FERRANTI 1936 NOVA ALL-WAVE SUPERHET

CIRCUIT.—A four-valve, three-wave-band superhet for operation on A.C. mains.

On short waves, the aerial input to V1, a frequency changer, is through two inductively coupled coils. Medium and long wave coils that might affect short wave reception are shorted out.

On medium and long waves the input is through a band-pass filter which incorporates an image rejector. The output of V1 is passed through an I.F. transformer tuned to 125 kc. to V2, an H.F. pentode.

The output of V2 passes to the diode portion of V3, a double diode output pentode. Signals are then fed to the grid of the pentode section of the valve through the volume control.

One diode of V3 is employed to provide A.V.C. bias to V1 and V2, in the orthodox manner. Tone control is effected by means of R21 and C22.

Mains equipment consists of the transformer, full-wave rectifier, electrolytic condensers, and the speaker field in the negative lead.

Special Notes.—The dial lamp is a standard 6.2 volt .3 amp. type, and is fixed to a metal plate on top of the tuning dial assembly. This lifts out to allow removal of the lamp.

The external speaker connections follow standard practice and are on the low resistance side of the output transformer.

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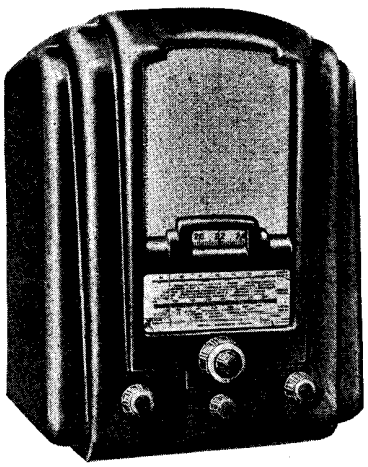


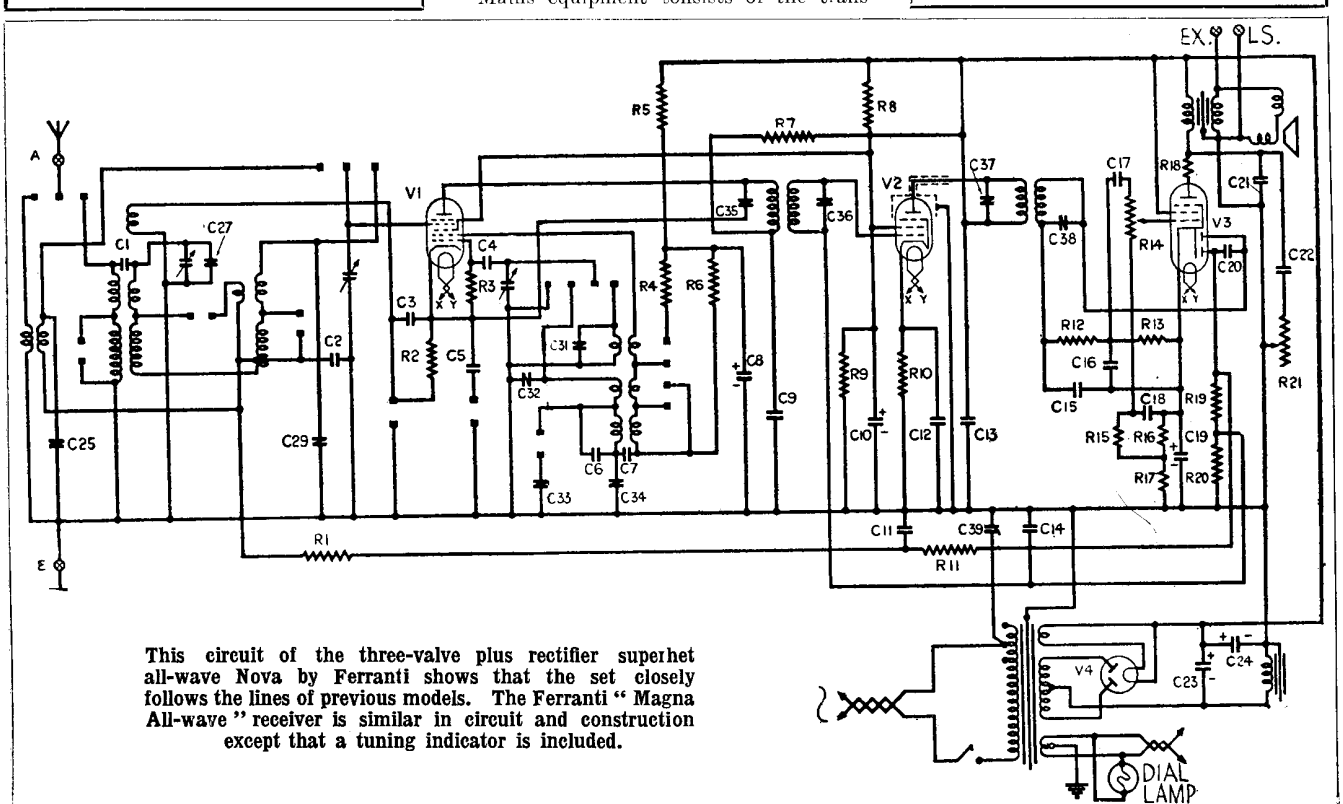
A special Magnascope tuning scale above the usual all-purpose dial is a distinguishing feature of the Ferranti Nova all-wave A.C. superhet produced for the 1936-37 season.

RESISTANCES

R.	Purpose.	Ohms.
1	V1 A.V.C. bias decoupling ...	250,000
2	V1 cathode bias	300
3	V1 oscillator grid leak ...	100,000
4	V1 oscillator anode feed ...	1,000
5	V1 oscillator anode decoupling	30,000
6	V1 oscillator anode feed ...	150,000
7	V1 anode decoupling... ...	1,000
8	V1 and V2 screen potr. feed ...	25,000
9	V1 and V2 screen potentiometer...	50,000
10	V2 cathode bias	450
11	A.V.C. decoupling	1,000,000
12	H.F. filter	100,000
13	Demodulator diode load ...	500,000
14	Volume control	1,000,000
15	V3 bias decoupling	100,000
16	V3 auto bias	140
17	A.V.C. delay	600
18	V3 anode stopper	140
19	A.V.C. potentiometer... ...	4,000,000
20	A.V.C. potentiometer... ...	1,000,000
21	Tone control	50,000

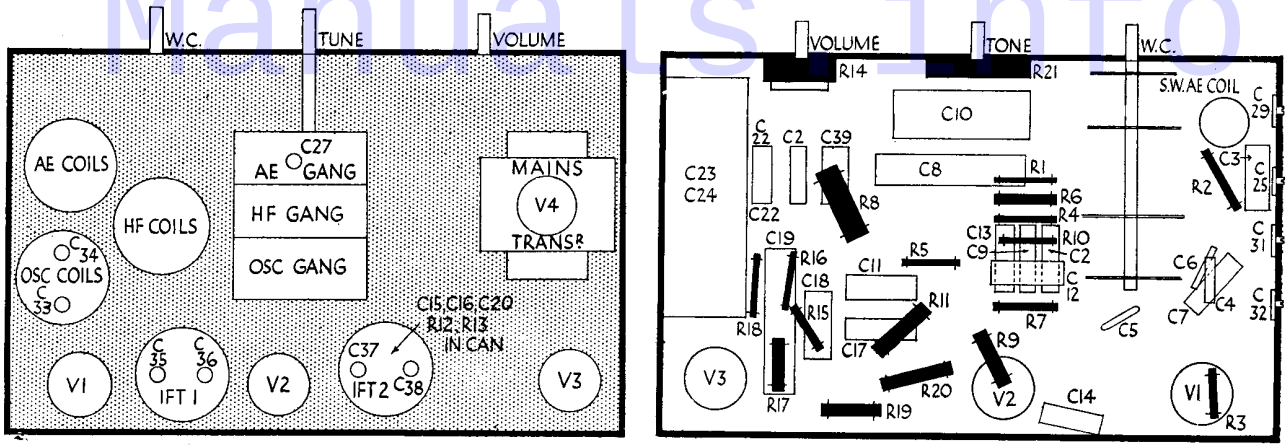
CONDENSERS

C.	Purpose.	Mfd.
1	Top capacity coupling ...	.000016
2	Band pass coupling	.05
3	V1 cathode bias shunt ...	.05
4	V1 oscillator grid	.00005
5	V1 cathode bias shunt (S.W.)	.0005
6	V1 oscillator corrector ...	.000018
7	V1 osc. anode coupling ...	.01
8	V1 osc. anode decoupling ...	2
9	V1 anode decoupling... ...	.1
10	V1 and V2 screen by-pass ...	4
11	A.V.C. decoupling	.05
12	V2 cathode bias shunt ...	.1
13	V2 anode decoupling... ...	.1
14	V2 A.V.C. decoupling ...	.05
15	H.F. filter	.00015
16	Demod. diode load by-pass	.00015
17	L.F. coupling	.02
18	V3 grid decoupling	.25
19	V3 cathode bias shunt ...	4
20	A.V.C. diode coupling ...	.00015
21	V3 anode decoupling... ...	.002
22	Tone control	.05
23	H.T. smoothing	8
24	H.T. smoothing	8
39	Mains H.F. by-pass	.002



This circuit of the three-valve plus rectifier superhet all-wave Nova by Ferranti shows that the set closely follows the lines of previous models. The Ferranti "Magna All-wave" receiver is similar in circuit and construction except that a tuning indicator is included.

FERRANTI 1936 NOVA ALL-WAVE SUPERHET



The top-of-chassis layout of the Nova (left) and the underneath arrangement of parts (right). Note that condensers are shown in outline and resistors in solid black.

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The speaker, therefore, should have a low speech coil resistance.

Removing Chassis.—Remove the four knobs from the front of the cabinet, which are secured by spring clips, and four securing bolts from underneath.

Next, free the speaker leads from the sockets on top of the mains transformer.

The connections, looking from the back, are: (1) Blue; (2) green; (3) red, and (4) black.

The chassis can then be completely removed from the cabinet. Should it be required to test the receiver out of the cabinet, the speaker leads must be extended, as the field forms part of the smoothing equipment.

ALIGNMENT NOTES

Two peaks will be found when adjusting some of the trimmers. In each case the one nearer the minimum position is the correct one.

I.F. Circuits.—Connect a modulated oscillator tuned to 125 kc. to the grid of V1 and the chassis, and an output meter across the external speaker terminals. Adjust C38, C37, C36 and C35 for maximum reading on output meter.

Medium-wave Band.—With the oscillator still connected to the grid of V1, inject and tune in a signal of 228 metres and adjust C32 for maximum reading on the output meter.

Transfer the oscillator, still tuned to 228 metres, to the aerial and earth terminals, *via* a dummy aerial, and adjust C27 and C29 for maximum.

Tune oscillator and receiver to 500 metres and while rocking the tuning condenser adjust C33 for maximum.

Long-wave Band.—Tune the oscillator and receiver to 1,807 metres and adjust C34 for maximum.

Short-wave Band.—Tune the oscillator and receiver to 19.7 metres—this is marked on the top of the tuning dial by a small black line—and trim C31 for maximum.

An image should be found slightly to the right of the correct peak. Verify this and then return and adjust C25 for maximum output.

QUICK TESTS

Quick tests are available on this model on the terminal strip on the mains transformer. Volts measured between this and the chassis should be:—

Blue lead, 95 volts.

Green lead, 285 volts, smoothed H.T.

Red lead, 290 volts, unsmoothed H.T.

Black lead, 0 volts, chassis link.

When taking the blue lead voltage, the positive of the meter goes to the chassis.

VALVE READINGS

No signal. Volume at maximum. 200 volts. A.C. mains.

V.	Type.	Electrode.	Volts.	Ma.
1	VHT4 Met. (7)	anode ...	290	2.7
		screen ...	100	5.1
		osc. anode	100	1.7
2	VPT4 Met. (5)	anode ...	290	5.1
		screen ...	100	2.7
3	PT4D (7) ...	anode ...	280	38
		screen ...	290	9
4	R4 (4)... ... (All Ferranti)	filament...	290	—

Simple Explanation of Foundation of Radio

ENGINEERS who wish to obtain a grasp of the theory behind radio sets can hardly do better than obtain "Foundations of Wireless," a volume written by A. L. M. Sowerby, M.Sc.

The book explains the principles on which the design and operation of modern receivers are based, and provides knowledge which will enable new developments to be understood.

Although written in simple, chatty language, the book contains all necessary formulæ, diagrams and graphs. Mr. Sowerby, however, explains these mathematical devices. His book is, in fact, an introduction to the mathematics of radio as well as to radio itself.

That it will enable them in future to follow many of the graphs and formulæ encountered in technical articles will prove one of the biggest attractions of the book to many radio men.

In the 260 or so pages at his disposal Mr. Sowerby deals with his subject in an amazingly comprehensive manner.

For instance, in less than 50 pages he progresses from an introduction on the nature of wireless signals through explanations of fundamental terms, units and formulæ to a discussion of high-frequency circuits. Here Mr. Sowerby deals with the effects of inductance, capacity and resistance, and with phase relations in a manner seldom presented in a short and simple book.

Next comes a 20-page chapter on tuned circuits—a subject of special importance, as on the correct design of these the performance of every set ultimately depends.

Detection and the triode valve are then explained. The diode is fully explained—a point worth noting, because most books "explaining radio" somehow omit mention of this important and, to the learner, puzzling type of rectifier.

A few sub-headings from the chapter on triode valves will indicate the comprehensive lines on which the book is written: Amplification factor, mutual conductance, load impedance, dynamic characteristic, effect of load on amplification, and power in grid and anode circuits.

Upon the groundwork now provided Mr. Sowerby proceeds to describe the nature of the received signal and explains the need for detection. Then follow 11 chapters describing the design of receivers.

The superhet and its frequency changer has a lengthy chapter to itself, as do also I.F. tuning circuits and automatic volume control.

Finally the book has both a detailed list of contents and an index.

It should be emphasised that the book, while being a simple explanation of radio—that is, as simple as a serious explanation of a highly technical subject can well be—is definitely not a "popular" volume. It is planned, not for the man who wants to "get an idea of," but for the man who wants to understand and intends to study.

The book is priced at 4s. 6d. net, and is obtainable at 4s. 11d., post free, from the Technical Book Dept., Odhams Press, Ltd., 85, Long Acre, London, W.C.2.