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DUET
FADERS
USER'S HANDBOOK

TECHNICAL INFORMATION

DUET

FADERS

USER'S HANDBOOK

RANK STRAND ELECTRIC

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A DIVISION OF RANK AUDIO VISUAL LIMITED

RANK STRAND

User's
Handbook

ISSUE 1

DUET FADERS

USER'S HANDBOOK

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1. INTRODUCTION

The DUET Fader Wing is a self-contained auxiliary lighting control designed to operate in parallel with the main DUET console. In addition, its contribution to the whole lighting state can be recorded on the DUET. Two presets are provided, each with its own Master fader, one inverted such that simultaneous movement gives a dipless crossfade from one preset to the other. The wing is manufactured in two sizes, up to 60 channels, and from 61 - 120 channels, the latter being in a double size frame.

This wing allows lighting to be composed and recorded in a manner familiar to users of manual control systems, as well as providing an auxiliary control to aid the operation of houselights, special effects or other auxiliary functions. In the unlikely event of a failure or disconnection of the main DUET console it automatically switches to provide direct control of the dimmers, thus providing a form of emergency back-up. The wing is separately mains powered.

This handbook is intended to enable a competant technician to install, commission, use correctly and carry out first line maintenance of the Fader Wing. For further circuit detail and repair information to enable a trained electronics engineer to repair the Fader Wing, a separate publication, the DUET SYSTEM Maintenance Handbook is available, covering all parts of the system.

2. TECHNICAL SPECIFICATION

MAIN INPUT : 110-120V or 220-240V A.C.
47-63 Hz
50 VA

DIMMER OUTPUT : 0V (No light) to -10V (Full light) via a 10K resistor + silicon diode. Connection via RTG18/26 (per 24 ways) to DIN 41618..

ENVIRONMENT : Operating 0°C to +35°C
Storage -25°C to +50°C
Humidity 10% to 90% R.H. (Non condensing)
"office" level cleanliness.

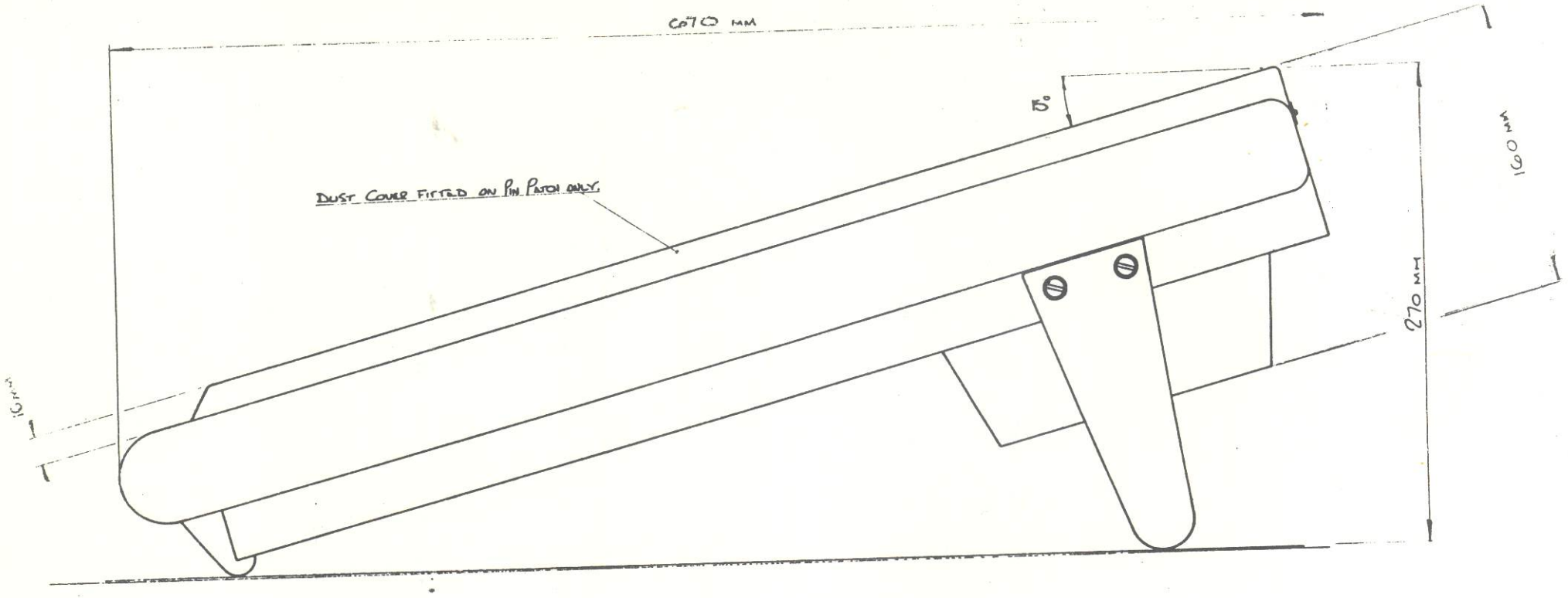
PHYSICAL : Standing size - 60 way :

Width	574mm
Depth	670mm
Height	270mm
Weight	15Kg

Standing size - 120 way :

Width	1070mm
Depth	670mm
Height	270mm
Weight	25Kg

(see outline drawing 1C1845 over)



OVERALL WIDTH.

60 WAY FADER WING & PIN MATRIX - 574 MM

120 WAY FADER WING. - 1070 MM.

RANK STRAND ELECTRIC	TOLERANCES		SCALE 1/2 F. Size.	DATE	TITLE -
	IMPERIAL	METRIC	DRAWN D.E Nash	22.11.78	DUET - PIN MATRIX/FADERS
A DIVISION OF	FRACTION ± 1/64	1 DEC PLACE ± 0.4mm	CHECKED		OVERALL SIZES.
Rank Audio Visual Limited	DECIMAL ± .005	2 DEC PLACE ± 0.1mm	APPROVED		
	ANGULAR 0·25°		MATERIAL ~		
DIMENSIONS IN ~~INCHES~~/MILLIMETRES	UNLESS OTHERWISE STATED				
THIRD ANGLE PROJECTION	USED ON - DUET IL20000.		FINISH ~	ISSUE A	DWG. No IC21845

3. INSTALLATION

3.1 Unpacking

The Fader Wing is supplied packed in a cardboard carton with foam protection. Unpack carefully to avoid damage and retain the packing in case the unit ever needs to be returned for repair. Check the following items are enclosed :

1	DUET Fader Wing with correct number of Channel Fader modules fitted for size of system, i.e. 48, 60,72,84,96 or 120 channels.
1	Users Spare Kit
1	Users Handbook
2	Legs

Check each item for any sign of damage, notifying the shipping company and supplier immediately in any such event. Do not attempt to use if damaged until instructed otherwise, as a safety hazard may exist.

The two legs should be fitted to the sides of the case near the rear, using the screws loosly fitted there.

3.2 Options

The DUET Fader Wing is provided housed in a narrow desk for up to 60 channels (60 way version) or a wide desk for 61-120 channels (120 way version). The type supplied will depend of the size ordered. In addition each can be fitted or deleted to provide intermediate capacities of 48,72,84,96 or 120 channels.

It is possible by addition of channel fader modules to expand the channel size of the small (60 way) desk up to 60 channels and the larger desk up to a maximum of 120 channels from whatever size is

initially installed. However an exchange for a larger desk is needed to extend a small desk above 60 channels.

3.3 Mains Connections

The power cable should be connected to a mains supply as specified on the rear of the unit, either 110-120V AC or 220-240V AC. If the supply is incorrect, it will be necessary to change the power supply sub-assembly on the Fader wing as no user alterable switching is provided.

The cable is 1.25mm^2 conductor size and should be protected by a maximum fuse rating of 13A. The Fader wing is internally protected by a fuse mounted on the rear. If this fails it must be replaced by one of indentical rating i.e.

110-120V	2A, Anti-surge, 20mm
220-240V	1A, Anti-surge, 20mm

The power cable conductors are colour coded thus :

Brown	- Live
Blue	- Neutral
Green/Yellow	- Earth

It is imperatiive that a continuous and adequate earth connection is provided.

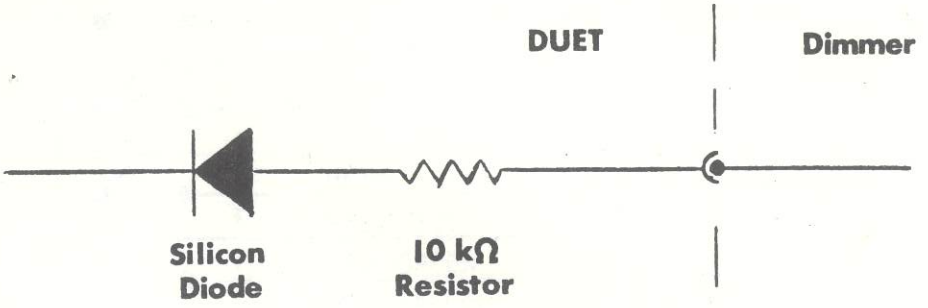
3.4 DUET and Dimmer Connections

Two sets of connections have to be made from/to the DUET Fader wing, the Manual recording link to the DUET console, and linking of the dimmer connections. The Manual connection is made by simply plugging the MANUAL cable from the base of the Fader wing into the corresponding socket on the rear of the DUET console.

The dimmer connection for the Fader wing is achieved by simple chaining into the main DUET console dimmer connectors. To install, unplug the dimmer connectors from the DUET console and plug into the

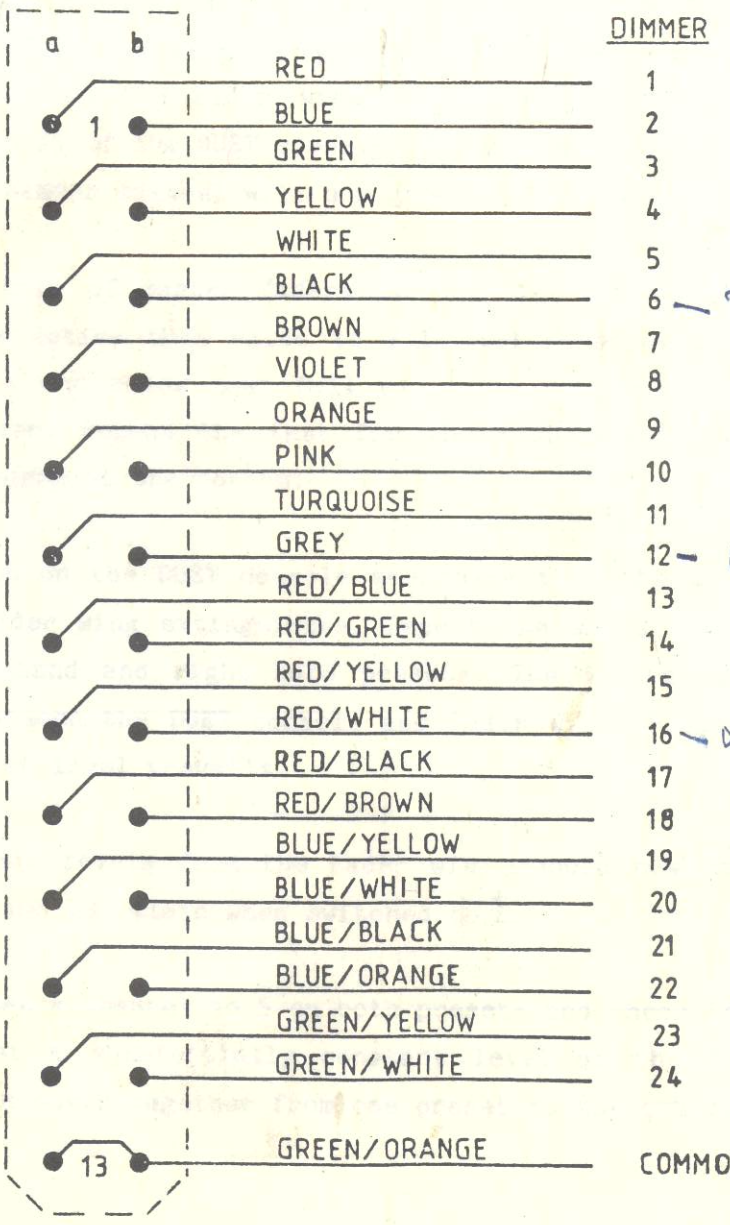
corresponding connectors on the base of the Fader wing. Then plug the DIMMER LINK cables from the Fader wing back into the original dimmer output connectors on the DUET console. Internal connections inside the Fader wing now ensure that the DUET console and Pin Matrix unit operate in parallel in direct mode.

The dimmer connections to the DUET system are detailed in the DUET console Technical Handbook, but the following summary is provided to assist users.
The control signal voltage is normally 0V to -10V via a 10K resistor and silicon diode as below.



No other voltages can be provided.

The dimmers are connected via ITT Cannon RTG 18/26 way connector in multiples of 24 as shown in the drawing below :



Five connectors carry dimmers 1-24, 25-48, 49-72, 73-96, 97-120, wired in the same progression as above.

4. TESTING

Make the mains and DUET and dimmer connections as described above. Apply power and switch on the DUET Fader wing only (ensure that the illuminated switch on the rear of the Fader wing and both the indicators on the front (~~AU~~ and DIRECT) illuminate. This state indicates that the Fader wing is directly driving the dimmers, independently of the DUET console. Connection of a visible luminaire to every dimmer channel will now greatly aid rapid testing.

Set the pair of master faders to the top so that the left hand preset is active then raise to full and reset each channel fader separately and check that full exclusive control is obtained over each dimmer. Repeat the test for the right hand preset with the master faders at the bottom.

Now switch on the DUET console and check that the DIRECT indicator on the fader wing extinguishes. Repeat the above channel tests for the left hand and right hand presets. The interaction of channel levels between the DUET console and Fader wing should be such that the highest level prevails.

The channel levels from the Fader wing should now be seen on the DUET VDU and LED mimic when switched to Σ.

Finally set a channel to 5 on both presets and check that the dimmer remains at a substantially constant level as the pair of master faders are moved together from one preset to the other.

5. OPERATION

5.1 Normal Operation

Normal operation is when the DUET console and Fader wing are both connected and turned on, and the DIRECT indicator on the front of the Fader wing is extinguished. In this mode of operation the outputs from the channel faders are automatically switched through the MANUAL connection to the DUET console and output to the dimmers in conjunction with the channel outputs from the DUET console. This provides for the channel levels established to be displayed and recorded in the DUET console.

The interaction between the DUET console and Fader wing is that the dimmer assumes the higher of the console output and Fader wing. Thus a channel at an intermediate level on the DUET console may be raised further but not reduced by the Fader wing.

5.2 Setting and Recording a Lighting State

Turn on the DUET console and Fader wing. Clear the A, B and T playback stores on the console (see DUET console Operators Handbook). Set the master faders on the Fader wing to the top, making the left hand preset active. Now set each light to its required level by operation of the corresponding fader on the left hand preset.

The result may now be recorded on any memory number on the DUET console by use of REC $\sum$.

5.3 Crossfading between Presets

In normal operation the two master faders on the Fader wing provide additive mastering between the two presets but limited so that no channel may exceed the highest of the two presets. The left hand master fader controls the left hand preset and the right hand master fader the right hand preset, but in an inverse action. The result is that if the two faders are moved together from the top to the bottom a dipless crossfade will occur between the left and right hand preset.

5.4 DIRECT Operation

If the DUET console is turned off, is disconnected or fails, the Fader wing automatically switches to a DIRECT mode of operation indicated by the DIRECT indicator on the front panel. In this situation the Fader wing is directly controlling the dimmers via its own dimmer connections and ceases feeding any signals to the DUET console.

This still provides the operator with a two preset control facility, but the result may not now be displayed or recorded on the DUET console (which is probably now not operational). In addition the mastering provided by the master faders is now simple highest-takes-precedence between the two mastered presets. Thus to prevent a dip whilst crossfading between presets it may be necessary to move the incoming preset master fader in advance of the outgoing.

If this mode of operation is chosen, or inevitable due to a DUET console failure, the simplest method of operation is as follows. Set the master faders to the top and set the first state on the left hand preset now being the current lighting. Set in advance the next lighting state on the right hand preset. On cue, crossfade in the time required to the right hand preset and reset the left hand preset to the next state. Repeat this progression as required.

6. MAINTENANCE

6.1 Important Notes

There is no need for routine maintenance of the DUET Fader wing if it is kept in a clean environment. Cleanliness is important to maintain trouble-free operation and regular cleaning using a vacuum cleaner is recommended. Be particularly careful to prevent cleansing agents, e.g. foams, obtaining ingress to the channel or master faders.

It is strongly recommended that all servicing should be entrusted to the local Service Agent who has the necessary training, service equipment and spares to carry out efficient repairs.

WARNINGS

i) Disconnect the power cable to ensure electrical isolation before obtaining internal access.

ii) Do not unplug or plug any connector in the unit when mains power is applied.

iii) Read the relevant section of this handbook before attempting any dis-assembly.

6.2 Fault Diagnosis

The following trouble-shooting hints are provided to aid a technically competant user perform simple maintenance.

* means consult your local Service Agent.

FAULT	POSSIBLE CAUSE	ACTION
Mains indicator does not illuminate	i) Mains supply missing or input fuse blown	Restore or replace
	ii) Power supply module faulty	* Replace
	iii) Ref 1618 PCB faulty	* Replace

DIRECT indicator fails to illuminate when expected	Ref 1618 PCB faulty	* Replace
DIRECT indicator always illuminated	i) DUET console faulty	* Repair
	ii) MANUAL Link cable fault	Examine and repair or replace as necessary
	iii) Ref 1618 PCB faulty	* Replace
All the 12 channels from one channel fader module malfunction	Channel Fader module unplugged or faulty	* Refit or replace
One or a group of channels (not above) malfunction on one or both presets in normal operation	Ref 1618 PCB (channels 1-72 or Ref 1620 PCB (channels 73-120) faulty	* Replace
One channel malfunctions in normal and DIRECT mode in one preset	Channel Fader module faulty	* Replace
One whole preset malfunctions	i) Master Fader faulty	Replace with spare from DUET console spares kit
	ii) Ref 1618 PCB faulty	* Replace

Indicators operate normally but both presets totally mal-function	Ref 1618 PCB faulty	* Replace

6.3 Internal Access

Both sizes of frame use the same method of internal access, which is by a hinged flap on the base. Stand the Fader wing on its side, preferably with some means of rigid support. Remove the screws along the front of the base, then hinge the flap out. It will be seen that this gives access to most internal wiring, the Ref 1618 60/72 FADER INTERFACE PCB and in the large frame, the Ref 1620 73/120 FADER EXPANSION PCB.

Further access may be obtained by removal of any blank panels fitted or Channel Fader modules.

6.4 Channel Fader Module Removal and Replacement

Obtain internal access to the main PCB's inside as outlined in section 6.3. Remove the two screws holding the Channel Fader module in from the front. Trace the flat cable to its connection on the appropriate main PCB and unplug by gently holding aside the retaining clips then pull the plug from the socket. The module may now be completely removed.

If access to a particular fader is required then release all the fader knobs with a strong pull on a piece of cord wrapped round under each knob. Then release the three base screws and withdraw the supporting PCB and faders. If a replacement fader is soldered in it must be carefully aligned before re-soldering.

Replacement of the module is the reverse of removal. The original channel number label should be slid out of its retaining channel and fitted into the replacement before refitting. Replace the faders plug with the red stripe on the flat cable towards the pip on the socket, and take care that the plug pins do not become bent as they may fracture.

After refitting pay great attention to obtaining a neat and strain-free repositioning of the modules flat cable and any others disturbed. Most modules cables are longer than necessary since they are all manufactured identically and must be made long enough so

that they can be connected even when fitted in a far corner of the frame. Consequently there is considerable excess of flat cable which should be folded and held under the clips provided.

6.5 Ref 1618 60/72 Fader Interface PCB Removal and Replacement

This is the only internal electronic PCB fitted in the small frame (60 way) and is fitted on the left hand side in the larger frame (120 way). To remove first release and move to one side the Channel Fader module over the power supply (left preset 13-24 on a small frame, left preset 25-36 on large frame) and move aside. Now unplug the PCB power cable plug from the 6 way MOLEX socket in the power supply, lifting the locking tab before pulling.

Next release the base flap as described in Section 6.3 to give access to the PCB. Unplug as described in Section 6.4 all the Channel Fader module cables from the PCB and identify them so they can be correctly replaced. Now unplug, by pulling on the cable, the flat cables from the rear Channel socket panels and the Ref 1620 73/120 FADER EXPANSION PCB if fitted, again identifying each cable as it is unplugged.

The PCB may now be removed by closing the barbs on the 6 nylon pillars and withdrawing.

Replacement is the reverse of removal taking care to refit connectors securely. Refit the Channel Fader cables as described in Section 6.4. The flat cables from the Channel Output socket panels and the Ref 1620 PCB have keys to define their orientation, but in all cases they should be connected so that the triangles moulded into the plug and socket housings are adjacent. If possible, re-adjust the Ref 1618 PCB as described in Section 6.9 before closing the base.

Ensure that the internal cabling is as tidy and strain-free as possible and will not be caught in any fixings before closing the base.

6.6 Ref 1620 73/120 Fader Expansion PCB Removal and Replacement

This PCB is only fitted in the larger size of frame (120 way), but is present even if only 60 or 72 channels are fitted so that expansion is simple. Removal follows the same lines as the Ref 1618 PCB, described in Section 6.5, but it is not necessary to unplug the cable from the power supply.

Replacement is again a reversal of removal, following the same guidelines as described in Section 6.5.

6.7 Master Fader Removal and Replacement

There are two master faders fitted to the centre panel of the Fader wing, one controlling the left preset, the other the right preset.

To replace a fader, first release the base as described in Section 6.3, then remove by pulling the fader knob. From the rear, now remove the two screws holding the clips above and below the fader, unplug the fader from the PCB above and remove.

Replacement is the reverse of removal, but it may be necessary to transfer the support clips to the new fader if it is not fitted with them.

6.8 Power Supply Module Removal and Replacement

DISCONNECT THE POWER CABLE FROM THE MAINS SUPPLY

Remove the four screws holding the power supply module to the base and gently separate. When sufficient separation is achieved, unplug the Master PCB power cable from the internal 6 way MOLEX connector, lifting the locking tab before pulling. The power supply module is now free for removal.

Replacement is the reverse of removal, but check that it is wired for the correct mains voltage.

6.9 Adjustments

The only adjustment provided is on the Ref 1618 60/72 Fader Interface PCB. This sets the reference voltage for the presets.

First release the base flap as described in Section 6.3, to give access to the PCB.

Now reconnect the DUET console and Fader wing and turn both on. Taking great care over personal safety and possible electrical damage, set a channel to full on one preset whose master is full, and meter (or VDU) it on the DUET console. Now adjust RV1 ("SET FULL") until the channel is displayed just at full, then add one half turn clockwise. Now turn off and refit the base.

This adjustment may need to be reset if the DUET console is adjusted or repaired.

7. DUET FADER WING LAYOUT DRAWINGS

60 way 1A21882

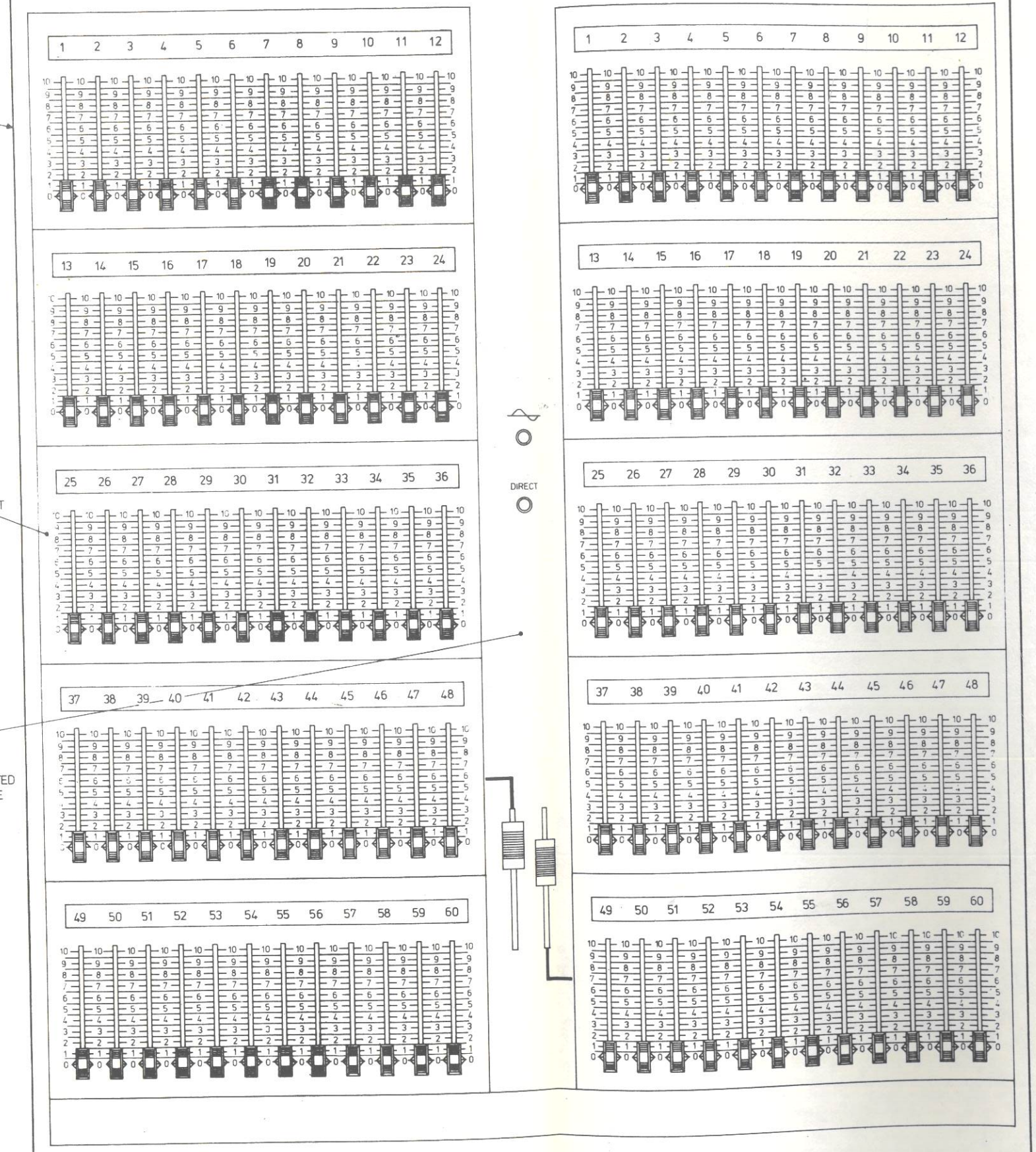
120 way 1A21883

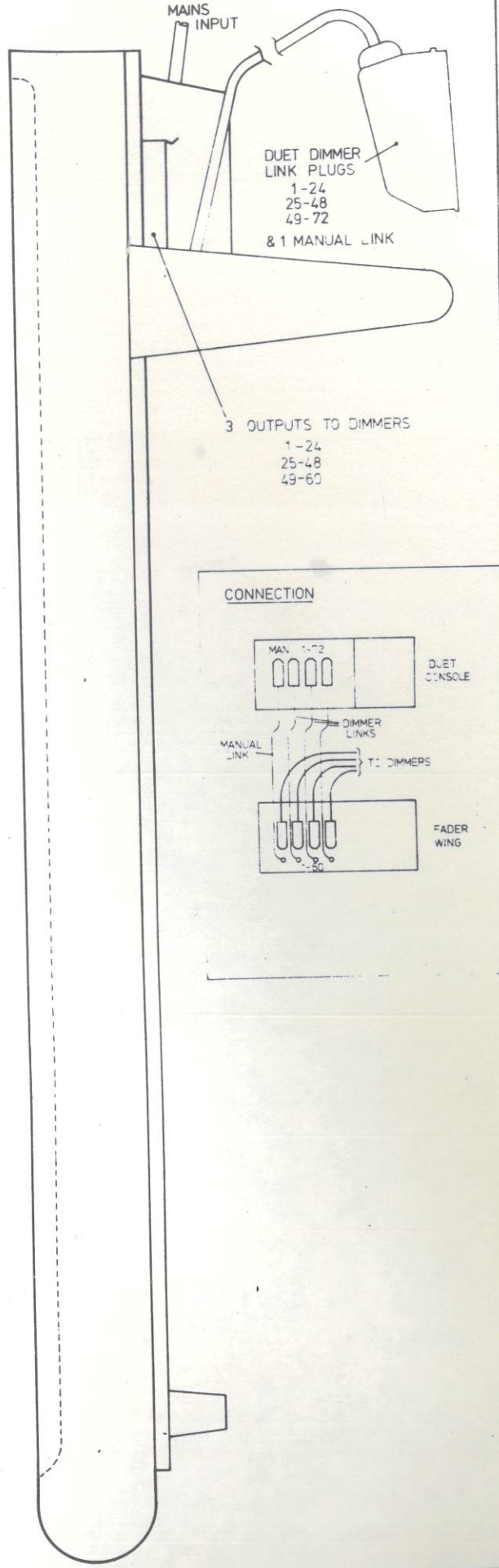
DWG. Nº	1A 21882	ISSUE	A

2 PRESET 48/60 CHANNEL FADER WING WITH SPLIT, DIPLESS CROSSFADING OUTPUT CAN BE RECORDED ON MAIN DUET CONSOLE BY REC PUSH UNLESS IN "DIRECT". IN "DIRECT" MODE (CAUSED BY FAILURE OR DISCONNECTION OF MAIN DUET CONSOLE) THE FADER WING ACTS AS A 2 PRESET MANUAL BACK-UP DRIVING THE DIMMERS DIRECTLY

12 CHANNEL FADER MODULES. 8 FITTED FOR 48 CHANNEL/2 PRESET, 10 FOR 60 CHANNEL/2 PRESET

MASTER PANEL WITH CROSSFADERS AND STATUS LEDS. ~ LED INDICATES MAINS POWER IS APPLIED. "DIRECT" LED INDICATES THAT THE MAIN DUET CONSOL IS TURNED OFF OR DISCONNECTED AND THE FADERS ARE IN DIRECT CONTROL OF THE DIMMERS. SPLIT CROSSFADER PROVIDES A HIGHEST-LIMITED ADDITIVE DIPLESS CROSSFADE (UNLESS IN "DIRECT" IN WHICH CASE IT IS SIMPLE HIGHEST-TAKES-PRECEDENCE) BETWEEN PRESET 1 AND 2.





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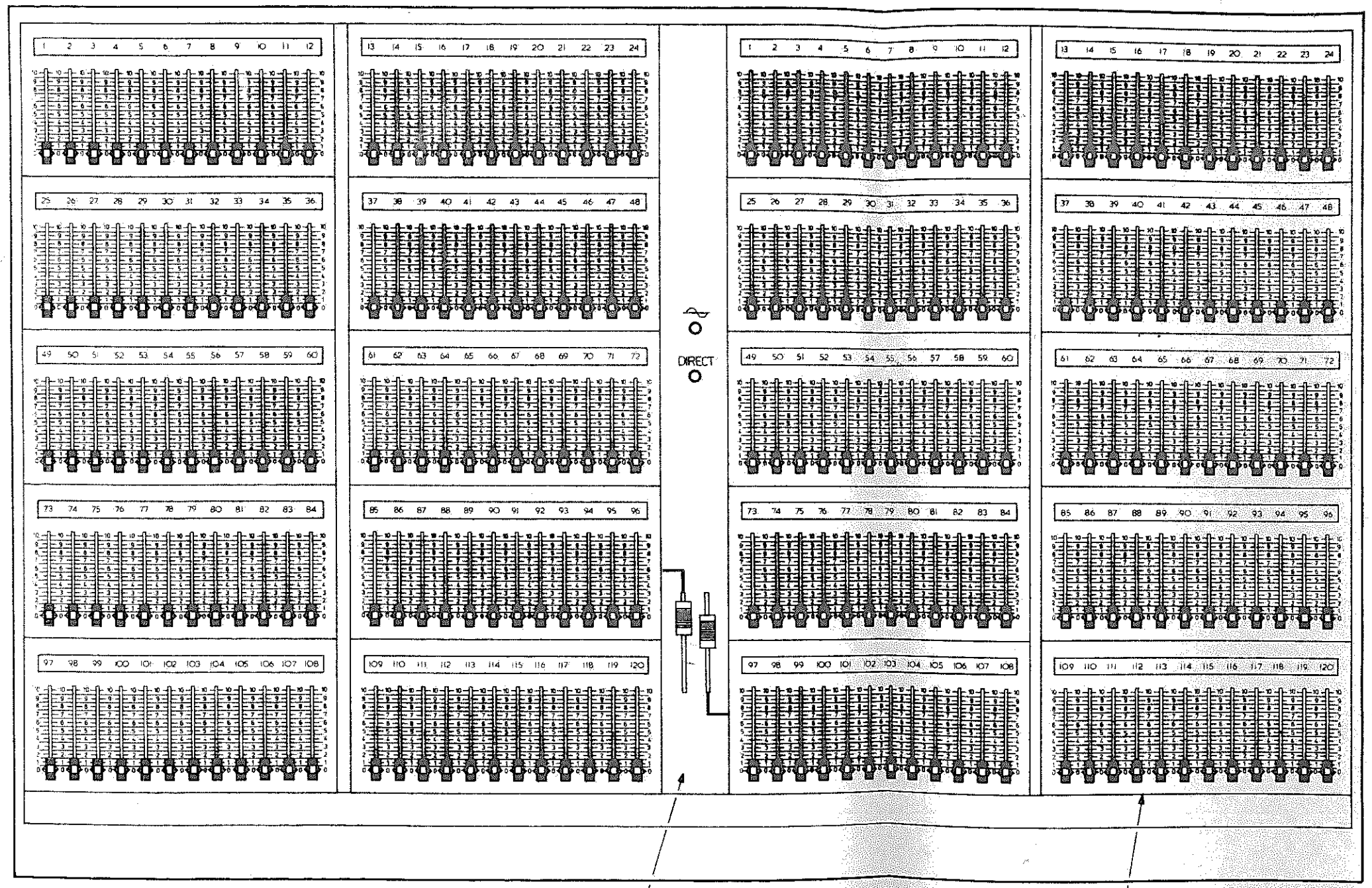
TOLERANCES		SCALE	T-T	DATE
IMPERIAL	METRIC	DRAWN	D.L.G	29-5-78
FRACTION ± 1/64"	1 DEC PLACE ± 0·4mm	CHECKED		
DECIMAL ± .005"	2 DEC PLACE ± 0·1mm	APPROVED		
ANGULAR ± 0·25°		MATERIAL		
UNLESS OTHERWISE STATED				
USED ON		FINISH		

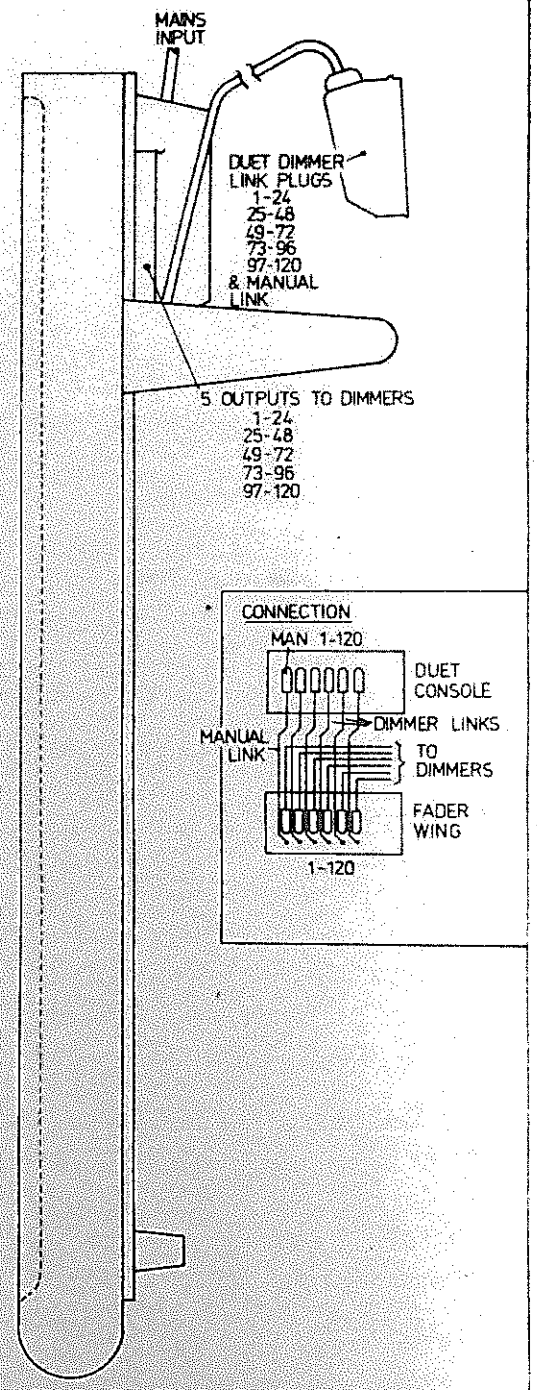
TITLE: DUET 60 WAY FADER WING LAYOUT

ISSUE A

DWG. Nº 1A 21882

DWG N° 1B 21883 ISSUE A





2 PRESET 72/84/96/120 CHANNEL FADER WING WITH SPLIT, DIPLESS CROSSFADING. OUTPUT CAN BE RECORDED ON MAIN DUET CONSOLE BY REC PUSH UNLESS IN "DIRECT". IN "DIRECT" MODE (CAUSED BY FAILURE OR DISCONNECTION OF MAIN DUET CONSOLE) THE FADER WING ACTS AS A 2 PRESET MANUAL BACK-UP DRIVING THE DIMMERS DIRECTLY.

MASTER PANEL WITH CROSSFADERS AND STATUS LEDS. ⏚ LED INDICATES MAINS POWER IS APPLIED. "DIRECT" LED INDICATES THAT THE MAIN DUET CONSOLE IS TURNED OFF OR DISCONNECTED AND THE FADERS ARE IN DIRECT CONTROL OF THE DIMMERS. SPLIT CROSSFADER PROVIDES A HIGHEST LIMITED, ADDITIVE, DIPLESS CROSSFADE (UNLESS IN DIRECT IN WHICH CASE IT IS SIMPLE HIGHEST TAKES PRECEDENCE) BETWEEN PRESET 1 AND 2.

12 CHANNEL FADER MODULES
12 FITTED FOR 72 CHANNEL / 2 PRESET
14 " " 84 " " "
16 " " 96 " " "
20 " " 120 " " "

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DIMENSIONS IN INCHES/MILLIMETRES
THIRD ANGLE PROJECTION

TOLERANCES	
IMPERIAL	METRIC
FRACTION ± 1/64"	1 DEC PLACE ± 0·4mm
DECIMAL ± ·005"	2 DEC PLACE ± 0·1mm
ANGULAR ± 0·25°	
UNLESS OTHERWISE STATED	
USED ON :-	

SCALE	1:2	DATE
DRAWN	D.L.G	5:7:78
CHECKED		
APPROVED		6.7.78
MATERIAL :-		
FINISH :-		

TITLE :- DUET 120 WAY FADER WING LAYOUT

ISSUE A | DWG. N° 1B 21883