

# Tempus M24

## Memory Control



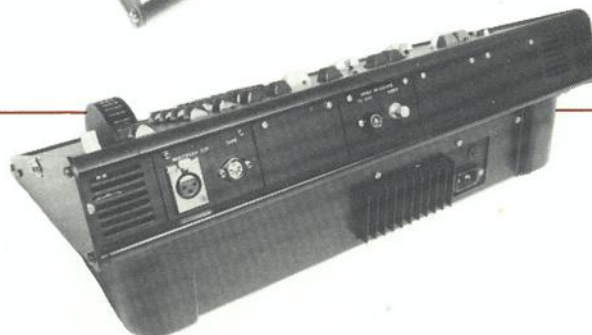
# Rank Strand

Tempus M.24 is the dimmer intensity memory control for small theatres, studios and public halls and is so compact and lightweight that it is also ideal for touring rigs and outside broadcasts.

Tempus M.24 has fewer push buttons than a pocket calculator but has the comprehensive facilities of an advanced memory control; it can, if needed, execute concurrently up to six different cues all at different recorded timings, or a sequence of 50 or more cues running consecutively. At any time, even during such multi-part fades, the fader wheel provides immediate control of any one or more channels to meet the unforeseen needs of the moment. Like Galaxy, Rank Strand's most powerful memory system, it is the latest operator action that takes command; like Galaxy it has the same high standards of 16-bit fade processing and 8-bit recording and output accuracy.

Any existing 2 or more preset desk (unless it is a museum piece) can be used in conjunction with Tempus M.24 and the lighting contribution of that manual desk can be recorded into the fast-access memory of the M.24. This memory stores up to 185 different lighting states for the maximum of 60 control channels. All, or any part, of this memory can be transferred to and from tape by plug-in addition of an ordinary domestic cassette recorder. The Tempus M.24 also has an output socket to which a monochrome television set can be connected for an inexpensive Visual Display Unit which is not essential, but desirable for faster interrogation of detail. Another output is provided for a quality CCTV monitor.

Tempus M.24 has a multiplexed output so that a single 2-conductor screened cable conveys all intensity information, in serial form, to one or more local Multiplex boxes which each have plug and socket control connections for up to 24 dimmers.





# Tempus M24

## Specification

### Power Input

220 - 240 or 110 - 120V, 47/63Hz  
Each unit requires separate power input.

### Tempus M.24 Output

Multiplexed analogue link via 2-core screened cable.

### Multiplex Interface Unit Output dimmer drive

0V (Off) to -10V (Full) via 10k ohm & silicon diode.  
Optionally 0V (Off) to +10V (Full) via 1k ohm & silicon diode.

Other control voltages are possible, within the limits +/ - 15V.

Multiplex Unit, 4x6 channel, 0V to -10V interface. 0371009

Connection via 4x2m long control cables each terminated in 8-pin 'Bleecon' plug to mate with Tempus

Multiplex Unit, 24 channel, 0V to -10V interface 25 way D-type connector. 0371104

Multiplex Unit, 24 channel, 0V to +10V interface 25 way D-type connector. 0371305

### Input from Manual Fader Desk or Wing

As for dimmer drive outputs.

### Control Channels

In increments of 12, from 24 to 60 maximum. One Multiplex Interface Unit is required for each 24 channels.

### Environment

Operating, 0°C to 35°C, 10% to 90% maximum relative humidity (non-condensing). 'Office' level cleanliness.

### Processors

M6803, 8-bit data, 16-bit address  
M68B09, 8-bit data, 16-bit address

### Cycle Time

Executive - typically 48ms.  
Contact Scan - typically 12ms

### Fade Processing Accuracy

16-bit.

### Recording Accuracy

8-bit (256 step).

### Output Accuracy

8-bit (256 step).

### Fast-Access Memory

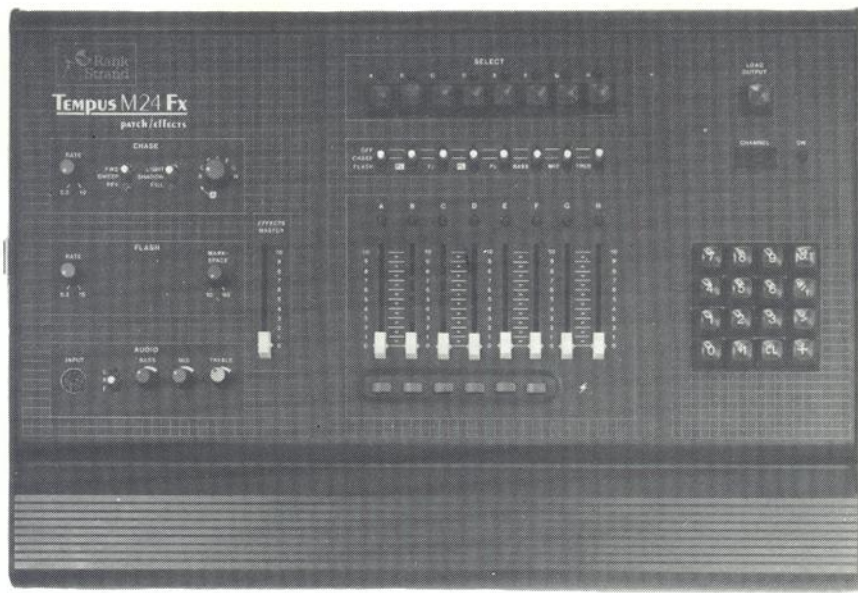
Low-power semiconductor, battery maintained for minimum of a week.  
Capacity depends on number of channels fitted. 60 channel systems have 185 memories available. Smaller systems have 199.

### VDU Mimic Output

Modulated UHF (optionally VHF) 625/525 line, 50/60Hz field, with connection via co-axial connector, and 1V positive composite video with connection via 75 ohm BNC socket.

### Tape Memory Storage

Uses standard domestic audio recorder. 100m V rms input/output on standard 5 pin DIN socket; Mono or Stereo.



## Tempus M.24 Fx

This optional Patch/Effects Desk is a supplementary control which matches the style of the Tempus M.24 Memory Control but incorporates an electronic equivalent of a pin-patch to route the same Channel numbers to any one, or more, of 8 Group Faders six of which also have Flash On pushes. The 8 Groups can also be selected to the effects generator incorporated which provides sophisticated **Chase, Flash,** and **Audio** (sound to light conversion) facilities with an Effects Master fader. In normal operation the Patch/Effects desk is mastered by the Manual master fader of the Tempus M.24 Memory Control, but only when this is powered-up. However the supplementary desk is self-contained with a totally independent, multiplexed output to

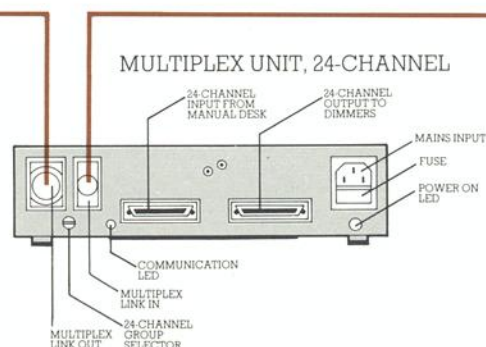
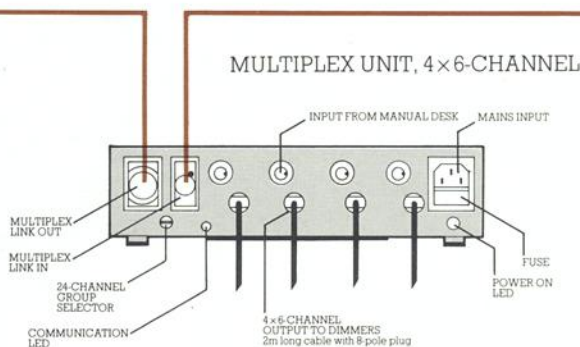
communicate with the same Multiplex Units, for blocks of 24 dimmers.

The keypad allows any Channel numbers to be assigned at full-on to any Group Master fader, and Channels can be common to 2 or more groups whose master faders combine on a *highest* takes precedence basis.

However **LOAD OUTPUT** provides virtually-instant formation of back-up groups because it copies Tempus M.24 Memory Control output to the selected A - H group, interpreting all intensity levels above 10% as 'on' in the group, and any levels below 10% as 'off'. Groups formed by either method can be combined on their faders and, if required, the combined output can be recorded (as previously described) on a Memory number of the principal control.

## Dimensions

	WIDTH	DEPTH	MAX. HEIGHT
Tempus M.24 Memory Control	530mm	360mm	190mm (including detachable cover)
Multiplex Interface Units	280mm	75mm	200mm
Tempus M.24 Fx Patch/Effects Desk	530mm	360mm	140mm (including detachable cover)



The Company reserves the right to make any variation in design or construction to the equipment described.



# Rank Strand

Rank Strand Limited  
PO Box 51, Great West Road  
Brentford, Middlesex TW8 9HR  
United Kingdom  
Telephone 01-568 9222 Telex 27976



# Tempus M24 Memory Control

Internally the table-top desk has an output store including each and every dimmer channel. Whenever Channel control facilities are 'used' these update the intensity levels in this output store. The contents of this output store, which is mastered by the Memory master fader, can be recorded into the fast-access memory when a Memory number has been allocated for future identification.

When any Memory number is recalled the **FADE** push initiates a gradual update of the output store to the recalled intensity levels. If a modification of those levels is then desirable the Channel control facilities are 'used' in exactly the same way as they were 'used' to initiate the lighting – the *latest* instruction takes precedence.

Any external multi-preset or auxiliary desk interfaced to the Tempus M.24 is mastered by the Manual master fader on the M.24 desk; when the output of an external desk is combined with that of the Tempus M.24 the *highest* level takes precedence.

## At Switch-On

When the Tempus M.24 desk is switched-on the intensity levels are restored to the levels existing in the output store when the equipment was last switched-off; however fades in progress at that time will not be restored, nor Channel or Memory numbers selected at that time. The **CHANNEL** mode of keypad operation will be selected automatically after a brief self-checking routine. Check that the Memory master fader is at 10 (full), that the Manual master fader is at zero, and that the Dead Blackout switch, immediately above those faders, is up to the **0** position. It is advisable to set the two Fade Duration faders (below the Time Match legend) to around 5 seconds.

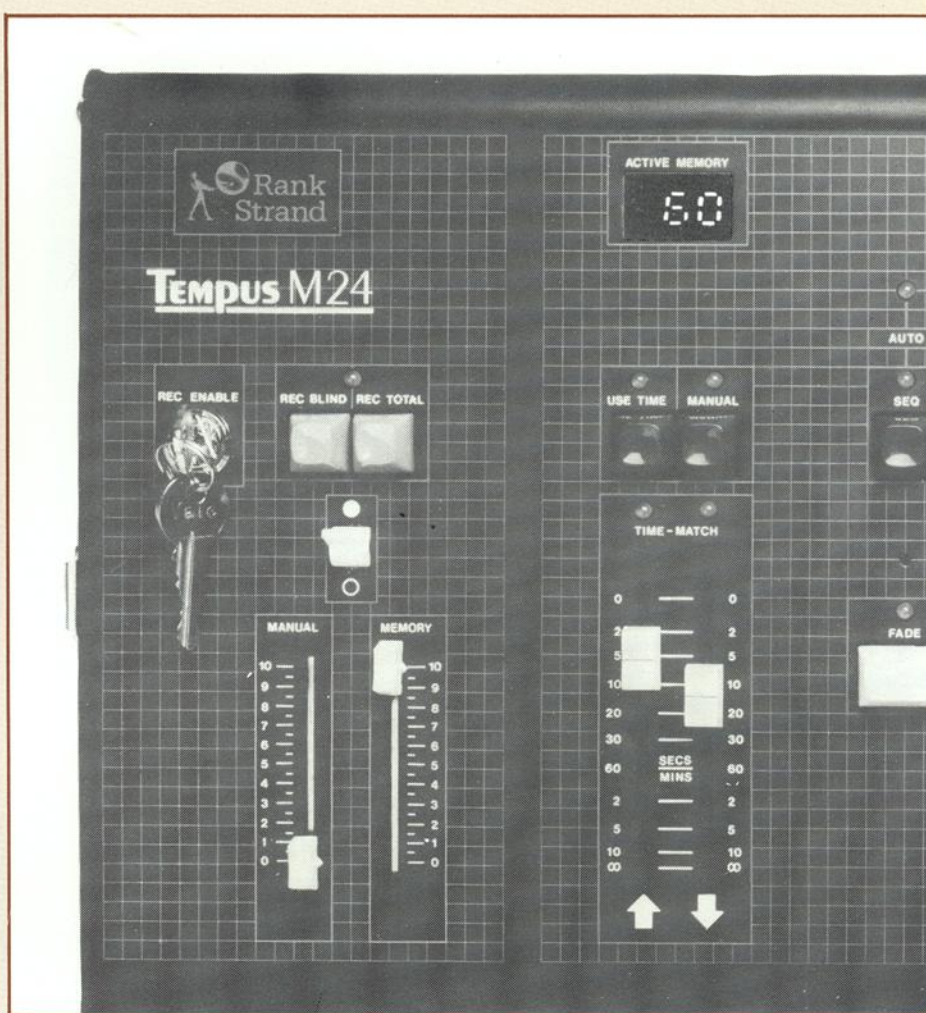
## Selecting Memory or Channel Number for 'Use'

The **MEMORY** or **CHANNEL** mode switches determine whether the keypad is to select Memory numbers or Channel numbers, and also change the numeric display to show the last-selected number. Pressing **MEMORY** cancels **CHANNEL** mode and its associated L.E.D. indicator, and vice-versa. However, the last-selected number, whether Channel or Memory, remains selected and available for 'use'.

The digits keyed into the keypad appear in the numeric display, above, for verification. **Clear** cancels the selection if a mistake is made, but it is not normally necessary to press **Clear** before selecting a new number because once a selection has been 'used' the next digit keyed in is interpreted as the start of a new number selection. The **+1** key increments the selected Channel or Memory number by one each time it is pressed. If a non-valid number, beyond the capacity of the control, is attempted then the display blanks ready for a valid number.

When a Channel or Memory number is already selected, pressing the **+** key will blank the numerical display and substitute a **+** prefix to allow another number to be added to the selection for simultaneous 'use'. Similarly the **-** key allows a number to be deleted (see Thru below).

In Channel mode a consecutive sequence of Channel numbers can be selected for 'use' simultaneously by entering the lowest number, pressing **THRU**, and then entering the highest number of the sequence.



## 'Using' Channel Numbers

The normal function of the Fader Wheel is to increase or decrease the existing intensity levels of Channels selected for 'use' according to the amount, the rate and direction of movement applied. One full quadrant movement of this continuous wheel will change the level from zero to full, or vice versa. When more than one Channel number is 'used' each will be increased or decreased the same amount from their starting levels. Movement beyond full light, or below zero is ignored, but immediate control is regained when the Fader Wheel is reversed but the relative balance is maintained.

When the **@** (at) push is pressed this changes the response of the keypad to 'use' selected channels so that the next digit, or **F**, entered changes the intensity level(s) of those channel(s) to the level of the digit pressed, or to Full. More precise levels are available by pressing **.** (decimal point), and then another digit. If the second number is not preceded by **.** then this will be interpreted as the start of a new number selection.

When **@** is invoked the **+** and **-** keys used prior to a digit key then increase, or decrease, the existing intensity level(s) of selected channel(s) by the keyed-in percentage.

The Level numeric display above the Fader Wheel normally shows the intensity level, as a percentage or **F** for full, of the last-selected Channel number.

Pressing **RETURN** will change 'used', but still selected Channel numbers, back to their original starting levels. The adjacent **⚡** (flash) sprung-centre switch changes selected Channels to full while pressed upwards, or to zero downwards.

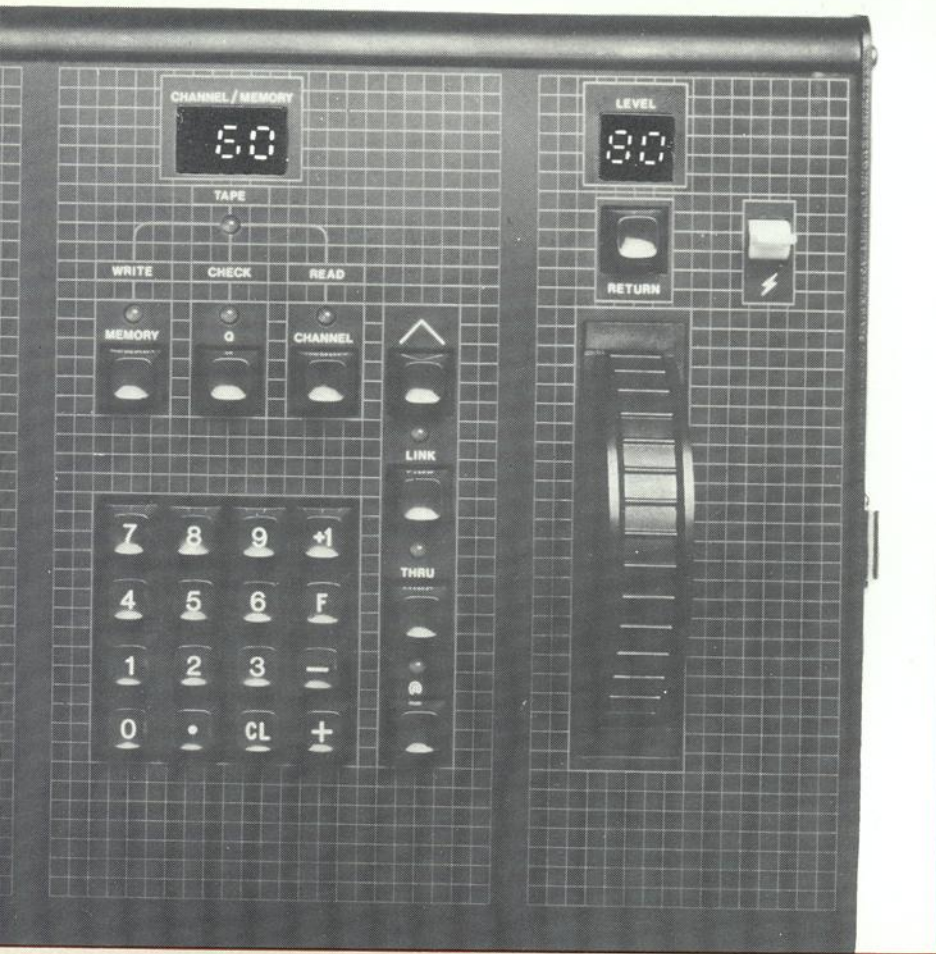
## 'Using' Memory Numbers to Record Lighting

Both **RECORD** pushes are inoperative unless a valid Memory number is selected for future identification, and unless the key has been inserted in the **RECORD ENABLE** keyswitch and turned clockwise to the captive position. The L.E.D. indicator adjacent to the pushes lights momentarily to indicate a successful recording.

The **RECORD TOTAL** push stores the precise intensity levels of all the 'active' lighting – the source of this is dependent upon either one, or both, of the Manual and Memory master faders being above zero. The alternative **RECORD BLIND** push stores the intensity values preset, but not effective because the master fader for that source is at zero. Therefore it is possible to store 'active' or 'blind' the intensity levels determined by either the Tempus M.24 desk, or those determined by an auxiliary desk, or a combination of both sources, depending on the relative positions of the respective master faders.

Whenever intensity levels are recorded the settings of the two Fade Duration faders, calibrated from 0 seconds to 10 minutes, are also recorded, unless the **USE TIME** L.E.D. indicator is lit, in which case any pre-existing recorded time is preserved.





### 'Using' Memory Numbers to Recall Lighting

Select the required Memory number, set the Fade Duration faders to the timing required and press the **FADE** push to initiate a crossfade to the intensity levels previously recorded with that Memory number. The L.E.D. indicator adjacent to the push will remain alight during the fade. As soon as the fade is initiated the Memory number will appear in the Active Memory numeric display, and the keypad is freed to select a new Memory number, or Channel number.

The settings of the two Fade Duration faders will determine the rate of change, which can be accelerated or retarded by altering those faders. If set to 0 seconds pressing **FADE** will execute a snap, switch change; at the opposite end of the scale  $\infty$  (infinity) is equivalent to stop. The left-hand Duration Fader controls only those channels increasing in intensity, and the right fader those decreasing to allow fade to be profiled to suit the stage or studio action.

If the **USE TIME** push is pressed prior to **FADE** then the timing will be at the duration settings recorded when the intensity levels were recorded. These can be matched by moving each Duration Fader until the **TIME MATCH** L.E.D. indicators light. **USE TIME** can then be de-selected, by pressing again, and the rate of change modified manually if required.

Alternatively the Duration Faders can be used as manual masters – select **MANUAL**, then press **FADE**, next change the two faders to the bottom of the scale to 'collect' the fade and then raise the faders towards the top of the scale.

It is not necessary to complete a fade before starting the next, not even in **MANUAL** mode.

### Modifying Channel Levels

The 'active' lighting can be modified at any time, even during the progress of a fade, by selecting the Channel number(s) and 'using' the Fader Wheel and/or the @ (at) keypad facilities as previously described. There is never any need to match the initial intensity level(s) before taking control.

The intensity level content of any Memory number can also be modified 'blind' (before 'use') by first selecting the required Channel number(s), next the Memory number and then pressing **CHANNEL** and **MEMORY** mode pushes simultaneously while 'using' the Fader Wheel and/or the @ (at) keypad facilities. The **RECORD ENABLE** keyswitch must also be on at the time.

### 'Using' Memories in Sequence

The **SEQUENCE** facility, invoked while the adjacent L.E.D. is lit, automatically advances the Memory number to the next each time the **FADE** push is released – thus the next Memory number is ready to be 'used'. The next Memory number is normally the next in numerical progression, but **LINK** allows any sequence to be recorded by assigning a link number to any Memory number. In Memory mode, when **LINK** is pressed the first time, the numerical display changes to show the link number (if any); a valid number subsequently keyed in will be recorded as the link number when **LINK** is pressed a second time, provided the **RECORD ENABLE** keyswitch is on. Link numbers are automatically erased when either of the **RECORD** pushes are pressed to ensure that a Link number is a deliberate instruction (not one left in the memory from a previous production).

If **SEQUENCE** is pressed while the  $\Delta$  (shift) push is also pressed the **AUTO** L.E.D. will light to indicate Auto Sequence mode of operation; this automatically selects the next Memory number and automatically initiates the next **FADE** on completion of the previous change.

By assigning link numbers to the first and last Memory numbers in a series, and using Auto Sequence, it is simple to arrange any repeating chase sequence. Auto Sequence can, of course, be combined with **USE TIME** to take into account the Fade Duration times recorded with each Memory number allowing a precisely-timed, complex programme to be run automatically.

### Crossfades, Move Fades, Dim Fades

A crossfade is, by definition, a fade where the new intensity levels totally replace the previous lighting. It follows that only one crossfade can be in progress at any moment in time, and this is the latest one started. With Tempus M.24 it is not necessary to complete one crossfade before starting, on cue, the next.

There are occasions, for multi-part and processional cues, when it is convenient to add the intensity level content of a Memory number to the existing lighting; these Move fades, as they are called, are readily available with Tempus M.24 by prefixing the Memory number with a + sign. Dim Fades, where those Channels above zero in a Memory number are subtracted to fade to zero on cue are also possible by prefixing the Memory number with a - sign.

Either a + or - prefix can be recorded with the Memory number for use with the **SEQUENCE** facility, or keyed-in prior to selecting a Memory number for recall. The appropriate prefix appears in all relevant numeric displays whenever Memory numbers are used in **SEQUENCE**. Move or Dim fades are initiated in exactly the same manner as normal crossfades – by pressing the **FADE** push on cue, but up to 6 Move or Dim fades can be in progress simultaneously. In these circumstances the two Time Duration faders allow rate of change intervention of the latest fade started. Any crossfade (without a + or - prefix to the Memory number) which is initiated will automatically predominate.

Move fades can also be arranged so that some Channels fade out to zero (a normal crossfade would fade out all other Channels). This is achieved by recording those channels required to fade to zero with just a . (decimal point) instead of an intensity level.

Move and Dim fades can also be operated manually by the Fader Wheel – press **Q** (which inhibits Memory and Channel mode), key in the Memory number and move the Fader Wheel upwards or use the keyboard @ (at) facilities for a switch change. Memory numbers without a prefix will assume Move fade mode in these circumstances. This facility is also very valuable for composing new lighting from existing Memory numbers used as groups complete with intensity level balance.

### Memory to and from Tape

Tempus M.24 has in-built capability to transfer, check, and recall the intensity level, time, any link number and any + or - prefix content of Memory numbers from its internal fast-access memory to a good quality, but not special, tape cassette. No exotic equipment is required, merely a reasonable quality mono or stereo domestic cassette recorder. This facility is invaluable for any form of repertoire, for pre-plotting, and for added security of detail especially in multiple-user situations where another operator could, unintentionally, overwrite his or her lighting on required Memory numbers, if they had the Record Enable key.

Basically the method of operation is to define the series of Memory numbers to be transferred by using the **THRU** push with the first and last Memory numbers required, then whilst holding the  $\Delta$  (shift) push depressed using the second function of **MEMORY** to initiate the **WRITE** function, or **Q** for the **CHECK** function, or **CHANNEL** for the **READ** function. The **TAPE** L.E.D. lights until the transfer is complete and the numeric display is used to monitor progress.