

dynamic technology limited **dataLite**

**Lighting
Control
System**

dynamic technology limited

dataLite

10 Watkin Road Wembley Park Wembley Middlesex Telephone 01-902 1119

**Lighting
Control
System**

Introduction

Comprehensive control systems for stage lighting have existed for many years. Originally these systems comprised many identical controls, one for each lamp circuit in use, and in this form the systems were adapted to suit the needs of the modern theatre and television.

The increasing number of lighting circuits required, as well as the frequency at which changes of brightness occurred, extended the existing facilities to their limits. Lighting consoles gradually assumed such enormous proportions that the reach of an operator, as well as his skill, soon became a normal requirement. To spread the load over a longer time scale, lamps were latched by electro-mechanical means to provide a primitive storage facility. However, each time a variation in brightness was required, the lamps had to be adjusted manually, often within an impossibly short space of time.

The spirit of engineering, being what it is, reacted unfavourably to further development along these lines and concentrated rather on reducing lighting control to more manageable proportions. This was achieved by the application of operational storage on a scale matching the size of the problem.

Using this method, the size of the control panel does not change greatly—despite an expansion in the size of the system being controlled. Furthermore, ergonomic control layout is possible, and any expansion of the system becomes a simple exercise in allocating sections of the large storage capacity.

This new lighting control system from Dynamic Technology has been designed and developed on this very basis, and provides standard control

layout with controls operationally grouped, associated with adequate digital storage and control capacity.



The prime requirements of any lighting control system can be summarised as follows.

- 1 To assemble a complete and possibly complex lighting plot with ease and with speed.
- 2 To provide a means of storing the assembled lighting plot for future use.
- 3 To repeat (1) and (2) as often as necessary within finite limits.
- 4 To recall any of the stored plots at will, and bring into immediate use.
- 5 To provide a means of cross fading between any two or more stored plots, either manually or automatically.
- 6 To modify a given plot by addition or subtraction of other plots.
- 7 To take manual control of any lamp circuit should the need arise.
- 8 To provide, when required, modified brightness levels for certain pre-selected lamps without the necessity of modifying each memory containing the selected lamps.
- 9 To display to the operator at all times adequate information concerning the state of all the above.

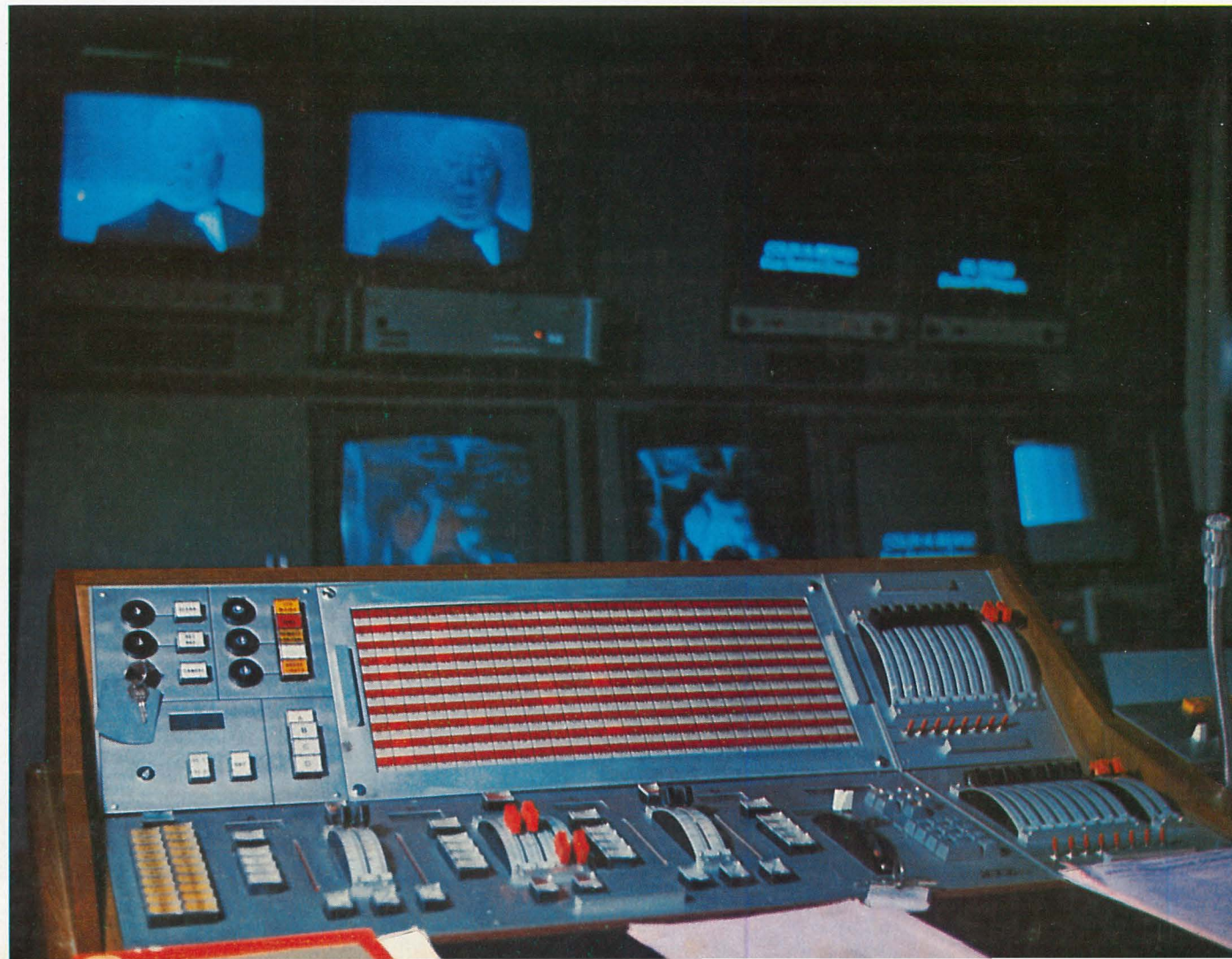
All of these requirements are provided as an integral part of the standard daTalite system.

Certain secondary considerations which help the operation can be provided in addition to the standard system when required. These are :-

- 1 Provision for building up complete lighting plots and storing them from the stage or studio floor.
- 2 Provision to flash any number of lamps at predetermined rates to provide special effects.

This information to be stored in the memory and recalled as required.

- 3 Provision to automatically bring the individual lamp control fader to the correct position on selecting any circuit.
- 4 Provision of remote mimic display panel, for use on a studio floor. In the daTalite system, a standard monitor can provide the mimic display.



The daTalite lighting control system

The daTalite lighting control system makes use of digital computer techniques throughout. All analogue signals are immediately converted into digital signals and are processed and stored in this form. They only retain their analogue form at the output of the processing unit.

These techniques allow extensive use to be made of the latest digital integrated circuits, and results in a compact unit occupying much less volume than has hitherto been possible for a system of such complexity. It also reduces the power consumption of the system, and minimises the number of interconnecting cables between units.

The reliability factor of integrated circuits is known to be greater than that of discrete components, and in a unit as complex as a lighting control system, this is of the utmost importance.

The complete daTalite system is divided into four basic units, plus the necessary power supplies.

Located in the main lighting control area are the control panel and mimic display. The control panel houses all the normally used controls and can be conveniently sub-divided into three portions.

- 1 Store Selection
- 2 Group Operation
- 3 Individual circuit selection and adjustment.

The mimic display houses a small panel on which are located certain of the main controls in addition to the dual mimic display. One half of the mimic will display all lamps that are actually on, whilst the other half may be switched to indicate which lamps are on in any of the operational stores.

The central processing unit may be located adjacent to the control panel or at some remote point, such as a central apparatus room. It only requires twenty-one inches of standard 19" bay space, plus a further 17½ inches for the power supplies. This space also includes the core store memory.

The dimmer control interface translates the single output of the central processing unit to the required number of control signals for the individual thyristor dimmers. It can be located with the central processing unit, or at a point adjacent to the dimmers themselves.

The layout of the control panel has been designed using operational experience gained in some of

today's most modern television studios. Up to a hundred lighting patterns for as many as 300 lamps and their individual brightnesses may be selected and stored in the standard daTalite system.

Special features of this system are the functional separation of the controls and the convenient division of the main control section into two duplicated panels. These panels, A-B and C-D, form the operational basis of the complete system. An extensive range of operations is possible using the A-B or C-D panels alone, embracing cutting, sequence-cutting, augmenting, storing and automatic cross-fading of selected lighting patterns. A mimic display panel indicates the number of lighting circuits involved in each pattern.

Combined use of the A-B and C-D panels allow more complex and dynamic operations to take place, such as simultaneous secondary cross-fades on separate time scales. This duplicated system is an essential and novel feature of lighting control and provides many important operational advantages, including simplicity of control in complex situations as well as a more dynamic presentation of the overall production.

RECORD

A
B
C
D

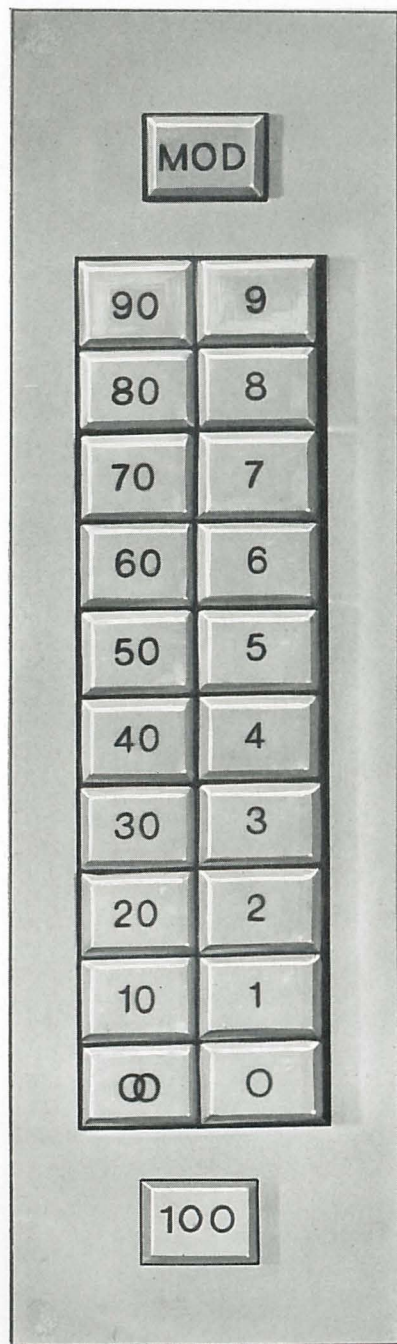
1	11	21	31	41	51	61	71	81	91	101	111	121	131	141	151	161	171	181	191	201	211	221	231	241	251
2	12	22	32	42	52	62	72	82	92	102	112	122	132	142	152	162	172	182	192	202	212	222	232	242	252
3	13	23	33	43	53	63	73	83	93	103	113	123	133	143	153	163	173	183	193	203	213	223	233	243	253
4	14	24	34	44	54	64	74	84	94	104	114	124	134	144	154	164	174	184	194	204	214	224	234	244	254
5	15	25	35	45	55	65	75	85	95	105	115	125	135	145	155	165	175	185	195	205	215	225	235	245	255
6	16	26	36	46	56	66	76	86	96	106	116	126	136	146	156	166	176	186	196	206	216	226	236	246	256
7	17	27	37	47	57	67	77	87	97	107	117	127	137	147	157	167	177	187	197	207	217	227	237	247	
8	18	28	38	48	58	68	78	88	98	108	118	128	138	148	158	168	178	188	198	208	218	228	238	248	
9	19	29	39	49	59	69	79	89	99	109	119	129	139	149	159	169	179	189	199	209	219	229	239	249	FLASH 1
10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	FLASH 2

MDD

A B C D

100

dataLite



Main store selection

A special feature of this system is the 'MOD' store which contains all 'last minute' alterations to lighting patterns and retains them for use as and when required. This facility allows the lighting director to alter any previously assembled lighting patterns. By pressing the 'MOD' button, at the top of the panel, at the appropriate time, the selected lighting patterns are instantly modified to the revised settings.

Selection is by 20 buttons giving 1-99 selection for a 100 memory system (0 is 'MOD' store). An additional button increases the selection by 100 giving 1-199 for a 200 memory system.

Only the two buttons representing the selected store light at any one time, thus indicating the number of the store in use.

Lamp address panel

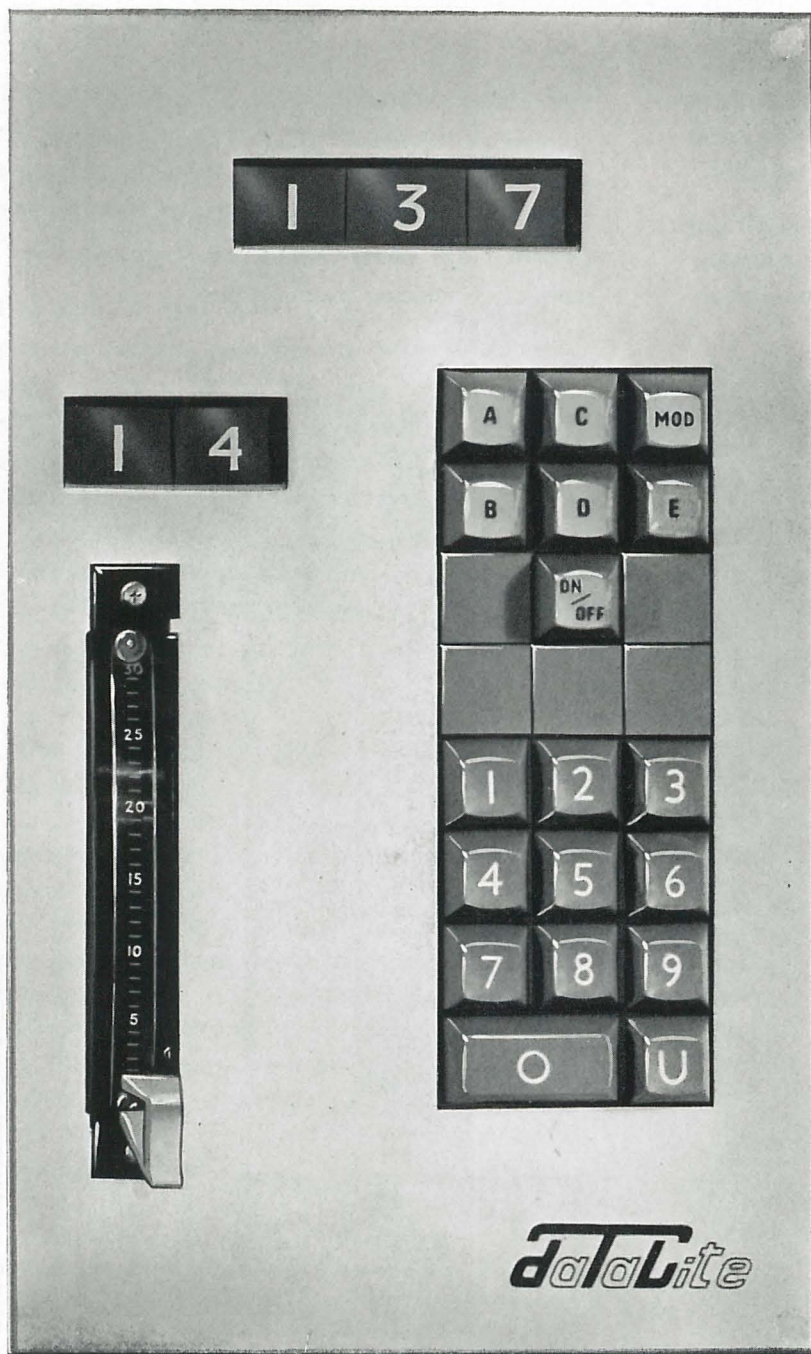
Has a 9 plus BAR keyboard for circuit selection with a 3 digit readout with 'NEXT' selection indication for Hundred, Tens and Units AND units only selection.

Individual lamp circuits are selected using straightforward decimal selection of the circuit number, which is then displayed on the numeric indicator at the top of the panel.

The fader is switched in automatically once it has been adjusted to the displayed brightness setting and then allows the selected lamp brightness to be changed and subsequently stored. The stored level of brightness is displayed, over 30 increments, on the numeric indicator above the fader. The fader may be set to the stored brightness level manually or automatically, according to option, using a special comparator facility.

Buttons A, B, C & D transfers the information to the selected group. Button E transfers the lamp circuit straight to the fader bypassing the store giving direct control of any lamp in the studio without affecting the stored information. Any selected circuit can be switched on or off by the button provided.

The 'MOD' button allows an individual brightness to be stored directly into the 'MOD' store bypassing the store and group controls.



The brightness fader on the individual portion of the main control panel is provided as standard with auto-set facilities. If the fader setting is too high compared with the stored brightness, the lamp at the lower end of the fader lights up. Similarly if the fader setting is too low, the lamp at the upper end of the fader is illuminated. Movement of the fader lever towards whichever lamp is on, will adjust the fader in the right direction. When the fader setting and the stored brightness level are identical, both lamps will be off, and the fader is automatically connected into circuit, and will take control of the selected lamp. It will retain control until a new lamp is selected.

Servo fader

An alternative fader can be provided which is servo controlled from the stored brightness setting of the lamp selected.

On completing the lamp selection, i.e. hundreds – tens – units, or units only, the servo system motors the fader to the correct setting. On reaching the correct setting, the auto-set facility connects the fader into circuit and disconnects the servo. The time taken by the fader to move from one extreme to the other is one second, and pro-rata for proportional movements.

The servo fader ensures that on all lamp selections, the fader is at the right setting and connected into circuit immediately. It also provides a secondary indication by its position of the brightness setting for any selected circuit.

Operational group stores

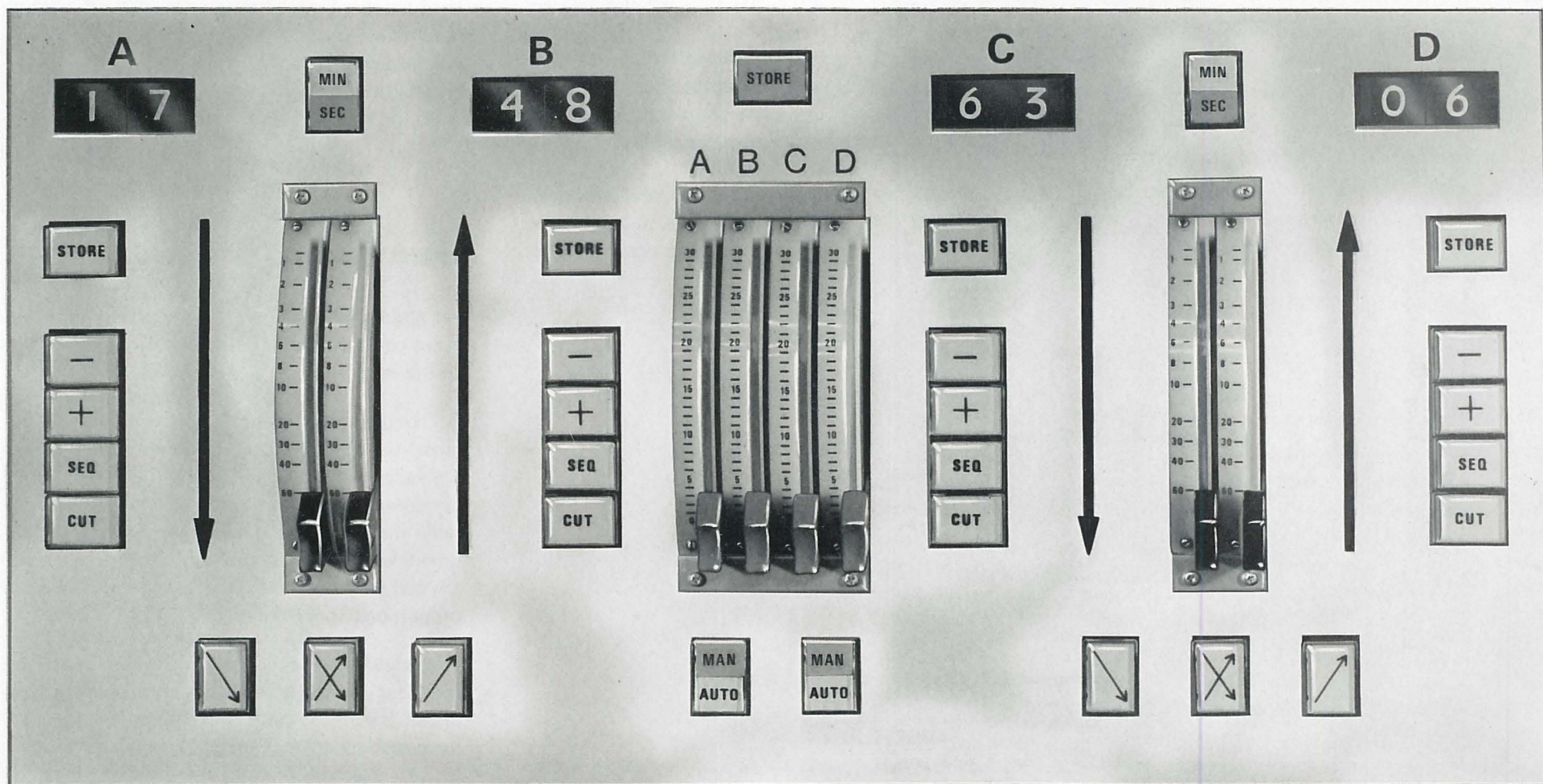
Four identical groups A, B, C & D are provided, each group has Cut, Plus, Minus, Cancel, Record and sequential operational buttons with Manual/Auto faders.

The two pairs of groups AB and CD each have independent Manual/Auto linear dipless cross

fade, with a time interval of 1.0 to 64 seconds or 1.0 to 64 minutes. The time duration of the cross fade is indicated by the four columns of red light.

The output of either A, B, C & D or A/B or C/D can be entered into the main store. A & C are normally stage groups with B & D normally preset groups,

at the end of a manual or auto cross fade the contents of the preset group is transferred to the stage group. Each of the operational store A, B, C & D has its own independent two digit readout (3 digit if 200 memory system) indicating the last main store selected to that group.



A-B control

The selected lighting patterns are introduced into the 'A' or 'B' side using the appropriate CUT button, the pattern numbers being displayed on the numeric indicators.

Using the 'A' controls, on automatic working, the patterns become operationally effective as production lighting immediately they are cut in, and may then be down-faded automatically by pressing the 'down-fade' button. This down-fade process is channel selective, and if the same channel is present in 'B', the pattern will be down-faded only as far as the lowest brightness held there. If the 'B' brightness level is higher than the 'A' level, then no down-fade takes place.

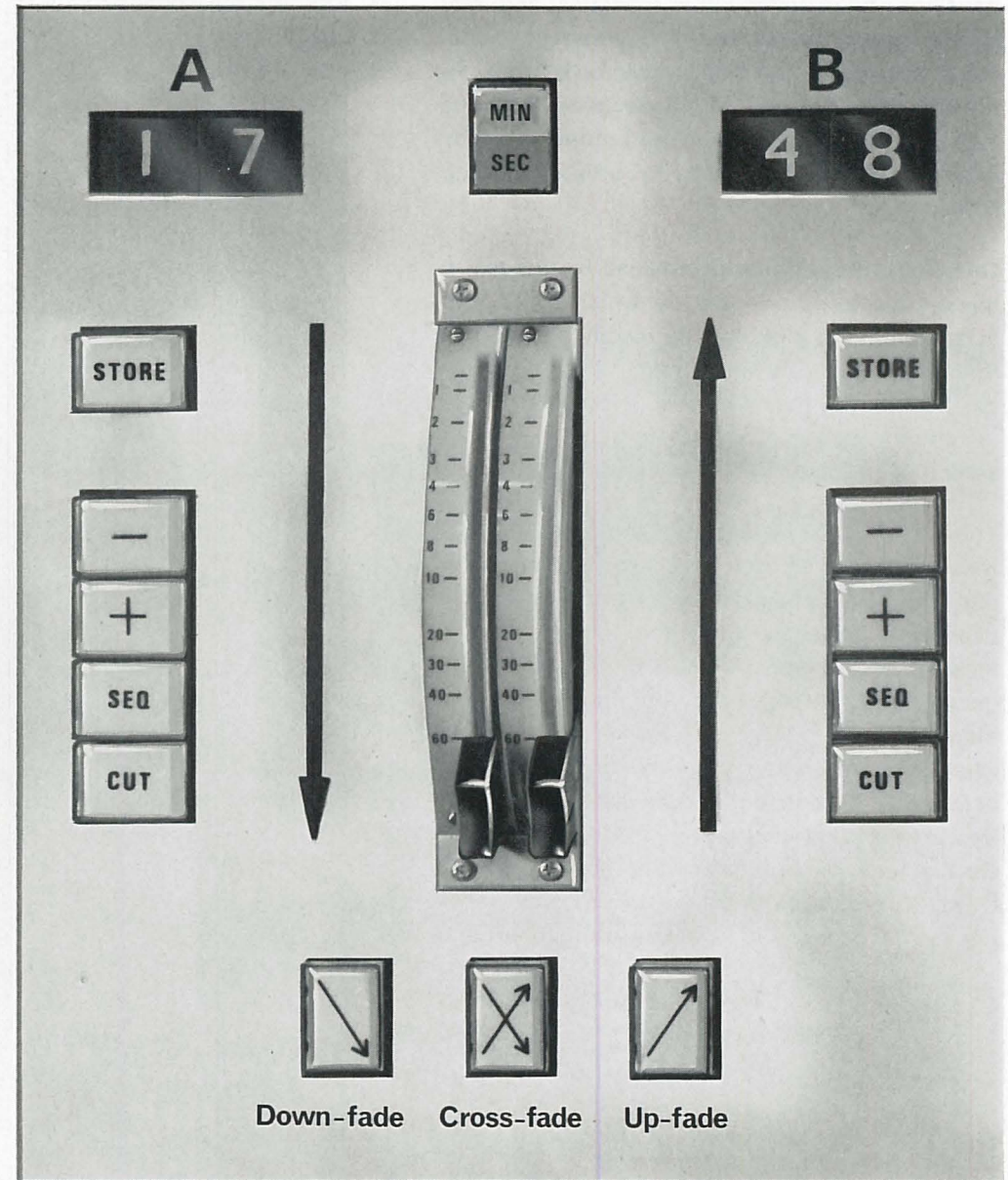
Using the 'B' controls, however, the patterns do not become operationally effective on automatic working until the 'up-fade' button is pressed. Again, the comparator ensures that when the channels are in 'A' and 'B' the up-fade proceeds only if the channel brightness is greater in 'B'. Simultaneous cross-fading between 'A' and 'B', takes place when the cross-fade button is pressed: the comparator ensures that channels at the same brightness remain unaffected. Where brightness differences do exist between common channels, the transition takes the form of a straight line with no brightness dip.

As soon as the automatic fade process is complete, the patterns originally in 'B' are transferred into 'A'.

The fade initiate buttons are all push-push in action, and each operation either initiates or suspends the fade process, the last operation

taking precedence in control.

The rates of fade are adjustable and the progress of the up and down fades are indicated separately.



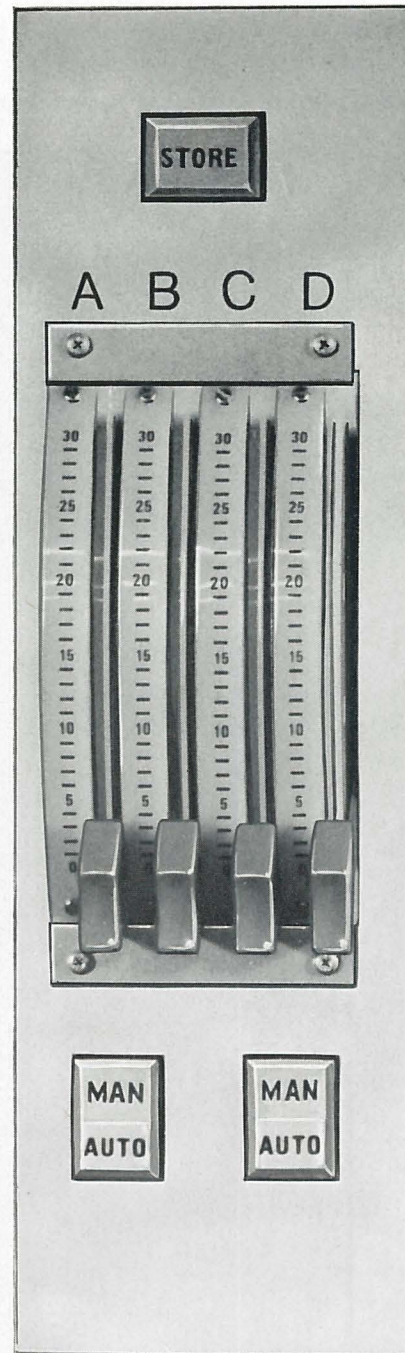
Manual control

The A-B and C-D sections of the main control panel may be operated either separately or jointly in the manual rather than the automatic mode, using the AUTO-MANUAL selector buttons. In the fully manual mode, all four sections or groups may be balanced separately and stored, thereby adding a new dimension to artistic lighting control.

One of the many bonuses provided by this group storage facility is the ease by which up to four existing lighting plots can be readily adjusted as though they were single circuits, and the combined output of the four re-adjusted plots stored in a vacant memory. This is of particular use when setting up coloured cyclorama lighting.

The individual luminaires providing a single colour to any expanse of cyclorama can be selected to one group, allowing the group manual fader to be used as a master fader for that colour. If this is repeated with different colours for the three other groups, adjustment of the four faders provides immediate changes of cyclorama lighting, not only from saturated colours to pastel shades, but also of intensity. Storing of the combined group output into a vacant memory will record the brightness level of each circuit contributing to the required effect. Any number of different combinations of the four faders may be stored in this manner.

Use of the C-D automatic fade facility to transfer from one plot to the next can then produce continuously changing cyclorama lighting effects, and leave the A-B groups available for either manual or automatic fading of foreground lighting.



Mimic panel

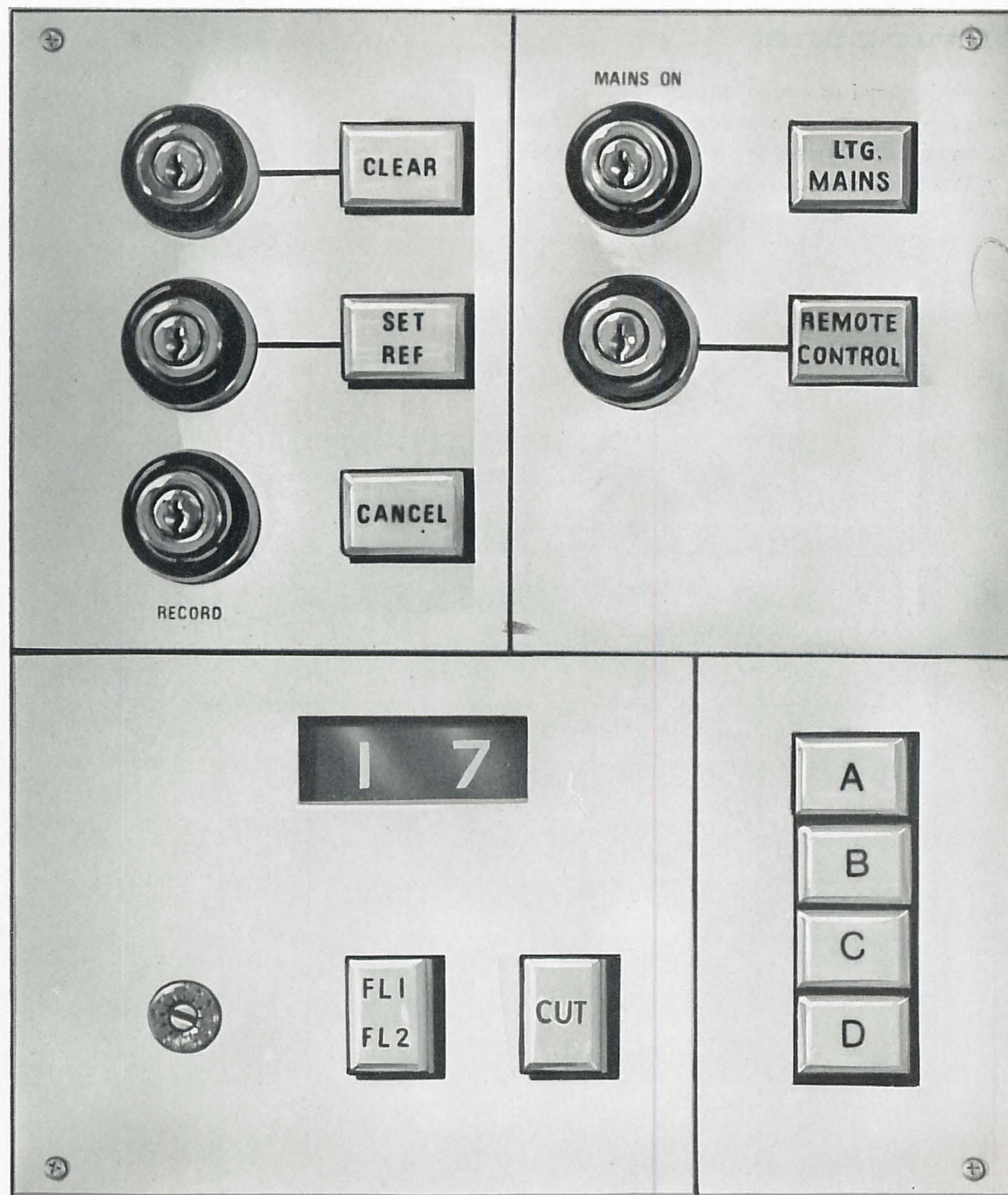
The mimic panel is a twin display system, indicating the lamps on in the studio by a red display and the lamps reselected in the operational stores A, B, C & D independently by a white display.

1	11	21	31	41	51	61	71	81	91	101	111	121	131	141	151	161	171	181	191	201	211	221	231	241	251
2	12	22	32	42	52	62	72	82	92	102	112	122	132	142	152	162	172	182	192	202	212	222	232	242	252
3	13	23	33	43	53	63	73	83	93	103	113	123	133	143	153	163	173	183	193	203	213	223	233	243	253
4	14	24	34	44	54	64	74	84	94	104	114	124	134	144	154	164	174	184	194	204	214	224	234	244	254
5	15	25	35	45	55	65	75	85	95	105	115	125	135	145	155	165	175	185	195	205	215	225	235	245	255
6	16	26	36	46	56	66	76	86	96	106	116	126	136	146	156	166	176	186	196	206	216	226	236	246	256
7	17	27	37	47	57	67	77	87	97	107	117	127	137	147	157	167	177	187	197	207	217	227	237	247	
8	18	28	38	48	58	68	78	88	98	108	118	128	138	148	158	168	178	188	198	208	218	228	238	248	
9	19	29	39	49	59	69	79	89	99	109	119	129	139	149	159	169	179	189	199	209	219	229	239	249	FLASH 1
10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	FLASH 2

Master panel

All master operation buttons are ineffective until the key for the button has been inserted and operated.

CONTROLS Mains ON/OFF
Local/Remote Control
Record
Clear Store
Set Reference
Cancel



Flasher facility

Any lamp or number of lamps can be selected from a main plot to form one or two independent flashing sub plots.

The information on the selection of the lamps and the two flashing ratios is stored, and can be called upon repetitively for insertion into any other plot or plots.

This is a particularly useful facility for the simulation of 'lightning flashes', 'flashing neon signs', headlights on a moving vehicle" etc. etc.

Remote control panel

The remote control panel duplicates a number of the main panel controls and indicators, and is designed to allow complete lighting plots to be assembled, recorded in the main store, and transferred from the main store to the 'A' operational store, from a remote location.

It would normally be located on the studio floor, but a further use is for limited control of a slave studio, provided the main studio is not in use. In addition it provides a useful maintenance aid, as it may be plugged directly into the central processing equipment, giving local control of a large number of processes within the complete system.

The panel is connected to the central processing equipment by means of a fifteen core cable, which carries the necessary power and signals to and from the remote panel. The small number of circuits necessary is achieved by use of time sequential multiplexing of the signals to and from the remote panel.

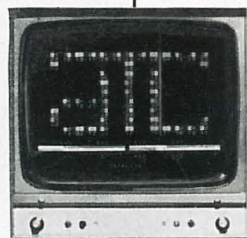
On switching on the remote panel, the various indicators are brought into circuit, but the controls are not operative until the local/remote key on the main control panel is turned to remote. This transfers certain controls to the remote panel, inhibiting the equivalent controls on the main panel. At the same time, the 'A' operational store is automatically selected on the individual portion of the main panel, and the group selection buttons disconnected.



DaTaLite '300' Interconnections

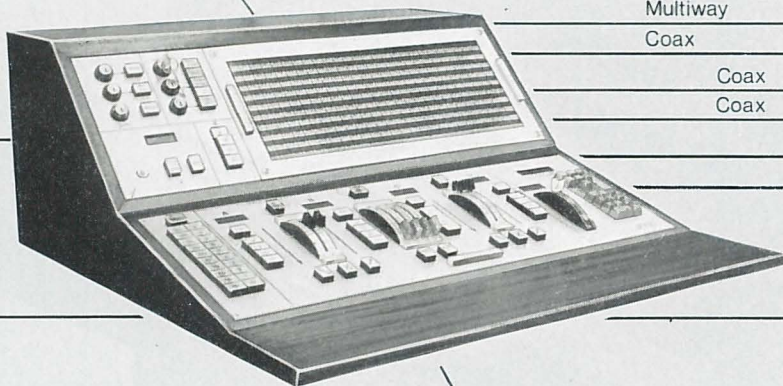
Coax

Data for the CRT Mimic can be transmitted over any standard video network



CRT Mimic Display

Twin Display Mimic



Control Panel

Multiway

Coax

Coax

Coax

Multiway

Multiway

Mains Interlock

20metres
provided as
standard

Memory

1 1/4"

5/4"

Bay 6' x 2'sq

CPU

15 3/4"

CRT Mimic

5 1/4"

PSU

15 3/4"

6 O/P CRT Mimic
Display Unit
(Optional extra)
or Standard in
place of Twin
Display Mimic

Mains I/P
to System

PSU

10 1/2"

Control Room

Apparatus Room

Coax

Studio Floor



Remote Control Panel
(Optional extra)

15 core cable (Not provided as standard)

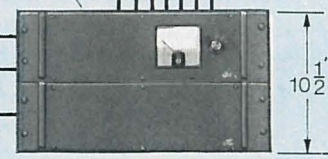
25 core cable per Dimmer Bay

Multiway Cables to
Manual Override System
in Control Room
(Optional extra)

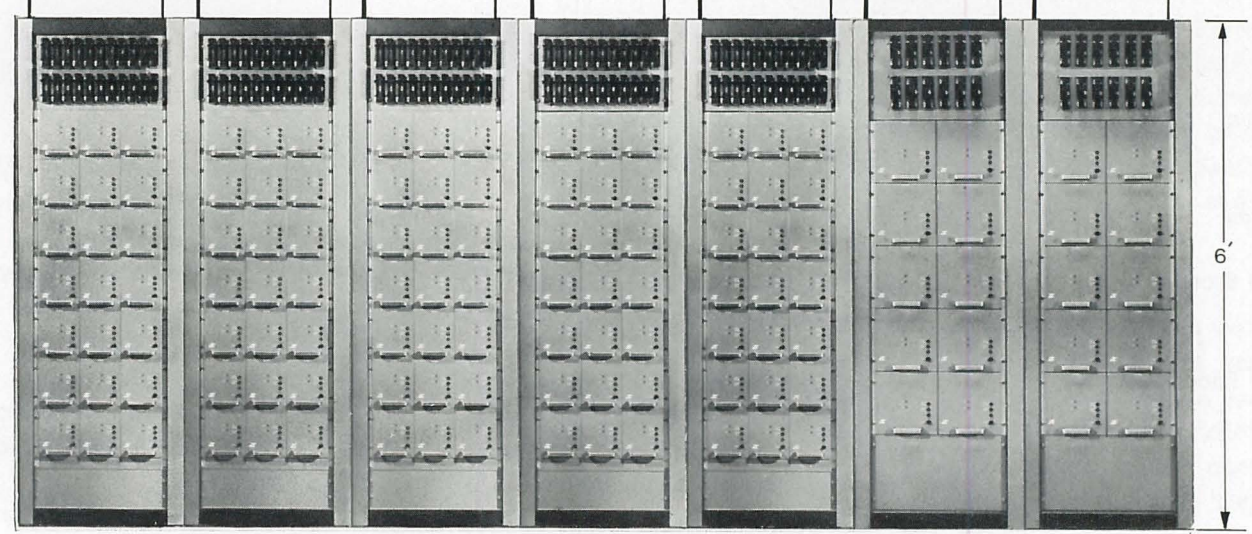
20 metres
provided as
standard

DCI

Coax
Coax
Mains
Interlock



All Dimmers in remote area are
controlled by 2 coaxial cables



Dimmer Room

DaTaLite '300' specification

Number of memories available	– 99 plus modification store	Store Selection	– By self illuminated 'tens' and 'units' buttons provided with electronic latching and interlock facilities
Max. number of circuits controlled	– 4K 20 store – 155 – 8K 20 store – 299	Individual Panel Lamp Selection	– Nine plus bar keyboard with facilities for providing units only selection
Number of operational stores	– 4 – A, B, C, D	Indication	– By triple digital indicator which also provides 'next' selection indication and 'units only' indication
A Store	– CUT ADD SUBTRACT STORE AUTO-DOWN FADE SEQUENCE CUT	Level Adjustment	– By quadrant fader fitted with 'high' and 'low' lamps. Servo control of fader available
B Store	– As A Store but AUTO-UP FADE	Brightness Indication	– By dual Digital Indicators.
C Store	– As A Store	Operational Store Selection	– A, B, C, D or 'MOD' STORE selected by illuminated keyboard. E selection provides direct access to output of processing unit.
D Store	– As B Store	ON/OFF	– Self illuminated button alternately switches selected circuit ON or OFF
A/B Stores	– Automatic cross fade. Selection of manual fading by two quadrant faders	Main Panel	POWER ON/OFF – By removable key Remote Control – By removable key Clear Store – By keyswitch and push button Set Reference – By keyswitch and push button Record ON – By keyswitch Cancel – By push button (alternative circuit arrangement available)
C/D Stores	– As A/B	Mimic Selection	– By four push buttons
A/B/C/D Stores	– Transferring into main memory the combined output of the four groups	Indicator Lights	– Remote control on
A/B/C/D Fade Rates	– All independently adjustable by individual quadrant faders over the range 1 sec to 64 secs or 1 min to 64 mins Minutes/Second changeover by A/B switch and C/D switch	Mimic Display	Studio Circuits on – Red Display Selected Store – White Display Circuits on
A/B/C/D State of Fade Indicator	– By 'Column of Light' indicators	Main Store	– Fabritek type 340 4K 20 bit or 8K 20 bit
A/B/C/D Plot Number Indication	– By dual digital indicators		

DaTaLite '100'

The DaTaLite '100' is a smaller version of the now established DaTaLite '300' lighting control system. It has been repackaged so that it occupies even less bay space, and has an even smaller control panel, whilst still retaining the majority of the features provided as standard in the major system.

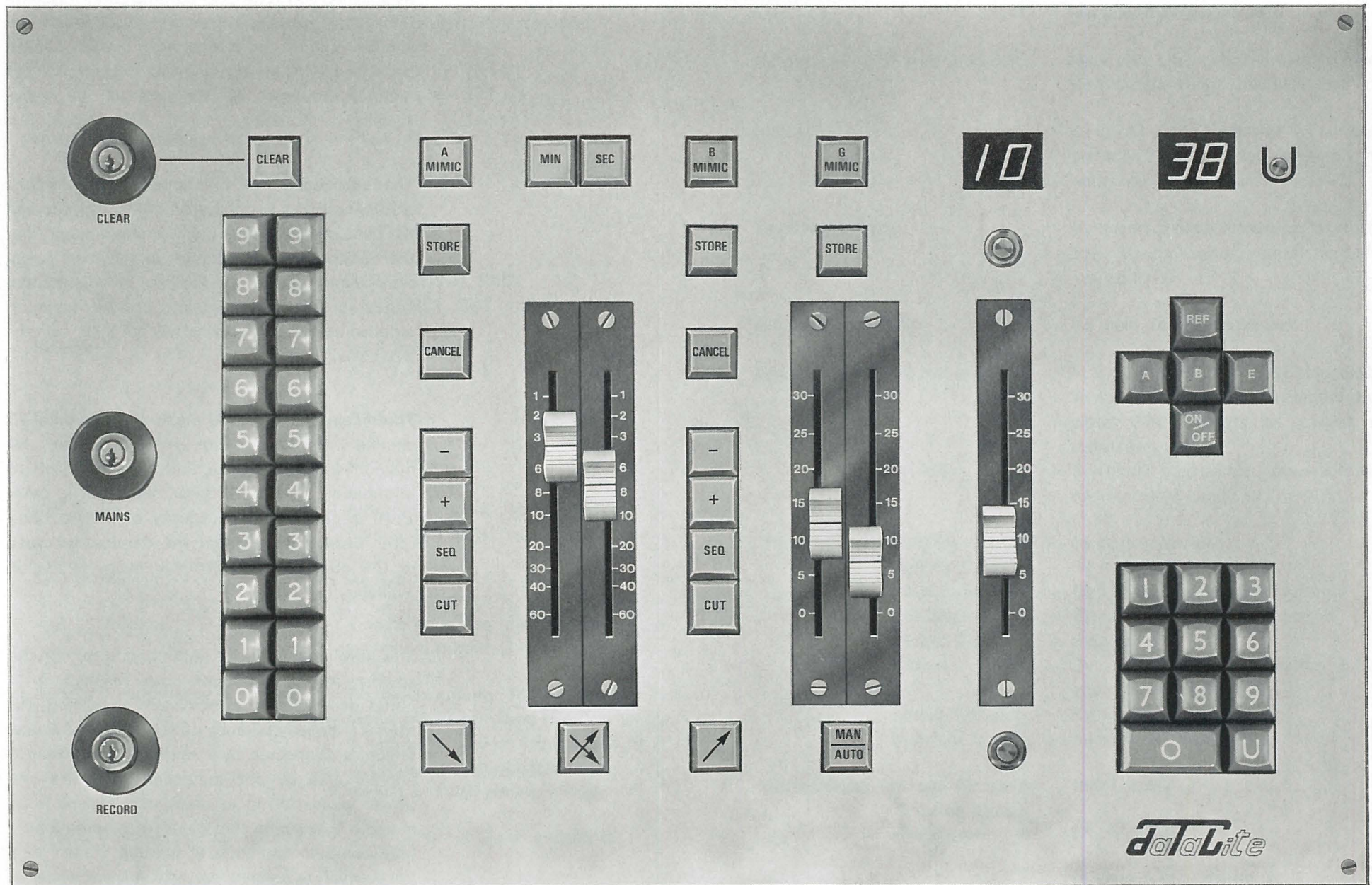
The introduction of the comprehensive mimic display utilising a standard monitor has allowed the removal of the majority of the indicators from the control panel in addition to the twin 'lamp' type mimic display. By limiting the operational stores to two, the complete control panel is reduced in size to approximately 20" x 12" (50cms x 31cms).

The system provides 100 memories for up to 79 circuits, or with minor re-arrangement, 80 memories for 99 circuits, and not just on or off information, which is quite common in other small systems. As the majority of printed circuit cards used in the system are identical to those in the major system, virtually every facility is available.

This new approach to lighting control for the smaller studio or theatre has resulted in a complete lighting control system occupying less than 27 inches (67cms) of standard bay space, which is connected to a single control panel in another area by one multicore cable and one power cable, and to as many mimic displays as required by a single coaxial cable, yet providing a fully computerised form of lighting control at a price which is competitive with manual systems.

DaTaLite 100 control panel

DATA LITE



DaTaLite 100 specification

NUMBER OF MEMORIES 100 with a maximum of 79 circuits available.
or 80 with a maximum of 99 circuits available.

OPERATIONAL STORES 2, 'A' and 'B'

'A' STORE Mimic Display Add
Store Sequence Cut
Cancel Cut
Subtract Manual or Auto down fade

'B' STORE As 'A' Store but Auto up fade

'A/B' STORE Automatic cross fade or manual fading via two faders, Storing into main memory the combined outputs of 'A' and 'B' Stores after the fader adjustment, with mimic display selection of combined output.

'A/B' FADE RATES Independently adjustable by individual faders over the range:
1 sec to 64 secs, or
1 min to 64 mins.

STORE SELECTION By 'tens' and 'units' buttons, provided with electronic latching and interlock facilities.

INDIVIDUAL LAMP SELECTION Nine plus bar keyboard, with facilities for units only selection, with 2 digit readout of lamp selected.

INDIVIDUAL LEVEL ADJUSTMENT By slide fader fitted with high and low lamps, with 2 digit readout of lamp brightness.

INDIVIDUAL PANEL OPERATIONAL STORE SELECTION 'A', 'B', 'E' and reference level, selected by illuminated keyboard. 'E' selection provides direct access to output of processing unit. A further button provides individual on/off selection.

MAIN CONTROLS

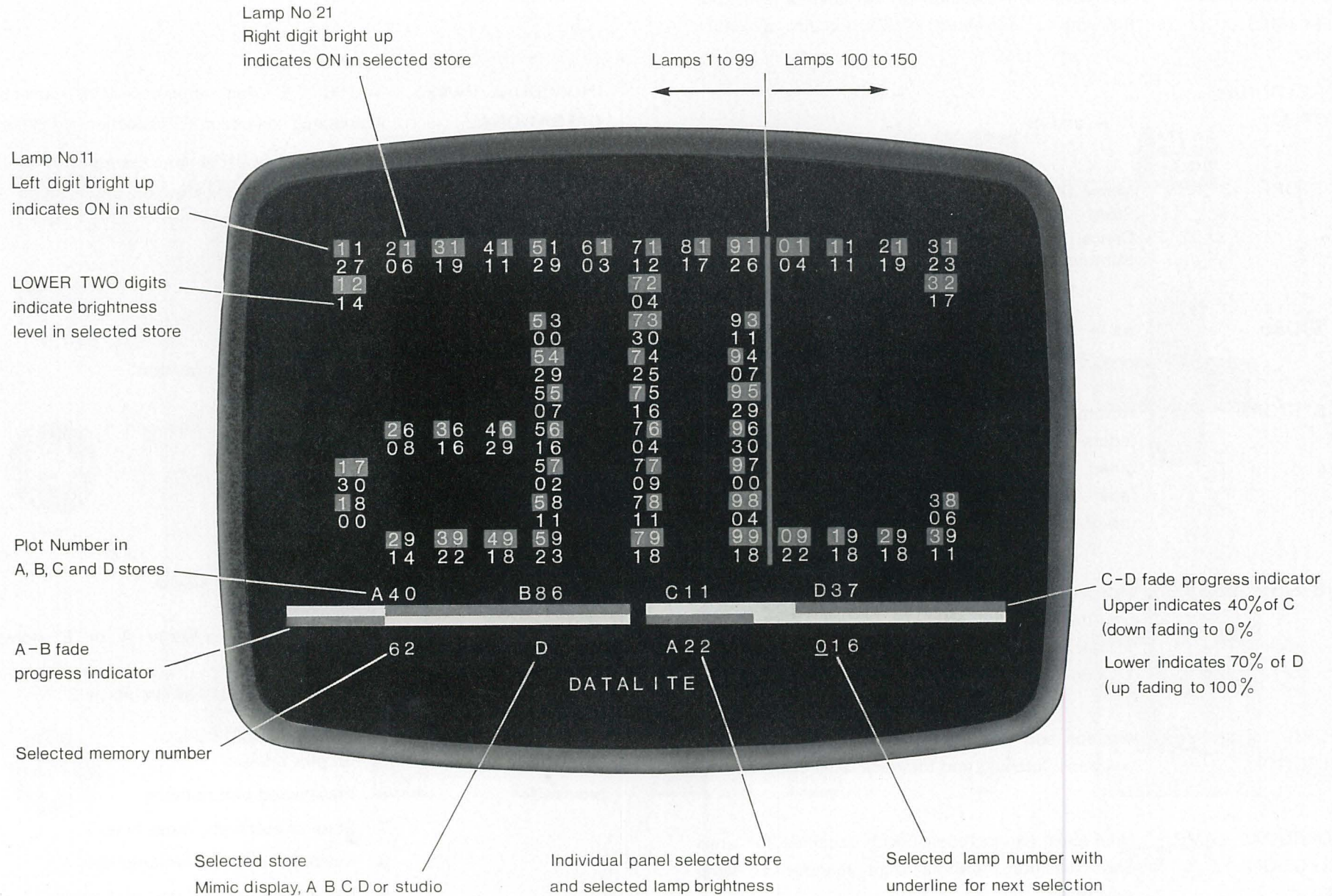
- POWER ON Key Switch
- CLEAR ALL MEMORIES Key Switch and Push Button
- RECORD ON Key Switch

MIMIC DISPLAY Provides display of:

Utilises standard 625 lines monochrome monitor, operating at 320 lines 50 Hz non interlaced.
(Monitor not provided)

1. All circuits on in studio.
2. All circuits on in either 'A' or 'B' store, or in studio.
3. Brightness level of all circuits in '2'.
4. 'A' plot number.
5. 'B' plot number.
6. Preselected plot number.
7. State of automatic cross fade.
8. Individual selected lamp number.
9. Individual selected lamp brightness.

CRT mimic display



The DaTaLite CRT mimic display encoder unit enables complete operational information concerning the DaTaLite lighting control system to be distributed over a single coaxial cable. This information can then be displayed on any good quality 625 line picture monitor.

The complete encoding unit is contained in a $5\frac{1}{4}$ " high standard 19" mounting tray and has its own six output video distribution amplifier.

The major portion of the display area is allocated to presentation of the number of circuits which are ON in the studio or ON in a selected store. In addition, the brightness level for each circuit ON in the selected store is displayed as a 0-30 readout. The selected store mimic can also be switched to read studio brightness irrespective of which of the four operational stores is providing the brightness information. When using this mode of operation, the brightness levels displayed follow fade actions. The letter 'F' is displayed alongside the numbers of the circuits corresponding to flashers, if these are provided.

The remaining portion of the display is devoted to presenting information which would normally be presented by indicators on the control panel. The first row of information displays the letters and plot or memory numbers present in the four operational stores. Asterisks take the place of the 'Red Windows', indicating a change to the contents of a store so that it is not necessarily a true memory or plot number.

The second row of information provides fade progress information for the automatic fade facilities. These are similar in action to the column of light indicators on the control panel but are horizontal rather than vertical. These indicators are switched off when manual fading is selected.

The third row of characters supplies the remaining information normally displayed on the control panel. This is made up of pre-selected memory number with the letter 'M' if the modification facility is selected, letters denoting the operational store displayed on the selected part of the mimic and the operational store controlled by the individual panel, the brightness of the individually selected circuit with a square lit if the lamp is ON and the individually selected circuit number with 'next' selection indicator or the letter 'U' to show control of units only.

On systems with more than 149 circuits, it is not possible to display both lamp number and the brightness figure whilst retaining large figures. In this case the ON information is shown as above and a pushbutton switch can change the display so that the lamps which are ON in the selected display show their brightness, whilst all other lamps show circuit numbers dimly. In this way it can still be seen which are the ON circuits.

Dynamic Technology Limited

