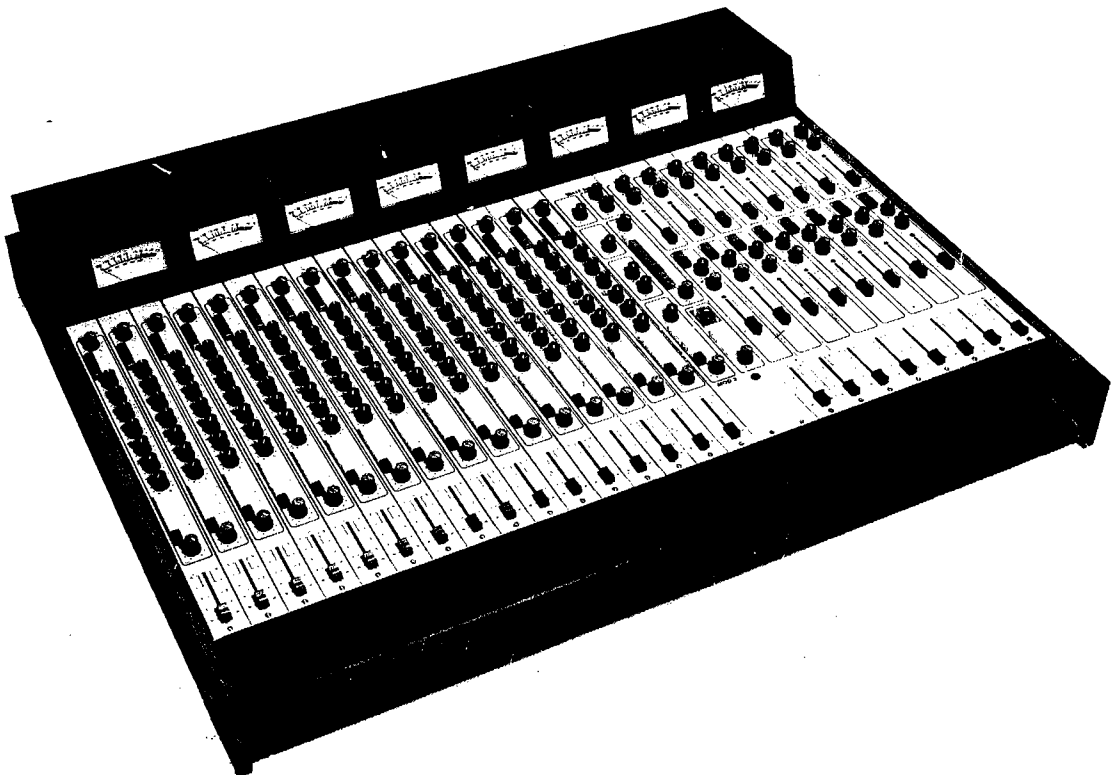


AHB

MODULAR MIXING CONSOLE

SERIES III



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I N T R O D U C T I O N

THE MODULAR SERIES 3 CONSOLE IS THE LATEST VERSION OF A STUDIO MIXER WHICH HAS AN IMPRESSIVE PEDIGREE. AT THE LAST COUNT OVER A DOZEN HIT RECORDS, COUNTLESS JINGLES AND SEVERAL MAJOR STAGE SHOWS HAVE BEEN MIXED ON MODULAR SERIES CONSOLES.

THIS PROVES THAT THE MIXER IS QUITE CAPABLE OF SUCCESSFUL COMMERCIAL RESULTS PROVIDED, AS WITH ALL PROFESSIONAL EQUIPMENT, IT IS USED IN THE MANNER FOR WHICH IT HAS BEEN DESIGNED.

IT IS ESSENTIAL THAT ALL THE OPERATIONAL AND CALIBRATION PROCEDURES DESCRIBED IN THIS MANUAL ARE FULLY UNDERSTOOD AND ADHERED TO AS IT IS ONLY BY KNOWING THE CAPABILITIES (AND LIMITATIONS) OF YOUR EQUIPMENT THAT PROFESSIONAL RESULTS WILL BE OBTAINED.

OUR TECHNICAL STAFF ARE ALWAYS AVAILABLE FOR ADVICE AND CONSULTATION AND IF ANY PART OF THIS MANUAL CANNOT BE UNDERSTOOD WE WILL BE PLEASED TO ASSIST YOU.

FINALLY, THE MOD 3 HAS BEEN CONSTRUCTED AND TESTED TO HIGH STANDARDS AND SHOULD GIVE YEARS OF SUCCESSFUL RECORDINGS BUT DON'T EXPECT MIRACLES, IF YOUR FADERS BECOME DIRTY THEY WILL SOUND NOISY, IF YOUR LEADS ARE OLD AND YOUR CONNECTORS TARNISHED THEY WILL DEGRADE THE SIGNAL THEY CARRY.

MOD 3 MANUAL: OPERATIONAL DESCRIPTION

This section explains the facilities and functions of the MOD 3 console from the viewpoint of the operator, the details of signal path circuitry not relevant to successful recording technique are provided in the schematic and circuit diagram. The identification of the controls and their operation is made easy by the cross referenced brochure illustrations which should be studied with this section. All input features are prefixed 'A', outputs 'B', auxiliary and monitor 'C'.

Since the format of MOD 3 is the conventional independent input module, output module type the location and function of controls is largely self explanatory and easily learned.

The step by step sequence of recording operations for standard 16 X 8 MOD 3 with an eight track recorder from original tracks to stereo mixing shows the use of all console features. Notes on the step up to 16 track operation for which MOD 3 is ready are included at the end.

1. STANDARD CONNECTIONS

When MOD 3 16 X 8 is used in a eight track studio the connection system listed provides all basic facilities for recording and mixing. Spare input capability is available and the individual operator can improve on the standard format to his own wishes, some ideas are suggested in the operational text.

MOD 3 MANUAL: OPERATIONS

STANDARD EIGHT TRACK SYSTEM CONNECTIONS

CONSOLE	CONNECTION	EQUIPMENT
Mic Inputs	3 Pin XLR	Studio Wall Boxes
Line Inputs 9-16	$\frac{1}{4}$ inch Mono Jack	Eight Track Outputs *
Line Inputs 1-8	$\frac{1}{4}$ inch Mono Jack	Spares available for effects inputs
Insert Points	$\frac{1}{4}$ inch Stereo Jack	Normalised Jackbay if required
Outputs 1-8	3 Pin XLR	Eight Track inputs 1-8
Outputs 1,2	Paralleled with eight track.	Stereo Master inputs L,R.
Monitor Inputs 1-8	$\frac{1}{4}$ inch Mono Jack paralleled with line inputs 9-16	Eight Track outputs
Monitor Outputs L,R	$\frac{1}{4}$ inch Stereo Jack	Control room amplifier
Aux 1 Output	$\frac{1}{4}$ inch Mono Jack	Foldback amplifier
Aux 2,3 Outputs	$\frac{1}{4}$ inch Mono Jacks	Echo & Effects inputs
Tape Input L,R	$\frac{1}{4}$ inch Stereo Jack	Stereomaster outputs L,R.

* Assuming tape recorder has one output per track switching between SYNC and REPRO Source. For machines with separate outputs connect SYNC to monitor inputs, REPRO to line inputs.

N.B. All insertion points are wired such that tip is send and ring is return. Send and return earths share the same sleeve connection.

EIGHT TRACK RECORDING SESSION

PLANNING: Once a session is in progress any attention given to routine equipment operation is at the cost of concentration on the client and his material. Five minutes thought on the arrangement of microphones and console channels, and the allocation of mixed outputs to tape recorder tracks repays in the smooth hitch-free running of the session. Microphones can be plugged up to any available channels but those nearer the centre of the consoles will cause less strain for the single operator being within easy reach. The outer tracks on tape are the most vulnerable to accidental damage while loading and unloading the recorder, the edge of tape becoming frayed or stretched and some oxide backing lost along with the programme content. High frequency content is most quickly degraded and for this reason the outer tracks are often reserved for low frequency programme, bass tracks for example. At least one track should always be left spare during early takes so that track reduction can be made as the session progresses. The channel routing system (A8, A9) allows panning for stereo groups between odd and even tracks but not between two odd or two even tracks, don't build up MONO tracks without first planning the allocation of stereo groups. Lastly annoying interruptions to trace and eliminate unwanted sounds can be eliminated by resetting console controls to "neutral" before a session commences i.e. gain & level controls go off, switches up, equaliser set for flat response and faders down.

LAYING FIRST TRACKS

With the track and microphone plan established each individual microphone channel requires setting for gain, equalisation and routing assignment before recording starts. Each microphone should be set individually, the fader position noted and then closed while another is set. Having established the initial gain and tone settings balancing can start in the normal way. When setting each microphone channel first raise the fader to the '1' mark, this leaves adequate adjustment for raising or lowering the volume later and the signal will be at the correct operating level for best noise and distortion performance.

Select MIC (A1 up) and make the necessary routing assignment to the output using buttons (A8) and pan pot (A9). Output fader (B1) should be positioned at '1'. The mic gain control can then be adjusted and the correct setting will show on the VU meter corresponding to the output in use. Console VU meters indicate output level when button LINE OUT (C5) is up, and monitor input level when in. The microphone is heard by selecting monitor MONMIX (C4) and raising the output monitor fader (B2) and monitor volume control (C4). If as a result of eq. settings (A6) the VU level changes significantly readjust at the gain control to return to a VU reading of '0' on peak loudness. Line inputs are treated similarly but using the fader as the level control. Select PAD (A2) if mic gain adjustment to minimum still results in high meter readings or if a line input signal needs a fader setting below '2' for correct operating level. This action will protect the programme from overload in the equaliser stage. When several microphones are routed to one output the resultant mixed signal will raise the indicated VU level and the output fader can be used to trim this down. If distortion is heard reduce the individual channel faders. The SOLO system (A11 and C4) is provided to check individual channels without disturbing fader balance. In brochure A11 is incorporated in routing description A8.

Echo effects are set up using auxiliary sends 2 & 3 which are post fader outputs. With the channels set up as described, settings of '5'-'6' on the channel send controls and the master controls (C2) will usually provide a normal line level output for the echo effect. Note 'tip' send and 'ring' return arrangement on inserts. Spare channel line input and the echo return system (C3) can be used to mix echo signals back into the console either to be recorded using the routing sections or to the monitor section only for 'wet' monitoring. To achieve this use the echo return section echo to monitor control (C4) or route the signal to a spare output and use the monitor fader for echo balance. In 8 track studios the auxiliary monitor input may also be used to monitor echo return.

The talkback section (C6) on the auxiliary module includes the facility to identify track 1 with track identification (slate).

OVERDUBBING

It is unusual for all the tracks needed to be completed at one take and the need arises to use the console to accept further live microphone signals and record these on spare tracks while mixing live foldback signals and monitoring off tape material for the next tracks. If all tape tracks but one are full, further capacity can be obtained by reduction (bouncing) onto the spare track. Select tracks that can be mixed without compromising the final mix, harmony vocals for example, and route these through console line inputs to the spare track. The mix balance will be heard on the output monitor section.

The next batch of tracks can now be balanced and the tape recorder set to 'SYNC' output on tracks already recorded to provide the control room and foldback monitor mix off tape. Two methods of the overdub recording are possible.

1. Using spare channels as line inputs, route the existing tracks to a spare output for monitoring. Send foldback from channel Aux 1 controls, select eq. cut unless time allows experimentation with eq. at this stage.
- OR
2. Using the console LINE OUT (C5) monitor mode. This refers to tape recorder output which will be received by the eight monitor sections (B2) instead of receiving console output. The monitor Aux controls also transfer to "off tape" programme and give the studio musician a synchronised tape mix. The monitor faders and pan (B2) provide the control room monitor mix, and monitor aux sends provide the foldback mix, from already recorded tracks. All the input channels are available for new programme sources and the outputs corresponding to unused tracks receive the new track mix. The monitor section on these outputs is cancelled back to the original console monitor mode (LINE IN) by the 'SYNC' switch above each section (B4). With the console in this mode overdubbing continues, each monitor section SYNC button being released and channel routing cancelled as the tracks are filled until the programme is completed. If the need for each effect output cannot be met with the aux send outputs, at any time a spare output can be selected and patched to the input of the effect required, spare inputs being used as echo return inputs.

MIXING

The STEREO monitor mode (C4) on MOD 3 selects outputs 1 & 2 as the main stereo monitor mix and the master recorder receives output 1 & 2 signals. Master machine replay can be monitored with monitor 'TAPE' mode (C4). The console

monitor section is no longer in use and channel line inputs 9-16 will be receiving the eight track replay tracks. Channels 1-8 are available to receive echo effects, additional live material if required, also spare output groups 3-8 can be cross patched to channel line inputs if a subgroup is required in the mix. VU meters 1 and 2 show the stereo mix output level to tape. Output faders and channel faders should be raised to '1' initially and the balance adjusted on the channel faders as normal. If the resulting output level is too high reducing the channel faders will run a lower risk of distortion than reducing the output faders. A disappointing 'muddy' sound can result from applying excessive amounts of equalisation boost when mixing, this is usually distortion in stages after the equaliser. The channel pad (A2) cuts incoming signals to allow maximum use of eq without this risk. The monitor solo system allows individual tracks to be checked for sound quality.

MONITOR SELECTOR SUMMARY

Line Out	Switches monitor mix between desk and 'off tape' monitoring.
Tape	Selects output of stereo master tape recorder to monitors.
Stereo	Switches monitors to output faders 1 and 2 for mixdown. Meters 1 and 2 read stereo output.
Mon Mix	Selects monitor mix to control room monitors. Programme determined by line out button.
Aux 1	Selects foldback (cue) to monitors.
Solo	Switches Solo (PFL) to monitors individual channel buttons then select solo signal.
Mono	Simply adds left and right monitor programme.
Dim	Cuts monitor volume without disturbing main settings. Also operated by talkback button.

MOD 3 16 X 8 16 TRACK OPERATION

Line Inputs 1-16	$\frac{1}{4}$ inch Mono Jack	16 Track Outputs
Outputs 1-8	3 Pin XLR via Jackbay or Switch Box*	16 Track Inputs 1-8 or 9-16
Monitor Inputs 1-8	$\frac{1}{4}$ inch Mono Jack	16 Track Outputs 1-8
Aux Monitor Inputs 1-8	$\frac{1}{4}$ inch Mono Jack	16 Track Outputs 9-16

* see text.

The standard MOD 3 16 X 8 has the complete monitoring section needed for 16 track recording, tracks can be laid up to eight at a time and channels 1-16 provide mixing inputs. Console outputs can be connected to the sixteen track machine either by installing jackbay points between console and recorder for cross patching or by fitting a switch unit arranged to connect console output 1 either to track 1 or 9, output 2 either to track 2 or 10 etc. This can be done either with individual switches or a relay system to transfer all eight console outputs simultaneously.

Monitoring for the tracks 9-16 uses the auxiliary monitor inputs (B2) and the changeover switches (B5). All recording should be with the console in the 'line out' (C4) monitor mode and SYNC buttons (B4) engaged on each output as it is recorded, released after record to provide off tape monitor. When tracks 9 and above are required operate the changeover buttons to transfer track outputs 1-8 to auxiliary monitor section so that tracks 1-8 are balanced on the upper monitor faders, pan and Aux 1 bank and new tracks monitored on the lower bank with console output monitor facility still available in the monitor 'SYNC' mode. VU meters will show the programme in the lower monitor bank at all times i.e. console output if SYNC buttons pressed, off tape programme if not.

MOD 3 / SR MANUAL"PHANTOM POWER CIRCUITS"

Condenser microphones may be used in two ways with these consoles.

- i). Microphones having batteries inside their case or external power pack. In both cases the output is audio only and will not need the special facilities available on the console.
- ii). Microphone is used without internal or external power supply and must be supplied with power to operate. The phantom power system distributes a voltage equally across the balanced audio lines to the microphone where it is tapped off and used to drive the internal amplifier. Many microphones of this type will generate their own power from any voltage above 9 volts. Others, notably the Neumann type, require 48 volts.

Both types of Allen & Heath consoles contain the facility as standard to provide phantom power distribution, but in the SR Series this is disconnected in manufacture since it is less likely to require phantom power and the accidental connection of unbalanced cables and signal sources is more likely in PA use.

Console Internal Power Distribution

On each input channel the microphone input XLR pins 2 and 3 are each connected via a 6.8k ohm resistor to the phantom power buss (pin 5). These pins 2 and 3 are also the microphone transformer primary. In the case of the SR Series these circuits appear on the multiway outlet socket. Chassis wiring transfers the phantom power buss (pin 5) to pin 4 on Auxiliary Module pcb A. This pin is connected to the power input socket pin 3. Standard MOD 3 consoles contain a link on Auxiliary pcb A which connects phantom power buss to console +24 volt supply, this voltage will also appear on power socket pin 3. *

To modify this arrangement for +48 volt (or other) phantom power supply disconnect the link on Auxiliary pcb A. Open the power input plug and connect new supply positive to pin 3, negative to pin 2. Refer to the POWER CIRCUIT Diagram. To connect phantom power on SR Series consoles add the link on Auxiliary A pcb between pins 4 and 6 or connect on external supply as described for MOD 3.

To disconnect phantom power on individual channels, remove the channel from the chassis. Locate the wire link which is close to the mic/line pad switch assembly. The link is marked "phantom power", and connects pin 5 (+24 volts) to the 6.8k ohm resistor on the microphone transformer primary. Cut this link off the pcb.

*** IMPORTANT**

On all MOD 3 consoles after January 1979 the link on Auxiliary pcb A has been replaced by a link in the power input plug between pins 3 and 4. To disconnect +24v power simply open XLR plug and remove link. To connect +48v phantom power, having removed link connect separate power lead to pin 3 of plug. The negative side of the 48v supply should be connected to pin 2.

MOD 3 MANUAL

OPTIONS

This section covers a number of useful variations on the standard product which are simple and require only the basic skills with a soldering iron & hand tools.

1. AUX 2, PRE POST SELECTION
2. USE WITH TAPERECORDERS WHERE OVU = +4dBm OR HIGHER LEVEL
3. REDUCED CONTROL ROOM MONITOR LEVEL
4. ALTERNATIVE PHANTOM POWERING ARRANGEMENTS (see drawing sheet)
5. INSERTION POINTS

1. AUX 2, PRE POST SELECTION

Auxiliary 1 circuit is provided for mixing foldback headphone monitor using the send controls on the channels and outputs. Electronically Aux 2, is equally suitable for use as foldback outputs only that it derives programme post channel fader. Some applications may call for more than one pre fade foldback mix or for the effects output Aux 2 to derive programme from some channels post fade and some pre fade, this requirement is anticipated and each channel module Aux 2 send control derives its programme via a wire link on the pcb which can be connected either to be pre (foldback) or post (effect) the channel fader. The standard MOD 3 is supplied with all Aux 2's connected post fade, the procedure for pre fade connection follows:

- i) Prepare work space with a clear flat area the size of an input module. Tools:- Small Pliers, Fine Point Soldering Iron, Solder and Screwdriver POZIDRIVE 2PT.

Remember when soldering that reliability starts here. A good solder joint is bright and shiny with the conductor visible at the tip of the joint surrounded by a cone of clean solder on all sides. Good soldering requires four conditions:

- a) Cleanliness. Dirty or oxidised parts will not be wetted properly by the hot solder.
 - b) Fresh Solder. Use a fine gauge (18 or 20 SWG) electronic grade solder with flux incorporated in the core.
 - c) Heat Both parts (pcb pad and component) must be in contact with the iron tip to reach solder melting point temperature BEFORE solder is applied.
 - d) Time is required for parts to reach solder M.P., the larger the part the longer required. The joint needs at least four seconds to set. Keep parts steady for this time.
- ii) Remove channel modules for modification by unplugging the connectors beneath the meterhood and releasing the two 4BA fixing screws & washers. Transfer module to work area.

iii) The Aux 2 pre/post selector link is on the pcb in front of the Aux 2 volume control and four holes are arranged in pairs, one pair forming the POST circuit, and one pair forming the PRE circuit as indicated.

To change states either cut off the existing link completely and make the new link with fresh wire or carefully remove the solder from the outer end of the link, lift this end free of the pcb, swing it across the new location and solder in place.

Any or all modules can be modified in this way and a mix of prefader Aux 2 & post fader Aux 2 sends is possible.

2. USE WITH TAPE RECORDERS WHERE OVU = +4dBm OR HIGHER LEVEL

Audio operating levels referred to programme meters are standard power measurements made on a 1KHz sine wave tone. The power is expressed in decibels (dB) relative to the standard level 0dBm which is the voltage developed across 600 Ω when 1 mw power is dissipated. The dBm while strictly a power measurement has come to be used as an expression of voltage since most audio equipment output amplifiers will produce the necessary power to satisfy the 600 Ω requirement but rarely are loaded by 600 Ω , the actual terminal voltage remains constant at 0dBm = 0.775v RMS. When a manufacturer fits a VU meter to his equipment the red sector above OVU indicates programme levels that are in danger of overload distortion, the ear being the final judge of safe maximum level depending on the type of programme and the ratio of peak to average power. The volume of a reference tone at OVU will be determined by the decision of the manufacturer as to his equipment operation level and will vary between manufacturers. Thus it is quite likely that, say, a recording console output adjusted on reference tone to OVU will, when connected to the record input of a tape recorder, fail to produce a corresponding OVU reading.

When studio equipment is interconnected in this way it is necessary to refer to the manufacturers data to obtain the operating level that corresponds to OVU before making calibration adjustments between equipment. A typical requirement is for the console outputs and meters to be aligned to correspond with tape recorder inputs & meters to enable the best use of the dynamic range characteristics of both equipments and avoid unnecessary noise and overload. Console output signals need to be at sufficiently high level to be immune from electrical interference so that distribution does not involve expensive shielding. Higher operating levels are only obtained with more expensive components and cost/performance compromises must be reached. The performance of magnetic tape dictates the range of operating levels used for tape recorders, consoles' outputs typically provide a suitable level for recording without significant additional gain or attenuation.

Two common operating levels are OVU = +4dBm and OVU = 0dBm. MOD 3 is to the second standard. Tape recorders having the same operating level will give optimum results without adjustment. Tape recorders using the OVU = +4dBm standard do not give optimum results since the input signal from the MOD 3 is not sufficient to produce maximum modulation of the tape. Correction of the 4dB mismatch can be made either at the tape recorder or the console. If tape recorder input and output level controls are available these should be used. Select the recorder meters to show incoming signal. Route a 1KHz sine wave through the console to obtain OVU on all console outputs. Adjust each recorder track input level control to increase the recorder gain so that the recorder meter now shows OVU instead of -4VU. Treat each track identically and then record a section of tape with this arrangement. This will be used to adjust the recorder output controls to reduce output level 4dB.

Select MOD 3 monitor mode "LINE-OUT". Console meters now show tape output signal. Play the recorded section of tape, the console meters will be overloaded by the signal and be on the R.H. end stop. Reduce the output level setting on each recorder track in turn to obtain a console reading of OVU. This system uses the gain available on most tape recorder inputs and does not compromise the performance of the MOD 3.

If the tape recorder does not offer this facility the correct level can only be achieved using preset volume controls within the console at the expense of output headroom giving a greater risk of overload when recording. Input & output modules require attention for this variation.

i) Recalibration of Console Outputs:

Each output module requires modification so that the output meter reads 4dB lower. This achieved by padding the meter output on the module p.c. board.

Remove the output module by unplugging the connectors beneath the meterhood. Release the two module 4BA fixing screws and washers, raise the module from the chassis slightly and unplug the phono lead to the socket tray. Transfer the module to the work surface. Work on the module in order and replace them in the same sequence.

The output to the meter leaves the module on edge connector pin 8. Approx 1 inch to the left is a wire link labelled LK in the signal path. Remove this link by cutting at each end and removing the solder from the joint. Fit a $\frac{1}{4}$ watt carbon film 5% tolerance resistor value 2.7 kilohm in place of the link.

Replace the module. If an accurate A.C. voltmeter is available check the new meter calibration by setting up the console with a 1 KHz sine wave tone routed to each output. Measure the voltage across the output socket pins 1 & 3 and adjust for +4dBm (1.23v RMS). Check for output meter reading of OVU $\pm \frac{1}{4}$ dB. The meter reading will automatically be corrected very close to this reading by the resistor. Small corrections can be made using the preset behind each VU meter. This procedure can be used at any time to calibrate the console meters. The standard console is adjusted for OVU = 0dBm. Check meter mechanical zeros first with no signal present.

ii) Recalibration of Console Channel Line Inputs

Record a section of tape to the new calibration this will be used to align the channel module line input presets. Remove the channel from the chassis, lay a protective surface across modules to the left and place the module, components upper most, on the surface. Reconnect the edge connector circuits using the 8 & 10 way extenders from the spares kit. The line input preset is found between the 10 way edge connector and the panel, anticlockwise rotation reduces the signal volume.

Set the tape recorder to replay the new +4dBm reference tone and route the channel to an output, adjusting the faders for OVU indication. Turn the preset anticlockwise until the VU reading is -4dB. This restores the normal signal level through the channel and allows faders to be used at their normal positions. Repeat for all channels.

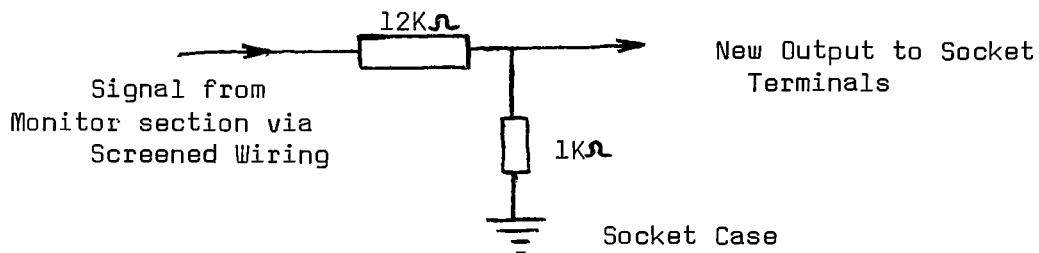
3. REDUCED CONTROL ROOM MONITOR LEVEL

The monitor volume control on MOD 3 gives useful control of the signal to the monitor amplifiers over a 20dB range when used with power amplifiers whose

rated sensitivity for maximum power is 0dBm (77mV RMS). Several manufacturers of power amplifiers design their products to give rated output for lower input signals, for example the QUAD 303 which requires -4dBm (500mV RMS) approximately. With high sensitivity amplifiers the volume control is nearly always a minimum and fine control is more difficult. The monitor output volume can be reduced at the output socket on the Auxiliary panel to permit normal operation under these circumstances. A soldering iron, solder and four $\frac{1}{4}$ watt resistors will be required, (2 off 1 kilohm, 2 off 12 kilohms).

Remove the connectors and fixing screws holding the Auxiliary module in place. Transfer it to the work area.

Prepare two 20dB resistor attenuators by twisting together the leads of two resistors one 1 kilohm, one twelve kilohms, both $\frac{1}{4}$ watt 5% carbon film. Make the joint such that the resistor bodies are at right angles, solder and trim the joint $\frac{1}{2}$ inch from the resistor bodies.



Remove the monitor signal wires from the jack socket tip & ring terminals. Leave the screen attached. Connect the resistor attenuator across the jacksocket according to the sketch above 1 kilohm to earth, monitor signal to 12 kilohm, output to socket from junction.

4. ALTERNATIVE PHANTOM POWERING ARRANGEMENTS (see drawing sheet)

Refer to drawing sheets for power supply & phantom power recommendations.

5. INSERTION POINTS

Switching stereo type (3 pole) $\frac{1}{4}$ inch sockets are in circuit on each input channel after the mic/line switch and before the equaliser. On each output an identical socket is in circuit after the output amplifier and before the output socket and monitor/meter feed. In both cases the input is on the ring circuit and will accept line level signals. The output is on the tip circuit and provides a line level signal, minimum recommended load is 600 ohms. Many basic crosspatching operations to adapt the standard console format can be achieved with a stereo jack-jack lead with tip & ring circuits crossed at one end. This lead will also inject oscillator signal to the channel & outputs.

MOD 3 MANUAL: SERVICE

The following section is not intended to enable non technical operators to repair printed circuit cards (these should be returned to the factory or an agent for service) rather to cover the routine maintenance requirements and enable the operator to pin point a faulty section and bypass it so that work may continue while the repair takes place.

Routine Maintenance

The construction & material used in MOD 3 will give long and satisfactory service under normal conditions of use. A few guidelines follow which will help prolong the useful life and minimise service expenses.

Cleaning. Avoid the use of solvents such as methylated spirit or isopropyl alcohol which may damage paint finish, control knobs and meter dials. A damp clean cloth is the best method for removing everyday contamination.

Controls. Even the most expensive control has a limited life, when the mechanical action becomes worn and imprecise and the active electrical parts noisy. Control life is prolonged by care with refreshments near the console and never forcing a control. Noisy controls can have their life extended by the use of proprietary cleaning fluids suitable for use on electrical and plastic material, "FOSPRO" available from FUTURE FILM DEVELOPMENTS, LONDON is a suitable cleaner for application to fader sliders and fader & pot control carbon tracks, push button switch elements and edge connectors. Always use minimal quantity.

Power Supply

A power supply failure is unlikely to occur but as power is essential any fault finding routine should start with a check of power supply output on load.

Check with a D.C. meter on the BLUE & BROWN (+ve) wires inside the power plug. Correct voltage 24.0 ± 1 volt.

This voltage is also present on all chassis 10 way socket pins 2 & 6 (+ve) and on the meter illumination circuit.

Low supply indicates either a failure in the power unit or a fault in the console which draws excessive current from the supply triggering its protection circuitry. Either low distorted audio output or no output will result. Meter lamps dim or off.

Unplug supply connector at console and measure for correct D.C. voltage.

If correct voltage is present fault is in console. A faulty channel can be found by lifting each channel in turn until clear of the 10 way socket. Monitor the power supply output and note the channel that clears the fault. A short circuit on the meter illumination cannot be found with an ohm meter since the filament bulbs when cold offer a very low impedance. Remove the lamp power wires inside the meterhood to check for a short.

Meter Calibration: Equipment Needed: Sine wave signal source 1 kHz.
Accurate A.C. voltmeter.
Preset adjuster (small screwdriver).

Under normal conditions of use the MOD 3 VU meters will need only minor recalibration to correct for error of less than 1dB. Should greater errors show up check for damage to the meter p.c.b components before attempting recalibration.

To recalibrate VU meter

- 1) Turn off all console inputs, tape recorders etc. check each VU for mechanical zero (no deflection) setting and readjust the slotted zero set button where necessary.
- 2) Connect sine wave generator to one input and A.C. voltmeter across output one. Adjust channel and output controls for a 1 kHz sine wave output of 0dBm. Make VU meter adjustment with the preset at the rear of the meter. Indication may vary slightly between meterhood raised and lowered positions. Check in the lowered position before moving the voltmeter to output two and repeating the procedure.

Replacing Meter Bulbs.

Two types of meter/pcb/illumination systems are in use:

- 1) Rear illuminated modutec type.
- 2) Internal illuminated Alps type.

Type One

Uses one pcb/meter assembly for a group of four meters, two sets making a complete meterhood. All bulbs are in parallel and the failed unit(s) will be obvious.

Tools: Light pliers, small tip soldering iron, new bulb.

Turn off console power. Raise meter hood.

Use pliers to release the two large nuts on the rear of each meter. These nuts hold the p.c. board.

Care: Four glass diodes lie between each pair of nuts, avoid damage with pliers. Lower the pcb from the rear of the meters and support this to prevent strain to the signal/power wiring.

Melt the solder joint on one side of the dead bulb and lift the bulb leg free. Melt the other joint and remove the bulb.

Form the legs on the new bulb to the correct shape. Solder it in place by heating the pc board in advance placing the tinned bulb lead on the pool of molten solder.

Type Two

Four meters are mounted to each meter p.c board. Two boards making a complete meterhood. Each meter has a filament bulb in each lower corner accessible by removing the front cover with care not to damage the paintwork, use a credit card or similar stiff plastic to lever the cover off. The two bulbs in each meter are in series, the bulb circuits of the four meters on each board are also in series, failure of any one bulb extinguishes the seven others. Remove the cover from all the meters in the group of four. Use multimeter on ohms range to detect the dead bulb by measuring each bulb in turn. Faulty unit will read high resistance. Cut the faulty unit away and replace with a new bulb taking care not to disturb the red wires.

CONSOLE MODULE FAULT FINDING

From the point of view of the non-technical operator the priority in fault finding is to identify the faulty section and restore operation of the rest of the console as quickly as possible. This process should always include checks on the other equipment in use, microphones, cables, taperecorders etc., before a console module is extracted for service. Modular design offers the minimum down time and disruption in the event of failure, fault finding can take advantage of modular construction by allowing a new combination of inter-equipment connections to be made. Guidelines are given to pinpointing fault areas before service work commences:

<u>SYMPTOM</u>	<u>POSSIBLE FAULT LOCATION AND PROCESS OF ELIMINATION</u>
SIGNAL NOT RECORDED	<p>FIRST CHECK FOR INSERTION PATCHING ERROR, ROUTING ERROR.</p> <p>CABLE FAULT: Swap both ends of console output lead. Fault follows lead, lead faulty.</p> <p>TAPERECORDER FAULT: Swap console output lead at recorder end only. If fault persists on original recorder channel, check recorder channel for fault.</p> <p>CONSOLE FAULT: Swap console output lead at console end only. Fault remains at same console location but transfers to new recorder track, suspect faulty console output module.</p> <p>Swap output modules, replace original wiring order. Fault moves with module, return faulty module for service. Fault remains in original output <u>POSITION</u> suspect chassis fault in edge connector or phono plug.</p>
LOW DISTORTED OR ABSENT MIC SIGNAL.	<p>FIRST CHECK FOR INSERTION PATCHING ERROR, MODULE CONTROL SETTING ERROR.</p> <p>MIC FAULT: For condenser mics check phantom power availability at end of cable, voltage present on pins 2 and 3. Lack of volts or imbalance check for correct balanced wiring.</p>

CONSOLE FAULT: Swap microphones. Fault persists Swap console input plug to another channel. Copy control settings. Fault clears suspect channel fault. Swap channel to another position in console keeping original cables and plugs. Fault persists return channel for service. Fault clears suspect chassis fault. Check edge connector wiring.

LOW, DISTORTED OR ABSENT
OFF TAPE SIGNAL.

FIRST CHECK FOR INSERTION PATCHING ERROR AND MODULE CONTROL SETTINGS.

TAPERECORDER FAULT: Swap recorder output lead at recorder end only. Duplicate control settings on new receiving module. Fault persists suspect recorder module fault.

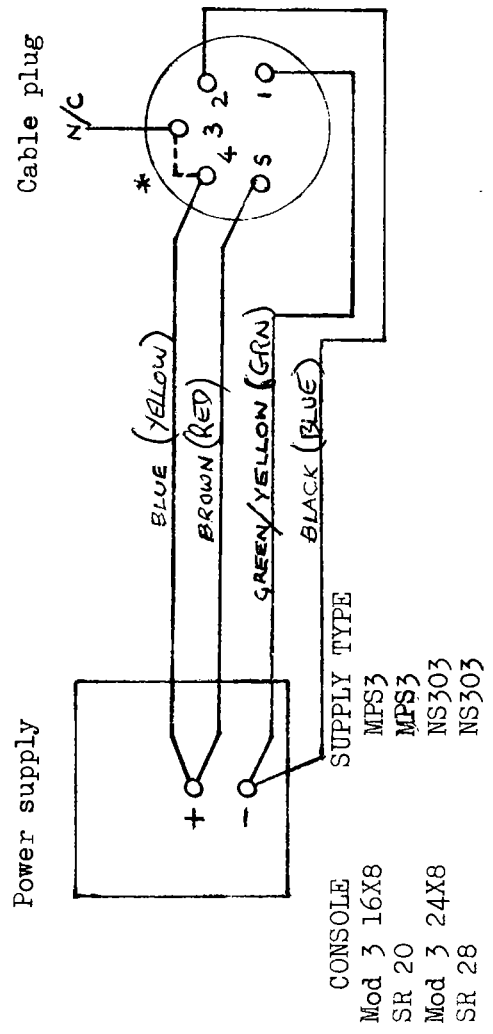
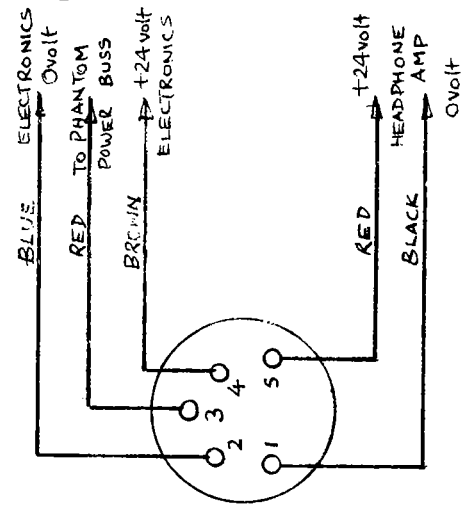
CABLE FAULT: Swap recorder output lead at both ends (including console channel to monitor input link if used). Fault follows cable suspect cable fault.

CONSOLE FAULT: Swap channel input lead(s) with known good channel. Fault persists on suspect channel, replace lead(s) to the original arrangement. Transfer module to another chassis position. Fault persists module is faulty. Fault clear suspect chassis fault at original location. Confirm with a known good module. Check edge connector circuits.

MODULE SERVICING

Refer to the circuit diagrams and system schematic diagrams for details of electronics. Service charts for the input and output modules identify the amplifier sections and give operating voltages for these. We recommend in the interest of long term performance that only experienced personnel, the dealer or AHB undertake repair work to module electronics. See guarantee procedure card if applicable.

Panel socket



CAUTION: PHANTOM POWERING puts D.C. voltage on microphone input XLR pins 2 and 3. A short circuit between either pin and ground (pin 1, cable screens and mixer chassis) will result in severe distortion and possible damage to the microphone input transformer in the input module.

When phantom power is in use only balanced cables and microphones must be connected to the microphone inputs.

* All MOD 3 consoles are supplied with +24volt phantom power connection internally as standard.

All SR series consoles are supplied with no internal connection of phantom power.

See the separate section " Phantom power circuits" for details on the connection of different voltages and the procedure for disconnection of the internal supply.

* Link now inside 5 pin plug (as diagram)

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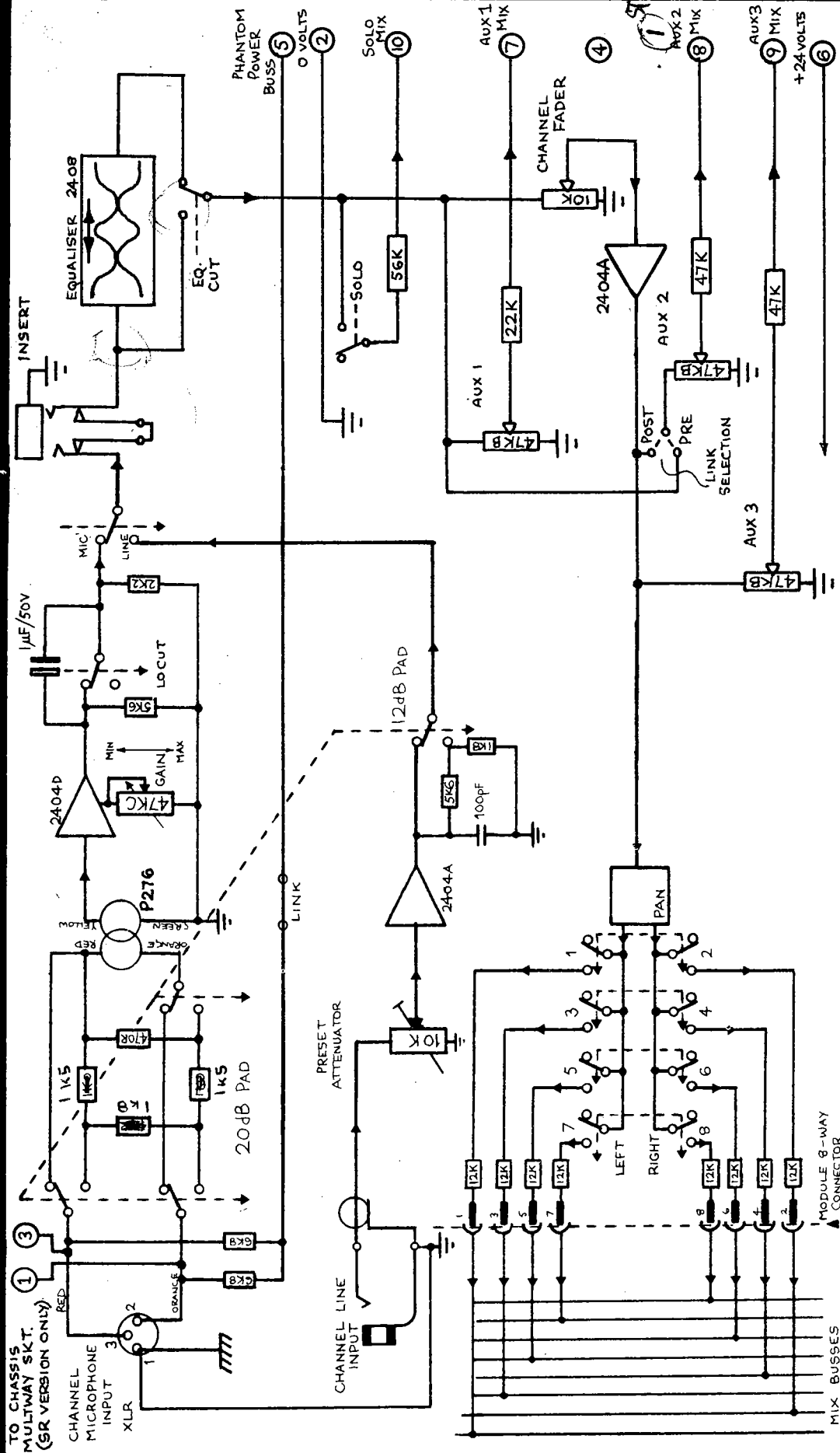
POWER SUPPLY CONNECTIONS: MOD 3/ SR series.

Nov. 1978

MOD 3 MANUAL:

DRAWING LIST.

SYSTEM SCHEMATIC	2401
INPUT MODULE	2410
OUTPUT MODULE	2409
CHASSIS CCTS.	2418
EQUALISER	2408
MIC PREAMP	2404D
LINE BUFFER	2404A
AUX 1 MIX AMP	2404B
MONITOR LINE AMP	2404E
AUX 2, 3 AMP	2404D
OUTPUT MIX AMP)	2406A
MONITOR MIX AMP)	
OUTPUT LINE AMP	2406B
AUX 1 OUTPUT AMP	2405A
TALKBACK PREAMP	2405B
SOLO MIX AMP	3104
HEADPHONE AMP	2417
OSCILLATOR	2416
INPUT SERVICE CHART	
OUTPUT SERVICE CHART	
MPS 3 POWER SUPPLY	



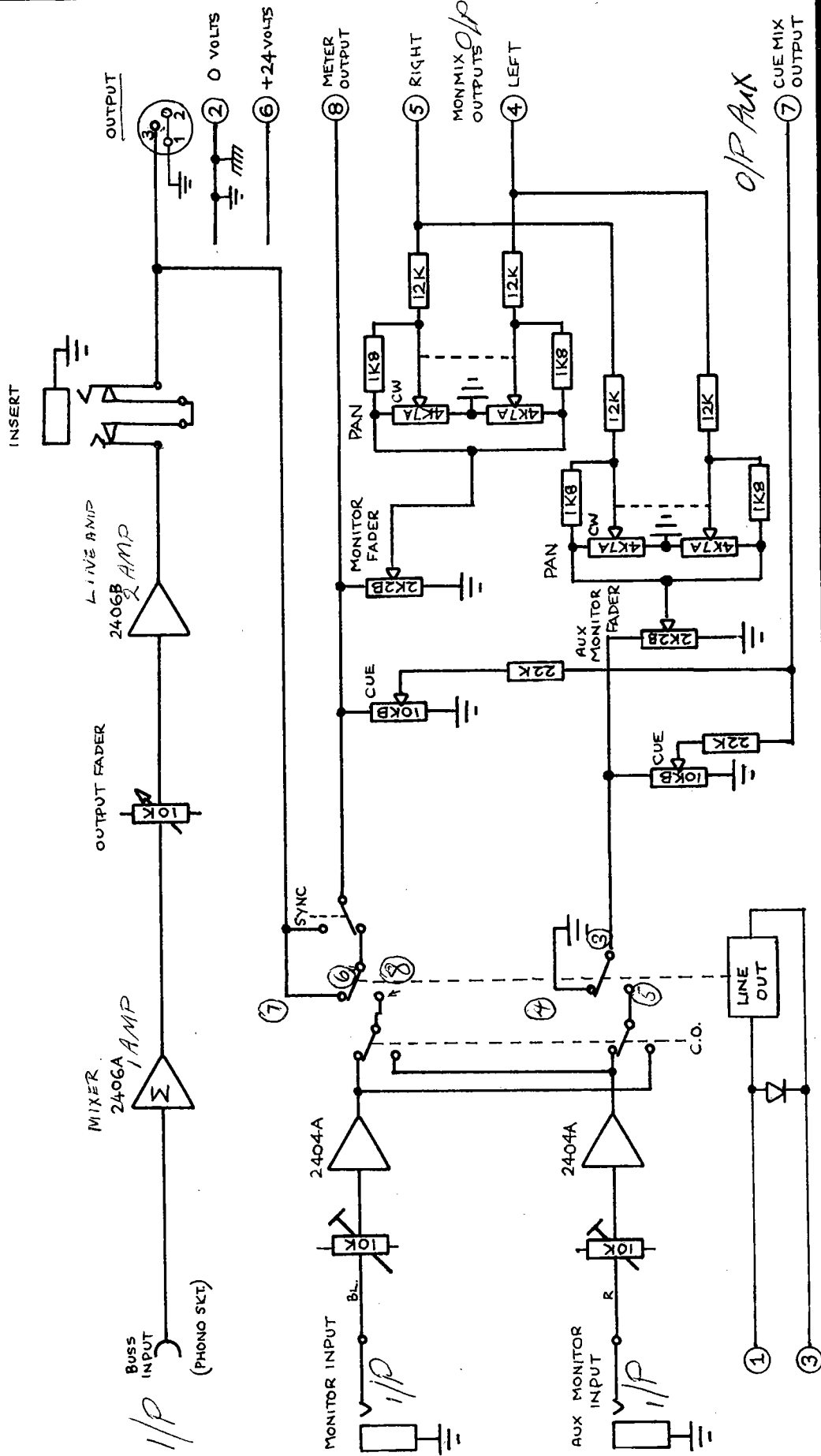
MOD 3 / SR SERIES INPUT CHANNEL

DRAWING NUMBER
2410
REV. 12.78.

— O — EDGE CONNECTOR PIN NOS.

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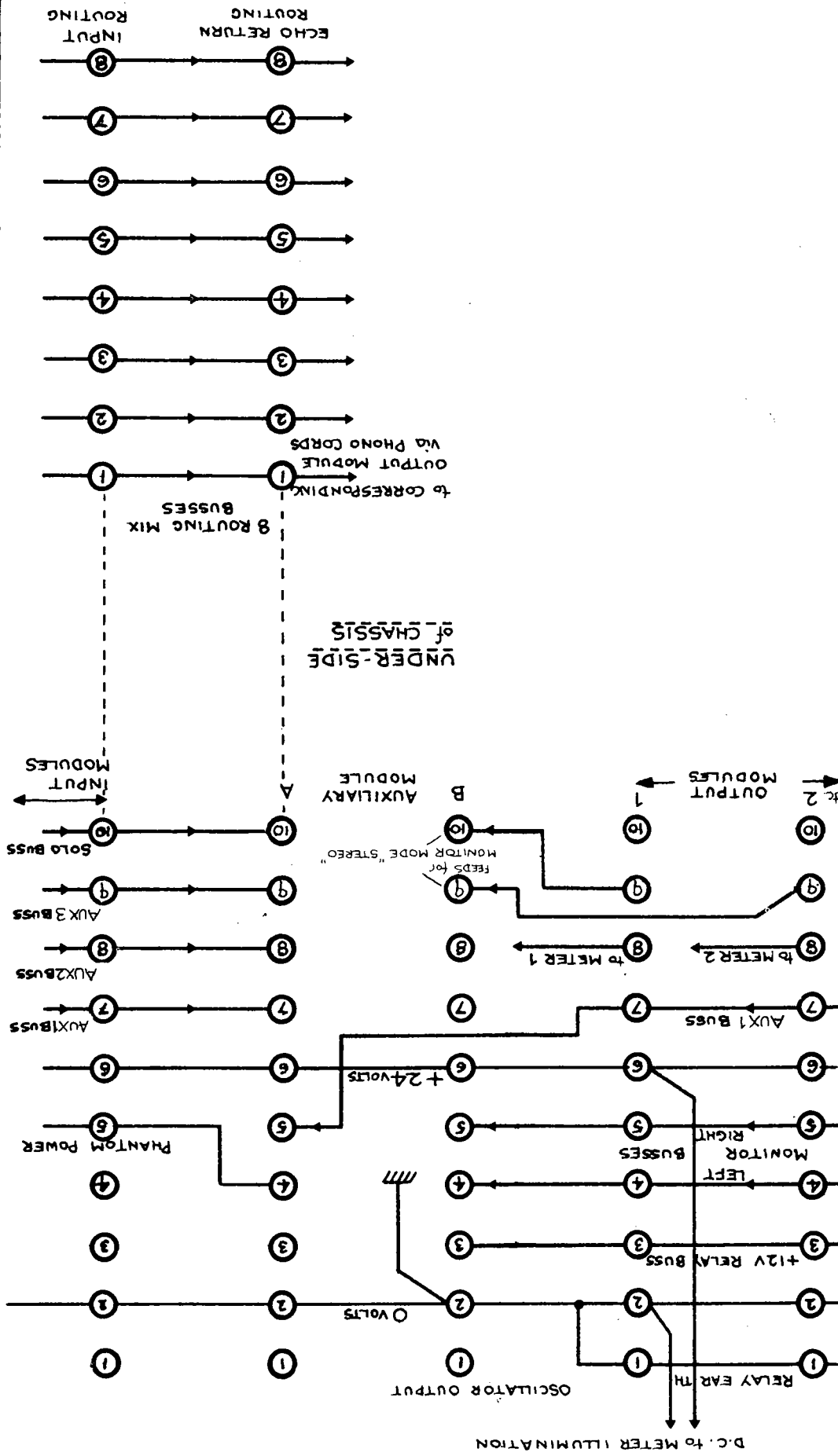
Allen and Heath Limited.

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London, N8, 7BR. Tel: 01-340-3291.

MOD 3 OUTPUT MODULE SERIES FIVE

DRAWING NUMBER
2409
R 15.12.78

○ — EDGE CONNECTOR PIN Nos.



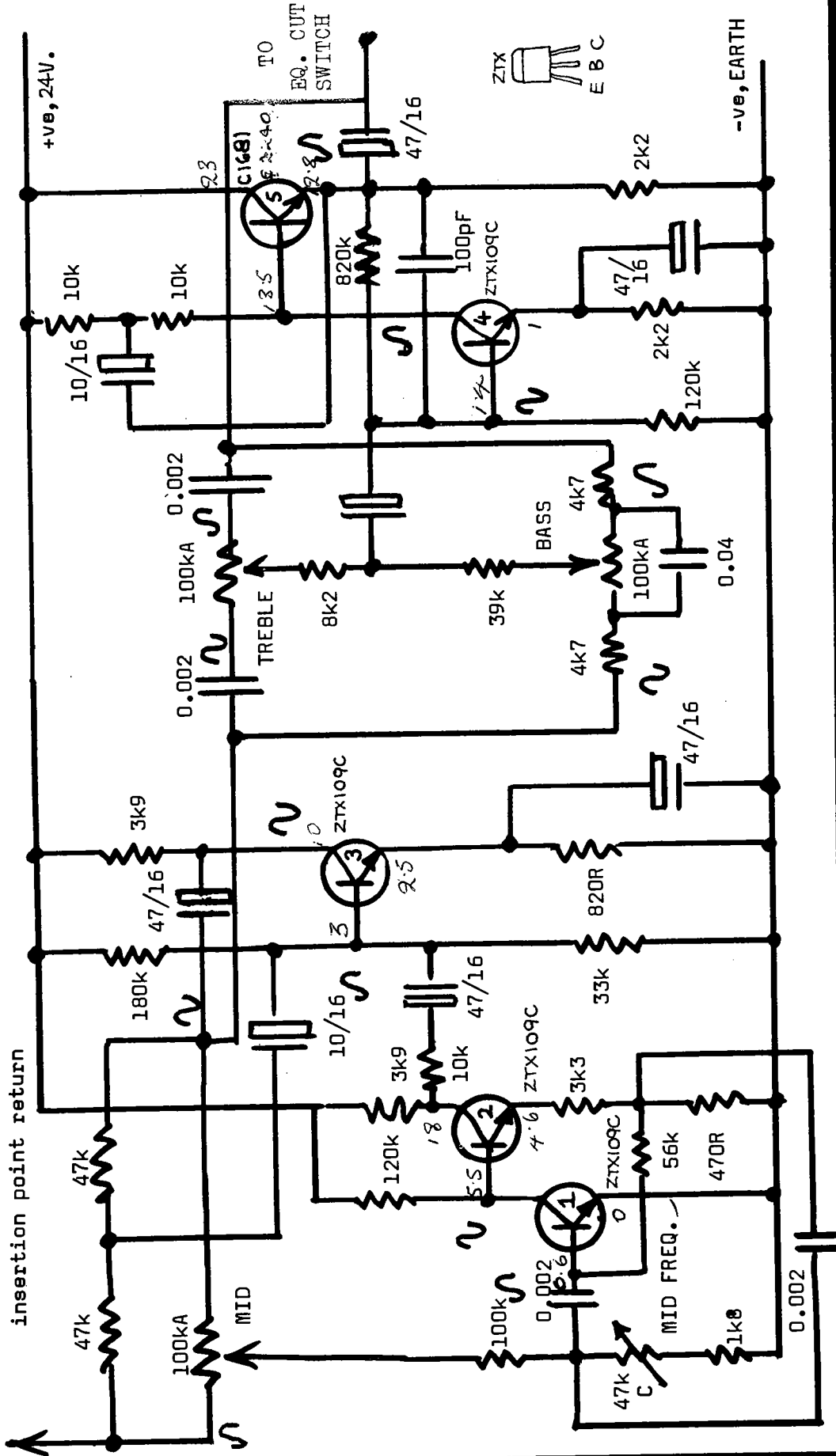
MOD 3 SYSTEMS: STANDARD CHASSIS CONNECTIONS
2418

STANDARD UNITS PRODUCED SEPT. 78 ONWARDS. NUMBERS IN CIRCLES REFER TO CHASSIS EDGECONNECTOR PINS AS SEEN WITH BASE OF UNIT REMOVED.	DRAWN	12.12.78 <i>AK</i>
	CHECKED	13.12.78 <i>MA</i>

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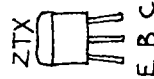
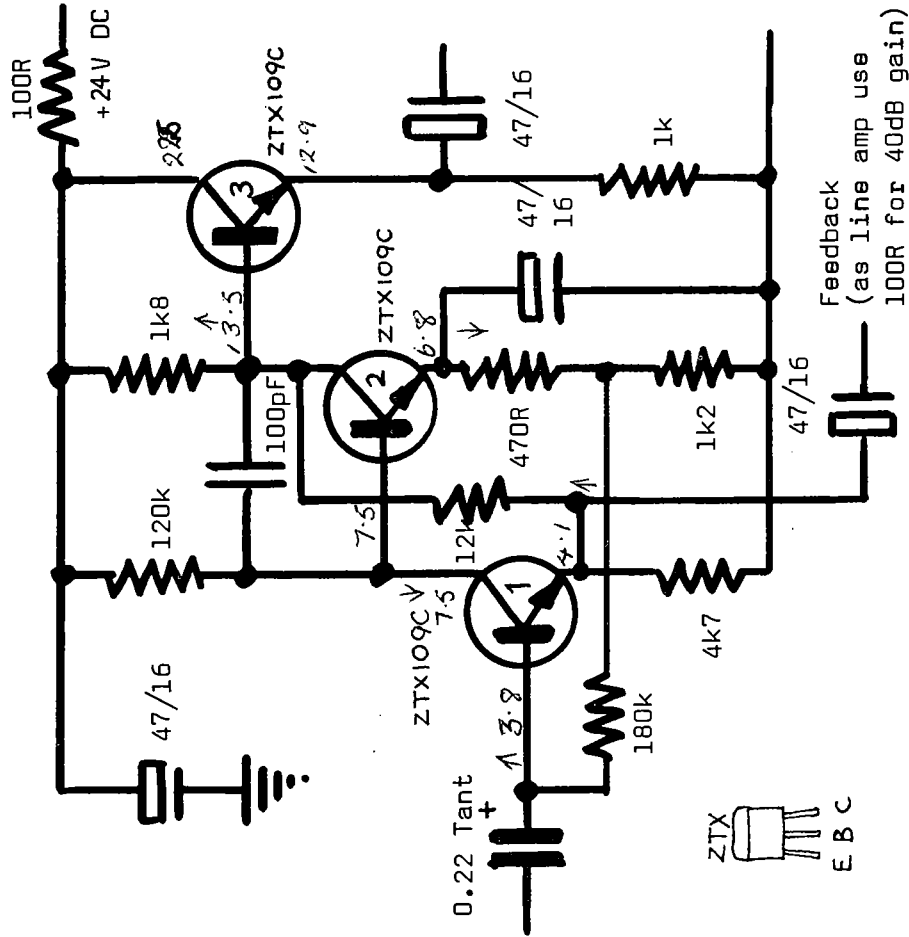
MOD 3 SR SERIES AMPLIFIERS: EQUALISER

Capacitors are all shown as mFd./µV.

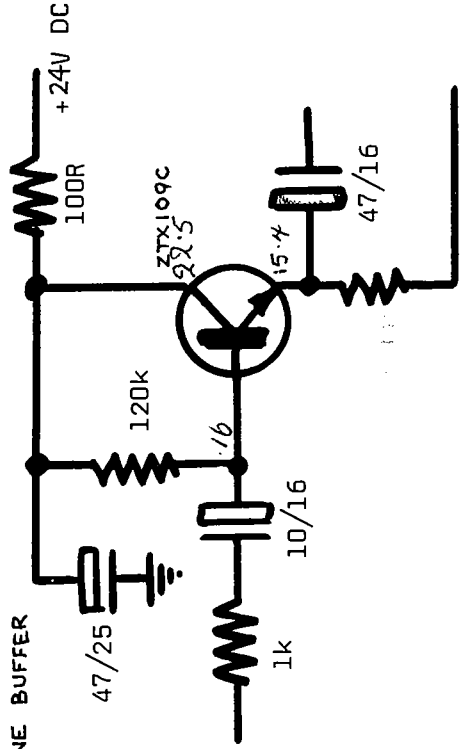
Drq.No. 2408

© 15.12.76.

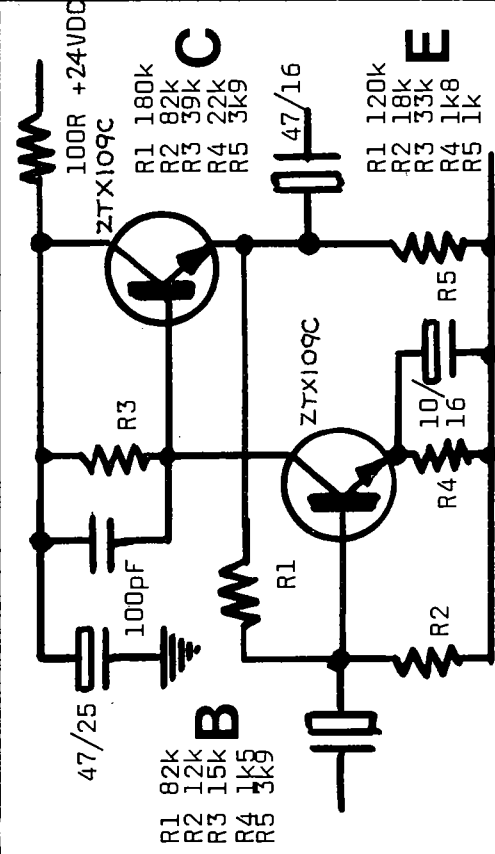
D MICROPHONE PRE-AMP.
AUX 2,3 OUTPUT AMP.



A LINE BUFFER



B



Allen and Heath Limited.

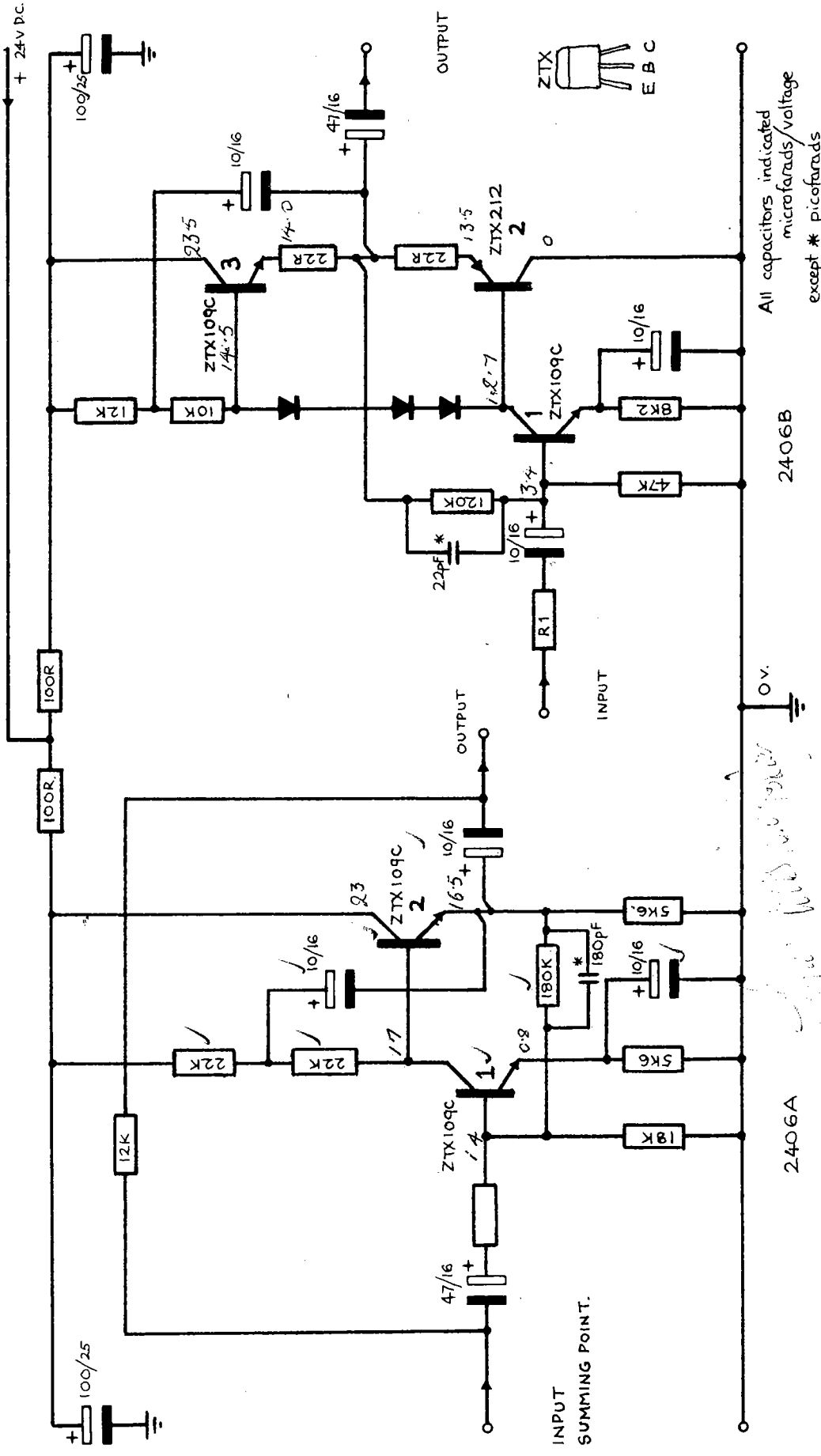
Pembroke House, Campsbourne Road.
London, N8, 7BR. Tel: 01-340-3291.

MOD3 SR SERIES AMPLIFIERS

All capacitors are shown as Capacitance/μV

Drawg. No 2404A-E
R 15.12.78.

3



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MOD 3 AMPLIFIERS :

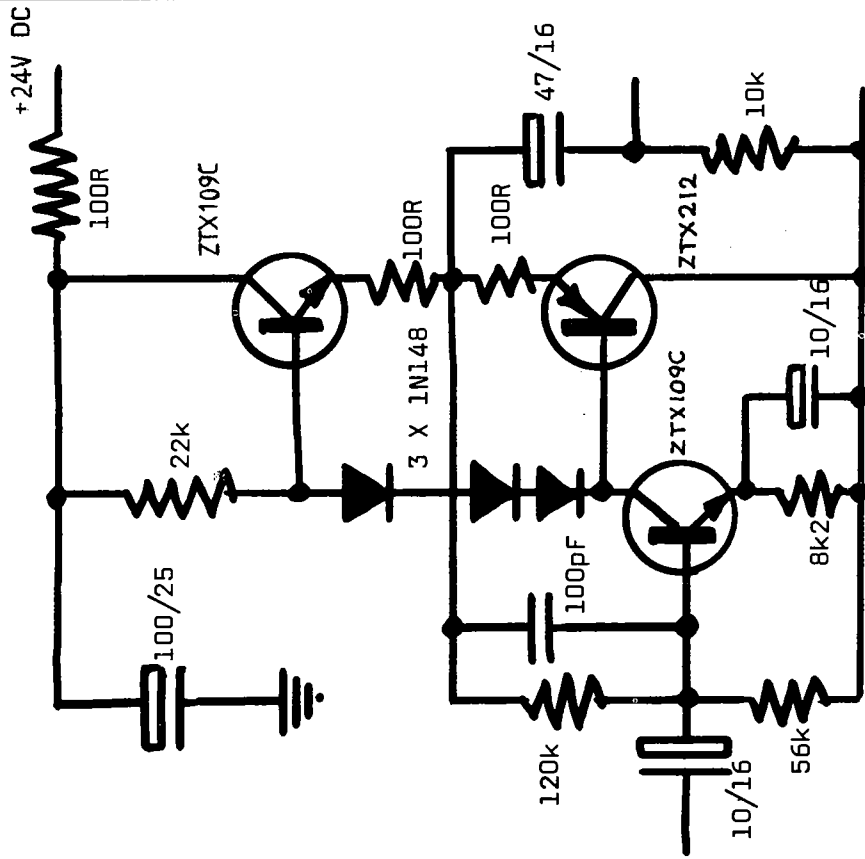
MIX AMP 2406A
LINE AMP 2406B

R1 VALUES: MOD 3 OUTPUT = 18K Ω
SR SERIES LEFT } = 120K Ω
SR SERIES RIGHT }

DRAWN 12.12.78
CHECKED 12.12.78

All capacitors indicated
microfarads/Voltage
except * picofarads

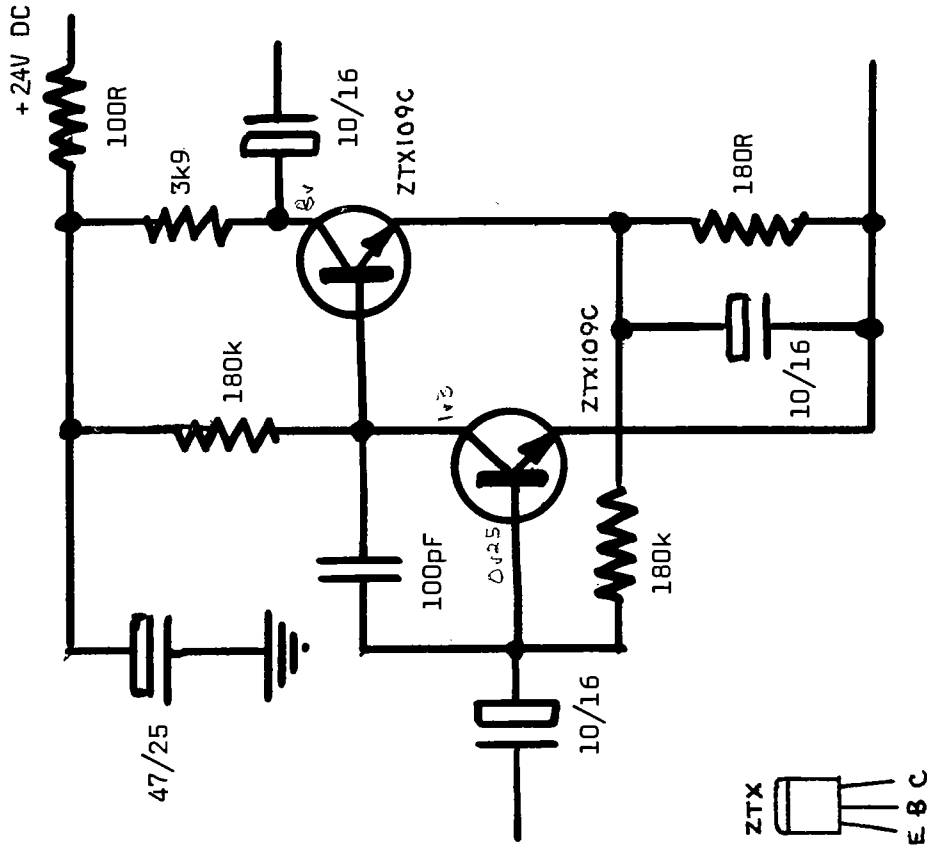
Handwritten note: 100/25

A

AUX 1 OUTPUT AMP.

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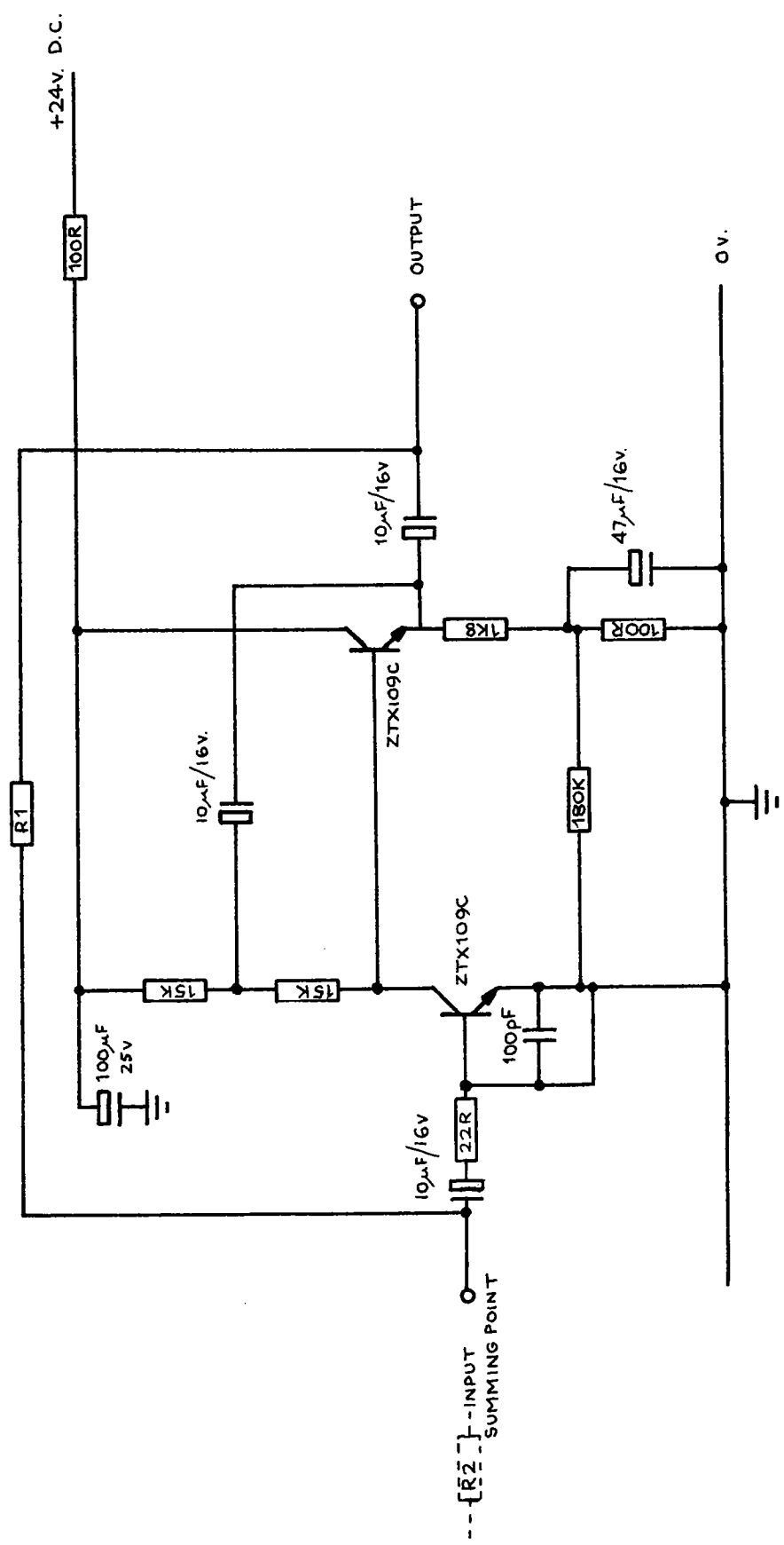
B

TALKBACK MIC PRE-AMP

MOD 3/SR SERIES AMPLIFIERS

All capacitors are shown as Capacitance/UV

Drawg. No. 2405A/B
R 15.12.79.



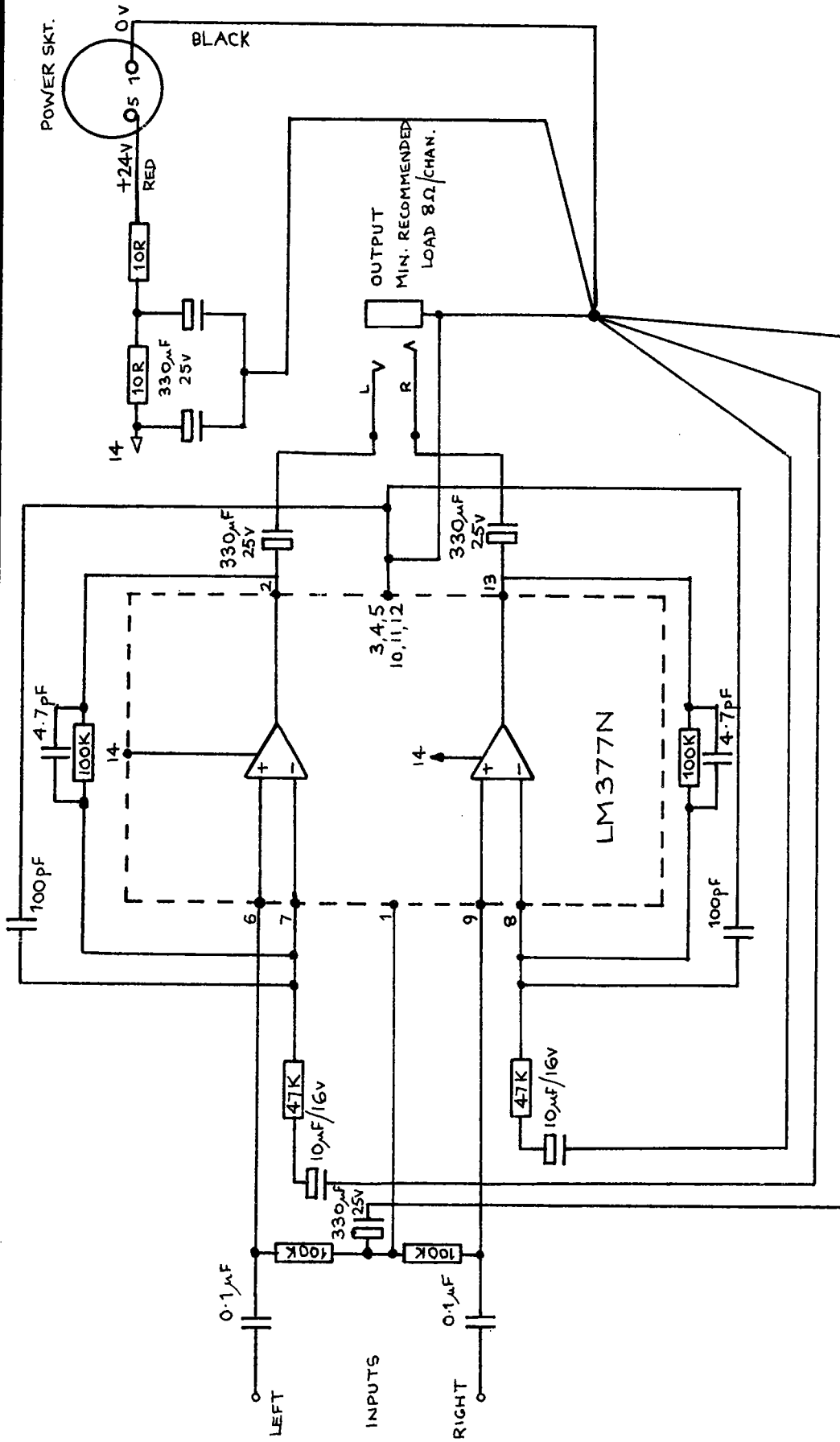
INVERTING VIRTUAL EARTH MIXING AMPLIFIER: FOR UNITY GAIN $R_1 = R_2$.
 SR SERIES SOLID MIX AMP $R_1 = 56K\Omega$.

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MOD 3 / SR SERIES: AMPLIFIERS

DRAWING NUMBER
3104
 15.12.78.



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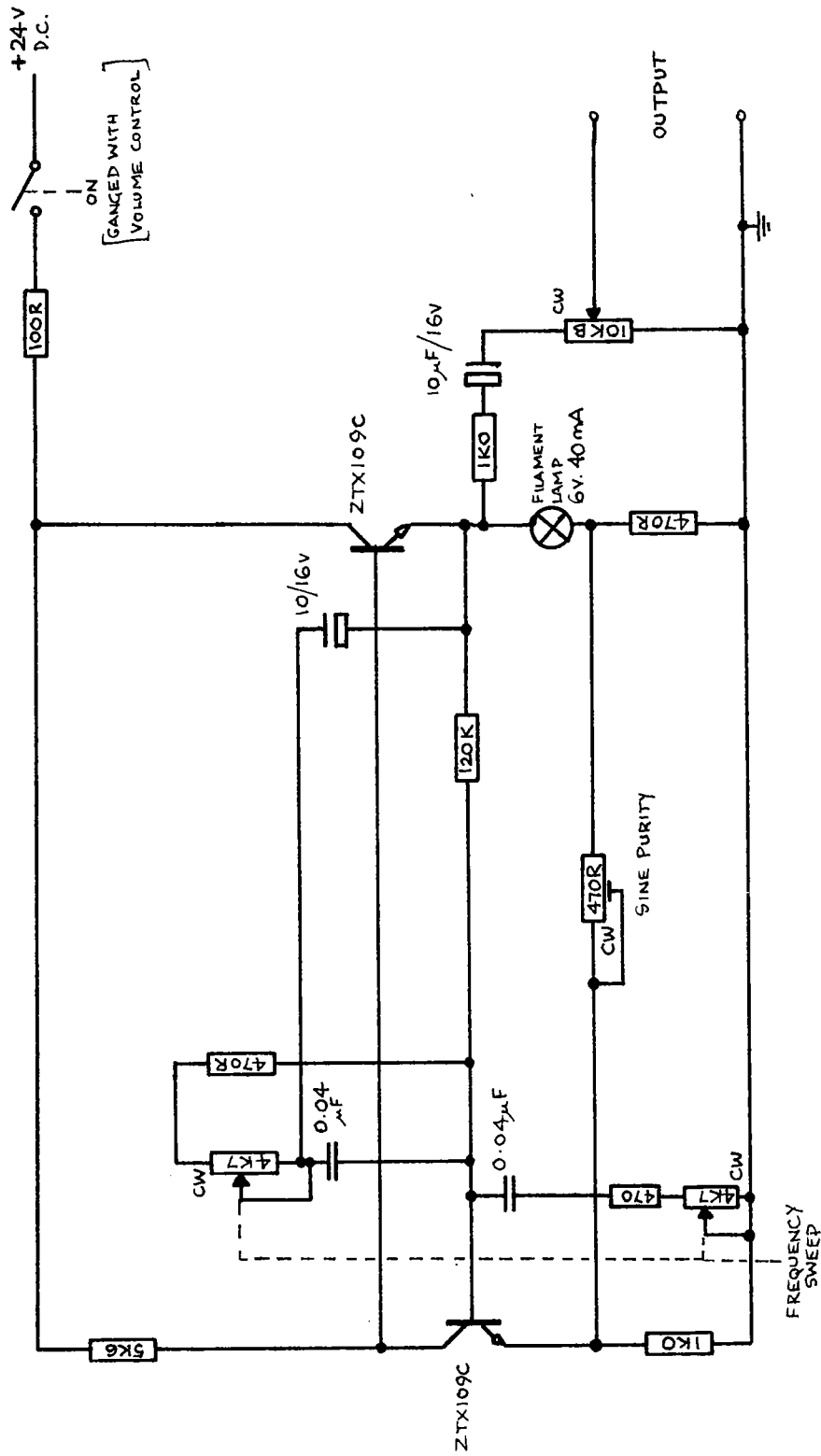
Pembroke House, Campsbourne Road,
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MOD 3 SR SERIES: HEADPHONE AMPLIFIER

DRAWING NUMBER

2417

REV. 15.12.78.



ZTX
EBC

MOD 3/SR SERIES: OSCILLATOR

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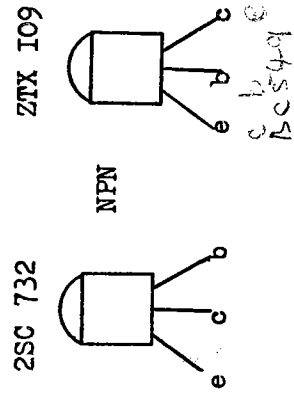
DRAWING NO.
2416.
A15.12.78

NO-SIGNAL BIAS VOLTAGES (40,000HM/V. METER)

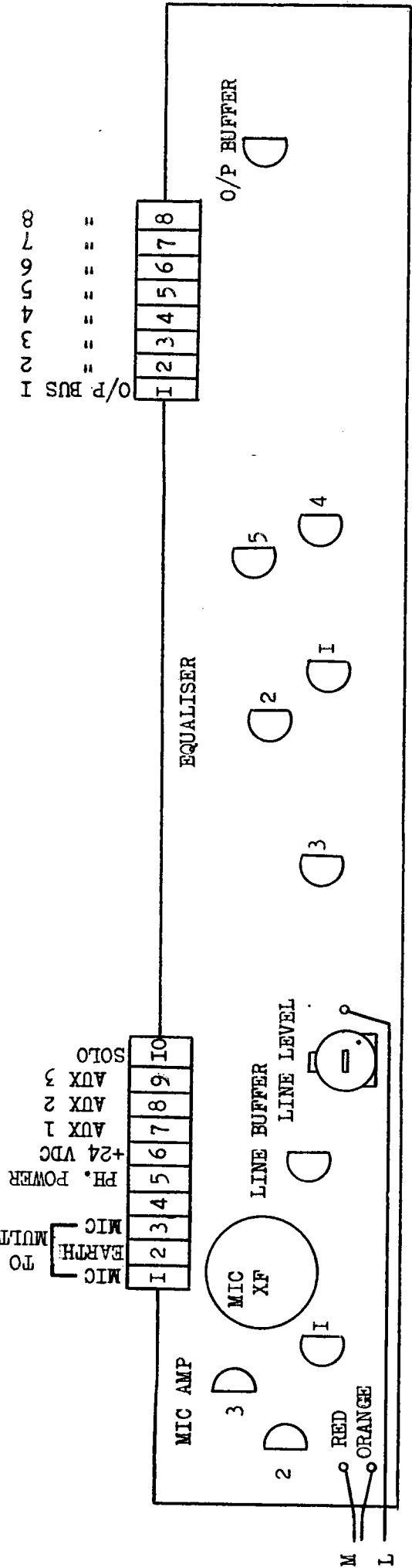
STAGE	TRANSISTOR	BASE	COLLECTOR	EMITTER
MIC AMP 2404 D	I	3.8	7.5	4.1
	2	7.5	13.5	6.8
	3	13.5	22.5	12.9
BUFFER 2404A				
EQ UALISER 2408	I	0.6	5.5	0
	2	5.5	18	4.6
	3	3	10	2.5
	4	1.4	13.3	1
	5	13.3	23	12.8

SERVICE CHART: MOD3/SR SERIES INPUT SERIES 4.

REFER TO DRAWING 24-10



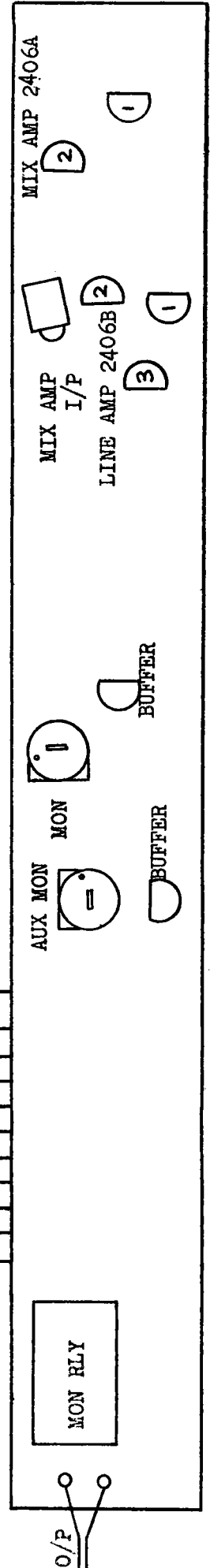
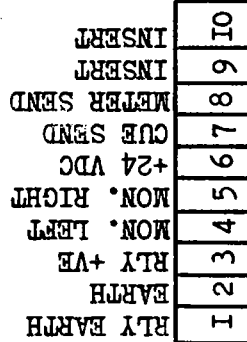
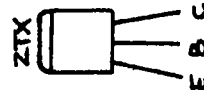
*SR Series only.



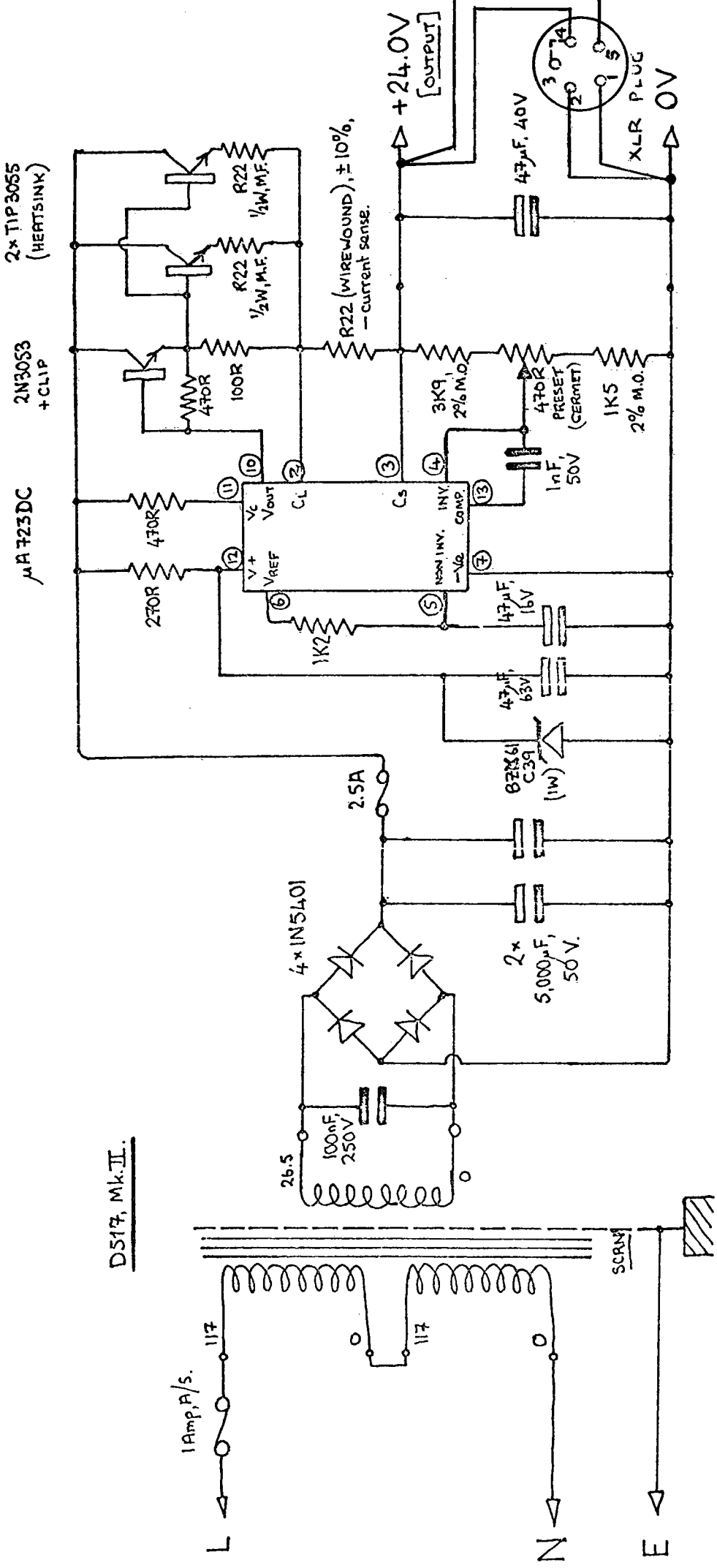
NO-SIGNAL BIASING VOLTAGES. (40,000 OHM/V. METER.)

STAGE	TRANSISTOR	BASE	COLLECTOR	EMITTER
MIX AMP 2406A	I	1.4	17	0.8
	2	17	23	16.5
LINE AMP 2406B	I	3.4	12.7	3.1
	2	12.7	0	13.5
BUFFER 2404A	3	14.5	23.5	14.0
		16	22.5	15.4

SERVICE CHART: MOD 3 OUTPUT SERIES 5.
REFER TO DRAWING 2409



D517, Mk.II.



AHB MPS3: 24V 2.5A D.C. REGULATED SUPPLY

All unmarked resistors, 1/4W, 5%, CARBON FILM. A&R, Issue 1, 11-11-75, J.D.



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