
STRAND ELECTRIC
type DL
idm
INSTANT DIMMER MEMORY

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The key to stage lighting and to television lighting is the dimmer control to regulate all the many circuits that go to make up a particular lighting picture, so that some play a dominant role and others a secondary role. Not only within a particular picture are dimmers essential but also as a means of effecting a change from one picture to another; perhaps slowly as in a sunset or instantly as in a switch cue where for example many dimmers have to change level to accompany the lighting up of a chandelier.

The first incandescent lamp stage lighting installation, that of the Savoy Theatre, London, in 1881 had dimmers, eight of them to be exact, and the world's first regular public high definition television service in the world, the B.B.C. at Alexandra Palace in 1936, had thirty dimmers in each of the two studios.

Nowadays it is commonplace to install at least a hundred dimmers in a theatre or studio and installations of two hundred or more are quite usual. Strand Electric have been in the forefront of the development of the modern lighting control and it is they who have pioneered the British school of lighting control.

The distinctive features of such a control are compactness and simplicity. The multi-preset systems characteristic of American lighting controls with their miniature levers numbered in thousands on the one hand and the elaborate mechanics of the German servo preset control desks on the other hand have always been avoided. Much of the work in such multi-preset controls is concerned with repeating channels which do not have to change.

Strand Electric have employed instant memory grouping which has enabled the operator to concern himself only with channels that have to change and this has also had the merit of keeping the number of presets down; not more than three being usual in Strand Electric practice.

No matter how compact and efficient the control itself there has remained the bugbear of time consumed in plotting and reproduction of the plot. Attempts have been made to solve this by using punched card for this purpose but this method has been proved time and time again to be too slow. All lighting changes in the final event are timed to the movement of the actor and he can move with such rapidity that the machine simply has not time to respond before he has in fact moved on to another area. Another weakness of the punched card is the difficulty in skipping back to a card read some cues earlier, in order to repeat a lighting sequence.

None of these difficulties is present with Strand Electric Instant Dimmer Memory systems*. Two systems are made, the first, IDM Type R (page 3 left) employs rocker tablets to each channel to raise or lower dimmers electronically. This system is currently being made for the Canadian National Theatre complex, Ottawa and is supplied to special order and specification. The second system, IDM Type DL (page 3 right) is available in standard models, is described in these pages and is currently on show.

Strand Electric were the first firm in the world to introduce a complete fully working lighting control system with instant dimmer memory—i.e., recording of all intensity levels, intermediate and otherwise, that go to make up a lighting effect. This was in December, 1965.

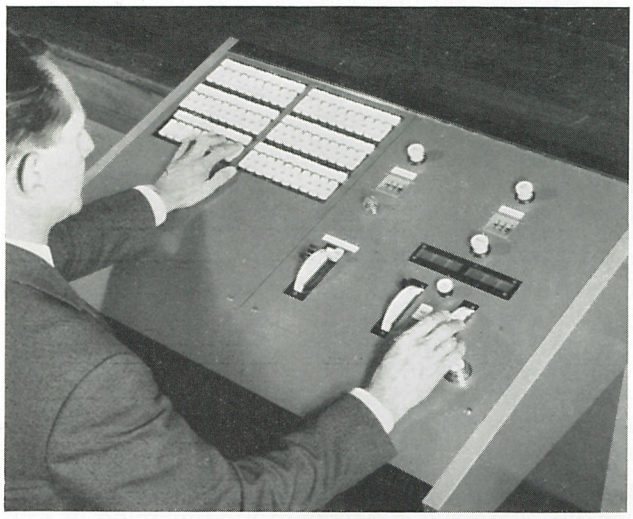
Instant Dimmer Memory means exactly what it says: "instant response, as fast as light itself", and there is nothing faster than that. Recording is magnetic and there are no mechanical devices to slow down the process. Determine the lighting, give it any one of two hundred and fifty cue numbers, and the whole content is recorded instantly. Select the cue number that is to playback and the whole of that lighting content is available to fade in or switch in instantly, complete exactly as recorded, irrespective of whether the cue was called in sequence or out of sequence. Skipping forwards or backwards is equally simple: all that is needed is the cue number.

Instant is of course a loose term, for time does not

British Patent No. 918,527. Patent applications Nos. 27314/65 and 20462 and world patents.

stand still, but it is legitimate to use the expression when, as in Strand IDM systems, a process can only be measured in microseconds (10^{-6} sec.) and there is no lapse of time in making the particular cue available to playback; all are equally and instantly available.

Precise and comprehensive recording and playback means that lighting is no longer limited to what the operator has the skill and time to carry out, and above all there is considerable saving in time at



rehearsal. A lighting control is tested to the full at rehearsal, and Strand System IDM is designed to cope with these conditions of strain, speed, and indecision in comparison with which the rest is simple. Absence of delay and the ability to modify—to change one's mind—these are the two great requirements. It is speed plus the need to skip backwards and forwards as rapidly as memory itself that spell the doom of punched card, adjustable plattens, tape, and all the rest.

Consider for a moment the various techniques of the lighting rehearsal. The first is of the all too rare type where the lighting designer has done his homework and arrives with a plot with even some tentative dimmer levels (intensities) written in. As the ultimate judgement is visual, the original plot gets pulled about and a new set of dimmer levels results. The second form of lighting rehearsal is the common one. In this the director, with or without a lighting designer, sits down, calls for this and that lighting channel, qualifies each with doses of up-a-little and/or down-a-little, until the moment arrives when he calls "OK, that is Cue X. Plot it."

Using an orthodox lighting control the operator would now be faced with checking the positions of the dimmer levers for a hundred or more channels to make sure they are all written down properly. This takes time and the director gets impatient.

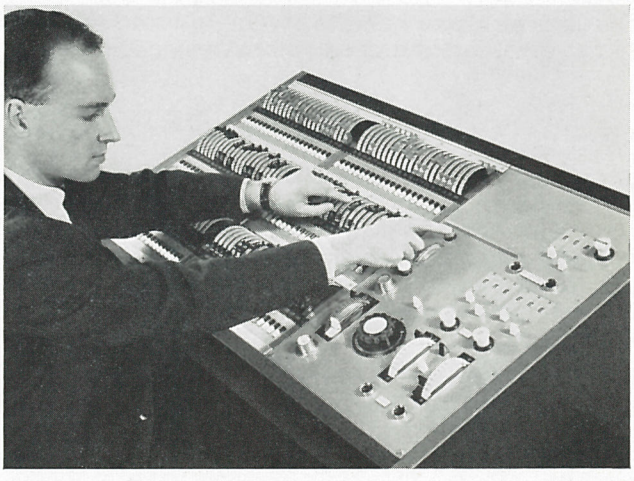
When all is ready, or as nearly ready as it is ever likely to be, the next cue is arrived at in the same way, and so on, for perhaps the whole of an act. We now have to run through from one lighting cue to another to get the actual process of changing right. So far the operator has merely got a series of figures (dimmer levels) against each cue; how he can get from one to another in such a way as to give the effect required has yet to be worked out. As the run-through proceeds, modifications are made: dimmer levels changed, channels removed and new ones put in.

Before long there is disaster. "No, not that way," shouts the director. "Go back and do that cue again." In a full rehearsal with company and scenery the operator may be told to go back several cues, from, for example, Cue 25 to Cue 17. In any case "Go back" usually heralds a crisis, for, so far as the operator has been able to plan or practise anything, it has always assumed moving forwards through the show. Cue 17 may be the result of things done in all or some of the preceeding cues.

It is the rehearsal that keeps the operator on his toes and, of his duties, it is the constant writing down and scratching out on the plot, together with reading and reproducing the detail of the plot, and setting a hundred or more preset levers at a time which is the cause of strain. Inaccuracies creep in and, the more tired all become the worse things get. It is commonplace for the second halves of shows to receive superficial attention to lighting simply because time has run out!

The third or last type of lighting rehearsal is the one for which there has been no time available at all. It is combined with the dress rehearsal. The lighting is vamped as the rehearsal, or even sometimes the show itself, proceeds.

It is to solve the problems just outlined that Strand Electric have designed their IDM Systems. Completely flexible rehearsal operation with precise subsequent reproduction to follow is offered. Except for the running order of cues and the master control timings, the operator writes nothing down and subsequently neither reads nor sets his individual dimmer channels. All this is done automatically for him, as instantly as thought itself, yet at all times the operator can take over, modify, and re-memorise; he remains in command.



The need has been known at Strand, builders of many of the world's largest lighting controls, for many years, but until now technological development could not provide the answer. Punched cards and their relatives are too slow and clumsy, so also are mechanically driven slave control desks. Today the answer is to be found in the heart of the modern computer. It cannot tell you what you want to do—that is the job of the artist, and his requirements may appear quite irrational. Strand IDM Systems can tell you and your switchboard exactly what you did—irrational or not.

PRINCIPAL FEATURES

Instant Dimmer Memory giving thirty-two discrete steps in respect of each dimmer for two hundred and fifty presets.

Instant availability for playback of the two hundred and fifty presets in any order, sequentially or skipping forwards or backwards at will.

Full set of normal Strand dimmer controls one per channel, to set lighting and, in consequence, a control console familiar to any lighting operator. Such new techniques as have to be learnt can be picked up in a matter of minutes.
The fact that lighting effects were conceived using standard dimmer levers facilitates preparation of lighting plots for transfer or touring a production to theatres where orthodox switchboards are installed.

Visual display of channels in playback at the dimmer control levers.

Modification of any or all channels can take place at any time and the result be instantly re-recorded or discarded. When desired, previously recorded lighting and that proposed for re-recording can be compared by switching over from one to the other before coming to a decision.

Visual indication of dimmer check positions no matter whether the dimmers are under control from the console levers, from either playback, or from any combination of all three and no matter at what intermediate positions the master faders feeding these may be.
The information obtained visually (i.e., the actual levels at the dimmers which are producing the particular lighting effect) is what the Memory instantly records and what will be produced when the particular playback master on which that lighting cue has been recalled is put to full on.

Dimmer controls can always be operated directly to carry out lighting cues without using the Instant Dimmer Memory equipment, should it be considered desirable.

Control consoles are remarkably compact. A single desk type unit with a top panel area of only 44 inches wide × 26 inches back to front can house 120 dimmer channels and all associated controls and masters. For 180 channels the width is increased to 57 inches. Larger numbers of dimmer channels, for example 240, are housed in an ergonomic floor standing wing unit 36 in. × 27 in. × 48 in. high with a small desk to house the masters. This could also accommodate any ancillary equipment such as colour filter change, communications, etc.

Rehearsal Desk: The control can be so constructed that the part of the desk containing the dimmer levers can be unplugged. It can then be used in the rehearsal position, next to the producer, by the lighting designer to work out his lighting, or for second-thoughts at a run-through. Alternatively this can be a separate desk as at the National Theatre (Old Vic, London) and Glyndbourne Opera House. It is still possible to record or re-record such results arrived at there. Similarly if a Z wing for operation of lighting from the stage area is also installed recording will take this into account.

A standard punched tape machine and readout unit for automatic subsequent programming of productions in repertoire can be supplied. This extra equipment is by no means *essential* to repertoire playing if the operational procedures below are adopted. It is important to note that the Instant magnetic recording of System IDM/DL itself is permanent and will only be erased when re-recording. The purpose of punched tape is solely for convenient re-programming.

Any existing Strand Thyristor (controlled rectifier) dimmer installation, and possibly some of those of other manufacturers, can have System IDM/DL instant dimmer memory control added to it.

DETAILED DESCRIPTION

Strand System IDM type DL control desk consists of two parts; a complete set of individual channel controls, and the master faders complete with the dimmer memory controls. For models of up to 180 channels, the two parts will usually be combined on the one console unit. Above this number, a master desk and a wing unit may be preferred.

(1) **Channel Dimmer Controls:** There is one Strand luminous dimmer lever per channel. Each of these has a scale 0 to 10, in units and halves, mounted at $\frac{5}{8}$ in. centres and internally illuminated in white and in red by two lamps. Each lamp fully lights the scale in its own colour, but when both are on the two separate indications can be clearly discerned. Lamps are of the long life type and the colour is integral in the lever unit. Each dimmer scale is also fitted with a spring allowing it to be depressed at will to operate a micro switch.

(2) **Channel Selectors:** Under each dimmer lever is a pair of black and white push buttons which are used to group up, black to the A master and white to the B master. With both depressed, the channel is connected as a Common to both masters. Both pushes can also be tripped to keep that channel lever off.

(3) **Master Faders:** There are four (linear type) identified from left to right as A, B, C and D.

A. Black knob, red scale (Black Selected Channels)

B. White knob, red scale (White Selected Channels)

C. Black knob, white scale (Playback C)

D. Black knob, white scale (Playback D)

(4) **Crossfader:** Rotary fader with moving dial and arrow indication; turned anti-clockwise it indicates as C and clockwise as D. A tab switch over this control is put down to transfer control from the separately operated C and D Faders to give an integrated crossfade from one playback to the other. The crossfader can be fitted with an adjustable automatic speed control as an extra where, as in opera, frequent slow working justifies it.

(5) **Transfer Controls:** Control normally assumes use of the Instant Dimmer Memory system (see below) and Master Faders C and D; to render the Channel Controls (above) or Master Faders A and B operational, the following transfer controls are used.

ALL TRANSFER shielded Red push to change over from Faders C & D to A & B and light all Channel Controls in red.

ALL TRIP shielded White push to trip all channels back to C and D and cancel red display.

INDIV TRANSFER Red push used when touching dimmer scales to transfer Channels individually (see also DIAL below).

INDIV TRIP White push used when touching dimmer scales to trip Channels individually.

(6) **Dial:** This is a master indicator calibrated 0 to 10 to correspond with the Channel Dimmer scales. Each time an individual dimmer scale is depressed a reading is given on this dial of the actual state at each dimmer no matter what part or parts of the system may be controlling it.

(7) **White display off:** When either playback is used, any channel which is not at zero will give a white indication in the channel dimmer lever the moment the Master Fader (C or D) itself leaves zero. To restrict display, when necessary, to one playback although both may be in use, the tab switch between C and D faders is put over towards the one to be retained; the centre position gives both.

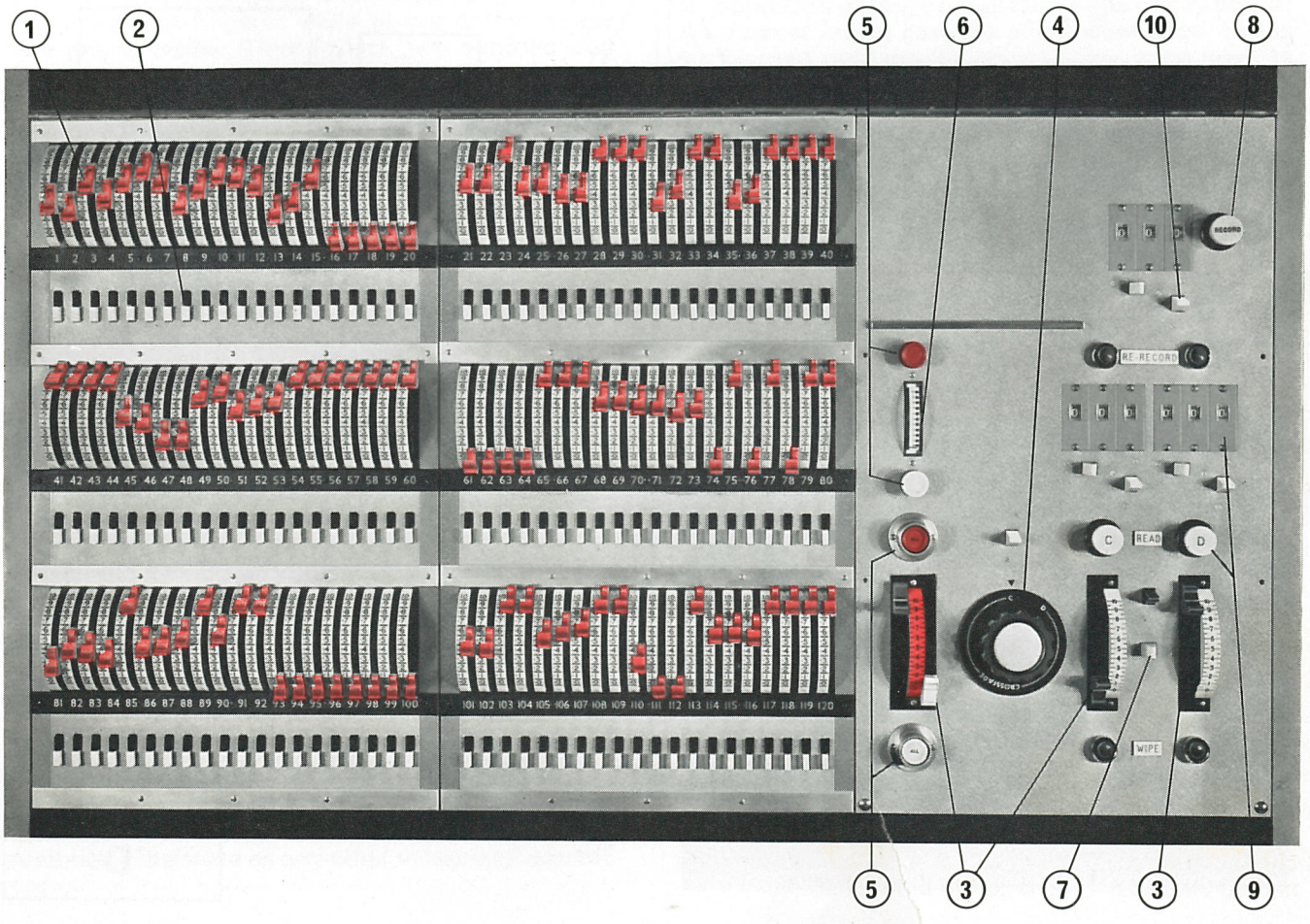
INSTANT DIMMER MEMORY CONTROLS:

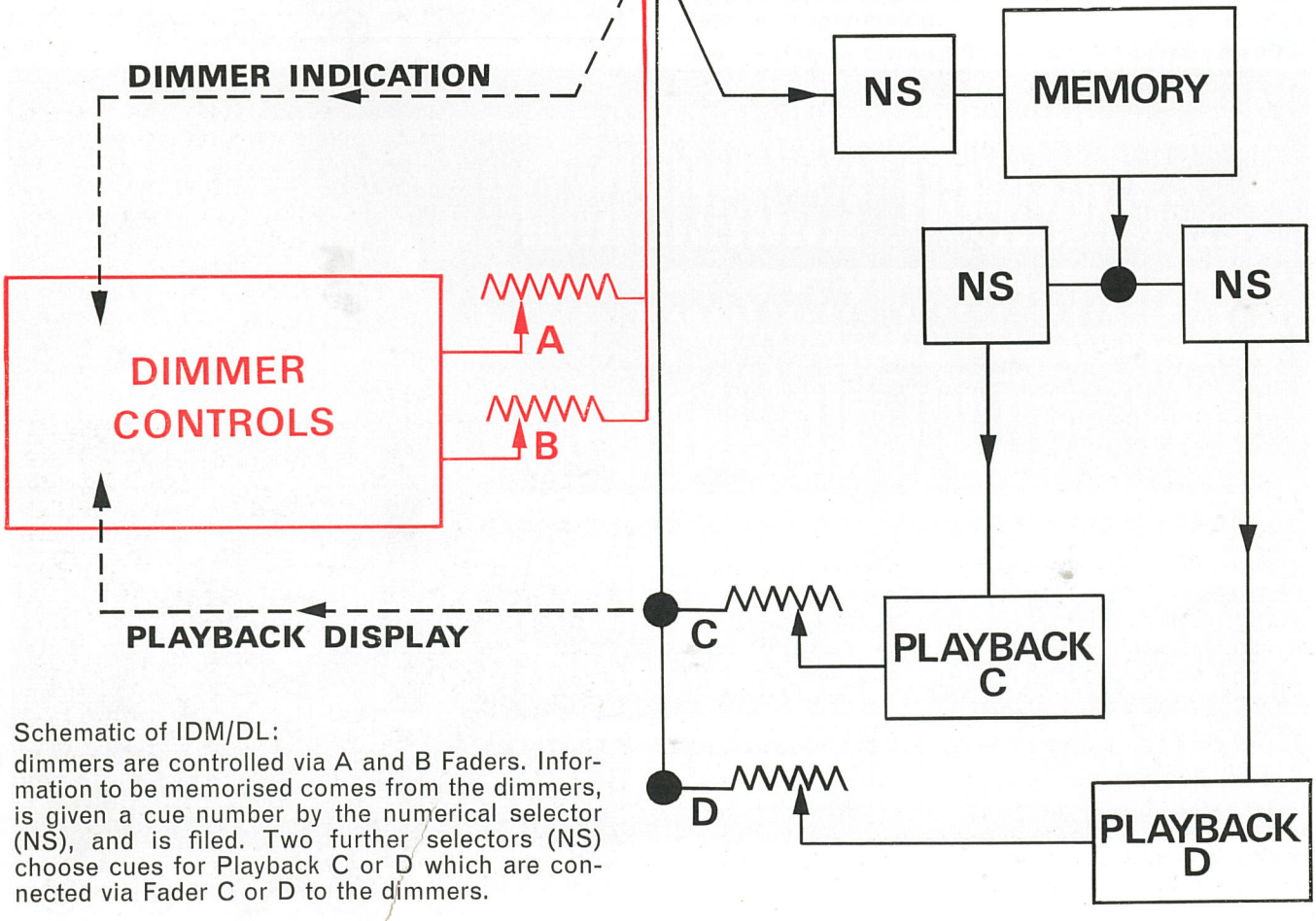
(8) **Record:** There is one luminous push and a numerical selector. The push shows an amber warning light when transfer (see above) to the channel controls implies an unrecorded state. The light is extinguished each time the push is depressed and restored each time transfer takes place. Selection of a new record number also displays the warning light. Any recording is permanent and may be used any number of times; only further recording using the same file number will erase it.

(9) **Playback:** There are two complete playback systems associated with the C and D Master Faders. Each has a numerical selector, a READ push and a WIPE push. The READ pushes are luminous and each shows white after being depressed. This light is extinguished whenever a new numerical selection is made on that playback or the playback is cancelled by its WIPE push. Numerical selection does not trip the playback; the light is extinguished merely to show that the particular number selected is not that in the playback at the time. The READ and WIPE pushes are just above and below the C or D fader to which they belong. Above each READ push in turn are the Numerical Selectors.

(10) **Numerical Selectors:** There are three, one for Record and two for the Playbacks, and all are identical. Either of the two for the Playbacks can also be used for recording if either of the RE-RECORD pushes above them are used. This will be convenient when making a modification to an effect just read, for it avoids calling that number again.

The numerical selectors are externally operated from two tab switches immediately under.





Schematic of IDM/DL:
dimmers are controlled via A and B Faders. Information to be memorised comes from the dimmers, is given a cue number by the numerical selector (NS), and is filed. Two further selectors (NS) choose cues for Playback C or D which are connected via Fader C or D to the dimmers.

Operating the STRAND IDM/DL

These notes are intended as suggestions only, and the operator will discover with pleasure the true versatility of system IDM/DL as familiarity grows.

It is worthwhile bearing in mind that although system IDM/DL will record exactly the content of a very large number of lighting effects, thus making it a "multi-multi" preset, it does not follow that each cue should necessarily be carried out in this way. After all, in any show with a lighting plot worthy of the name, the operator will have to be on duty to carry out the actual selection of the cue numbers and time the changes to accord with the tempo of the playing at that performance. Attendance is also necessary to cover accidents such as a particularly critical spotlight being knocked out of position or its lamp having failed.

This being so, it is surely not the role of the Instant Dimmer Memory to record everything for automated reproduction: but rather to assist the operator by removing the drudgery of writing down, while the producer waits impatiently, large numbers of complex levels at rehearsals, often only to rub them out when asked to do something different when that cue comes round again. Also there is the laborious task of reading the plots and setting up and resetting the presets, once the lighting has been established, each time the show is put on. Accuracy, too, is often imperilled for it seems a law of theatre that the more complex cues always bunch together one on top of the other with scarcely a moment between them!

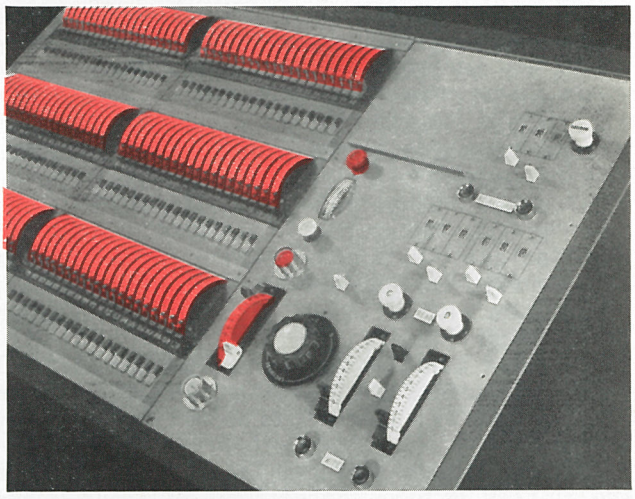
The true and very remarkable utility of the Strand IDM/DL becomes apparent if the operator sees the control as one preset (or Rehearsal System) of orthodox dimmer levers complete with push buttons to form three groups (A or B and Common) immediately under the fingers; while at his or her elbow there are, in facility if not in fact, two hundred and fifty auto-setting and auto-plotting presets which can be made ready for use from the C and D masters instantly by merely calling up their identity numbers.

Either or both the A and B masters can be used on their own without even switching on the Instant Dimmer Memory equipment. Alternatively, once the lighting is memorised, the cue numbers can be called first on the C master then on the D master to be cut or faded in and out at any pace required—all work taking place in the memory system. However, the best line of approach is to keep the two forms of control in play together and use the A, B, C, or D masters to perform those functions for which each may be particularly suited. No matter how confused the means, any lighting effect once decided upon can immediately be recorded to be brought back simply by raising one playback fader to full.

Operations not requiring use of Instant Dimmer Memory

Items (1) to (6) only require the dimmer racks switched on. Put Master A at Full, B, C, and D at Zero. Press the ALL TRANSFER red push and all dimmer channel scales will light up in red. Raise FOH inhibitor to full, if there is one. Push all the black group pushes in. (Any hard straight edge can be used to do many at a time, if preferred.)

1. To raise and lower lights individually: Use individual dimmer levers in the normal manner; their response is the same as any other modern all-electric control.

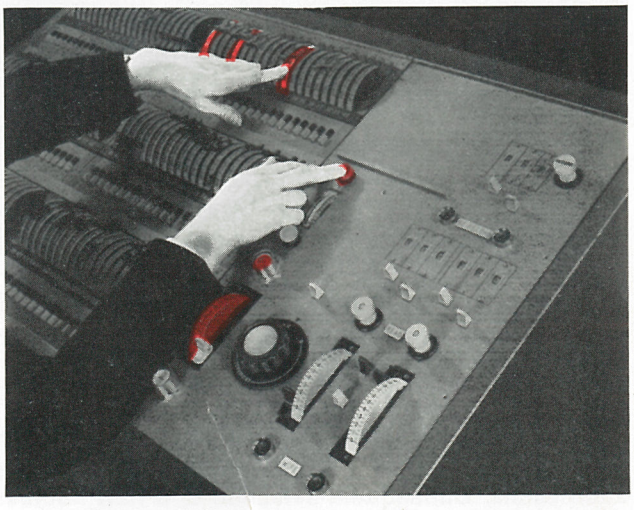


2. To fade in or out all lighting: Use Master A in conjunction with individual dimmer levers in the normal manner. Masters are all-electric and do not move the individual levers.

3. To form two groups under individual control: Press the white push buttons for the channels to form the second group. Use Masters A and B separately or in combination as required. Transfer of individual channels from the A master to the B or vice-versa does not involve any flicker if the masters are near enough in line at the time.

4. To crossfade two groups and keep a third unchanged: Press both black and white pushes down simultaneously in the case of channels which are not to change. In this case always raise one fader to full before taking down the other.

5. Selection of large or small groups of channels: As dimmer levers have no effect when their scales are blacked out (see (6) below), there is no need to push dimmer levers down to zero when not in use. Thus all levers can be precisely set to the levels at which they will ultimately be used, and two groups formed on the push buttons; but, if only a few channels are required, INDIV TRANSFER will be used to select them. If very many channels are needed, then the ALL TRANSFER can be used, and the few not required de-selected by using INDIV TRIP. Use of this facility makes it possible for cues involving a few channels to be immediately followed by cues with large numbers or vice-versa—the time-consuming accurate setting of dimmers having been done beforehand.

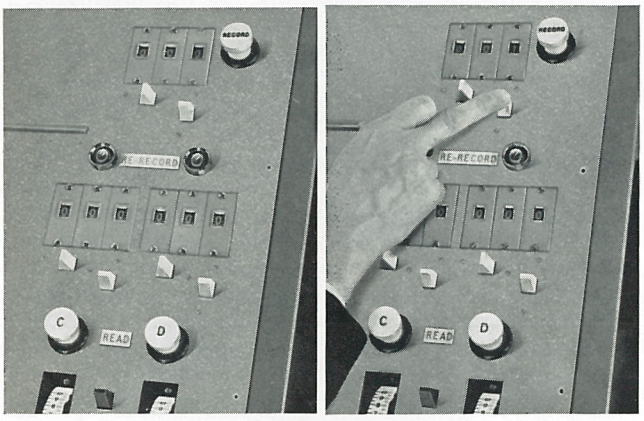


6. To blackout: For DBO press the ALL TRIP. To blackout channels individually, hold INDIV TRIP push down and touch dimmer scales of channels concerned. The red internal illumination of these scales will be extinguished as well. To restore all light, use ALL TRANSFER. To restore individually, hold INDIV TRANSFER push down and touch dimmer scales as appropriate. To give a partial blackout leaving some channels on, group up on the A and B masters and bang the appropriate one down on cue. Under these circumstances the red selection and indication will not be lost. There is also a normal DBO switch between C and D faders should one wish to use it. Push down to sustain and push up to flash.

Operations using Instant Dimmer Memory

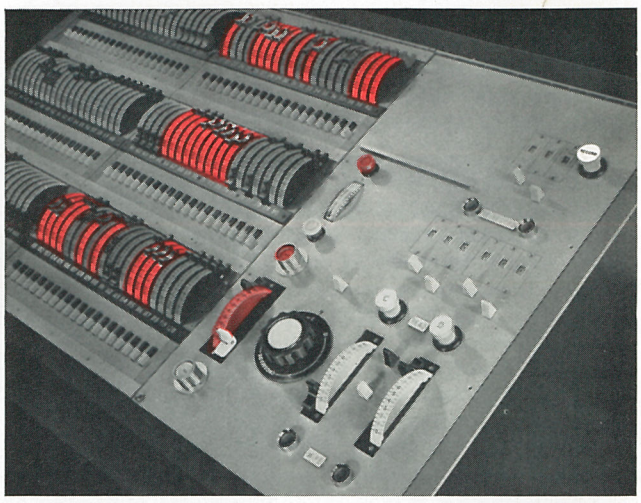
For the remainder of these instructions the Instant Dimmer Memory is assumed to be switched on, ready for action.

The expression RECORD is used to describe the process of filing the contents of a cue in the Memory. It should not, however, be confused with the familiar process of tape recording, being instead an instant process happening as fast as the operator can press and release the push button.



Note on use of numerical selectors: Under each selector are two sprung centre miniature tab switches. The right hand one operates vertically and it is pushed up once to obtain the next number to the one already displayed in that indicator (e.g., 7 will follow 6, or 100 will follow 99). As cues will more often than not alternate between the C master and the D master, it will be necessary to give two quick flicks to shift the number on two digits at a time. When the tab is held down, the indicator will set to zeros. The left hand tab works horizontally, and when pushed to the right gives the next digit in the tens column, or to the left the next in the hundreds column, in each case leaving the other columns unchanged.

7. To set and record (thin) lighting effects of few channels: Use INDIV TRANSFER, touching each dimmer scale to cause it to turn red as it is brought into use: then any channel displaying red can be taken "up a little" or "down a little" until instructed to plot. Set the required cue number in the Record indicator window and press the RECORD push, whereupon its internal amber lamp will be extinguished. The cue has merely been recorded, but actual control still lies with the desk levers which continue to display red. The amber light in the RECORD push was in fact brought on the moment either the INDIV TRANSFER or the ALL TRANSFER push was pressed, as a warning that an unrecorded state exists. Subsequent selection of a new number

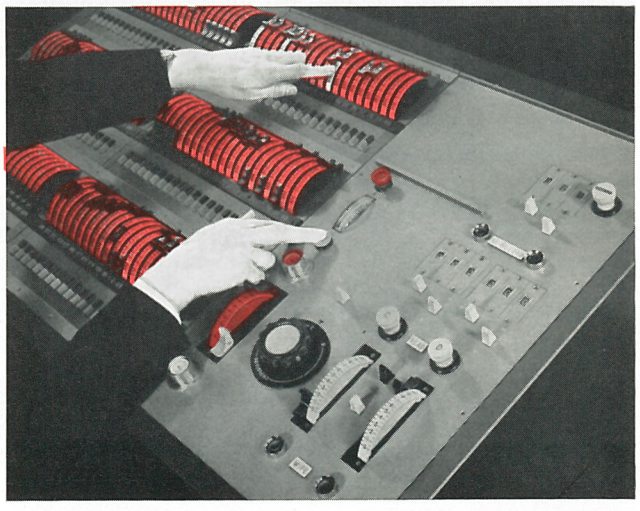


brings back the lamp warning in RECORD each time.

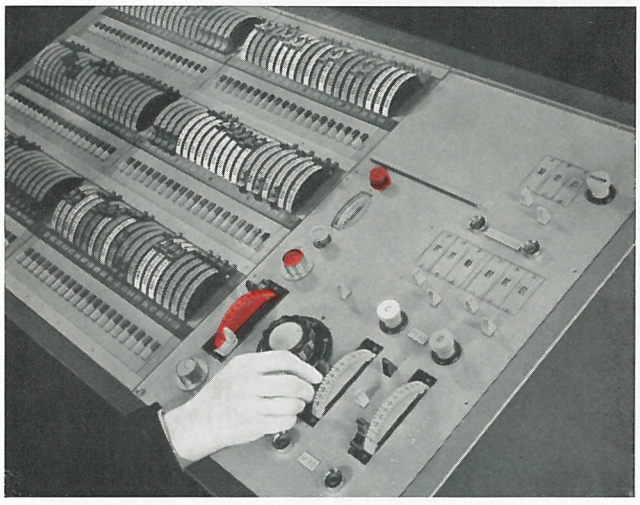
8. To set and record (thick) lighting effects of many channels: Use the ALL TRANSFER push and remove unwanted channels either by pushing their dimmer levers to zero or by using the INDIV TRIP. When the lighting effect is correct, allocate cue number and record as before.

9. To set and record a series of cues involving a progressive fade on one group of channels while others change to individual levels: Form two groups using the black and white pushes and reduce one on the master as appropriate. This kind of thing might be needed in a sunset or dawn series where the sky progressively changes as a whole during which combinations of channels representing the switching in or out of artificial lighting have to alter. Each time the required lighting effect is achieved, allocate numbers and record.

10. To make up and record lighting effects by combining large blocks or choruses of light, rather than individual channels: Certain lighting effects may be composed, as for example in ballet, by adding together large numbers of individual channels working together as groups. Thus it may be a question of adding all the blue battens (strip-lights) to all the stage-left blue booms and to all the stage-right blue booms plus the stage-right pink booms as well. This example involves four groups, which it is obviously better to play one against the other as four blocks on masters, rather than as perhaps fifty or sixty individual channels. The procedure involves use of memory playback and is described in 15, 16 & 17 below.



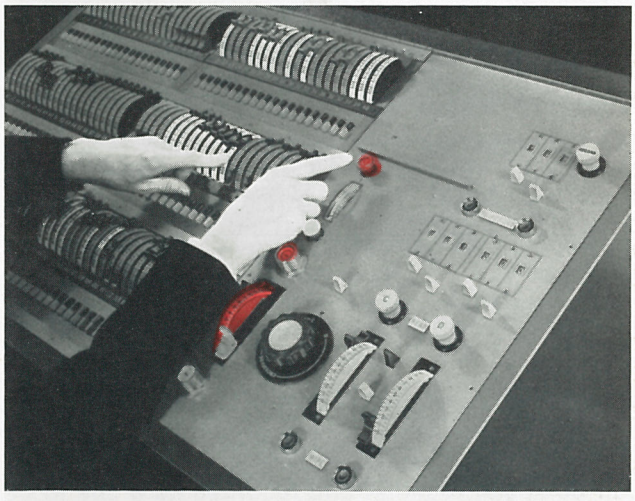
11. To playback a cue: At the beginning of a playback series both the C and D faders are put to zero; subsequently, for most cues, one will be raised to full, then the other taken out. Press the ALL TRIP push and all the dimmer scales lose their red display, thereby indicating that their levers are no longer in control. Select the required cue number on the numerical selector for the C Master and press the READ push which will then light up instantly to indicate that the particular cue number shown is "ready" in the playback. Raise the C fader to full at the speed required. Immediately the fader leaves zero, the scales in the dimmer levers display in white which individual channels, now being fed from the playback, are in any state other than zero (i.e., in check or at full).

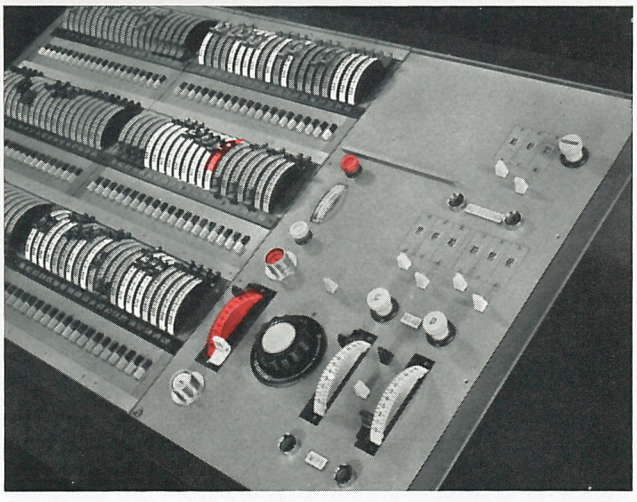


12. To change to another cue: Select the required number in the D Master Indicator, READ and raise the D fader to full, then take out the previous lighting using the C fader. A new number can now be selected on C and the reverse process adopted. It will be noticed that each time a new number is selected the lamp in the READ push under it is extinguished. This is to show that the particular number now showing is not the one in that playback. The file is, so to speak, ready, but has not yet replaced its predecessor in the playback; to carry this out, READ must be pressed. When the READ push is pressed, it removes the previous cue from the playback and substitutes the new one. If it should be desired to clear the old cue from a playback without substituting a new one, the WIPE push below the C or D fader is used. The proviso that the incoming fader must be raised to full before the outgoing is taken down only applies if there are channels common to both cues. But see also (19) below.

13. To modify a channel or channels when the playbacks are in use: It will be required from time to time, especially of course during rehearsal, to modify channels "up a little" or "down a little" or even take them right out, although they are now fed from playback and not from the dimmer levers. First the dimmer level in the playback should be discovered by pressing the channel dimmer scale and reading its position on the specially calibrated indicator dial. The lever is approximated to this position and the individual transfer push pressed; the scale light changes from white to red, indicating that the channel is under control from the desk. It is only necessary to approximate the level, because the purpose of the operation is to alter it anyway, and an exact record of it still exists until re-recorded. It is, however, important to ensure that either the A or B fader is at full to ensure a supply to the individual channel lever. In practice, therefore, during rehearsal with playback one of these is kept at full. This channel, and others if required, can be modified to give a new effect, which can be compared with the old by using the TRANSFER and TRIP pushes appropriately. The new effect can then be recorded under a new number by using the RECORD push, or under the old number by using a RE-RECORD push. These latter pushes also extinguish the amber light in the RECORD push, which warned of an unrecorded state the moment transfer took place.

Although the new lighting has been recorded for recall as one effect, it is still held by a combination of playback and dimmer levers which shows as a mixture of some levers displaying white and some red. The cue should be re-read, so that the dimmers already displaying red will also show white and the reds can be tripped, if desired, and control returned completely to playback. However, it may be that the same modification has to appear in several cues, in which case the partial transfer can be retained at the desk and re-recorded into all such cues until no longer required.

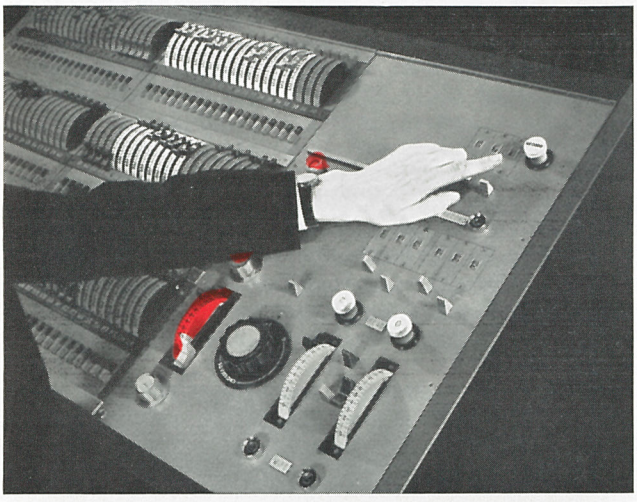




14. To pile two cues: Select the two cues required and read as above, but use both C and D faders in any relationship required. Under these circumstances, the white lamp display in the dimmer lever scales comes from two piled sources. Should it be necessary to know what each is doing, the display of one can be extinguished for the time being by pushing the tab between the two faders towards the other.

This has no effect on the lighting under control at the time.

15. To amalgamate the content of two cues and record as a third: Proceed as in (14) above, and when the C and D faders are in the relationship required (both at full, or one at full and the other at a quarter, for example), allocate a new number and Record. The faders can be at any position; what is in fact recorded is the state of the dimmers at the time. This routine provides a means of recording a proportional cut on one fader or any mixture of the two.



16. To make up and record lighting effects by combining groups or choruses of light, rather than individual channels: Record each group separately, preferably giving them a series of numbers at the high end of the memory store. In this way there will be no interference when the time comes to record the show cues in the normal way. The procedure follows that in (15) above. A pair of groups is combined and recorded as a third; then another group is called up and combined with the result and so on. Due to the Instant Memory action this process is in fact much faster than would appear at first sight. In this way any number of groups in any proportion can be added together and recorded as a cue to be brought in under one number using one master. At any time individual channels can be modified or trimmed using the transfer to the dimmer levers in the usual way. The individual groups should be kept in being on their memories as this could be useful, as in (17) below.

17. To remove or modify a group in a lighting effect made up (as in 16) of several which were then memorised as one: The lighting effect will be on one playback and the group in question should be called up on the other playback. The indicator switch between the C and D Faders is pushed over towards this latter, thereby extinguishing the indication of all except that group. Using INDIVIDUAL TRANSFER, the channels forming the group can be matched over to the dimmer levers and taken out or modified using the A Fader, the result being re-recorded under a single cue number, as usual, for subsequent performance. (For television work where this taking out of groups is very common, extra circuitry can be added to do it automatically.)

18. To preview the content of an incoming playback before it takes effect as lighting: Raise Master Fader from zero sufficiently to allow its micro switch to operate (at about the first half division). Use White Display Off switch to restrict indication to the playback in question.

19. To Crossfade two cues: Under these circumstances, one of the C and D faders will be at full and the other at zero. The crossfader knob should be placed to bring either C or D under the arrow to match the fader which is at full. The crossfader* can now be switched in and an integrated crossfade will take place in which channels at levels common to both playbacks will remain steady without the overlap needed when this is done as previously described on the C and D faders. It is important to set the C and D faders with the correct one at full, as shown under the arrow, and the other at zero before switching the crossfader out of circuit.

20. Follow on cues affecting several groups: This type of cue, which is sometimes described as processional, would on orthodox controls be grouped up on several submasters. Then, first this group, then that makes its entry and proceeds at different speeds, as far as the dexterity of the operator allows, ultimately to arrive at some grand concluding effect. Bearing in mind that there are four masters, A and B, C and D, on system IDM/DL, it is easy to read down two of the more complex groups on C and D, and set two of the lesser groups by hand on the dimmer levers for A and B without much trouble. Progress is then as usual, with some manual play on the individual levers thrown in, if required.

That is one method; another, more logical and far more precise, is to split the processional cue into separate pictures at each entry. This method could not be adopted on orthodox controls because of the limited number of presets, but with 250 instant presets, instead of just 3 (or at the most 10) manual ones, the operator can afford to use half a dozen or so for a follow on cue. Procedure is to record exactly the state of light just before the first entry, second entry, third entry, and so on. The relative levels so recorded will automatically determine which channels creep, which channels have to overtake, and which channels cease to move at all. Once recorded, all the operator has to do is to read down the cue numbers and concentrate on the timing of his crossfader between each cue. No complicated operation, giving this master a push, then that or keeping an eye on several motorised masters, being necessary.

21. Slow changes with switch cues intervening: The commonest examples are sunsets or dawns, in which, as the general light slowly increases or reduces, various practical fittings are switched in or out together with the spots representing their lighting. There may be several such cues. Using system IDM/DL they can be precisely and simply performed by a variant of the second method outlined in (20) above. In this case, instead of each picture representing an entry in a progressive dimmer change, there are particular moments when the identical lighting is recorded as a second cue but with the channels representing the lighting from the fitting added. Thus a gradual fade takes place on the crossfader and is completed just before the switch cue itself is read on the fader next due to come in. Whichever it is, either C or D, it is put to full, but has no effect. However, at the moment of the switch cue, the crossfader is cut out, thereby giving an immediate switch over to the cue with the added lights. Many variants can be used: for example, if two

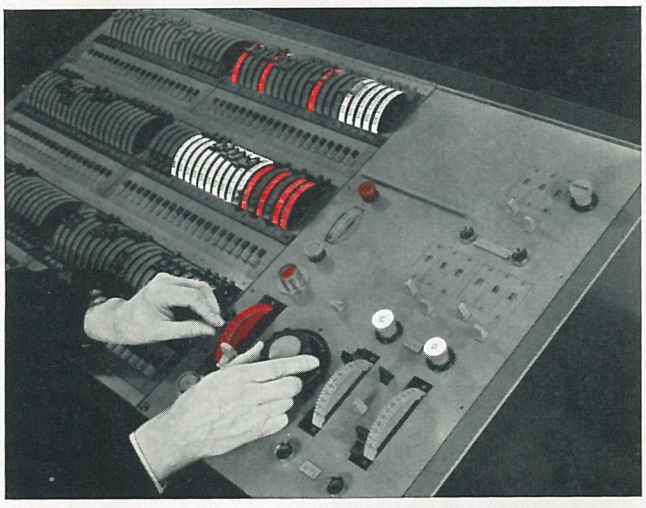
**This crossfader can be provided with an auto-timing regulator to cover slow speeds as in opera.*

switch cues follow quickly one on the other after the fade period, then the next cue will be recorded to include the additional lights representing the second practical fitting. The necessary "cut" to give the switching effect is given by pressing the READ push of the incoming playback at the same time as pressing the WIPE on the outgoing one. Alternatively the two faders can be banged in and out. If, however, a further fade has to take place before this happens, the first fitting lights are repeated on the intervening cue but the background lights are reduced before recording it. A further cue is then recorded with the second fitting's lights added.

For some reason or other, the very precision of these methods seem to breed mistrust. In questioning them it is implied that the actor may dart over, flip the prop switch on and jump clear before the operator has completely finished the fade which precedes the switch cue. A hasty cut in under these circumstances could also affect the background. The proper solution is to keep an eye on the action and hurry the fade if necessary.

However, if there are still qualms, the A and B masters can be used for the fittings lights, the desk levers being set by hand accordingly. The sunset continues slowly crossfading from memory to memory, but certain channels are transferred to the desk levers and grouped to A and B, which are simply banged in or out when their turn comes.

It might not even be necessary to plot these manually set levels, since they could be recorded as one cue number and read on a playback during the interval which preceded the scene. Dial readings are then taken of the individual channels displaying white and the dimmer levers set to correspond ready for their entry later on.



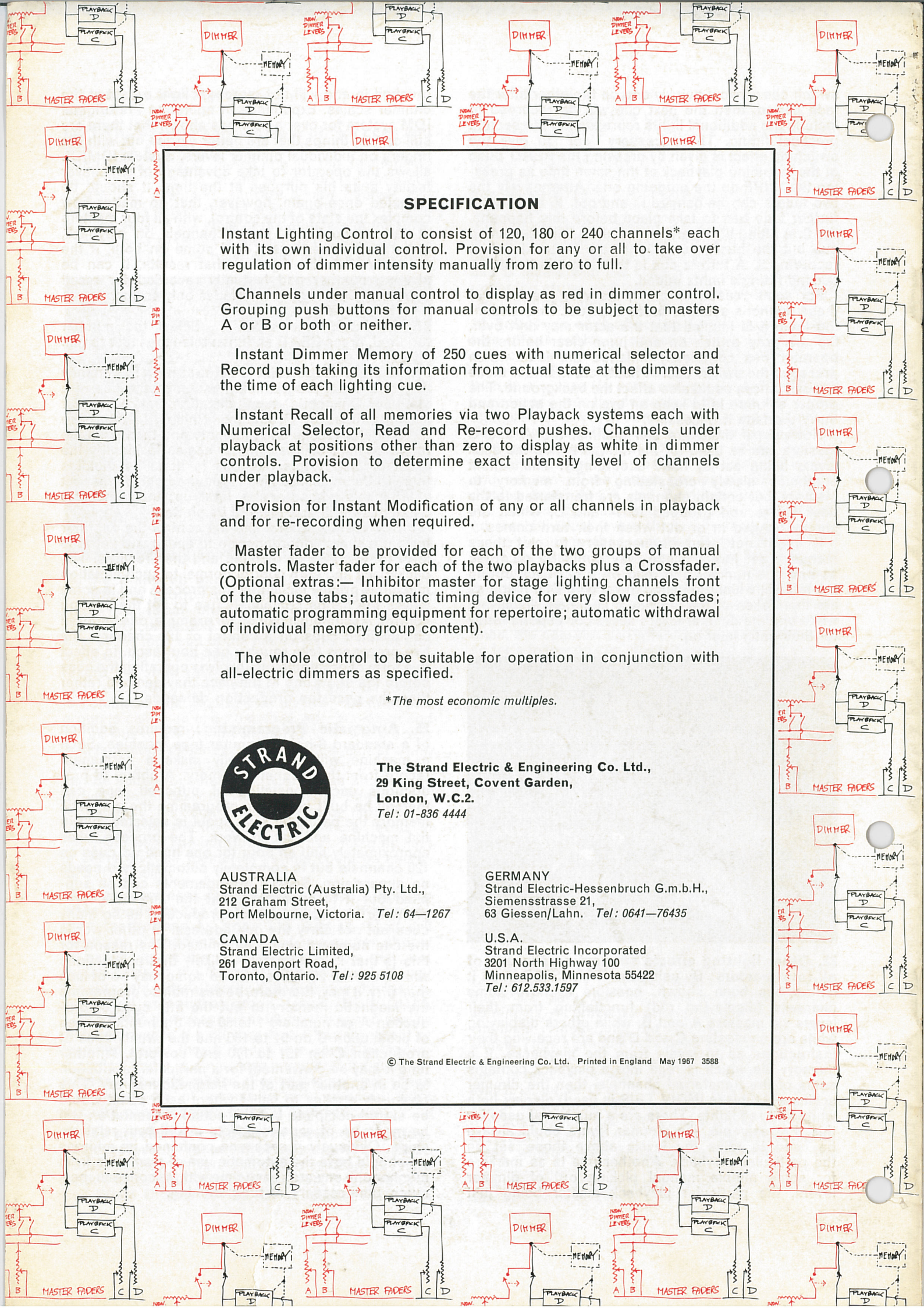
22. Other lighting effects suggesting the use of all four masters: By using the TRANSFER push it is, as has been shown, possible to have some channels (displaying red) functioning from their levers via masters A and B, while others displaying white are on masters C and D and are receiving their instructions as to levels from the playbacks. If a memory file which is read into a playback contains some of the transferred channels, then the dimmer scales will (unless INDIV TRIP is used) display both white and red lights. There are a number of uses for this. For example, the dimmer levers could always be used to raise the levels above those set on the particular playback. Another use is as markers for some nimble manual picking out of dimmer levers, the particular playback master being just touched in and will not represent light except at the dimmer scales. Experience in operating the original IDM system for over a year has shown that there are still certain things that are better carried out with the fingers on individual dimmer levers. System IDM/DL allows the operator to take advantage of whichever facility suits his purpose at the time. It should be repeated once again, however, that no matter how complex the state of the control, with all four masters at various positions, some channels on playback, some on dimmer levers, and some on both, if the producer likes the lighting that results, it can be given a number and instantly recorded for recall thereafter by bringing one fader only to full.

23. Go back to cue "X": Select the number required, press READ and then raise the fader to full.

24. Manual Repertoire Programming: A handy way of manual programming assumes the use of a standard magnetic tape dictation machine, for example those by Grundig or Philips. In this case the operator recalls each memory and then uses the touch contact on the dimmer scales to identify the exact dimmer levels. As this is done he dictates them to the machine. This is required only in respect of channels whose scales light up; the remainder being at zero do not need to be plotted.

In reverse, to programme the control the operator becomes the stenographer so to speak and sets the lever for each file as dictated and then records. The backspace and stop control normal to such dictation machines greatly facilitates this process and in some leaves the hands completely free to set the lighting control. Assuming a plot of, for example, one hundred complicated cues on a control of 120 channels the two processes take roughly one hour each. In effect this form of programming involves operating the cues before the show and at the pace they demand rather than the pace the production demands.

25. Automatic Programming: requires addition of a standard 8-hole computer tape machine. Such a machine will automatically make a permanent record from the magnetic memory. A library of productions each consisting of punched tape can thereby be built up. To re-programme the magnetic memory the particular tape spool is selected, put in the machine and set to work. The process takes approximately half an hour for one hundred cues on 120 channels but is completely automatic and needs no supervision. Special arrangements can be supplied but it is suggested that the automatic programmer should store each production as so many cues but not carry the cue address. In other words the cue numbers would be omitted. The reason for this is that it is extremely unlikely that productions will consist of 250 cues, indeed some may be of less than fifty. It may, therefore, be desirable to programme the magnetic memory to put the fifty cues of production A on numbers 1 to 50 and the hundred cues of production B on 51 to 150 and the twenty cues of production C on 151 to 170 and so forth. Another time it may be convenient for a particular production to be in another part of the magnetic memory. This obviously applies to ballet where each ballet would be stored complete but the actual presentation will be made up of various ballets in different relationships. Obviously if each one contained its address we should have the automatic use of memories from number one onwards each time with, in consequence, much unnecessary re-programming.



SPECIFICATION

Instant Lighting Control to consist of 120, 180 or 240 channels* each with its own individual control. Provision for any or all to take over regulation of dimmer intensity manually from zero to full.

Channels under manual control to display as red in dimmer control. Grouping push buttons for manual controls to be subject to masters A or B or both or neither.

Instant Dimmer Memory of 250 cues with numerical selector and Record push taking its information from actual state at the dimmers at the time of each lighting cue.

Instant Recall of all memories via two Playback systems each with Numerical Selector, Read and Re-record pushes. Channels under playback at positions other than zero to display as white in dimmer controls. Provision to determine exact intensity level of channels under playback.

Provision for Instant Modification of any or all channels in playback and for re-recording when required.

Master fader to be provided for each of the two groups of manual controls. Master fader for each of the two playbacks plus a Crossfader. (Optional extras:— Inhibitor master for stage lighting channels front of the house tabs; automatic timing device for very slow crossfades; automatic programming equipment for repertoire; automatic withdrawal of individual memory group content).

The whole control to be suitable for operation in conjunction with all-electric dimmers as specified.

**The most economic multiples.*

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