential selection, or automatic sequential selection. Up to six simultaneous fades of different durations are possible using the system's fade timer, with the capacity still to control a seventh memory manually while the fade(s) are in progress. The fade timer can provide fade times of up to 10 minutes duration. Recorded times can be used or ignored as required, and can be overridden manually if necessary.

Any parameter of a recorded scene can easily be modified at any time.

Video Mimic

A visual display unit, which may be either a video monitor or a standard domestic TV receiver, can be connected as an optional aid to scene plotting. The mimic shows channel levels, fade types and durations, details of memory links, and a range of other useful data.

Basic Terms and Concepts

Like any other specialised activity, stage lighting has its own concepts, terminology and procedures, which are peculiar to that activity. Some of these are equally applicable to manual and memory control, while others apply only to memory lighting because they refer to facilities which don't exist on manual systems. While we cannot embark on a comprehensive course in the general subject of stage lighting, we feel that it would be helpful to those with little or no experience if we at least defined the terms which you will come across throughout the remainder of this handbook.

General Concepts

Any stage lighting set-up consists essentially of a number of lights (also referred to variously as lamps, lanterns, luminaires, fixtures and instruments) individually adjustable in brightness by some form of control, or **fader**, system. Other aspects of the lights will also be controllable, of course, including shape and position of beam, and colour, but here we are concerned only with control of brightness. Each light and its associated fader is generally known as a **channel**, and the effect created on stage by any given combination of channels is known as a **scene**. Most lighting systems allow for setting up more than one scene at a time, and for them to be faded up and down by means of **master faders**. The scene currently on stage is often referred to as the **active scene**, and the one(s) set up to follow it as the **preset scene(s)**.

Productions generally require a number of discrete scenes, and the change-over from one scene to the next is called a **fade**. There are basically two types of fade: a **crossfade** in which the new scene totally replaces the old one; and a **move fade** in which the new scene is effectively added to the old. The choice of which type to use depends largely on the effect to be achieved as will be shown later by example. The precise timing of the change-over from one scene to another is referred to as the **fade profile**.

Put at its simplest, then, the basic task of lighting control consists of creating **scenes** by suitable adjustment of **channels** prior to the production, which are then re-created during the performance and used by **fading** from one to the next according to a prepared plan.

That, of course, is reducing it to absolute basics. The complexity and number of scenes created will depend on the requirements of any given production, on the sophistication of the equipment available, and on the skill of the operator.

When using a manual system, each scene and fade devised in rehearsal has to be **plotted** manually by making a written note of all fader settings, and of fade types and durations. In performance, each scene has again to be manually set up, and the fade from one to the next effected by moving master faders. The maximum level of complexity is often limited by the difficulties involved in setting up preset scenes in rapid succession whilst at the same time moving the master faders, possibly at different speeds.

Memory System Concepts

The process of creating scenes in rehearsal is not very different using a memory system like the M24, except that there is only one fader used to control all channels by means of **keyboard assignment**. However, once the scene is devised and the details of the fade profile worked out to the satisfaction of all, every detail can be **recorded** in a numbered electronic **memory** location for recall during performance, almost totally eliminating the need for manual plotting.

Because details of fade types and durations are recorded as well as the actual lighting set-ups, it is possible to so arrange a sequence of scenes that all that is required of the operator during performance is to press a button to initiate each fade at the appropriate time. This should not be taken to mean that the role of the lighting operator is reduced to that of a button-pushing automaton. The full range of possibilities opened up by a memory system means much greater creativity in rehearsal, less room for error, and more time for finely adjusting the lighting to suit an individual performance.

Glossary of Terms

Active Scene

The scene currently on stage (see Scene).

Auto Sequence

Sequential recall of memories where each fade is initiated automatically on completion of the preceding one.

Blind Recording

Recording scenes set up on the M24 or on a manual wing while the corresponding fader (MEMORY or MANUAL) is at zero.

Build

Add the fade into a lighting scene.

Channel

The output to a single light.

Channel Mode

M24 mode in which keyboard entries represent individual channels.

Cue Mode

M24 mode in which memories can be selected on the keypad, and controlled manually with the fader wheel.

Effects Unit

An external control unit which can be connected to the M24 and used for special lighting effects.

Fade

The transition from one lighting scene to another.

BASIC TERMS AND CONCEPTS

Fade Profile

The nature of the timing from one scene to the next.

Fader

A mechanical control for effecting fades, setting times, etc.

Highest-Takes-Precedence

An operating rule whereby the highest of 2 or more control outputs to the same channel overrides the other outputs.

Latest-Takes-Precedence

An operating rule whereby the latest control operation on a channel or memory supercedes all previous instructions.

Link

A connection defined between two memories causing one to follow the other in a sequenced recall.

Manual Fade

A fade controlled by mechanical faders.

Manual Fader Wing

A control console containing 1 manual fader for each controlled light channel.

Memory

A numbered electronic storage location for recording of a single scene.

Memory Mode

M24 Operating Mode in which keyboard entries represent memories.

Plotting

Physical or electronic recording of channel levels in a scene.

Preset Scene

A scene set up to follow the active scene (see Scene).

Scene

A particular arrangement of lights on stage.

Sequence

An M24 operating mode in which memories are recalled in sequence each time the FADE button is pressed.

VDU

Visual display unit.

Video Mimic

A VDU used for displaying control data from the M24.

Connecting Up

If the system is not already connected up and working, refer to Chapter 2 of the Operators' Handbook, which explains clearly what to connect to where. Follow the instructions there carefully, and then return to the rest of this section.

Switching On

After connecting the system up as shown in the Operators' Handbook, you are ready to power it up, and to start exploring the facilities that it offers. Before doing so, however, it is worth spending just a bit of time appreciating what happens at switch-on and why.

The M24 is what is known as an intelligent system (though don't read too much into that word 'intelligent'), and as such has the ability to test many of its own functions and even some of the things connected to it. This it does every time it's switched on, before it enters its initial operating state, which we will say more about in a moment. Most importantly, the M24 is also a memory system, and one of the things it remembers is which lights are on whenever the power goes off. It does this to save the operator from having to hurriedly recreate a scene if the electricity happens to go off for a while in the middle of a performance - the lights come on when the power does exactly as they were before it failed.

Unfortunately, the system doesn't know the difference between a momentary power failure, and being switched off for the night. (We told you not to make too much of the word 'intelligent'!) Therefore, if the system has been in use before, and the last scene was not cleared before switching off, that scene will be faithfully re-created when you switch on. So don't be too surprised if the stage is bathed in lights that you didn't ask for - it's not some random activity on the part of the M24, but a feature carefully designed in to avoid disasters in the middle of a performance.

Note: Later versions of M24 offer several restart modes - see the Operator's Handbook for details.

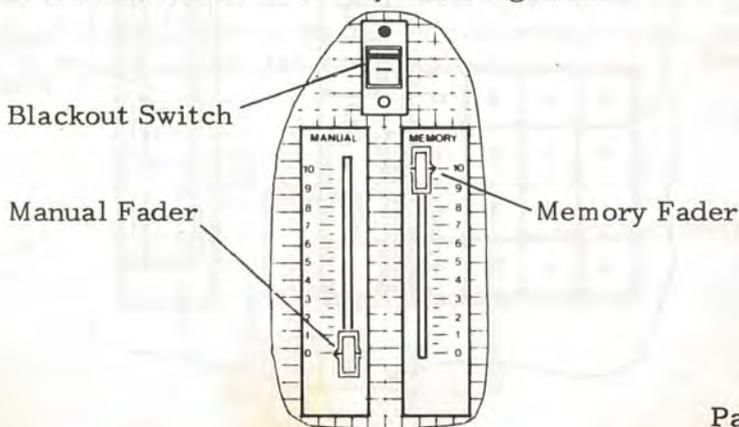
Returning to the subject of self-testing for a moment, if you watch the M24 panel display windows when you switch on, you will notice that they briefly show a horizontal bar before going blank. This merely indicates that self-testing is in progress, and can be ignored. At the end of this short routine, the system enters its initial operating state and is fully ready for operation.

Now switch on the power supplies to the system dimmers, multiplex interface units, and M24 console. If a manual fader wing is provided, and is not powered from the dimmer racks, then this should also be switched on.

Ignoring any lights which may have come up for the reason explained above, the system will now be in its initial state which is: all numeric displays blank, and all indicator lamps off, except the one above the CHANNEL button.

Note: From now on, we will refer to the numeric displays simply as displays, and the indicator lamps as indicators.

The system is now ready for operation, but before moving on, just check the setting of the manual and time faders, and the blackout switch. Set the MANUAL fader to zero, the MEMORY fader to 10, and check that the blackout switch above them is in the up position. Set both the time duration faders to 2 seconds. The functions of these controls will be explained later, but for now they can be ignored.



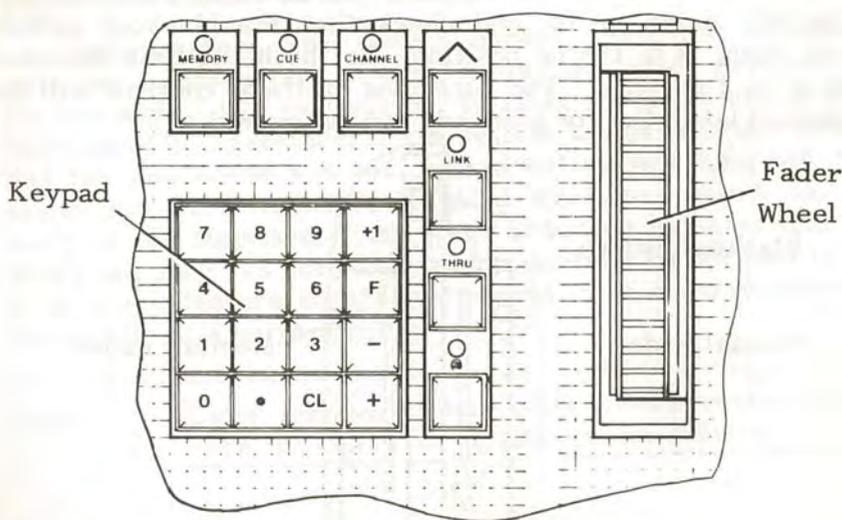
OPERATION

The following text is intended to guide you through the basic operation of the system and to show you by worked example some of its creative possibilities.

For now we will not make any mention of the video mimic or what it is displaying, as not every system will be equipped with one, and in any case the system operation is easier to appreciate by actually observing lights on stage. Interpretation of this very useful but optional device is explained fully in the operators manual and can be understood more easily once you have had time to familiarise yourself with the basic system operation.

Basic Operations

The basic job of any lighting control system is to enable the brightness of every light connected to it to be adjusted in order to create any required lighting scene on stage. On a manual system there is one channel fader for each light. On the M24, there is just one channel fader which is connected (or, more correctly, assigned) to whichever channel you wish to adjust at any given time. This fader is the wheel on the right of the panel, and you assign it to the various channels using the keypad on its left.



Both fader wheel and keypad have other functions, but for now we will deal only with selecting and controlling channels.

If you've just switched on and done nothing else, the panel will be in the initial state already described - that is, all displays blank, and all indicators off except CHANNEL. If the panel is not in this state, and just so that we start from a common point, clear the panel by the following procedure:

Press the MEMORY button

Press CL on the keypad

Press the FADE button

Press the CHANNEL button

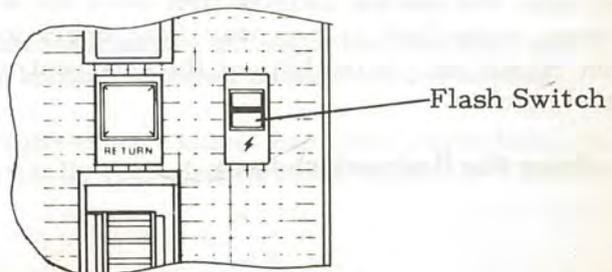
Press CL on the keypad

This procedure will also get rid of any lights which may have come up when you switched on.

Selecting and Adjusting Channels

When the CHANNEL indicator is on as it should be now, numbers entered at the keypad are interpreted as channel identity numbers.

Just as on a manual system you must know which fader controls which light before you can start constructing scenes, so on the M24 you must establish the channel number for each light. To enable you to do this we will straight away introduce you to the use of the flash switch.



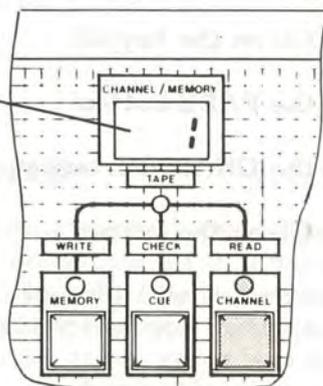
OPERATION

Using this switch you can set the level of any selected channel fully up or down, and by doing so visually identify the light which it controls.

Enter 1 at the keypad.

Notice that there is a 1 now displayed in the CHANNEL/MEMORY display, showing the identity of the channel selected for control.

In channel mode,
display shows
channel numbers



Press the flash switch up.

If there is a light connected to channel 1, it will come up at full brightness when the flash switch is up.

Enter 2 at the keypad.

Notice that the CHANNEL/MEMORY display now shows 2, and also that there was no need to press clear (CL) before entering the second channel selection. As a general operational rule, the system assumes that once the selected channel has been controlled in any way (and operation of the flash switch counts as control), then the next entry will be a new channel number.

Press the flash switch up.

Again, if there is a light connected to the channel, it will be switched full on, enabling you to identify the light controlled by channel 2.

Repeat this procedure for all channels, and make a note of the lights controlled by each one.

Having identified the light connected to each channel, you are now in a position to select for control any light on the system simply by entering its channel number on the keypad.

Enter the number of any channel on the keypad.

The channel number is shown in the CHANNEL/MEMORY display, and the level of the channel output (lamp brightness) is under direct control of the fader wheel.

Move the fader wheel slowly away from you.

Notice that as soon as you start moving the wheel, a number is shown in the LEVEL display, commencing at 1. The number displayed represents the output level of the channel as a percentage of maximum.

Continue moving the wheel up, and notice that the number shown in the LEVEL display increases to 99 and then changes to F indicating Full or 100%.

At this point, the light is full on and further upward movement of the wheel has no effect. Until another channel is selected on the keypad, the level of the current channel can be adjusted up or down as much as you wish to achieve the desired level. Slightly less than one full sweep of the exposed section of the wheel is equivalent to a fade up or down of 100%.

Set the current channel at any level you like, and then enter another channel number on the keypad.

Because the previous channel has been controlled, the key entry is automatically regarded as a new channel. The new

OPERATION

channel number replaces the old one in the CHANNEL/MEMORY display, and the fader wheel is now assigned to that channel. The light controlled by the previous channel remains at the level set.

Set a level for the new channel in the same way as before using the fader wheel.

Continue selecting and adjusting channels until a lighting scene is complete.

If you wish to change the level of a channel already set, simply enter its number and adjust it as before. You can go on selecting, adjusting, re-selecting and adjusting for as long as you like until you achieve precisely the lighting scene you require.

If you're used to a manual system, you can see that there is basically no difference between this operation on the M24 and the same operation using manual faders, except that instead of moving a separate fader for each light, you just call up each light for adjustment on the one fader.

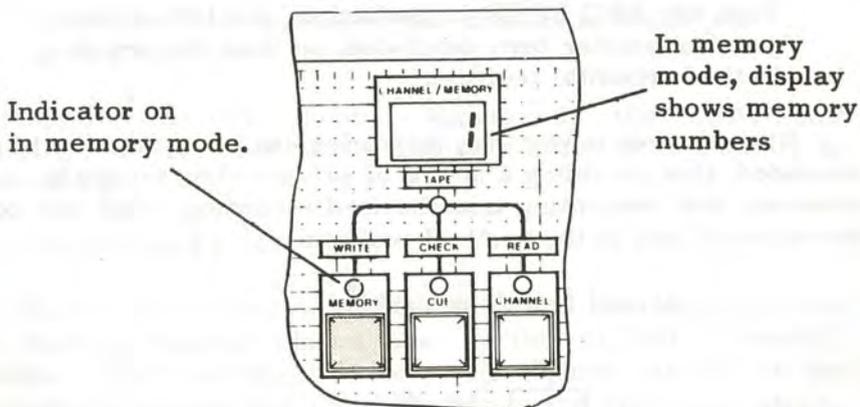
It's at this point, however, that the M24 really starts to show its worth. If you were using a manual system and wanted to plot the scene in front of you for later use, you would have to write down manually the settings of all of your faders, and then physically re-position them before or during the performance - and that goes for every scene you set up. Not so on the M24. You can simply record every detail of the scene in its capacious memory for instant recall whenever, and however often, you like - here's how.

Recording and Recalling a Scene

Up to now you have been thinking only in terms of individual channels, and keypad entries have been interpreted by the system as channel numbers. This is because the keypad is in **channel mode** - entered either automatically at switch on, or manually by pressing the CHANNEL button, and indicated by illumination of the CHANNEL indicator.

To record scenes, the keypad has to be set in an alternative mode - **memory mode** - by pressing the MEMORY button.

Press the MEMORY button.



The MEMORY indicator is now on, indicating that the system is in memory mode and ready to record or replay scenes. Before actually recording the scene though, a word of explanation concerning the process.

It is useful to think of the system's memory as a sort of filing system containing up to 199 numbered locations each of which can hold all of the details of one, and only one, scene. For the moment we are concerned only with channel numbers and levels, but you will see later that other information can be stored as well. When a scene is complete, you simply file it away in one of the numbered memory locations, or memories for short, and make a note of the memory number. Any scene can be stored in any memory, according to your own requirements. When you want a scene again, you simply recall the memory using its identity number and it is re-constructed exactly as it was before.

OPERATION

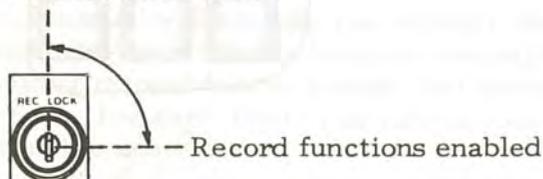
Choose a memory number and enter it on the keypad.

Key entries are now interpreted not as channel numbers, but as memory numbers, and consequently the CHANNEL/MEMORY display represents memory selections.

Turn the REC LOCK keyswitch on the left of the panel a quarter turn clockwise, so that the key is in the horizontal position.

When the key is vertical, memories can be replayed but not recorded, thus providing a means of safeguarding scenes in memory, and preventing unauthorised recording. The key can be removed only in the vertical position.

Record functions disabled



Press the red REC TOTAL button, and notice that the adjacent indicator lights momentarily to indicate a successful recording operation.

Your scene is now stored away at the memory location you chose, while at the same time remaining unchanged on stage. All that is left for you to do is to make your usual script notes and include the number of the memory in which the scene is stored.

Just to prove that the scene really is recorded, we'll clear it from stage, and then recall it.

Press CL on the keypad, and then press the FADE button.

You, or rather your stage, should now be in darkness. What you have done is to select no memory, and then fade to it! What else could the system do but turn all the lights out? This is one of two ways of clearing all lights simultaneously - the other you'll see in a moment, and shortly after we'll discuss the different uses for both.

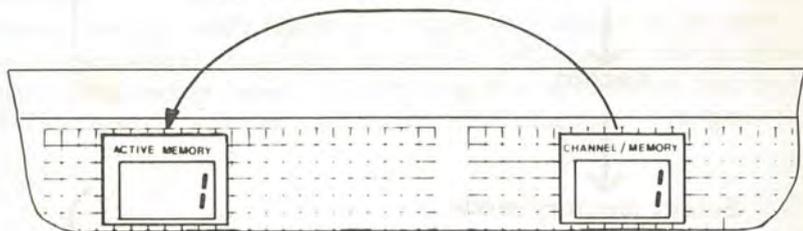
Now enter the number of the memory in which you stored your scene.

Notice that the number appears in the CHANNEL/MEMORY display, indicating that this is the next memory to be recalled.

Now press FADE

Your scene should rapidly be re-constructed on stage, and its memory number placed also in the ACTIVE MEMORY display. This display, therefore, shows the number of the memory which is actually contributing to the lighting on stage.

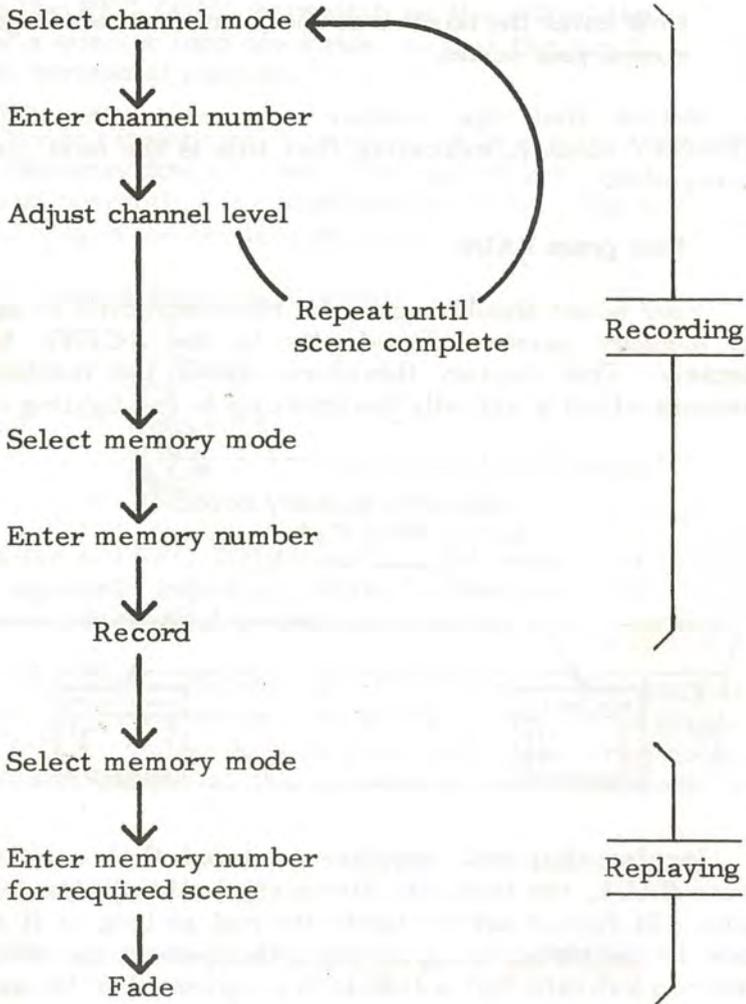
Selected memory becomes active when Fade is executed



Incidentally, you may have noticed that each time you press FADE, the indicator above the button lights for a short time. In fact it always lights for just as long as it takes the fade to complete - which in our case is about two seconds - in order to indicate that a fade is in progress. This becomes more important when you are using long fade durations as you will see later on.

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The actions that you have just performed - that is, setting up, recording, and recalling a scene - form the basis for all other operations, so it is worth recapping before moving on. The flowchart below shows the steps in the process.



Creating Additional Scenes

The procedure for setting up additional scenes is identical to that used for the first one - but you have to ensure at all times that the keypad is in the correct mode for the operation in progress. The flowchart above shows that on completion of a record operation the keypad will be in memory mode, and consequently entries call up memories not channels. Before you can select and adjust channels for another scene you must first re-select channel mode.

Select channel mode by pressing the CHANNEL button.

The keypad is now returned to the condition in which you can select and adjust the channels for your second scene, exactly as you did those for the first. We'll run through the procedure for one more scene in detail, and take the opportunity to demonstrate one or two more functions at the same time.

Notice that the scene on stage did not alter when you re-selected channel mode. If you wish to begin constructing the second scene from scratch with no lights up, you will first have to cancel the lights which are on from scene 1. You could, of course, select each channel in turn and adjust it to zero with the fader wheel, but this is pretty tedious if the number of lights involved is large. Combining the actions of two buttons - THRU and @ - allows you to cancel all lights in one go.

OPERATION

Try this:

Enter 1 on the keypad.

Press the THRU button.

Enter on the keypad the number of the highest channel on your system.

Press the @ button.

Enter 0 on the keypad.

The THRU button gives you the facility to group channels for simultaneous adjustment simply by specifying the lowest and highest number in the group; for example, [10 THRU 20] designates channels 10 to 20 inclusive for control. Any adjustment of level, after specifying a group, will affect all channels in the group equally.

Note: The square brackets are used here as elsewhere in the text simply to separate an actual key entry sequence from the rest of the text.

@ is used for direct entry of levels for the selected channel(s) as an alternative to normal fader adjustments. For example, a key entry of [4 @ 5] selects channel 4, and then sets its level at 50%.

Thus, combining these two functions as we did just now with the entry [1 THRU N @ 0] (where N is the highest channel number on your system) designates a group 1 to N inclusive, and sets the level for all channels in the group at zero - i.e. off. This is the second method of clearing lights simultaneously which we mentioned earlier. Now use a combination of the facilities covered so far to set up a second scene - you could try the following as an example.

Select channel 1 and set a level with the fader wheel.

Select channels 3 to 6 inclusive by entering [3 THRU 6], and set a level with the fader wheel.

Set a direct-entry level for channel 8 by entering [8@7] (i.e. 70%).

Set a direct-entry level for a group of channels by entering [12 THRU 15@F] (i.e. full).

Notice that when you select the @ function, the indicator adjacent to the button is lit, and then goes off as soon as a digit is entered. The system takes the first entry after the @ as being a percentage X 10 and regards the entry as complete. Thus [@ 1] is interpreted as 'at 10 %', [@ 5] as 'at 50 %', and so on. If you want a level to 1 % accuracy - say, 13 % or 55 % - then you enter a decimal point after the first digit. The @ indicator again lights to indicate that the next digit will be accepted as the units of the percentage. Thus [@ 1.3] is taken as 'at 13 %', [@ 5.5] as 'at 55 %', etc. If a decimal point is not entered, the second digit after the @ is taken as a new channel number.

The THRU function is cancelled as soon as control is applied to the designated group, either by moving the fader wheel or setting a direct entry level.

Recording the Second Scene

Having set up your second scene, you now have to record it using exactly the same procedure as for the first.

Select memory mode by pressing MEMORY.

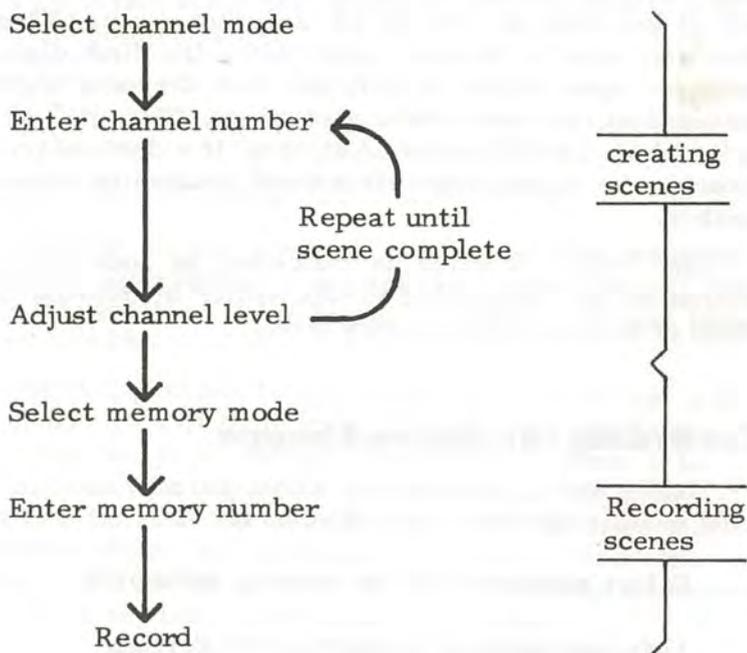
Enter any memory number on the keypad.

Press REC TOTAL.

OPERATION

The second scene is now recorded in the memory you selected. As explained earlier, there are absolutely no constraints concerning which memory you use to store any given scene, but two points should be considered when making the choice. Firstly, recording into a given memory overwrites any information which already exists in that memory. Therefore, you should keep careful note of memories used, and be sure not to record into any containing scenes which you wanted to keep. Secondly, there are operational advantages (which will become obvious later) to recording consecutive scenes in consecutive memories, e.g. scene 1 in memory 1, scene 2 in memory 2, and so on. This is not essential, but does simplify recall during performance as you will see.

The flowchart for recording a number of scenes becomes:



You can now go on to record as many scenes as you wish in exactly the same manner, but before you do, let's just consider the subject of clearing lights between scenes in a bit more detail. You have used two methods, one in memory mode, the other in channel mode.

In memory mode you used just:

[CL FADE]

In channel mode you used:

[1 THRU N@0]

Both work equally well for clearing all lights, and if that's what you want to do, it's purely a matter of preference which one you use. But suppose you want to change just some of the lights in one scene to create the next one. In such a case it may be quicker or more convenient to use the second method to clear just the lights you don't need, rather than clearing the whole lot by the first method and starting all over again.

Record scenes into memories 1, 2, 3, 4 & 5 using the techniques covered so far.

Practise clearing lights between scenes using both of the methods described.

Playback During Performance

Now that you have had a bit of practice at creating and recording scenes, we'll start looking at ways to recall them in performance.

There are several ways in which the fades from one recorded scene to the next may be executed. In some cases, the choice of which to use may be entirely a matter of preference, in others it may be largely dictated by the requirements of the production. Basically, though, fades on the M24 divide into those using the automatic fading system, and those controlled manually.

Automatic Fades

Random Selection of Memories

Although you may not have realised it, you have been using the automatic fading system all the time so far in recalling your stored scenes. In its basic operation, as you have been using it, the next required memory is selected on the keypad, the fade executed by pressing the FADE button. The next memory is then entered on the keypad, FADE again pressed at the required time, and so on. The process is automatic in the sense that you do not have to move any manual faders to go from one scene to the next.

Check that memory mode is selected, and enter 1 on the keypad.

Press FADE.

The number 1 appears in the ACTIVE MEMORY display, and the scene stored in memory 1 will be re-created on stage.

Enter 2 on the keypad and notice that 2 is now shown in the CHANNEL/MEMORY display.

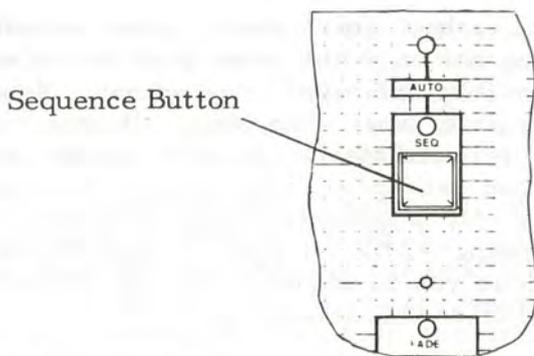
This is the state that you would normally be in during performance, with one scene on stage and the next preset for recall at the appropriate time. The two displays now show your active and preset scenes, so you know at all times which scene is on stage, and which one you will get when you initiate the next fade.

Press FADE.

The preset scene quickly replaces the one on stage, and its corresponding memory number (2) is entered into the ACTIVE MEMORY display. This procedure can be repeated to recall any number of scenes, and has the advantage that they can be recalled in any order. That is, it allows for random selection of memories should this be desirable.

Sequential Selection of Memories

Where there is an orderly sequence of scenes to be recalled, use of the sequence (SEQ) button avoids the necessity to enter individual memory numbers on the keypad, with the exception of the first number in the sequence.



Select Memory 1 on the keypad

Memory 1 is shown in the CHANNEL/MEMORY display as being the preset memory.

Press the SEQ button.

The indicator adjacent to the button is lit to indicate that you are in sequence mode, and it will remain lit until sequence mode is cancelled.

Press FADE

Notice that the preset memory number (1) has been transferred to the ACTIVE MEMORY display as usual. This time, however, instead of the 1 also remaining in the CHANNEL/MEMORY display, it has been replaced by 2, indicating that memory 2 has automatically been selected to provide the preset scene.

Without first selecting another memory, press FADE again.

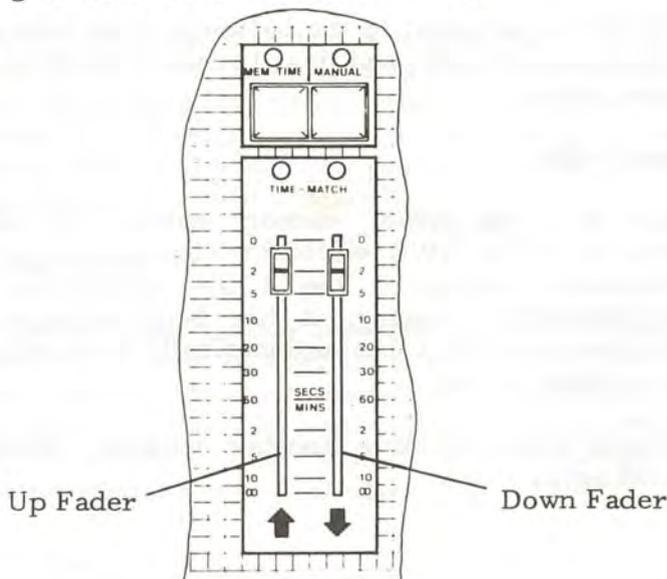
OPERATION

Now 2 has been transferred to ACTIVE MEMORY and has been replaced in the CHANNEL/MEMORY display by 3. Each time the FADE button is pressed while sequence mode is selected, the system fades to the memory shown in the CHANNEL/MEMORY display, and the next memory is automatically selected to provide the preset scene.

We mentioned earlier that there were operational advantages to storing scenes in the order that they would be required, in sequentially-numbered memories. You can probably now appreciate what they are. If you have a production which is predictable in the scene change requirements, you can set up all your scenes in sequential memories and then simply progress from one to the next during performance by pressing FADE on cue. In fact, there is a procedure which allows you to sequence through memories in any order, which will be described later on.

Timer-Controlled Automatic Fades

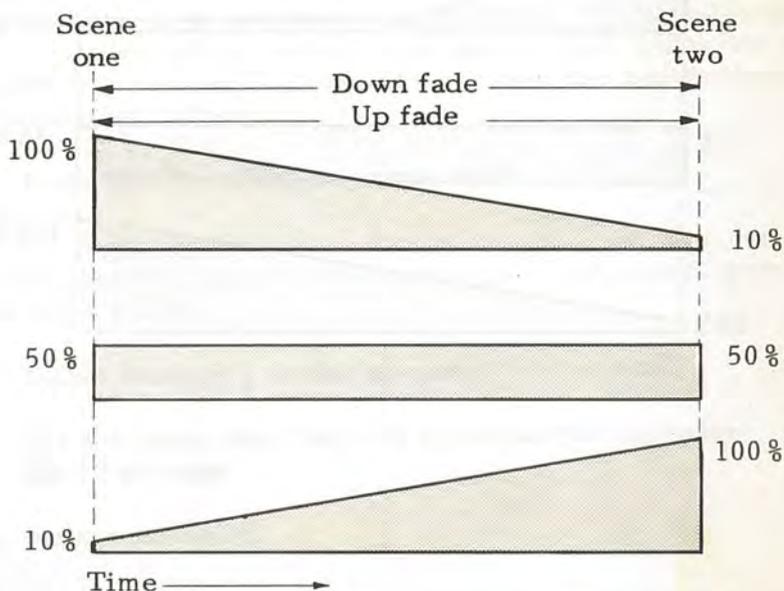
Up to now we have made no mention of time in relation to fades, and all fades have been completed in a couple of seconds or so because that's the time we told you to set right at the beginning on the two time duration faders.



In reality, however, such fast fades are the exception rather than the rule, and it is perhaps appropriate at this point to show you how to set longer time durations using these faders which allow the fade duration for channels fading down, and that for channels fading up in any given scene change to be controlled quite independently.

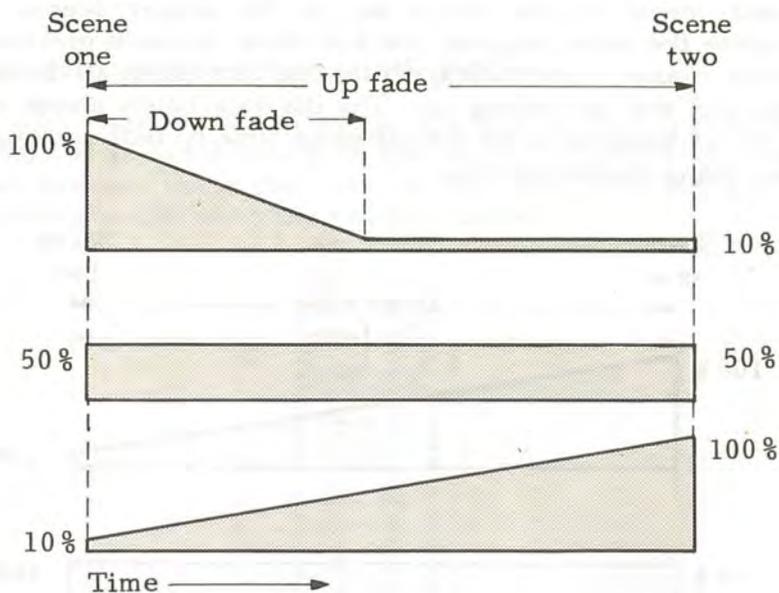
Before we go on to use the faders, we feel we must make clear just what their effect is. We don't want to get too involved in the technicalities of the subject, but there could be some confusion, especially if you are used to using a manual system, if we don't say something about it.

The important point to appreciate is that in a fade from one memory to another, you are not fading the whole of one scene down and the whole of the next one up. Instead, when you start a fade on the M24 you are merely causing the active scene to be modified by moving channels directly from their current levels to the levels set in the preset scene. To illustrate the point, suppose you had three channels involved in a scene change - one fading down, one remaining at the same level, and the last fading up. The diagram below shows what the effect would be if we set the same time on both faders, the scene change looks like this:

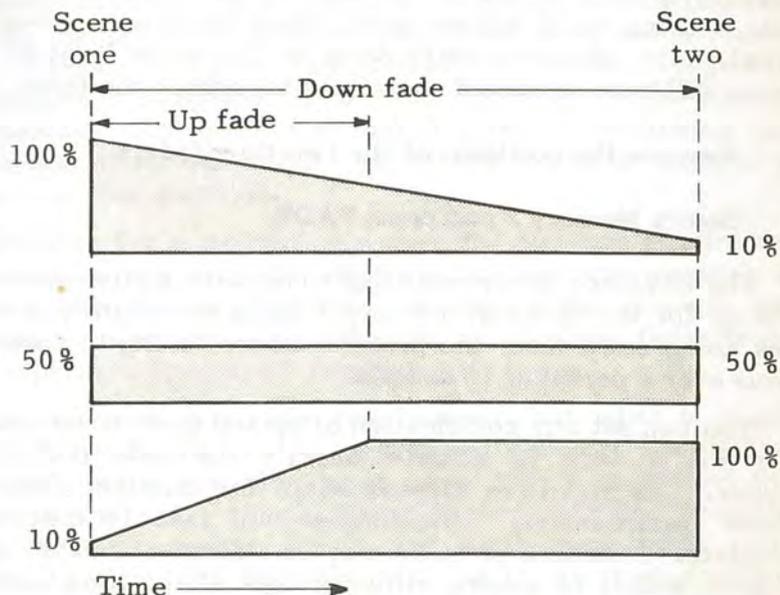


OPERATION

Those channels that are required to go to new levels - whether up or down - move directly to the levels in the new memory. Those channels which are at the same level in both memories are unaffected by the faders. Notice particularly that both up and down parts of the fade start at the same time - the point at which the FADE button is pressed. In this instance, we have up and down fades of the same duration, so they also finished together, but what if we set the faders for different times? The time duration faders control only the time it takes for channels going up and channels going down to complete their changes in level, so all that happens is that one element of the fade - up or down depending on how the faders are set - finishes before the other. If the down fade duration is the shorter, you get this effect:



If the up fade duration is shorter, you get:



Both elements of the fade still start at the same time and all channels still go directly to their new levels with no dip in levels between scenes. As a result, you cannot get a blackout between scenes - intentionally or otherwise - by using the time duration faders alone (except in a special case which we will describe in a moment). Now let's see how the faders operate by actually using them.

Press SEQ to cancel sequence mode.

The sequence indicator should be off, and the current ACTIVE MEMORY should be shown as 3. If not, select memory 3 and press FADE.

Select Memory 1 on the keypad.

Set the down time fader at 0, and set the up fader for 10 seconds.

Now press FADE.

OPERATION

As dictated by the time faders, the lights which are at a lower level in the new scene faded down immediately, but those moving to a higher level faded up over a 10-second period. Any channels which were at the same level in both scenes will have remained unchanged throughout the fade.

Reverse the positions of the two time faders.

Select Memory 2 and press FADE.

The sequence is reversed this time, with lights required to fade up for the scene in memory 2 doing so instantly, and the ones going down from the previous scene fading to their new levels over a period of 10 seconds.

You can set any combination of up and down times prior to initiating a fade to achieve exactly the fade profile you require. As you have already seen, the shortest fades are almost instantaneous - the longest will take 10 minutes to complete. Durations of fades may be altered while they are in progress simply by moving either or both of the time faders to speed up or slow down the fade.

Moving a fader to the infinity mark (∞) stops the fade altogether and leaves the scene at whatever level it reached before being halted. Because the FADE indicator lights and remains lit until both up and down parts of any fade are completed, it will stay on until you return the fader to a time setting to complete any fade suspended in this way.

The special case we mentioned just now in which it is possible to achieve a blackout between scenes using the time faders, occurs where you have a scene at the end of which all channels fade out. If you set a very short down fade time and a long up fade time, the lights from one scene will all go out before those in the next reach a significant level. Of course, the up fade will be running and you will have a blackout only so long as it takes for the lights in the new scene to come up.

Practise selecting memories and setting various fade times. Alter fade durations while they are in progress and note the effect.

As you'll see in a moment, it is possible to execute fades in the same way that you would on a manual system, by physically moving the time faders to control up and down fades over any time period. There are, however, several significant advantages in using the M24's timer for this purpose. The first and perhaps most obvious is that it makes simultaneous fades easier and more repeatable - especially if one or more of the fades is of long duration.

Imagine for a moment a simple and common requirement. You have a box set with daylight through the windows and some general room lighting. In one scene change, room lighting is to remain constant while the daylight fades to dusk over a period of perhaps 5 minutes.

As we said, a simple requirement, but what is slightly tricky is producing a long convincing fade on the daylight, especially when you may have other things to do and think about at the same time. Using timer-controlled automatic fades, this becomes a simple and easily repeatable action. Before we show you one way of doing it, we must emphasise that it is not by any means the only way. As your experience with the M24 grows, you will find that there are usually several different ways of performing any given lighting task. The essence of the system is flexibility, and we would not like you to think that our examples represent the only, or even necessarily the best, way of tackling any given job. They are designed to illustrate principles and to give you a starting point from which you can develop your own operating procedures as you get the feel of the system.

To return to the scene change we were considering, you could use two separate recorded scenes as follows:

Set up a scene with some lights at full to represent daylight, and some others at, say, 75% for room lighting. Record the scene in Memory 1.

Now set up another scene with just the room lights, and record it in Memory 2.

OPERATION

The two recorded scenes are, if you like, the starting and finishing points. What we need now is to profile the fade from one to the other to produce the required effect. Here's one way of achieving it in practice.

First, clear all lights using [CL FADE]. Then, to take us into the first scene:

Set 5 seconds on the up fader to represent the build as scene 1 opens.

Select Memory 1 and press FADE.

After 5 seconds you're safely into scene 1. Now to prepare the long fade on the daylight to take us into scene 2:

Set the UP fader to zero, and set the required daylight fade time (say, 2 minutes for the sake of this exercise) on the down fader.

Since there are no lights added in scene 2, we can use a cross fade which, if you remember from our introduction of basic terms is one in which the new scene totally replaces the old, and will eventually leave just the room lights.

Select Memory 2, and press FADE.

Nothing happens to the room lights as they are at the same level in both scenes, but the daylight is now fading, and will continue to zero over the next two minutes. You can speed up, slow down, or stop the fade, just by moving the down fader.

Because the M24's timer is taking care of the fade you are now free to cope with other things (like reading this text) while all the time a beautifully smooth, slow fade is in progress.

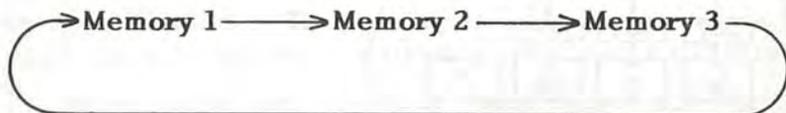
We have deliberately kept this example simple, and avoided mention of alternative methods, because some of them require the use of functions not covered so far. As we come to them, we will return to our box set and elaborate a little.

Before moving on, return both faders to 2 seconds.

Auto-Sequencing

A refinement of sequential playback of memories described above, in which the FADE button is pressed every time you want the next memory, is **Auto Sequencing**. This facility is similar to normal sequencing in that the memories are recalled one after another without you having to select them on the keypad - the difference though is that once you start the sequence it continues automatically. As soon as the first fade is complete, the next memory is automatically selected and the next fade initiated without you having to do anything. Unless something stops it, the system will progress through all its memories then return to 1 and start over again. Not a terribly useful feature you might think - after all, what kind of production requires a continuously changing sequence of 199 scenes?

We can't think of one either, but that's not really the idea. Auto Sequence is intended mainly to be used with another of the M24's facilities to enable you to set up such things as chase sequences, where a short series of scenes continuously repeat. For example, suppose you had, say, a dance scene during which you want the cyclorama colour to change continuously from red to blue to green and back to red. Auto sequence is ideal for this, but in order to demonstrate it, we have first to introduce that other facility we mentioned just now. It's called **linking**, and what it is, is the ability to link one memory number to another so that sequences can be defined instead of being allowed to go through all memories. If you link memory 3 to memory 1 for instance, a sequence would progress like this:



OPERATION

Let's set up a chase sequence to show how linking and auto sequence works.

Note: From now on, when we use the term "recall" in relation to a memory, we mean select it on the keypad and press FADE so that the stored scene is actually on stage.

Recall memories 1, 2 and 3, and check that you have a recognisably different scene in each one. If not record new scenes.

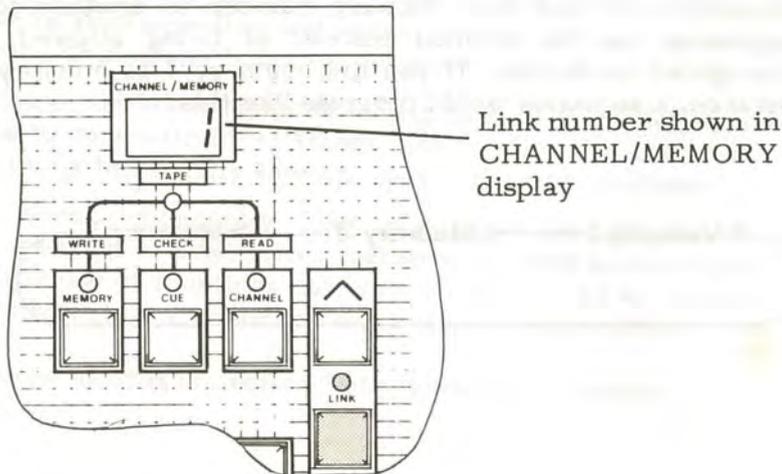
Now recall memory 3.

What we will now do is to record a link, linking Memory 3 to Memory 1.

Press the LINK button.

Notice that the LINK indicator is lit. If any link already exists, the memory number involved will be shown in the CHANNEL/MEMORY window. In our case it will probably be blank, indicating that no link exists. In either case:

Enter 1 on the keypad.



A 1 is now shown in the CHANNEL/MEMORY window to show that this is the memory to which the active one (i.e. 3) will be linked.

Press LINK again.

The LINK indicator now goes out and a 3 is replaced in the display, showing that the link operation is completed. Now we'll see how this affects sequential replay operations.

Press the SEQ button to select sequence mode.

Recall memory 1.

Now repeatedly press FADE and notice what happens.

As you might have expected, memories are selected in the sequence 1-2-3-1-2-3-1 and so on.

Now select auto sequence mode by holding the shift key (^) down and pressing SEQ.

Both indicators above the SEQ button should now be on.

Press FADE.

There is your chase sequence, with the scenes in memories 1, 2, and 3 continuously replacing each other.

With both time faders at 2, the fade from one scene to the next is fast and the chase runs quite quickly. But as before, each individual fade operation will obey the time faders, so you can alter the nature of the chase if you wish by adjusting one or both of them. Try moving the faders to various settings while the auto-sequence is running and observe the effect.

When you've had enough of this frenzied activity, you can stop the auto-sequence by pressing the SEQ button (there's no need to hold the shift button down). The fade in progress will complete, and whichever scene is last selected by the auto-sequence will remain on stage.

OPERATION

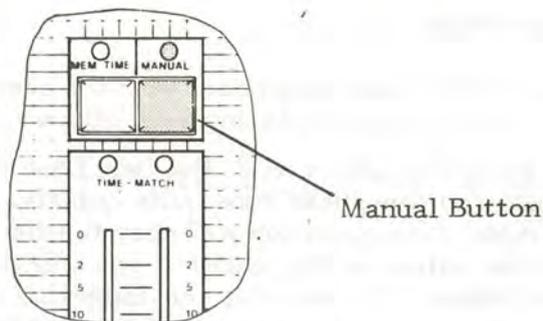
If the link between memories 3 and 1 is no longer required, it can be cleared simply by recalling memory 3 and then pressing [LINK CL LINK]. Should you want to change, rather than remove the link, use the same procedure, but instead of pressing CL, enter the new link number - e.g. [LINK 5 LINK]. A link recorded in any given memory will automatically be cancelled if a new scene is recorded in the memory.

Manually-Controlled Fades

In spite of the undoubted benefits deriving from the M24's timer-controlled fader system, there are numerous occasions when full manual control of a fade is essential. To achieve this, you depress the MANUAL button, which has the effect of making the fade duration controls behave as manual masters. We will use the scenes set up for the chase sequence earlier to demonstrate.

Clear all lights from stage.

Select Memory 1 on the keypad, but before pressing FADE, depress the MANUAL button.

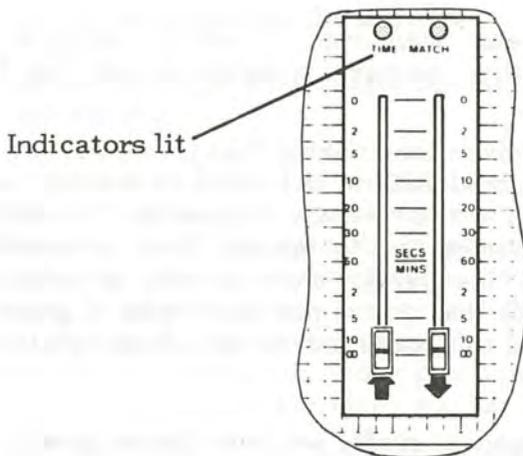


As is the general rule on the M24, the associated indicator lights when the button's function is active, in this case to show that fades are to be executed manually.

Press FADE.

Although 1 is immediately shown as the ACTIVE MEMORY, nothing happened apart from the FADE indicator coming on to show that a fade is, technically, in progress. You now have to bring the lights up by operating the faders. As a convention, the faders are arranged to perform the fade to the preset memory while moving upward, so they first have to be moved down to the bottom to 'collect' the fade.

Move both faders to the bottom of their travel and notice that the TIME MATCH indicators above them light as they reach the stop.



This indicates that the fade is now under fader control.

Move the faders upward to bring up the scene in Memory 1.

As the faders reach the top of their travel, the FADE indicator goes off to indicate that the fade is complete. However, manual fades can, if required, be reversed at any point simply by moving the faders down again. If you do, the FADE indicator lights to show that a fade is again in progress.

OPERATION

With MANUAL function still selected, and both faders at the top, recall Memory 2.

Again, although 2 is immediately shown as the ACTIVE MEMORY, the scene has not changed because it is under manual control.

Move both faders down to 'collect' the fade.

Move both faders up again, and notice how both the up and down fades can be controlled independently to give precisely the required profile.

The fade between memories 1 and 2 remains fully reversible until another memory is selected and the FADE button again pressed.

You could be forgiven for thinking that there was not much else to say about manual faders, but you'd be wrong. In our pursuit of flexibility, we have made it possible (indeed, very simple) to switch horses, so to speak, from automatic to manual control, or vice versa, while a fade is actually in progress. This means that you're not stuck with a given fade profile once initiated if it turns out to be inappropriate. Try this:

While still in manual mode, set both faders about mid way.

The fade is now, by definition, at an intermediate stage, and can be completed either by continued movement of the faders, or by simply reverting to timer control. If manual is de-selected, the fade will complete in the time set on the faders.

De-select manual mode by pressing MANUAL.

A normal timer-controlled fade should now be taking place. As with the timer-controlled fades you performed

earlier, the rate of fade can be adjusted while it is running by up or down movement of the faders. Note that, if you switch to timed fade like this, the fade will always proceed to the memory shown in the ACTIVE MEMORY display. It is not possible to continue a reverse-fade operation with the timer.

More likely, perhaps, than switching from manual to timer, is the need to assume manual control of a proceeding time fade which is going too fast, too slow, or in the wrong direction.

With both faders at zero, and manual mode de-selected, recall Memory 1.

Now set both faders for about 60 seconds, and select Memory 2 on the keypad.

Press FADE, and then after ten seconds or so press MANUAL.

As soon as MANUAL is pressed, the automatic fade is suspended. As in a normal manual operation, the fade now has to be 'collected', but this time the rules are somewhat different. The fade has already reached some point between start and finish, so to avoid sudden changes in light levels you want the manual faders to take over where the timer left off. This is achieved by matching the fader positions to the time left to run on the suspended fade before manual control is assumed.

The procedure is to move the faders to one end or the other, and then move them back along their tracks until the TIME-MATCH indicators light. It is only at this point that the faders take control.

Move the faders to the bottom, and then slowly back up until both TIME-MATCH indicators light.

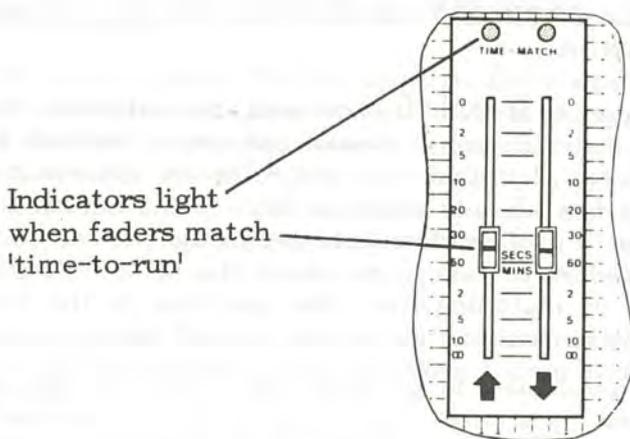
The fade will now behave as a normal manual operation, and can be completed or reversed at any required rate.

Notice that we said just now that the faders can be moved to either end to collect the fade, not just to the bottom as before. The reason for arranging it this way has to do with the

OPERATION

fact that manual fades can go in either direction. By going to the appropriate end, you can approach the pick-up point with the faders already moving in the direction that you want the fade to proceed, and thus make it a smoother operation.

If you want to proceed in the direction that the fade was going, move the faders to the bottom to collect and then move them up to complete. If on the other hand you want to reverse the fade, move the faders first to the top and then bring them down to complete the reversal. In either case, the TIME MATCH indicators will light as the faders reach the 'time to go' point and smooth control of the fade can be assumed.



Incidentally, a good way to delay a time fade that's running too fast is simply to select manual mode to suspend the fade for a while and then without having moved the faders, cancel it to resume the timed fade. In this way, you just introduce a sort of 'wait state' in the fade, and you can do it as many times as you like while the fade is in progress - very useful if things are happening a bit more slowly than you'd expected on stage.

Crossfades and Move Fades

As we said at the beginning, there are two fundamentally different types of fade used in lighting control: crossfades, in which the new scene totally replaces the old one; and move fades, in which the new scene is added to the old one. This of course applies whatever lighting control system you use, but the distinction is particularly important on the M24.

In a crossfade, all channels are taken under control at one time and adjusted to the level recorded in the new memory. If no level is recorded for a channel, the new level is automatically taken to be zero and the channel fades down. Thus, in a crossfade you have to specify a level for all channels you want on, otherwise they are faded to off.

Movefades, on the other hand, affect only those channels for which a level has specifically been set in the new memory. Any that do not have a level set are left alone and remain at the level set from the last memory. Let's use just three channels to demonstrate the basic difference between the two fades.

OPERATION

Suppose we have a scene (1) in memory 1 consisting of the following: (The / indicates that no level is set for the channel.)

CHANNELS			
	1	2	3
MEMORY 1	/	50	F

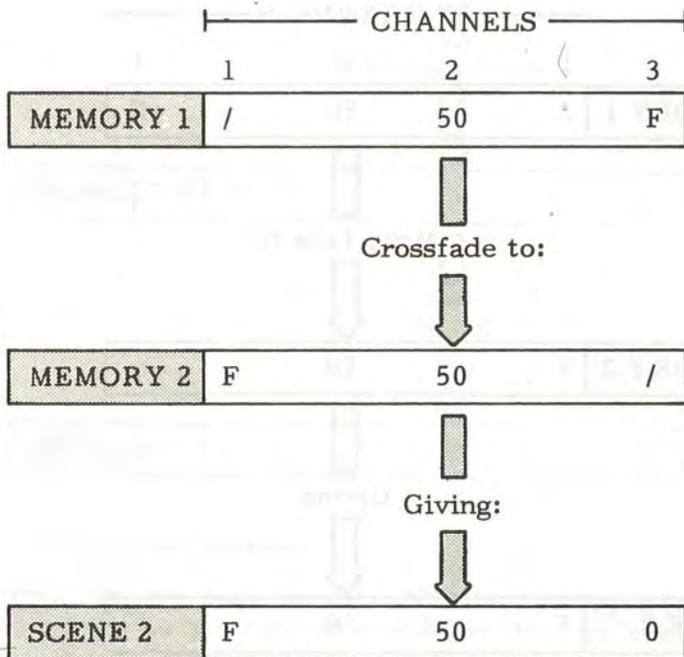
The corresponding scene on stage will be:

CHANNELS			
	1	2	3
SCENE 1	0	50	F

Suppose now that we have Memory 2 set up as:

CHANNELS			
	1	2	3
MEMORY 2	F	50	/

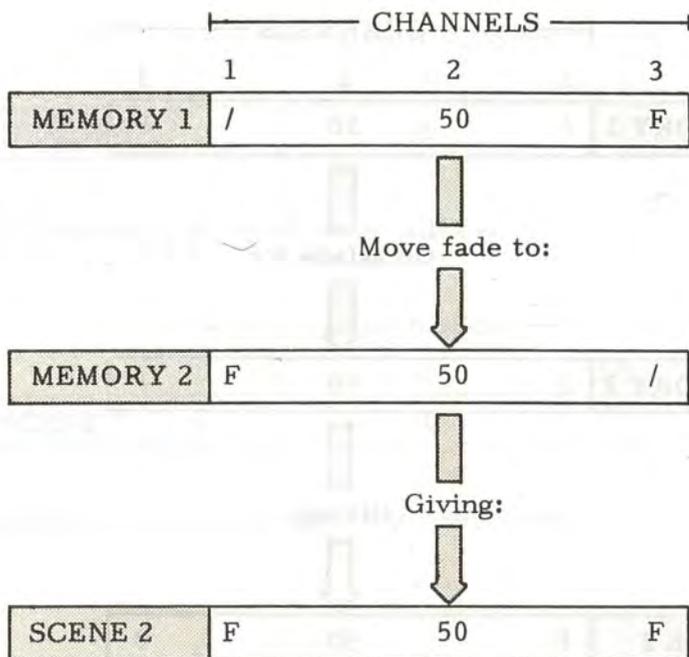
If we perform a crossfade, all channels are involved and the effect is:



Notice how channel 3 is affected even though there was no change of level deliberately specified in memory 2. The fade to zero is implied in a crossfade unless you specify otherwise.

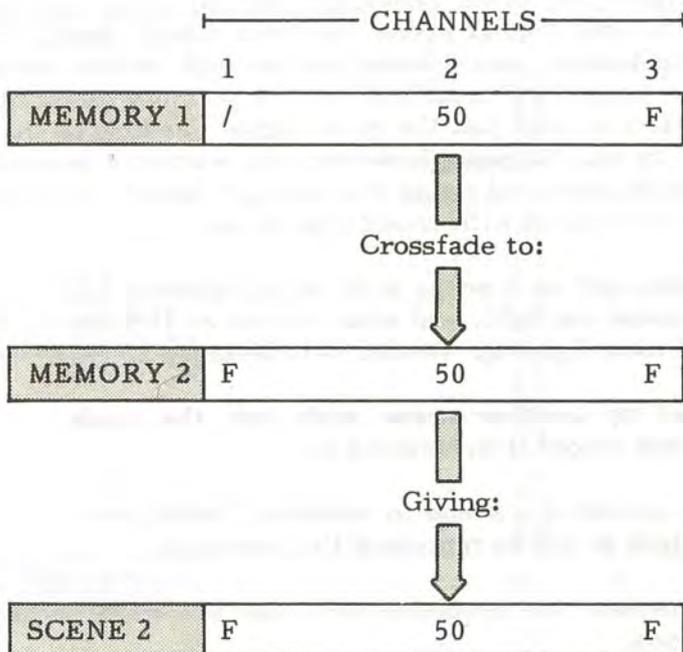
OPERATION

Compare this with the effect of a move fade involving the same two memories.



Now you notice that channel 3 was not affected. The same would apply to any channels which did not have new levels in the new memory - they remain at their old levels. The effect on stage is that scene 2 is added to scene 1 rather than replacing it.

You may ask why we don't just do this:



the effect is just the same.

Well yes, we have to admit that in this limited example it is, and if all fades were as simple as this, we could probably forget move fades altogether - but they're not. The really important point to appreciate is that all channels are taken under control in a crossfade even if there is no change of level specified for them. It follows, therefore, that only one crossfade is possible at any given time. Any fades, of whatever type, in progress when a crossfade is initiated are instantly cancelled and replaced by the new crossfade.

In a move fade, on the other hand, those channels which are not specified in the new memory are entirely free to be involved in other fades, and up to six simultaneous move fades are possible.

Let's go back to that box set we were using earlier to see what this means in practical terms. Remember that we had an initial scene involving two groups of lights - one group representing daylight, the other providing general room lighting. The change to the second scene involved simply fading the daylight group to zero over a long time period. Simple enough using a timer-controlled crossfade from a memory containing both groups, to one with just the room lights - as long as that's all you want to do. Suppose, however, you wanted a practical room light to be switched on as the daylight faded. Here you will run into difficulties with crossfades alone.

As before, set up a scene with some lights at full to represent daylight, and some others at 75% for general room lighting. Record it in Memory 1.

Now set up another scene with just the room lights, and record it in Memory 2.

Finally, record a a scene in memory 3 with just a single light at full to represent the practical.

To demonstrate the problem, we'll just see what happens using crossfades.

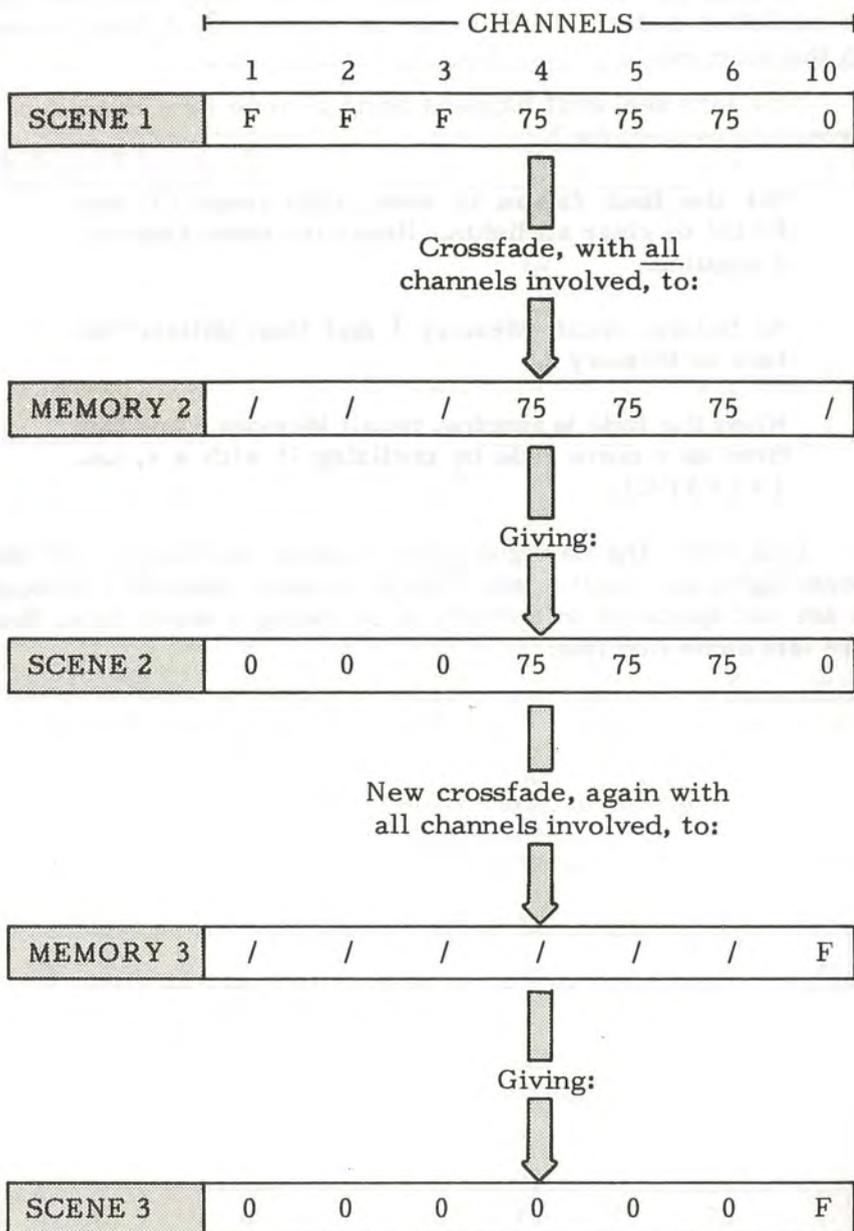
Clear all lights and then recall Memory 1.

Set, say, 2 minutes on the down fader and 0 secs. on the up fader, select Memory 2 and press FADE.

So far, so good. Your room lights are staying where they should and the daylight group is gradually fading to zero.

Now select Memory 3 and press FADE.

Well, your practical came on all right, but now you'll notice that both the daylight and general room lights are fading. To try and make it completely clear why this happened, suppose your daylight group was on channels 1 through 3, general room lights on 4 through 6, and the practical on 10. The fades proceed like this:



OPERATION

As soon as the fade to memory 3 is initiated, the first fade is cancelled and all channels not on in memory 3 fade to zero in the time set.

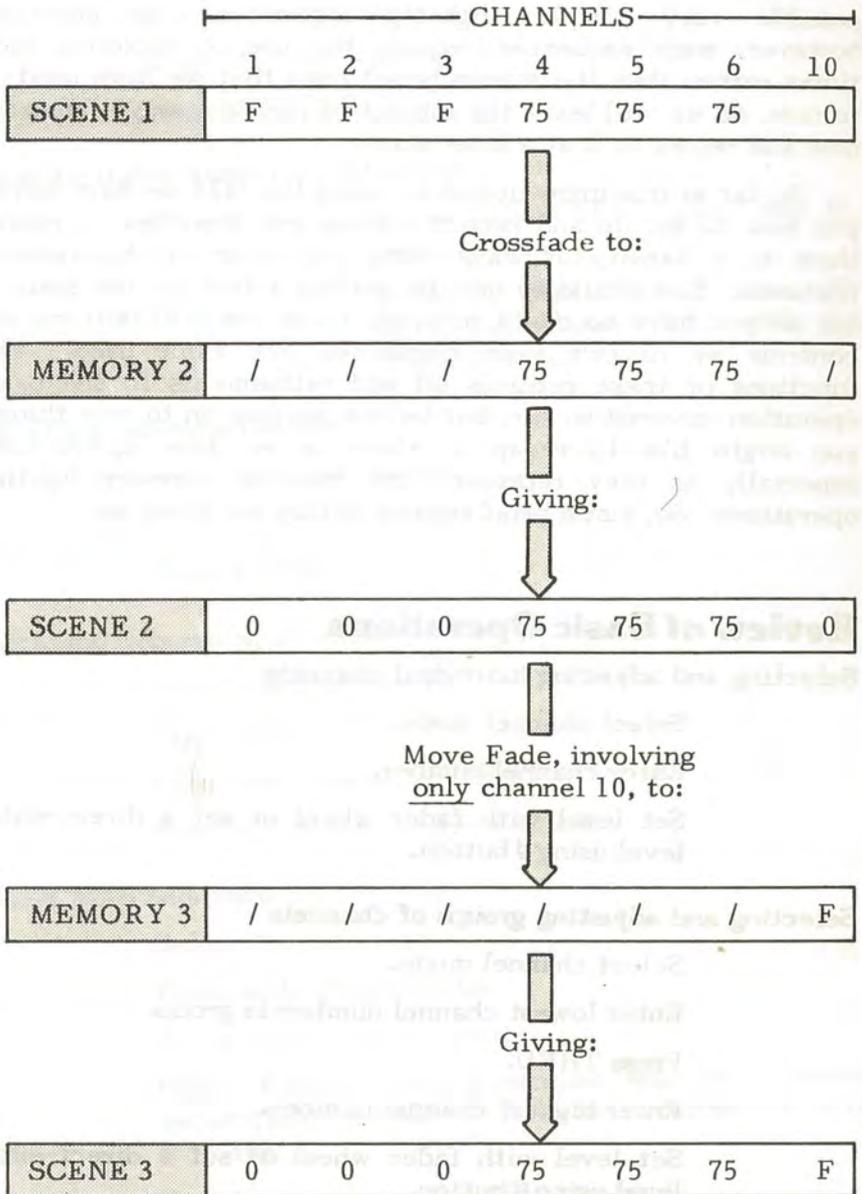
Now let's see what happens using a move fade instead of a crossfade to memory 3.

Set the both faders to zero, then press CL and FADE to clear all lights. Reset the down fader to 2 minutes.

As before, recall Memory 1 and then initiate the fade to Memory 2.

When the fade is running, recall Memory 3 but this time as a move fade by prefixing it with a +, i.e. [+3 FADE].

This time, the daylight fade proceeds unchanged, and the room lights are unaffected. This is because channels 1 through 6 are not specified in memory 3, so, being a move fade, they are left alone like this:



OPERATION

Up to six move fades can take place simultaneously, with each fade running at a different rate if necessary, making possible very complex lighting sequences. In practice, however, such sequences require the use of recorded fade times rather than the manually-set ones that we have used up to now, so we will leave the subject of multiple move fades for now and return to it at a later stage.

So far in this introduction to using the M24 we have shown you how to set up and record scenes, and then how to replay them in a variety of ways using a number of the systems features. You should by now be getting a feel for the system, but as you have no doubt noticed, there are still buttons and controls we haven't even mentioned, let alone used. The functions of these controls all add refinements to the basic operation covered so far, but before moving on to new things, you might like to recap on those we've done up to now, especially as they represent the core of memory lighting operations. So, just a brief resume before we move on.

Review of Basic Operations

Selecting and adjusting individual channels

Select channel mode.

Enter channel number.

Set level with fader wheel or set a direct-entry level using @ button.

Selecting and adjusting groups of channels

Select channel mode.

Enter lowest channel number in group.

Press THRU.

Enter highest channel number.

Set level with fader wheel or set a direct-entry level using @ button.

Recording Scenes

Select Memory mode.
Enter Memory number.
Press REC TOTAL.

Clearing lights to set up next scene

Either: Press [CL FADE] while still in memory mode.
Or: Enter [1 THRU N @ 0] (where N is highest channel No.) while in channel mode.

Recalling individual scenes

Select memory mode.
Enter required memory number.
Press FADE.

Recalling Sequences of Scenes

Select memory mode.
Press SEQ.
Enter first No. in sequence.
Press FADE for each new scene.

Using Auto Sequence

Select Memory mode.
Press shift (^) and SEQ.
Enter first No. in sequence.
Press FADE - all memories will be recalled sequentially unless a link is recorded in any memory.
To stop sequence, press SEQ again.

Setting time for fades

Select memory mode.

Set down fader (⏏) for fade time of channels fading down, and up fader (⏏) for fade time of channels fading up.

Enter memory number of next scene.

Press FADE - scenes fade in times set.

Fade rates can be changed while in progress.

Recording Links

Set up or recall memory to be linked.

Press LINK.

Enter no. of link memory.

Press LINK.

To cancel link, recall linked memory and press [LINK CL LINK].

Performing manual fades

Select memory mode.

Enter preset memory number.

Press MANUAL.

Press FADE.

Move time faders to bottom to collect fade and then move up to perform fade.

Taking manual control of a timed fade

While fade is running, press MANUAL.

Move faders to either end then back till TIME MATCH indicators light.

Move faders either way to complete or reverse fade.

Cross fades and move fades

Crossfades affect all channels.

Crossfade replaces old scene with new.

Only one crossfade possible at a time.

Fades are automatically crossfades unless specified otherwise.

Move fades affect only channels designated in new memory.

Move fades add new scene to old.

Up to six simultaneous move fades possible.

Move fades specified by prefixing memory number with +.

Operating Refinements

In describing and demonstrating the basic functions of the M24, we have purposely avoided discussing some facilities which could be regarded as refinements, as doing so would merely have complicated matters. By now though, you should be reasonably familiar with the basic concepts of setting-up, recording, and recalling scenes, as well as with the use of such functions as time fades, sequential replay and so on. So now, to complete your introduction to the M24, we propose to back-track over some of the topics already covered, but this time bringing in the functions we previously brushed aside. We will also describe the few remaining controls on the system which up to now we have studiously ignored.

Refinements In Setting Up

Keypad Refinements

So far, you have selected channels in just two ways - either individually, or in contiguous groups using the THRU button, e.g. [10 THRU 20]. But the keypad is in fact a good deal

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more flexible than this, and by making use of the three buttons +1, -, and +, you can simplify and speed up selection and adjustment considerably.

Taking the buttons in order, +1 simply selects the next channel number, or, put another way, it increments the selected channel number by 1. Channels in a sequence can therefore be selected without the need to enter each individual channel number. Say, for example, you wanted to adjust some channels in the group 1 through 10. Instead of entering 1, 2, 3, 4 etc. and adjusting as required, you could simply enter 1, +1, +1, +1 etc. and adjust the channels as necessary.

Select a sequence of channels by entering the first number, followed by [+1 +1 +1] etc.

Notice that the channel number in the CHANNEL/MEMORY display is incremented each time +1 is pressed.

A small additional advantage of selecting channels this way is that the channel entry is always taken as complete each time the +1 button is pressed, even if no adjustment is made. You will recall that individual entries are complete only on entry of the second digit or on adjustment of the channel.

The ability to select and control a group of channels simultaneously using the THRU button is extremely useful as you have already seen. In practice though, few scenes will consist of a single continuous block of channels such as 10 THRU 20. More likely, they would be something like 10 to 20 except 14, plus 22, 36 & 58, plus 40 to 45. The + and - buttons allow you to think in just this fashion and enter any combination of channels you like.

Taking as an example the group just described, you would select those by the following sequence of keys:

[10 THRU 20 - 14 + 22 + 36 + 38 + 40 THRU 45]

Any adjustment of the fader wheel, or direct entry of a level would, as usual, affect all channels in the group equally.

If you subsequently wanted to add to or subtract from the group, you simply enter the channel numbers prefixed by + or - as appropriate. Thus [+ 25 + 30 THRU 35] would add channels 25, and 30 to 35 to the group: [+ 25 - 10 THRU 15] would add channel 25 and subtract 10 to 15.

Try setting up and modifying groups using the +1, + and - buttons.

Combining these three additional buttons, +1, + and - with the @ and THRU functions introduced earlier, you can see that with a little practice the process of setting up scenes can be performed very rapidly indeed.

Set up this scene using the appropriate buttons:

<u>Channels</u>	<u>Level</u>
1 to 5 + 7 & 9	F
6 & 8	80%
10 to 15 & 17 to 20	50%
16	75%

Probably the quickest way is to enter:

[1 THRU 5 + 7 + 9 @ F]

[6 + 8 @ 8]

[10 THRU 20 - 16 @ 5]

[16 @ 7.5]

There is a further application of the + and - buttons in which they are combined with the @ button to modify channel levels by a pre-determined amount. By way of example, suppose channel 10 was at 50% and you wanted to raise it to 75%. You already know two ways of doing this: either, select the channel and raise the level with the fader wheel; or select the channel and use a direct-entry level - i.e. [10 @ 7.5].

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As an alternative you can add 25% directly by entering [10 @ + 2.5]. Similarly, you can subtract from an existing level using the - button, e.g. [10 @ - 2.5] would lower the channel level by 25%.

Note: In this context, a percentage change is not, as you might expect, a percentage of the channel's existing level, but of full brightness. Thus, if a channel is at 50%, [@ + 1] gives 60%, not 55%.

The Return Button

When setting channel levels with the fader wheel, you may or may not have noticed that the wheel is 'positionless' in character, by which we mean that the channel level is determined not by the position of the wheel but only by the amount it is moved after channel selection. Additionally, each time a channel is selected, the position of the wheel is deemed to represent the current level. All this may seem rather academic, but it does have practical implications. In particular, it offers the great advantage that since only movement of the fader wheel has any effect, channel levels don't alter simply as a result of being selected.

On the other hand, suppose you adjust a channel by mistake. Unless you noted the level in the LEVEL window before you made the adjustment, you may have difficulty finding the original level again using the fader wheel.

To get you out of just this sort of difficulty, we have equipped the M24 with a RETURN button whose job it is to return the channel instantly to the level which existed when it was selected. To demonstrate the action, try this:

Set up a scene involving a number of lights.

Now suppose you wanted to see the effect of changing the level of one of the channels involved. Adjusting any channel is very easy, but it could be difficult to reset the exact level quickly using the fader wheel if you discovered (or were told!),

for instance, that you'd adjusted the wrong one, and hadn't taken a note of the level before adjusting.

Select one of the channels contributing to the scene, and adjust it to a markedly different level.

Now press the RETURN button.

Instantly, the original level is restored, but be warned - this works only on the channel or group of channels currently under control. If you adjust a channel and then select another one, pressing RETURN will not restore the level of the previously adjusted channel(s).

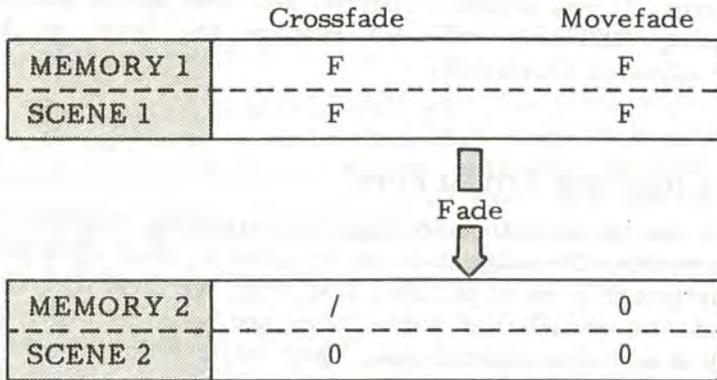
Setting Channels 'On At Zero'

Before we finish with selecting and adjusting channels we must re-introduce the subject of move fades to clear up a point which may possibly have puzzled you when we first discussed them. You will recall that move fades are those in which the new scene is added to the old one. They differ from crossfades most significantly in that channels which are not specifically given a level in the new memory remain as they were in the old. Whereas, in crossfades, channels which are not given a new level are faded to off. The difference is illustrated below for a single channel. Remember, we use / to mean 'no entry'.

	Crossfade	Movefade
MEMORY 1	F	F
SCENE 1	F	F
		
MEMORY 2	/	/
SCENE 2	0	F

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What you may have wondered, is just how you do make a channel fade to zero in a move fade when you specifically want it to. The answer, quite logical when you think about it, is that you specify a level of zero in the new memory. It's referred to as setting the channel 'on at zero' because technically the channel is on, but at a level of zero. So whereas with a crossfade, simply not specifying a level ensures that the channel goes to zero, a move fade requires you positively to enter a level of zero to achieve the same effect. The fade then looks like this:



Notice that this time there is specific level of 0 in memory 2 in the case of the move fade. However, before you rush off and try to enter a level of zero, we should point out that you do not actually enter [N@ 0] (where N is the channel number). To indicate a level of zero you use instead the decimal point by entering [@.]. Let's use an example to show how this works in detail.

Record a scene in Memory 1 consisting of just Channel 1 at full.

In Memory 2, record a scene with just Channel 2 at full.

If what we have been saying so far is true, the absence of a level for any given channel should be interpreted differently in a crossfade and a move fade.

Recall Memory 1, and then execute a crossfade to 2 by entering just [2 FADE].

So far, so good. According to the rules we set out, channel 1, which had no level in memory 2, is faded to zero in the crossfade.

Recall Memory 1, and then execute a move fade to 2 by entering [+2 FADE].

We doubt that it comes as any surprise that this time you end up with both channel 1 and channel 2 on. Again, according to the rules we've given, the channel for which there was no level specified (i.e. 1) is simply ignored by the move fade. (You'll have to take our word for it, but so indeed were all the other channels except 2.)

Suppose, however, you wanted channel 1 to fade even though you are using a move fade. Well, as we said, you have to enter the level zero in memory 2.

Recall Memory 2. Now return to channel mode and enter [1 @ . CL] (i.e. Channel 1 at zero).

Re-record the scene in Memory 2.

The CL is necessary after the decimal point, to prevent the system taking the next key entry as a percentage level less than 10 as in [1 @ .9] (i.e. 1 at 9%) for example.

Now let's see how this affects the two fades.

Recall Memory 1, and then execute a crossfade to 2.

As you might have expected, there is no difference. Memory 2 totally replaces 1, leaving just channel 2 on.

Recall Memory 1 and then execute a move fade to 2 using [+2 FADE].

Unlike the last move fade, you have now achieved your fade to zero on channel 1, by the use of 'on at zero'.

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You may at this point be wondering why you should make life complicated for yourself by using a move fade to achieve what can more easily be done in a simple crossfade. Bear in mind though that our example above is designed to demonstrate an effect only, not to illustrate a use for it. This we will do more than adequately (we hope!) later on, but to give you a clue, it has to do with operation of scenes involving multiple move fades, and a valuable facility which we have not even mentioned yet - the CUE facility.

One last point before we leave this topic: 'on at zero' is a real channel level just like any other level, and like any other level it will be erased if you re-record the memory. If you still require the channel on a zero, you have to set it so or the channel will revert to off.

Refinements In Recording

Quite early on, we mentioned that information other than channel levels could be recorded with each scene, but we have for the most part deliberately avoided doing so for two reasons. Firstly, we wanted to avoid confusion, and so introduced features as far as possible one at a time: and secondly, using features manually for a while should have given you a sound appreciation of what they do.

To be specific, the things that can be recorded, apart from channel levels, are:

Links A link to another memory can be recorded with any scene, so that when it is recalled in a sequence operation, it is followed by the linked memory rather than the next numerical one. (We have already used a link in one of our examples, but they will be dealt with in more detail.)

Fade Times In each memory, you can record the fade time for the scene coming up, and the fade down time for the scene which it is replacing. Both times can be used, ignored, changed or overridden, just as circumstances dictate.

Type of Fade The fade is assumed to be a cross fade unless you specify otherwise. If the fade is recorded as a move, it will behave as such when recalled in a sequence or auto sequence operation. Recalled manually, it will still behave as a crossfade unless you again specify otherwise.

Recording Links

Recording links is a very simple process, both to do and to understand, so we will deal with it first.

The purpose of recording links is to alter the order in which memories are recalled during a sequence operation. In the absence of links the system recalls all memories in strict numerical sequence, but by use of links the sequence is entirely under your control and can be defined according to requirements. Two principal uses suggest themselves - creating loops for chase sequences, and inserting extra scenes into an existing sequence. The first of these has already been demonstrated, but we will repeat it here to remind you how the link was set up.

Record recognisably different scenes in Memories 1, 2 and 3.

Now select Memory 3 on the keypad, and then enter [LINK 1 LINK].

This action links memory 3 to memory 1, so a sequence operation commencing at memory 1 will continuously recall 1, 2, 3, 1, 2, 3, and so on. Note that you don't need actually to recall a memory to set up a link. Since links operate on the memory shown in the CHANNEL/MEMORY display, simply entering the number on the keypad is sufficient.

Press SEQ, and then recall Memory 1.

Now repeatedly press FADE, and notice how the three scenes are continuously recalled.

OPERATION

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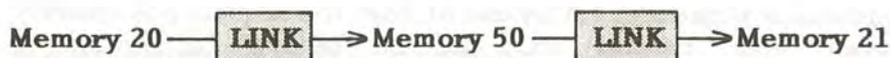
Press SEQ, and then recall Memory 1.

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Links can be examined, simply by recalling the appropriate memory, and pressing LINK once. Any link which exists will be shown in the CHANNEL/MEMORY display. For example, if you recall memory 3 and press LINK, the display should show 1. Should you wish to change the link, enter the number of the new link memory on the keypad, and then press LINK again. To clear the link altogether, recall the memory and press [LINK CL LINK], or just recall the memory and re-record it.

The procedure for inserting a memory into an existing sequence is much the same except that two links are required. For instance, to insert memory 50 between memories 20 and 21, you would need to link 20 to 50, and 50 back to 21.



The procedure is as follows:

Recall Memory 20.

Don't worry if there is nothing recorded in it, we are interested for the sake of demonstration only in the sequence as shown in the M24's display windows.

Record a link to 50 by entering [LINK 50 LINK].

Recall Memory 50 and record a link to 21 with [LINK 21 LINK].

Again, don't worry if 50 and/or 21 are empty.

Recall Memory, say, 18 and then press SEQ to put the system in sequence mode.

Now repeatedly press FADE.

The sequence shown in both MEMORY displays should be 18, 19, 20, 50, 21, 22, and so on. Using this technique, you can easily accommodate those extra scene changes that have a habit of cropping up minutes before the performance starts.

Recording Fade Times

The ability to use fade times recorded with each scene has two major advantages. Firstly, it allows you to set up a complete lighting sequence in rehearsal, leaving only the actual initiation of fades to be carried out in performance. This is of particular advantage when there are a large number of scene changes or when changes occur in rapid succession. Secondly, it makes possible complex scene changes involving several simultaneous or overlapping fades, with different durations for each one if required.

The process of recording fade times could hardly be simpler than it is on the M24. In fact, you have unwittingly been doing it all along, because the settings of the fade duration controls are automatically recorded each time you record a scene. You won't have noticed, simply because even though fade times have been recorded, we've made no use of them in replaying the recorded scenes.

Before we actually go through the process of recording different times, we would ask you to cast your mind back to the operation of manually-set times, by doing the following exercise. You should already have recognisably different scenes in memories 1 and 2 from the link exercises earlier, but if not, record two new ones.

Now recall Memory 1. Set significantly different times on the two fade duration controls, and then recall Memory 2.

Using the time faders in this way, it is tempting to regard the down fader as being related to scene 1, and the up fader as being related to scene 2. But as we explained earlier, both fade times are in fact related to the new scene, and the faders simply control the time it takes for channels moving up or

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down from the current scene to reach the levels set in the new memory. When you come to recording a sequence of timer-controlled scene changes, it is important to bear this fact in mind because it will help you arrange the time instructions within the sequence. Let's record some times and see how they work when you recall the scenes.

Suppose we have simple requirement starting with a five second fade up (build fade) to scene 1. This is followed after some time by a 20 second fade of channels going down from scene 1 and a slower, say 30 second, fade up of the new channels for scene 2. Finally, scene 2 fades to zero in five seconds. O.k., so this sequence you could handle manually, but as elsewhere it's the principles that are more important than the actual example.

This is how you would set up the sequence:

Recall memory 1.

Set the up fader for five seconds, and leave the down fader at 0. Now re-record the scene, complete with time, by pressing the REC TOTAL button.

"Wait a minute", I hear you cry "I thought you said we wanted a 20 second fade at the end of scene 1". So we do, but as our discussion just now emphasised, each pair of fade times controls the fades into a scene, not out of it. Put another way, the fade times control the time it takes for channels to fade down or up from the levels in the previous scene to the levels in the one being recalled. At the point of fading to scene 1, there won't be a previous scene so you can't fade channels down from it! The down fader is, therefore, left at zero when you record scene 1.

Now recall memory 2.

Set the down fader for 20 seconds, and the up fader for 30 seconds.

Re-record by pressing REC TOTAL.

Now we have our down fade duration for scene 1. What about the fade to zero at the end of scene 2? Well, there are several ways of achieving this (like almost everything else on the M24) depending on what is to follow, but we won't go into the alternatives right now. This time we'll assume that it's a simple fade out - end of show - nothing to follow. In which case, perhaps the simplest way of doing it is to fade to a memory containing no channels that are on, but containing just a down fade time.

Recall Memory 3 and set all channels to zero.

Set the down fader to 5 seconds, and the up for zero.

Re-record the scene in Memory 3.

That's our whole sequence recorded.

You'll see from this simple sequence, that each recorded scene consists of a set of channel levels, with fade details tagged to it. But remember, they are not the fade times into and out of the scene like this:

Scene 1		
Fade up time	Channel levels	Fade down time

Scene 2		
Fade up time	Channel levels	Fade down time

Instead, they are details of a single fade like this:

Scene 1		Channel levels
Fade details		
Down time	Up time	

Scene 2		Channel levels
Fade details		
Down time	Up time	

where the times recorded with each scene refer to the time taken for channels to move up and down from the previous scene.

Using Recorded Times

To make use of the recorded times in recalling the scenes, you depress a button we haven't used so far - MEM TIME. When the MEM TIME function is switched on, any time durations which are recorded with a scene will operate when the memory is recalled. This applies whether the scene is recalled by individual selection, sequence, or auto sequence.

Return both faders to zero, and clear all lights from stage.

You are now ready to begin recalling your sequence for the performance.

Press SEQ so that memories will be recalled sequentially.

Press MEM TIME.

The adjacent indicator should light, as should the TIME MATCH indicators.

Now recall Memory 1.

Your first scene should now be on stage after a build of 5 seconds. Notice again that the FADE indicator comes on to show that there is a fade in progress, and then goes off. When the fade is very long and slow, this is often the only way of being certain of exactly when it finishes! At the same time, the indicator above the up fader went out. Ignore this for now - we'll explain the significance in a moment.

Initiate the fade to scene 2 by pressing FADE.

Again, because MEM TIME is selected, channels fade down and up in accordance with the recorded times (20 and 30 seconds respectively) to effect the transition from scene one to scene 2. When the fade is complete (FADE indicator off):

Press FADE again.

You should now have completed your sequence with the 5 second fade to blackout.

As we said, this is a very simple sequence, but the principles remain the same no matter how complicated the requirement is or how many scene changes there are.

Before we move on to more complicated sequences, we had better explain the significance of the TIME-MATCH indicators. You may recall from the earlier exercises involving timed fades that it is possible to take over manual control at any point in a fade should the need arise. If you remember, the TIME MATCH indicators were used to help you pick up the fade without sudden changes in light levels. Well, you can take manual control in exactly the same way when you are using recorded times, and the TIME MATCH indicators serve the same purpose. However, there is another procedure with which the TIME MATCH indicators are principally designed to assist.

Rather than assuming full manual control of a timed fade, you may just need to alter the rate at which it is progressing. This can very simply be done with the aid of the TIME MATCH indicators, as the following exercise will demonstrate.

Press SEQ to de-select sequence mode.

Check that MEM Time is still selected.

Recall memory 1.

Now select memory 2, which from the last exercise has fade up and down times of 20 seconds and 30 seconds respectively recorded with the scene, but do not press FADE yet.

We will now initiate the fade to memory 2, but, during the course of the fade, alter the rate at which it is proceeding.

Press FADE to start the fade running, and then immediately move the time duration faders down until both TIME MATCH indicators are lit, and then de-select MEM TIME.

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There will be no sudden change in fade rate because the faders were matched to the recorded time, but if you now move them up or down you will shorten or lengthen the fade duration accordingly.

Move both faders down to a setting of 2 or 3 minutes.

The main point to appreciate in this exercise is that you have not assumed manual control of the fade, the timer is still controlling it, but you now have the ability to determine how fast the timed fade runs. If you move the faders to new settings while the fade is in progress, the remainder of the fade will complete in the new times. If your fade has not already completed:

Move the faders up to a shorter time and observe the effect on fade rate.

This ability to vary the rate of a recorded time is a very useful facility, and we suggest that you repeat the last exercise a few times to get the hang of using it. Incidentally, fiddling around with a fade in this way has no effect whatever on the recorded time values which remain as originally recorded for future use.

Recording MANUAL

If you know in advance that a particular fade will have to be performed manually at each performance, say in a situation where the duration of the fade is unpredictable, you can record Manual as you would otherwise record a fade time. Manual mode will then be entered automatically if the memory is recalled with MEM TIME selected. It works like this:

Set both faders to zero, and check that SEQ and MEM TIME are both de-selected (indicators off).

Recall memory 2, which from the last exercise has fade down and up times of 20 and 30 seconds respectively recorded for the fade.

We will now re-record the scene in the same memory, bearing in mind that when a scene is recorded the control panel settings as they are at the time are recorded with it. Our old fade times will, therefore, no longer apply.

Select manual mode (MANUAL indicator on).

Press REC TOTAL.

Manual fade is now a recorded parameter with scene 2, allowing the fade from scene 1 to be profiled as required each time the scene change takes place.

Cancel manual mode, and clear all lights.

Select MEM TIME and sequence mode (SEQ).

Recall memory 1, and note that the 5-second build is still there.

Now press FADE for scene 2.

Note that although 2 is shown in the ACTIVE MEMORY display, the scene-change has not taken place because of the manual instruction recorded with it. The MANUAL indicator lights to show that the system is now in manual mode.

Move both faders to the bottom to collect the fade.

You now have full manual control and can move the faders up exactly as required to complete the fade.

Complete the fade, and then press FADE for the fade to scene 3. The fade to blackout should operate exactly as before, since it is only scene 2 which has the manual instruction incorporated.

Modifying Recorded Times

Should you find that a recorded time is not correct, you don't need to re-record the entire scene, the time can be modified by the following very simple procedure.

Select the relevant memory number on the keypad.

Set the new required times on the time faders.

Press MEM TIME while holding the shift button depressed.

So far, we may have given the impression that the correct procedure for recording time is to record fade durations for each scene at the time of recording the scene. You can do this of course, but in reality, it is more common for channel levels of all scenes to be worked out and recorded first without worrying about fade durations, and then for all the fade times to be put in as a single task afterwards using the procedure just outlined. A nominal working fade time - something like 5 seconds - is usually set on the faders during scene recording, which can then be modified as described to achieve the required fade profiles. You can change fade times as often as you like, so it is very easy to get them right by a process of trial and error. Let's just modify the fade times in memory 2 for the sake of example. From the last exercise, the memory has a 'time' of 'manual' recorded; change this to, say, down 10 seconds, up 15 seconds as follows.

Select memory 2.

Check that SEQ, MANUAL, and MEM TIME are all de-selected.

Set the down and up faders for 10 and 15 seconds respectively.

Hold the shift button down and press MEM TIME.

The new times are now recorded in the memory. You can check that this is so by recalling memory 1 and then performing a fade to memory 2 with MEM TIME selected. The same procedure can be employed for adjusting the fade durations on all scene changes in the production.

To recap on recording and using times:

Any times set on the duration faders when a scene is recorded will automatically be recorded with it.

The recorded down-fade time controls the rate at which channels fade down from the previous scene: the recorded up-fade time controls the rate at which channels fade up from the previous scene.

Recorded times will apply only if MEM TIME is selected at the time of recall.

If MANUAL is selected at the time of recording, the system will enter manual mode when the scene is recalled with MEM TIME selected.

Recorded time fades can be overridden if necessary by pressing MANUAL during the fade and assuming manual control, or by de-selecting MEM TIME and altering fade rate by moving time faders.

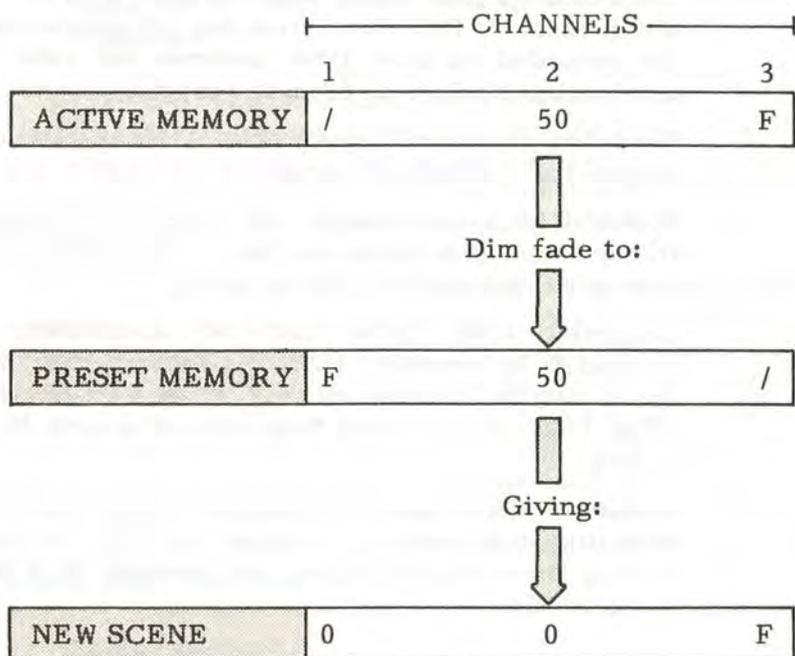
Recorded times can be modified at any time by selecting the memory number on the keypad, setting times on the faders, and pressing shift and MEM TIME.

Recording Fade Types

Whenever you record a scene, the type of fade is recorded with it and will apply when the scene is recalled in a sequence operation. Unless you specify otherwise, all fades are recorded as crossfades. If you want a move fade, you must prefix the designated memory number with + before you record the scene.

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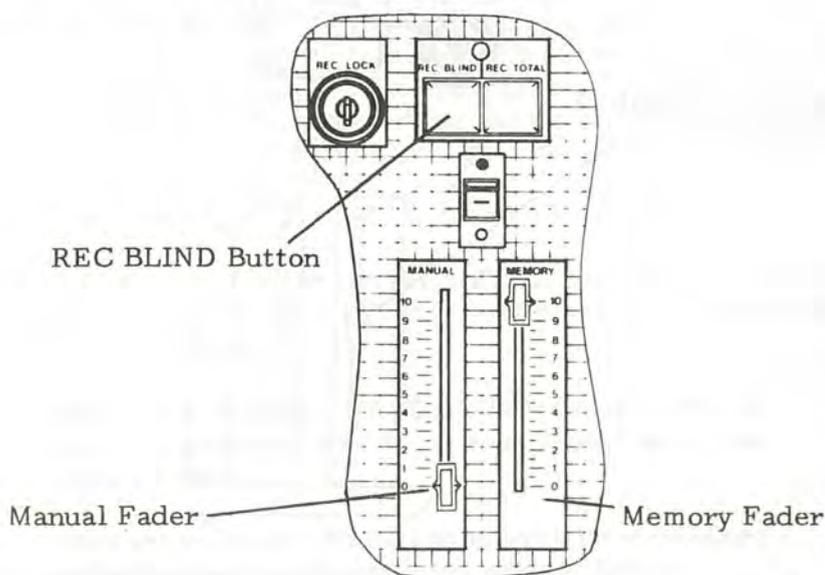
In addition to the standard cross and move fades, the characteristics of which we have already explained, and which are further illustrated in later examples, there is one more fade type which we should briefly mention. It is a special type of move fade, often referred to as a 'dim fade', and achieved by prefixing the memory number with a minus (-) rather than a + as in a standard move fade. The effect is to fade all channels which are on in the preset memory to zero, but to leave all other channels unaffected. The effect is shown in the illustration below.



Recording Blind

The blind recording facility makes it possible for lighting scenes to be set up and recorded without affecting the current output state of the system. Two main uses suggest themselves: recording scenes for a production while the stage is in use for rehearsal; and recording additional scenes while a performance

is actually in progress - to accommodate last-minute production changes for instance. To show how this is done, we have to introduce the concept of using a manual fader wing as a parallel control device. We also have to introduce some of the few controls so far not used - the MANUAL and MEMORY master faders, and the REC BLIND button.



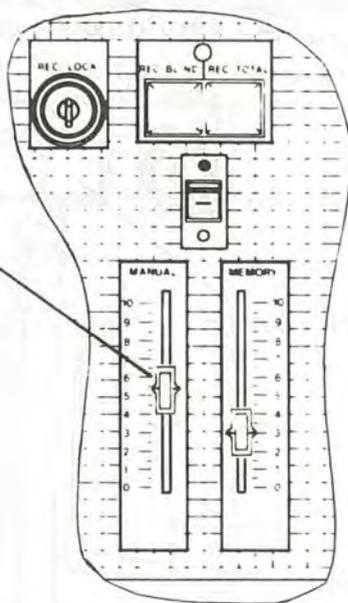
We mentioned right at the beginning of this booklet that there was provision for connecting a manual fader wing to the M24 and for the output of that wing to contribute to the output from the system. Well, it works like this. The two faders - MEMORY and MANUAL - act as master faders on the contribution to the system output from the M24 itself, and from a connected manual wing respectively.

You may recall that at the outset we set MANUAL to zero, and MEMORY to 10. This was because we were concerned until now only with the controlling lights from the M24. However, if the MANUAL fader is advanced to 10, the M24 regards the settings of the individual faders on a connected manual wing in exactly the same way as it does the channel levels set on its own panel. If a given channel is

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controlled from the memory system and from the manual wing at the same time, the system decides between the two levels on a highest-takes-precedence basis. That is, the channel will assume the higher of the two levels.

Highest contribution
takes precedence



Perhaps the most obvious application for this facility is in providing an additional means of controlling a group of lights when for one reason or another you can't use the M24 controls. You could set up additional scenes on the manual wing, and bring them up using the MANUAL fader. However, this is not the application that we are interested in showing you at the moment. What is perhaps more interesting, if not so obvious, is the fact that the output from the manual wing can be recorded in memory even when it is not contributing to the current system output.

What this means in practice is that you can set up a lighting scene on the manual wing with the MANUAL fader at zero so that it has no effect on the lighting on stage at the time, but still record the scene in memory. Of course, you can't see the actual effect of the scene set up - hence the term 'blind recording' - so you have to be able to predict it fairly

accurately from experience, but it does mean that you are not barred from scene plotting just because the stage is in use. The procedure for blind recording is very simple, and we'll go through an example to show you how it operates. (Of course, you will need a manual fader wing to carry out the exercise.)

Suppose you have a rehearsal in progress on stage which is likely to last all day, and you have provided lights for it from the M24. You are then informed that there is to be a presentation ceremony on stage before tonight's performance for which you will need perhaps three simple lighting changes. How do you set them up without disturbing the rehearsal? The answer, even if it is not the ideal solution, is to record them blind.

On the M24, set up a scene to use for rehearsal.

It doesn't matter for the sake of this exercise whether you record it or not - what matters is that you have lights up that you must not disturb.

Make sure that the MANUAL fader is at zero - if it's not, anything you do on the manual wing will show on stage.

Now set up on the manual wing some general stage lighting your first scene for the presentation.

On the M24, set up the controls exactly as you would for a normal recording - i.e. select memory mode, enter a memory number, set fade times. None of this will affect the current stage lighting.

Now press REC BLIND - the adjacent indicator will light if the record action is successful.

This procedure can now be repeated to record all of the scenes for the presentation, and all without the slightest disturbance to the rehearsal. And there's more. If it's more convenient, the roles of the manual and memory systems can be reversed, with the manual wing providing the stage lighting, and scenes being set up blind on the M24. It is necessary only

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to set the MANUAL fader up, and the MEMORY fader to zero. A point worth stressing is that the system will blind-record only if one or other of these two faders is at zero, and then will record the scene set up on the corresponding panel. If both faders are at zero, the contributions from both panels will be combined on the highest-takes-precedence basis, and recorded.

We hinted just now at other uses for the manual fader wing facility. In this introduction we don't intend to describe them any further, because they are the sort of uses which you will soon discover for yourself as your experience with the system grows. We will just emphasise that it is a facility well worth bearing in mind whenever you are looking for a bit of extra control capacity.

Refinements In Playback

Simultaneous Channel and Memory Operations

You may have noticed if you are really observant, that where we have mentioned channel or memory mode we have been careful to refer to the keypad, rather than the system, being in one mode or the other. Basically, what we mean by this distinction is that when one mode or the other is selected, the only part of the system which becomes specifically dedicated to channel or memory affairs is the keypad - the rest of the system remains un-dedicated. As a result, it is possible to perform both memory and channel operations simultaneously. To demonstrate:

Select on the keypad any memory in which you know that there is a scene recorded, but don't press FADE yet.

Set a time on the up fader of about 30 seconds.

Suppose in performance you realised that one of the channels involved in the scene fading up was becoming too bright - here's how you could correct it.

Press FADE to initiate the fade up.

Decide which channel is becoming too bright, then select channel mode and enter the number on the keypad.

Move the fader wheel down.

As is the general rule on the M24, this action is governed by a latest-takes-precedence philosophy, meaning that it is always the last control action which is obeyed, earlier instructions being overruled. Thus in the exercise you just performed, the channel level at the end of the fade is that set on the fader wheel, not that dictated by the memory. This is clearly an example of the system performing a memory operation while the keypad is used in channel mode. (Incidentally, the level in the memory is not affected by this action, and will still apply next time the scene is recalled.)

Conversely, channel operations may be performed while the keypad is in memory mode. When memory mode is selected, the number of the last-selected channel is removed from the CHANNEL/MEMORY display to make room for memory numbers, but the channel selection is not cancelled, and the channel can still be adjusted with the fader wheel. You should still be in channel mode with a channel selected - if not, set the system in this state.

Now select memory mode and recall a memory.

While still in memory mode, move the fader wheel, and notice that the level of the channel that was selected before entering memory mode is adjusted.

The RETURN button and flash switch also function normally for the last-selected channel, but if you wish to adjust a different channel you have to return to channel mode as in the previous example to make the new selection. Again, the recorded level for the affected channel is not changed by this action.

Multiple Fades

Among the most demanding situations faced by any lighting controller, are scene changes involving several simultaneous but independent fades of different time durations. Imagine having to move, say, four manual master faders simultaneously, but at different speeds. Faced with the physical difficulties of performing such a feat, most people would give it up as a bad job and create something more simple.

However, using a combination of the M24's facilities, and in particular, recorded fade times, these, and even more complex tasks are not only possible, but quite simple. To demonstrate the truth of that statement, we will use another hypothetical set. Here is the scenario.

The production is a musical set in a waterfront location. Scene 1 opens with just a blue cyclorama on the backcloth representing the sea. An upstage 'corridor' of light across the stage is then faded up as the actors come on upstage from both sides. As the cast moves slowly forward, first a midstage, then a downstage corridor of lights are faded up so that the effect is one of a curtain of light rippling forward with the cast. As the cast reaches the front of the stage, follow spots for the principal singers are snapped on.

To achieve the effect of the light curtain travelling forward, you need four overlapping build fades initiated in quick succession, but each running at a different speed. Then you need the snap fade for the spots, probably before the last fade has completed. Handling all five fades manually would be quite a feat of control, and you'd stand little chance of getting the timing right so that the light curtain moved with the actors.

Using the M24, on the other hand, you could adjust the time duration on each fade by trial and error in rehearsal so that it reached full intensity in just the right time to follow the choreography. Having got one fade right, you record it with its fade time, and then work on the next one. In the

procedure that follows, we have designated the cyclorama, upstage, midstage and downstage groups of lights, groups 1, 2, 3 and 4 respectively. The spots, we have designated group 5. If your lights don't permit you to create the curtain effect we've described, just set up any five groups and follow the rest of the argument. After all, as we have said before, it's the principle we're trying to demonstrate, not any particular lighting set-up.

Clear all lights, de-select MANUAL, SEQ, and USE TIME.

Set up a scene with group 1 at full.

Set the down fader to 0 seconds, and set a time of 5 seconds on the up fader.

In this exercise, there are no channels fading down, so the down fader should be set to 0 seconds throughout.

Record the scene in Memory 1.

The cyclorama is now recorded with a 5-second build for the opening of scene 1.

Clear all lights from stage. Set up a scene with group 2 at full.

Set a time of 10 seconds on the up fader.

Select memory mode and record the scene as a move fade in memory 2- i.e. press [+2 FADE].

Remember, you must use move where you want overlapping fades, because crossfades cancel any existing fades as soon as they are initiated - so prefix all memory numbers with + before recording.

Repeat the procedure, recording group 3 in Memory 3 and group 4 in Memory 4 with fade up times of 15 and 20 seconds respectively.

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Don't forget to clear the lights from one scene before you start setting up the next, otherwise all lights which are on will be taken over by each successive fade, until eventually all lights are being controlled by the last fade instead of being independent.

Finally, repeat the procedure, recording group 5 in memory five with a fade-up time of zero - i.e. a snap fade.

So, you now have five scenes, all recorded as move fades with individual fade times. How would they be recalled in performance? For the effect we described, we want a smooth downstage movement of the light. Therefore, the first four fades should start as near as possible together, allowing their different fade times to produce the apparent forward movement. Initiation of the fifth fade would have to be timed manually, to ensure that the spots came on for best effect. Sequence operation is ideal for this because it saves you entering the individual memory numbers, allowing the first four fades to be started in rapid succession, followed by fade five at the appropriate time.

Clear all lights from stage.

Press USE TIME, to ensure that your recorded times are brought into effect.

Select sequence mode by pressing SEQ.

Select memory 1 on the keypad and then press FADE four times in quick succession.

You should now be able to sit back and watch four beautifully timed fades completing in time durations of between 5 and 20 seconds. All that's left for you to do is to press FADE at the right time to bring on the spots. So, what would have been a difficult manual operation has been turned

Set up three recognisably different scenes and record them in sequential memories, each as a move fade (prefixed +), and each with fade times of 5 seconds. If you want any channels to go out, remember to record them as 'on at zero' - if you can't remember why this is necessary, go back and read the explanation on page 59.

Form a loop by linking the last of the three memories to the first.

Now, in another memory, set a scene with a group of channels not used in the other three at full.

You can now set an auto sequence in operation, and then bring up a fourth memory using CUE.

Select MEM TIME, and AUTO SEQ.

Select one of the three memories in the loop, and press FADE.

Your auto sequence should now be running, with a new fade starting every 5 seconds or so.

Now press CUE to select the CUE keypad mode.

Enter the number of the fourth memory recorded just now, and then move the fader wheel up.

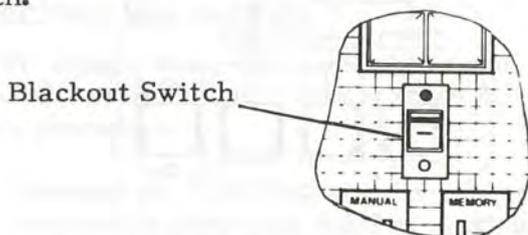
The scene is entered as a move fade, even if you did not specify it as such, so the auto sequence is not affected. Had any of the channels in your cue fade already been on, they would have obeyed the normal rules of move fades, and moved to the levels in the new memory. Both up and down parts of the fade occur simultaneously at the speed dictated by fader wheel movement, and the number shown in the LEVEL display represents the proportion of fade completion as a percentage. Thus when 50 is displayed, the fade is half completed.

As an alternative to controlling cue fades with the fader wheel, you can use the @ button. The process is much the same as setting channel levels except that the number entered represents the proportion of the fade completed as a percentage of total, rather than the actual levels of the channels involved. For example, [CUE 10@5] would cause an immediate fade on the channels involved from their existing levels to the levels that they would reach half way through a normal fade to memory 10.

The other main use for Cue is in controlling two fades manually at the same time. You can initiate one fade in memory mode and assume manual control in the usual way using the time faders, and then select cue mode and manually control a second fade exactly as we described just now.

Blackout

By this point in the proceedings, the prospect of temporary oblivion may hold some appeal, so it's perhaps a good time to introduce the only control not yet mentioned - the blackout switch.



Very simply, if you set the switch down, it switches off all channels instantly - switch it up again and all previous lighting is restored. The switch does not affect the progress of fades or alter any system modes.

Storing Lighting Scenes on Tape

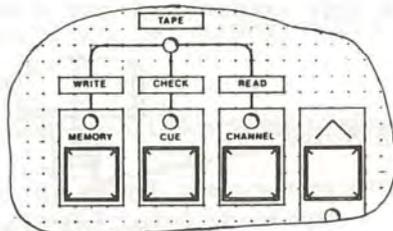
Now that you've seen the advantages of being able to store lighting scenes for later re-use, you won't find it hard to

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appreciate the further advantages of storing them in some form of archive medium. For a start, there is always the possibility, however remote, that information stored in electronic memories may be corrupted or lost. The M24's memory has batteries which maintain information for at least a week when it's not connected to the mains, but if you leave it longer than that you stand to lose the fruits of your hard labour unless you have a copy in some form that doesn't deteriorate. Then there is the simple point that if you have a good lighting sequence, why not save it? You may find a use for it next month, next year, whenever.

To allow for both of these eventualities, we have opted to provide the ability to store material on ordinary magnetic recording tape as being inexpensive, simple, and convenient. Any tape recorder will do the job, but naturally the standard audio cassette type is the easiest to use, and we provide a record/playback lead which is suitable for use with most types.

The MEMORY, CUE, and CHANNEL buttons double as tape control buttons by using them in conjunction with shift.



Recording

You can record the contents of selected memories either singly, or in groups. To demonstrate the process, record a block of memories as follows:

Locate the five-pin tape socket on the rear of the M24 and connect it to the cassette recorder using the lead supplied.

Load a good quality tape cassette.

Select memory mode, and enter [1 THRU 5] on the keypad.

Set the tape recorder to record, adjust the record level control (if there is one) and allow sufficient time for the tape leader to go through.

Hold the shift button down and press MEMORY. This acts as the 'write' control and causes the memory contents to be 'written' onto the tape.

The TAPE indicator lights to show that there is a tape operation in progress, while the one above the MEMORY button lights to indicate that it is a WRITE, or record, operation. The designated memories will now be recorded onto the tape, and as each one is recorded its number is shown in the CHANNEL/MEMORY display.

Wait until the TAPE indicator goes off and then stop the tape. The recording process is complete.

Checking Recordings

To ensure that the contents of the memories have been correctly recorded, you should immediately use the following check procedure.

Rewind the tape, and set the tape recorder volume control to about one third of maximum.

Enter [1 THRU 5] on the keypad, then hold the shift button down and press CUE.

Again, the TAPE indicator lights to show that a tape operation is in progress, but this time with the CHECK indicator lit.

Set the tape recorder to play.

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As the contents of each memory are checked, its number appears in the CHANNEL/MEMORY display, and on completion of a successful check operation both indicators go off.

If any errors are detected, the number of the memory involved stays in the display, and both the TAPE and CHECK indicators flash. The most likely cause of errors is incorrect volume setting on the tape recorder. Repeat the check at different settings until a suitable level is found, and then use this volume setting for all future check and read operations.

Loading Memories From Tape

There is only one point to consider before you load taped information back into the memory: the same rules apply as with ordinary recording in that existing memory contents will be overwritten - so make sure there is nothing there that you want.

Rewind the tape, and set the tape recorder volume to the setting determined in the check procedure.

With the keypad set in memory mode, enter [1 THRU 5].

Make sure that the REC LOCK keyswitch is in the enable position, then press shift and CHANNEL.

Once again, the TAPE indicator comes on, this time with the READ indicator to show that information is going to be 'read', or retrieved, from the tape.

Set the tape recorder to play to start the read operation.

As each memory is loaded, its number appears in the CHANNEL/MEMORY display, and the indicator above the REC BLIND and REC TOTAL buttons lights momentarily. Any detected errors will be indicated in the same way as during a check operation.

Wait until the two indicators go off, and then switch off the tape recorder.

The read operation is now complete, and the scene information is loaded back into the memories in which it was originally recorded. You can appreciate from this exercise that tape storage offers both security for the sequences which you create, and the ability to store unlimited numbers of scenes for any length of time.

Although we have used a specific group of memories for this example, you can, as we said earlier record any single memory or group of memories.

The subject of tape storage is covered in more detail in the accompanying Operators' Handbook.

The Video Mimic

The video mimic is a visual display unit which may be either a standard domestic TV receiver, or a purpose-designed monitor. As its name suggests, the device mimics the current state of the control system, showing among other things, the levels of all the controlled light channels, which channels are selected for control, the numbers of the active and preset memories, fade types and durations, and much more.

We do not propose to give any detailed explanation here of the use of the video mimic, partly because it is an optional addition to the system, but mainly because the principal purpose of this introductory booklet is, as stated at the outset, to provide an introduction to the M24 itself. We hope that the foregoing text has enabled you to operate the system with some confidence, and would suggest that you now read through the Operators' Handbook which, although a little more technical in nature, gives full details of all the functions and facilities which we have not been able to cover here. Armed with your knowledge of the M24 gained from this introduction, you should now have no difficulty in following the explanations given there, including the very full one describing the use and interpretation of the video mimic.

The Control Panel

The control panel is shown opposite with the controls numbered for identification. The paragraphs which follow give a brief description of the function of each control, but they are not intended as comprehensive definitions since the preceding text and the Operators Handbook go much more fully into their operation.

Control, Indicator and Display Functions

- (1) **Keypad** - used for selecting channels for control, and memories for recording or recall.

- (2) **Keypad Mode Selector Buttons**

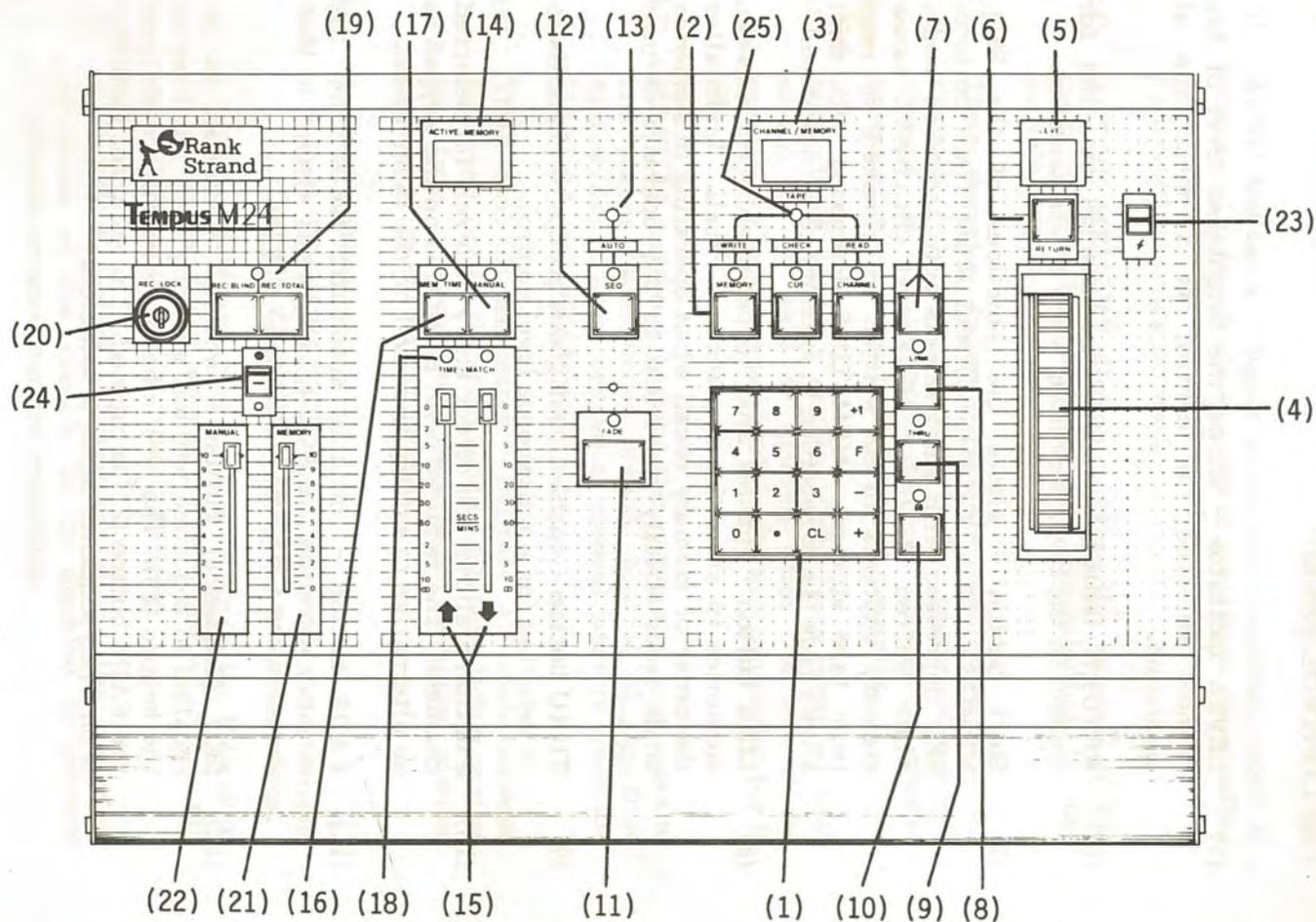
CHANNEL button - places the keypad in channel mode, allowing individual light channels to be selected and controlled to construct a scene.

MEMORY button - places the keypad in memory mode, allowing scenes to be stored in, and recalled from, memories. Adjacent indicator lights when memory mode is selected.

CUE button - enables a memory to be recalled and controlled by the fader wheel when the automatic fade system is unavailable - when a manual or auto-sequence fade is in progress for instance.

- (3) **CHANNEL/MEMORY display** - shows the number last entered on the key pad. In channel mode the numbers represent individual channels; in memory or cue mode they represent memories.

- (4) **Fader wheel** - controls the level of selected channel(s). The wheel's position is deemed to represent the channel level at the time of selection, and thus no change in level occurs as a result of selection.



THE CONTROL PANEL

- (5) **LEVEL indicator** - shows the brightness level of the channel selected for control as a percentage of maximum.
- (6) **RETURN button** - returns the channel selected for control to the level prevailing when it was selected.
- (7) **Shift button** - alters the functions of the SEQ, MEMORY, CUE, CHANNEL, and MEM TIME buttons. SEQ depressed with shift selects auto sequence mode, while shifted MEMORY, CUE and CHANNEL cause memory contents to be written to, checked, or read from tape storage. MEM TIME depressed with shift allows fade times recorded in memory to be modified.
- (8) **LINK button** - enables links to be established between memories to alter the sequence of recall. Links alter the order of memory recall when operating in sequence mode from strictly numerical to any operator-defined order.
- (9) **THRU button** - enables contiguous groups of channels to be selected for simultaneous level control.
- (10) **@ button** - allows the direct entry of levels for selected channels. The required level is entered on the keypad as an alternative to setting the level on the fader wheel.
- (11) **FADE button** - initiates automatic fades from the memory shown in the ACTIVE MEMORY display to that shown in the CHANNEL/MEMORY display.
- (12) **SEQ (Sequence) button** - enables memories to be recalled in sequence without entering their numbers on the keypad (20). The next memory is recalled each time the FADE button (21) is pressed. The adjacent indicator is on when sequence mode is selected.

- (13) **AUTO indicator** - lights when auto sequence mode is selected. In this mode successive memories are recalled automatically on completion of each fade without the FADE button being pressed.
- (14) **ACTIVE MEMORY display** - shows the number of the memory selected and actually contributing to the console output.
- (15) **Time duration faders** - set the time durations for channels fading up or down in the course of a scene change. In manual mode, they act as manual master faders enabling fades to be profiled manually.
- (16) **MEM TIME button** - enables fade times recorded with scenes to be used or ignored when the scenes are recalled. Times are used when the adjacent indicator is on.
- (17) **MANUAL button** - disables the automatic fade system, and places fades under manual control of the time faders (22). Faders behave as manual masters when the MANUAL indicator is on.
- (18) **TIME MATCH indicators** - indicate a match between times set on the duration faders, and time left to run on the fade in progress. Used when assuming manual control of an automatic fade.
- (19) **Record buttons**
 - REC TOTAL** records the outputs from the console which are actually controlling the lamp brightness.
 - REC BLIND** enables a scene set up on the M24 or on a manual fader wing to be recorded while it is not contributing to the console output.
- (20) **REC LOCK switch** - keyswitch allows the recording functions of the console to be disabled to prevent accidental or unauthorised recording.

THE CONTROL PANEL

- (21) **MEMORY fader** - acts as a master fader on desk outputs contributed by the memory (M24) system.
- (22) **MANUAL fader** - acts as a master fader on console outputs contributed by a connected manual fader wing.
- (23) **Flash switch** - sets the level of the selected channel at full or zero to aid channel identification.
- (24) **Blackout switch** - enables all console outputs to be switched off simultaneously for instant blackout.
- (25) **Tape Indicators**

TAPE - indicates that a tape operation is in progress. Tape operations are selected by pressing shift and one of the keypad mode buttons, and the particular operation is indicated as follows:

WRITE - indicates that the contents of memories are being written to (recorded onto) tape.

CHECK - indicates that tape recorded data is being checked for absence of errors.

READ - indicates that tape recorded data is being read from tape and loaded back into system memory.

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