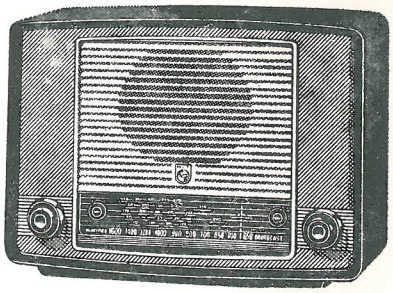
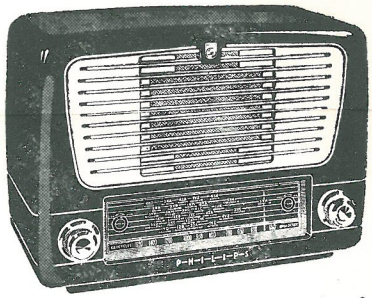
PHILIPS RADIO "METROPOLITAN" Model BZ366A





5-VALVE SUPERHETERODYNE RECEIVER

Mains Supply: 210-250 volts, 50 c/s, A.C., 40 watts.

Wave Range: 535—1,740 kc/s.

Intermediate Frequency: 455 kc/s.

REMOVAL FROM THE CABINET

Most service work, including alignment and the replacement of volume and tone controls, may be carried out while the chassis is still mounted in the cabinet. Whenever it is essential to remove the chassis from the cabinet, proceed as follows:

Remove the mains plug from the supply.

Remove the base shield earthing screw and the two retaining screws from the back cover. Pull the cover down to remove from the top slots, then back to remove from the base grooves.

Release the power cord and mains plug through the holes in the back cover. Unsolder the speaker and pilot lamp wires from the lugs on top of the output transformer.

Remove the two chassis retaining screws located in the front brackets at each end of the chassis and fixed into the moulded bosses in the front of the cabinet and above chassis level.

Pull the four knobs off the control shafts.

Turn the receiver upside down on the bench and remove the pointer from the pointer drive cable.

Slide the chassis back out of the cabinet.

REPLACING THE CHASSIS IN THE CABINET

Place the chassis on the rails in the cabinet, fit the mounting screws into the holes in the front brackets. Fit the panel lampholder assembly bracket over the mounting screw on the tuning condenser end of the chassis, then slide the chassis forward and tighten the mounting screws.

After the chassis has been replaced it may be necessary to adjust the position of both panel lamps to obtain the best dial scale illumination. The power supply end pilot lamp may be turned on the cabinet boss, and the tuning condenser pilot lamp adjusted by loosening off the mounting screw and moving the bracket.

ALIGNMENT OF THE RECEIVER

The chassis should be fitted in the cabinet before alignment adjustments are commenced. Switch on the receiver and allow it to warm up for a few minutes. Turn the tuning condenser to minimum capacity. Check that the Radio/Gram switch is in "Radio" position. Turn the volume control to maximum position and the tone control to minimum high note position. Unscrew the adjusting cores on the I.F. filters nearly right out.

Apply a signal of 455 kc/s modulated 400 c/s, 30% to the control grid of the ECH81 valve, through a 0.01 mfd. condenser, and adjust for maximum output in the following sequence (see trimmer location diagram).

1—Diode coil.
2—EBF80 plate coil.
3—ECH81 plate coil.
4—EBF80 grid coil.

If the above adjustments are carefully carried out in sequence no further adjustment should be made.

Seal the I.F. adjusting slugs. The sensitivity should require less than 25 μv. for 50 milliwatts output.

Remove the 0.01 mfd. condenser from the control grid of the ECH81 valve, and connect the signal generator by means of a standard dummy aerial to the aerial and earth connections of the receiver. Turn the tuning condenser to the maximum capacity position and adjust the pointer at the low-frequency end of the dial scale.

Turn the aerial and oscillator trimmers to their mid-capacity positions.

Apply a signal of 600 kc/s to the aerial and turn the pointer to the 600 kc/s position on the dial scale.

Adjust the broadcast oscillator padder C5 until the signal is tuned in. Adjust the coil on the Ferroxcube rod by sliding the coil along the rod with an insulated stick, for maximum output. Seal the coil on the rod. Turn the tuning knob until the pointer is in the 1500 kc/s position on the dial scale, and apply a signal of 1500 kc/s to the aerial. Adjust the broadcast oscillator trimmer until the signal is tuned in, and adjust the broadcast aerial trimmer for maximum output.

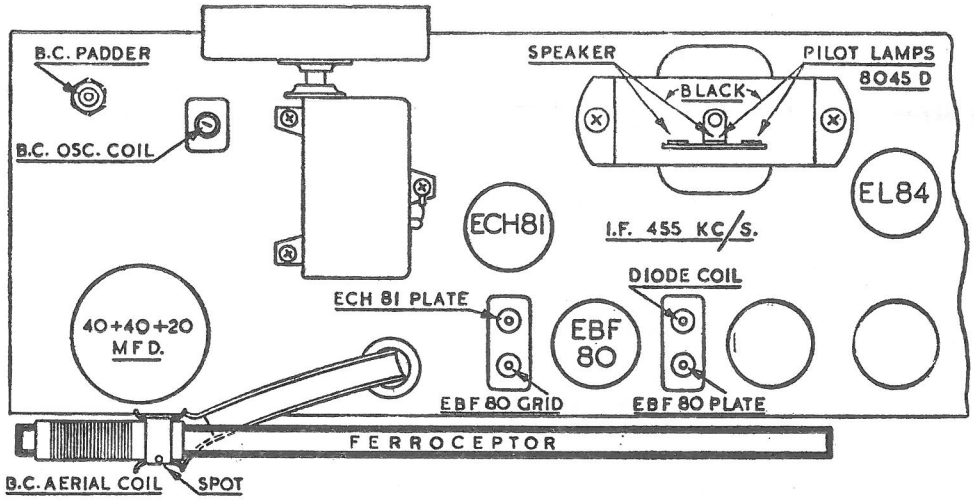
The crossover point is at 950 kc/s, and if the calibration is out, and sensitivity low at this point, the oscillator inductance should be adjusted.

If 950 kc/s tunes in at a lower frequency on the dial scale then the oscillator inductance adjusting core should be screwed in, slightly overcorrecting, then the oscillator padder adjusted to correct 600 kc/s and the oscillator trimmer to correct 1500 kc/s.

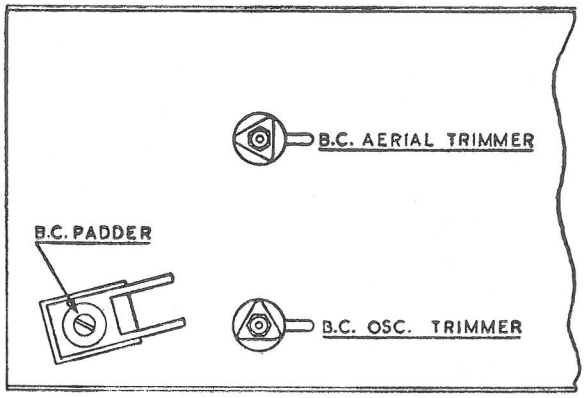
Repeat if necessary.

If 950 kc/s tunes in at a higher frequency on the dial scale, the oscillator inductance adjusting core should be screwed out, again slightly overcorrecting, and the oscillator padder and trimmer adjusted to correct the calibration of 600 kc/s and 1500 kc/s respectively.

The low-impedance aerial coupling gives constant aerial gain over the band, and has negligible effect on the Ferroxcube rod adjustment when an external aerial or signal generator is plugged into the aerial socket, so that final adjustment of the rod with an induced signal is not necessary.

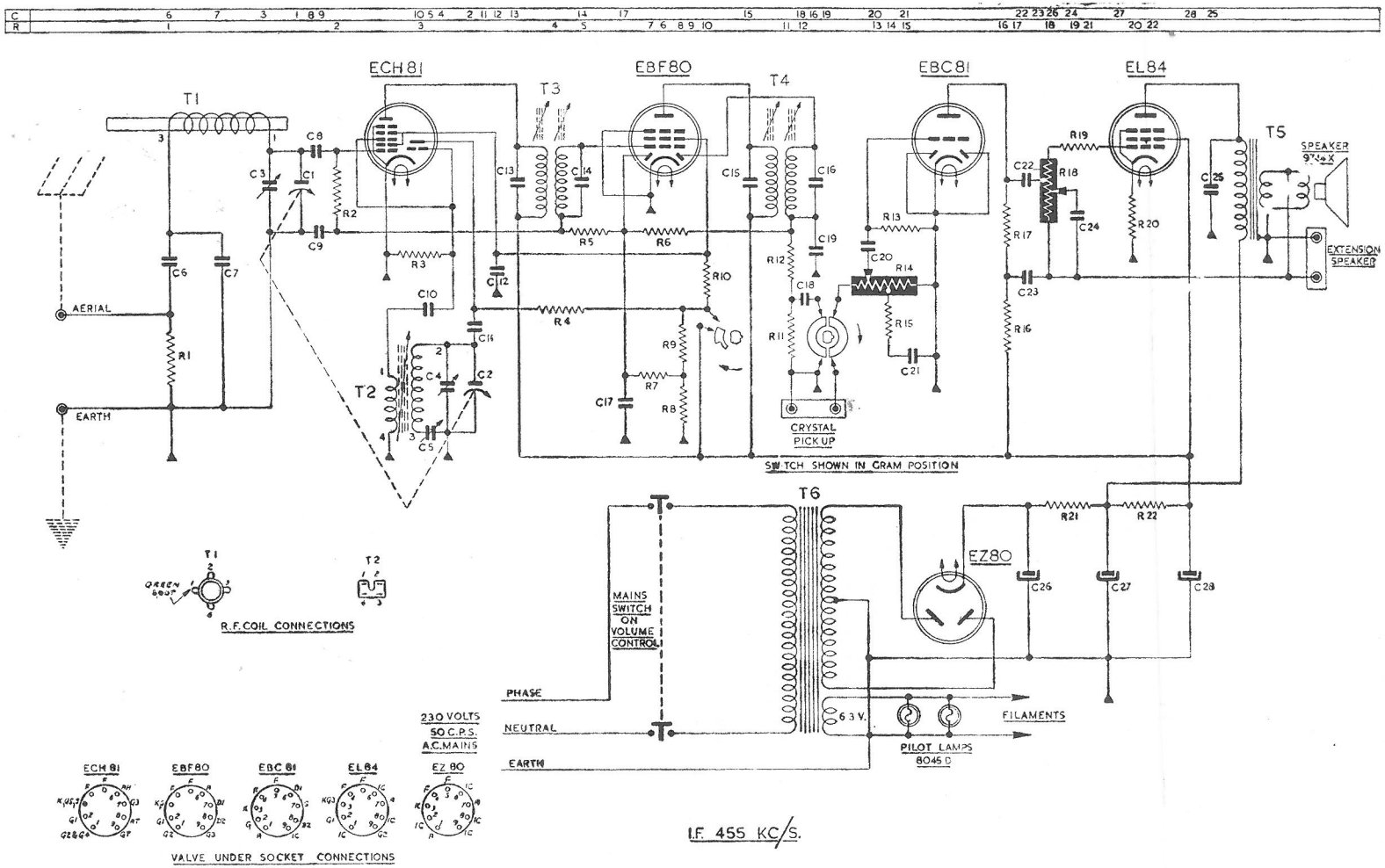


TOP VIEW



BOTTOM VIEW

TRIMMER DIAGRAM



CONDENSERS

C1 12—500 mmfd } ganged condenser
C2 12—500 mmfd }
C3 3—30 mmfd air trimmer
C4 3—30 mmfd air trimmer
C5 150—750 mmfd padder
C6 560 mmfd ceramic
C7 3300 mmfd styroflex
C8 150 mmfd ceramic
C9 .05 mfd 350 v. paper
C10 47 mmfd ceramic
C11 150 mmfd ceramic
C12 .02 mfd 500 v. paper
C13 110 mmfd ceramic
C14 110 mmfd ceramic
C15 110 mmfd ceramic
C16 110 mmfd ceramic
C17 500 mmfd mica
C18 .01 mfd 500 v. paper
C19 100 mmfd ceramic
C20 .01 mfd. 500 v. paper
C21 .02 mfd. 500 v. paper
C22 .02 mfd 500 v. paper
C23 .01 mfd 500 v. paper
C24 1500 mmfd ceramic
C25 2000 mmfd 750 v. paper
C26 40 mfd } 350v. triple electro
C27 40 mfd }
C28 20 mfd }

RESISTORS

R1 15 k ½ w. carbon
R2 1 meg. ¼ w. carbon
R3 47 k ¼ w. carbon
R4 27 k 1 w. carbon
R5 4.7 meg. ¼ w. carbon
R6 2.2 meg. ¼ w. carbon
R7 10 meg. ¼ w. carbon
R8 100 k ¼ w. carbon
R9 470 k ¼ w. carbon
R10 22 k 1 w. carbon
R11 270 k ¼ w. carbon
R12 100 k ¼ w. carbon
R13 10 meg. ¼ w. carbon
R14 2 meg. tapped at 400 k potentiometer
R15 39 k ¼ w. carbon
R16 100 k ½ w. carbon
R17 100 k ½ w. carbon
R18 500 k tapped at 50 k potentiometer
R19 1000 ohms ¼ w. carbon
R20 150 ohms 1 w. carbon
R21 370 ohms 4 w. wire wound
R22 1800 ohms 4 w. wire wound

COILS

T1 Ferroxcube rod aerial coil VK 469-73
T2 Oscillator coil VK 471-50
T3 Micro "12" I.F. filter A3 127-42
T4 Micro "12" I.F. filter A3 127-42
T5 output transformer VK 671—01/03
T6 power transformer VK 631—05

VOLTAGE TABLE

All readings taken with a primary input of 230 volts 50 c/s. Full load primary current should not exceed 240 mA.

Input: 40 watts.

Valve	Function	Filament	Cathode	Screen	Plate
ECH 81	Frequency converter and oscillator	6.2	—	60	Hexode 230 Triode 100
EBF 80	I.F. amplifier, demodulator and delayed A.V.C.	6.2	—	60	230
EBC 81	Audio voltage amplifier	6.2	—	—	85
EL 84	Power output pentode	6.2	6.6	230	260
EZ 80	Full-wave indirectly-heated rectifier	6.2	300	—	285 A.C. per plate
8045 D	Pilot lamps	6.2			

Voltage across C26, 300 volts. C27, 275 volts. C28, 230 volts.

The above voltages are measured between the points indicated and chassis with a meter having a resistance of 20,000 ohms per volt on D.C. ranges and 1,000 ohms per volt on A.C. ranges. Variations up to plus or minus 5% are permissible.

Radio/Gram switch in "Radio" position, tuning condenser at maximum capacity.

COIL AND TRANSFORMER RESISTANCES

T 1	Ferroxcube rod aerial coil	VK 469 73		1.1 ohms
T 2	Oscillator coil	VK 471 50	Tuned	6.75 ohms
			Feedback	3.15 ohms
T 3	Micro "12" I.F. filter	A3 127 42	Primary	14.5 ohms
			Secondary	14.5 ohms
T 4	Micro "12" I.F. filter	A3 127 42	Primary	14.5 ohms
			Secondary	14.5 ohms
T 5	Output transformer	VK 671 01/03	Primary	325 ohms
			Secondary	0.45 ohms
T 6	Power transformer	VK 631 05	Primary	40 ohms
			Filament	0.1 ohms
			Secondary	330 ohms
				360 ohms

REPLACING THE GANG DRIVE CORD

(See Fig. 1)

It is necessary when replacing the gang drive cord to remove the chassis from the cabinet. Open the brass "C" ring, retaining the bakelite drum on the shaft, and remove the drum. Turn the tuning condenser to the maximum capacity position and attach the spring A3 646 57 securely to the drum by bending the lug on the drum over one end of the spring. The small-diameter part of the bakelite drum has a slot across the rim, and two small grooves to position the drive cord. Under the slot is a round hole into which the brass tube on the cord is fitted with the long end of the cord (21 7/16") toward the back of the drum. Slide the drum on to the shaft and replace the brass "C" ring.

When the long slot in the rim of the large-diameter part is at the 12 o'clock position a hole in the shaft mounting bracket above the chassis will line up with a hole in the smaller-diameter part of the drum. A short pin or nail placed in these two holes will hold the drum in position while further threading-up operations take place.

The back part of the cord makes one complete turn round the drum in a clockwise direction, then passes over the tuning spindle, making 2½ turns in a clockwise direction, progressing towards the chassis. The brass ferrule on the end of the 3" flex cable fits into the left-hand slotted hole in the bakelight drum mounting bracket, and the ferrule on the other end of the 3" flex cable fits into the rear slotted hole on the pulley mounting bracket on top of the tuning condenser. The front part of the cord (18 13/16") makes 2½ turns round the small diameter of the bakelite drum in an anti-clockwise direction, then passes under the tuning spindle, making 2½ turns in an anti-clockwise direction, progressing away from the chassis. The brass ferrule on the end of the 3 3/16" flex cable fits into the left-hand slotted hole in the bakelite drum mounting bracket, and the ferrule on the other end of the flex cable fits into the front slotted hole on the pulley mounting bracket on top of the tuning condenser, passes round the tuning condenser drum in an anti-clockwise direction, through the hole in the side of the drum, over the capstan and the cord tab on the end attaches to the end of the spring. Remove the pin holding the bakelite drum in position and pass the back cord round the tuning condenser drum in a clockwise direction. Do not pass the cord round the pulley as shown in the diagram, but pass the cord through the hole in the side of the drum, round the capstan and hook the end of the cord over the spring. By turning the tuning spindle in a clockwise direction tension will be put on the spring, so that the slack will appear in the back cord, which can then be placed round the pulley. Turn the drive shaft a few times to equalise the tension over the cord, and, if necessary, place the turns on the drums and shaft, so that they do not bind.

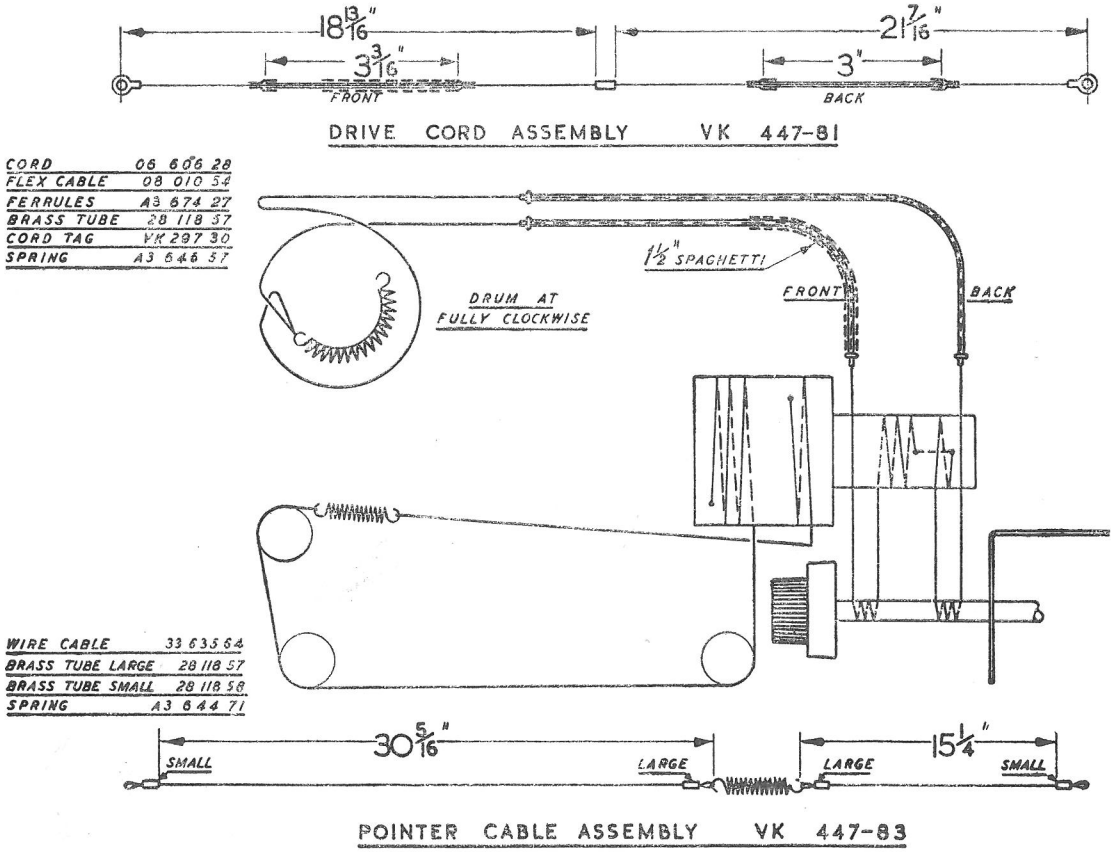


Fig. 1

REPLACING THE POINTER DRIVE CABLES

(See Fig. 1)

Turn the tuning condenser to the maximum capacity position, and place the small brass clamp of the $15\frac{1}{4}$" piece of cable in the longest slot in the rim of the large-diameter bakelite drum, which should be at approximately 12 o'clock position. The cable makes $1\frac{1}{2}$ turns round the drum in a clockwise direction progressing towards the back of the drum. Keeping tension on the end of the cable, turn the tuning condenser to the minimum-capacity position, taking up the cable on the drum. Pass the 30 5/16" cable round the three pulleys, and feed on to the bakelite drum at approximately 7 o'clock position in a clockwise direction, making $1\frac{1}{4}$ turns round the drum. Stretch the spring slightly, and place the small brass clamp into the slot at the 10 o'clock position on the drum. The cables should now be adjusted on the drum so that they do not cross, and both cables should progress towards the back of the drum when taking up cable.

REPLACING THE TONE CONTROL DRIVE CABLE

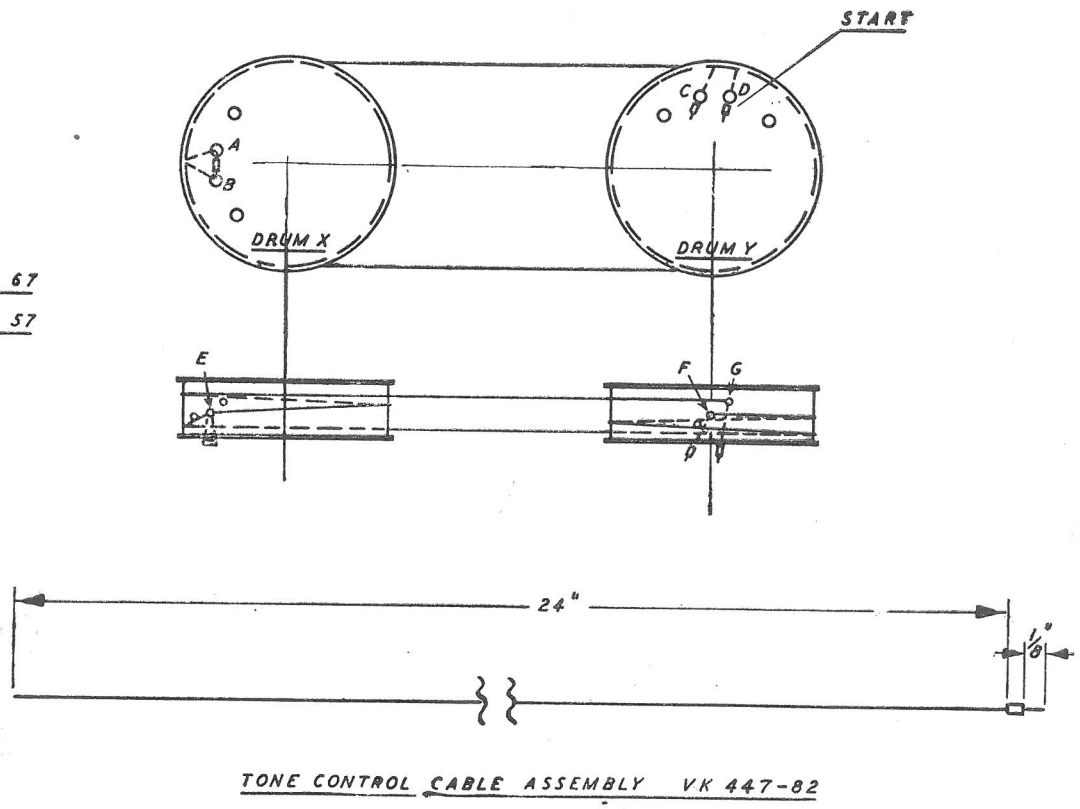
(See Fig. 2)

Turn the drums to the position shown in the diagram (tone control in the low position). With the cable shown in the diagram, push the free end through the hole "D" in drum "Y", then up through hole "G", making $\frac{1}{4}$ turn in an anti-clockwise direction round drum "Y", and $1\frac{1}{4}$ turns round drum "X" in an anti-clockwise direction. Feed the cable through holes "E" and "A", and slide a cable clamp (28118.57) over the cable.

Pull the cable tight and pinch the clamp securely. Push the cable through hole "B", then through hole "E" again, and pass the cable round drum "X", $\frac{1}{4}$ turn in an anti-clockwise direction. Pass the cable under drum "Y" for $1\frac{1}{2}$ turns in an anti-clockwise direction then through holes "F" and "C". Slide a cable clamp over the cable, pull tight and clamp securely. Cut off superfluous end of the cable.

CABLE 33 635 67

3 TAGS 28 118 57



TONE CONTROL CABLE ASSEMBLY VK 447-82

Fig. 2

LIST OF SPARE PARTS

No spare cabinets are available for this model, so that if a cabinet has to be replaced a substitute type A3 770 64 with flocked paper backing A3 554 28 and a back and bottom cover assembly VK 369 83 should be ordered.

Back and bottom cover assembly	VK 369 85
Flocked paper backing	A3 552 09
Knob, small (Tuning)	A3 752 34
Knob, small (Volume)	A3 752 78
Knob, large (Tone)	A3 752 36
Knob, large (Radio/Gram)	A3 752 76
Knob spring	A3 522 08
Dial glass (printed)	VK 852 24
Spring clips for back	A3 449 00
Radio/Gram switch	VK 421 44
Tone control	48 904 30/ GL 50K + 450K
Volume control	48 900 00/DL M4 + 1 M6
Ferroxcube rod	56 681 23/4B
Tuning condenser (C1, C2)	49 001 42