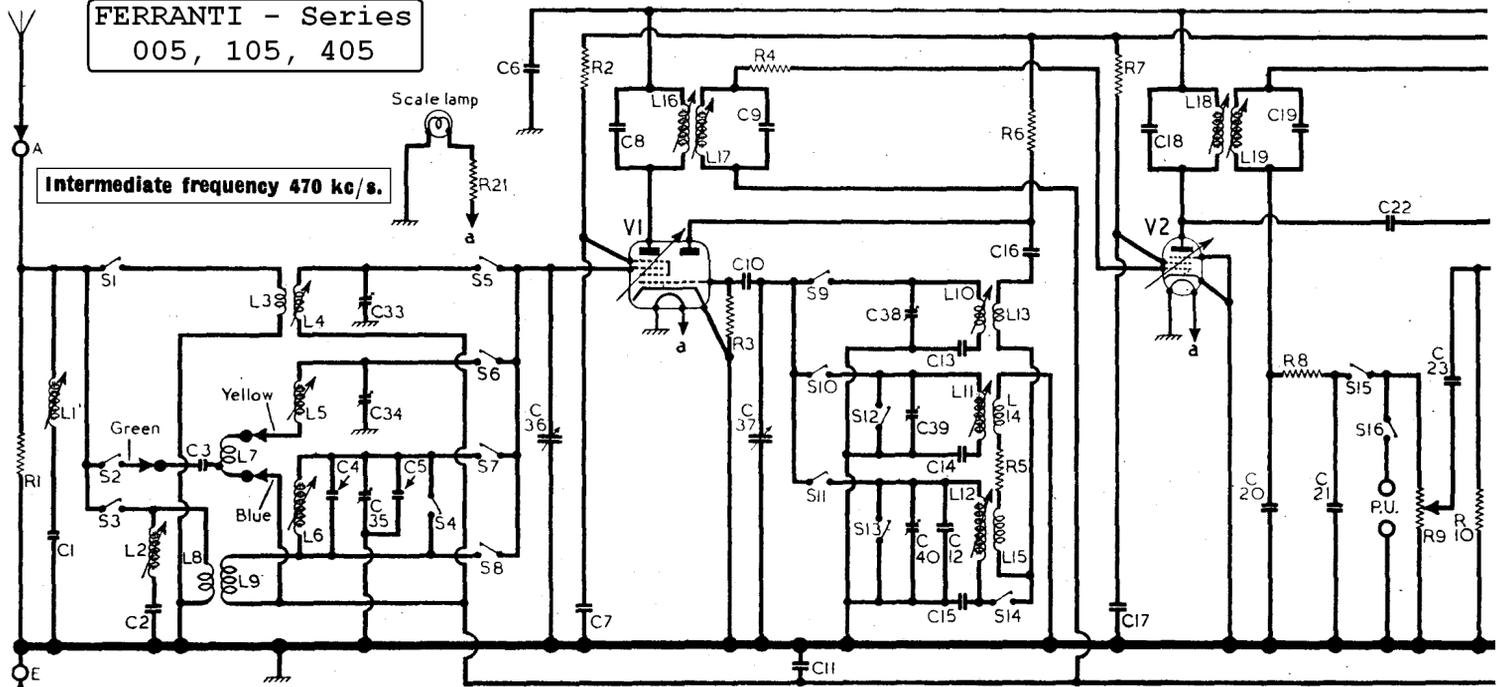


FERRANTI - Series
005, 105, 405

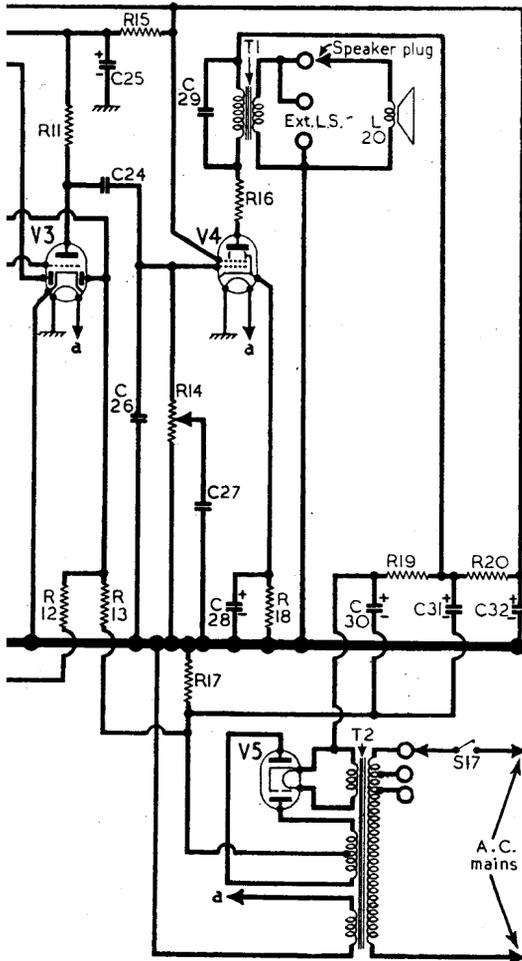
Intermediate frequency 470 kc/s.



In the 005A and 105A the aerial circuit is considerably modified and the frame aerial windings L7, L8, L9 are omitted. In the radiograms 405, 405A and 405LP, negative feed-back

is introduced between the cathode circuits of V3 and V4, but it is in circuit only on gram. The export models have a 110V tapping on the mains transformer and a

fuse in that lead.



CAPACITORS		Values	Locations
C1	I.F. filter tuning ...	30pF	F5
C2	Image filter tuning	150pF	F4
C3	Aerial coupling ...	50pF	G3
C4	L. W. aerial trimmers	15pF	G3
C5		80pF	G3
C6		0.1µF	E4
C7	H.T. decoupling ...	105pF	B2
C8	V1 S.G. decoup. ...	0.05µF	E4
C9	1st I.F. trans. tun.	105pF	B2
C10	V1 osc. C.G. ...	100pF	F4
C11	A.G.C. decoupling	0.1µF	F4
C12	L.W. osc. trimmer	100pF	G4
C13	S.W. osc. tracker ...	0.004µF	G4
C14	M.W. osc. tracker ...	470pF	G4
C15	L.W. osc. tracker ...	130pF	G4
C16	Osc. anode coup. ...	0.001µF	F5
C17	V2 S.G. decoup. ...	0.05µF	E5
C18	2nd I.F. trans. tun.	105pF	C2
C19		180pF	C2
C20		150pF	D5
C21	I.F. by-passes ...	150pF	D4
C22	A.G.C. coupling ...	100pF	D5
C23	A.F. coupling ...	0.02µF	D3
C24	A.F. coupling ...	0.01µF	D4
C25*	H.T. smoothing ...	16µF	E4
C26	I.F. by-pass ...	400pF	D4
C27	Part tone control ...	0.01µF	F3
C28*	V4 cath. by-pass ...	50µF	D3
C29	Tone correction ...	0.005µF	F5
C30*	H.T. smoothing ...	16µF	E5
C31*		16µF	E5
C32*		16µF	E4
C33†		40pF	A1
C34†	M.W. aerial trim. ...	40pF	A1
C35†	L.W. aerial trim. ...	40pF	A1
C36†	Aerial tuning ...	—	B1
C37†	Oscillator tuning ...	—	B2
C38†	S.W. osc. trimmer ...	40pF	A2
C39†	M.W. osc. trimmer ...	40pF	A1
C40†	L.W. osc. trimmer ...	40pF	A2

* Electrolytic. † Variable. ‡ Pre-set.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	
V1 6K8G ...	250	2.5	105	5.3	—
V2 6K7G ...	250	10.0	105	2.3	—
V3 6Q7G ...	70	1.0	—	—	—
V4 6V6G ...	280	40.0	245	3.6	12
V5 B52 ...	295†	—	—	—	325

† A.C. volts, each anode.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	I.F. rejector ...	20.0	F4
L2	Image rejector ...	3.2	F4
L3	S.W. aerial coup. ...	0.2	F3
L4	Aerial tuning coils	Very low	F3
L5		2.6	G4
L6		6.3	G3
L7	M.W. frame aerial ...	0.5	—
L8	L.W. frame aerial coils ...	0.6	G4
L9	L.W. frame aerial coils ...	16.0	G4
L10		Very low	F4
L11	Oscillator tuning coils ...	4.4	F4
L12	Oscillator re-action coils ...	11.0	G4
L13		0.4	F4
L14	1st I.F. trans. { Pri. Sec. }	1.0	F4
L15		3.5	G4
L16		10.0	B2
L17	2nd I.F. trans. { Pri. Sec. }	10.0	B2
L18		7.5	C2
L19	Speech coil ...	6.0	C2
L20		2.8	—
T1	Primary ...	180.0	—
	Secondary ...	0.4	G5
	Primary, total ...	45.0	—
	H.T. sec., total ...	270.0	—
T2	Rectifier htr. ...	0.2	A2
	V1-V4 htr. ...	0.2	—
S1-S16	Waveband switch	—	F3
S17	Mains sw., g'd R14	—	G3

RESISTORS		Values	Locations
R1	Aerial shunt ...	33kΩ	F5
R2	V1 S.G. feed ...	10kΩ	D5
R3	V1 osc. C.G. ...	47kΩ	F5
R4	V2 C.G. stopper ...	2.2kΩ	B2
R5	Osc. stabilizer ...	470Ω	G4
R6	Osc. anode feed ...	22kΩ	E4
R7	V2 S.G. feed ...	22kΩ	D5
R8	I.F. stopper ...	100kΩ	D5
R9	Volume control ...	1MΩ	D3
R10	V3 C.G. ...	10MΩ	D3
R11	V3 anode load ...	100kΩ	D4
R12	A.G.C. decoupling ...	2.2MΩ	D5
R13	A.G.C. load ...	2.2MΩ	D5
R14	Tone control ...	500kΩ	G3
R15	H.T. smoothing ...	4.7kΩ	D4
R16	V4 anode stopper ...	100Ω	E4
R17	V1, V2, G.B. ...	47Ω	D5
R18	V4 G.B. ...	270Ω	D4
R19	H.T. smoothing ...	470Ω	G5
R20		1.5kΩ	G5

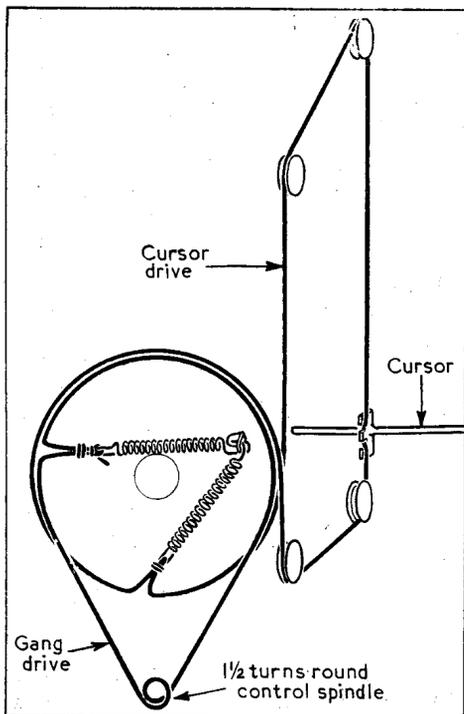
DRIVE CORD REPLACEMENT

There are two separate cords in the tuning drive system, the gang drive cord and the cursor drive cord. The course they follow is shown in the sketch below, where the tuning drive system is drawn as seen from the rear of the chassis with the gang at maximum capacitance.

Three feet of nylon braided glass yarn is required for the cursor drive, and eighteen inches for the gang drive. These lengths leave an ample margin for tying off.

The scale panel must be removed to fit the cursor drive, but it is held in place only by one screw at each corner, and it is sufficient simply to slacken these to remove the panel. Each fixing bracket holds a rubber pad, specially shaped to grip the glass. A fifth rubber pad takes the pressure of a fifth bracket at the top centre.

The cursor can be slipped on to the cord after it is fitted, and can be adjusted roughly to cover the 2,000 m calibration mark on the scale when the gang is at maximum. Final adjustment as described under "Circuit Alignment" can then be made after replacing the scale panel.



Sketch showing the tuning drive system as seen from the rear, neglecting obstructions, with the gang at maximum capacitance. Two separate cords are required.

Modifications and Divergencies

There are two basic models in this series from which the remainder are derived, and these are the 005 and the 105. These two are similar in all respects except that the 005 is housed in a plastic cabinet, while the 105 has a wooden cabinet. Our sample receiver was a 105.

The 005A and 105A are like the 005 and 105 in all respects except the aerial circuit, where the frame aerials are omitted. In these models L4, L5 and L6 are straightforward tuning coils connected between their switches and the A.G.C. line, and they all have aerial coupling coils, connected between the aerial switches S1, S2, S3 respectively and chassis in the conventional manner. The image filter L2, C2 is omitted. C5 becomes 50 pF. C3 is omitted.

FERRANTI - Series
005, 105, 405

CIRCUIT ALIGNMENT

Connect an A.C. voltmeter via a 0.1 μ F capacitor across T1 primary as an output meter. The output of the signal generator should be adjusted during the alignment so that the output meter reading does not exceed 20 V.

I.F. Stages.—Switch set to L.W., turn gang and volume control to maximum and connect the output of the signal generator, via a 0.1 μ F capacitor in the "live" lead, to control grid (top cap) of V1 and chassis. Feed in a 470 kc/s (638.3m) signal and adjust the cores of L19 (location reference C2), L18 (D5), L17 (B2) and L16 (E5) for maximum output.

I.F. Rejector.—Transfer signal generator leads via a dummy aerial to A and E sockets and switch set to M.W. Feed in a 470 kc/s signal and adjust the core of L1 (A2) for minimum output.

R.F. and Oscillator Stages.—During the following adjustments the back cover, with attached frame aerial, should be placed in the same position relative to the chassis as it occupies when fitted to the cabinet. In the case of model 405, however, the frame aerial is mounted on the side of the cabinet and during alignment should be kept as far from the chassis as the connecting leads permit.

Check that with the gang at maximum the cursor coincides with the figure 2,000 on the L.W. scale. The position of the cursor may be adjusted by slackening the two fixing screws in the drive drum bush and rotating the drum while keeping the gang at maximum.

M.W.—Switch set to M.W., tune to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust C39 (A1) for maximum output. Feed in a 214 m (1,401 kc/s) signal, tune it in on the set for optimum reception and adjust C34 (A1) for maximum output. Tune set to 500 m, feed in a 500 m (600 kc/s) signal and adjust the cores of L11 the cabinet and during alignment should be kept as far from the chassis as the connecting leads permit.

Check that with the gang at maximum the cursor coincides with the figure 2,000 on the L.W. scale. The position of the cursor may be adjusted by slackening the two fixing screws in the drive drum bush and rotating the drum while keeping the gang at maximum.

The radiogram version 405 employs a modified 105 chassis and a 10in speaker. The differences as compared with our circuit diagram are as follows: the pick-up is shunted by a 0.003 μ F capacitor. V3 cathode and R18 are disconnected from chassis and joined together, then they are returned to chassis via a 10 Ω resistor, introducing negative feedback. The value of C28 is changed from 50 μ F to 0.25 μ F.

This 10 Ω resistor is short-circuited on radio by the radio/gram switch unit, which on the 405 is separate from the waveband switch assembly. The same sector of this switch unit short-circuits C17 on gram, returning V2 screen to chassis and muting radio. The other sector of the switch unit simply performs the change-over function of S15, S16 in our diagram.

(A1) and L5 (A1) for maximum output. Repeat these adjustments until no further improvement results.

L.W.—Switch set to L.W., tune to 1,800 m, feed in a 1,800 m (167 kc/s) signal and adjust the cores of L12 (A2) and L6 (A1) for maximum output. When adjusting L6, rock the gang to obtain optimum results. Tune set to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust C40 (A2) and C35 (A1) for maximum output. When adjusting C35 rock the gang to obtain optimum results. Repeat these adjustments until no further improvement is obtained.

Image Rejector.—Switch set to L.W., feed in a strong 247 m (1,214 kc/s) signal and tune set for optimum reception. Adjust the core of L2 (A2) for minimum output.

S.W.—Switch set to S.W., connect output of signal generator, via a 400 Ω non-inductive resistor as dummy aerial to A and E sockets. Tune set to 190 m on M.W. scale (this corresponds to the desired point on the S.W. scale), feed in a 16.67 m (18 Mc/s) signal and adjust C38 (A2) by first screwing it to maximum capacitance (without forcing) and then slowly unscrewing it until two peaks are obtained. The second peak (at the lower capacitance setting) is the correct one. Feed in a 20 m (15 Mc/s signal) and tune the set for optimum reception. Adjust C33 (A1), while rocking the gang, for maximum output. Tune set to 45 m, feed in a 45 m (6.67 Mc/s) signal and adjust the amount of coupling between the S.W. tracking leads (F4) and their respective coils L10, L4 for maximum output. These two wire leads are covered in the same coloured sleeving as the rest of the wiring, but they can be distinguished by the fact that they are thicker than the surrounding wires. Repeat these adjustments until no improvement can be obtained.

A 1 M Ω resistor is shunted across the volume control R9, and C26 is omitted. C27 is returned to V3 triode anode instead of to chassis, so that it tends to shunt C24 at one end of the control, giving bass boost, and to shunt the output from V3 at the other end, giving top cut. The gramophone motor leads are connected across the 230 V section of the mains transformer T2 primary.

The 405A is like the 405, but it embodies the modifications explained earlier for the 005A and 105A. The 405LP is like the 405, but it is fitted with a 3-speed automatic record playing unit.

Export Models.—There are five of these, bearing the same model numbers as their home prototypes with the suffix "E." They are 005E, 005ME, 105E,