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PRELIMINARY

INSTRUCTION BOOK

FOR

TYPE REU-100

RANGE EXTENSION UNIT

NEMS CLARKE CO.

919 JESUP BLAIR DRIVE • SILVER SPRING, MARYLAND

A DIVISION OF Vitro CORPORATION OF AMERICA

ENGINEERING ASSOCIATES, INC.
2912 Stanley —— P. O. Box 886
Fort Worth, Texas — Ph. WA 3-7386

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919 Jesup Blair Drive
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PERFORMANCE SPECIFICATIONS

REU-100

Tuning Range:	250-475 Mc
Noise Figure:	14 db maximum, 10-12 db avg.
Gain:	8 db minimum, 10-12 db avg.
I.F. Frequency	60 Mc
I.F. Bandwidth	3 Mc minimum
Image Rejection	40 db minimum
I.F. Rejection	65 db minimum
Input Impedance	Approx. 50 ohms
Output Impedance	50-75 ohms
Power Consumption	20 watts
Power Input	115/230 volts, 50-60 cps
Weight	15 lbs.

TUBE COMPLEMENT

Symbol	Type	Function
V-201	5842/417A	R.F. Amplifier
V-202	6AK5	Mixer
V-203	6AF4A	Local Oscillator
V-101	0A2	Voltage Regulator

GENERAL DESCRIPTION

The REU-100 Range Extension Unit has been designed specifically to raise the operating frequency range of the NEMS-CLARKE 55-260 megacycle receivers.

The REU-100 tunes continuously from 250 to 475 megacycles, and will raise the operating frequency range of a receiver to the latter figure.

Front panel controls of the REU-100 consist of the frequency selector knob and dial, the antenna selector switch, and the power on switch. On the rear apron of the chassis will be found the 55-260 megacycle terminal (J-106), the 250-475 megacycle terminal (J-101), the common terminal (J-105) and the 117-230V. voltage selector switch.

The REU-100 has a 50 ohm coaxial input, and consists of an RF amplifier, a local oscillator and a mixer. It provides a 60 megacycle output which can be fed directly into any receiver capable of receiving a signal of this (60Mc) frequency. The unit measures 19 in. wide by 7 in. high by 11-3/4 in. deep, and is designed for standard relay rack mounting. The front panel is finished in smooth gray enamel. The weight of the unit is approximately 15 lbs.

THEORY

The input signal is applied to the cathode of the 5842 (417A) grounded-grid amplifier. The basic tuning element is a Mallory UHF Spiral Inductuner with the input circuit broadly tuned by one of the four Inductuner tuning sections. The plate output of the 417A is capacitively coupled to the grid of the 6AK5 pentode mixer through a double-tuned band-pass circuit.

The oscillator, of a modified Colpitts configuration, has a frequency of 60 megacycles above the RF signal. Maximum oscillator stability is insured by the use of regulated B+ voltage for the oscillator tube (a 6AF4-A triode). The oscillator signal is injected into the mixer grid through C-206, a 2.0 μμf capacitor, thus developing an operating bias voltage proportional to the amplitude of the local oscillator signal.

A decoupled test point, from a tap on the mixer grid resistors (R-204 and R-205), provides a means of observing the response of the RF circuits and measuring the oscillator injection voltage. Trimmers are incorporated in the RF plate, mixer input, and oscillator tank circuits for proper alignment and adjustment. The plate of the 6AK5 is tuned to 60 megacycles by L-204, a tunable series coil, and is coupled to the output through a low side capacitor, C-217.

The REU-100 has been fully aligned and tested in the factory and should give relatively trouble-free performance. The critical nature of UHF circuits is such that field servicing of the unit is generally limited to replacing tubes. Only a limited number of components in the RF subchassis may be replaced without disturbing critically tuned circuits. When replacing components, it is imperative that the new components have leads of indentical length with those of the old component, and that the physical location and arrangement of all other components and leads not be disturbed.

ALIGNMENT PROCEDURE

A. I.F. Alignment:

1. Connect the output of the REU-100 to a VHF receiver which can be tuned to 60 megacycles, and which is equipped with an input signal strength meter.

2. Feed 60 Mc CW from a signal generator to the grid of the 6AK5 mixer tube.

3. Tune the output coil (L-204) for maximum output as indicated on the signal-strength meter of the VHF receiver.

B. Local Oscillator Adjustment

Local oscillator adjustment is limited to correcting the reading of the tuning dial, if it is found to be in error. The replacement of a tube may produce an error, and this can be corrected by adjusting C-213. The adjustment should be made with a signal generator of high accuracy at 475 m.c.

The low-frequency end of the dial is controlled by the inductance of L-206. The correct adjustment has been made at the factory and should not require readjustment.

C. R.F. Alignment

The RF circuits are wide band and are designed around a modified Mallory four-section UHF Inductuner. If realignment is necessary, proceed as follows:

(1). Connect a sweep generator with a 50 ohm source impedance to the antenna input terminal J-101.

(2). Connect a high-gain oscilloscope to test point TP-101.

(3). Set the tuning dial at 300 Mc.

(4). Adjust C-211 and C-212 for a double-tuned symmetrical response centered at 300 Mc.

NOTE: The RF response at the high-frequency end is controlled by fixed inductances and adjustment should not be attempted in the field.

PARTS LIST

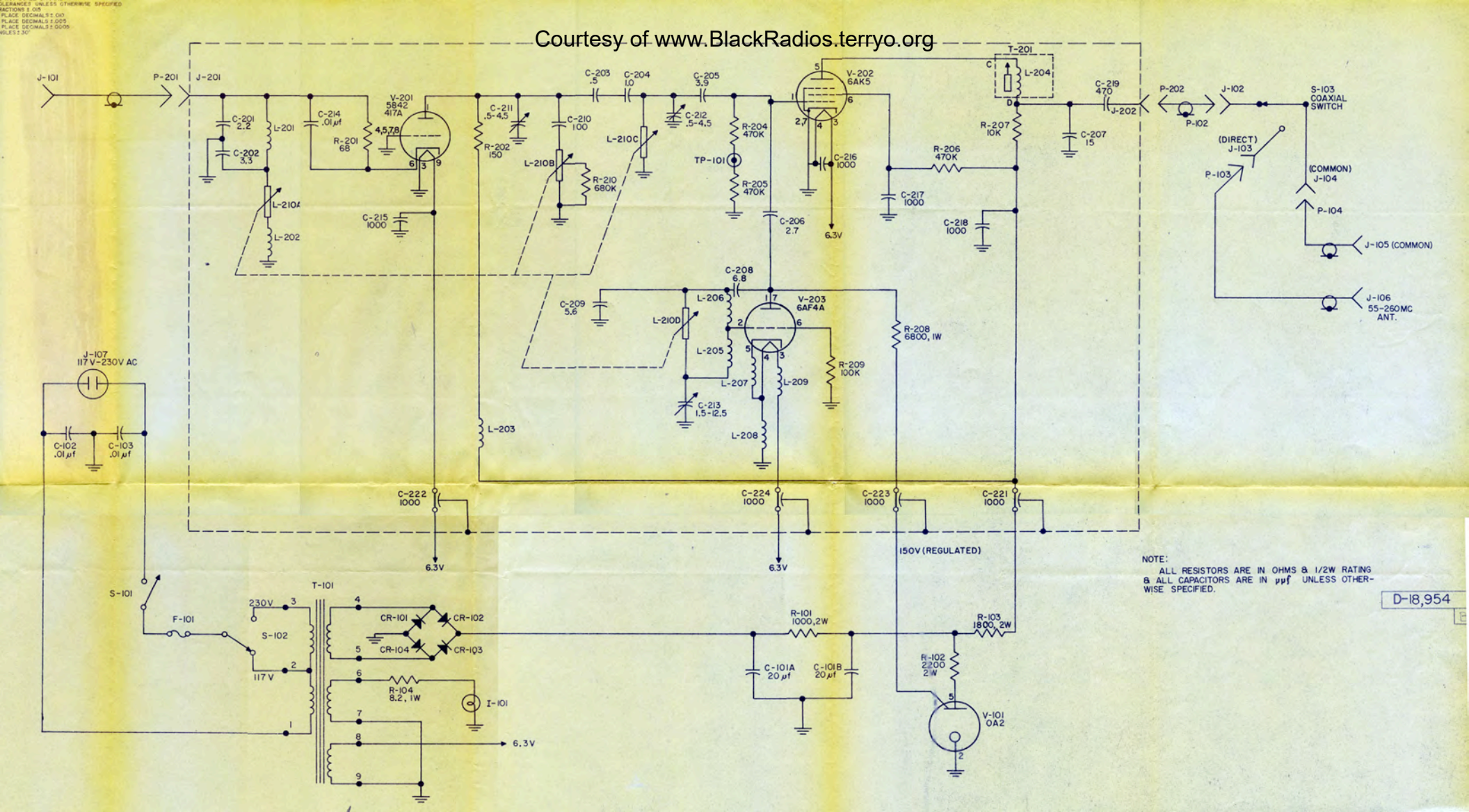
REU-100

REF. SYMBOL No.	NAME OF PART AND DESCRIPTION
C-101	CAPACITOR: ELECTROLYTIC, 2 section, plug in 20-20 MFD 450V, Aerovox AEP-44J
C-102	CAPACITOR: ceramic disc, .01 mfd, 500 V; Sprague 29C9B8
C-103	Same as C-102
C-201	CAPACITOR: ceramic, 2.2 mmf± .25mmf, 500 V; Erie NPO-A
C-202	CAPACITOR: ceramic, 3.3 mmf± .25mmf, 500 V; Erie NPO-A
C-203	CAPACITOR: ceramic, .5 mf±.25mmf, 500 V; Erie NPO-A
C-204	CAPACITOR: ceramic, 1.0mmf,±.25mmf, 500 V; Erie NPO-A
C-205	CAPACITOR: ceramic, 3.9mmf, ±.25mmf, 500V; Erie NPO-A
C-206	CAPACITOR: ceramic, 2.7mmf, ±.25mmf, 500 V; Erie NPO-A
C-207	CAPACITOR: ceramic, 15mmf ±5%, 500 V; Erie NPO-A
C-208	CAPACITOR: ceramic, 6.8 mmf, ±.25 mmf, 500 V; Erie NPO-A
C-209	CAPACITOR: ceramic, 5.6 mmf, ±.25 mmf, 500 V; Erie NPO-A
C-210	CAPACITOR: ceramic, 100 mmf, ±10%, 500 V; Erie N 1400-A
C-211	CAPACITOR: variable, tubular, ceramic .5 to 4 mmf, 500 V; Cambridge Thermionic CST-6.
C-212	Same as C-211
C-213	CAPACITOR: variable, tubular, ceramic 1.5 to 12.5 mmf, 500 V; Cambridge Thermionic CST-50
C-214	Same as C-103
C-215	CAPACITOR: ceramic disc, .001 mfd, 500 V; Sprague 40C214
C-216	Same as C-215
C-217	Same as C-215
C-218	Same as C-215
C-220	Not used
C-221	CAPACITOR: feedthru, .001 mfd, 500 V; Sprague 514C1
C-222	Same as C-221

REF. SYMBOL NO.	NAME OF PART AND DESCRIPTION
C-223	Same as C-221
C-224	Same as C-221
F-101	FUSE: slo-blo, 3 amp, Bussman MDL
I-101	LAMP: incandescent, 6-8 V, .015 amp, GE #47
J-101	CONNECTOR: BNC UG-1052/U
J-102	P/O S-103
J-103	P/O S-103
J-104	P/O S-103
J-105	Same as J-101
J-106	Same as J-101
J-107	CONNECTOR: Male, 2 contact, AC line; Hubbell #7486
J-201	CONNECTOR: BNC, UG-1094/U
J-202	Same as J-201
L-201	Strap, NEMS-CLARKE, A-18969
L-202	Strap, NEMS-CLARKE, A-18970
L-203	Coil Winding: NEMS-CLARKE, A-18974
L-204	P/O T-201
L-205	Strap, NEMS-CLARKE, A-18971
L-206	Coil, Winding: NEMS-CLARKE, A-18973
L-207	Coil Winding: NEMS-CIARKE, A-18972 -1
L-208	Coil Winding: NEMS-CLARKE, A-18972-2
L-209	Coil Winding: NEMS-CLARKE, A-18972-3
L-210A	INDUCTUNER, 4 section, VHF; Mallory 60-50309
L-210B	P/O L-210
L-210C	P/O L-210
L-210D	P/O L-210
P-101	Not used
P-102	CONNECTOR: BNC UG-88/U
P-103	Same as P-102

REF SYMBOL NO.	NAME OF PART AND DESCRIPTION
P-104	Same as P-102
P-201	Same as P-102
P-202	Same as P-102
R-101	RESISTOR: fixed, composition, 1000 ohms 5%, 2 W; Allen Bradley
R-102	RESISTOR: fixed, composition, 2.2 K, 5%, 2W; Allen Bradley
R-103	RESISTOR: fixed, composition, 1.8 K, 5%, 2W; Allen Bradley
R-104	RESISTOR: fixed, composition, 8.2 ohms, 10%, 1W; Allen Bradley
R-201	RESISTOR; fixed, composition, 68 ohms, 5%, 1/2 W; Allen Bradley
R-202	RESISTOR; fixed, composition, 150 ohms, 10%, 1/2 W; Allen Bradley
R-203	Not used
R-204	RESISTOR; fixed, composition, 470 K, 10%, 1/2 W; Allen Bradley
R-205	Same as R-204
R-206	Same as R-204
R-207	RESISTOR: fixed, composition, 10 K, 10%, 1/2 W; Allen Bradley
R-208	RESISTOR; fixed, composition, 6.8 K, 5%, 1 W; Allen Bradley
R-209	RESISTOR: fixed, composition, 100 K, 10%, 1/2 W; Allen Bradley
R-210	RESISTOR: fixed, composition, 680 K, 5%, 1/2 W; Allen Bradley
S-101	SWITCH: Toggle, SPST; Herman Smith # 520
S-102	SWITCH: Toggle SPDT; Herman Smith #521
S-103	SWITCH: Rotary,coaxial, 2 pos., BNC; Danbury-Knudsen CS-400
T-101	TRANSFORMER: Power, NEMS-CLARKE,
T-201	TRANSFORMER: I.F; NEMS-CLARKE
V-101	TUBE: Electron, 0A2
V-201	TUBE: Electron, 5842
V-202	TUBE: Electron, 6AK5
V-203	TUBE: Electron, 6AF4A
W-101	POWER CORD ASSEMBLY: (w/connector #7484 Hubbell) Cornish #3510
XF-101	FUSEHOLDER: Bussman H.K.P.
XI-101	LAMP ASSEMBLY: min, bayonet; Drake 219-236U32AH

REF. SYMBOL NO.	NAME OF PART AND DESCRIPTION
XV-101	Socket, tube, 7 pin min; TS-102P01
XC-102	Socket, Tube, Octal; TS-101P01
XV-201	Socket, tube, 9 pin min; Mycalex 90 A 299
XV-202	Socket, tube, 7 pin min; Mycalex 70 A 403
XV-203	Same as XV-202



NOTE:
ALL RESISTORS ARE IN OHMS & 1/2W RATING & ALL CAPACITORS ARE IN μμf UNLESS OTHERWISE SPECIFIED.

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