

Index, Glossary, Reference Information

The following pages include an index by Collins type number, an index by equipment function and a cross index of applicable military nomenclature. Included also are tables, charts and graphs showing useful basic reference information.

Finding Power and Voltage/Current when Decibels are known

Voltage Ratio	Power Ratio	-db+	Voltage Ratio	Power Ratio	Voltage Ratio	Power Ratio	-db+	Voltage Ratio	Power Ratio
1.0000	1.0000	0	1.000	1.000	.5623	.3162	5.0	1.778	3.162
.9886	.9772	.1	1.012	1.023	.5559	.3090	5.1	1.799	3.236
.9772	.9550	.2	1.023	1.047	.5495	.3020	5.2	1.820	3.311
.9661	.9333	.3	1.035	1.072	.5433	.2951	5.3	1.841	3.388
.9550	.9120	.4	1.047	1.096	.5370	.2884	5.4	1.862	3.467
.9441	.8913	.5	1.059	1.122	.5309	.2818	5.5	1.884	3.548
.9333	.8710	.6	1.072	1.148	.5248	.2754	5.6	1.905	3.631
.9226	.8511	.7	1.084	1.175	.5188	.2692	5.7	1.928	3.715
.9120	.8318	.8	1.096	1.202	.5129	.2630	5.8	1.950	3.802
.9016	.8128	.9	1.109	1.230	.5070	.2570	5.9	1.972	3.890
.8913	.7943	1.0	1.122	1.259	.5012	.2512	6.0	1.995	3.981
.8810	.7762	1.1	1.135	1.288	.4955	.2455	6.1	2.018	4.074
.8710	.7586	1.2	1.148	1.318	.4898	.2399	6.2	2.042	4.169
.8610	.7413	1.3	1.161	1.349	.4842	.2344	6.3	2.065	4.266
.8511	.7244	1.4	1.175	1.380	.4786	.2291	6.4	2.089	4.365
.8414	.7079	1.5	1.189	1.413	.4732	.2239	6.5	2.113	4.467
.8318	.6918	1.6	1.202	1.445	.4677	.2188	6.6	2.138	4.571
.8222	.6761	1.7	1.216	1.479	.4624	.2138	6.7	2.163	4.677
.8128	.6607	1.8	1.230	1.514	.4571	.2089	6.8	2.188	4.786
.8035	.6457	1.9	1.245	1.549	.4519	.2042	6.9	2.213	4.898
.7943	.6310	2.0	1.259	1.585	.4467	.1995	7.0	2.239	5.012
.7852	.6166	2.1	1.274	1.622	.4416	.1950	7.1	2.265	5.129
.7762	.6026	2.2	1.288	1.660	.4365	.1905	7.2	2.291	5.248
.7674	.5888	2.3	1.303	1.698	.4315	.1862	7.3	2.317	5.370
.7586	.5754	2.4	1.318	1.738	.4266	.1820	7.4	2.344	5.495
.7499	.5623	2.5	1.334	1.778	.4217	.1778	7.5	2.371	5.623
.7413	.5495	2.6	1.349	1.820	.4169	.1738	7.6	2.399	5.754
.7328	.5370	2.7	1.365	1.862	.4121	.1698	7.7	2.427	5.888
.7244	.5248	2.8	1.380	1.905	.4074	.1660	7.8	2.455	6.026
.7161	.5129	2.9	1.396	1.950	.4027	.1622	7.9	2.483	6.166
.7079	.5012	3.0	1.413	1.995	.3981	.1585	8.0	2.512	6.310
.6998	.4898	3.1	1.429	2.042	.3936	.1549	8.1	2.541	6.457
.6918	.4786	3.2	1.445	2.089	.3890	.1514	8.2	2.570	6.607
.6839	.4677	3.3	1.462	2.138	.3846	.1479	8.3	2.600	6.761
.6761	.4571	3.4	1.479	2.188	.3802	.1445	8.4	2.630	6.918
.6683	.4467	3.5	1.496	2.239	.3758	.1413	8.5	2.661	7.079
.6607	.4365	3.6	1.514	2.291	.3715	.1380	8.6	2.692	7.244
.6531	.4266	3.7	1.531	2.344	.3673	.1349	8.7	2.723	7.413
.6457	.4169	3.8	1.549	2.399	.3631	.1318	8.8	2.754	7.586
.6383	.4074	3.9	1.567	2.455	.3589	.1288	8.9	2.786	7.762
.6310	.3981	4.0	1.585	2.512	.3548	.1259	9.0	2.818	7.943
.6237	.3890	4.1	1.603	2.570	.3508	.1230	9.1	2.851	8.128
.6166	.3802	4.2	1.622	2.630	.3467	.1202	9.2	2.884	8.318
.6095	.3715	4.3	1.641	2.692	.3428	.1175	9.3	2.917	8.511
.6026	.3631	4.4	1.660	2.754	.3388	.1148	9.4	2.951	8.710
.5957	.3548	4.5	1.679	2.818	.3350	.1122	9.5	2.985	8.913
.5888	.3467	4.6	1.698	2.884	.3311	.1096	9.6	3.020	9.120
.5821	.3388	4.7	1.718	2.951	.3273	.1072	9.7	3.055	9.333
.5754	.3311	4.8	1.738	3.020	.3236	.1047	9.8	3.090	9.550
.5689	.3236	4.9	1.758	3.090	.3199	.1023	9.9	3.126	9.772

Finding Power and Voltage/Current when Decibels are known

Voltage Ratio	Power Ratio	-db+	Voltage Ratio	Power Ratio	Voltage Ratio	Power Ratio	-db+	Voltage Ratio	Power Ratio
.3612	.1000	10.0	3.162	10.000	.1778	.03162	15.0	5.623	31.62
.3126	.09772	10.1	3.199	10.23	.1758	.03090	15.1	5.689	32.36
.3090	.09550	10.2	3.236	10.47	.1738	.03020	15.2	5.754	33.11
.3055	.09333	10.3	3.273	10.72	.1718	.02951	15.3	5.821	33.88
.3020	.09120	10.4	3.311	10.96	.1698	.02884	15.4	5.888	34.67
.2985	.08913	10.5	3.350	11.22	.1679	.02818	15.5	5.957	35.48
.2951	.08710	10.6	3.388	11.48	.1660	.02754	15.6	6.026	36.31
.2917	.08511	10.7	3.428	11.75	.1641	.02692	15.7	6.095	37.15
.2884	.08318	10.8	3.467	12.02	.1622	.02630	15.8	6.166	38.02
.2851	.08128	10.9	3.508	12.30	.1603	.02570	15.9	6.237	38.90
.2818	.07943	11.0	3.548	12.59	.1585	.02512	16.0	6.310	39.81
.2786	.07762	11.1	3.589	12.88	.1567	.02455	16.1	6.383	40.74
.2754	.07586	11.2	3.631	13.18	.1549	.02399	16.2	6.457	41.69
.2723	.07413	11.3	3.673	13.49	.1531	.02344	16.3	6.531	42.66
.2692	.07244	11.4	3.715	13.80	.1514	.02291	16.4	6.607	43.65
.2661	.07079	11.5	3.758	14.13	.1496	.02239	16.5	6.683	44.67
.2630	.06918	11.6	3.802	14.45	.1479	.02188	16.6	6.761	45.71
.2600	.06761	11.7	3.846	14.79	.1462	.02138	16.7	6.839	46.77
.2570	.06607	11.8	3.890	15.14	.1445	.02089	16.8	6.918	47.86
.2541	.06457	11.9	3.936	15.49	.1429	.02042	16.9	6.998	48.98
.2512	.06310	12.0	3.981	15.85	.1413	.01995	17.0	7.079	50.12
.2483	.06166	12.1	4.027	16.22	.1396	.01950	17.1	7.161	51.29
.2455	.06026	12.2	4.074	16.60	.1380	.01905	17.2	7.244	52.48
.2427	.05888	12.3	4.121	16.98	.1365	.01862	17.3	7.328	53.70
.2399	.05754	12.4	4.169	17.38	.1349	.01820	17.4	7.413	54.95
.2371	.05623	12.5	4.217	17.78	.1334	.01778	17.5	7.499	56.23
.2344	.05495	12.6	4.266	18.20	.1318	.01738	17.6	7.586	57.54
.2317	.05370	12.7	4.315	18.62	.1303	.01698	17.7	7.674	58.88
.2291	.05248	12.8	4.365	19.05	.1288	.01660	17.8	7.762	60.26
.2265	.05129	12.9	4.416	19.50	.1274	.01622	17.9	7.852	61.66
.2239	.05012	13.0	4.467	19.95	.1259	.01585	18.0	7.943	63.10
.2213	.04898	13.1	4.519	20.42	.1245	.01549	18.1	8.035	64.57
.2188	.04786	13.2	4.571	20.89	.1230	.01514	18.2	8.128	66.07
.2163	.04677	13.3	4.624	21.38	.1216	.01479	18.3	8.222	67.61
.2138	.04571	13.4	4.677	21.88	.1202	.01445	18.4	8.318	69.18
.2113	.04467	13.5	4.732	22.39	.1189	.01413	18.5	8.414	70.79
.2089	.04365	13.6	4.786	22.91	.1175	.01380	18.6	8.511	72.44
.2065	.04266	13.7	4.842	23.44	.1161	.01349	18.7	8.610	74.13
.2042	.04169	13.8	4.898	23.99	.1148	.01318	18.8	8.710	75.86
.2018	.04074	13.9	4.955	24.55	.1135	.01288	18.9	8.811	77.62
.1995	.03981	14.0	5.012	25.12	.1122	.01259	19.0	8.913	79.43
.1972	.03890	14.1	5.070	25.70	.1109	.01230	19.1	9.016	81.28
.1950	.03802	14.2	5.129	26.30	.1096	.01202	19.2	9.120	83.18
.1928	.03715	14.3	5.188	26.92	.1084	.01175	19.3	9.226	85.11
.1905	.03631	14.4	5.248	27.54	.1072	.01148	19.4	9.333	87.10
.1884	.03548	14.5	5.309	28.18	.1059	.01122	19.5	9.441	89.13
.1862	.03467	14.6	5.370	28.84	.1047	.01096	19.6	9.550	91.20
.1841	.03388	14.7	5.433	29.51	.1035	.01072	19.7	9.661	93.33
.1820	.03311	14.8	5.495	30.20	.1023	.01047	19.8	9.772	95.50
.1799	.03236	14.9	5.559	30.90	.1012	.01023	19.9	9.886	97.72
					.1000	.01000	20.0	10.000	100.00

Finding Decibels when Voltage/Current Ratio is known

Voltage Ratio	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
1.0	.000	.086	.172	.257	.341	.424	.506	.588	.668	.749
1.1	.828	.906	.984	1.062	1.138	1.214	1.289	1.364	1.438	1.511
1.2	1.584	1.656	1.727	1.798	1.868	1.938	2.007	2.076	2.144	2.212
1.3	2.279	2.345	2.411	2.477	2.542	2.607	2.671	2.734	2.798	2.860
1.4	2.923	2.984	3.046	3.107	3.167	3.227	3.287	3.346	3.405	3.464
1.5	3.522	3.580	3.637	3.694	3.750	3.807	3.862	3.918	3.973	4.028
1.6	4.082	4.137	4.190	4.244	4.297	4.350	4.402	4.454	4.506	4.558
1.7	4.609	4.660	4.711	4.761	4.811	4.861	4.910	4.959	5.008	5.057
1.8	5.105	5.154	5.201	5.249	5.296	5.343	5.390	5.437	5.483	5.529
1.9	5.575	5.621	5.666	5.711	5.756	5.801	5.845	5.889	5.933	5.977
2.0	6.021	6.064	6.107	6.150	6.193	6.235	6.277	6.319	6.361	6.403
2.1	6.444	6.486	6.527	6.568	6.608	6.649	6.689	6.729	6.769	6.809
2.2	6.848	6.888	6.927	6.966	7.008	7.044	7.082	7.121	7.159	7.197
2.3	7.235	7.272	7.310	7.347	7.384	7.421	7.458	7.495	7.532	7.568
2.4	7.604	7.640	7.676	7.712	7.748	7.783	7.819	7.854	7.889	7.924
2.5	7.959	7.993	8.028	8.062	8.097	8.131	8.165	8.199	8.232	8.266
2.6	8.299	8.333	8.366	8.399	8.432	8.465	8.498	8.530	8.563	8.595
2.7	8.627	8.659	8.691	8.723	8.755	8.787	8.818	8.850	8.881	8.912
2.8	8.943	8.974	9.005	9.036	9.066	9.097	9.127	9.158	9.188	9.218
2.9	9.248	9.278	9.308	9.337	9.367	9.396	9.426	9.455	9.484	9.513
3.0	9.542	9.571	9.600	9.629	9.657	9.686	9.714	9.743	9.771	9.799
3.1	9.827	9.855	9.883	9.911	9.939	9.966	9.994	10.021	10.049	10.076
3.2	10.103	10.130	10.157	10.184	10.211	10.238	10.264	10.291	10.317	10.344
3.3	10.370	10.397	10.423	10.449	10.475	10.501	10.527	10.553	10.578	10.604
3.4	10.630	10.655	10.681	10.706	10.731	10.756	10.782	10.807	10.832	10.857
3.5	10.881	10.906	10.931	10.955	10.980	11.005	11.029	11.053	11.078	11.102
3.6	11.126	11.150	11.174	11.198	11.222	11.246	11.270	11.293	11.317	11.341
3.7	11.364	11.387	11.411	11.434	11.457	11.481	11.504	11.527	11.550	11.573
3.8	11.596	11.618	11.641	11.664	11.687	11.709	11.732	11.754	11.777	11.799
3.9	11.821	11.844	11.866	11.888	11.910	11.932	11.954	11.976	11.998	12.019
4.0	12.041	12.063	12.085	12.106	12.128	12.149	12.171	12.192	12.213	12.234
4.1	12.256	12.277	12.298	12.319	12.340	12.361	12.382	12.403	12.424	12.444
4.2	12.465	12.486	12.506	12.527	12.547	12.568	12.588	12.609	12.629	12.649
4.3	12.669	12.690	12.710	12.730	12.750	12.770	12.790	12.810	12.829	12.849
4.4	12.869	12.889	12.908	12.928	12.948	12.967	12.987	13.006	13.026	13.045
4.5	13.064	13.084	13.103	13.122	13.141	13.160	13.179	13.198	13.217	13.236
4.6	13.255	13.274	13.293	13.312	13.330	13.349	13.368	13.386	13.405	13.423
4.7	13.442	13.460	13.479	13.497	13.516	13.534	13.552	13.570	13.589	13.607
4.8	13.625	13.643	13.661	13.679	13.697	13.715	13.733	13.751	13.768	13.786
4.9	13.804	13.822	13.839	13.857	13.875	13.892	13.910	13.927	13.945	13.962
5.0	13.979	13.997	14.014	14.031	14.049	14.066	14.083	14.100	14.117	14.134
5.1	14.151	14.168	14.185	14.202	14.219	14.236	14.253	14.270	14.287	14.303
5.2	14.320	14.337	14.353	14.370	14.387	14.403	14.420	14.436	14.453	14.469
5.3	14.486	14.502	14.518	14.535	14.551	14.567	14.583	14.599	14.616	14.632
5.4	14.648	14.664	14.680	14.696	14.712	14.728	14.744	14.760	14.776	14.791
5.5	14.807	14.823	14.839	14.855	14.870	14.886	14.902	14.917	14.933	14.948
5.6	14.964	14.979	14.995	15.010	15.026	15.041	15.056	15.072	15.087	15.102
5.7	15.117	15.133	15.148	15.163	15.178	15.193	15.208	15.224	15.239	15.254
5.8	15.269	15.284	15.298	15.313	15.328	15.343	15.358	15.373	15.388	15.402
5.9	15.417	15.432	15.446	15.461	15.476	15.490	15.505	15.519	15.534	15.549
6.0	15.563	15.577	15.592	15.606	15.621	15.635	15.649	15.664	15.678	15.692
6.1	15.707	15.721	15.735	15.749	15.763	15.778	15.792	15.806	15.820	15.834
6.2	15.848	15.862	15.876	15.890	15.904	15.918	15.931	15.945	15.959	15.973
6.3	15.987	16.001	16.014	16.028	16.042	16.055	16.069	16.083	16.096	16.110
6.4	16.124	16.137	16.151	16.164	16.178	16.191	16.205	16.218	16.232	16.245

Finding Decibels when Voltage/Current Ratio is known

Voltage Ratio	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
6.5	16.258	16.272	16.285	16.298	16.312	16.325	16.338	16.351	16.365	16.378
6.6	16.391	16.404	16.417	16.430	16.443	16.456	16.469	16.483	16.496	16.509
6.7	16.521	16.534	16.547	16.560	16.573	16.586	16.599	16.612	16.625	16.637
6.8	16.650	16.663	16.676	16.688	16.701	16.714	16.726	16.739	16.752	16.764
6.9	16.777	16.790	16.802	16.815	16.827	16.840	16.852	16.865	16.877	16.890
7.0	16.902	16.914	16.927	16.939	16.951	16.964	16.976	16.988	17.001	17.013
7.1	17.025	17.037	17.050	17.062	17.074	17.086	17.098	17.110	17.122	17.135
7.2	17.147	17.159	17.171	17.183	17.195	17.207	17.219	17.231	17.243	17.255
7.3	17.266	17.278	17.290	17.302	17.314	17.326	17.338	17.349	17.361	17.373
7.4	17.385	17.396	17.408	17.420	17.431	17.443	17.455	17.466	17.478	17.490
7.5	17.501	17.513	17.524	17.536	17.547	17.559	17.570	17.582	17.593	17.605
7.6	17.616	17.628	17.639	17.650	17.662	17.673	17.685	17.696	17.707	17.719
7.7	17.730	17.741	17.752	17.764	17.775	17.786	17.797	17.808	17.820	17.831
7.8	17.842	17.853	17.864	17.875	17.886	17.897	17.908	17.919	17.931	17.942
7.9	17.953	17.964	17.975	17.985	17.996	18.007	18.018	18.029	18.040	18.051
8.0	18.062	18.073	18.083	18.094	18.105	18.116	18.127	18.137	18.148	18.159
8.1	18.170	18.180	18.191	18.202	18.212	18.223	18.234	18.244	18.255	18.266
8.2	18.276	18.287	18.297	18.308	18.319	18.329	18.340	18.350	18.361	18.371
8.3	18.382	18.392	18.402	18.413	18.423	18.434	18.444	18.455	18.465	18.475
8.4	18.486	18.496	18.506	18.517	18.527	18.537	18.547	18.558	18.568	18.578
8.5	18.588	18.599	18.609	18.619	18.629	18.639	18.649	18.660	18.670	18.680
8.6	18.690	18.700	18.710	18.720	18.730	18.740	18.750	18.760	18.770	18.780
8.7	18.790	18.800	18.810	18.820	18.830	18.840	18.850	18.860	18.870	18.880
8.8	18.890	18.900	18.909	18.919	18.929	18.939	18.949	18.958	18.968	18.978
8.9	18.988	18.998	19.007	19.017	19.027	19.036	19.046	19.056	19.066	19.075
9.0	19.085	19.094	19.104	19.114	19.123	19.133	19.143	19.152	19.162	19.171
9.1	19.181	19.190	19.200	19.209	19.219	19.228	19.238	19.247	19.257	19.266
9.2	19.276	19.285	19.295	19.304	19.313	19.323	19.332	19.342	19.351	19.360
9.3	19.370	19.379	19.388	19.398	19.407	19.416	19.426	19.435	19.444	19.453
9.4	19.463	19.472	19.481	19.490	19.499	19.509	19.518	19.527	19.536	19.545
9.5	19.554	19.564	19.573	19.582	19.591	19.600	19.609	19.618	19.627	19.636
9.6	19.645	19.654	19.664	19.673	19.682	19.691	19.700	19.709	19.718	19.726
9.7	19.735	19.744	19.753	19.762	19.771	19.780	19.789	19.798	19.807	19.816
9.8	19.825	19.833	19.842	19.851	19.860	19.869	19.878	19.886	19.895	19.904
9.9	19.913	19.921	19.930	19.939	19.948	19.956	19.965	19.974	19.983	19.991

Voltage Ratio	0	1	2	3	4	5	6	7	8	9
10	20.000	20.828	21.584	22.279	22.923	23.522	24.082	24.609	25.105	25.575
20	26.021	26.444	26.848	27.235	27.604	27.959	28.299	28.627	28.943	29.248
30	29.542	29.827	30.103	30.370	30.630	30.881	31.126	31.364	31.596	31.821
40	32.041	32.256	32.465	32.669	32.869	33.064	33.255	33.442	33.625	33.804
50	33.979	34.151	34.320	34.486	34.648	34.807	34.964	35.117	35.269	35.417
60	35.563	35.707	35.848	35.987	36.124	36.258	36.391	36.521	36.650	36.777
70	36.902	37.025	37.147	37.266	37.385	37.501	37.616	37.730	37.842	37.953
80	38.062	38.170	38.276	38.382	38.486	38.588	38.690	38.790	38.890	38.988
90	39.085	39.181	39.276	39.370	39.463	39.554	39.645	39.735	39.825	39.913
100	40.000	—	—	—	—	—	—	—	—	—

Decibel Conversion Chart

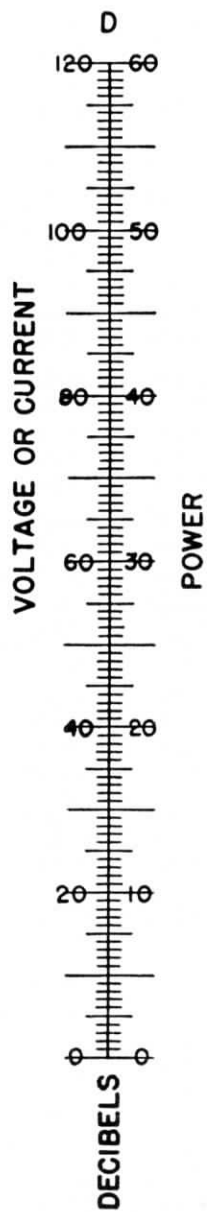
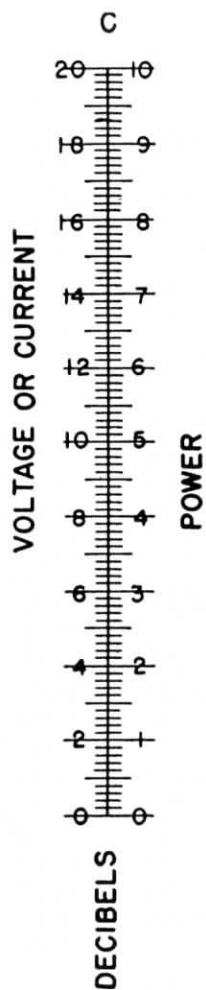


Chart for converting current or power ratios to decibels.

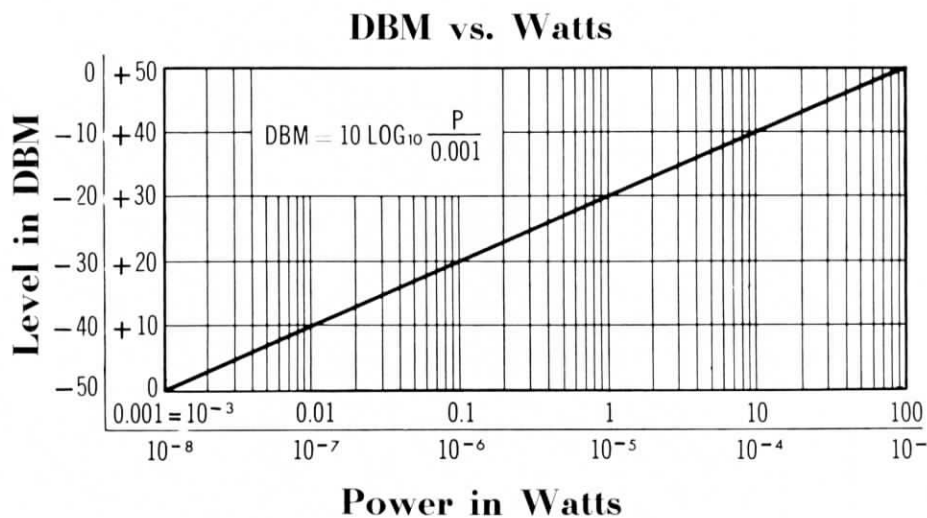
Examples explaining the use of the decibel conversion chart are as follows:

(1) Assume a voltage ratio of 2.4 to 1.2. This voltage ratio in decibels is found by drawing a line from 1.2 on scale A to 2.4 on scale E passing through the decibel voltage scale C at 6 decibels. This can also be found on scales B, D and F; however, the decibel scale D is not expanded as much as the decibel scale C and cannot be read as accurately.

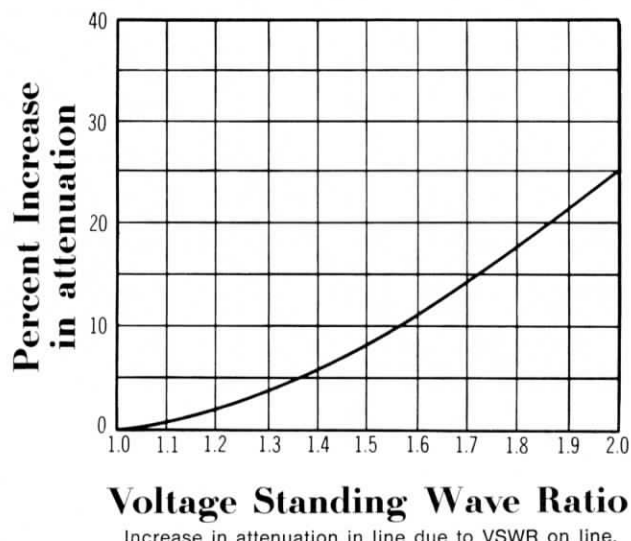
(2) Assume a voltage ratio of 1200 to 1.2. This voltage ratio in decibels is found by drawing a line from 1.2 on scale B to 1200 on scale F passing through the decibel scale D at 60 decibels.

(3) Assume a power ratio of 580 to 320. This power ratio in decibels is found by drawing a line from 3.2 on scale A to 5.8 on scale E (the ratio of 580 to 320 is the same as 5.8 to 3.2) passing through the decibel scale D at 2.6 decibels.

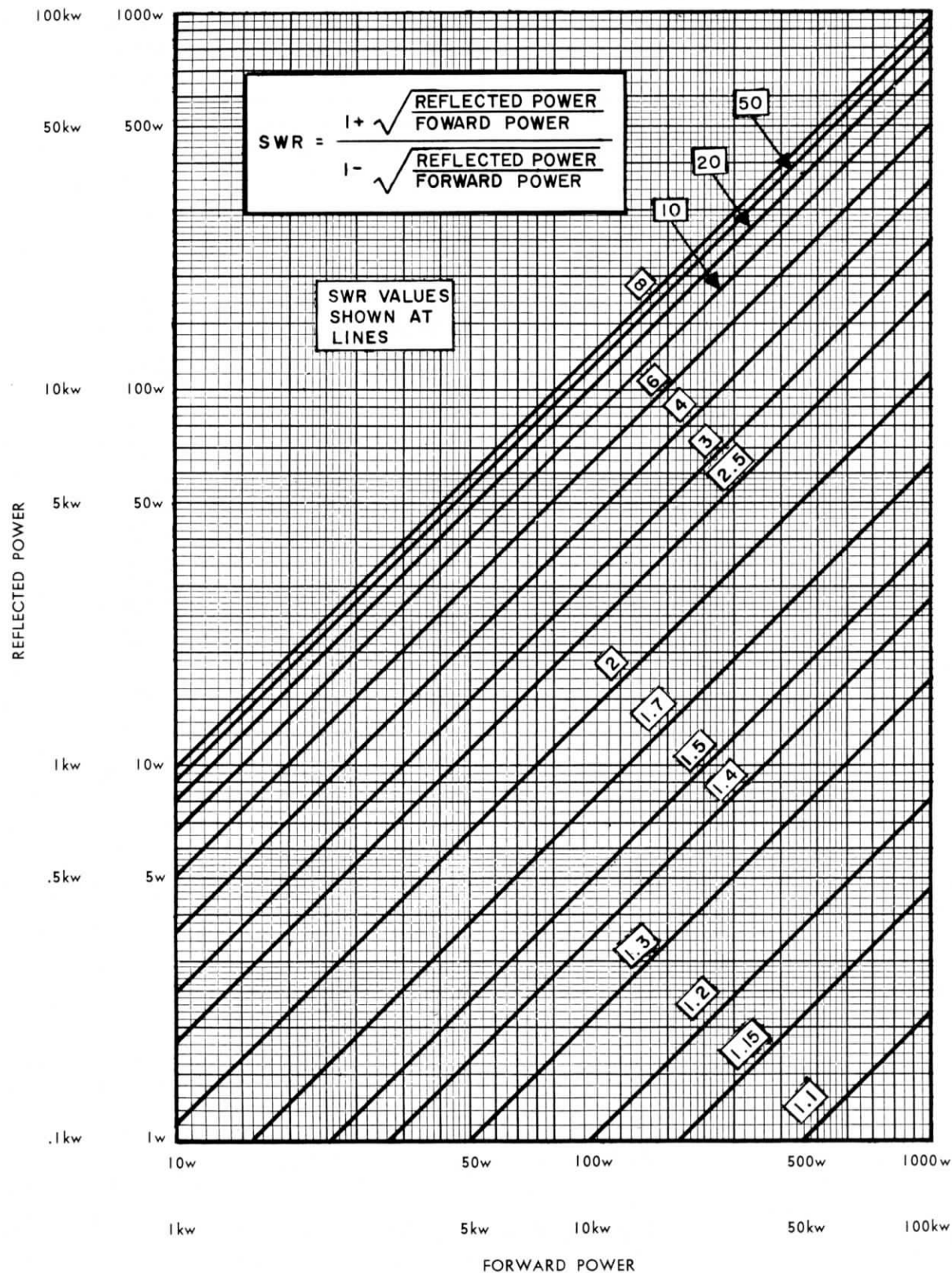
From the above examples it will be noted that the smaller value of any ratio will always be located on scale A or B and the larger value will always be located on the respective scale E or F. Also, the decibels corresponding to ratios of less than 10 to 1 can be found on either set of scales; however, it is preferable to use scales A, C and E as the decibel scale C is expanded and can be read with greater accuracy.



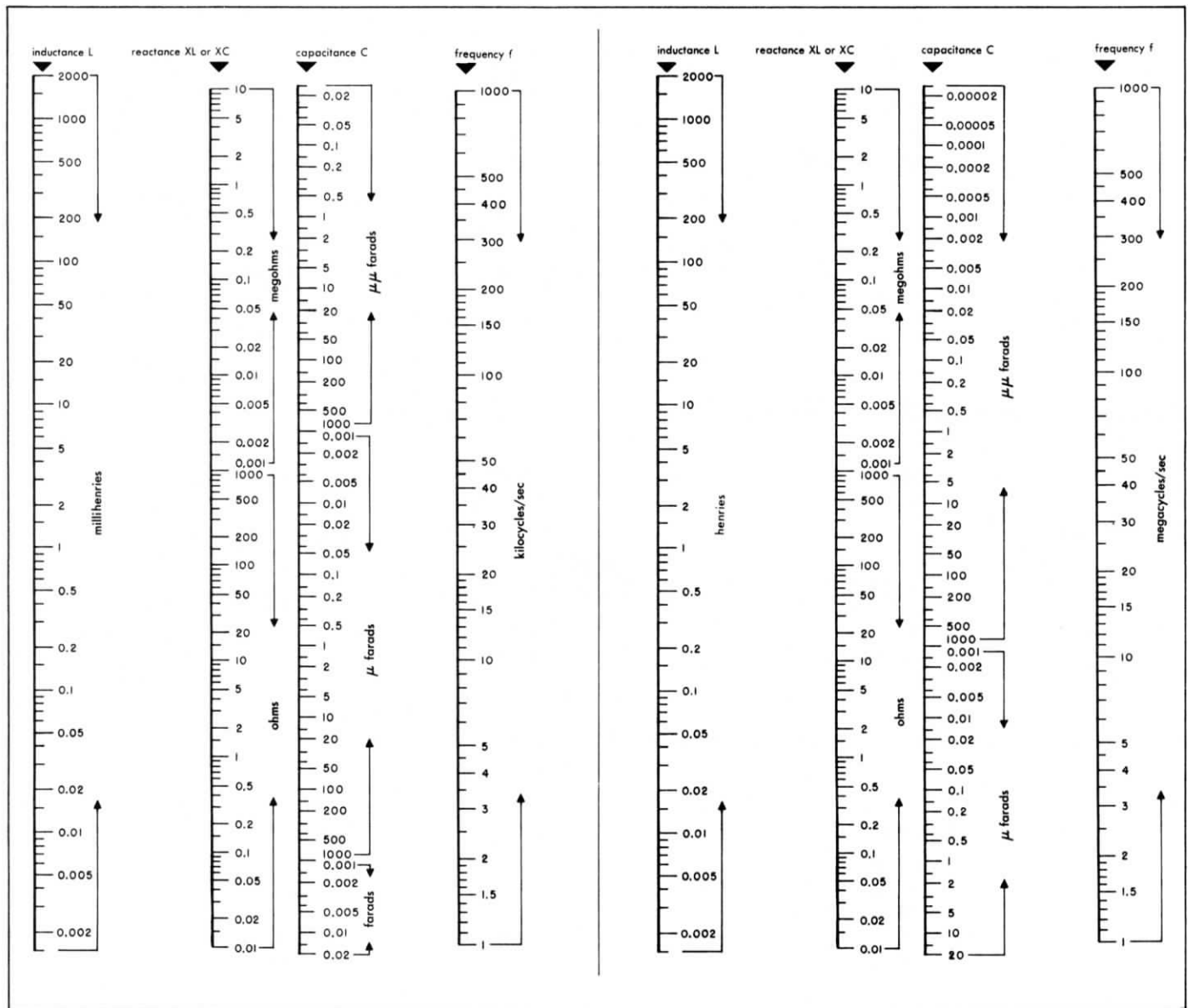
Antennas, Towers and Wave Propagation



Forward vs. Reflected Power



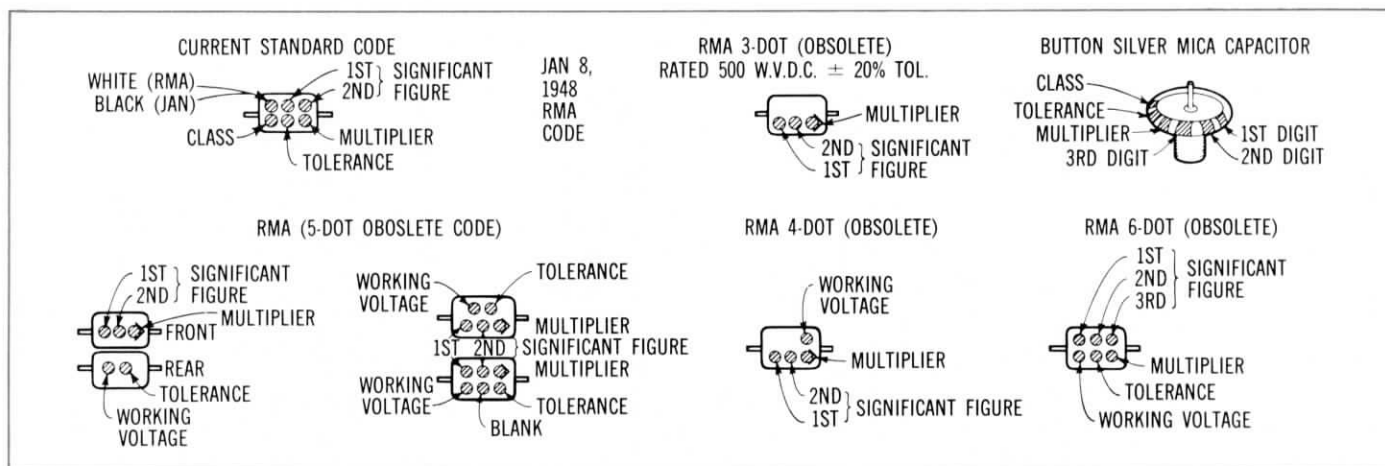
Reactance Chart



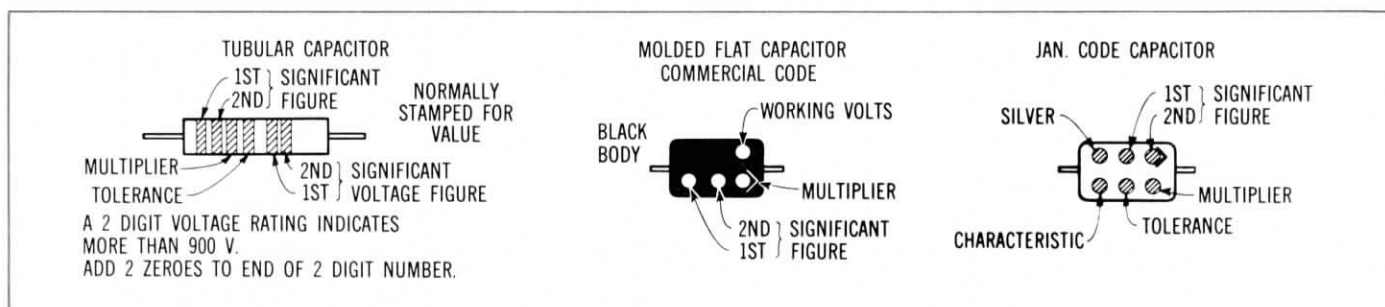
Decimal Equivalents of Fractions

1/32..... .03125	9/32..... .28125	17/32..... .53125	25/32..... .78125
1/16..... .0625	5/16..... .3125	9/16..... .5625	13/16..... .8125
3/32..... .09375	11/32..... .34375	19/32..... .59375	27/32..... .84375
1/8..... .125	3/8..... .375	5/8..... .625	7/8..... .875
5/32..... .15625	13/32..... .40625	21/32..... .65625	29/32..... .90625
3/16..... .1875	7/16..... .4375	11/16..... .6875	15/16..... .9375
7/32..... .21875	15/32..... .46875	23/32..... .71875	31/32..... .96875
1/4..... .25	1/2..... .5	3/4..... .75	1..... 1.0

Standard Color Code – Molded Mica-Type Capacitors



Standard Color Code – Molded Paper-Type Capacitors



Standard Color Code – Resistors and Capacitors

INSULATED UNINSULATED COLOR	FIRST RING BODY COLOR FIRST FIGURE	SECOND RING END COLOR SECOND FIGURE	THIRD RING DOT COLOR MULTIPLIER
BLACK	0	0	NONE
BROWN	1	1	0
RED	2	2	00
ORANGE	3	3	,000
YELLOW	4	4	0,000
GREEN	5	5	00,000
BLUE	6	6	,000,000
VIOLET	7	7	0,000,000
GRAY	8	8	00,000,000
WHITE	9	9	000,000,000

RADIAL LEAD DOT RESISTOR
MULTIPLIER
2ND FIGURE
TOLERANCE
1ST FIGURE

RADIAL LEAD (BAND) RESISTOR
MULTIPLIER
2ND FIGURE
TOLERANCE
1ST FIGURE

5-DOT RADIAL LEAD CERAMIC CAPACITOR
TEMP. COEFF.
CAPACITY
MULTIPLIER
TOLERANCE

EXTENDED RANGE TC CERAMIC HICAP
TEMP. COEFF.
TC MULTIPLIER
CAPACITY
TOLERANCE
MULTIPLIER

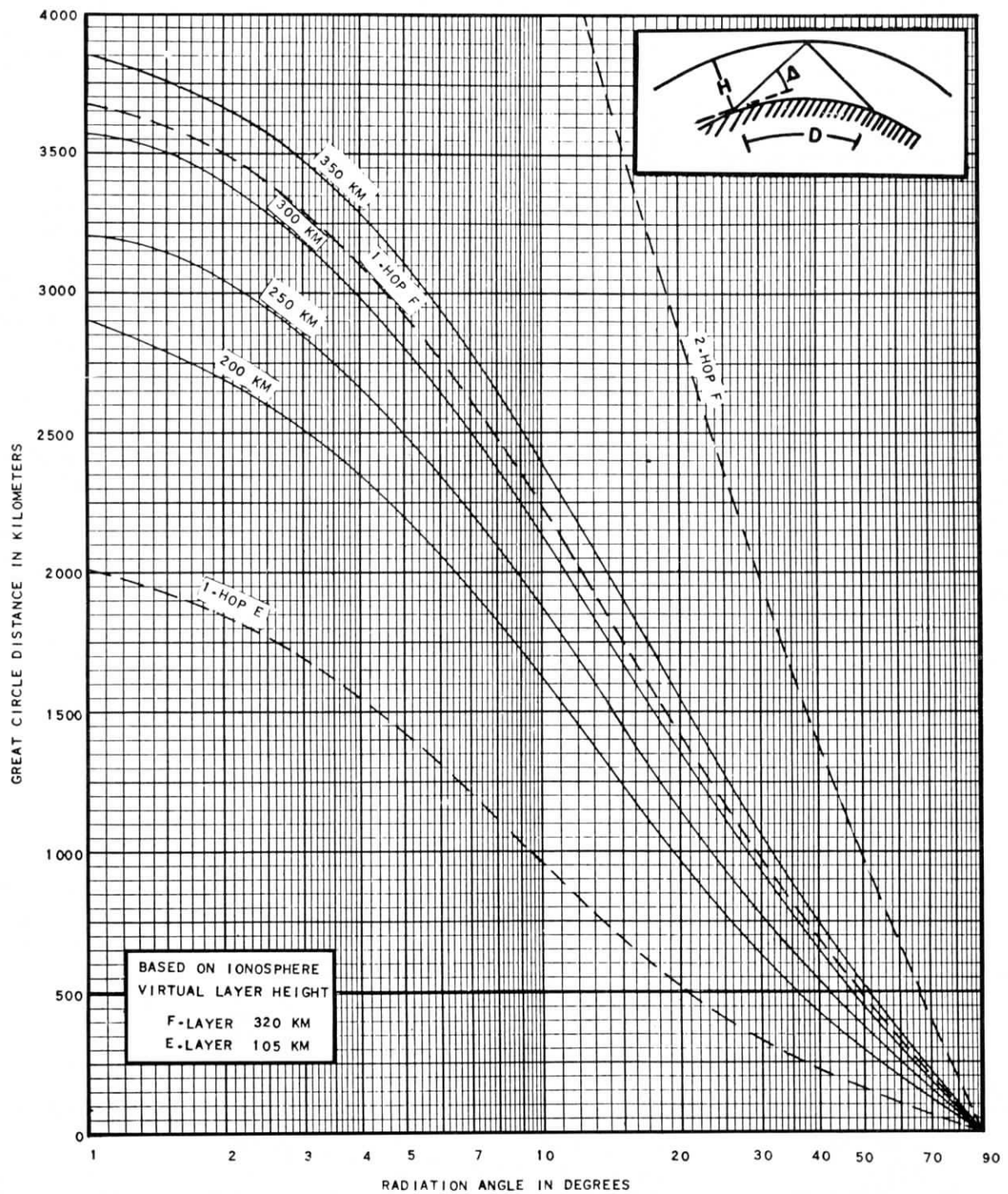
AXIAL LEAD RESISTOR
BROWN - INSULATED
BLACK - NON-INSULATED
MULTIPLIER
TOLERANCE
1ST AND 2ND SIGNIFICANT FIGURES
WIRE WOUND RESISTORS HAVE 1ST DIGIT BAND DOUBLE WIDTH

AXIAL LEAD CERAMIC CAPACITOR
TEMP. COEFF.
CAPACITY
MULTIPLIER
TOLERANCE

BY-PASS COUPLING CERAMIC CAPACITOR
CAPACITY
TOLERANCE
MULTIPLIER
VOLTAGE (OPT.)

DISC CERAMIC RMA CODE
5-DOT
CAPACITY
MULTIPLIER
TOLERANCE
TEMP. COEFF.
3-DOT

Radiation Angle Versus Great Circle Distance Curves



Symbols and Prefixes

ac	alternating current	ISO	International Standards Organization	uhf	ultra-high frequency
af	audio frequency	j	$\sqrt{-1}$	v	velocity
AFC	automatic frequency control	k	kilo (10^3)	v	volt
A M	amplitude modulation	kg	kilogram	va	voltampere
amp	ampere	kva	kilovolt ampere	vhf	very high frequency
ASA	American Standards Association	kw	kilowatt	vlf	very low frequency
ASTM	American Society for Testing Materials	L	inductance	vol	volume
AVC	automatic volume control	lab	laboratory	vs	versus
ave	average	lb	pound	w	watt
B	susceptance	LC	inductance-capacitance	X	reactance
BCD	binary-coded decimal	lf	low frequency	Y	admittance
C	capacitance	log	logarithm	Z	impedance
C	Centigrade, degrees Centigrade	m	mass	α	short-circuit forward current-transfer ratio (common base)
cm	centimeter	m	meter; milli (10^{-3})	β	short-circuit forward current-transfer ratio (common emitter)
COD	cash on delivery	ma	milliampere	L	reflection coefficient
cps	cycles per second	max	maximum	Δ	increment
cw	continuous wave	mbar	millibar	δ	loss angle
D	dissipation factor	Mc	megacycles per second	θ	phase angle
db	decibel	mh	millihenry	λ	wavelength
dbm	decibel referred to one milliwatt	mil	0.001 inch	μ	micro- (10^{-6})
dc	direct current	min	minimum; minute	μa	microampere
E	voltage	mm	millimeter	μbar	microbar
EIA	Electronics Industries Association	mmho	millimho	μf	microfarad
emf	electromotive force	m Ω	milliohm	μh	microhenry
F	Fahrenheit, degrees Fahrenheit	M Ω	megohm	μsec	microsecond
f	farad	MM Ω	megamegohm	μv	microvolt
f	frequency	mv	millivolt	Ω	ohm
fm	frequency modulation	mw	milliwatt	$\bar{U}$	mho
f.o.b.	free on board	n	nano (10^{-9}); any number	w	angular velocity ($2\pi f$)
G	conductance	nsec	nanosecond		
g	gravitation constant	n $\bar{U}$	nanomho		
Gc	gigacycles per second	oz	ounce		
g_m	transconductance	p	parallel, as L_p		
h	henry	PF	power factor		
h_f	forward current-transfer ratio	pf	picofarad		
h_i	short-circuit input impedance	PH	hydrogen in concentration		
h_o	open-circuit output admittance	pp	push-pull; pages		
h_r	reverse voltage-transfer ratio	ppm	parts per million		
I	current	p-to-p	peak-to-peak		
IEC	International Electrotechnical Commission	prf	pulse repetition frequency		
IEEE	Institute of Electrical and Electronics Engineers	Q	quality factor		
I F	intermediate frequency	R	resistance		
in.	inch	$\text{\textcircled{R}}$	registered trademark		
IRE	Institute of Radio Engineers	RC	resistance-capacitance		
		re	referred to		
		rf	radio frequency		
		RH	relative humidity		
		rms	root-mean-square		
		rpm	revolutions per minute		
		s	series, as L_s		
		sec	second		
		sync	synchronous, synchronizing		
		T	period		
		t	temperature		
		t	time		

Prefixes

Orders of magnitude from 10^{12} to 10^{-18} are designated by the following prefixes:

Order	Prefix	Symbol
10^{12}	tera	T
10^9	giga	G
10^6	mega	M
10^3	kilo	k
10^2	hecto	h
10	deka	da
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

Military Nomenclature Cross Reference

<i>Military Nomenclature</i>	<i>Equipment</i>	<i>Collins Type No.</i>
AN/ARM-73	Test Harness	678P-2
AN/MRC-95	HF Communication System	VC-102
AN/PRC-38	HF-VHF Transceiver	618K-1
AN/PRC-47	HF Transceiver	618U-1
AN/SRA-22	HF Antenna Coupler	180T-2
AN/URC-32	HF Transceiver	KWT-6-8
C-1940/ARC-58	Coupler Control	309A-2
C-3940/ARC-94	Radio Set Control	714E-3
C-4832/TSW	Coupler Control	309A-2D
C-6116/TSC-15	Frequency Control	714Y-2
C-6118/FRC-93	Speaker Console	312B-4
CU-351/AR	HF Antenna Coupler	180L-3A
CU-523/ARC-58	HF Antenna Coupler	180R-6
CU-737/URC	Line Flatteners	180U-2A
CU-791/URT	Line Flatteners	180Y-1
CU-991/AR	HF Antenna Coupler	180L-2
CU-1169/SRC-16	HF Antenna Coupler	490C-1
CU-1170/SRC-16	HF Antenna Coupler	490C-2
F-871/U	Bandpass Filter	635R-1
M-127/FRC-93	Microphone	MM-1
MK-773	Maintenance Kit	678Y-3
OA-1373/FRC	Frequency Standard	40N-2
OA-1448/GRT	HF Power Amplifier	205J-1
OA-2008/FRR-53	Frequency Standard	40N-1
PP-3702/ARC-102	Power Inverter Mounting	390J-2
PP-3990/FRC-93	Power Supply	PM-2
R-1122/GR	Receiver	51S-1
R-1156/GR	Receiver	51S-1F
RT-648/ARC-94	HF Transceiver	618T-2
RT-698/ARC-102	HF Transceiver	618T-3
RT-718/FRC-93	HF Transceiver	KWM-2A

Collins Quality and Reliability



Collins Radio Company's reputation for dependable products is a result of the application of rigid, uncompromising standards of excellence. Quality and reliability testing programs are carried out by autonomous organizations whose responsibility crosses boundaries of design, engineering and production.

The quality control programs ensure that Collins equipment and systems perform according to predetermined specifications in the manufacturing test facility, as well as in the intended operational environment. Collins' reliability engineers work with development engineers to assure equipments and systems which will provide long, useful life.

The programs begin with the preparation of specifications for components and subsystems purchased from outside suppliers. When the first engineering model of a new equipment is completed, the unit is subjected to stringent and detailed review by a reliability committee composed of specialists trained to find and correct possible troubles. Following this, a preproduction or pilot line assembly operation provides manufacturing with an opportunity to finalize production assembly techniques and se-

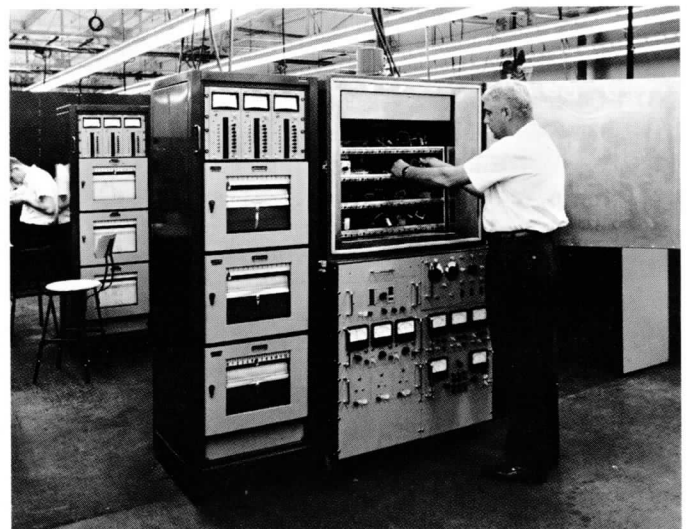
quences before initiation of the regular production schedule. Selected Collins equipments are also proven in an operational environment in the company's experimental HF radio station located in Cedar Rapids.

In manufacturing, each of the modules and subassemblies is subjected to stringent inspection. Groups of modules are then unitized and again given rigid examination as a subsystem. Maintenance of required specifications is assured by use of either standard test equipment, or as is true in many cases, test equipment developed by Collins to fill a specific requirement. Completed units, composed of modules and subsystems which have already been thoroughly checked, are given highly critical final tests. Here again the finest test devices known are employed. The finished product must meet or exceed exacting specifications, and it must perform satisfactorily in actual operating conditions. The final testing stage involves an operating or reliability run. This is performed under the environmental conditions in which the equipment will be used.

As a further quality audit, equipments are selected from finished

goods stock on a statistical basis and reinspected and retested. Collins also maintains an environmental and reliability test area of approximately 16,000 square feet, equipped to verify the operational effectiveness of any equipment from a single unit, such as a receiver or transceiver, to highly sophisticated electronic systems in almost any environmental extreme. The environmental test laboratories provide tests for sine wave and random noise vibration, shock, explosion, radio interference, rain, salt spray, spin, altitude, and extremes of heat and cold. These facilities include equipment to simulate actual operation in single or combined environments, where applicable, and to measure performance under extreme conditions. All Collins test equipment is periodically checked for accuracy and stability.

Evidence of thorough, painstaking attention to the highest quality and reliability standards is reflected in the thousands of Collins equipments and systems which are providing outstanding performance in varied functions throughout the free world. Product support programs, tailored to the individual customer's specific requirements, are available to assist in maintaining high operational and maintenance standards. These services include field installation and maintenance, customer personnel training, spare parts, equipment repair and modification and updating information. Personnel engaged in support activities maintain close liaison with design engineers, production specialists and quality control personnel to keep abreast of the latest technological developments.



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Glossary

- AFC** Automatic Frequency Control. A circuit that holds a receiver on the frequency of the station it is receiving.
- AGC** Automatic Gain Control. A device which automatically adjusts the gain of a receiver in accordance with the received signal level.
- ALC** Automatic Load Control. A circuit which allows a high average level of modulation and optimum transmitter power output within rated limits of distortion.
- ARINC** Aeronautical Radio, Inc. A corporation whose principal stockholders are the U. S. airlines and whose activities include (1) cognizance of airborne and ground electronics systems in the interest of compatibility, (2) coordination and exchange of technical information, and (3) operation of an extensive communication system devoted to the aeronautical services.
- ATR** Air Transport Radio. A form factor agreed upon within the airline and electronics industries governing the configuration of avionics equipment. A "one ATR" unit has the following dimensions: width, 10.125" (25.72 cm); height, 7.625" (19.37 cm); length, 19.5625" (49.69 cm).
- AVC** Automatic Volume Control. A device which maintains the output of a receiver within narrow limits while the signal input amplitude varies over a wide range.
- BALANCED MODULATOR** A circuit in which the carrier and modulating signals are introduced in such a manner that after modulation takes place the output contains the two sidebands without the carrier.
- CARD CAGE** A unit to house plug-in circuit cards. Interconnecting wiring is usually included.
- CCITT** Consultative Committee for International Telephone and Telegraph. The committee has the responsibility of studying technical and operating questions pertaining to wireline transmission and issuing recommendations.
- COMPATIBLE AM** A method of AM transmission or reception using one sideband and reinserted carrier.
- CROSS-MODULATION** A type of interference caused by modulation of the carrier of the desired signal by an undesired signal.
- DIAL PULSE CONTROL** A remote control system for the Universal Radio Group equipment which permits subscriber control of Universal Radio Group equipment from a dial telephone over four-wire circuits.
- DIV** Diversity. A method of reception using two receivers operating on different frequencies or with spaced antennas to overcome the effects of fading by selecting the strongest of two signals.
- EIA** Electronic Industries Association.
- FREQUENCY SHIFT KEYING** A form of frequency modulation in which the modulating wave shifts the output frequency between predetermined values.
- IF TRANSLATOR** A unit of the Universal Radio Group equipment which contains audio and IF circuits. It is used with an RF translator in receiver or exciter applications.
- INTERMODULATION DISTORTION** Loss of fidelity resulting from the generation of frequencies that are the sum and difference of those contained in the applied waveform.
- LOGARITHMICALLY PERIODIC ANTENNA** An antenna which is characterized by input impedance and radiation patterns that are uniform over a wide range.
- MECHANICAL FILTER** A magnetostrictive device with extremely sharp selectivity characteristics.
- MTBF** Mean Time Between Failures. Usually expressed in hours of operation and used to evaluate equipment reliability.
- MODEM** Modulator and Demodulator. A bilateral unit which processes data information for communication over radio channels.
- MODULE** A group of related components, usually comprising a circuit division, arranged on a common mounting.
- MULTIPLEX** The simultaneous use of two or more channels on a single circuit.
- PEP** Peak Envelope Power.
- PEV** Peak Envelope Volts.
- PILOT CARRIER** A technique in which a small amount of carrier power is transmitted with the sideband. This type of operation allows compatibility with older equipment.
- POWER AMPLIFIER** An amplifier to raise the exciter output signal to the desired RF level in a communication system.
- PRODUCT DETECTOR** A detector circuit characterized by minimum intermodulation products and requiring small local carrier voltage. It is ideal for single sideband applications.
- Q MULTIPLIER** A filter which has sharp peak response or a deep rejection notch at a particular frequency.
- RF FEEDBACK CIRCUIT** An inverse feedback arrangement used in RF amplifiers to reduce harmonic distortion and improve fidelity.
- RF SWITCHING MATRIX** A device to rapidly interconnect a number of power amplifiers and antennas, as required in a communication system.
- RF TRANSLATOR** A unit of the Universal Radio Group equipment which contains RF circuitry. It is used with an IF translator in receiver or exciter applications.
- RTTY** Radio Teletypewriter. Teletypewriter communication over radio circuits.
- SELCAL** Selective Calling. A method of alerting a desired receiving facility by means of a coded discrete signal.
- SSB** Single Sideband. A method of radio transmission wherein the intelligence is contained in only one sideband. Results in conservation of spectrum, more effective "talking power."
- TGC** Transmitter Gain Control. A circuit to maintain the over-all transmitter gain within relatively narrow limits.
- TSO** Technical Standard Order. A U. S. Federal Aviation Agency regulation detailing minimum performance and quality control standards for equipment used on specified civil aircraft.
- TWO-OUT-OF-FIVE WIRE SWITCHING** A method using only five wires to provide ten switching combinations.
- VOX** Voice Operated Relay. A circuit which automatically switches a transceiver from receive function to transmit function whenever the operator speaks into microphone.
- VU** Volume Unit. A term used to express the magnitude of a complex electrical wave, such as that corresponding to speech or music.