Volume 3 AMENDMENT No.2 v 1.01

After the publication of 'Wireless for the Warrior' Volume 3 'Reception Sets', a small number of minor (typing) errors and incorrect data was spotted. In this Amendment corrected and extended with a detailed development history by Steve Dunford.

Reception Set A.E.W. 1 (N.Z.)

Country of origin: New Zealand

Revision v 1.01

In cooperation with Steve Dunford.

DATA SUMMARY

Organisation: Eastern Group Supply Council. (UK).

Design: Believed by Radio (1936) Ltd, in Auckland.

Manufacturers: Radio (1936) Ltd, Radio Corporation of New Zealand, Philips, Collier & Beale and probably more.

Year of Introduction: 1944.

Purpose: Entertainment and education.

Frequency Coverage: Four ranges: 550-1600kHz, 6-12MHz, 12-17MHz, 16-24MHz.

Circuit features: Superheterodyne with an IF of 455kHz; RF stage, mixer/local oscillator, IF stage, detector/AVC/ 1st AF stage, AF output.

Sensitivity: 5-8µV at 550-1600kHz or 15-20µV at 6-24MHz for 500 mW AF output.

AF output: 2½ W into 500Ω.

Valves: 6U7G (2x), 6K8GT, 7Q7GT, 6V6GT.

Power Supply: 6V DC; synchronous vibrator HT unit.

Size of cabinet (in): Height 8¾, length 14¼, width 10.

Weight (lbs): 34¼.

References:

- Correspondence, advice and permission to use material from his book was kindly granted by Steve Dunford, New Zealand.
- Correspondence with Chris Underwood, New Zealand.
- Photographs page 1 and 2 courtesy Ray Robinson, VK2NO, https://www.tuberadio.com/robinson/museum/AEW1/
- 'The Radio Corporation of New Zealand story', Steve Dunford, ISBN 9780473714970. Website: www.vintageradio.co.nz
- Working Instructions and Service Bulletin, Reception Set A.E.W.1 (N.Z.). Z1/ZA 30006. n.d. (UK user handbook).
- Wireless for the Warrior, Compendium 2, L. Meulstee, 2012, ISBN 978-90-819271-0-9.

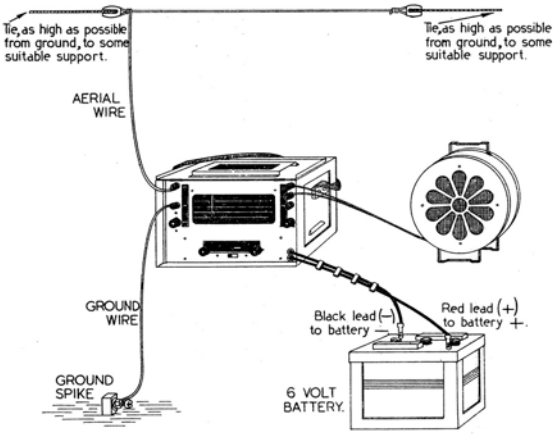
Remarks

Reception Set A.E.W. 1 (N.Z.), also known as Receiver Broadcast New Zealand Type B No. 1, was produced for troop entertainment ordered by the British Army.

The receiver was powered by a 6V accumulator, which provided the advantage that it could be used in places without mains electricity.

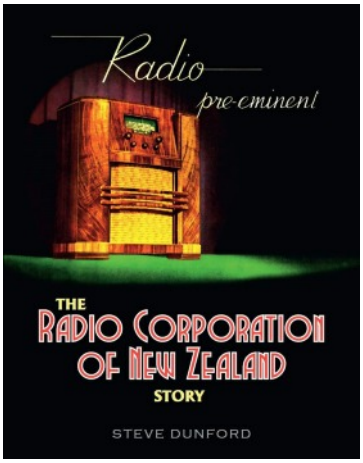
In its construction, standard components and many elements of a civilian broadcast receiver were used. It was still ruggedised, built into a steel case with a hinged lid protecting the controls and dial against damage during transit and storage. The radio was issued as a complete set with (according the working instructions) two high impedance loudspeakers, aerial and ground wire, and two 6V accumulators. The receiver power supply unit contained a 12V synchronous vibrator, which had been modified to operate on 6V. Even though the set was designed to operate on 6V, a 6V vibrator could not be used.

(In this amendment, the company name Radio Corporation of New Zealand was shortened to the commonly used Radio Corp NZ).



Setup of Reception Set A.E.W. 1 (N.Z.).

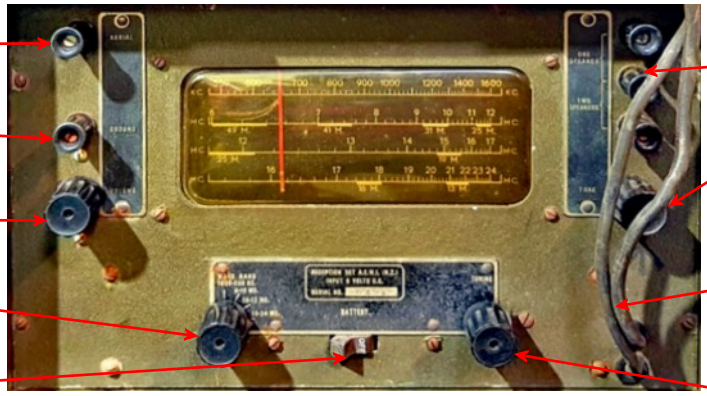
'The Radio Corporation of New Zealand story', by Steve Dunford.



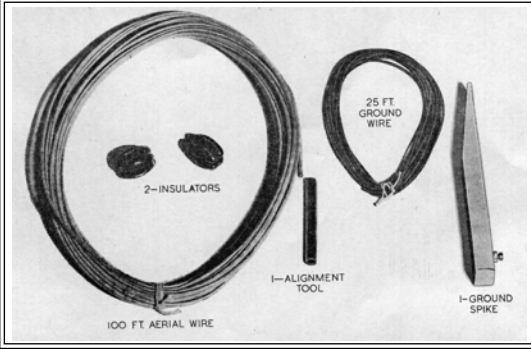
The book, first published in June 2024, containing nearly 800 photos, images, and advertisements spread over 408 pages, encompasses the golden age of radio, and is a must for radio enthusiasts, social history buffs or those interested in New Zealand's manufacturing past.

In 1929, a small shop opened in Wellington - repairing radios, and supplying parts to those building their own. The owner, William Marks, had only arrived in Wellington a few years earlier - but within a few short years he would grow this small store to become arguably the largest electronics manufacturing and distribution organisation the country had yet seen. The firm began as W. Marks Ltd., but would soon be given a title more closely resembling Marks' ambitions - Radio Corporation (N.Z.) Ltd. By the end of 1936, Marks would take his company public, changing its name once more, to the Radio Corporation of New Zealand Ltd - and alongside it sat his new retail arm - a nationwide chain of stores called Columbus Radio Centres. This book follows the development of the company and its products from its earliest days until it was eventually taken over, in 1959, by Pye (N.Z.) Ltd. The core details are interwoven with stories from the factory, stories about the staff members who made it more than just a job, stories about their radios, the brands they manufactured (Including Columbus and Courtenay) and technological breakthroughs they made in the radio field.

A limited print-run copy can be ordered directly from the author at www.vintageradio.co.nz or through the New Zealand Vintage Radio Society at https://nzvrs.com/

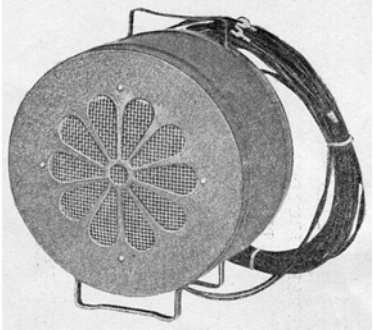


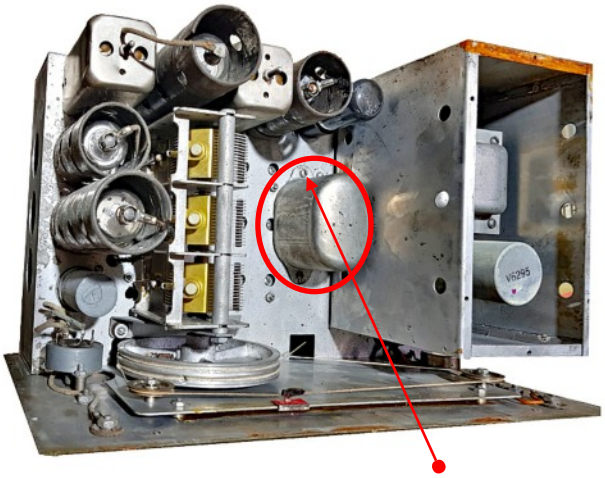
Functions of controls A.E.W. 1 (N.Z.) receiver.



A.E.W. 1 (N.Z.) aerial and earth installation kit (left).

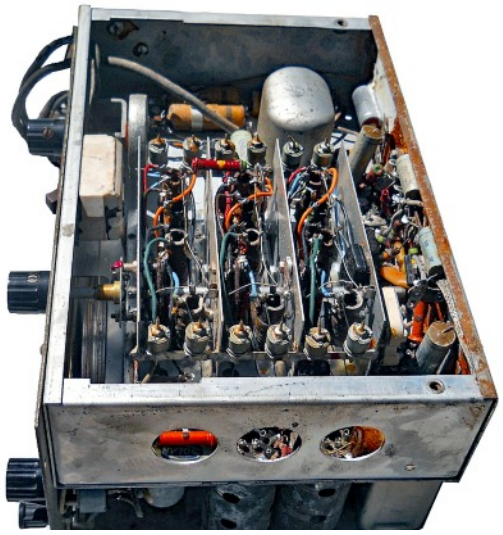
500 Ω impedance loudspeaker assembly as issued with the A.E.W. 1 (N.Z.). Most were believed to contain Rola speakers, although Radio Corp NZ had a contract to paint the housings.





Top chassis view showing screened vibrator power pack on the right-hand side of the chassis. Note the flimsy mounting of the heavy output transformer by two self tapping screws encircled in red.

Bottom view of the chassis, showing the band switch assembly. See the note in the text on page 3 about leaking wax capacitors located just above the wave change switches.



History of the development A.E.W. 1, by Steve Dunford, New Zealand.

The ZC1 project, involving so much of the New Zealand radio industry, had gone so well that other contracts were explored by the Ministry of Supply, ostensibly to gear the radio industry back up for peacetime production, but also to keep them busy during the wartime period.

This would ultimately result in two ammenities receivers being designed and built. One for the British forces via the Eastern Group Supply Council (EGSC) and the other for American troops via the United States Joint Purchasing Board (USJPB).

The first, known as Reception Set A.E.W. 1 (N.Z.), alternatively referred to by the British as 'Receiver, Broadcast, NZ, Type B, No. 1' (Type B sets were generally tropicalised and issued overseas), would be a complete disaster. In fact, it almost never even got off the ground.

The A.E.W. 1 (N.Z.) project was initially managed by Radio Corp NZ senior staff member Bart Fortune, who was, at the time, seconded to the office of the Controller of Radio Production, and the design work was supposedly done by engineers at Radio (1936) Ltd in Auckland. But the fact it ever got off the ground was a mixture of good luck and tenacity. The original design was rejected outright by the British, without notice. It seems the British Ministry of Supply wanted a louder set, but never actually thought to tell anyone.

On top of this, the initial pricing estimates by the office of the Controller of Radio Production here were too low, but once accepted the Eastern Group Supply Council (EGSC) would not budge on it, meaning most of the industry lost money on the project. Lengthy negotiations between New Zealand and the BMS (British Ministry of Supply) meant a small increase in the price was finally signed off, but at best most factories probably only broke even for all their work. As the factories were unable to make anything else, due to the wartime production rules, the industry ate the loss. The income was at least keeping the lights on, and staff employed. Some 15,000 were made in total, with between 2000 and 4000 (the number is not clear in documentation) A.E.W.1 (N.Z.) sets were made at Radio Corp NZ, along with large quantities of spares kits. What is known is that of the first 7250 sets made, Radio Corp NZ were allocated serial numbers 1-1000.

As with the ZC1 project, parts came from various factories, for it's part, Radio Corp NZ designed, and likely supplied, most of the coils, chokes and transformers. Factories would simply order the parts from the various other manufacturers at an agreed price as part of the contract. Radio Corp's NZ engineering drawings for the coils and transformers can still be found in the A.E.W. 1 (N.Z.) files at the Wellington office of Archives New Zealand.

The requirements for the set included the 13m short wave band, because the BBC intended to concentrate on this band in the Pacific. Slade argued strongly that the band was problematic in the region at the time, however, the British Army was determined to have it. They also wanted variable selectivity, because (based on their own experience) they believed radios in the Pacific region needed it.

It took considerable convincing (and no doubt some very diplomatically worded communiqués) that New Zealand built sets would be perfectly adequate without such a control.

In fact, New Zealand designed sets were typically, by necessity, superior in this regard, because local manufacturers had to build radios that could operate effectively with our diverse geography and widespread cities and towns.

15,000 of these sets, and numerous spares kits, would eventually be assembled and shipped to the EGSC but even then the problems were only just beginning. Many sets would arrive at their destination in various states of disrepair and this meant the goodwill that had been gained from previous packaging was lost, with serious losses attributable to shipping damage.

Of course, this damage, which included dislodged and broken valves, could also be partly attributable to rough handling and even rougher conditions later in the war, no doubt the supply lines were longer and roads more damaged, but the packing should have been suitable to protect the sets in these conditions, to a certain point anyway. The actual reasons for the damage were likely a combination of various factors, and blaming it all on the packaging, as it appears the Eastern Group Supply Council did, was probably not entirely fair.

Damage also included speaker transformers being ripped off the chassis in shipping. This was primarily due to the poor attachment (two small screws) of such a heavy component. And the decision to use this method of fastening would have come down to cost, 2 self tapping screws would be cheap when compared with 2 nuts, 2 bolts, 2 washers and 2 star washers which might normally have been used.

And the failures didn't end there, one of the tubular condensers, mounted above the band switch, would get so hot in tropical use that the wax would melt from it. The wax would then run down into the band switch contacts, rendering the whole set unserviceable. Tropicalised (metal encased) condensers could have been used, but again the cost limitations meant that they were not.

All in all, most of those involved with the A.E.W. 1 (N.Z.) project probably wished they had never heard of it, and it's probable that most were scrapped, as few seem to be left today

It's worth noting here that while the names of the sets seem to indicate a connection, the author has been unable to find any tangible link between the Army Education Welfare Service (A.E.W.S.) and the A.E.W. 1 or A.E.W. 2. The A.E.W.S. seems to primarily have been tasked with preparing those serving in the military for life after the war with training courses on all manner of topics, including radio design and servicing.

The courses were run remotely, much like a correspondence service, with each army unit having an education officer responsible for ensuring the modules were distributed, completed and returned for marking.

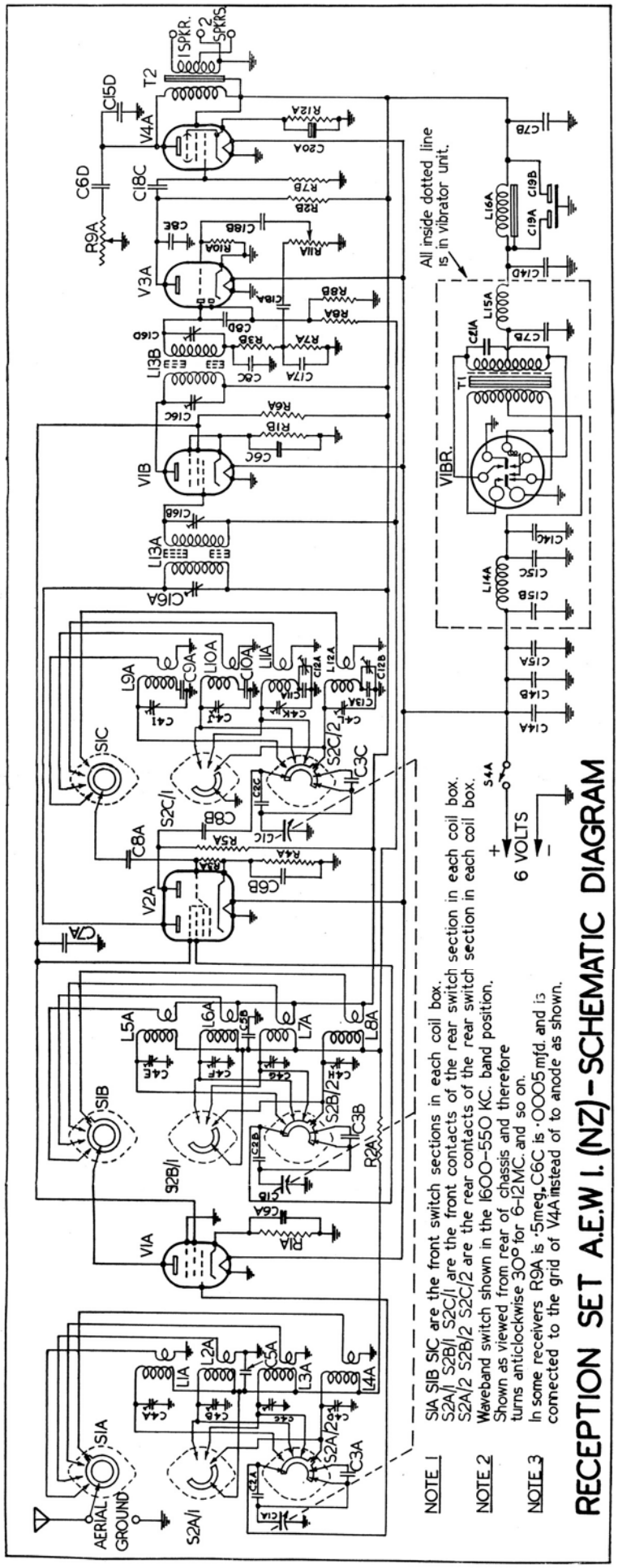


TABLE OF SWITCHES.

Schematic Reference	Type	Function.
S1A	Rotary. Single Pole 4 way	Aerial Coil Selector
S1B	Rotary. Single Pole 4 way	Detector Coil Primary Selector
S1C	Rotary. Single Pole 4 way	Oscillator Reaction Winding Selector
S2A/1	Rotary. 3 pole shorting	Short Circuit Unused Aerial Coil Secondaries
S2B/1	Rotary. 3 pole shorting	Short Circuit Unused Detector Coil Secondaries
S2C/1	Rotary. 3 pole shorting	Short Circuit Unused Oscillator Coil Secondaries
S2A/2	Rotary. Single Pole 4 way Special Shorting	R. F. Coil Secondary Selector
S2B/2	Rotary. Single Pole 4 way Special Shorting	Detector Coil Secondary Selector
S2C/2	Rotary. Single Pole 4 way Special Shorting	Oscillator Coil Secondary Selector
S4A	10 amp. S.P.S.T.	Battery Switch

TABLE OF INDUCTANCES, CHOKES AND TRANSFORMERS.

Schematic Reference	Function.
L1A	R.F. Coil, 16 to 24 megacycle Band
L2A	R.F. Coil, 12 to 17 megacycle Band
L3A	R.F. Coil, 6 to 12 megacycle Band
L4A	R.F. Coil, 550 to 1600 kilocycle Band
L5A	Detector Coil, 16 to 24 megacycle Band
L6A	Detector Coil, 12 to 17 megacycle Band
L7A	Detector Coil 6 to 12 megacycle Band
L8A	Detector Coil, 550 to 1600 kilocycle Band
L9A	Oscillator Coil, 16 to 24 megacycle Band
L10A	Oscillator Coil,12 to 17 megacycle Band
L11A	Oscillator Coil, 6 to 12 megacycle Band
L12A	Oscillator Coil, 550 to 1600 kilocycle Band
L13A	1st I. F. Transformer
L13B	2nd I.F. Transformer
L14A	Vib. L.T. R.F. Choke
L15A	Vib. H.T. R.F. Choke
L16A	Filter Reactor
T1	Vibrator Power Transformer
T2	Output Transformer

TABLE OF VALVES.

Schematic Reference	Type	Function.
V1A	6U7G	Screen Grid R.F. Amplifier
V2A	6K8GT	Hexode-Triode Mixer Oscillator
V1B	6U7G	Screen Grid I.F. Amplifier
V3A	6Q7GT	Duo-Diode Triode 2nd Detector 1st Audio Amplifier
V4A	6V6GT	Beam Tetrode Power Output

Circuit diagram A.E.W. 1 (N.Z.) receiver.

TABLE OF RESISTOR VALUES.

Schem. Ref.	Type	Value	Tolerance	Wattage	Function.
R1A	Carbon, Fixed	300 ohms	± 20%	1/3	Cathode Resistor, V1A
R1B	,, ,,	300 ohms	± 20%	1/3	Cathode Resistor, V1B
R2A	,, ,,	200,000 ohms	± 20%	1/3	AVC Decoupling, R.F. Stage
R2B	,, ,,	200,000 ohms	± 20%	1/3	Anode Load, V3A
R3A	,, ,,	50,000 ohms	± 20%	1/3	Grid Leak, Oscillator
R3B	,, ,,	50,000 ohms	± 20%	1/3	R.F. Filter, Diode Load
R4A	,, ,,	200 ohms	± 20%	1/3	Cathode Resistor, V2A
R5A	,, ,,	25,000 ohms	± 20%	1/3	Anode Feed, Oscillator
R6A	,, ,,	15,000 ohms	± 20%	1½	Screen Dropper, V1A, V2A, V1B
R7A	,, ,,	.5 meghom	± 20%	1/3	Diode Load
R7B	,, ,,	.5 meghom	± 20%	1/3	Grid Leak, V4A
R8A	,, ,,	1 meghom	± 20%	1/3	AVC Feed
R8B	,, ,,	1 meghom	± 20%	1/3	AVC Diode Load
R9A	Carbon Potentiometer	10,000 ohms	——	——	Tone Control
R10A	Carbon, Fixed	5-10 megohms	± 20%	1/3	Grid Leak, V3A
R11A	Carbon Potentiometer	½ megohm	——	——	Volume Control
R12A	Carbon, Fixed	400 ohms	± 20%	½ to 1	Cathode Resistor, V4A

TABLE OF CONDENSER VALUES.

Schem. Ref.	Type	Value	Voltage	Tolerance	Function.
C1A) C1B) C1C)	Variable	.00044 mfd.	——	——	Ganged Tuning Condenser
C2A	Silvered Mica	100 mmfd	——	± 2%	Band-Spread Condenser Aerial Stages, SW2 and SW3
C2B	,, ,,	100 mmfd	——	± 2%	Band-Spread Condenser Detector Stage, SW2 SW3
C2C	,, ,,	100 mmfd	——	± 2%	Band-Spread Condenser Oscillator Stage, SW2 and SW3
C3A	,, ,,	200 mmfd.	——	± 2%	Band-Spread Condenser Aerial Stage, SW1
C3B	,, ,,	200 mmfd.	——	± 2%	Band-Spread Condenser Detector Stage, SW1
C3C	,, ,,	200 mmfd.	——	± 2%	Band-Spread Condenser Oscillator Stage, SW1
C4A	Semi Fixed	3-30 mmfd.	——	——	R.F. Trimmer, SW3
C4B	,, ,,	3-30 mmfd.	——	——	R.F. Trimmer, SW2
C4C	,, ,,	3-30 mmfd.	——	——	R.F. Trimmer, SW1
C4D	,, ,,	3-30 mmfd.	——	——	R.F. Trimmer, B.C.
C4E	,, ,,	3-30 mmfd.	——	——	Detector Trimmer, SW3
C4F	,, ,,	3-30 mmfd.	——	——	Detector Trimmer, SW2
C4G	,, ,,	3-30 mmfd.	——	——	Detector Trimmer, SW1
C4H	,, ,,	3-30 mmfd.	——	——	Detector Trimmer, B.C.
C4I	,, ,,	3-30 mmfd.	——	——	Oscillator Trimmer, SW3
C4J	,, ,,	3-30 mmfd.	——	——	Oscillator Trimmer, SW2
C4K	,, ,,	3-30 mmfd.	——	——	Oscillator Trimmer, SW1
C4L	,, ,,	3-30 mmfd.	——	——	Oscillator Trimmer, B.C.
C5A	Tubular Paper	.05 mfd.	400v.	± 20%	AVC R.F. Bypass, R.F. Stage
C5B	,, ,,	.05 mfd.	400v.	± 20%	AVC R.F. Bypass, Detector, and I.F. Stage
C6A	,, ,,	.05 mfd.	600v.	± 20%	R.F. Bypass, Cathode V1A
C6B	,, ,,	.05 mfd.	600v.	± 20%	R.F. Bypass, Cathode V2A
C6C	,, ,,	.05 mfd.	600v.	± 20%	R.F. Bypass, Cathode V1B
C6D	,, ,,	.05 mfd.	600v.	± 20%	Tone Control Condenser
C7A	,, ,,	.1 mfd.	600v.	± 20%	Screen Bypass, V1A, V2A, V1B
C7B	,, ,,	.1 mfd.	600v.	± 20%	H.T. R.F. Bypass
C8A	Mica	.0001 mfd.	400v.	± 20%	Grid Condenser, Triode Section V2A
C8B	,,	.00005 mfd.	400v.	± 20%	Anode Coupling Condenser Triode Section V2A
C8C	,,	.0001 mfd.	400v.	± 20%	R.F. Filter, Diode Load
C8D	,,	.0001 mfd.	400v.	± 20%	AVC Diode Coupling
C8E	,,	.0001 mfd.	400v.	± 20%	2nd Detector Anode, R.F. Bypass
C9A	,,	.006 mfd.	400v.	± 10%	Padder, 16 to 24 M.C. Band
C10A	,,	.0035 mfd.	400v.	± 10%	Padder, 12 to 17 M.C. Band
C11A		.003 mfd.	400v.	±10 %	Padder, 6 to 12 M.C. Band
C12A)	Semi Fixed	220 mmfd, max	——	——	Padder, 6 to 12 M.C. Band
C12B)	,, ,,	220 mmfd, max	——	——	Padder, 550 to 1600 K.C. Band
C13A	Mica	.0003 mfd.	400v.	± 10%	Padder, 550 to 1600 K.C. Band
C14A	Tubular Paper	.25 mfd.	400v.	± 30%	L.T. R.F. Bypass
C14B	,, ,,	.25 mfd.	400v.	± 30%	L.T. R.F. Bypass
C14C	,, ,,	.25 mfd.	400v.	± 30%	VIB. L.T. R.F. Bypass
C14D	,, ,,	.25 mfd.	400v.	± 30%	H.T. R.F. Bypass
C15A	Mica	.004 mfd.	400v.	—20% +50%	L.T. R.F. Bypass
C15B	,,	.004 mfd.	400v.	—20% +50%	L.T. R.F. Bypass
C15C	,,	.004 mfd.	400v.	—20% +50%	VIB. L.T. R.F. Bypass
C15D	,,	.004 mfd.	400v.	—20% +50%	R.F. Bypass Anode V4A
C16A)	Semi Fixed	140 mmfd. max.	——	——	Trimmer, Primary 1st I.F. Transformer
C16B)	,, ,,	140 mmfd. max.	——	——	Trimmer, Secondary 1st I.F. Transformer
C16C)	,, ,,	140 mmfd. max.	——	——	Trimmer, Primary 2nd I.F. Transformer
C16D)	,, ,,	140 mmfd. max.	——	——	Trimmer, Secondary 2nd I.F. Transformer
C17A	Mica	.00005 mfd.	400v.	± 20% +50%	R.F. Bypass, Diode Load
C18A	Tubular Paper	.02 mfd.	600v.	± 20%	Diode Load, Audio Coupling
C18B	,, ,,	.02 mfd.	600v.	± 20%	Coupling, Grid V3A
C18C	,, ,,	.02 mfd.	600v.	± 20%	Coupling, Grid 4VA
C19A)	Electrolytic	10+10 mfd.	450v.	——	H.T. L.F. Filtering
C19B)	,,	10+10 mfd.	450v.	——	H.T. L.F. Filtering
C20A	,,	25 mfd.	25v.	——	Audio Bypass, Cathode V4A
C21A	Mica	.01 mfd.	1800v.	± 20%	Buffer Condenser

List of components A.E.W. 1 (N.Z.) receiver.