RADIO CONSTRUCTORS DATA SHEET 1

REFERENCE FORMULAE

Ohm's Law Equations

$$R=\frac{E}{I}, \qquad I=\frac{E}{R}, \qquad E=IR$$

where R is resistance in ohms, E is potential difference in volts and I is current in amps. Or, where R is in kilohms, E is in volts and I is in milliamps.

Capacitive Reactance

$$X_c=\frac{1}{2\pi fC}$$

where X_c is capacitive reactance in ohms, f is frequency in cycles per second and C is capacitance in farads. Or, where X_c is in ohms, f is in megacycles and C is in microfarads. The reactance of a given capacitor decreases as frequency increases.

Inductive Reactance

$$X_L=2\pi fL$$

where X_L is inductive reactance in ohms, f is frequency in cycles per second and L is inductance in henrys. Or, where X_L is in ohms, f is in megacycles and L is in microhenrys. The reactance of a given inductor increases as frequency increases.

Resonance

$$f=\frac{1}{2\pi\sqrt{LC}}$$

where f is resonant frequency in cycles per second, L is inductance in henrys and C is capacitance in farads.

Or,
$$f=\frac{1{,}000{,}000}{2\pi\sqrt{LC}}$$

where f is in kilocycles, L is in microhenrys and C is in pico-farads.

These formulae are true for series tuned circuits and have negligible inaccuracy for parallel tuned circuits with Q above 20.

Resistors Or Inductors In Series

$$R_{total}=R_1+R_2+R_3\ldots\ldots$$
$$L_{total}=L_1+L_2+L_3\ldots\ldots$$

Capacitors In Parallel

$$C_{total}=C_1+C_2+C_3\ldots\ldots$$

Resistors Or Inductors In Parallel

$$\frac{1}{R_{total}}=\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_3}\ldots\ldots$$

$$\frac{1}{L_{total}}=\frac{1}{L_1}+\frac{1}{L_2}+\frac{1}{L_3}\ldots\ldots$$

For two components in parallel,

$$R_{total}=\frac{R_1\times R_2}{R_1+R_2}$$

$$L_{total}=\frac{L_1\times L_2}{L_1+L_2}$$

Capacitors In Series

$$\frac{1}{C_{total}}=\frac{1}{C_1}+\frac{1}{C_2}+\frac{1}{C_3}\ldots\ldots$$

For two capacitors in series,

$$C_{total}=\frac{C_1\times C_2}{C_1+C_2}$$

D.C. Power Equations

$$W=EI, \qquad W=\frac{E^2}{R}, \qquad W=I^2R$$

where W is in watts, E is in volts and R is in ohms.

DECIBEL TABLE

The decibel is a unit which defines the *ratio* between two signal powers. $N = 10 \log_{10}(P_2/P_1)$ where N is in decibels (dB) and P_1 is the reference power. For signal voltages and currents, $N = 20 \log_{10}(V_2/V_1)$ or $N = 20 \log_{10}(I_2/I_1)$ where both voltages, or both currents, are *at the same impedance.*

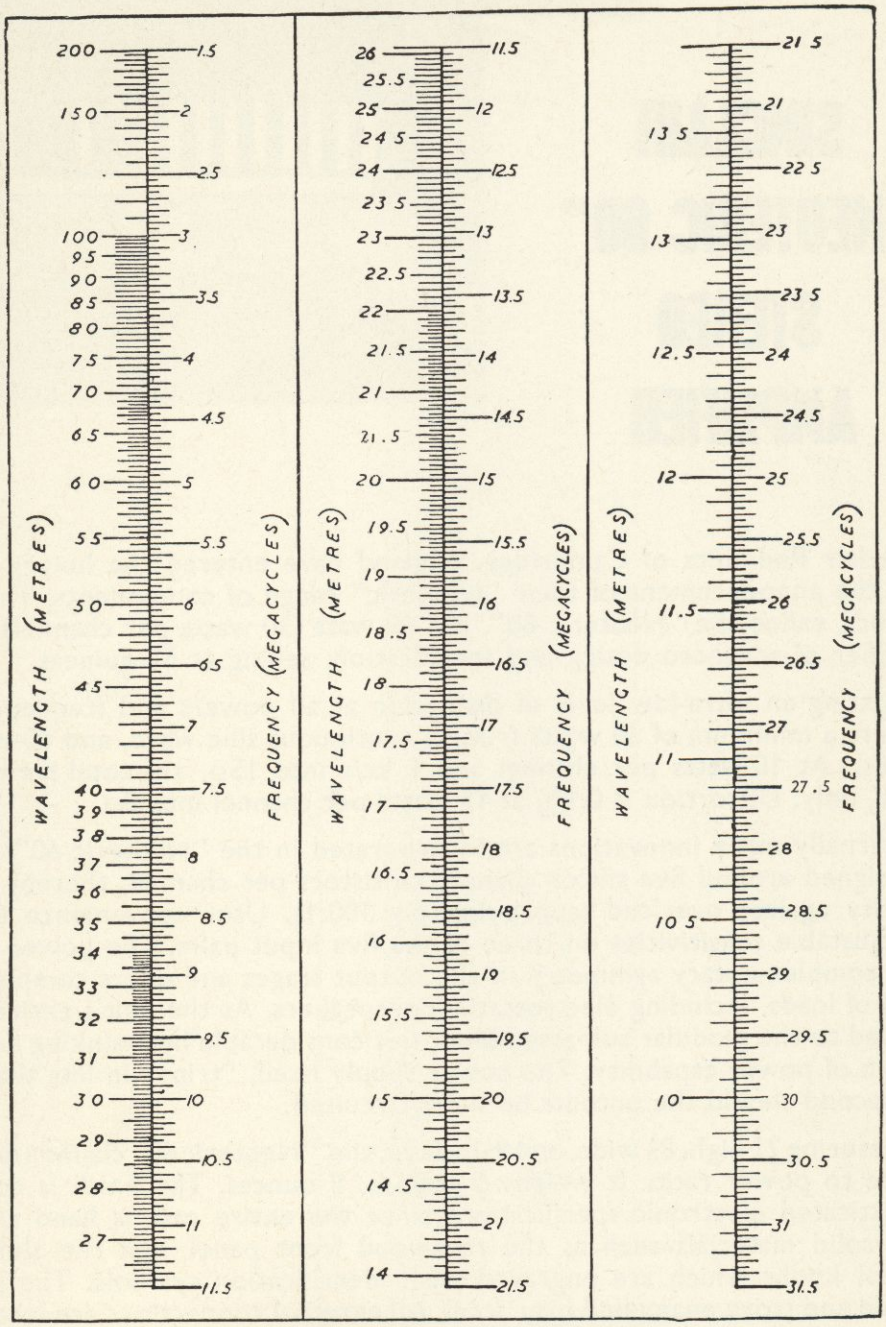
In the Table, the two left-hand columns apply to losses, whereupon the corresponding dB figure is negative (e.g. a voltage ratio of 0.316 = −10dB). The two right hand columns apply to gains, and the corresponding dB figure is positive. To find intermediate dB figures, multiply by the nearest convenient factor. Thus, for voltage or current ratios,

36dB = 16dB + 20dB = 6.310 x 10 = 63.10

Voltage or current ratio	Power ratio	dB	Power ratio	Voltage or current ratio
1.000	1.000	0	1.000	1.000
0.944	0.891	0.5	1.122	1.059
0.891	0.794	1.0	1.259	1.122
0.841	0.708	1.5	1.413	1.189
0.794	0.631	2.0	1.585	1.259
0.750	0.562	2.5	1.778	1.334
0.708	0.501	3.0	1.995	1.413
0.668	0.447	3.5	2.239	1.496
0.631	0.398	4.0	2.512	1.585
0.596	0.355	4.5	2.818	1.679
0.562	0.316	5.0	3.162	1.778
0.501	0.251	6.0	3.981	1.995
0.447	0.200	7.0	5.012	2.239
0.398	0.159	8.0	6.310	2.512
0.355	0.126	9.0	7.943	2.818
0.316	0.100	10	10.00	3.162
0.282	0.0794	11	12.59	3.548
0.251	0.0631	12	15.85	3.981
0.224	0.0501	13	19.95	4.467
0.200	0.0398	14	25.12	5.012
0.178	0.0316	15	31.62	5.623
0.159	0.0251	16	39.81	6.310
0.141	0.0200	17	50.12	7.079
0.126	0.0159	18	63.10	7.943
0.112	0.0126	19	79.43	8.913
0.100	0.0100	20	100.0	10.00
0.0316	0.00100	30	1,000	31.62
0.0100	10^{-4}	40	10^4	100.0
0.00316	10^{-5}	50	10^5	316.2
0.00100	10^{-6}	60	10^6	1,000
3.16×10^{-4}	10^{-7}	70	10^7	3,162
10^{-4}	10^{-8}	80	10^8	10^4
3.16×10^{-5}	10^{-9}	90	10^9	3.16×10^4
10^{-5}	10^{-10}	100	10^{10}	10^5

CUT ALONG THIS LINE

RADIO CONSTRUCTORS DATA SHEET 3



FREQUENCY/WAVELENGTH CONVERSION CHART

RC/DS/3

CUT ALONG THIS LINE

RADIO CONSTRUCTORS DATA SHEET 4

INTERNATIONAL MORSE CODE

Á or Å	·−−·−		
Ä	·−·−	N	−·
A	·−	Ñ	−−·−−
B	−···	O	−−−
C	−·−·	Ö	−−−·
CH	−−−−	P	·−−·
D	−··	Q	−−·−
E	·	R	·−·
É	··−··	S	···
F	··−·	T	−
G	−−·	U	··−
H	····	Ü	··−−
I	··	V	···−
J	·−−−	W	·−−
K	−·−	X	−··−
L	·−··	Y	−·−−
M	−−	Z	−−··
I	·−−−−	6	−····
2	··−−−	7	−−···
3	···−−	8	−−−··
4	····−	9	−−−−·
5	·····	0	−−−−−
Apostrophe	·−−−−·		
Brackets	−·−−·−		
Break sign	−···−		
Comma	−−··−−		
End of message	·−·−·		
End of work	···−·−		
Error	········		
Fractional bar	−··−·		
Full stop	·−·−·−		
Hyphen	−····−		
Inverted commas	·−··−·		
Invitation to transmit	−·−		
Note of interrogation	··−−··		
Preliminary call	−·−·−		
Separation (used between whole number and fraction)	−···−·		
Underline	··−−·−		
Understood	···−·		
Wait	·−···		

SPACING

A dot equals 1 unit A dash equals 3 units
Space between symbols forming a letter equals 1 unit
Space between two letters equals 3 units
Space between two words equals 5 units

N.A.T.O. SERVICES TELEPHONY CODE

A — Alpha	H — Hotel	N — November	U — Uniform
B — Bravo	I — India	O — Oscar	V — Victor
C — Charlie	J — Juliet	P — Papa	W — Whisky
D — Delta	K — Kilo	Q — Quebec	X — X-ray
E — Echo	L — Lima	R — Romeo	Y — Yankee
F — Foxtrot	M — Mike	S — Sierra	Z — Zulu
G — Golf		T — Tango	

RC/DS/4