BANDMASTER Z-MATCH ANTENNA COUPLER

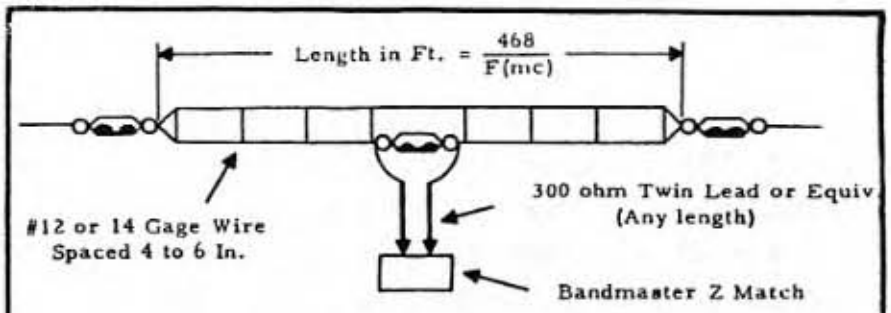
HARVEY-WELLS ELECTRONICS, INC.

SOUTHBRIDGE, MASS., U. S. A.

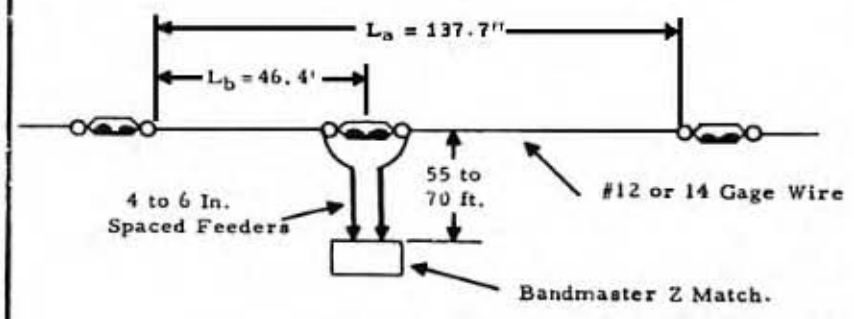
GENERAL:

The Bandmaster Z Match Antenna Coupler is a combination antenna matching device, 50 ohm dummy load, and VSWR indicating device designed to provide high efficiency antenna matching. The tuning arrangement is designed to cover the range of frequencies from 3.5 to 30.0 megacycles, while matching a 50 ohm input to reactive and nonreactive loads ranging from 10 to 2500 ohms, without switching coils.

The operation of the Bandmaster Match is based on the assumption that the transmitter used with it will tune into a 50 ohm resistive load.



FOLDED DIPOLE
HALF WAVE ANTENNA
FOR SINGLE BAND USE



OFF CENTER-FED
HARMONIC ANTENNA
FOR MULTI-BAND USE

L_a (Ft) = $\frac{492\ (N-.05)}{F(mc.)}$ L_b (Ft) = $L_a \times .3375$

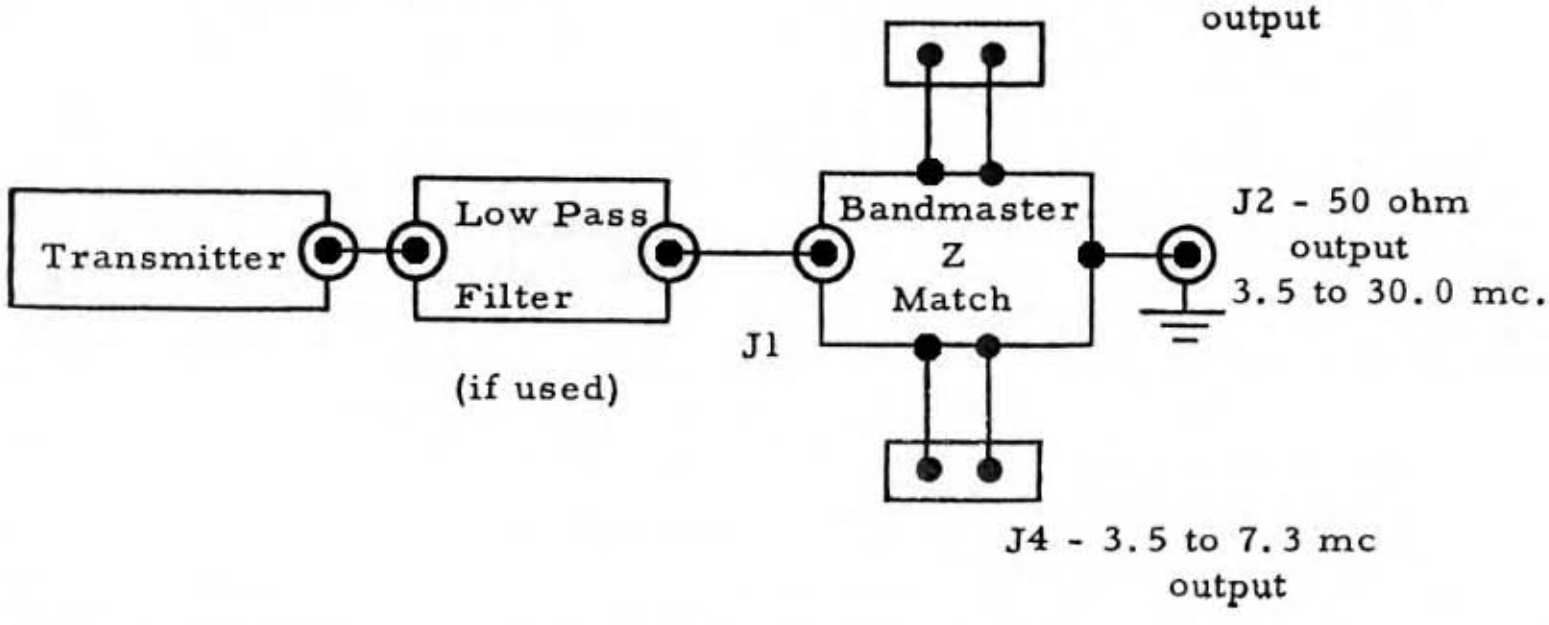
N = Number of half waves at highest frequency of operation.

F(mc.) = High frequency of operation.

Design Frequency = 28.4 megacycles.

TYPICAL ANTENNAS FOR USE WITH
BANDMASTER Z MATCH

INSTALLATION:



OPERATION:

Before attempting operation of this unit, the instructions presented here should be followed. The dummy load in this unit will handle continuous powers up to 50 watts maximum. The Bandmaster Z Match, when tuned to match the antennas to a 50 ohm line, will handle transmitter inputs up to 500 watts; therefore, all preliminary tuning of the transmitter into the 50 ohm dummy load should not exceed 50 watts.

A 50 ohm coaxial cable from the transmitter is connected to the input fitting J1. If a low pass filter is being used it should be inserted in the coax line between the transmitter and the Bandmaster Z Match. Connect the antenna to either J3 or J4 depending on the frequency. J3 is normally the output terminal for operation on either 14, 21, 27 or 30 megacycles, while J4 normally provides for output on 3.5 and 7 megacycles. With some antenna systems this may not hold. It is recommended that both sets of terminals be tried and that set used which results in the best signal reports.

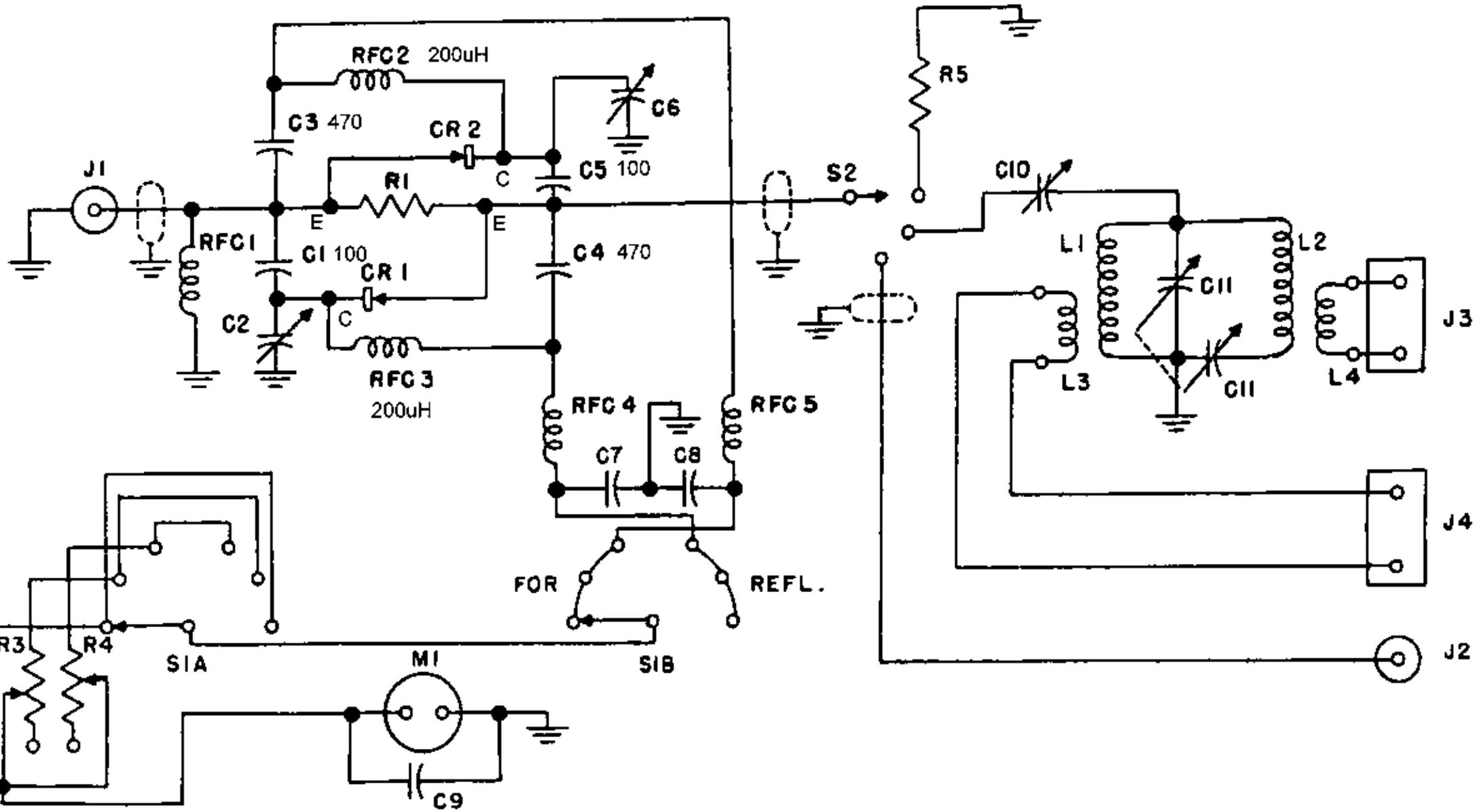
The Selector switch on the front panel, S2, is switched to position 1, placing the 50 ohm dummy load in the circuit. The transmitter is now tuned to its proper loading, and forward power is read on the meter. The Power switch, S1, provides for three scale selections depending on the power output of the transmitter in use. Position 1 of this switch provides a power scale of 0 to 10 watts, position 2 is calibrated for powers of 0 to 100 watts, while position 3 will record powers of 0 to 1000 watts (100 watt scale x 10). The 4th, 5th and 6th positions of this switch provide for reflected power readings calibrated over the same power ranges. The reflected power scales, when working into the dummy load, will not indicate as this load matches the line and no standing waves or reflections exist.

After loading the transmitter to its proper level into the dummy load, S2 is now switched to position 2 and the transmitter controls left alone. With the antenna connected to its proper output, C10 and C11 (main tuning controls) are now alternately tuned for minimum reflected power. When the reflected power reaches the level of 0 to 1 watt, proper match has been attained, and upon switching S1 back to its proper forward reading scale, power indicated should be the same as when the dummy load was in the circuit. The transmitter meter should also indicate the same as when it was tuned into the 50 ohm dummy load.

The third position on S2 allows the user to connect a 50 ohm antenna to J2 and be able to read forward and reflected power.

The VSWR bridge in this unit is factory aligned, and any adjustment of components will alter the impedance and false reading will result.

The Bandmaster Z Match is a precision built antenna coupler designed for rapid tuning of pretuned or random length antennas. It incorporates all the features needed for good rapid operation, and when properly tuned, the antenna will be definitely matched to the transmitter with no guess work.


RFC2 200uH
C3 470
CR 2
C6
C5 100
J1
R1
S2
R5
C10
RFC1
C1 100
CR 1
C4 470
L1
L2
C2
C11
J3
L3
C11
L4
RFC 3
200uH
RFC 4
RFC 5
C7
C8
J4
FOR
REFL.
R2
R3
R4
S1A
S1B
M1
J2
C9

ELECTRICAL PARTS LIST

BANDMASTER Z MATCH ANTENNA COUPLER

SYMBOL	DESCRIPTION	H-W PART NO.	QTY
C1, C5	Capacitor, fixed, mica 100 mmf 500 VDCW	A-1J3006-12G	2
C2, C6	Capacitor, variable .5 - 5 mmf	A-2E1000-4	2
C3, C4	Capacitor, fixed, mica 470 mmf 300 VDCW	1J(CM15D471M)	2
C7, C8	Capacitor, fixed, ceramic .001 mf 500 VDCW	A-1K3013-13M	2
C9	Capacitor, fixed, ceramic .02 mf 500 VDCW	A-1K3013-24M	1
C10	Capacitor, variable 340 mmf max.	A-2B1019-1	1
C11	Capacitor, variable 250 - 250 mmf	A-2B1018-1	1
CR1, CR2	Crystal 1N34	A-50C1004-1	2
J1, J2	Connector, Coaxial	A-16E1003-1	2
J3	Post, Binding	A-16F1003-1	2
J4	Post, Binding	A-16F1003-2	2
L1, L3	Coil, Tuning, L.F.	B-12D1009-1	1
L2, L4	Coil, Tuning H.F.	B-12D1010-1	1
M1	Meter	C-69C1008-1	1
R1	Assembly, Resistor Special 0.625 ohm 8 watts	B-90D1124	1
R2	Resistor, Variable 2.5K ohms	A-6A4002-252M	1
R3	Resistor, Variable 25K ohms	A-6A4002-253M	1
R4	Resistor, Variable 50K ohms	A-6A4002-54M	1
R5	Resistor, fixed, composition 50 ohms 50 W	A-5A7001-51	1
RFC1, RFC4, RFC5	Choke, R. F. 2.5 mh	B-12A1036-501	3
RFC2, RFC3	Choke, R. F. 200 uh	B-12A1035-501	2
S1	Switch, Rotary	B-47F1045-1	1
S2	Switch, Rotary	B-47F1044-1	1

NOTE Can use 16 ea 10 ohm 2W non-inductive resistors for R1