

Phase-meter LED Display PCB SC1535

This card not only holds the LED arrays and their comparator/driver ICs, but also applies the Peak/VU CTRL signal to the bus that runs along the length of the meter bridge.

The phase drive DC voltage enters via CONN pin 1, and is applied to the input of the LM3914 comparator/driver chips. The internal potential dividers of these are connected together via pins 4 and 6 and the total voltage across this can be adjusted by VR1. R2,3,4,5 set the display brightness as for the normal bargraph metering system.

7.07 TS24/TV24 STEREO SUB-GROUP TECHNICAL DESCRIPTION

The TS24/TV24 Stereo Sub-Group module has multiple applications. When fitted to an otherwise standard TS24, (to the right of the Command and Utility modules), it allows either simple stereo sub-grouping, or efficient and controlled return of stereo effects, with comprehensive EQ, routing and logic control facilities. In operation and layout the module is very similar to the TS24 I/O module, and very little familiarisation time is required. For the rest of this description "Stereo Sub-Group" is abbreviated to "SSG".

The following drawings and PCB numbers apply to this module:-

Circuit board	PCB No.	DRAWING No.
TS24 SSG module LH PCB	SC1545	ED2248
TS24 SSG module RH PCB	SC1546	ED2180
Sub-break PCB (on LH PCB)	SC1571	
SPAD switch Sub-PCB	SC1400	
TS24 SSG Module Block Diagram		ED2163

Operating Levels

The TS24 operates normally with standard +4dBu input and output levels. However, the internal operating levels are reduced to a nominal -2dBu, giving 6dB greater headroom. The use of advanced circuitry means that the noise performance of the desk remains very good. The only significant consequence of this reduced internal level is that the insert send/return points are at -2dBu: all other ins and outs, however, are at +4dBu.

Division of Functions

The module is divided into two main PCBs, the Left and Right-hand. Audio and logic signals pass between the two, and it is not feasible to carry out functional checks unless the PCBs are connected together. The major functional blocks of the module are divided between them as follows:-

LEFT-HAND PCB

Input phase-reverse switches.
Aux source select switches.
Mono summing amp.
Group input balanced line amps.
TV Group summing amps.
Insert send and Ground cancelling amps.
Insert return balanced line amps.
Routing matrix and sub-break system. (qv).
Logic controlling EQ position, CUT status and Solo status.
Power supply decoupling networks.

RIGHT-HAND PCB

Two sets of input balanced line amps, with variable gain.
Six aux send pots.
LED ladder current source.
SPLIT buffer, high-pass filter, and 4-band EQ.
Four mono-sum amps to feed Aux sends.
Electronic muting block, MIX post-amp, bal control and buffers.
Channel post-amp, balance control and buffers.
Multi-point peak-detect system.

7.08 LEFT-HAND PCB DESCRIPTION

PHASE-REVERSE SWITCHES (S3,S4). Both left and right channels of each input are reversed in phase, and signals with just one channel out of phase must be corrected in some other way. From here the balance signals pass to the input amps on the RH PCB.

AUX SOURCE SWITCHES (S7-S12). There are four possible sources for the aux sends, Channel PRE, Channel POST, Mix PRE and Mix POST. Selection is made for each pair of auxes (1-2,3-4,5-6) using a simple switching tree.

ALT SWITCH (S2). This swops over inputs 1 and 2, coming back from the input amps, and now single-ended. Normally when SPLIT is in, input 1 feeds the Mix path and input 2 feeds the Channel path. With ALT in this state of affairs is reversed.

MONO SUMMING AMP (IC6 etc). This circuit-block normally sits in the input 1-to-Mix path, unless ALT is used. If the L button is pressed, to provide a 'left only' output, the Left signal only is routed to IC6 via R10, and this is in turn routed to the R signal path via S5b. The R button works similarly via R11 and S6b. When both buttons are in a mono (L+R) sum is formed at the junction of R10,11 and is passed on to both signal paths.

THE SUB SWITCH (S1). This, when pressed, gives an input from the groups instead of external inputs. This will be either the outputs of the normal I/O module groups, normalised through from the patchbay via IC1 and IC2, or the output of the TV group summing amps (IC3), as selected by links.

GROUP INPUT BALANCE AMPS (IC1,2). These are conventional differential amps configured for a gain of -6dB. The group signals (eg. from I/O modules 1 and 2), come in balanced from the SSG patchcard at a nominal +4dBu, and are converted to a single-ended from at -2dBu. These amps are not used if the SSG is being used as part of a TV24 desk.

TV GROUP SUMMING AMPS (IC3,1,2). These are only in use when the SSG is installed in a TV24 desk. The extra 16 TV groups are summed by eight SSG modules. The summing amps are fairly conventional, with shunt feedback around C3,C5 through R5. DC feedback is via R6. IC1,2 provide a phase inversion to get the signal back into correct phase.

INSERT SEND AMP (IC8a). This is a ground cancelling stage that allows unbalanced effects to be connected without problems from ground-loops. Any unwanted signal on the external ground is fed back to the send amp via R113, and cancelled out. This stage has unity-gain.

INSERT-RETURN AMP (IC8b). This is a conventional differential amp configured for unity-gain. It can be used either for a true balanced input, or with an unbalanced input to cancel out noise on the external ground. Note that the insert operates at -2dBu.

ROUTING MATRIX (S14-S26). This is a conventional routing matrix, with each switch controlling a pair of groups. (eg 1-2 on S26). Note that the signal on each mixing resistor is shorted to ground by the back-contact when the switch is not pressed, to minimise cross-talk.

When the SUB switch is in use, routing a normal I/O group back to the routing matrix can produce a feedback loop when a group is routed to itself. To prevent this the sub-break PCB is arranged to break the signal path on the relevant pair of groups for each SSG module. For example, on the first SSG, I/O groups 1 and 2 can potentially be routed back to themselves, however, the sub-break PCB (SC1571) will have been programmed, by removing tracks carrying the relevant pair of groups, so that any signal going to groups 1-2 must pass through FETs F1, F2 or F3, F4. These are configured to break the signal path when the SUB switch is activated. S1f turns ON F1, shunting the signal to ground, while F2 is turned off. This prevents a feedback loop being formed, but leaves all the other groups unaffected.

CONTROL LOGIC (IC4,5,7 etc). This is virtually identical to that of the TS24 I/O module, and will therefore not be described in detail. The only major difference is that there is no flip-flop to control group/tape/T&G switching. Note that in this case IC4d, rather than a discrete transistor, is used to perform the logical inversion between the mute driver and TR8.

SUPPLY DECOUPLING. This is quite conventional, being done by R55-59 & C14-17, & R26, C7. Note that separate decoupling networks are provided for Left and Right PCBs, but both are situated on the LH PCB.

7.09 RIGHT-HAND PCB DESCRIPTION

INPUT BALANCED AMPS (IC1,2). These stages perform the balanced to single-ended conversion for the inputs, and also reduce the input level to the internal -2dBu. Variable-gain controls, (VR2,3), permit a range of +/-12dB, and preset trims, (VR1 etc), are provided so that the detented control positions can be set exactly 0dB overall. These trims are separate for each channel, and therefore also allow channel balance to be set exactly.

GAIN-CONTROL is accomplished by varying the amount of negative-feedback passed through IC1 and R9. This is set by potential divider VR2,R14. R13 limits the range of trim pot VR1. The use of buffer IC1b allows the feedback arm R9 to always see a low source impedance; this keeps the CMRR high as the stage gain is varied. From this stage the input signals pass across to the LH PCB.

AUX SENDS (VR5-7). These are conventional pots feeding mix resistors R5 etc. The ON switches, (S1,2,3), lift these mix resistors off the aux buses when not pressed, to minimise mix noise, and short the signals to ground through the switch back-contacts to prevent capacitive crosstalk across them.

LED LADDER & CURRENT SOURCE (TR1 etc). All LEDs on the SSG module are driven from a single current-source TR1, set by the value of R18 to deliver 6mA. LEDs not in use are shorted out, allowing this current to pass through other LEDs in the chain. S12c, (PFL LED control), is ganged with S12d, which signals a PFL condition to the Command Module by taking the Solo Enable bus down to -22V via R19. (See TS24 Technical description for details of solo/PFL signalling.)

SPLIT SWITCH & BUFFER (S14, IC3). Normally input 1 drives both the Mix and Channel path, through the back-contact of S14, but when SPLIT is pressed, and the other switches are in their normal position, input 2 drives the Channel, via IC25. This unity-gain buffer is essential to maintain a DC path to TR5,TR6 at all times.

HIGH-PASS FILTER (C6,C7,IC3). This is a standard Butterworth (maximal flatness) high-pass filter with an ultimate slope of 12dB/octave, commencing with a -3dB point at 100Hz. R35,36 attenuate the incoming signal by 6dB, and R39,40 cause it to be amplified by the same amount. This allows the filter stage to be operated at a depressed level that regularises its clipping behaviour. S4 switches the filter in and out.

The HP filter moves with the EQ and insert when the FLIP button is used.

EQUALISATION (IC4,5 etc.). The Equalisation is in a four-band format, with high and low shelving controls, and two middle. All four controls have two switched frequencies.

The HF stage is a cut-down Baxandall arrangement with R42 setting max boost/cut, and operating frequencies set by C9,10. S5a switches out C10 to raise the frequency by an octave.

The middle stages are identical to each other, except for the values of the capacitors. The High Middle is built around IC4b; feedback to the non-inverting input of IC4b is via Wein network C12,R47,C14,R48. This provides a bandpass response which can be shifted in centre-frequency by switching in and out C11,C13 with S6. The max boost/cut is set by R97; if the value of this is

too low for any reason the stage may oscillate.

The LF stage is also a cut-down Baxandall, with operating frequency set by C19,20, and max boost/cut controlled by R53,54.

From the EQ, the signal is passed to the insert circuitry on the LH PCB. Note that the insert therefore moves with the EQ, when the FLIP button is used.

MONO-SUM AMPS (IC9,10,11). These provide a mono sum of the L & R channels in various parts of the module, to generate mono versions of Channel PRE & Channel POST, and Mix PRE & Mix POST. (PRE and POST refer to the relevant fader). This is performed by simple passive mixing; eg. the channel PRE signal is generated at the junction of R90,R190 and buffered by IC11a, which drives any aux send pots selected to channel PRE. The overall gain is unity; ie. when two 0dB signals are present on L & R. the mono output is also 0dB.

ELECTRONIC MUTING BLOCK (IC7, TR9,10). This operates in exactly the same way as the I/O module mute system, giving very fast fade rather than an abrupt cutoff to prevent transient clicks. Carefully timed control signals are generated by the Mute Driver on the LH PCB, and are applied to TR9,10. IC7a simply provides phase-inversion to counter that in IC7b, and R71,C25,C26 ensure that op-amp offsets do not cause a thump when the mute block switches on or off.

8.00 SOUNDCRAFT RECOMMENDED WARRANTY

(This warranty applies to sales within the UK and should form the basis of the warranty offered by the overseas vendor of Soundcraft products.)

1. `Soundcraft' means Soundcraft Electronics Ltd.
 `End User' means the person who first puts the equipment into regular operation.
 `Dealer' means the person other than Soundcraft (if any) from whom the End User purchased the Equipment, provided such a person is authorised for this purpose by Soundcraft or its accredited Distributor.
 `Equipment' means the equipment supplied with this manual.
2. If within the period of twelve months from the date of delivery of the Equipment to the End User it shall prove defective by reason only of faulty materials and/or workmanship, (but not faulty design), to such an extent that the effectiveness and/or usability thereof is materially affected the Equipment or the defective component should be returned to the Dealer or to Soundcraft and subject to the following conditions the Dealer or Soundcraft will repair or at its option replace the defective components. Any components replaced will become the property of Soundcraft.
3. Any Equipment or component returned will be at the risk of the End User whilst in transit, (both to and from the Dealer or Soundcraft), and postage must be prepaid.
4. This warranty shall only be available if:-
 - a) the Equipment has been properly installed in accordance with instructions contained in Soundcraft's manual; and
 - b) the End User has notified Soundcraft or the Dealer within 14 days of the defect appearing; and
 - c) no persons other than authorised representatives of Soundcraft or the Dealer have effected any replacement of parts maintenance adjustments or repairs to the Equipment; and
 - d) the End User has used the Equipment only for such purposes as Soundcraft recommends, with only such operating supplies as meet Soundcraft's specifications and otherwise in all respects in accordance with Soundcraft's recommendations.

5. Defects arising as a result of the following are not covered by this Warranty: faulty or negligent handling, chemical or electro-chemical or electrical influences, accidental damage, Acts of God, neglect, deficiency in electrical power, air-conditioning or humidity control.
6. The benefit of this Warranty may not be assigned by the End User.
7. End Users who are consumers should note their rights under this Warranty are in addition to and do not affect any other rights which they may be entitled against the seller of the Equipment.

10.00 SCHEMATICS - iss 3

MI 2371	CONSOLE LAYOUT
ED 2320	BLOCK DIAGRAM
ED 2258	I/O MODULE BLOCK DIAGRAM
ED 2256	I/O MODULE SIGNAL FLOW DIAGRAM SHOWING BOUNCE
ED 2257	I/O MODULE SIGNAL FLOW DIAGRAM NOT SHOWING BOUNCE
ED 2219	I/O MODULE RIGHT HAND
ED 2220	I/O MODULE LEFT HAND
ED 2158	I/O MODULE BLOCK DIAGRAM
ED 2217	I/O MODULE SIGNAL FLOW DIAGRAM SHOWING BOUNCE
ED 2218	I/O MODULE SIGNAL FLOW DIAGRAM NOT SHOWING BOUNCE
ED 2155	I/O MODULE RIGHT HAND
ED 2151	I/P LEFT HAND PCB
ED 2161	COMMAND MODULE BLOCK DIAGRAM
ED 2159	COMMAND MODULE LEFT HAND SHT 1-2
ED 2159	COMMAND MODULE LEFT HAND SHT 2-2
ED 2156	COMMAND RIGHT HAND PCB SHT 1-2
ED 2157	COMMAND RIGHT HAND PCB SHT 2-2
ED 2327	EBOS CIRCUIT DIAGRAM for SC1443
ED 2196	OSC SUB-PCB
ED 2163	STEREO SUB-GROUP SIGNAL FLOW DIAGRAM
ED 2248	STEREO SUB-GROUP LEFT HAND PCB
ED 2180	STEREO SUB-FROUP RIGHT HAND PCB
ED 2244	FX RETURN SIGNAL FLOW DIAGRAM
ED 2241	EFFECTS RETURN RIGHT HAND
ED 2300	EFFECTS RETURN LEFT HAND
MI 2379	PATCHBAY CONFIGURATION
ED 2239	NEW PATCH CARD CONN DIAGRAM
ED 2247	PATCH BAY CARDS
MI 2394	I/O PATCH CARD CONN DIAGRAM
MI 2500	STEREO SUB - GROUP PATCH CARD CONN DIAGRAM
MI 2392	2 TRACK PATCH PCB CONN DIAGRAM
MI 2391	DATA PATCH PCB CONN DIAGRAM
ED 2249	OLD PHASE METER/VU. DRIVE CARD
ED 2242	PHASE METER
ED 2186	METER DISPLAY PCB CIRCUIT DIAGRAM
ED 2182	RECT. PCB CIRCUIT DIAGRAM
MI 2421	PSU WIRING
ED 2264	MASTER MIX INTFC PCB
ED 2211	VCA MASTER CIRCUIT

MASTERMIX
INSTALLATION MANUAL
FOR
MX900 FADERS IN SOUNDCRAFT TS24 CONSOLE

DOCUMENTATION RELEASE : 860131

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1. INTRODUCTION

1.1 FOREWORD

This manual outlines the installation and commissioning of a MasterMix Automation System for a Soundcraft TS24 console in which the original Fader Modules are replaced by Audio Kinetics designed and manufactured MX900 Faders.

This document is intended to provide an overview of the steps required in the installation with particular reference to the Faders. Reference is made to other installation manuals in the series for the individual units involved.

The MX900 Fader designed for the Soundcraft TS24 console is equipped with a small front panel which allows the fader to be fitted to the console's module. The console's original fader element is utilised.

1.2 Overview of The MasterMix System

The MasterMix Automation System is an intelligent datalogging system which stores DC control movements in relation to SMPTE Timecode. The control movements can be those generated by any facility on the console (if it can be DC controlled) or, in fact, any DC voltage which varies over a zero to 10 volt scale.

The system is outstandingly easy to use because, unlike other disk based systems, almost all of the functions the engineer might expect to have to key in himself, are taken care of by the system.

In essence, as soon as the System receives play speed timecode for the first time, it scans its inputs and forms a digital picture in memory of the setting of every control. Thereafter as the Computer recognises each new timecode frame, it stores in memory all the control movements that have occurred since the last frame. Once a reasonable amount of memory has been used, the contents are written on a specially formatted 5.25 inch floppy disk. As soon as the end of timecode is detected, the system completes the writing out of any data in memory and prepares the data for the next run.

The specially formatted 5.25 inch floppy disk is divided into 4 areas known as Stores A,B,C and D. While new data is produced, the MX644 reads the data from the last store it wrote to, outputs this to the console and collects any new data that arrives. This composite picture of the movements made at the console is written to a new storage area. The choice of which area to use is usually left up to the MX644 Computer when the areas will be used in rotation. The operator can intervene however to change the destination store, protect a store or even force the MX644 Computer to ignore any data generated. Towards the end of a session, the mixes in two different areas can be compared to determine the most pleasing version.

The system can be installed as either original console equipment or as a retrofit to existing console designs. Many consoles can be modified to accept MasterMix in one or other of its forms and the result is an automation system which requires the absolute minimum of operator involvement allowing the engineer to concentrate on the material rather than driving the system.

The software contains self checking routines which are run each time the power is applied or reset is pushed. If the system detects a problem it will inform the operator with simple status codes which allow its localisation and cure in the minimum of time.

A typical MasterMix Automation System is illustrated in Figure 1.1.

The System consists of the following modules:-

- THE MASTERMIX MX644 COMPUTER (AK Part No. MMM010)

Data is transmitted from the MasterMix Interface to the MX644 Computer down high speed serial communication links. This configuration allows the wiring of a large number of controls to be as short as possible between the Interface and the console and makes the main data highways to the Computer itself a simple multicore cable.

All the command lines such as the MasterMix Controller and Fader Control also communicate via the same serial links which makes installation simpler where cable ducts may have very little spare capacity.

The MX644 Computer consists of a 19 inch rack mountable box with a height of 2U (88mm) and an approximate depth, allowing for cable entry, of 500mm which houses the computer, 5.25 inch floppy disk unit, Timecode Reader/Generator and system status displays.

The MX644 provides connection of the Timecode input from the Multi-track tape recorder and Timecode output from the generator to the tape recorder (if required).

- THE MASTERMIX CONTROLLER (AK part no. AMM100)

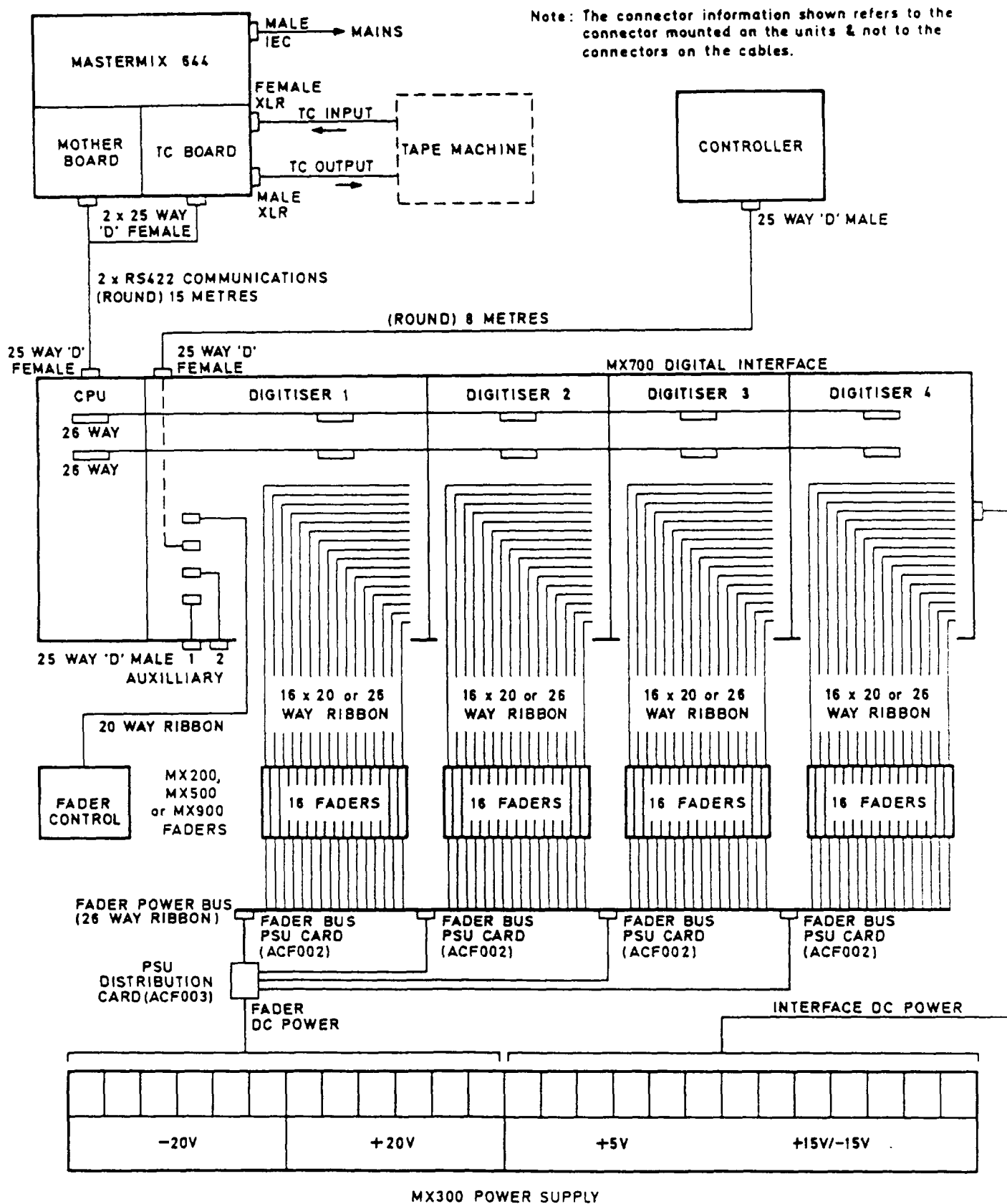
Consists of a PCB on which are mounted 20 switches used to control the system and the selection, and protection of the 4 'memories'. The PCB is normally supplied in a metal box (approx dimensions 150mm x150mm x 70mm high). On some consoles the controller may be mounted directly in the console.

- THE MX700 MASTERMIX INTERFACE

The Interface collects information from the control lines and distributes the relevant stored data to the controls which generated it on the last run of tape. This data is concentrated in the Interface and transmitted to the Computer down high speed serial links.

The MX700 Digital Interface provides all the intelligence necessary to control the VCA in response to control signals from the fader element or the previously stored movements. The summing of control signals to provide Automation Grouping is also under Computer control.

All fader movements are made by the Computer itself, under control of the fader element or the Computer's memorised version. That is, unless a catastrophic fault occurs, such as the Interface power supply's failing, in which case, control automatically reverts to the fader element directly.



MODIFICATION	ISSUE	DATE	DRAWN	CHECKED	DRAWING NO.
	A	26.11.84	JMW		A3/PM/PIM100/016 A3/PM/PIM900/016



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TITLE

MASTERMIX INTERCONNECTIONS FOR FULL RETROFIT

The MX700 Interface is normally supplied as a 19 inch rack mountable box with a height of 3U (132mm) and an approximate depth, allowing for cable entry of 520mm. The box should be positioned as close as possible to the console in order to minimize the length of the cable runs from the Fader to the MX700 Interface.

If the design of the console is appropriate, the PCBs which make up the interface can be mounted directly in the console.

- THE MASTERMIX INTERFACE POWER SUPPLY (AK Part No. AMM310)

Provides +5V, +15V and -15V DC power to the MX700 or MX800 Interface. It consists of a 19 inch rack mountable box with a height of 3U (132mm) and an approximate depth, allowing for cable entry, of 600mm.

If the console does not have the capacity to supply power to the AK Faders, the system can be equipped with a MASTERMIX INTERFACE AND FADER POWER SUPPLY (AK Part No. AMM300), which provides +20V in addition to +5V and +15V.

- THE FADERS

A retrofit package for the Soundcraft TS24 console includes Audio Kinetics (MX900) Faders which utilise the MX700 Digital Grouped Interface.

- THE FADER CONTROL

The Fader Control provides a set of switches and LED displays which are used with the MX700 Digital Interface to provide overall control of the Faders for such functions as Group Setup, All Write etc.

1.3 Copyright

The information contained in this document is the Copyright of Audio Kinetics Limited and must not be copied or reproduced without our written permission.

1.4 Additional Information

This manual deals primarily with the installation of the Faders and Fader Control.

The following manuals describe installation and commissioning of other parts of the MasterMix Automation System:-

MasterMix Installation Manual - MX644 and Controller (PIM644 or PIM645)

MasterMix Service Manual - Power Supply (PSM300)

MasterMix Service Manual - MX900 Fader (PSM900)
MasterMix Installation Manual - MX700 Interface (PIM700)

2. PARTS SUPPLIED AND EQUIPMENT REQUIRED

2.1 EQUIPMENT REQUIRED

The following equipment is required, in addition to a normal set of hand tools:

Cable Press.

High input impedance voltmeter.

Ribbon Bus Tester (See Section 4.2 for details).

Pair of scissors for cutting ribbon cable.

'Jaguar' IDC Insertion Tool JT 11-100-XX (AK Part No. KAP103)

2.2 PARTS SUPPLIED

The following outlines the parts supplied with a MasterMix Automation System for Full Retrofit to a console. The information in parenthesis are AK Part numbers:-

MasterMix MX644 Computer (complete with mains cable)	(AMM010)
MasterMix Controller	(AMM100)
MasterMix Controller cable	(AAM020)
MasterMix RS422 cable	(AAM010)
Box of 10 Formatted Floppy Discs Labels for discs	(XMD010)
MX700 Digital Grouping Interface	(MMK700)

This is available in four configurations :-

<u>No of channels</u>	<u>AK Part No.</u>
up to 16	MMK716
up to 32	MMK732
up to 48	MMK748
up to 64	MMK764

POWER SUPPLY (AMM300 or AMM310)

There are two possibilities :-

Interface Power Supply (AMM310) which provides +5V, +15V for the MX700 interface and the power for the faders is supplied by the console. The PSU to Interface Cable (AAM030) provides for connection.

Interface and Fader Power Supply (AMM300) which provides +20V in addition to +5V and +15V. Two cables : the PSU to Interface Cable (AAM030) and the PSU to Fader Cables (AAM050) provide for connection. A Fader PSU Distribution Card (ACF003) is included as part of the AAM050 cable.

Up to 64 Faders as required (MMF900).

A Fader Control (MMF190).

2.3 INSTALLATION KIT

The following details the additional parts required for installation of the faders in the console. They may be ordered as part of the MasterMix system or provided by whoever is doing the installation.

ORDERING INFORMATION

<u>No. of Faders</u>	<u>Number of Kits Required</u>			
	<u>ADM001</u> (16 fdrs)	<u>ADM002</u> (8 fdrs)	<u>ADM003</u> (Fdr Ctrl)	<u>ADM006</u> (Earth)
1 to 16	1	0	1	1
17 to 24	1	1	1	1
25 to 32	2	0	1	1
33 to 40	2	1	1	1
41 to 48	3	0	1	1
49 to 56	3	1	1	1
57 to 64	4	0	1	1

2.3.1 FADER INSTALLATION KITS (ADM001 & ADM 002)

The following table shows the quantities required for :-

- A single fader
- 16 faders (+ spares for breakages etc.)(AK Part No. ADM001)
- 8 extra faders (+ spares for breakages etc.) (AK Part No. ADM002)

CONNECTORS	AK PART No.	SINGLE FADER	16 FADERS (ADM001)	8 EXTRA (ADM002)
Audio I/O 4 way Jaguar Molex Socket.	KAP104	1	18	9
JAG 1300-104-424				
26 way ribbon open end Socket for power.	KAG030	1	19	9
20 way ribbon closed end Socket for fader links to interface.	KAG021	2	36	18
RIBBON CABLE				
26 way power bus	WAA101	0.150m	4m	-
20 way fader links to interface	WAA100	4m	70m	36m
FADER POWER CABLE				
32 x 0.2mm Green	WAE185		5m	-
32 x 0.2mm Red	WAE182		5m	-
32 x 0.2mm Blue	WAE186		5m	-
32 x 0.2mm Black	WAE180		5m	-
Power bus card	ACF002		1	-
Small cable ties	WAZ250	2	40	20
Large cable ties	WAZ251	1	24	12

The SINGLE FADER quantities are given for reference purposes only and should not be used for provisioning.

Please note that Audio Cables are not included.

2.3.2 FADER CONTROL INSTALLATION KIT (ADM003)

The following Kit (ADM003) is required for installation of the Fader Control :-

20 way ribbon closed end Skt	KAG021	2 Off
20 way ribbon cable	WAA100	4m

2.3.3 PROVISIONING

When provisioning for a specific console the quantities for 16 FADERS Kit (ADM001) and 8 EXTRA FADER Kit (ADM002) should be used. The table above assumes that at least 16 Faders are being installed and provisioning is done for increments of 8 faders as shown below :-

<u>No. of</u> <u>Actual Faders</u>	<u>Provisioning Formula</u>
1 to 16	16 FADERS
16 to 24	16 FADERS +8 EXTRA FADERS
25 to 32	16 FADERS +16 FADERS
33 to 40	16 FADERS +16 FADERS +8 FADERS
41 to 48	16 FADERS +16 FADERS +16 FADERS
49 to 56	16 FADERS +16 FADERS +16 FADERS +8 EXTRA FADERS
57 to 64	16 FADERS +16 FADERS +16 FADERS +16 FADERS

2.3.4 FIXING SCREWS

Note that the fixing screws used for the Faders and Fader Control are not included in the Installation Kits. It is assumed that the fixing screws for the original faders will be used. If this is not the case then suitable screws will need to be obtained (See Section 4.1.1).

2.3.5 EARTH CONNECTION KIT (ADM006)

AK PART No.		
32 x 0.2mm Green	WAE185	5m
Banana Plug 4mm Green (RS 444-191)	KAZ430	1

3. INSTALLATION OVERVIEW

3.1 MASTERMIX MX644 COMPUTER SITING

It is recommended that the MX644 be mounted within reasonably easy reach of the operator so as to allow access to the front panel controls and displays and facilitate floppy disc insertion and removal.

It is inadvisable to mount the MX644 in the console itself, as the internal power supply may produce interference.

The MX644 should not be mounted directly above significant heat producing equipment such as power supplies or power amplifiers.

The MX644 computer requires Timecode send and return to a track (usually Track 24) on the Master Tape Machine. These feeds are best hard-wired to the jackfield. It is unwise to bring Timecode through more channel electronics than absolutely necessary.

Details can be found in the MX644 Computer Installation Manual (PIM644).

3.2 MX700 INTERFACE SITING

The MX700 should be mounted in such a position as to limit the fader to interface ribbon cables to a maximum of 4 metres.

Since the fader links are terminated directly on the Digitiser PCBs via slots in the rear panel of the MX700, it should be mounted to allow easy access to the rear and top of the interface for maintenance purposes.

It is suggested that the MX700 be mounted beneath the console to allow the fader link ribbon cables to be tidily loomed into it. A pair of stands which raise the MX700 off the floor (NMM760 and NMM761) can be supplied.

Details can be found in the MX700 Interface Installation Manual (PIM700).

3.3 MX300 POWER SUPPLY

It is recommended that the Power Supply be mounted with the other studio power supplies, preferably in a 19 inch rack.

The Power Supply should be in a well ventilated site where the field and heat produced will not adversely affect other equipment.

It need not be physically close to the Interface or Console since 15 metres long power supply cables are provided.

Details can be found in the Power Supply Service Manual (PSM300).

4. MX900 FADER INSTALLATION AND CONNECTION

4.1 PHYSICAL INSTALLATION AND FADER ELEMENT CONNECTION

4.1.1 PHYSICAL INSTALLATION

Remove each input module and unscrew the blanking plate over the slot in the front panel. Discard the cover and inspect the screws. If they are M3 then they can be used to attach the electronics card to the front panel; if they are M2, they cannot be used and may be discarded. In the latter case, enough M3 screws must be obtained to allow for two per module with a few spares. The screws should be M3 pan, machine or cheese head 5 to 6mm long.

If the fixing of the front plate is by M2 screws, the holes in the modules will need to be opened out slightly to suit M3.

4.1.2 FADER ELEMENT CONNECTION

Identify the wires to the fader element. There should be five of them; Red, Yellow, Green, Blue and Black. It will be found that the green, blue and black wires are commoned at the channel PCB. The black wire is left untouched (it earths the fader element metalwork), the other four wires are cut 5 to 7cm from the module PCB and taking the MX900 module silk screen as a guide, inserted into the 4 way IDC connectors as follows :-

PL7 (towards the back of the console)

- Pin 1 Yellow wire from console module (audio out).
- Pin 2 Blue wire from console module (ground).
- Pin 3 Green wire from console module (ground).
- Pin 4 Red wire from console module (audio in)

PL8 (towards the sloping edge of the fader electronics PCB)

- Pin 1 Yellow wire to fader element (wiper).
- Pin 2 Blue wire to fader element (ground).
- Pin 3 Green wire to fader element (ground).
- Pin 4 Red wire to fader element (top of fader).

The wires are laid over the correct slot and pushed into the connector with the 'jaguar' insertion tool.

As each fader link to the console audio board is terminated, the connectors are pushed into place and the module screwed to the front panel. To check the connections, all VCA IN buttons are set with the button out and the audio path checked using the oscillator and the patch panel.

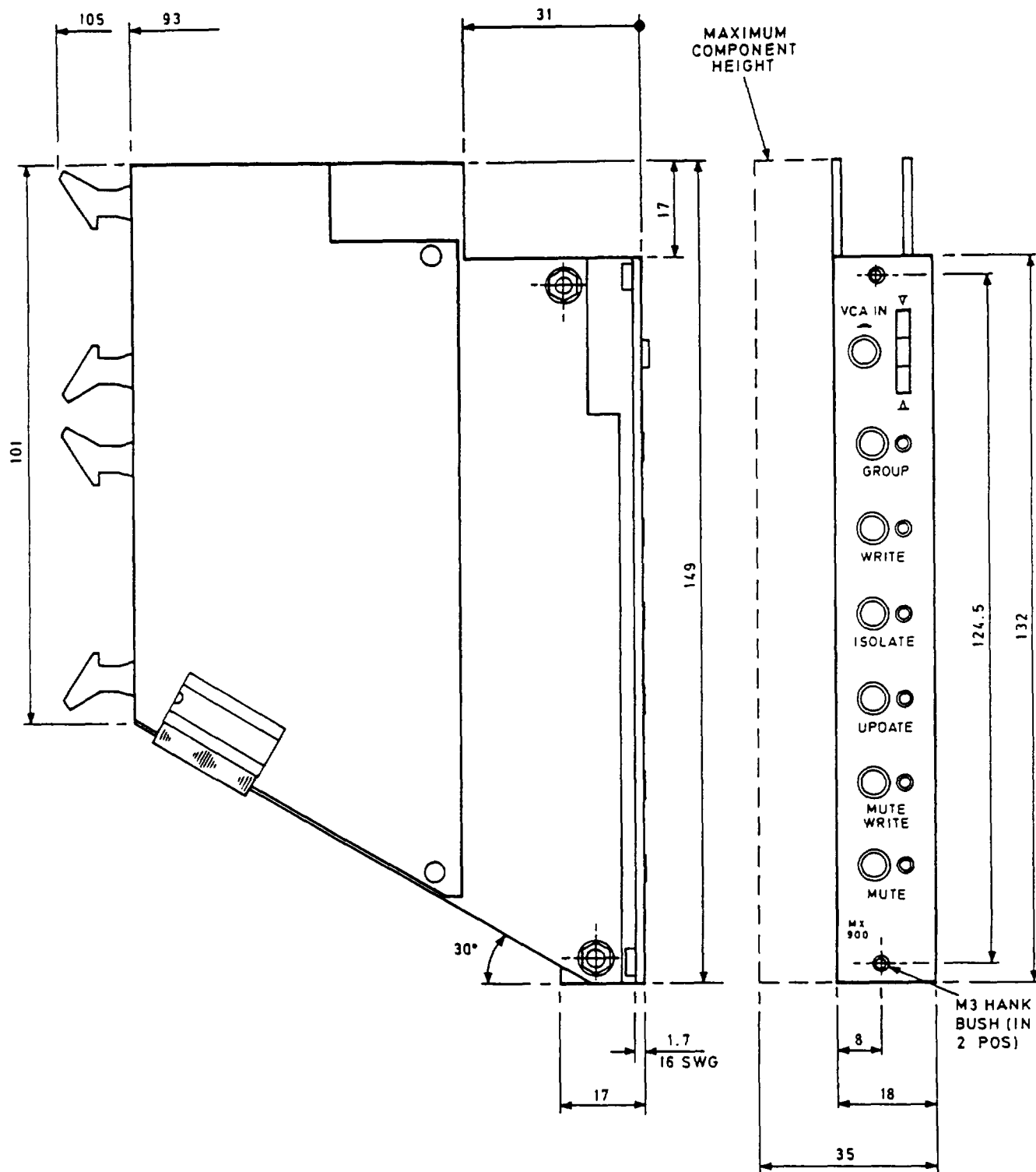


Figure 4.1

MODIFICATION	ISSUE	DATE	DRAWN	CHECKED	DRAWING NO.
	1	4.1.85	JMW		A3/PM/PSM900/4.1



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TITLE

**OVERALL PHYSICAL DIMENSIONS
 MX900 SERIES FADER**

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If any channel obviously has a curious law to the fader and does not properly shut the audio off, the connections are wrongly made and should be checked. This is very important where the connections to the faders are concerned because, for example, if the wiper and top of fader are interchanged, the reference voltage used when the automation is enabled will be shorted by the brush and track, resulting in the destruction of the fader.

4.2 FADER POWER HARNESS

The power interconnections for the Faders (and Interface) are shown schematically in Figure 4.2.

Details of the pin for pin connections and cable schedules can be found in the Power Supply Service Manual (PSM300).

The main power connection from the MX300 Power Supply to the console is by means of the Fader Power Cable (AK Part No. AAM051) which is equipped with a 26 way Female McMurdo Connector on one end (which mates with the 26 way Male McMurdo Connector on the MX300) and the Fader PSU Distribution Card (ACF003) on the other. The ACF003 should be mounted at a convenient point under the rear of the jackfield where it acts as a 'star' point for further distribution of power to up to four Fader PSU Cards (ACF002). The ACF003 occupies a space with approximate dimensions of 85mm x 60mm x 30mm.

The power harnesses between the ACF003 and the ACF002s are made up from individual 32 x 0.2mm wires supplied on the interface kit. See the Power Supply Service Manual (PSM300) for details.

The ACF002's provide an interface between the power harness and the 26 way Ribbon Power Bus. The 26 way Ribbon Power Bus consists of a 26 way ribbon cable with up to 16 (or if possible 24) 26 way IDC connectors mounted as described below. The IDC connectors should be mounted at a suitable distance apart so as to minimise the strain on the faders once the power bus has been connected to the 26 way connectors on the faders.

It is not recommended that the Power Bus be pre-made but rather that the dimensions be calculated once the Faders have been physically installed, as follows :-

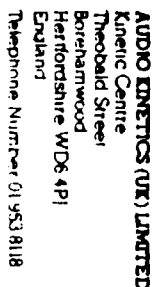
Lay the 26 way ribbon cable over the top of the Fader Modules with the marked wire (Pin 1) towards the rear of the console.

Starting from the left hand side of the console (Channel 1) a short piece of spare cable is left (50 to 60mm) then a mark for Channel 1 is made. Leave 4 module pitches then mark for Channel 2, then 4 module pitches then mark for Channel 3. Thereafter, make marks at 2 module pitches, except at the centre of the bus described below.

The extra length on the first two channels is only required for the first of the buses so that plugging and unplugging channels is made easier.

At the finish of the bus (after the 16th or 24th channel) a spare end 4 module pitches long should be left for the purpose of replacing a connector that fails during crimping or service.

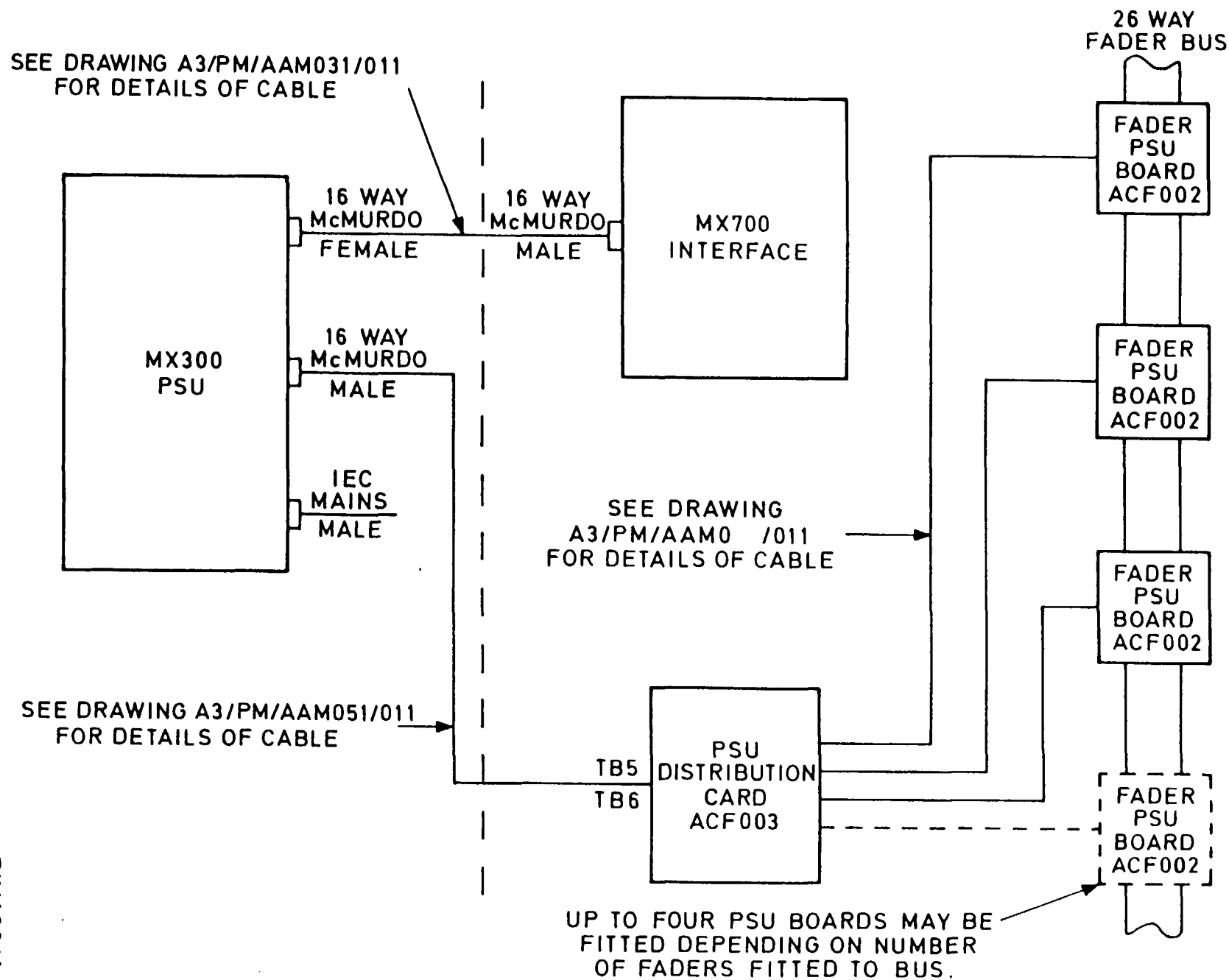
At the centre of the bus where the Fader PSU card (ACF002) is to be attached, a mark is made on the opposite side of the ribbon cable and an extra module pitch of slack is allowed each side.



OVERALL INTERCONNECTIONS DIAGRAM
FOR INTERFACE & FADERS

MODIFICATION	ISSUE	DATE	DRAWN	CHECKED	DRAWING NO.
	A	24.9.84	JMW		A4/PM/PSM300/L.1

PIM100/4.2
PIM900/4.2



The 26 way connectors should be crimped one by one taking care that the connectors will lie in the knee well with Channel 1 to the left with Pin 1 towards the front of the console and the open ends of the connector facing up. If there are polarising lugs on the connectors, these should all be facing to the left when the cable is in situ. This can be checked by ensuring that the arrow shaped mark moulded into the connector body is nearer the wire 1 side of the cable.

The connector for connection of the Fader PSU card (ACF002) should be crimped to the opposite side of the ribbon cable so that polarising lugs will be facing the opposite way.

Additional buses should be made similarly, with a spare end 4 module pitches long at each end. The ends should be taped to prevent shorts to chassis.

When crimping the connectors, the validity of the connection can be checked using a simple tester.

The tester consists of a male connector with all odd pins linked and all even pins linked. Either an Ohmmeter or a battery and buzzer is connected between the odd and even pins which will indicate shorts between adjacent conductors caused by the tines of the connector piercing adjacent wires as the crimp is made.

If the tester is plugged into the first connector on the bus, the crimping of subsequent connectors can be stopped before the tines mate fully home, allowing the offending connector to be realigned.

4.3 INTERFACE LINKS

A separate 20 way ribbon cable link is required from each Fader to the corresponding connector on the ACE252 Digitiser card in the MX700 Interface.

Details of the MX700 Installation can be found in the MX700 Installation Manual (PIM700).

The links should be as short as possible up to a maximum of 4 metres, terminated in a closed end 20 way IDC socket at each end, they should be cut and terminated in situ to achieve the correct lengths.

Allowance should be made for service loops for MX700 Interface removal and maintenance.

It is usual to bundle the links together in order to route the cables through the knee well to the MX700 Interface.

It is useful to work out how the Interface Links will exit from the console so that each cable will fall naturally over the correct connector on the ACE252 Digitiser Card

The first group of 16 links and the Fader Control Link (See Section 5.2) are laid into the MX700 Interface and each ribbon marked with their position of its connector (remembering to leave a service loop). The links are then removed, cut and clearly numbered both ends.

The next 16 links are treated similarly, and so on.

The connectors are then crimped into place at the fader end and each set of 16 links and laid into their final position in the well.

The ribbons are then dressed and harnessed lightly with support over longer runs and guided through the previously determined exit path. The MX700 is disassembled and the individual packs of ribbon sorted out into their correct numerical order. The Fader Control lead should be at the bottom of the first pack with its wire 1 at the opposite side to all fader links above.

The first pack is laid into the slot in the rear of the case and the links marked one by one so that, when cut, the connectors crimped to the ends will lie over their respective plugs.

Check that wire 1 is correctly lined with Pin 1 at each connector as marked on the ACE252 PCB. Note that on the ACE252 the Fader Control and Auxilliary connectors have Pin 1 on the opposite side to the Fader Connectors.

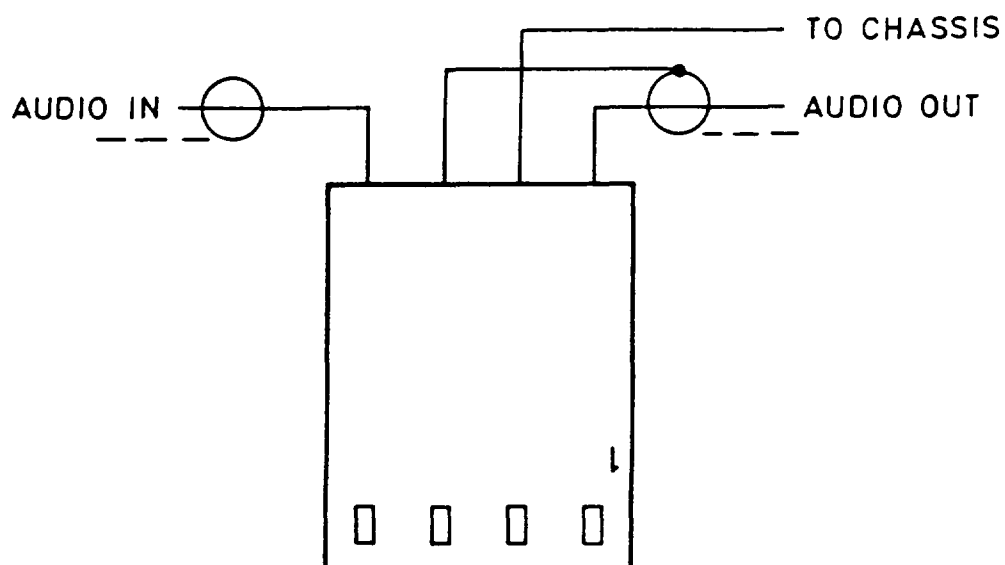
As the links are installed, the cable clamps at the rear of the MX700 should be fixed so that the amount of strain on the ACE252 PCBs is minimised.

The links do radiate interference, albeit at a very low level, and if they run parallel to unscreened mixing buses or mix input lines for significant distances, problems will occur.

Having established the optimum routes for the links, the bundles should be tie-wrapped and affixed to the underside of the console wherever required.

4.4 AUDIO CONNECTION

Audio connection to the fader is by means of a 4 way Molex connector as indicated in Figure 4.4 and Figure 4.1.



4 WAY MOLEX SHELL AND PINS VIEWED FROM CONTACT LOCKING SLOTS SIDE. SOCKETS DOWNWARDS.

FADER ANALOGUE GROUND IS CARRIED THROUGH SCREEN ON CABLE TO INPUT STAGE OF POST-FADER BUFFER AMPLIFIER IN CONSOLE MODULE.

CHASSIS CONNECTION IS TAKEN TO THE FADER ELEMENT METALWORK ONLY. THE FRONT PANEL IS GROUNDED VIA ITS FIXING SCREWS.

PIM100/4.3
PIM900/4.3

MODIFICATION	ISSUE	DATE	DRAWN	CHECKED	DRAWING NO.
	1	20.7.84	JMW		A4/PM/PSM200/5.6



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TITLE
AUDIO CONNECTIONS TO MX200/500/ 900 FADER SERIES