

THE ULTIMATE 'SCREEN-GRID FOUR'

by John W. Stokes

When one thinks of early short-wave receivers such well known American names as National, Pilot or Silver-Marshall are likely to come to mind, yet there was actually a contemporary New Zealand receiver with specifications which compared more than favourably with any of them. Hard to believe? Read on. But, first a few words on the history of short-wave reception.

As is generally known, wavelengths below 200 metres were first made use of by amateur radio operators in the United States and some other countries as early as 1923. By 1924 world records in long-distance working were being made by hams using wavelengths of 100 metres, or even lower, and New Zealand was right in the forefront of this exciting new field.



THE NEW SCREEN - GRID "4"

Amongst this country's earliest hams was Reginald John (Jack) Orbell of Christchurch, a man whose name was later to become familiar as both an amateur and professional radio man. Jack Orbell was one of the first five licensed hams (he held operator's certificate No 5), and, in June 1923 became the first person to hold a Third District callsign (3AA). At this time he was a close friend of the legendary Frank Bell* of Shag Valley Station.

By profession Orbell was a 'heavy current' man, at least he started out to be one with a B.E. degree in Electrical Engineering from Canterbury College. In 1924 he obtained a position at the Hora Hora hydroelectric power station (near Cambridge) and while there continued with his ham activities using a newly allocated First District callsign IAX, a call which he held for the remainder of his life.

After leaving Hora Hora Jack Orbell moved to Auckland where he worked for a while at this country's first licensed broadcasting station, 1YA. In 1927 he obtained a position as chief engineer at Radio Limited's embryonic radio factory, then situated in Wright's Building, Fort St. One account of his joining this firm states that he brought with him an all-wave receiver of his own design; another account credits him with designing the set after joining the firm. But, whichever way it was, the fact remains that the set which was to become the Ultimate 'Screen Grid Four' was Orbell's brainchild.

The commercial version, released in 1928, was a set of advanced design and featured a gang-tuned RF stage using the newly released Philips A442 screen-grid valve. A 'high-mu' (mu of 15) Philips A415 triode as a conventional regenerative detector was followed by two transformer-coupled AF stages. Originally a Philips B405 power triode was used in the output stage, but later versions used the new Philips B443 pentode. Because these pentodes could be plugged directly into the same 4-pin sockets, no modification to the set's wiring was needed when changing from triode to pentode, apart from running a flexible lead from the side terminal on the valve base to the B+ max point.

The SG4 was housed in an attractively finished aluminium box fitted with four ornamental corner pieces which were extended at their lower ends to form mounting feet. A hinged and stayed lid provided ready access to the coil sockets. Five sets (10) of plug-in coils gave a coverage of from 14 to 525 metres, though there was a gap between 100 and 200 metres. Of necessity, most of the components had to be imported; the tuning condensers were Australian 'Emmco' while the dials were the famous American National 'Velvet Vernier'. Because the SG4 was intended for use with a speaker, no headphone connection as such was provided, though it was stated that reception which was - "remarkably clear and of comfortable strength" could be obtained by plugging the phones into the gramophone pickup tip-jacks.

Although not the first locally assembled receiver to be marketed by Radio Ltd, the SG4 appears to have been the first model advertised and sold under the brandname 'Ultimate'. An AC version using a separate power pack was produced in 1929. In 1930 this model was available in a console cabinet, either as a straight radio or combined with a gramophone motor and pickup.

From a perusal of the accompanying tabulation it can be seen that the Ultimate SG4 was, at the time of its introduction, and for nearly a year afterwards, the only set of its type anywhere in the world to feature a tuned RF stage, and it was also the first to feature ganged tuning of the RF and detector stages.

That the design of the SG4 was basically sound is evidenced by the fact that it remained unchanged during the period (about three years) which the set was in production. So, it may be fairly said that the success of the SG4 was a tribute to Jack Orbell's ability. In the writer's opinion, it is regrettable that this pioneering achievement should have for so long gone largely unrecognised and it is hoped that this article will do something to redress the situation.

SPECIFICATIONS OF SOME EARLY SHORT WAVE RECEIVERS

MAKE	MODEL	COILS	S.G. RF Stage	COVERAGE (metres)	DATE Announced	REMARKS
BURNDEPT	Empire Screened Four	N/A	untuned	20-48 200-500	Sept 1928	Dual-wave coverage only Has band switch
NATIONAL	Thrill Box SW4	4	untuned	200-535 and SW	June 1929	Kitset only. Uses special divided tuning condenser
PHILIPS	2802	6	untuned	10-2600	May 1929 (in U.K.)	Has true all-wave coverage
PILOT	Super Wasp	10	tuned but not ganged	14-500	June 1929	Kitset only. First release did not include BC coils
SILVER-MARSHALL	Round-the-World 4	4/6	untuned	17-204 later also BC	Dec. 1928	Available as either kit or factory wired. BC band split into two sections.
ULTIMATE	Screen Grid 4	8	gang-tuned	14-525	Aug. 1928	Coverage not continuous; a gap between 100 and 200m

All the above listed sets were 4-valve battery-operated models released between 1928 and 1929 and, with the exception of the National and Pilot, were complete (factory built) receivers. The last named two were issued in kitset only as the firms concerned were not then licensed receiver manufacturers.