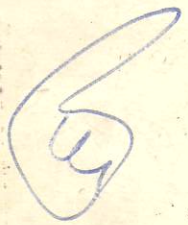
DUET OPS. HANDBOOK



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1 INTRODUCTION

Duet is designed as a small, self-contained, table-top memory lighting control system offering economical, comprehensive facilities with up to 199 memories for users from 48 to 120 channels. Two playbacks, offering both manual and timed crossfades, together with channel control by a fader wheel provide facilities comparable to previously much more expensive controls. Full use of the latest advances in electronics, including microprocessors, has resulted in reduced size and weight and increased reliability. Portability is a keynote of this system; it is easily one-man portable, and all connections used are simple and robust.

To enable users to tailor the system both their needs and means, there is a range of add-in options, extending the number of channels, the number of memories and an internal LED mimic. Add-on peripheral facilities encompass a full VDU mimic, a Floppy Disc Store for library storage of memories, matching 2 preset fader desks or 10 Master Pin Patch, a Riggers Control for remote level control of individual channels and a Submaster Control.

2. GLOSSARY OF TERMS

BLIND - A situation where a lighting state is unseen, but may be controlled.

CHANNEL - A single output from the desk usually driving a single dimmer.

CROSSFADE - A smooth change from one complete lighting state to another.

FADER WHEEL - A rotary, contactless, device for providing smooth control of level.

GROUP - An identified collection of channels, controlled as one.

HIGHEST-TAKES-PRECEDENCE - When combining channel levels, the highest level is taken.

LATEST-TAKES-PRECEDENCE - When combining channel levels, the latest non-zero level taken is used.

LED - Lighting Emitting Diode : a semiconductor indicator that emits light when energised.

LIVE - A situation when a lighting state's levels are currently used to control lights.

MEMORY - A record of the level of each channel in the system.

OFF - A level below 1%.

ON - A level above 1%.

STATE - A situation where each channel has a specific level.

STORE - A means to hold a state so as to maintain lighting levels.

VDU - Video Display Unit : an apparatus in which a television screen is used to display data.

3. SETTING UP

3.1 Installation

The unit can be used in temperatures from 0°C to 35°C and up to 90% Relative Humidity and stored in temperatures from -25°C to 50°C. However life expectancy and reliability will be improved if it is not exposed to extremes of temperature and humidity, mechanical shock or vibration.

A mains supply of 220-240V A.C. or 110-120V A.C., as specified on the rear of the desk, should be applied to the power cords of the desk and any peripheral options supplied, the power distribution being made by normal local power outlets as appropriate to the electrical practice of the users country. Should the mains supply be incorrect refer to the Users' Technical Handbook for details on conversion or contact the supplier. The dimmer control cables are plugged into the 26 pin sockets at the rear of the desk connecting 24 dimmers per socket, as marked. Any peripheral supplied should be connected in accordance with their Users' Handbook.

The Users' Technical Handbook gives full details for initial connection and testing.

3.2 Switching On and Initial State

The unit should be switched on by the switch on the rear right of the unit and all adjacent indicators should be seen to illuminate. A small control knob (◯) is provided nearby to adjust the intensity of the panel controls to suit the ambient lighting.

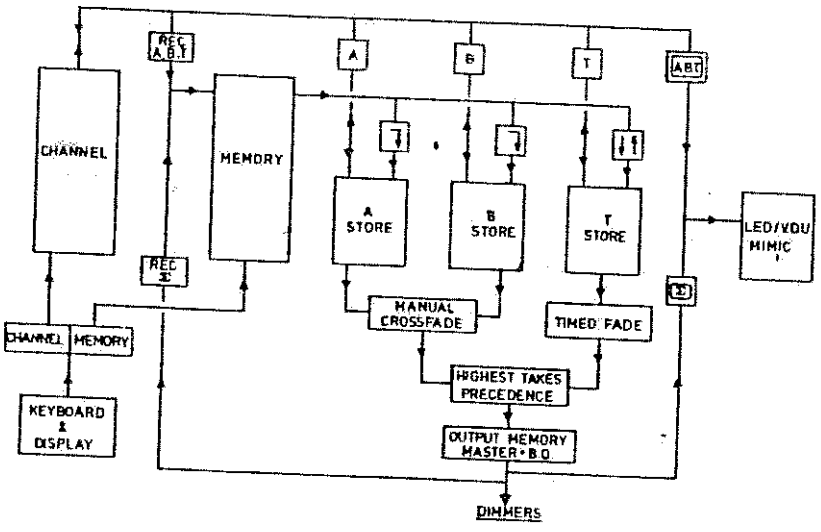
The controls will be seen to have initialised with the CHANNEL, A and Σ pushes illuminated and Numeric Display blank. The operator should ensure that the A/B crossfaders are set to the upper (A) end, that the Memory Master fader (Σ) is set to 10 and the blackout switch (☼) is not operating. The desk is now ready for initial lighting using the A store.

3.3. Basic Operational Concepts

All lighting channel levels are achieved by outputs from one or more of the three playback stores A, B or T. Store A and B are combined by the split dipless crossfader, whose output is further combined on a highest-takes-precedence basis for each channel with the output from the T store. The result is then overall mastered by the Memory Master and Blackout switch before driving the dimmers.

Individual control of a channels level is achieved by control of its level in any one of the above stores. In this way a single channel control facility (e.g. the fader wheel) can be used to set many channels, each channels level being held in the playback store after adjustment, allowing the channel control section to be used to set, or modify, another channels level. It is the contents of any one of these playback stores, or the total system output, which is recorded, and it is to these stores that a memory is "played-back" to restore the original state, either instantly, or as a fade.

To aid understanding of these general principles, the desk surface is suitably contoured, with vertical divisions between the playback stores, channel and memory sections, and horizontal connections for channel control and along the memory paths for playback and record. The Duet Operators Reference Diagram (Appendix 1) provides a cross reference between the controls and this Handbook.



4. USE OF DISPLAYS

4.1. Desk Panel

The Numeric Display above the keyboard normally displays the current channel or memory number called-up on the keyboard. It can be switched by the view pushes [?] to temporarily display the latest memory transferred to the playbacks (Sect. 14).

4.2. Mimic Controls

Two pushes control the meter and LED or VDU mimic (if fitted). When pushed to illuminate, [ABT] switches the meter and mimic to display the contents of the selected A, B or T playback store, while [Σ] switches the display to the total output.

4.3. LED Mimic (Optional)

This mimic consists of a legend for every channel in the system with a red LED indicator below to indicate if the channel is on in the selected playback store or system output as switched by Sect. 4.2. above. In addition any channel under control of the channel control section will blink on the mimic if on. The mimic can be switched by the view pushes [?] to temporarily display the contents of the playback store or memory (Sect. 14).

4.4. VDU Mimic (Optional)

This consists of a video monitor and driving electronics which can display up to 1,536 alphanumeric characters on a T.V. screen. The screen is divided into two sections, the top three quarters giving channel level information, whilst the bottom quarter provides details of control panel operations.

In the top section, the top line describes the source of channel

information, either A, B or T playback store, output or memory. The remainder of the section is organised into lines of 20 channels up to the maximum number of channels in the system. Each line has the channel number dimly displayed if off, and brightly displayed if on. The channel level in % (01 - 99, F) is displayed brightly below its number if on, and both channel number and level are displayed as a reversed black on white image if under control of the channel control.

The lower section of the screen is partitioned in a similar manner to the main desk panel, with sections for channel, memory, A, B and T playback stores. The CHANNEL section displays the channel number (CHANNEL...), flashing if invalid, its level in the selected store being controlled or output, and a display of the wheel movement (MASTER...%) showing amount of change. The MEMORY section displays the current memory number (MEM...), flashing if invalid and the last recorded memory number (REC...) only displayed (dimly) when the record keyswitch is on (1). Below is the recorded sequence memory number (LINK...) and recorded time (TIME minutes : seconds).

The A and B playback stores section show the latest memory transferred to A and B (MEM...) the direction of the crossfade (A to B or B to A) and the position of the crossfaders (...%). The T playback store section also shows the latest memory number (MEM...) transferred to T, the time of the current fade (TIME minutes : seconds) with flashing asterisks if stopped, and the fade progress (...%).

5. CHANNEL SELECTION

5.1. Initial Setting

All channels are called-up by use of the keyboard which must first be switched to channel control by depressing the CHANNEL push. Then the playback store in which the channel is to be controlled is selected by depressing either A, B or T pushes. If initially set-up as in Sect. 2.2. this is the A store.

5.2. Keyboard Action

The Channel to be controlled is called-up on the keyboard using the keys 0 to 9, CLEAR, +1, -1 and displayed on the numeric display above. Any previous number may be cancelled by depressing CLEAR (but see Sect. 5.3.), then the new channel number entered.

As each key is pressed, the previous number is shifted one position left in the Numeric Display and the new number appears on the far right. Leading zeros are suppressed. Thus channel 56 is called up by depressing keys CLEAR, 5 and 6. If a number greater than the maximum is attempted, then the display changes to a pair of flashing dots indicating that the number was invalid and the user should try again. The pushes +1 and -1 increment or decrement the channel number by 1.

5.3. Under Control

The channel is not brought under control until an attempt is made to change its level (Sect. 6) or a group is formed (Sect. 7). Then the channel being controlled is indicated on both the LED and VDU mimics (Sect. 4). Once this has occured, the channel number is considered as having been "used", and will automatically clear when entering a new number, saving the necessity of pressing CLEAR each time.

6. CONTROL OF LEVEL

6.1. Use of the Fader Wheel

Having called up the channel to be controlled, its level can then be adjusted by use of the fader wheel. This is an endless device, devoid of calibrations, and as a result does not need to be matched to the channels existing level. It can be used as easily to modify an existing level as to initially set up a level.

Any movement of the wheel will now change level up or down in sympathy with the wheel, such that one full quadrant movement of the wheel will change the level from zero to full. Any movement of the wheel for a channel above full or below zero is ignored, but immediate control is regained when reversed.

6.2. Meter

The meter displays the level of the selected channel either at the output of the system if [Σ] is illiminated or in the selected A, B or T playback store being controlled if [ABT] is illuminated. The level is shown on a 0 (off) to 10 (full) scale.

6.3. Use of @

The level of channel may be directly set using the keyboard in conjunction with the @ key, once the channel number has been called up. When the @ key is depressed it illuminates and the keyboard response changes such that the next key depressed out of 0 to 9 or F sets the channel to 0 to 90% or Full (100%). A finer level may then be set by pressing "." (decimal point) then a further number to give a 0 to 9% additional graduation. If the second number is not preceded by ".", then it will be interpreted as the start of a new channel number (Sect. 5). Thus depressing keys CLEAR, 1, 5, @, 7, ., 5 sets channel 15 at 75%.

The @ key may be further combined with the + and - keys to raise or lower the channel level, from its existing level, by the level subsequently entered on the keyboard. Thus the sequence CLEAR, 1, 5, @, +, 1 raises channel 15 by 10%, and 2, 0, @, -, 3, ., 5 reduces channel 20 by 35%. Any attempt to raise or lower a channel beyond 0% or 100% will be limited to these levels.

6.4. Set Level

This push provides a convenient way of setting channels on at a preset common level and off again. After calling up a channel, if SET LEVEL is depressed, then the channel will be set to the "set level". (initially 70% after switch-on) from whatever level it was at. The push will also now illuminate. A further depression will set the channel to zero and extinguish the push. This sequence may be repeated. If the channels level is adjusted (by use of the fader wheel or @) when the push is lit, and set level pressed again, then the revised level is retained and may be used on further channels. Thus the sequence 5, SET LEVEL, @, 6, SET LEVEL, 8, SET LEVEL, 1, 5, SET LEVEL sets channels 5, 8 and 15 at 60%.

6.5. Channel Control with MEMORY Selected

When the keyboard and numeric display are switched to MEMORY (Sect. 9.1.) then a restricted non-keyboard level control is still available over the last selected channels, by use of the fader wheel and meter. Return (RET) (Sect. 8.1.) and flash ( ) (Sect. 8.2.) also function normally.

7. CONTROL OF GROUPS OF CHANNELS

7.1. Multi-Channel Selection

When controlling channels with CHANNEL selected, then more than one channel can be called up for simultaneous control by use of the + and - keys. Pressing + or - before entering a new channel number will cause the previous number to clear and a + or - to appear in the Numeric Display, with the result that the subsequent channel number is added to, or subtracted from, those previously entered for control. Thus entering CLEAR, 1, +, 4, +, 2, 3 selects channels 1, 4 and 23 for simultaneous control and subsequent entry of -, 4 would reduce the channels to just 1 and 23. That these channels are simultaneously under control is shown on their LED or VDU mimics (if fitted). If at any time CLEAR is pressed, or a new channel is not preceded by + or -, then the previous group selected is lost.

When + or - is entered, the Numeric Display clears, but the previous channel number is retained for use with the +1 and -1 keys, so that 1, 5, +, +1, +, +1 selects channels 15, 16 and 17 for control.

7.2. THRU (Optional instead of SET LEVEL)

This push, usable only if CHANNEL is selected, enables a consecutive sequence of channels to be called up for control by entering just their first and last numbers. This is achieved by first entering the lowest number in the sequence on the keyboard, pressing THRU, which illuminates and clears the Numeric Display then entering the highest number. This sequence is actually brought under control and THRU is extinguished when a change of level or a further addition or subtraction is attempted. Thus entering CLEAR, 7, THRU, 1, 0, @, 6 sets the channels 7, 8, 9 and 10 at 60%.

7.3. Memory Group

It is possible to use a memory to specify a group of channels to be controlled. When CHANNEL is selected, pressing the GROUP push

causes it to illuminate and change the use of the keyboard to entering a memory number. This then gives control of those channels that are on in that memory.

The + and - keys may be used to prefix the GROUP to allow memory groups to be combined, a + GROUP adding those channels on in the memory to those already controlled, and a - GROUP removing from control those channels on in the memory. The entry of channel numbers and memory groups can be freely intermixed to form composite groups. For example, entry of CLEAR, GROUP, 3, 5, +, GROUP, 4, 7, -, 2, 2, @, +, 2 increase all the channels on in memories 35 and 47, except channel 22, by 20%.

It should be noted that no account is taken of the levels in the memory, other than whether on or off. The entry of an invalid GROUP memory number, like an invalid channel number, is indicated by a pair of flashing dots in the Numeric Display, signalling the user to try again.

7.4. Level Control of Groups

The full range of level control available to one channel (Sect. 6) is similarly available to several. Use of the fader wheel causes all those channels selected to increase or decrease by the movement up or down of the wheel. Thus if the wheel is moved up by 10% channels at 30% and 50% increase to 40% and 60% respectively. Any channel that reaches full or zero stops changing, but other channels will continue to change until similarly limited. A reversal of wheel movement then causes all channels to immediately reverse, thus destroying the balance between them. This can be corrected by use of the RET push (Sect. 8.1.). The use of @ for level control similarly either sets all the channels to the level entered, or increases or decreases by the + or - level entered, subject to the same limits as the wheel above.

The meter shows the level of the channel in the Numeric Display, however entered.

8. OTHER CHANNEL FACILITIES

8.1. Return

One of the features of the fader wheel, due to its 'positionless' characteristic, is the ease with which a modification can be made to a channel level. However, if its initial level is not noted, it can be difficult to correct a mistaken alteration. To overcome this, an internal return store is provided which retains the starting level of each channel whenever a channel or complete group is selected.

The return push RET illuminates whenever the channels are altered from their initial levels and, if the balance is not destroyed by attempting to move any beyond zero or full,, the push extinguishes when they are all restored to their initial levels. If the balance is destroyed or a rapid return to the original level is desired, pressing the RET push causes all the channels controlled to be instantly returned to their initial levels.

8.2. Flash

A centre biased lever switch ⚡ provides a means for identifying channels and their effects by temporarily setting the levels of all channels under control to full (up) or zero (down) at the system output. This does not change the contents of any playback store and the effect ceases when the switch is released.

9. MEMORY SELECTION

9.1. Memory Number

If the MEMORY push is operated, causing it to illuminate, the keyboard and Numeric Display may be used to select a memory number.

The keys 0 to 9, CLEAR, +1, -1 may then be used, in a similar manner to channel selection (Sect. 5.2.), to call up a memory. Any previous number may be cancelled by depressing CLEAR (but see Sect. 9.3.) before the new number is entered. As each key is pressed, the previous number is shifted left one in the display, and the new number appears on the far right. Thus memory 123 is called up by depressing keys CLEAR 1, 2, 3. If a number is called up greater than the fitted maximum, or the absolute maximum of 199, then the display changed to a pair of flashing dots and the memory warning indicator  flashes, indicating that the user should try again. The pushes +1, -1 increment the memory number by 1.

Switching the keyboard back to CHANNEL merely prevents keyboard access to the memory number. The last selected memory can still be used for playback transfers and recordings, and checked again by switching back to MEMORY.

9.2. In Use

The memory number is considered to have been used if, after selection, any playback transfer or recording action occurs. In this case any further number entry on the keyboard will automatically clear the previous number, obviating the need to press CLEAR each time.

9.3. Sequence

The memory number may be put into sequence by depressing the SEQ push to illuminate. Then whenever a memory is transferred to a

playback (Sect. 11 and 12), the number normally automatically increments by 1 after the transfer ready for the next transfer. SEQ causes the manual playback to automatically transfer the current memory number into the inactive (blind) playback store (A or B) at the end of a crossfade (Sect. 11.2.). The memories may be recorded to sequence other than the above simple increment by means of REC LINK (Sect. 9.4.). The keyboard may be switched to CHANNEL once in sequence, then the memories will be sequenced and transferred from the hidden memory number. This number can always be checked by switching back to MEMORY, and the memory warning indicator (⚠) will always show if the number has sequenced beyond the maximum.

9.4. Recorded Sequence

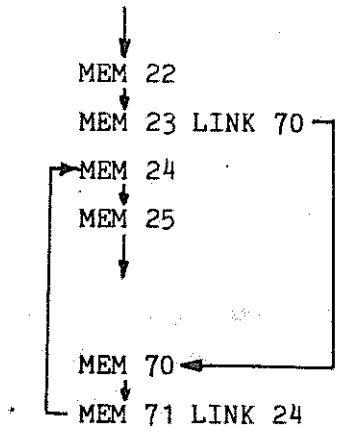
This facility implemented by the REC LINK push allows the sequence of memory numbers transferred when SEQ is active to be either normal increments of 1 or to jump to a memory specified in the memory last transferred.

Whenever any recording is made, a space for a memory number known as the LINK number, is allowed for. It may be changed in any memory provided the Record Lock Keyswitch is on (1) by first selecting MEMORY, then the required memory number on the keyboard. If then the REC LINK push is pressed, it illuminates and the Numeric Display changed to show the LINK number in that memory. This is the memory number to which a jump in the sequence would be made after transferring the original memory. If the LINK number is clear, normal sequence is invoked.

The LINK number may now be changed by keying in the required number, or clearing it with CLEAR, after which it is recorded in the memory by a second press on the REC LINK push, causing it to extinguish. Whenever any normal recording is made with REC A.B.T. or REC , the LINK number is cleared and must be reset if required as above. The LINK number may be examined as above, even with the record lock off (0), but in this case can not be modified.

The purpose of this facility is to allow an operator to insert later

recordings into an existing sequence of memories, or to interchange whole sequences of memories, so that the normal sequence facility can be used for the performance. For example an insert sequence might be:



where memories 70 and 71 are inserted between memories 23 and 24.

10. RECORDING

10.1. Recording System

A recording copies the total lighting state required at any time for all channels and all levels from zero to full into a particular memory number. This recording is permanently held (Sect. 16.2.) until a new recording is made at the memory number, totally replacing the old information with the new state. It is thus not necessary to erase a memory before re-recording.

A valid memory number must be selected and the record lock keyswitch switched to 1 before any recording can be made.

10.2. Record Lock

A keyswitch (TOK 4 key) is provided to protect against unauthorised recording in the memory. In position 0 all recording is inhibited and the key can be removed. In position 1 recording is allowed, but the key is captive in the lock, to encourage users to protect the memory when not actually recording. In both positions normal playback is allowed.

10.3. To Record

A recording may be made of the contents of the playback store selected for channel control, indicated by pushes A, B, or T being illuminated. In this case the store may be live or blind, and the levels recorded are not affected by any fader positions. This is achieved by pressing REC A.B.T which momentarily illuminates if successful.

Alternatively, a recording may be made of the total system output, as caused by any combination of manual playback crossfade, timed playback fade and output master controls. This is achieved by pressing REC Σ which momentarily illuminates if successful.

When any recording is made, the LINK number is cleared in that memory to prevent old sequence causing difficultiies in a new performance. If the original or a new LINK number is required it must be recorded separately as described in Sect. 9.4.

Any recording also includes the time set on the fade time controls (Sect. 12.3.) at the moment of recording unless the switch is set to =. In this case the original fade time in that memory is preserved, only the channel levels are recorded.

11. MANUAL PLAYBACK

11.1. Organisation

The manual playback section comprises two identical stores A and B between which is a split crossfader to achieve smooth lighting changes, the result contributing to the total system output (Sect. 3.3.). These two stores contain a level for each channel, which may be accessed and modified by the channel control section of the desk (Sect. 5 and 6). Alternatively, the stores can be loaded with the contents of a particular memory to recreate a recorded lighting state.

11.2. Memory Transfer

The memory to be transferred is called up via the keyboard in MEMORY control (Sect. 9.1.), then the required transfer push (▼) is pressed which causes the memory state to be copied to the playback store. The memory contents are not altered in any way. If the system has been initially set up as in Sect. 3.2., and a valid memory selected as in Sect. 9.2., then the A transfer push will cause the memory to appear instantly at the output, whereas the B transfer push will prevent the memory from being seen until a crossfade is carried out.

A successful transfer of a valid memory is indicated by the transfer push illuminating, indicating that a memory is held in the playback. If the memory number is blank at the time of transfer, then the playback store is cleared and the transfer push illumination extinguished, providing a blank store for new lighting composition.

11.3. Crossfading

A dipless, manual, split crossfader is provided as a means to achieve a smooth transition from one lighting state to another. With both faders at the top, A store is output; with both at the bottom, B store is output. When both faders completely reach one store end,

the channels are allocated such that the left hand fader controls those channels whose levels are higher in the opposite store, whilst the right hand fader controls those that are lower. Thus when a memory is transferred to the store on the blind side of the crossfader and a crossfade is then made to it, the left hand fader controls those channels increasing in level as a result of the fade, whilst the right hand fader controls those decreasing. Channels at the same level in both stores are not affected by either fader.

This allows crossfades to be profiled as since the incoming lights are separately controlled to the outgoing lights, they can be made to lead or lag as required for the effect, whilst common lights remain static. It should be noted that allocation of channels to the faders is always changed when a crossfade is completed or a channel is controlled by the channel control in A or B store. In this case the channel's allocation is automatically adjusted by referring to its level in the other store and switching the channel on to the appropriate crossfader.

If the sequence push (SEQ) is illuminated when a crossfade is completed, then the preset memory is transferred automatically to the inactive playback store, and the memory number incremented by one (Sect. 9.2.). In this manner it is possible to crossfade through successive memories without any further operations other than movement of the crossfaders.

12. TIMED PLAYBACK

12.1. Organisation

The timed playback consists of the playback store, the T store, and a next store which is used for the time fades. These two stores contain a level for each channel but normally only the T store may be accessed and modified by the channel control section of the desk (Sect. 5 & 6), thus normally these operations directly affect the system output (Sect. 3.3.).

12.2. Memory Transfer

The memory to be transferred is called up via the keyboard in MEMORY control (Sect. 9), then the transfer fade push ↑↓ is pressed. If successful this causes the transfer fade push to illuminate, the new memory to be copied to the Timed Playback next store, and a dipless crossfade to start from the current T store state to the next store at the time set (or optionally recorded) on the fade time controls.

If the transfer push is operated again during a fade, then the current fade stops, and a new fade to the new memory state is initiated from the stopped state.

If the memory number is blank when the transfer push is operated, then a fade to a clear state is initiated.

If channel control over T playback is selected during a fade then control switches to the next store so that the incoming state may be modified either before or as it appears.

12.3. Fade Time Controls

These consist of a fader calibrated 0/1 -.60 and infinity (∞) and a three position switch with LED indicators to select seconds (^^), minutes (^) or recorded time (=) (Sect. 12.4.). Thus fades may be achieved over times 0 - 60 seconds or 1 - 60 minutes, and may be

stopped at any time by moving the time fader to the extreme bottom (∞). Normally the two LED indicators show which time range is selected, but when stopped, both illuminate. When the switch is in the centre position the fade occurs at the time recorded for that memory (Sect. 12.4.).

The progress of the fade is shown on the digital fade progress indicator as a count from 0 to 9, then blank at completion.

12.4. Recorded Fade Time

Whenever any recording is made, there is included in the memory a recording of the time set on the Timed Playback fader and switch, unless the switch is in the centre position (=) in which case the time previously recorded in that memory is retained. In order to use this time recorded when playing back a memory to the Timed Playback, the time switch should be set to the centre (=) before the memory transfer is made. In this case the fade then occurs at the time recorded, and neither of the LED indicators by the time switch illuminate.

The actual time may be ascertained by reference to the VDU mimic (if fitted), or moving the time fader up or down until one of the LED indicators by the time switch illuminates. The fader then shows the time in seconds or minutes as indicated by the LED. Both LED's will illuminate when the fader matches a recorded time of .

Modification of the time of a fade in progress may be made at any time by merely setting the time switch to seconds or minutes as required and adjusting the fader accordingly. This can be achieved without any noticeable discontinuity of fade if the time is first matched as above. This modified time is then retained until a new recorded time fade is started.

To change the time of an otherwise satisfactory memory, the memory must be transferred to an unused playback store (A, B or T) then the revised time set on the fade time controls, and the memory from the same playback store (Sect. 10.3.) using REC A.B.T. .

13. MEMORY COMBINATION

In both the A, B and T playback stores memory states may be added to or subtracted from existing states by prefixing the memory with + or - using the corresponding keyboard keys. The + prefix causes a transfer push to add any channels on in the new memory to the existing playback store state, either as highest- or latest-takes-precedence (optional). The "-" prefix causes the transfer push to set to zero in the playback store any channels on in the memory. When applied to the T playback the effect is the same but occurs as a fade instead of the instant effect in the manual playback.

This process allows memories to be combined in the playback store to assemble a composite lighting state from pre-balanced groups of channels.

This process only allows memories to be combined sequentially in the playback store. If it is desired to add or subtract several memories simultaneously, they should be first combined in a blind playback, recorded as a new memory, then this composite memory used for the effect.

14. INTERROGATION

Four view pushes (?) are provided, one for each playback store and one for the memory control section. When pushed these provide a means of interrogation of the contents of the section whose view push is held pressed. The interrogation ceases when the push is released.

For the A, B and T playback stores, operating their view push temporarily changes the numeric display to indicate the last memory transferred to the store, and switches the LED and VDU mimics to display the contents of that store, regardless of previous display. The memory control section view push temporarily changes the Numeric display to the current memory number and switches the LED and VDU mimics to display the contents of that memory, providing a means of memory preview.

15. MASTER CONTROL

Two memory output master controls are fitted (Σ), a memory master fader and a memory black-out switch. The fader proportionally masters the output from the memory system to the dimmers, providing normal full output at 10, down to zero output at 0. The black-out switch allows normal lighting at  , but inhibits any outputs from the memory system at . These controls affect the state recorded by the REC Σ push.

16. THE MEMORY

16.1. Memory Organisation

The amount of memory fitted is dependent on the number of channels to be controlled by the system and the number of memories required, and is normally supplied in increments of 4,096 (4K) total stored channels (No. of channels (+4) x No. of memories). This is automatically partitioned in the most efficient manner for the number of channels required (plus 4 for recorded fade time and sequence information). Thus a single 4K unit of memory would provide 64 memories or a 60 channel system. The maximum memory number may be easily ascertained by entering an obviously invalid memory number (e.g. 999), then pressing -1 will cause the numeric display to revert to the maximum valid number.

16.2. Memory Retention

The memory used in this system is a very low power consumption semi-conductor memory in which the data is maintained, when mains power is removed by internal rechargeable batteries. These are automatically recharged whenever the system is powered-up. The capacity of the batteries is such that on a full charge they will support the memory for at least 30 days, and recharge fully in no more than 12 hours.

As a result an average use of the system of only 1/2 hour a day will ensure the maintenance of a full charge.

Normally the user need have no concern over the state of battery charge, but if the system is to be left unpowered for an extended period and it is important that the memory contents should be retained over that period, provision should be made for periodic powering-up, providing that the memory contents are not required, no damage will be done if the batteries are allowed to discharge.

17. OPTIONAL DESK FACILITIES

There is an internal programming switch located inside the desk which allows variation of several system parameters to suit the needs of a particular user. They are:-

1. Variation of the actual number of channels controlled by the system (this may be less than the maximum fitted).

2. Either highest- or latest-takes-precedence for + memory transfers.

3. Either THRU or SET LEVEL (SET LEVEL replaces the THRU push).

It should be noted that a change in the number of channels controlled in the system will cause the memory to be re-allocated, destroying any previously recorded memories.

Normally this switch would be set for the user on initial installation, but may be changed in situ. For details on how to change it, consult the equipment supplier or the users Technical Handbbok. DO NOT allow unskilled persons to gain internal access to the system.

18. OPTIONAL EXTRAS

18.1. General Considerations

Many of the options described below can be fitted directly by the user as they only involve simple external connections, described in their accompanying handbooks.

Others however require internal re-arrangements to the desk, and whilst the details are supplied, they should only be undertaken by skilled personnel, or returned to the supplier for conversion.

Not all these options will be available at certain times and places, and the interested user should consult their supplier for up-to-date information.

18.2. Channel Expansion

Expansion of the system size if offered in increments of 12 channels. This will involve change to any LED Mimic or Fader/Pin Patch Desk fitted and possibly extra output connectors and output circuit boards. Expanding the number of channels will reduce the number of memories unless extra memory is fitted. The maximum number of channels is 120.

18.3. Memory Expansion

Extra or exchange internal memory circuit boards can be provided to increase the memory by "4K" units of 4,096 total stored channels as described in Sect. 16.1. This is available up to a maximum of "24K" (24,576 total stored channels) or 199 memories whichever is less.

18.4. LED Mimic

This is a mimic of the lighting state in the selected playback store or output, as described in Sect. 4.3., fitted internally. It is

offered in increments of 12 channels to match the channel expansion. Up to 60 channels it is configured in rows of 20 channels, above that in rows of 30 channels.

18.5. VDU Mimic

This unit provides a video display of channels in use, their levels, those under control, and full information on the state of the main desk controls as described in Sect. 4.4.

This table-top unit mounts external to the main desk, and connects to the main desk via coaxial cable to an existing rear connector panel and an extra internal circuit board. The unit is separately mains powered.

18.6. Floppy Disc Store

This unit provides a means of storing the contents of the desk memory onto a small flexible magnetic disc for permanent library storage, allowing the desk to be used for new recordings. The disc may be used to re-program the desk with the original memories when required.

This table-top unit mounts externally to the main desk, connects to the main desk via a small cable to an extra rear connector panel and internal circuit board. The unit is separately mains powered.

18.7. Fader Desk

An extra desk containing 2 presets of channel faders is available, mastered by a dipless crossfader, in increments of 12 channels to suit the main desk. They normally operate in highest-takes-precedence manner with the playback outputs. A feature of these is that they may be used in conjunction with the mains desk, and recorded using the REC push, but will operate independently of the main desk as a back-up.

This table-top unit connects via the normal dimmer connections plus one extra cable and is separately mains powered.

18.8. Pin Patch Desk

This unit contains a pin matrix whereby any of 10 master faders may be connected to any channel in the system to give a highest-takes-precedence or inhibiting control over the channels levels. This provides 10 masters for effects, and will operate independently of the main desk as a back-up, but cannot be recorded.

This table-top unit, converts via the normal dimmer connections and is separately mains powered.

18.9. Riggers Control

This consists of a small hand-held control providing remote level control of channels, for use by a technician, to enable him to light and extinguish a luminaire whilst rigging or focusing it without needing an operator at the main desk. The control contains lever wheel switches to select the channel number, then 4 pushes to set, raise, lower or cancel the level of that channel.

Connection to the desk is by light twin screened cable or a radio link, either method allowing several simultaneous users. Riggers Control needs an extra internal circuit board and rear connector panel in the desk. The control is powered by an internal rechargeable battery.

18.10. Submasters Control

This consists of a table-top unit providing one extra playback store which is partitioned and controlled by 10 submaster faders. Each submaster section or the whole store has normal channel control and memory transfer facilities from the controls on the main desk. Thus

a lighting scene can be split into up to 10 sections, each balanced up or down relative to the others and the result recorded when satisfactory. The partitioning of the channels between the submasters can also be recorded and replayed.

This unit connects to the desk via a data cable, extra rear connector panel and internal circuit board, and is separately mains powered.

18.11 Printout

A hard copy printer is available to allow plot-sheets to be made for each memory. The format of such a printout is that of the upper part (channel zone) of the VDU display with LINK and TIME information added.

Any memory can be output individually or in consecutive groups at a rate of approximately one memory every ten seconds.

The printer is a free standing, separately powered unit and connects to the main colsole by a single lead.

19. TECHNICAL SPECIFICATIONS

Power Input:	110-120V/220-240V, 47-63Hz, 300VA Max. Single Phase.
Dimmer Output:	OV (No Light) to - 10V (Full Light) via 10K Resistor + Silicon Diode. Connection via RTG 18/26 (per 24 ways) to Din 41618.
VDU Mimic Output:	1V positive composite video 625/525 line, 50/60Hz, Field. Connection via 75 OHM BNC. socket.
Environment:	Operating: 0°C to +35°C, 10% to 90% maximum relative humidity (non-condensing). Storage: -25°C to +50°C, 10% to 90% relative humidity. "Office" level cleanliness.
Processor:	Motorola M6800 microprocessor, (8 bit data, 16 bit address).
System Cycle Time:	less than 35 ms.
Fade Processing Accuracy:	8 bit (256 step).
Recording Accuracy:	6 bit (64 step). (8 bit to special order).
Memory:	CMOS semi-conductor, battery maintained for minimum of 1 month. Maximum recharge time 12 hours. Maximum number of memories 199.

Appendix 1 Duet Operators Reference Diagram

External numbers refer to paragraphs in this handbook.