LINCOLN ORGAN SERVICE MANUAL

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

The purpose of this manual is to give the service engineer the technical information needed to understand the operation of the ELECTRONIC ORGAN, so that in the event of a fault developing it can be readily diagnosed and cleared.

The Manual is divided into sections which broadly correspond to the various sub-assemblies used in the construction.

C O N T E N T S

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1. GENERAL.

The Electronic Organ comprises four main units as follows:-

(A) The Keyboard and Tab Box.

The Tab Box contains one twin triode valve, together with the switches and components used for producing tones. The components are mounted on a chassis to the rear of the keyboard, behind the front panel of the organ, whilst the tabs are situated above the keyboard.

(B) The Oscillators.

Fifteen twin triode valves are employed as thirty oscillator stages. As each stage produces two notes, 60 notes may be keyed. A note sounds whenever a key is pressed, provided the 4', 8' or 16' tab is down and at least one "stop" tab is depressed.

Each oscillator valve and the tuning chokes and associated components for four notes are mounted on a hinged horizontal chassis. There are fifteen of these beneath the lid of the organ, each of which maybe lifted separately.

(C) The Amplifier.

The Oscillatory waveform comprising the tone is applied from the Tab Box via co-axial cable to the amplifier, which is a five valve circuit with push-pull output and negative feedback. The swell control is connected to the amplifier to vary the volume of sound between pre-set limits.

An output may be taken to a "Booster Amplifier" for driving a loudspeaker at some distance from the electronic organ.

(D) The Power Supply and Vibrato Circuit.

The H.T. supply is provided by a full-wave valve rectifier circuit with L/C and R/C smoothing. The H.T. is supplied from a separate transformer.

On the same chassis as the power supply is a two-valve oscillator circuit for producing a "Vibrato" waveform. This is a low frequency sinusoidal voltage with a pre-set amplitude and frequency. It is superimposed on the organ note in the oscillator stages, and gives a tremulo effect to the resulting notes.

Two additional circuits may be employed as optional extras. These are the Booster amplifier (mentioned above), and the Pedal Bass Unit, with which thirteen bass tones may be produced by foot pedals, in addition to the keyboard notes.

2. THE KEYBOARD.

The Keyboard is identical with a normal piano or organ keyboard, containing 61 notes. In addition to these are a number of "Tabs" situated above the keyboard. These correspond to organ stops and when pressed, make an electrical connection in the tone-forming unit known as the Tab-Box. Three of these tabs are associated with the keyboard:- The 8'tab, which must be pressed when the keyed note is to be heard.

The 16' tab, which must be pressed when the sub octave of the keyed note is to be heard.

The 4' tab, which must be pressed when the note one octave above the key pressed is to be heard.

KEYBOARD ACTION.

The keys are pivoted towards one end, and when depressed, tilt around the pivot against the action of a spring. The movement is sufficient to move a set of 3 contacts of fine, stiff, wire, in an upwards direction. These contacts are connected to the tuning choke of the oscillator associated with the note being pressed and the notes one octave below and one octave above it (see ½V7 circuit).

One contact connects with an earthed "bus-bar" which moves into position when the 8' tab is down, and causes oscillation to commence. Similarly a connection is made to earthed bus bars when the 4' or the 16' tab is pressed, which results in the production of the upper and lower octaves of the keyed note.

If none of these tabs are down, a connection is not made to the earthed bus-bars, and a note will not be sounded, even when a key is depressed. In the event of a note being heard when the tabs are up, the fine wire contacts may be bent, or the "bus-bars" set incorrectly. This should be remedied as detailed later.

3. THE OSCILLATORS.

There are fifteen double-triode valves type B65 acting as tone oscillators.

Each triode is an oscillator which can produce two notes adjacent in the scale, making a total of 60 notes. (There are 61 notes on the keyboard, but the highest "C" is connected to the circuit of the note one octave below).

Each oscillator is a form of COLPITTS, and is brought into operation by eathing the grid tuning circuit through the keyboard contacts.

The notes from each circuit are mixed on a "bus-bar" situated beneath the chassis. Further "bus-bars" carry connections to earth, H.T., the heater transformer and the vibrato circuit.

CIRCUIT ACTION OF THE OSCILLATORS.

Under static conditions, H.T.+ is applied to the valve anode via R1 (see circuit diagram of ½V7 stage). The cathode is connected to earth via R6 and R7 and the grid to earth via R8, R9 and two tuning chokes. The earth potential on the key-connections is isolated from the tuning chokes and no oscillations occur due to the damping effect of R9. The keys are shown with the 8' tab depressed, but not the 4' and 16' tabs.

When the note C#3 is pressed, the lower end of R8 is connected to earth, positive feedback occurs in the grid/cathode circuit and oscillation begins immediately. An output is developed across the anode load, comprising R1, C4, R3, and is passed via R2 to the "Signal" bus-bar. This output is rich in harmonics.

When the note C#3 is released, oscillations cease.

When the note C3 is pressed, the lower end of R9 is connected to earth, and oscillation begins once again. However the resultant note is at a slightly different frequency, due to the introduction of additional inductance. It will be seen that pressing the C#3 key overrides the action of the C3 key, and these two notes cannot be sounded simultaneously.

When the 4' tab is depressed, an earth connection is made to the grid circuit of the oscillator which provides the note one octave above the keyed note, and only this note is sounded. With the 8' tab ALSO depressed, both the keyed note and the note one octave above it are sounded, whilst with the 4', 8' and 16' tabs depressed, the keyed note will be accompanied by the notes one octave above and below it.

The output from each oscillator is applied to the tab box via a bus-bar, one half of which is connected to the oscillators producing all notes from C1 to G3, the other half being connected to the oscillators associated with the notes Ab3 to B5. This allows the production of a "Solo" effect. (See Tab Box).

A low frequency sinusoidal voltage of low amplitude is connected to the cathodes of each oscillator via the "vibrato" bus-bar. It is applied from the "vibrato" circuit. Its purpose is to modulate the oscillatory current through each valve, thereby giving a "tremulo" effect to the resultant note.

The Valves for C1, C2, C3 and R3, R7, R8 and R9 vary from valve to valve, and these components are carefully chosen for each individual circuit during manufacture.

The oscillator tuning chokes determine the frequency of the resultant note, which may be altered by variation of the inductance of the choke. This is done mechanically by means of a knurled nut which closes or opens the air gap in the iron core of the choke.

4. THE TAB BOX.

The function of this unit is to modify the waveform from each oscillator by selecting those harmonics which give it the desired characteristics, and passing them to the amplifier, at the same time attenuating unwanted harmonics.

Incorporated in the tab box are switches and controls associated with the vibrato circuit and the pedal bass unit.

The tab box receives an input from the "SIGNAL" bus-bars via pins 9 and 10 of the 12-way connector.

An output is taken from the junction of C4, C5, C16 via coaxial cable to the amplifier.

CIRCUIT ACTION.

V25 is a twin triode valve type 12AU7, each half of which acts as a feedback circuit. One half forms part of a resistance/capacity network connected between the junction of R2-R4 and earth. The waveform from the oscillators is applied to this point and modified by the network. When one of the tabs is depressed, the effect of the resistance/capacity circuit is changed, and therefore the resultant tone, whilst still having the same frequency, will have a different harmonic content and tonal quality. The valve has a more pronounced feedback effect on some frequencies than other, depending on the grid input circuit.

The other half of the twin triode valve is connected in a similar manner to perform its function when the "string" tab is depressed (when it is assumed. the remaining tab-switches are closed, earthing the junction of R2-R4). In this case the oscillatory waveform is modified by the valve and associated components connected between the junction of R1-R3 and earth.

The modified waveform is passed by either C4 or C5, via coaxial cable to the amplifier.

A further connection is made via C16 to the amplifier from the pedal bass unit. The amplitude of this input is controlled by VC1, connected so as not to affect the waveform from the oscillators when varied.

When the 'solo' switch is closed, the waveform from each half of the 'signal' bus-bar is connected direct to the above mentioned tone-forming networks. When this switch is open, the bus-bar carrying the higher notes is connected direct to V25 circuit, but that carrying the lower notes is connected via R16; attenuation of the lower notes results, and, due to a change of load on the 'signal' bus-bar, the upper notes are of slightly greater amplitude.

The vibrato controls VC2 and VC3 vary the amplitude (depth) and frequency(speed) of the tremulo superimposed on the notes. The tab switches the Vibrato on or off.

The amplitude of output from the pedal bass unit may be varied by selection of R22-R24.

One side of the heater supply is earthed in this unit only.

5. THE AMPLIFIER.

The amplifier comprises five valves and associated components driving a 12" permanent magnet loudspeaker.

The signal input is carried via co-axial cable to the grid of the first valve.

Push-pull output valves are used, driven by a twin triode phase-splitter. An output from this stage may be connected to a remote Booster Amplifier for operation of a loudspeaker at some distance from the organ itself.

CIRCUIT ACTION.

V16 is an unbiased amplifier type Z729, which contributes largely to the resultant tonal quality of the note. The output from its anode is connected via C5 to V17, a triode valve type L63. The input to the grid of this valve is controlled by the potentiometer VC1, which acts as the pre-set volume control, this works in conjunction with the swell control which varies the input to V17 between zero and the maximum as obtained from the pre-set control VC1. Capacitor C2 is a tone-compensating device, effective as the impedence across VC1 varies from zero to maximum.

V17 cathode circuit is not de-coupled, and is connected to the output stage from which it receives a degree of negative feedback. This reduces unwanted distortion of the tone waveform.

The output from V17 is connected to a phase-splitter valve, a twin triode type B65. Further negative feedback occurs in this circuit through R10, C7. An antiphase output is taken from each anode to the control grid of V19, V20, beam-tetrode output valves type KT66. This is a conventional stage, driving T1, the output transformer connected to the loudspeaker speech coil.

6. THE SWELL CONTROL.

The swell control is a unit containing a number of resistances connected in series to form a total of 1Meg.Ω. The junctions of each resistance is connected to a set of contacts, each insulated from the body of the unit and from each other.

A slider arm connects with these contacts as it is moved to its extremes, and selects a certain value of resistance to a maximum of 1Meg Ω.

A connection is taken from the slider arm and from one end of the resistance network, and carried via co-axial cable to the amplifier.

When the "swell" pedal is pressed, the resistance selected from the potentiometer increases, and the volume of the sound output increases.

There are mechanically set limits which prevent the slider arm of the control from "overshooting" the contacts.

7. THE PEDAL BASS UNIT.

In electronic organs, provision may be made for thirteen bass notes to be played by means of foot pedals, in addition to the notes of the keyboard. In this case a pedal bass unit is incorporated in the body of the organ and connected via the tab box to the amplifier.

CIRCUIT ACTION.

A triode valve type L63 is connected as a similar oscillator to that described above (i.e.½V7 circuit). The tuning chokes for the eight notes from C down to F each have one end connected to the grid capacitor C3, and the other end to the foot pedals. When the foot pedal for the selected note is pressed, the lower end of the choke is earthed and oscillation begins. In the case of the five notes from E down to C, each tuning choke has one end connected in series with the "F" choke to the grid capacitor C3, and the other end to the respective foot-pedal.

The foot-pedal switches have a two-way action, so that when the pedal is pressed, the movable contact switches over (to the right as shown on the diagram) and connects with the earth lead(via "14"). When more than one pedal is pressed, only one note is sounded, as the switch associated with the higher note overrides the lower switches.

An output is taken from the anode circuit through a tone-forming network comprising C5 - C10 and R7 - R11, to VC1 in the tab box. Movement of the slider arm of this control, which is pre-set, changes the amplitude of waveform applied via C16 to the amplifier.

Also in the tab box are four tab-switches to vary the amplitude of the bass notes while playing. The action of these switches is to introduce a difference resistance across C7 in the pedal bass unit.

8. THE POWER SUPPLY AND VIBRATO.

(A) POWER SUPPLY

The H.T. power supply produces potentials of 380v, 140v and 120v DC for the various circuits.

The L.T. supply is 6.3v AC.

CIRCUIT ACTION.

A full wave rectifier circuit uses a valve type 5V4G supplied with 350v AC on each anode. A cathode potential of 400v DC is produced across reservoir condenser C8, and smoothed by C7 and L1, across which a 20v drop occurs. There results 380v DC across C7, which is connected to the output stage of the amplifier. A further voltage drop occurs across R9, resulting in 140v DC across C6 and R10. This is connected to the oscillators and the pedal bass unit.

Due to a voltage drop across R8, 120v DC appears across C5, and is the H.T. for the vibrato oscillators V21, V22.

The H.T. supply of 295v DC for the tab box is connected via the amplifier.

The L.T. supply of 6.3v AC for the amplifier valves is taken from a winding on power transformer T2, one side of which is earthed at V16 cathode.

A separate transformer, T3, supplies 6.3v AC for the remaining valves. This supply has one side earthed in the tab box.

(B) THE VIBRATO

The vibrato oscillator provides a low frequency oscillation of small amplitude, applied via a cathode follower stage and co-axial cable to the cathode circuits of the tone oscillator valves. It causes the notes to have a tremulo effect, the extent of which can be controlled.

CIRCUIT ACTION.

V21 is a twin triode valve type B65 connected as an R/C oscillator of the cathode-coupled type. The speed of the oscillator is mainly determined by the amount of resistance connected between the grid of the second half and earth. (NB. This resistance is zero when the vibrato tab-switch (Tab Box) is closed, and the circuit does not function until this tab is depressed).

The amount of resistance may be changed by variation of VC3, the vibrato speed control situated in the Tab Box.

The waveform from the oscillator is applied to the input stage of a cathode follower valve, V22 type L63.

The cathode load of this stage is VC2, a potentiometer in the Tab Box. The amount of waveform selected from the cathode load is determined by the setting of this control, the vibrato amplitude control. From the Tab Box, the vibrato waveform is connected via C15 to the vibrato bus-bar in the oscillator stages. This bus bar is decoupled by a high valve capacitor, sufficient to virtually earth the bus-bar at the tone-oscillator frequencies, but providing an adequate load for the low frequency tremulo waveform.

9. THE TUNING PROCEDURE.

The Tuning Procedure for the Electronic Organ is carried out by adjusting the tuning choke associated with each note. This is done by means of a mechanical control on the choke which varies the air-gap of its iron core, and therefore its inductance and the frequency of the note. The minimum permissable air-gap is 3 mm. The larger chokes (which are noted in RED) control the "MAIN" notes, i.e. D♭ E♭ F G A B.

The smaller chokes (which are noted in BLACK) control the "SECONDARY" notes, i.e. C D E G♭ A♭ B♭.

The tuning procedure is governed by the fact that adjustment of the primary choke will affect the setting of the associated secondary choke. Thus, any adjustment made to a 'MAIN' note will detune its associated 'SECONDARY' note, but variation of the 'SECONDARY' choke will have no effect on the 'MAIN' note. For this reason, the "MAIN" notes must be tuned first.

The frequency of the note becomes lower as the tuning nut is turned clockwise, and the note flattens. Conversely, the note becomes sharper as the tuning nut is turned anti-clockwise.

Two suggested TUNING PROCEDURES are given below, but the tuner will rapidly establish his own method.

TUNING SEQUENCE 1.

To lay a scale by 5th's in 3rd octave.
(Octaves numbered 1 to 5 from lowest octave.)

Tune A 3rd octave to 440 c.p.s.

Tune A4 to A3
A5 to A3
A2 to A3
A1 to A3

Continue as follows:-

(x)	Tune	fifth	E4 to A3	slow(flat)beat.
	"	octave	E3 to E4	perfect.
	"	fifth	B3 to E3	slow flat beat.
	"	octave	B2 to B3	perfect.
(y)	"	fifth	G♭3 to B2	slow flat beat.
	"	"	D♭4 to G♭3	" " "
	"	octave	D♭3 to D♭4	perfect.
	"	fifth	A♭3 to D♭3	slow flat beat.
	"	"	E♭4 to A♭3	" " "
	"	octave	E♭3 to E♭4	perfect.
	"	fifth	B♭3 to E♭3	slow flat beat.
	"	octave	B♭2 to B♭3	perfect.
	"	fifth	F3 to B♭2	slow flat beat.

Cont'd....

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N.B. E.3 (secondary choke) will probably now be untuned, so retune octave E3 to E4 and check fifth E4 to A3 as at (x).

Tune fifth	C4	to	F3	slow flat beat.
" octave	C3	to	C4	perfect.
" fifth	G3	to	C3	slow flat beat.

N.B. G♭3 will now be untuned so retune fifth G♭3 - B2 as at (y).

Tune fifth	D4	to	G3	slow flat beat.
" octave	D3	to	D4	perfect.

Finally: Check fifth D3 to A3 (slow flat beat); if this beats too fast check through scale again for possible error. When scale is satisfactorily laid, tune octaves up and down from the tune scale in 3rd octave, in the following order:-

D♭, C, E♭, D, F, E, G, G♭, A, A♭, B, B♭.

TUNING SEQUENCE.2.

All Primary (main) notes are tuned before relative secondary notes are tuned, with the exception of B flat, which has to be re-tuned after B has been tuned.

Pitch British Standard. A.440 cps.

First Step.

Pitch A.440 cps.(A3)	
A3 octave down to middle A2	Perfect. No beat.
A2 major third down to F2	F 7 cps flat to A.
F2 octave up to F3	Perfect. No beat.
F3 major third down to D3 flat.	D flat 11 cps flat to F
D3 flat fourth down to A2 flat.	A flat 1 cps flat to D flat
A2 flat fifth up to E3 flat.	E " 0.7 cps flat " A "
E3 flat fourth down to B2 flat.	B " 1.0 cps flat " E "

-check B2 flat with lower F2(fourth)and upper F3 (fifth)
Same beat in both 4th & 5th, 0.8 cps.

Second Step.

F2 fifth up to C3	C 0.6 cps flat to F.
C3 fourth down to G2	G 1.0 cps flat to C.
G2 fifth up to D3	D 0.7 cps flat to G.

check D3 with A3 1.0 cps.

Third Step.

A2 fifth up to E3	E 0.8 cps flat to A.
E3 fourth down to B2	B 1.1 cps flat to E.
B2 fourth down to G2 flat.	G flat 0.8 cps flat to B.

check G2 flat with D3 flat. 0.6 cps.

B flat will require re-adjusting after B has been tuned.

Cont'd.....

The nine major thirds when tested should have the following beat rates.

F2	- A2	7.0 cps.
G2 flat	- B2 flat	7.5 cps.
G2	- B2	8.0 cps.
A2 flat	- C3	8.5 cps.
A2	- D3 flat	9.0 cps.
B2 flat	- D3	9.5 cps.
B2	- E3 flat	10.0 cps.
C3	- E3	10.5 cps.
D3 flat	- F3	11.0 cps.

The four major sixths as follows.

F2	- D3	8.0 cps.
G2 flat	- E3 flat	8.5 cps.
G2	- E3	9.0 cps.
A2 flat	- F3	9.5 cps.

All octaves should be tuned perfect from the Scale.

10. REMOVAL AND REPLACEMENT OF UNITS.

Before carrying out any of the following procedures, the organ MUST be disconnected from the Mains supply.

10. 1. THE MAIN FRAME.

(a) Unscrew the lid apron at the back of the organ and release the lid stay. The lid and apron are removed as one piece.

(b) Undo 4 bolts fixed into T-nuts, two at the top left, two at the top right of the framework.

(c) Undo two woodscrews at the rear of the organ.

(d) Remove the Control panel 12-way connector at the front - left of the organ.

(e) Remove the pedal generator 8-way connector situated near the 12-way. This is accessible from the rear.

(f) Remove the octal plug terminating the lead from the main frame to the power supply and disconnect heater cable at connecting block.

(g) Remove retaining springs on top end of bus-bar connecting rods and release rods from tab levers. Loosen the locking nuts on the key-contact unit, and lift unit clear. Care must be taken when removing the main frame that the key-contact unit does not foul any other part.

(h) Withdraw the main frame.

To replace the main frame, reverse the above procedure, taking care that a key operates only one contact lift when pressed, and that the 4', 8' and 16' tabs function correctly. Adjustable nuts are provided for re-positioning the key-contact assembly where necessary.

10. 2. THE CONTROL PANEL AND TAB BOX ASSEMBLY.

(a) Lift the lid of the organ.

(b) Remove tab box cover.

(c) Remove two screws, situated at each end of the control panel.

(d) Remove the spring from top end of each octave coupler connecting rod. Push rods towards rear of organ.

(e) Remove co-axial cable connector and control panel connecting plug.

(f) Bring panel forward and remove.

To replace, reverse the above procedure.

10. 3. TO LIFT THE OSCILLATOR CHASSIS.

(a) Lift Organ lid and remove lid-stay. lower lid.

(b) Remove 5 woodscrews holding the lid and lid apron at the rear.

(c) Remove apron and lid.

Cont'd.....

(d) Unscrew one screw per chassis. This is situated at the front.

(e) Lift chassis on hinge and allow to rest at an angle with the underside uppermost.

To re-fix reverse the above procedure.

10. 4. THE POWER SUPPLY.

(a) Remove the 7 and 8-way connectors.

(b) Remove the mains connection from the Mains Input Block.

(c) Remove the heater supply connection.

(d) Undo 4 screws fixing the unit to the console floor.

(e) Withdraw the unit.

To replace, reverse the above procedure.

10. 5. THE AMPLIFIER.

(a) Remove the 8-way connector.

(b) Remove the speaker leads.

(c) Remove the signal input connector.

(d) Remove the swell box connector.

(e) Undo 4 screws fixing the unit to the console floor.

(f) Withdraw the unit.

To replace, reverse the above procedure.

10. 6. THE PEDAL BASS UNIT.

(a) Remove the 14-way connector.

(b) Undo 4 screws fixing the unit to the console floor.

(c) Withdraw the unit.

To replace, reverse the above procedure.

10. 7. THE SWELL BOX.

(a) The cover is removed after undoing four corner screws.

(b) The upper and lower limits of travel for the slider arm, are determined by means of two adjustment points on the attenuator box, and the extent of pedal-movement is pre-set by means of two adjustment points on the pedal.

11. BOOSTER.

This consists of a Tone Chamber containing two loudspeakers and an amplifier with built in power supply.

The amplifier is similar to the output stage of the console amplifier and the signal from the console is supplied to the grids of two KT66 valves operating in push-pull.

Twin screened cable should be used for the signal line.

The rectifier is a 5V4G valve, in a full wave circuit and the mains supply may be obtained from the terminal block situated at the left hand rear of the console.

In this case the console On-Off switch will also control the Booster. For this reason no separate switch or mains fuses are fitted.

12. FAULTS.

The most common fault on any organ is that known as "cyphering" (i.e.) a note sounds without the key being depressed. This is caused by a key contact failing to break clear of the bus-bar.

Inspection will locate the trouble and in some cases it may be necessary to reset the contact wire by judicious bending.

Lack of tonal changes with Tab operation may be due to the failure of the Tone Forming Valve V25 or its associated circuit. Remember too that the Tab switches should be closed when the Tab is off. (up).

THE SWELL CONTROL

A new type Swell Control has been introduced which will eventually replace the original box type having fixed resistors and sliding contacts.

This new assembly makes use of a standard 1 Meg ohm log-law potentiometer which can easily be replaced if and when the need arises.

Two accurately machined castings are pivoted together at one end. The base casting carries the control element, the upward limit and friction adjustments, while the upper casting carries the swell pedal and downward limit adjustment.

The free end of the upper casting is machined to form a toothed quadrant or gear sector which engages with a pinion which is locked to the potentiometer shaft by means of two grub screws. This shaft rotates in nylon bearings.

The arc through which the pedal can swing is set by two limit adjustments and the stiffness of operation is controlled by a friction adjustment which consists of a spring loaded leather plunger bearing on either side of the toothed quadrant. Each plunger is retained in a threaded cup which screws into the casting.

CONTROL REPLACEMENT:-

Set pedal so that the pinion grub screws can be slackened off.

Slacken retaining screw at bottom of fixing bracket. Swing bracket clear and withdraw potentiometer, at the same time catching the pinion which is now free.

Renew control and replace assembly in reverse order.

N.B. Be careful that the nylon bearings are not pushed out or deformed.

It is important that restriction of the pedal at either end of its travel is controlled by the limit adjustments and not by the potentiometer. To check this proceed as follows:-

Slacken off lock nuts and then rotate milled edge limit screws so that pedal travel is limited only by the maximum rotation of the potentiometer.

Depress pedal and adjust downward limit screw until the potentiometer is turned back about 5° from its maximum position.

Tighten lock nut.

Repeat with pedal in upward position, this time adjusting the upward limit screw which is behind the pivot point of the castings.

Drop a spot of light machine oil into oil-hole.

FRICTION ADJUSTMENT:-

The stiffness of the swell action is largely a matter of organist's preference, but always ensure that sufficient friction is applied to prevent a floppy action when the pedal is foot operated.

To adjust the stiffness the milled edge friction adjustment screws are turned clockwise to increase friction and counter clockwise to reduce friction.

Equalise movement of the two adjusting screws to prevent strain being thrown on the pivot.

THE THEATRE ORGAN.

Although basically similar to the Lincoln Organ, the Theatre model has certain modifications which have resulted in faster attack and tonal differences.

OSCILLATOR CHASSIS:-

Resistors R7 and R8 have been adjusted to give a faster attack and correct harmonic content. As these values are adjusted during voicing and may vary from organ to organ, no component values are specified.

TAB BOX:-

Because of the changes made to the harmonic content of the oscillator output certain "stops" have been renamed. In general the components used in association with the six right hand "tabs" remain as in the Lincoln model. Occasional differences may occur depending upon voicing requirements.

Referring to the left hand "tabs" one pedal control has been replaced by a "Mellow" stop which functions as follows:-

Across each input resistor R1 and R2 in the Tab Box is shunted a condenser of 500 to 1000 pf (depending upon voicing requirements) which serves to increase the treble response. When the "Mellow" tab is depressed the shunt condensers are disconnected.

The diagram will make this point clear.

SWELL CONTROL:-

To enable the swell control to be operated more freely the restriction rod has been removed. On later models using the new type swell control free movement is achieved by slackening the friction adjusting pads.

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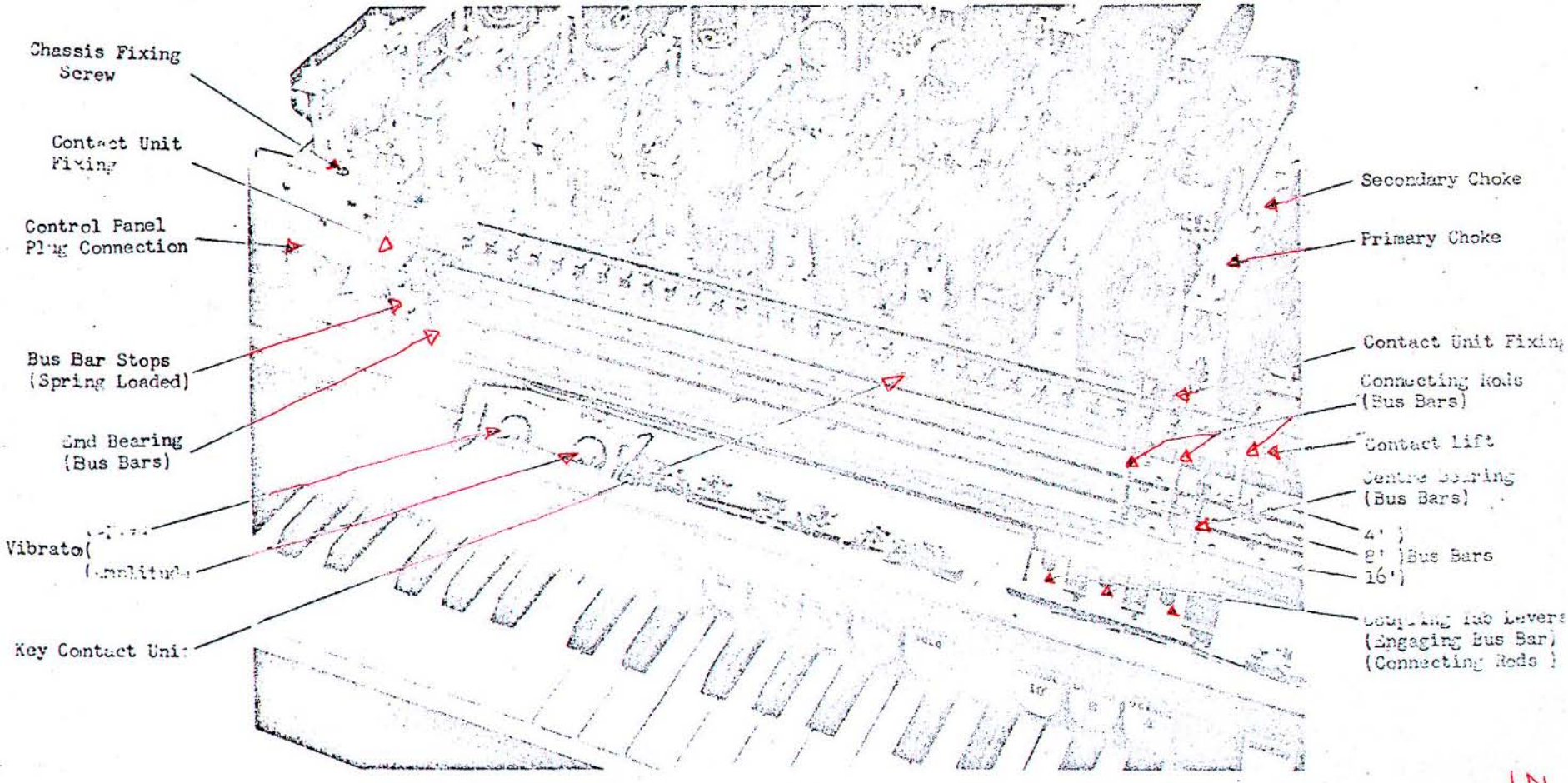
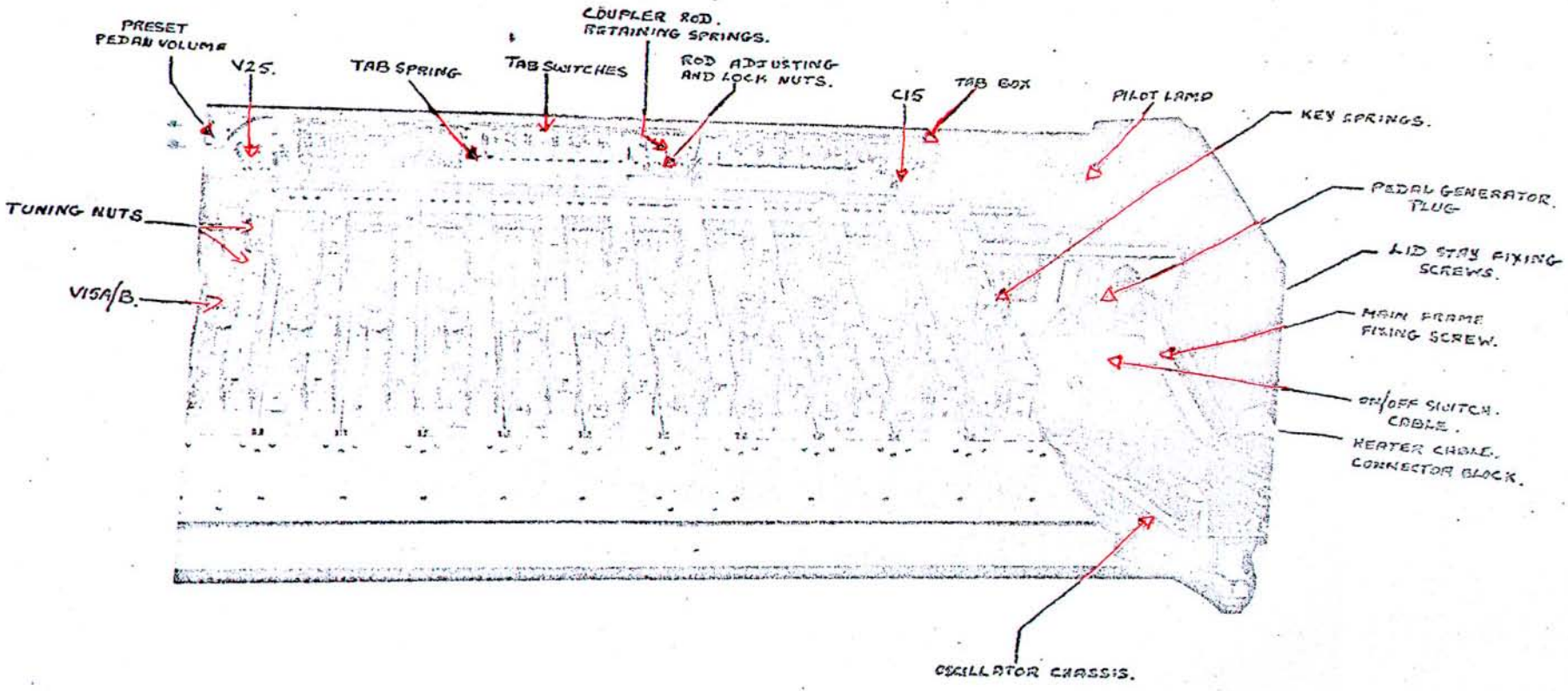
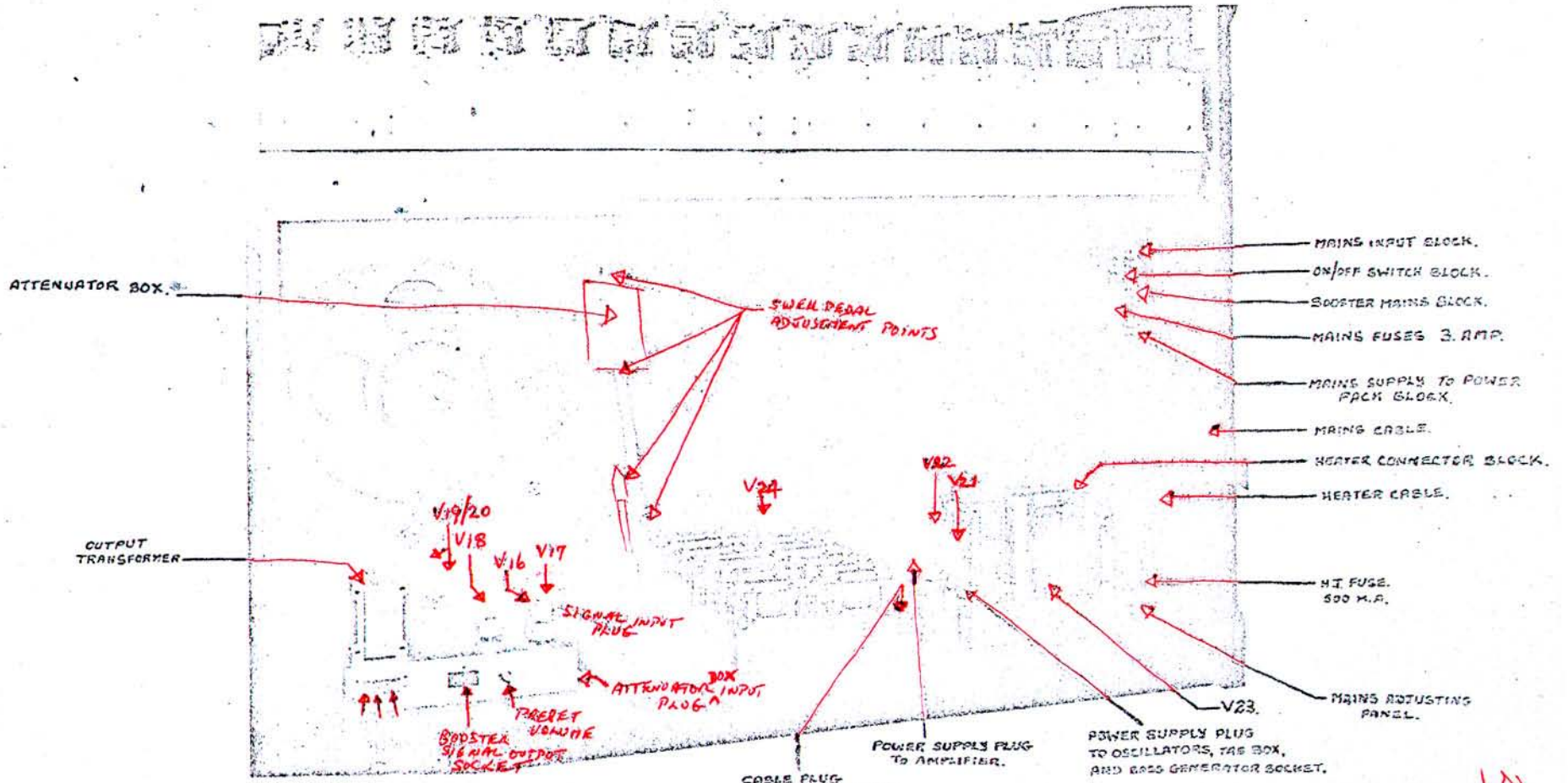


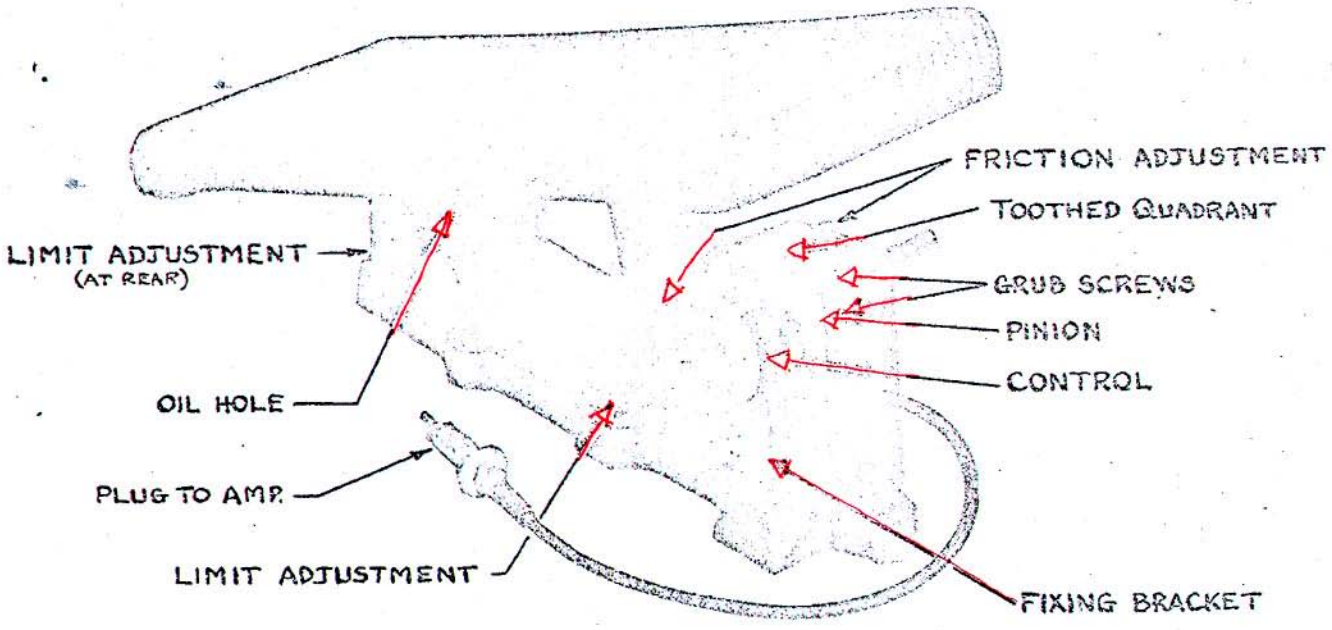
FRONT VIEW - CONTROL PANEL RELEASED.



VIEW LID AND BACK PANEL REMOVED.

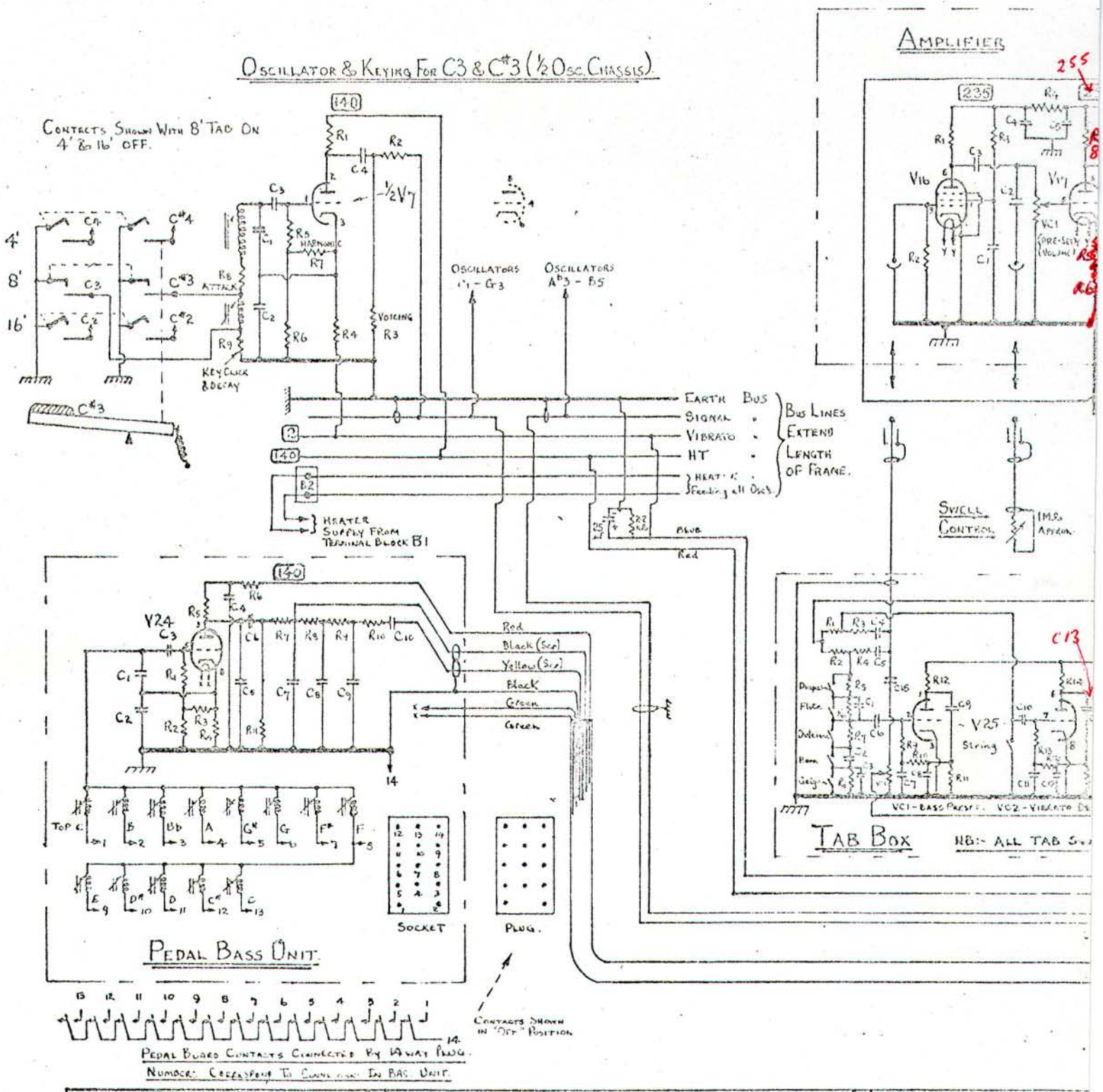


VIEW. BACK REMOVED.



SWELL CONTROL

— FOR INFORMATION OF



PEDAL BASS UNIT.

CODE	VALUE	PART No.	CODE	VALUE	PART No.
C1	0.25 mF 350v	C226	R1	10 M ohms 1/4W	R46
C2	0.82 mF "	—	R2	1 M "	R29
C3	0.005 mF	C217	R3	0.5 M "	R33
C4	8 mF 350v	C232	R4	0.1 M "	R27
C5	0.1 mF "	C225	R5	1.5 M "	R41
C6	0.1 mF "	—	R6	18 K "	R27
C7	0.01 mF "	C223	R7	22 K "	R31
C8	0.01 mF "	"	R8	100 K "	R27
C9	0.01 mF "	—	R9	100 K "	—
C10	0.1 mF 250	C224	R10	100 K "	—
			R11	10 K "	R17

AMPLIFIER.

CODE	VALUE	PART No.	CODE	VALUE	PART No.
C1	0.05 mF 500v	C14	R1	470 K ohms 1/4W 10%	R32
C2	0.05 mF "	"	R2	100 K " " "	"
C3	0.01 mF 350v	C220	R3	2 M " " "	R49
C4	16 mF 350v	IC 2	R4	2.2 K " " "	R20
C5	16 "	"	R5	2.2 K " " "	R13
C6	0.05 mF 500v	C14	R6	500 " " "	R6
C7	0.05 mF "	"	R7	27 K " " "	R21A
C8	0.05 mF "	"	R8	270 K " " "	R31
C9	0.05 mF "	"	R9	470 K " " "	R32
C10	0.05 mF "	"	R10	1 M " " "	R39
C11	0.05 mF "	"	R11	20 K " 1/4W 1%	R150
C12	16 mF 450v	C51	R12	1 K " " "	R37
			R13	100 K " 1/4W 5%	R224
			R14	100 K " " "	"
			R15	22 K " 1/4W 1%	R13

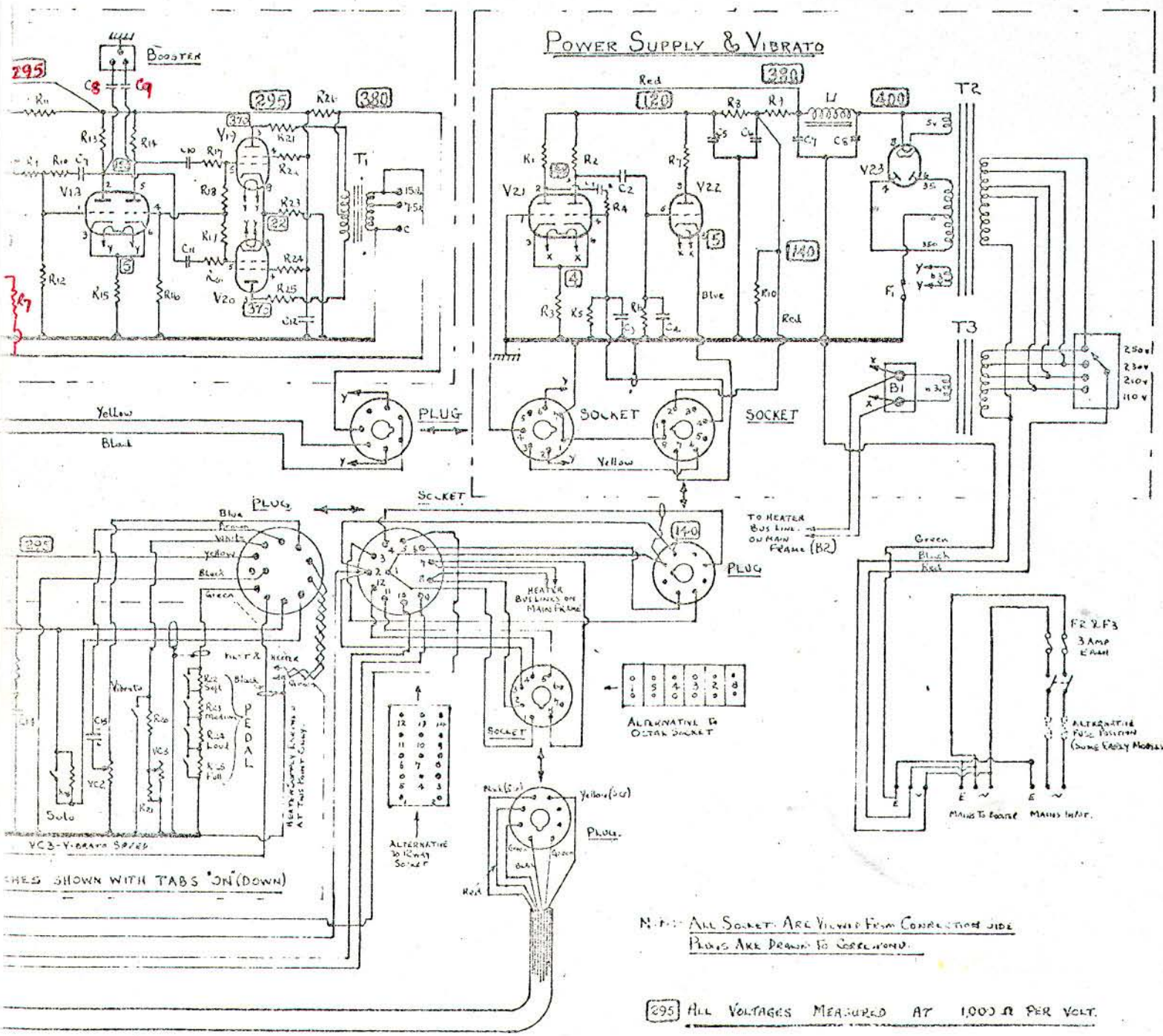
CODE	VALUE	PART No.
R16	470 K ohms 1/4W 5%	R48
R17	100 K " " "	R27
R18	470 K " " "	R48
R19	470 K " " "	"
R20	100 K " " "	R27
R21	100 " " "	R4
R22	100 " " "	"
R23	250 " 1/4W 5%	R131
R24	100 " " "	R4
R25	100 " " "	"
R26	10 K " 1/4W 5%	R190
VC1	1 M "	P22
T1	O.P.T.	T13

POWER SUPPLY & VIBR

CODE	VALUE	PART No.	CODE	VALUE
C1	0.05 mF 350v	C37	R1	25K
C2	0.1 mF 350v	C25	R2	25K
C3	0.05 mF 350v	C37	R3	22K
C4	0.25 mF 350v	C226	R4	47K
C5	8 mF 350v	C43	R5	22K
C6	100 mF 275v	C1	R6	1
C7	32 mF 450v	C30	R7	25
C8	16 mF 500v	C3	R8	5
			R9	25
F1	FUSE 500 m/a	F13	R10	25
T2	TRANS. (MAINS)	T3		
R1	BLEED 2 MΩ	B30		
T3	TRANS. RECTIF.	T4		
L1	CHOKE	C173		

† ADJ. ST. TO BALANCE TREBLE & BASS IF REQUD.

SERVICE ENGINEER ONLY



TAB BOX.

Code	Value	Rating	Code	Value	Rating	Code	Value	Rating
C1	0·01 µF	A	C7	100 K ohms/log	A	R21	47K ohms	R23
C2	500 pF	A	C20	100K	"	R23	10K	R19
C3	0·002 µF	A	C15	47 K	"	R18	8K	R19A
C4	0·01 µF	"	C7	47 K	"	R19		
C5	0·01 µF	"	C22	37 K	"	R21A	270K	R31
C6	0·05 µF	C224	R6	15 K	A	R18	1M	R33
C7	0·003 µF	C10	R7	10K	A	R17	68K	R17
C8	0·01 µF	C7	R8	47K	A	R25	22K	R24
C9	0·05 µF	C224	R9	100K	"	R27	47K	R22
C10	0·05 µF	"	R10	47K	"	R23	150K	R26
C11	0·002 µF	C15	R11	10M	"	R46		
C12	0·004 µF	C20	R12	500K	"	R33	VC1	500K
C13	0·05 µF	C224	R13	47K	"	R23	VC2	5K
C14	0·1 µF	C23	R14	500K	"	R31	VC3	1M
C15	25 + 25	C25	R15	1M	"	R32		
C16	0·01 µF	C7						

OSCILLATORS

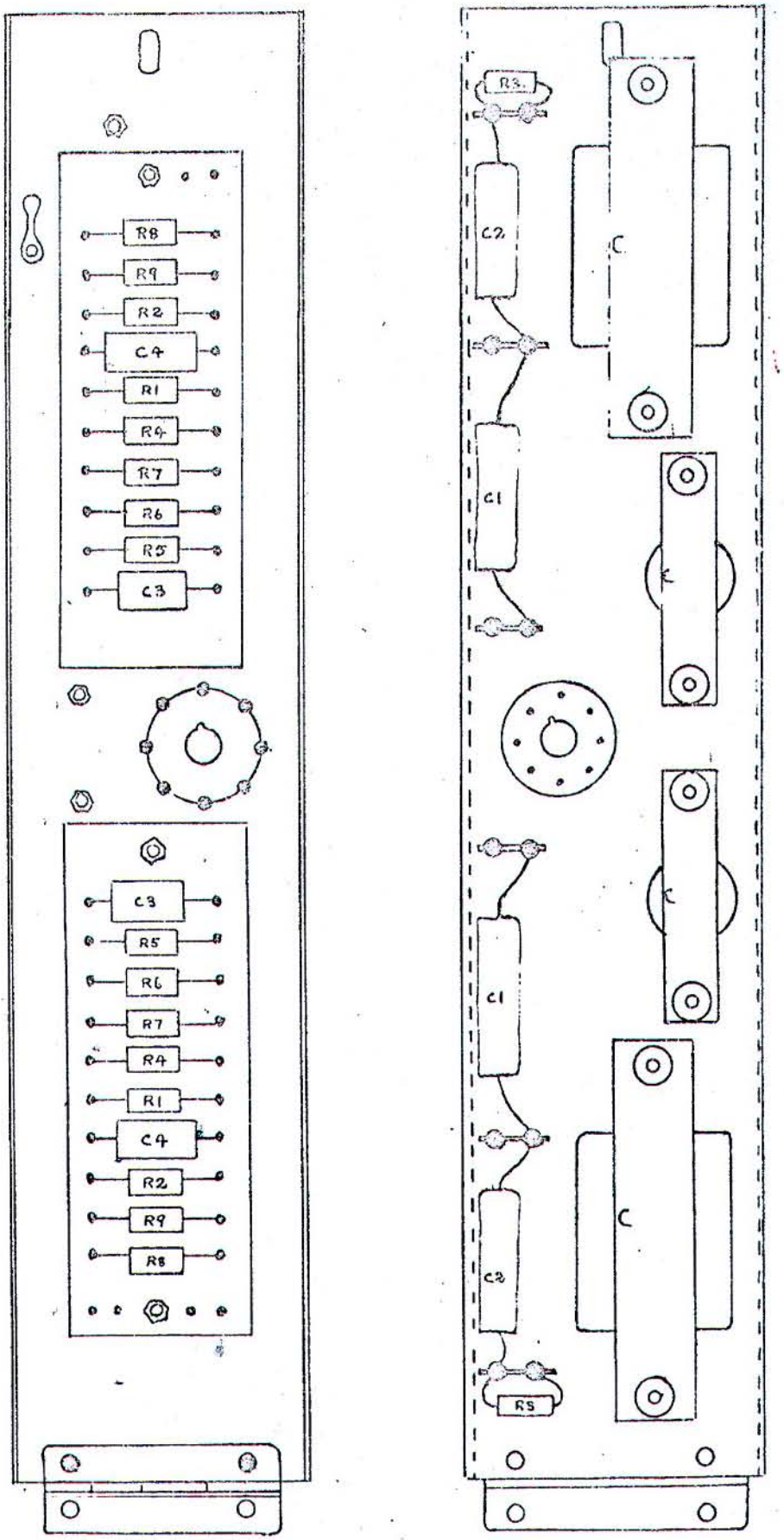
Code	Value	Rating
C1 *	AS REQUIRED	
C2 *	" " "	
C3 *	" " "	
C4 *	0·1 µF 250v	C24
R1	1·5 M ohms	R41
R2	68K "	R25
R3	AS REQUIRED	
R4 †	100 - 270 K ohms	
R5	10 M ohms	R46
R6	2·2 M "	R42
R7	AS REQUIRED	
R8	" "	
R9	" "	
R	DEPENDS ON OSC. PITCH	

† MODULATION FOR VIBRATO

VALVES

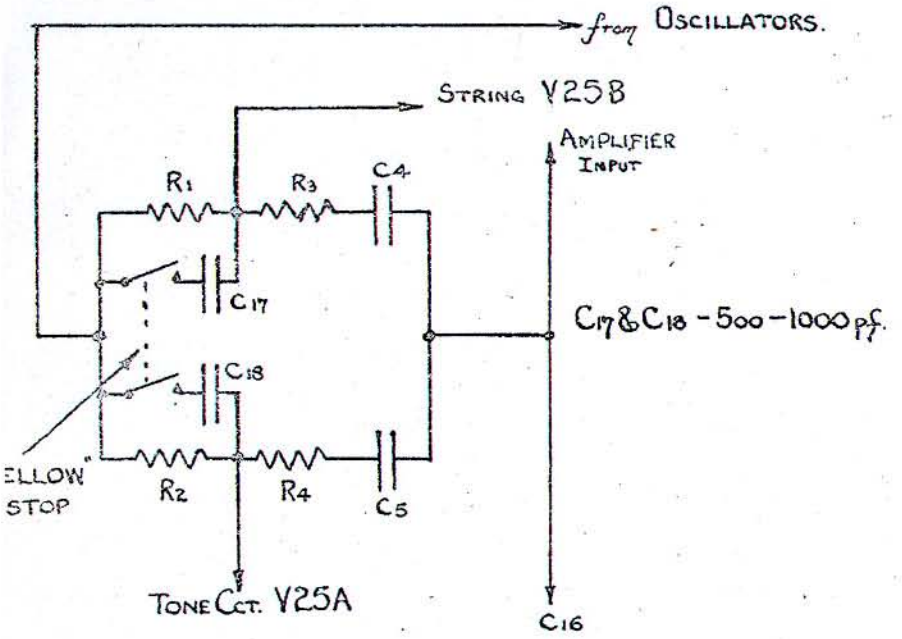
Code	Type
V1-15	B65
V16	Z762
V17	L63
V18	B65
V19	XT66
V20	"
V21	B65
V22	L63
V23	5Y4G
V24	L63
V25	12AT7

CHASSIS NO.

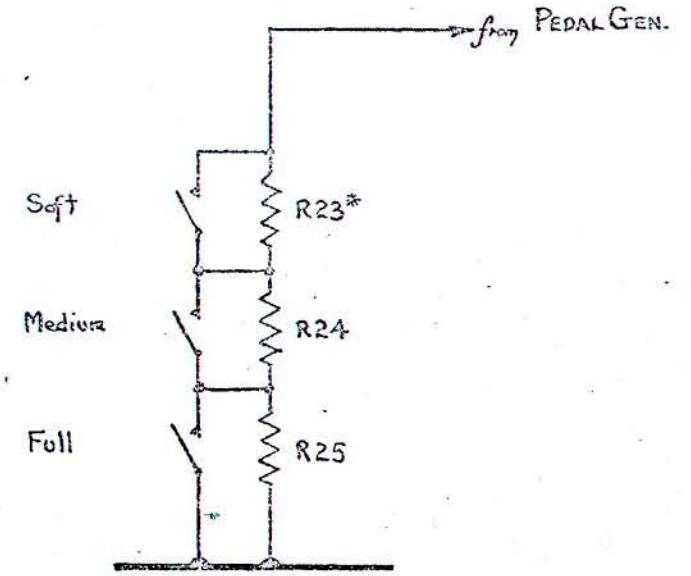


COMPONENT WIRING OSCILLATOR CHASSIS.

SELMER ELECTRONICS. DATE 1.1.55 DRAWN L.W.T. TAYLOR. DRG No 1266.



TONE CIRCUIT



* 15K On Some Instruments.

PEDAL CIRCUIT

— THEATRE ORGAN —

Values As Shown In Full "Tab-Box" Circuit
Except Where Otherwise Stated.