

The 1946

ADVANCE

standard 4/5 circuit

Here is a standard type 4/5 dual-waver of a type we have not described for some time, suitable for almost all occasions in which a reliable set is needed with or without a gramophone pick-up attachment. We have taken some trouble in matters of chassis layout etc. and to see all the component parts are available. It is a set truly in the tradition of the many fine "Advances" of the past.

ONE of the problems in building sets of this nature during the war years has been that items such as tuning gangs have been virtually unobtainable. Some of them are still hard to get, but they can be bought nowadays. In fact, everything in this set was bought at radio shops in Sydney with the exception of the chassis.

The chassis will be obtainable also when this article appears. We have gone into a huddle with the chassis manufacturers, with the result that this chassis will be our standard type for 4/5 dual-wavers from now on. All the well-known makes of coils, gangs, and dials will fit it, and the chassis people are going to considerable trouble to see that all their holes are punched in the right places!

STANDARD CHASSIS

In fact, this close co-operation with chassis makers will be a plank in our policy from now on. We will use a new type of chassis only when the job cannot be reasonably fitted on an existing type. The big snag here, of course, is the matter of tuning dials. These are of such a variety that it is frankly impossible to make one chassis which will fit them all.

However, if you want a chassis using a dial that calls for a great cut-out something like the Sydney graving dock, then there seems no other solution than to mark it out, and have it made as a special. Trying to please everybody in this matter simply means that chassis come into use which somehow don't seem to please anybody.

We'll have a little more to say about this when we begin to discuss the layout of the set.

Now a word about the circuit. Our aim here was to evolve something which was in fact, standard. This is the idea, of course, behind all the Advance sets. Furthermore, we wanted a circuit cap-

PARTS LIST

1 Chassis "Advance 46"
1 2-gang tuning condenser
1 Tuning dial
1 4/5 Dual-wave bracket
2 465 Kc Intermediates
1 Power transformer, 80 mill., 385V-0-385V, 6.5V, 5V, filaments.

RESISTORS:

1 2 meg., 1 1.5 meg., 3 1 meg.,
1 .5 meg., 1 .25 meg., 1 .1 meg.,
1 .05 meg., 1 150 ohm W.W., 1
50 ohm W.W., 1 25,000 Voltage
Divider, 1 .5 meg. potentiometer,
1 50,000 ohm pot.

CONDENSERS:

3 8 or 16 mfd electrolytics 600V,
1 25 mfd electrolytic, 3 .1 mfd, 4
.05 mfd, 4 .001 mfd, 1 .0005
mfd.
1 30H Filter Choke.

VALVES:

1 6J8G, 1 6G8G, 1 6J76, 1 6V6G,
1 5Y3G.

SPEAKER: 1500 ohm F.C. to match
6V6G.

SUNDRIES: 5 octal sockets, 1 4-
pin socket, 3 valve cans, valve clips,
knobs, hookup wire, power flex, etc.

minimum necessary, without in any way sacrificing essential performance.

The final result pleased us so much that a friend of ours, actually the musical director of a well-known Sydney college, insisted on acquiring the finished job from us without further ado. What struck him most was the good tone quality on both radio and records. So if that's a recommendation, there it is!

THE VALVES

The valve line-up is straightforward. There is a 6J8 converter for a start. There is no objection to the use of a 6K8 here, with very similar results, if the oscillator plate is reduced to 100 volts. The comparative performance of these two valves has been covered so often that we don't propose to argue about it here. Either will give fine results.

The IF valve is a 6G8G, used as IF amplifier, second detector, and AVC voltage producer. This allows the audio amplifier, a 6J7-6V6 combination, to follow standard circuitry which has been so popular in the past. It is, in fact, an audio amplifier with a tuner built in to the same chassis.

The rectifier is a 5Y3G. Yes, an 80 will be OK. In fact, any directly heated 5-volt rectifier will do, but we don't particularly advise an indirectly heated type without taking special precautions. It will give a higher voltage than is required, and might possibly give some trouble with electrolytic burnouts. There is no point in making life any harder for filter condensers than is necessary.

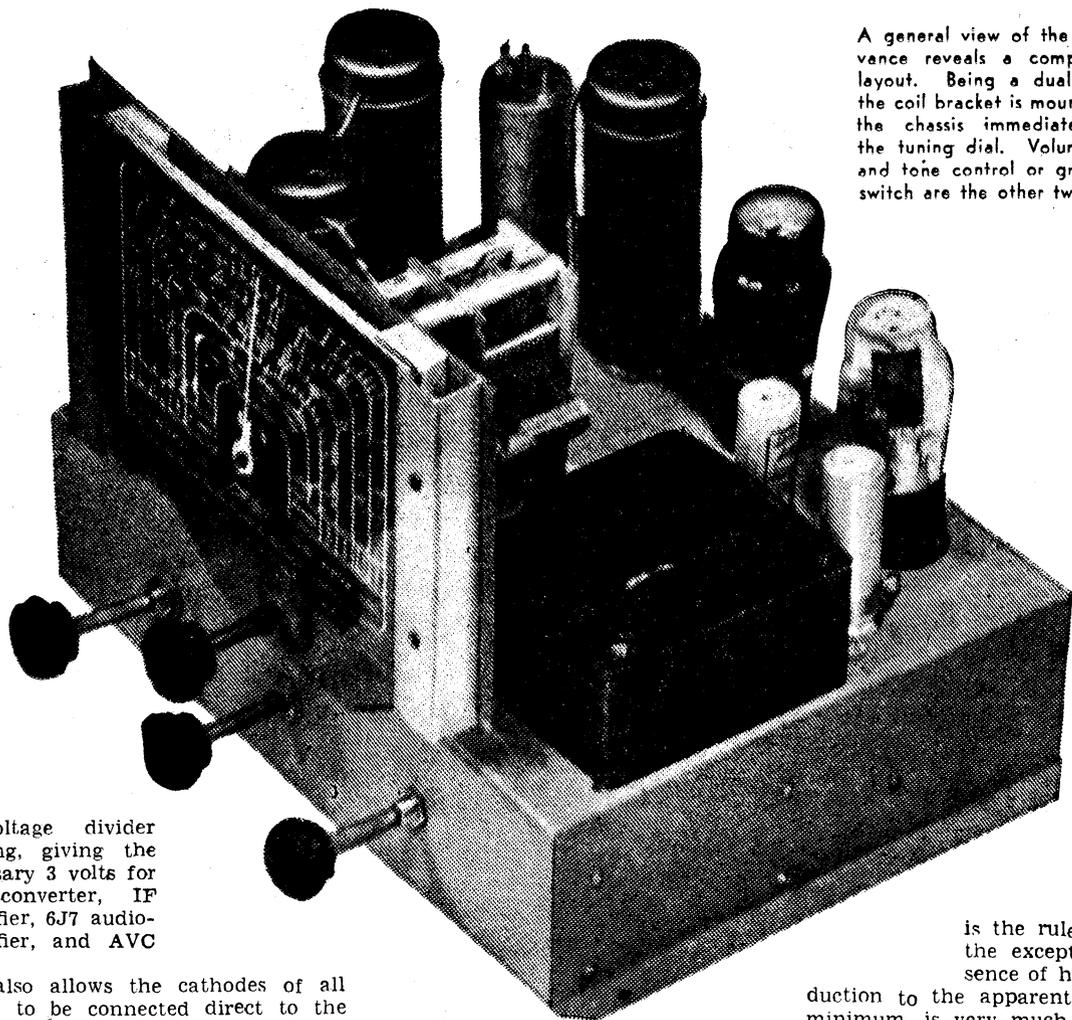
BIAS VOLTAGES

You will notice that a feature of this circuit is the use of back bias throughout. One can spend some time discussing the merits or demerits of this idea, but we can see no objection to it, particularly as we are suggesting the use of a filter choke to help reduce residual hum, something the home-builder is always keen about. It also saves a few resistors and condensers, and simplifies layout and construction.

The bias resistor is actually two in series. The total value of the two, 200 ohms, is sufficient to give the correct bias for the 6V6. The smaller of the two, 50 ohms, allows what is virtually

able of the clearest possible layout and construction, so that even the near novice could build it, and get results. We have tried to keep the parts to the

by
John Moyle



A general view of the 1946 Advance reveals a compact, neat layout. Being a dual-wave set, the coil bracket is mounted under the chassis immediately below the tuning dial. Volume control and tone control or gramophone switch are the other two controls.

a voltage divider tapping, giving the necessary 3 volts for the converter, IF amplifier, 6J7 audio-amplifier, and AVC line.

It also allows the cathodes of all valves to be connected direct to the chassis, another good circuit feature, as well as allowing a cleaner job of wiring.

A 25 mfd electrolytic, or a 10mfd., if the larger type isn't available, is adequate filter for the bias resistor.

VOLTAGE DIVIDER

Yet another point worthy of mention is the use of the voltage divider. This avoids the use of voltage dropping resistors, and ensures that a practically constant voltage is available at all times for screens and oscillator plate. This again is a matter which could be discussed at some length, but in a receiver of this type, the advantages which go with an IF amplifier screen-dropping resistor may be regarded as among the finer points which will not seriously affect matters one way or another.

An additional and very valuable advantage of the voltage divider is that its bleed current loads the rectifier until the other valves have warmed up, and thus avoids excessive initial peak voltages from doing damage to filter condensers when the set is first switched on.

FILTER CIRCUIT

You will notice that we have included a filter choke in the set. The reason is that we wished to keep the hum to the lowest possible value. The

average person generally finds that the use of a 1500 ohm field coil and a couple of 16mfds. condensers reduces the hum to a low enough level for all practical purposes. And in most cases it does, remembering that there is nearly always a certain amount of hum on a station carrier, and this is often more than comes from the set.

So you can please yourself whether you use this choke, which, with the extra condenser, is quite easily included at any time.

One point is that its use makes decoupling in the plate circuit of the 6J7 unnecessary.

If you want to include this decoupling, the resistance value is .1 megs, and the bypass condenser .25mfds. or greater.

We find, however, that in homes where consistent low-level listening

is the rule rather than the exception, and absence of hum, or its reduction to the apparently irreducible minimum, is very much worth while. Particularly if you use a good, well-baffled speaker, which tends to make the most of any which may be left.

INVERSE FEEDBACK

Of course, we have used inverse feedback, with the absurdly simple circuit which connects the plates of the 6J7 and the 6V6 through a resistor. We have used a 2 meg resistor, although it is permissible to use a 1.5 or even a 1 meg if more feedback is required. I have had quite a discussion on this point with Neville Williams, who is very learned in such matters, and he likes a bit more feedback than I do. He also likes to fit one of his tone-controls as standard, but somehow I felt that in our Advance design it was better to aim for simplicity here, real-

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In our next issue, we plan to describe the 1946 Standard. This will be a larger set than the Advance, probably including an R.F. stage with the alternative of broadcast band only, or both broadcast and short-wave bands. It will feature a simple push-pull output circuit, and should represent the simplest and best approach to the "big set" problem.

REAR VIEW OF NEW ADVANCE

course of the story. Don't forget to connect all the earthed points together with heavy, tinned copper wire, as a sprayed metal chassis will often prove unreliable as an "earth" if you merely screw the solder lugs down under convenient nuts. There are plenty of these, of course, to allow very short earthing leads where required.

Note that the bypass condenser on the oscillator B plus lead is tucked under the coil unit—about the only component not immediately in view.

If you use can-type electrolytics, as we did, take great care to mount the first two on washers, so that the cans are insulated from the chassis. Fibre washers are OK and you may have to enlarge the mounting holes in the chassis to avoid shorting the bolts. Obviously, as the condenser cans are intended to connect to the transformer secondary centre-tap, you will short out the bias resistors if they make contact with the chassis.

Condensers with pigtails are quite OK, however, and can be tucked under the chassis with plenty of room.

BIAS RESISTOR MOUNT

Incidentally, the bias resistors are mounted on a small panel at the side of the chassis, and two of the solder lugs are used to anchor the 240 volt AC leads. Unfortunately, transformer manufacturers at the moment do not always provide terminal strips on their products, and you must not on any account have AC leads floating round which are not firmly and properly anchored to such a strip.

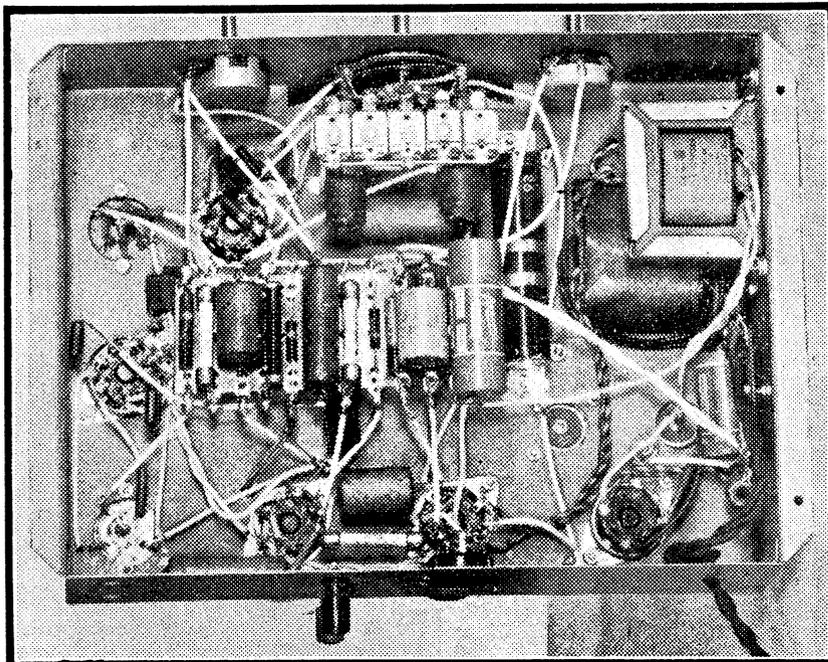
The condenser gang may look unfamiliar to some of you. It is an AWA type which has recently appeared on the market, and which we understand

will be obtainable in increasing quantities from now on.

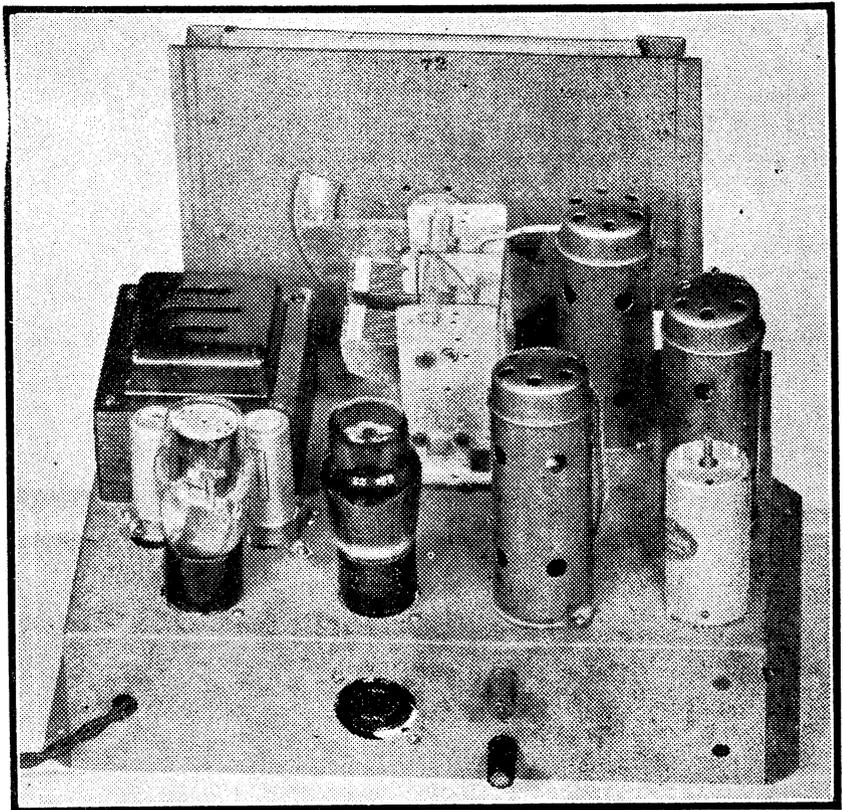
For quite a while, Stromberg "H" gangs have been scarcer than the

proverbial hen's teeth, a fact which has hindered home builders not a little. However, we bought our AWA gang over the counter, and have reason to believe that they will become more plentiful in time. It is an excellent condenser in every way.

UNDER-CHASSIS WIRING OF SET



The central panel for mounting components is shown in this picture, as well as the wiring in general.



Further placement of parts is shown in this picture. The chassis has a pair of terminal holes for pick-up terminals if these are required.

DIAL SETTINGS

The shape of the condenser plates is considerably different from those of the Stromberg, but, strangely enough, we found it possible to obtain correct lining-up on an "H" type dial, by dint of a little wangling. We found that with the plates right in mesh, the dial pointer on 2CR, and the padder lined for this condition, the stations came in almost on the dot. We suggest that before lining-up you start with things arranged this way. With an "H" gang, of course, start with the needle showing zero and the gang plates completely unmeshed.

Which brings us to the standard procedure of lining-up. First, the broadcast band.

LINING UP

Tune to a station near 2SM—this station will do if it is being received at steady strength, and not too strongly. A small aerial will reduce strength, if it is, and make adjustments more positive.

Now adjust the oscillator trimmer until 2SM is received at its right dial setting. It may possibly be necessary to keep the aerial trimmer in step if

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