RCA Victor

Test Oscillator

Type TMV-97-A

INSTRUCTIONS

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

IB 23327

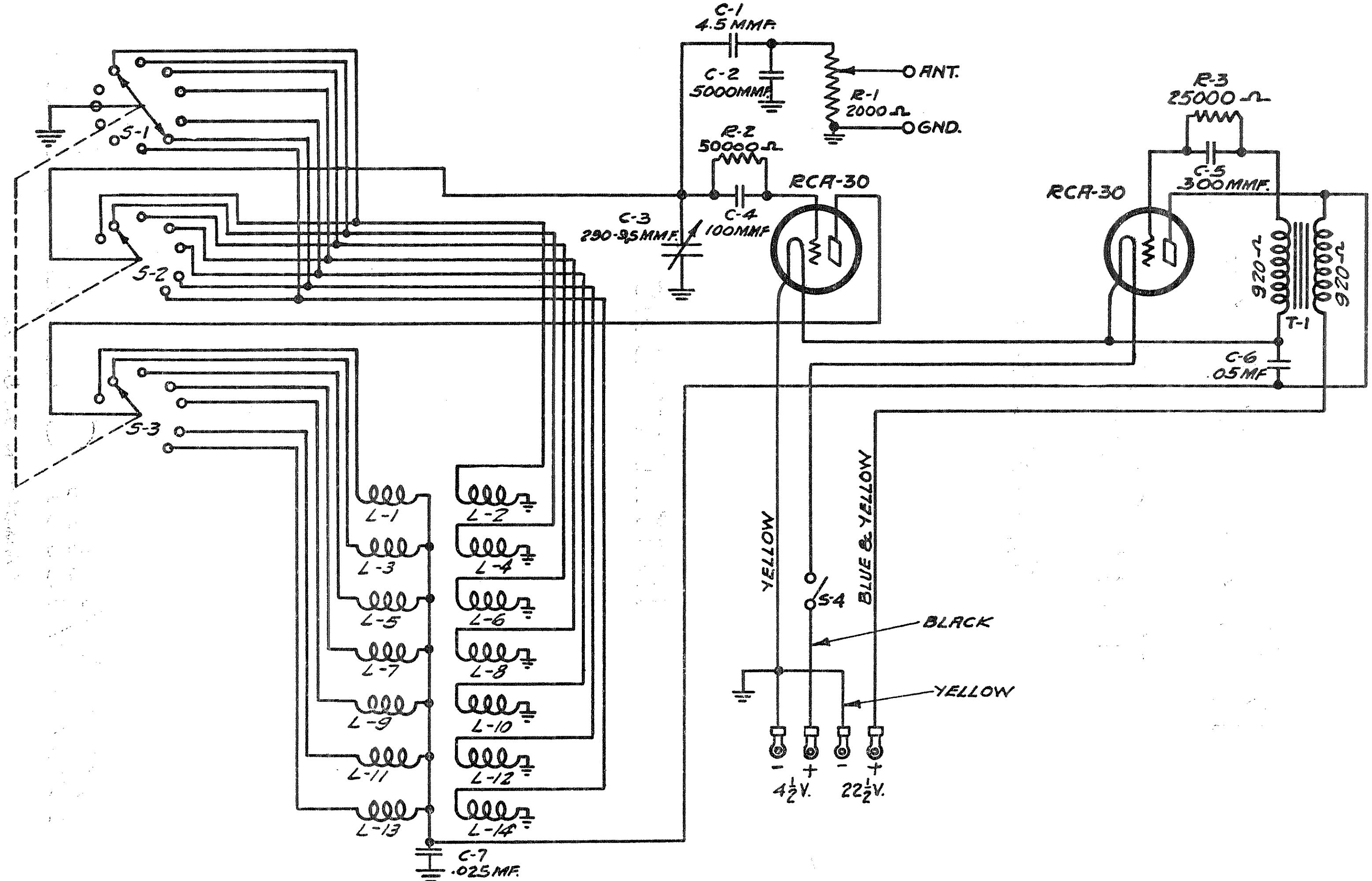

Figure 1—Schematic Circuit

Instructions for

Test Oscillator

Type TMV-97-A

Introduction

The Type TMV-97-A Test Oscillator is a compact, self-contained portable oscillator designed especially for servicing and test purposes. It is an R. F. oscillator, modulated at 400 cycles and covers the frequency range from 150 K. C. to 25,000 K. C. in seven steps. Power for its two Radiotrons, RCA-30, is obtained from two self-contained batteries. The instrument is entirely shielded in an aluminum case.

Controls on the front panel are the "On-Off" switch, vernier tuning dial, range switch and output control. Two binding posts are also provided for conveniently connecting its output to the circuit being tested.

The over-all dimensions of the instrument are approximately 9¾″ wide, 4½″ deep and 8½″ high (including handle). Its weight is 3½ lbs. including batteries.

The following frequency ranges are covered by the seven position Range Switch.

Position	*Frequency Range (K. C.)*
1	150-330
2	330-720
3	720-1160
4	1160-3050
5	3050-7400
6	7400-14300
7	14300-25000

The oscillator is shipped complete with Radiotrons, but less batteries. Figure 1 shows the schematic diagram and Figure 2 the wiring diagram.

Installation of Batteries

Two batteries are required, one 4½ volt filament battery (Burgess No. 2370, Eveready No. 771 or equivalent) and one 22½ volt "B" battery (Burgess No. 4156 or equivalent).

Remove the four screws at the top and side edges of the front panel and withdraw the chassis from the cabinet. Make certain that the Radiotrons are firmly in their sockets and the "On-Off" switch is off. Then turn the chassis upside down. Sufficient space is allowed beneath the chassis for insertion of the batteries, which should be located and connected as shown in Figure 3. Turn the case over on its top and replace the chassis while both chassis and cabinet have their bottom uppermost. This assures proper location of the chassis and batteries within the case. Then turn the oscillator over and replace its front panel mounting screws. The unit is then ready for operation.

Operation

1. The output of the oscillator is connected to the receiver under test by means of the two binding posts located on its front panel. A reference to the service instructions for the receiver under test will disclose the proper place for making such connections to the receiver.

2. Turn the oscillator "on" and adjust the tuning dial and range switch to obtain the desired frequency signal. A reference to the calibration charts on pages 6 to 9 inclusive, gives the proper dial setting for the various frequencies. Also see notes under "Calibration."

> NOTE—The vernier tuning ratio may be varied from 6:1 to 20:1 by adjustment of the position of the small arm above the tuning knob. The extreme clockwise position of the arm gives a 20:1 ratio which is very useful for critical tuning.

3. The output of the oscillator is varied by means of the small knob located on the right side of the panel. For comparing sensitivity, it may be necessary to further decrease the output from that obtained at the minimum position of the output control. This may be done by using two carbon resistors, one of 100 ohms and the other of 100,000 ohms resistance, connected in series and placed across the antenna and ground binding posts of the oscillator. (The 100 ohm resistor must be connected to the ground binding post.) Connect the receiver antenna lead to the junction of the two resistors and the ground lead to the ground terminal. Then by recording the position of the output dial setting throughout the receiver range (for same signal output) a good indication of the relative receiver sensitivity may be obtained.

> NOTE—At the higher frequencies it may be necessary to move the oscillator a short distance from the receiver to avoid stray pickup.

Calibration

Figures 4, 5, 6, and 7 show typical calibration curves for the TMV-97-A oscillator. The individual oscillators will be found to be within plus or minus 3% of these calibration curves. However, as it is usually desirable to have a more accurate calibration than these curves, blank graph sheets are given in Figures 8, 9, 10 and 11 for each owner to calibrate his own instrument. This is done by tuning in stations in the various ranges on a receiving set and then beating them with the test oscillator for zero beat. The frequency of the test oscillator will then be identical with that of the station. By noting the oscillator dial reading and the station frequency, a very accurate calibration may be plotted on the pages indicated.

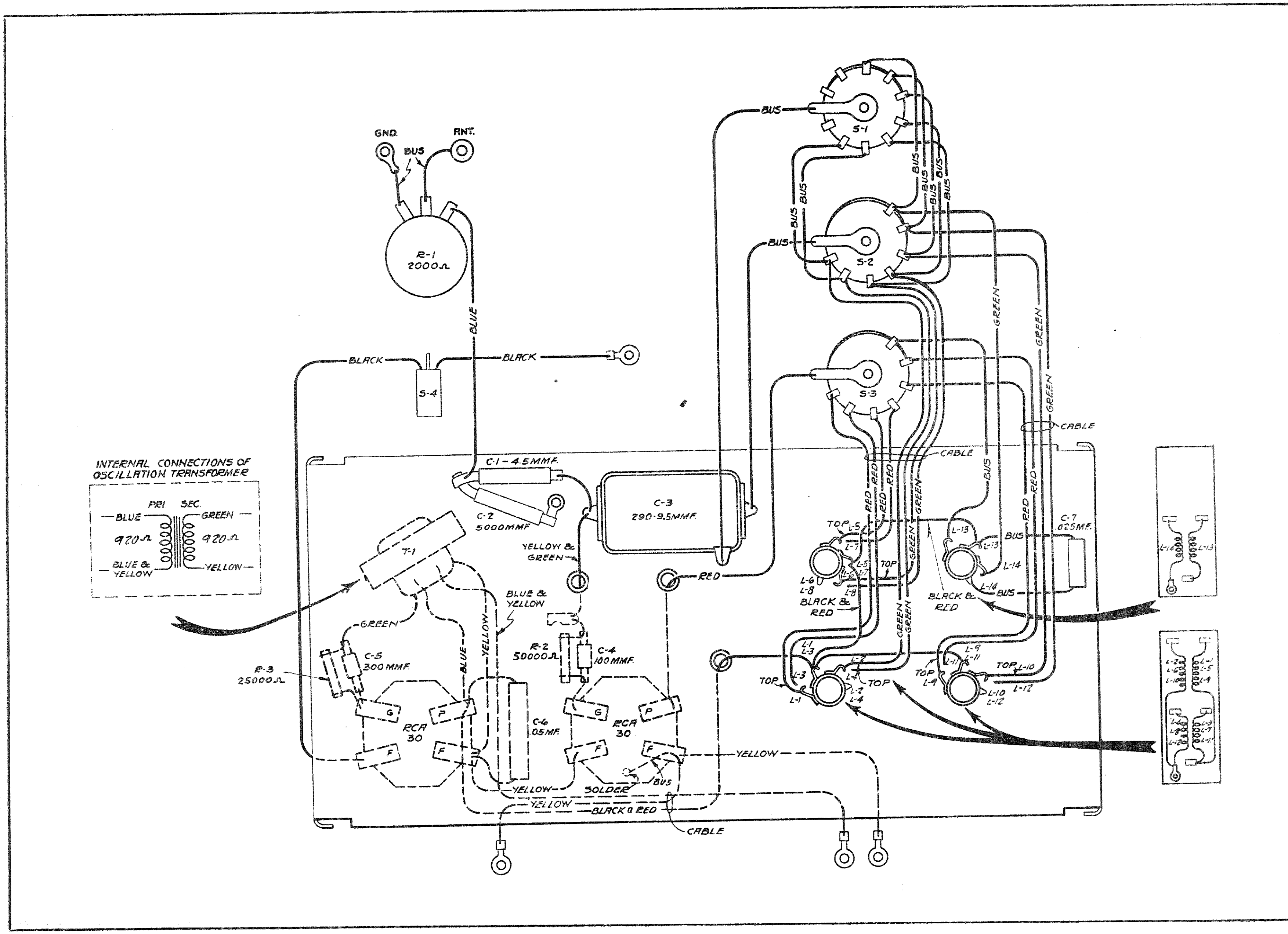

Figure 2—Wiring Diagram

For the lower frequencies, 150 K. C. to 550 K. C., a calibration is readily made by using harmonies of the oscillator for checking against frequencies in the broadcasting band. For example, 175 K. C. can be checked by beating its fourth harmonic with Station WLW, the frequency of which is 700 K. C.

NOTE—For the convenience during calibration, we have listed a number of prominent broadcasting stations opposite their frequency on pages 14, 15 and 16.

Maintenance

The battery voltages should be checked if at any time the output of the oscillator becomes weak. The drain on the batteries is small, so that their expected life is approximately 15 hours' operation. However, the batteries should be replaced when the filament battery voltage is less than 3 volts and the "B" battery voltage is less than 17 volts. Always replace the batteries by withdrawing the entire unit from the front of the cabinet. Never remove the back panel.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
2039	Switch—Single pole, single throw toggle switch	$0.72	3979	Transformer—A. F. oscillation transformer (T1)	$1.94
2744	Capacitor—4.5 mmfd. capacitor (C1)—Package of 5	1.60	3980	Condenser—Tuning condenser (C3)	1.40
2932	Capacitor—5,000 mmfd. capacitor (C2)	.50	3981	Capacitor—300 mmfd. capacitor (C5)	.30
3110	Resistor—25,000 ohm—¼ watt carbon resistor (R3)—Package of 5	1.00	3982	Handle—Carrying handle	.60
3114	Resistor—50,000 ohm—¼ watt carbon resistor (R2)—Package of 5	1.00	3983	Switch—Range switch (S1, S2, S3)	3.94
			3984	Knob—Moulded knob	.30
3640	Capacitor—.05 mfd. capacitor (C6)	.25	3985	Scale—Range switch dial scale	.66
3765	Capacitor—.025 mfd. capacitor (C7)	.34	3986	Scale—Attenuator potentiometer dial scale	.66
3794	Capacitor—100 mmfd. capacitor (C4)	.30	3987	Potentiometer — Attenuator potentiometer (R1)	1.70
3975	Coil—R. F. oscillation coil (L1, L2, L3, L4)	1.38			
3976	Coil—R. F. oscillation coil (L5, L6, L7, L8)	1.38	3988	Post—"Antenna-Ground" binding post	.32
3977	Coil—R. F. oscillation coil (L9, L10, L11, L12)	1.28	3989	Dial—Tuning condenser vernier dial	4.15
			3990	Clip—Spring steel clip	.25
3978	Coil—R. F. oscillation coil (L13, L14)	1.28	6300	Socket—Radiotron socket	.35

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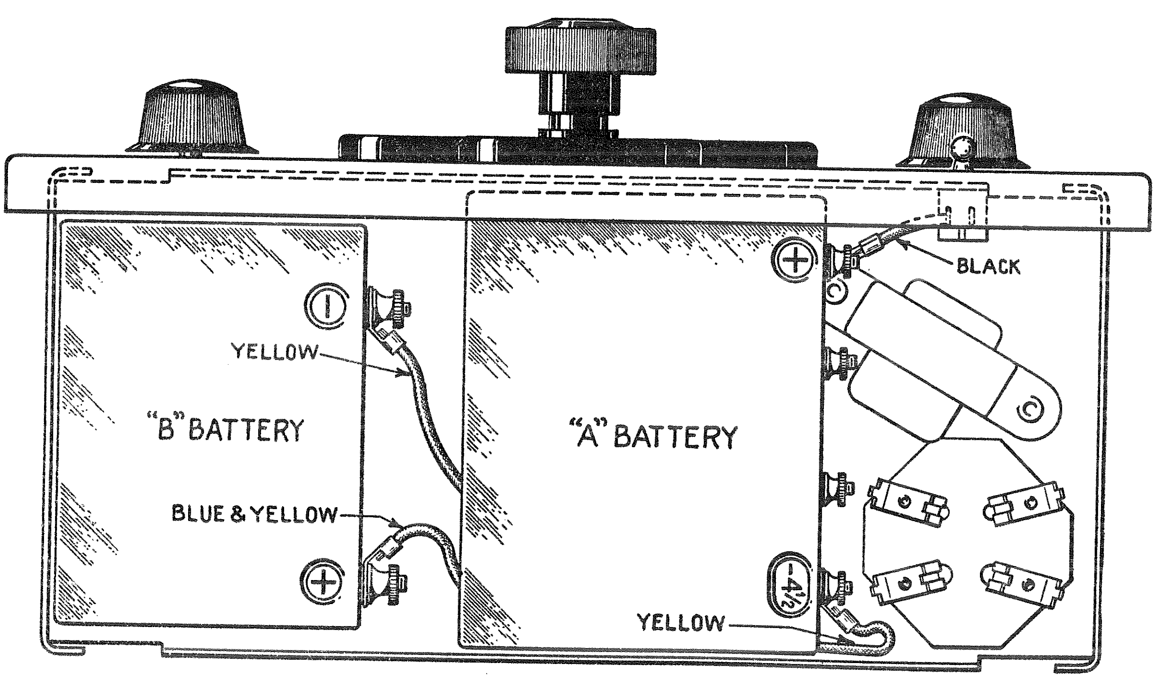

Figure 3—Location of Batteries

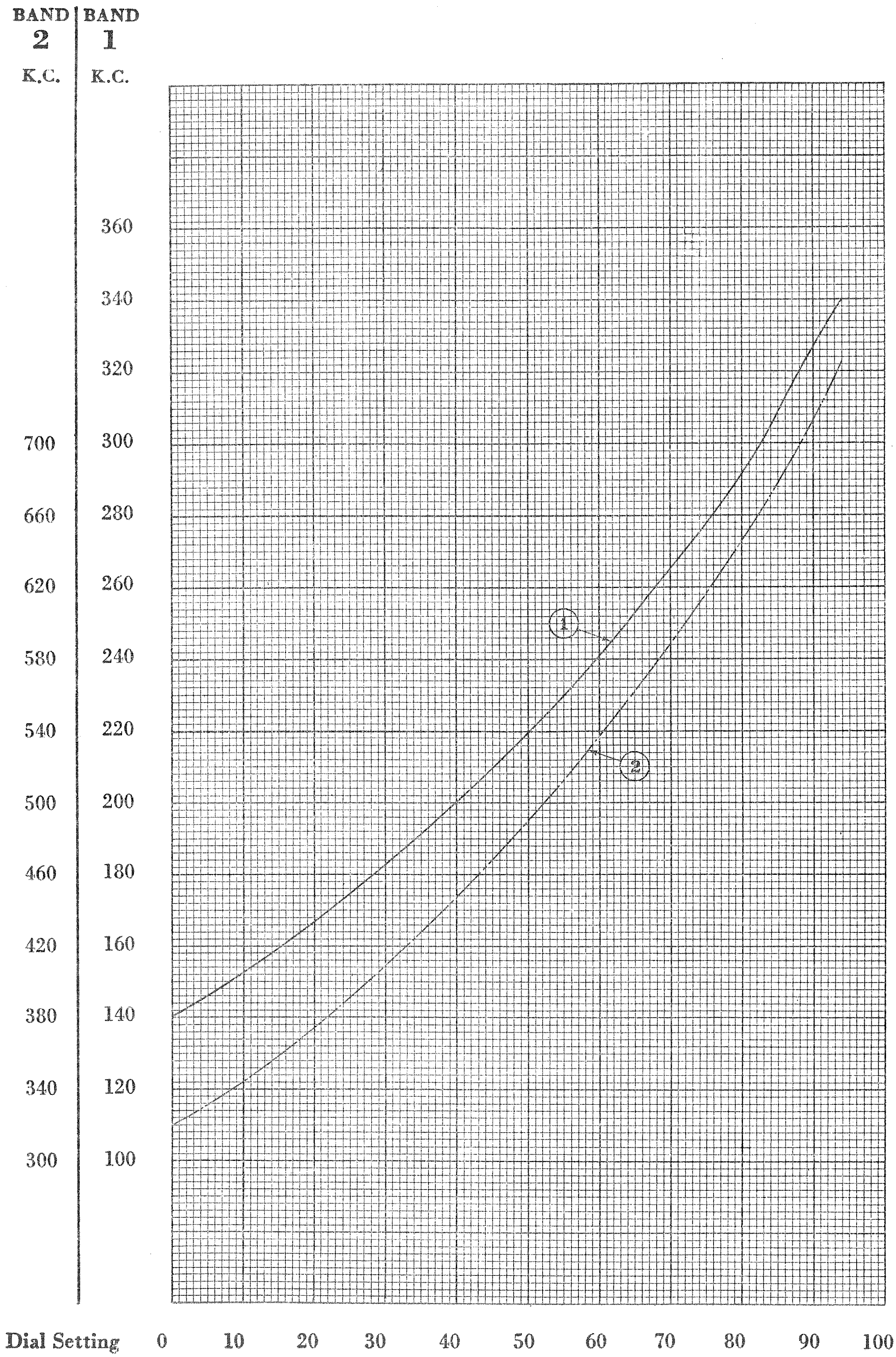

Figure 4—Typical Calibration Curves of Bands 1 and 2

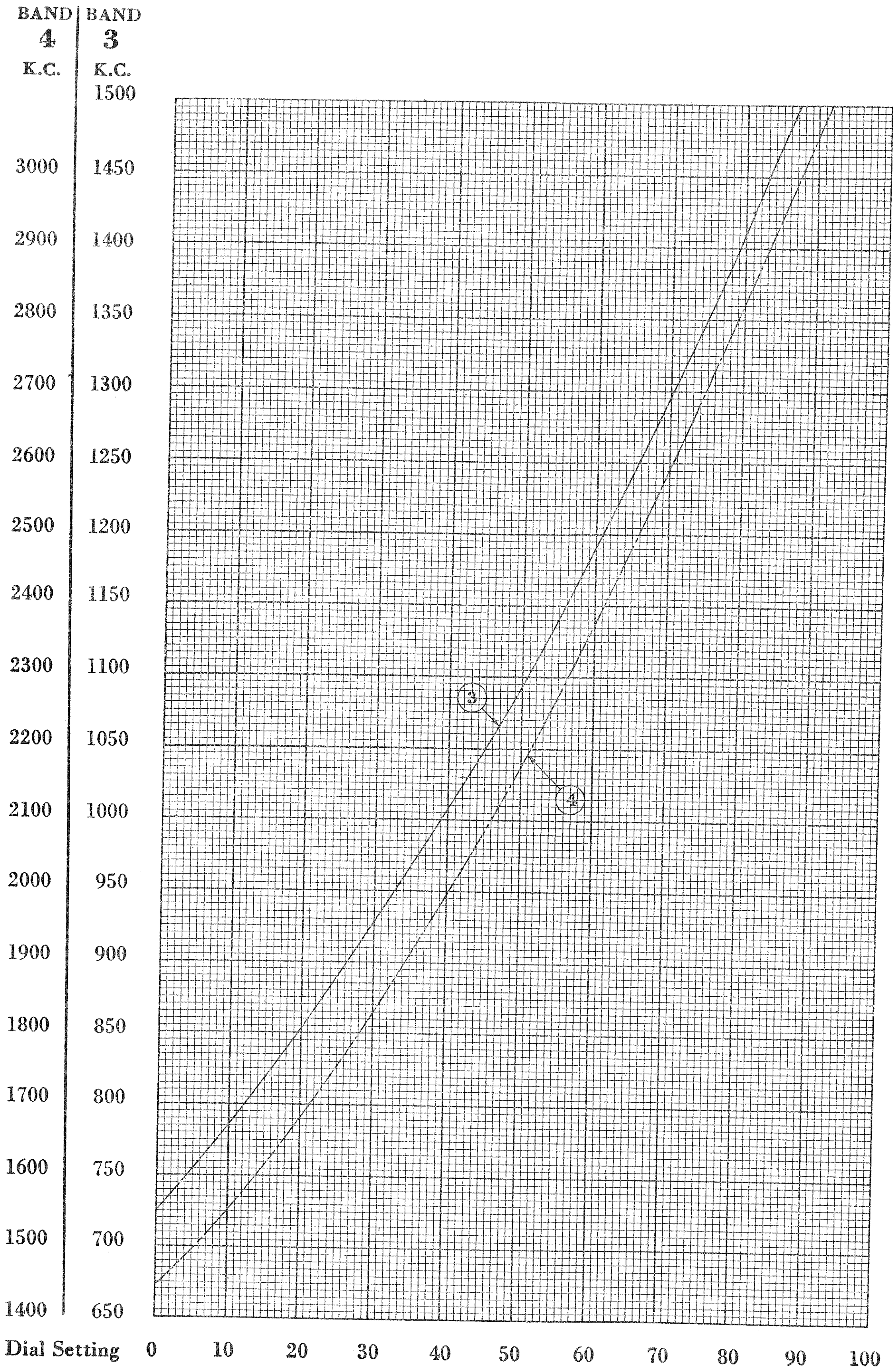

Figure 5—Typical Calibration Curves of Bands 3 and 4

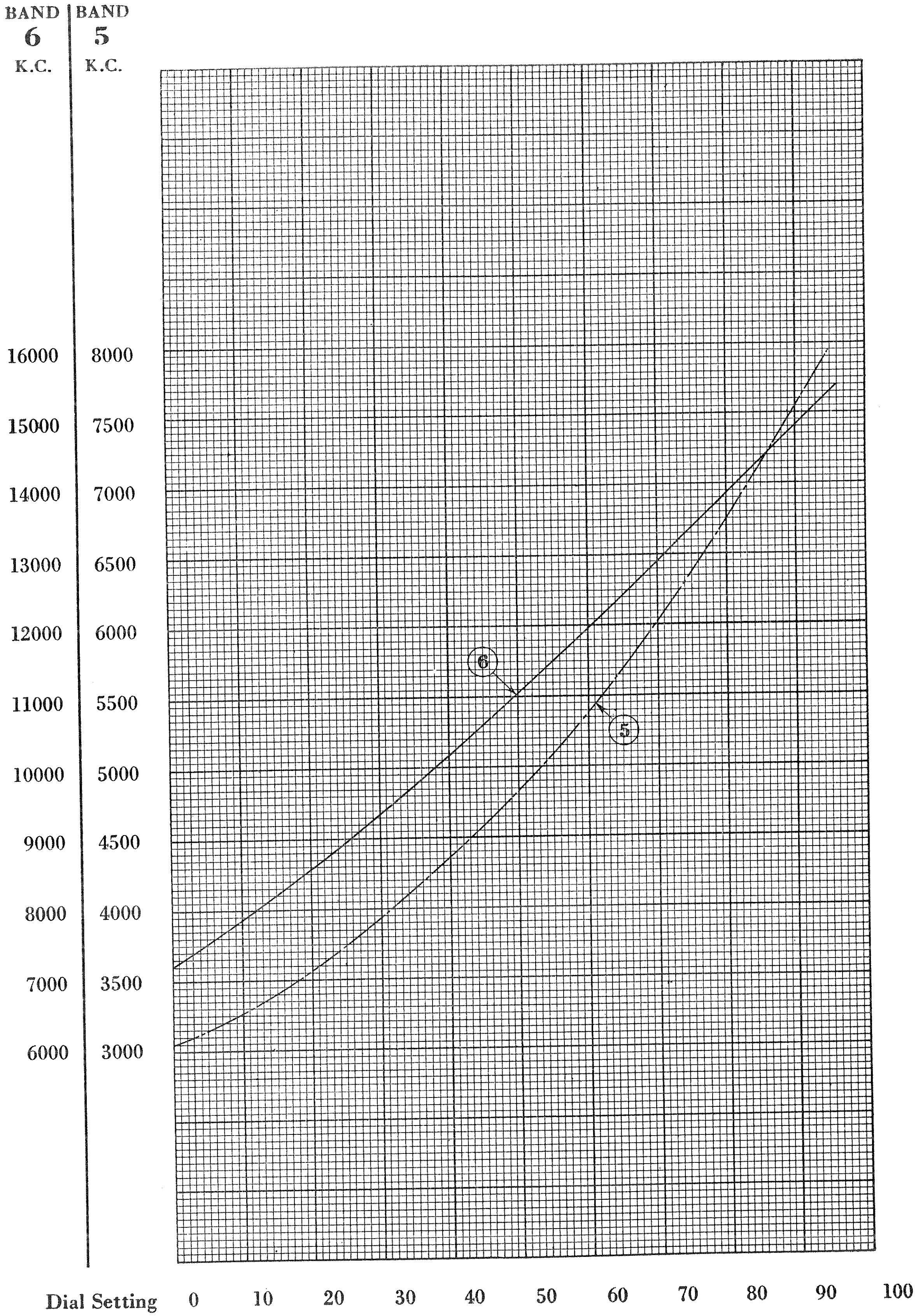

Figure 6—Typical Calibration Curves of Bands 5 and 6

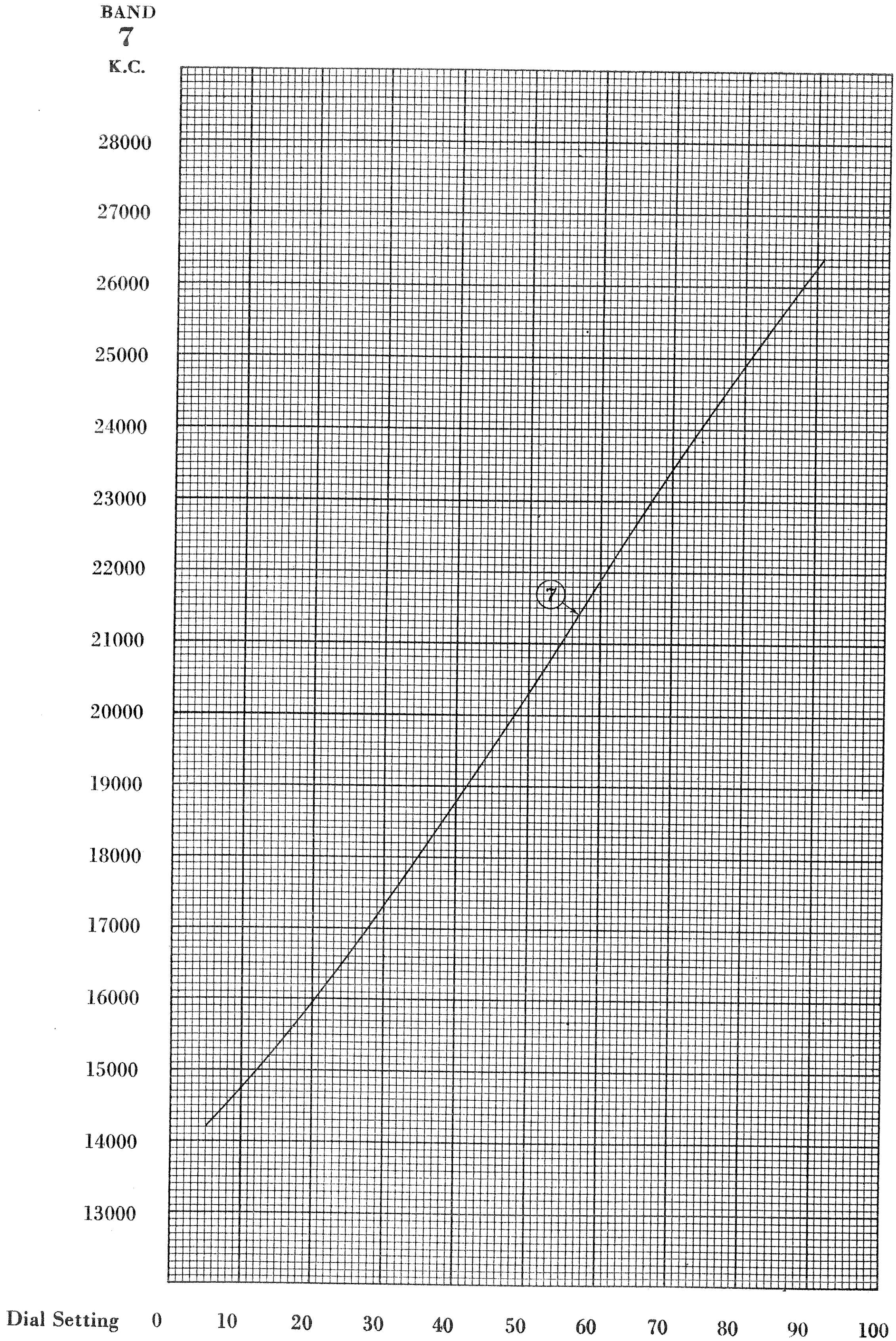

Figure 7—Typical Calibration Curve of Band 7

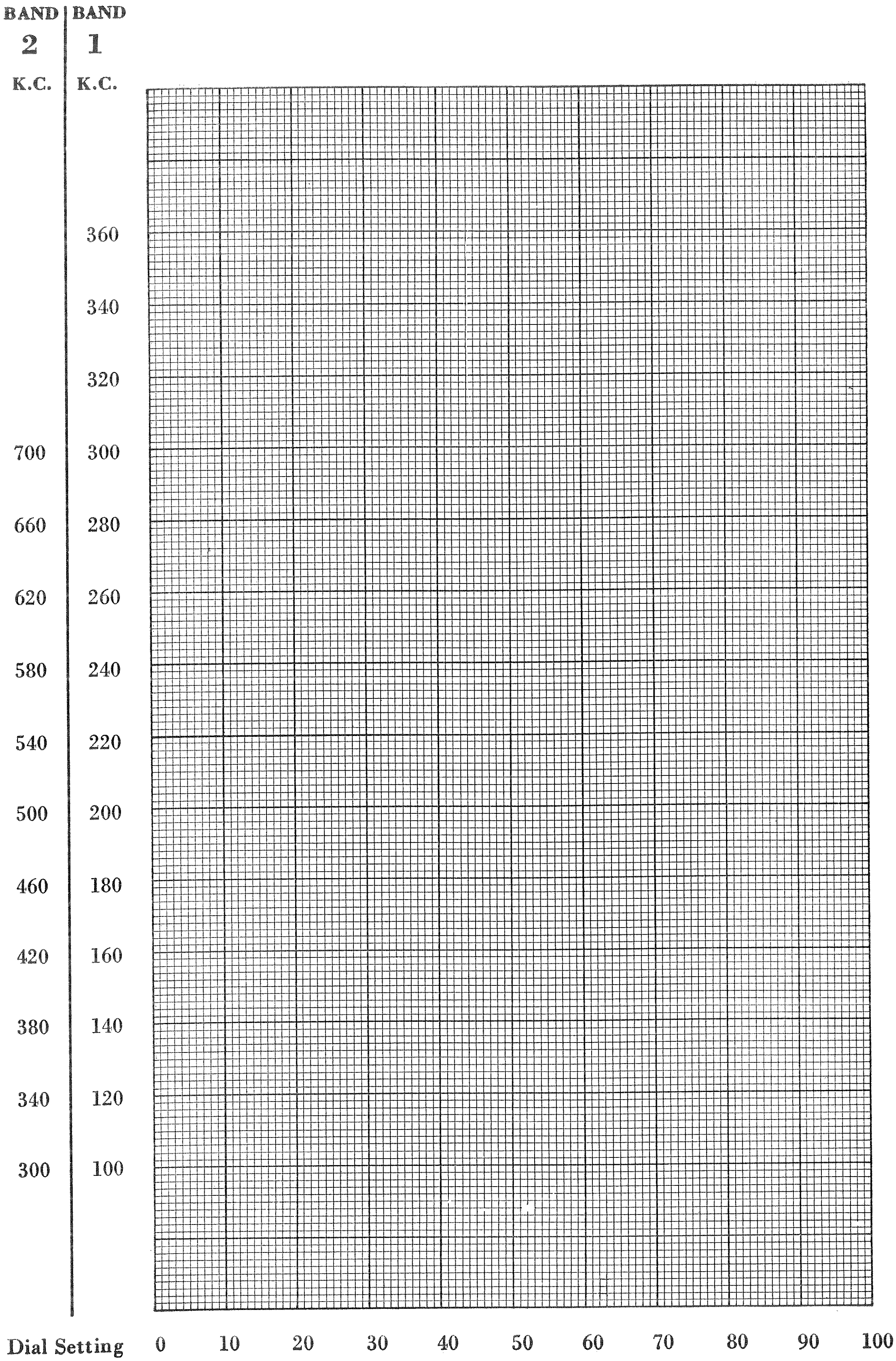

Figure 8—Graph Sheet for Plotting Curves of Bands 1 and 2

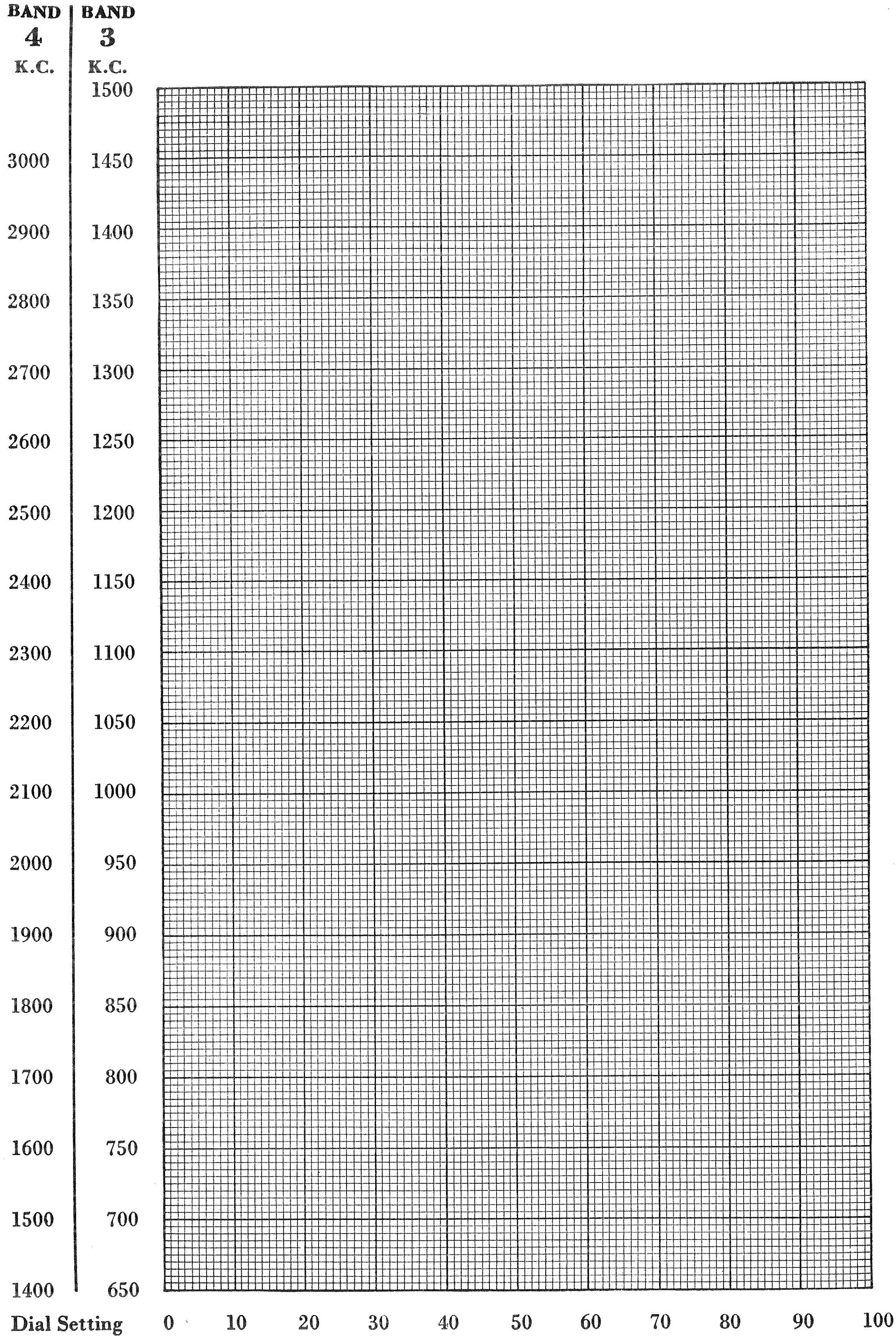

Figure 9—Graph Sheet for Plotting Curves of Bands 3 and 4

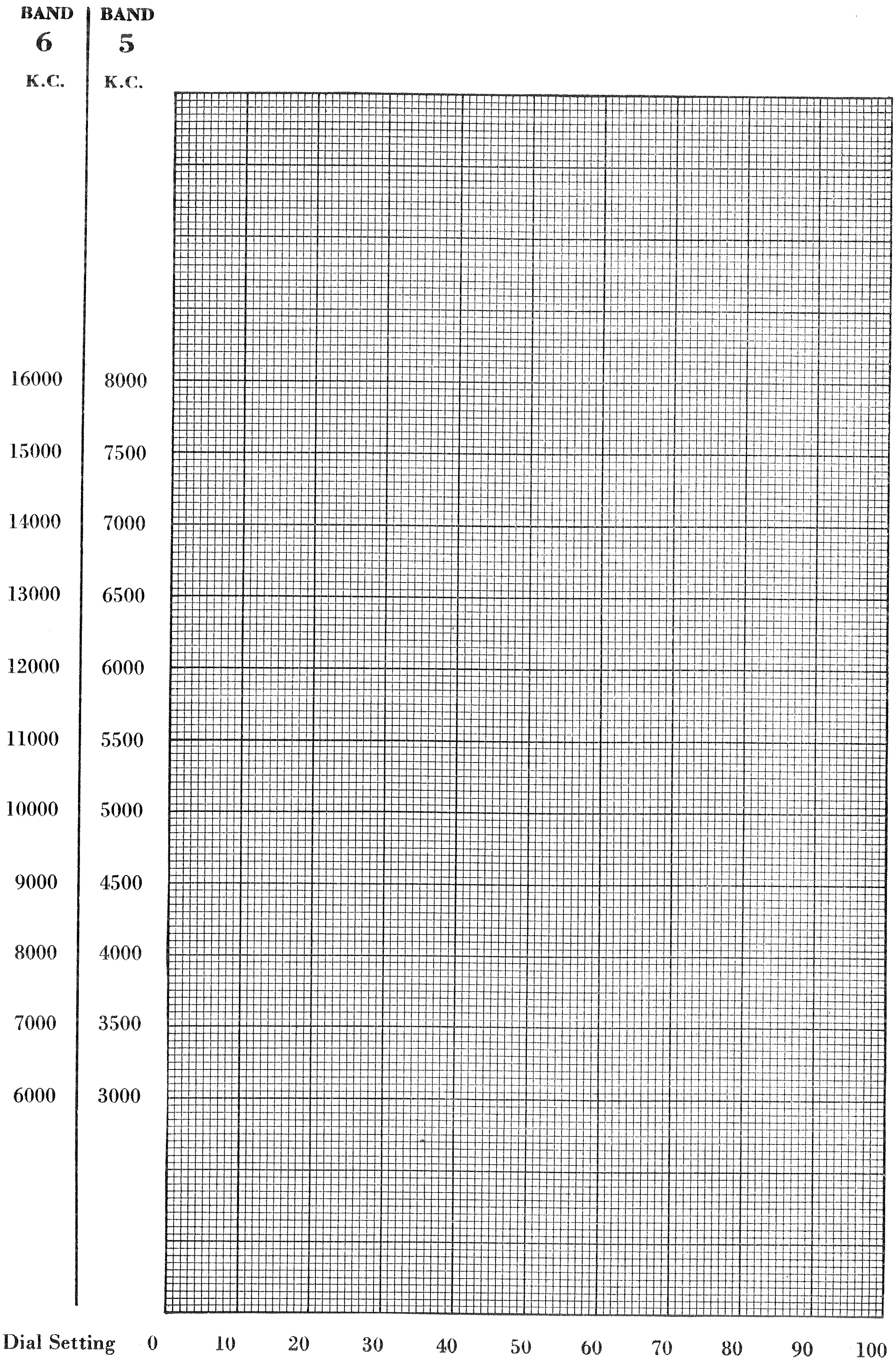

Figure 10—Graph Sheet for Plotting Curves of Bands 5 and 6

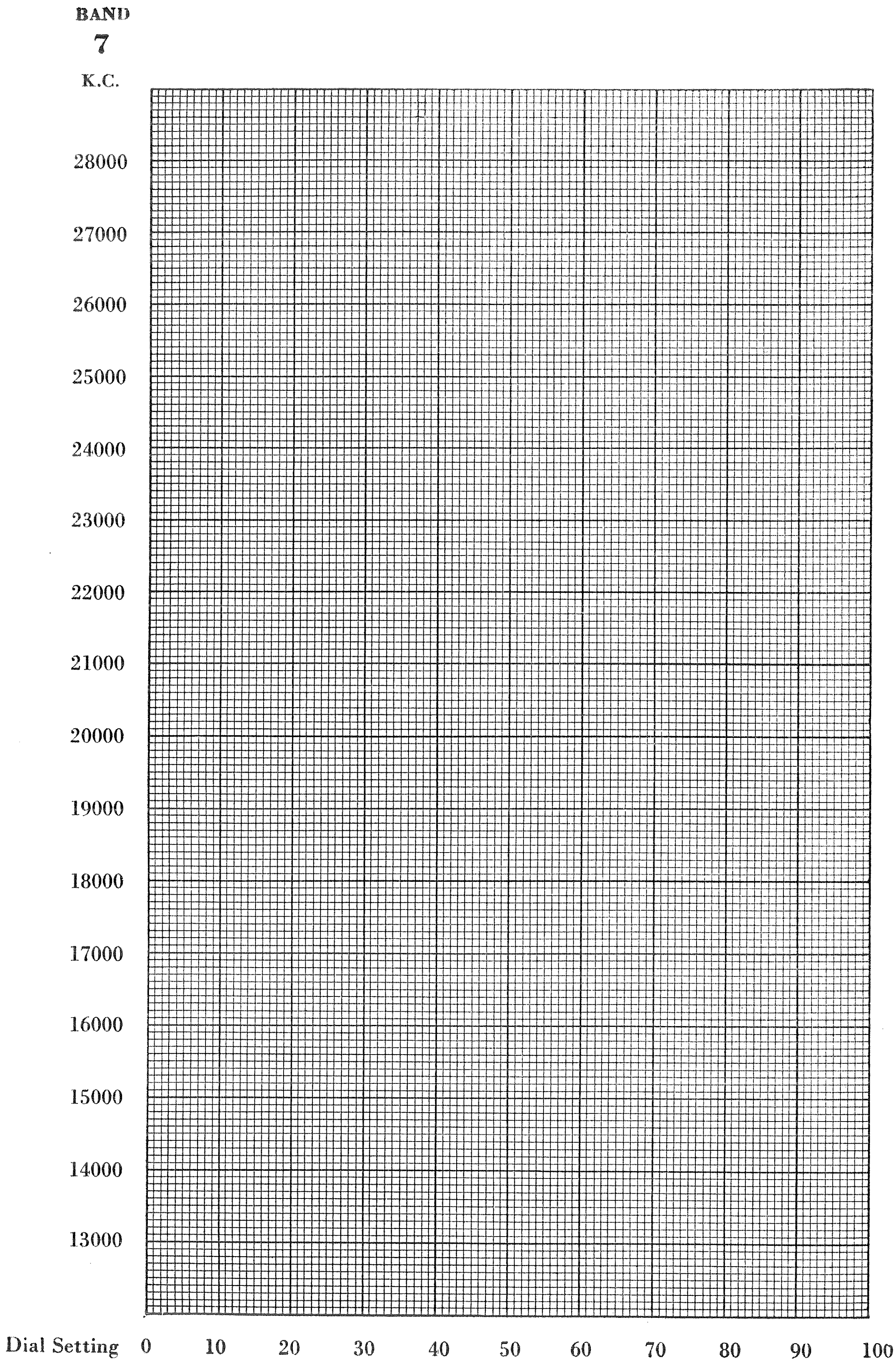

Figure 11—Graph Sheet for Plotting Curves of Band 7

SHORT WAVE BROADCASTING STATIONS

STATION	WAVE LENGTH (Meters)	FREQUENCY (Kilocycles)	STATION LOCATION	POWER (Kilowatts)
POLICE	190	1574	United States (State)	½ (max.)
POLICE	175	1712	United States	½ (max.)
AMATEUR	167–150	1800–2000	Phone	1 (max.)
POLICE	124–120	2412–2506	United States	½ (max.)
AMATEUR	77–75	3900–4000	Phone	1 (max.)
RW15	70.2	4273	Khabarovsk, U. S. S. R.	20
HVJ	50.21	5968	Vatican City	10
RV49	50.0	6000	Moscow, U. S. S. R.	20
VE9DR	49.95	6005	Montreal, Canada	4
DJC	49.83	6020	Berlin, Germany	5
W4XB	49.67	6040	Miami, Fla., U. S. A.	2
GSA	49.59	6050	London, England	20
W3XAU	49.5	6060	Philadelphia, Pa., U. S. A.	1
W8XAL	49.5	6060	Cincinnati, Ohio, U. S. A.	10
VQ7LO	49.5	6060	Nairobi, Kenya, Africa	1
W9XAA	49.34	6080	Chicago, Ill., U. S. A.	½
CP5	49.26	6090	La Paz, Bolivia	1
OXY	49.26	6090	Copenhagen, Denmark	½
VE9GW	49.22	6095	Toronto, Canada	1/5
W9XF	49.18	6100	Chicago, Ill., U. S. A.	5
W3XAL	49.18	6100	New York, N. Y., U. S. A.	35
YV1BC	49.10	6110	Caracas, Venezuela	1/5
ZTJ	49.02	6120	Johannesburg, Africa	5
W2XE	49.02	6120	New York, N. Y., U. S. A.	5
W8XK	48.86	6140	Pittsburgh, Pa., U. S. A.	40
AMATEUR	42.86–41.1	7000–7300	Mostly Code	1 (max.)
HBP	38.48	7797	Geneva, Switzerland	20
CNR	32.26	9300	Rabat, Morocco, Africa	12
GSB	31.55	9510	London, England	20
VK3ME	31.55	9510	Melbourne, Australia	25
OXY	31.51	9520	Copenhagen, Denmark	½
W2XAF	31.48	9530	Schenectady, N. Y., U. S. A.	40
DJA	31.38	9560	Berlin, Germany	5
W1XAZ	31.36	9570	Springfield, Mass., U. S. A.	10
GSC	31.30	9585	London, England	20
VK2ME	31.28	9590	Sydney, Australia	12
W3XAU	31.28	9590	Philadelphia, Pa., U. S. A.	1
HBL	31.26	9595	Geneva, Switzerland	20
XETE	31.25	9600	Mexico City, Mexico	1
EAQ	30.43	9855	Madrid, Spain	20
FYA	25.64	11700	Paris, France	12
VE9JR	25.62	11710	Winnipeg, Canada	2
GSD	25.53	11750	London, England	20
DJD	25.51	11760	Berlin, Germany	5
12RO	25.4	11810	Rome, Italy	9
W2XE	25.36	11830	New York, N. Y., U. S. A.	5
GSE	25.29	11865	London, England	20
W8XK	25.27	11870	Pittsburgh, Pa., U. S. A.	40
FYA	25.21	11900	Paris, France	12
CNR	23.38	12830	Rabat, Morocco, Africa	12
AMATEUR	21.2–21.1	14150–14250	Phone	1 (max.)
HVJ	19.84	15120	Vatican City	10
GSF	19.82	15140	London, England	15
DJB	19.74	15200	Berlin, Germany	5
W8XK	19.72	15210	Pittsburgh, Pa., U. S. A.	40
FYA	19.68	15240	Paris, France	12
W2XE	19.64	15270	New York, N. Y., U. S. A.	5
W2XAD	19.57	15330	Schenectady, N. Y., U. S. A.	25
GSG	16.88	17770	London, England	15
PHI	16.88	17775	Huizen, Holland	20
W3XAL	16.87	17780	New York, N. Y., U. S. A.	35

MEDIUM WAVE STATIONS

U. S. A., Canada and Mexico

STATION	WAVE LENGTH (Meters)	FREQUENCY (Kilocycles)	STATION LOCATION	POWER (Watts)
CKLW	555.2	540	Windsor, Ont.	5000
WGR	545.1	550	Buffalo, N. Y.	1000
WQAM	535.4	560	Miami, Fla.	1000
WWNC	526.0	570	Asheville, N. C.	1000
XEPN	516.9	580	Piedras Negras, Coah.	75000
CMW	508.2	590	Havana, Cuba	1400
KFSD	499.7	600	San Diego, Cal.	1000
WDAF	491.5	610	Kansas City, Mo.	1000
WTMJ	483.6	620	Milwaukee, Wis.	1000
XFG	475.9	630	Mexico City, D. F.	2000
KFI	468.5	640	Los Angeles, Cal.	50000
WSM	461.3	650	Nashville, Tenn.	50000
WEAF	454.3	660	New York, N. Y.	50000
WMAQ	447.5	670	Chicago, Ill.	5000
KPO	440.9	680	San Francisco, Cal.	50000
CFRB	434.5	690	Toronto, Ont.	10000
WLW	428.3	700	Cincinnati, O.	50000
WOR	422.3	710	Newark, N. J.	5000
WGN	416.4	720	Chicago, Ill.	25000
XER	410.7	730	Villa Acuna, Coah.	150000
WSB	405.2	740	Atlanta, Ga.	50000
WJR	399.8	750	Detroit, Mich.	10000
WJZ	394.5	760	New York, N. Y.	50000
WBBM	389.4	770	Chicago, Ill.	25000
XEYZ	384.4	780	Mexico City, D. F.	10000
WGY	379.5	790	Schenectady, N. Y.	50000
WBAP	374.8	800	Fort Worth, Tex.	50000
WFAA	374.8	800	Dallas, Tex.	50000
WCCO	370.2	810	Minneapolis, Minn.	50000
WHAS	365.6	820	Louisville, Ky.	25000
KOA	361.2	830	Denver, Colo.	12500
CMC	356.9	840	Havana, Cuba	500
WWL	352.7	850	New Orleans, La.	10000
WABC	348.6	860	New York, N. Y.	50000
WENR	344.6	870	Chicago, Ill.	50000
WLS	344.6	870	Chicago, Ill.	50000
KLX	340.7	880	Oakland, Cal.	1000
CMX	336.9	890	Havana, Cuba	1000
WLBL	333.1	900	Stevens Point, Wis.	2500
CKY	329.6	910	Winnipeg, Man.	5000
WWJ	325.9	920	Detroit, Mich.	1000
KMA	322.4	930	Shenandoah, Iowa	500
KOIN	319.0	940	Portland, Ore.	1000
KMBC	315.6	950	Kansas City, Mo.	1000
CRCT	312.3	960	Toronto, Ont.	5000
KJR	309.1	970	Seattle, Wash.	5000
KDKA	303.9	980	Pittsburgh, Pa.	50000
WBZ	302.8	990	Springfield, Mass.	25000
WOC	299.8	1000	Des Moines, Ia.	50000
KQW	296.9	1010	San Jose, Cal.	500
KYW	293.9	1020	Chicago, Ill.	10000
CFCN	291.1	1030	Calgary, Alta.	10000
KTHS	288.3	1040	Hot Springs, Ark.	10000
KNX	285.5	1050	Hollywood, Cal.	25000
WTIC	282.8	1060	Hartford, Conn.	50000
WTAM	280.2	1070	Cleveland, O.	50000
WBT	277.6	1080	Charlotte, N. C.	25000
KMOX	275.1	1090	St. Louis, Mo.	50000
WPG	272.6	1100	Atlantic City, N. J.	5000
WRVA	270.1	1110	Richmond, Va.	5000
KTRH	267.7	1120	Houston, Tex.	1000
KSL	265.3	1130	Salt Lake City, U.	50000
WAPI	263.0	1140	Birmingham, Ala.	5000
WHAM	260.7	1150	Rochester, N. Y.	25000

Medium Wave Stations—U. S. A., Canada and Mexico (Continued)

STATION	WAVE LENGTH (Meters)	FREQUENCY (Kilocycles)	STATION LOCATION	POWER (Watts)
WOWO	258.5	1160	Fort Wayne, Ind.	10000
WCAU	256.3	1170	Philadelphia, Pa.	50000
KOB	254.1	1180	Albuquerque, N. M.	10000
WOAI	252.0	1190	San Antonio, Tex.	50000
WIBX	249.9	1200	Utica, N. Y.	100
WBAX	247.8	1210	Wilkes-Barre, Pa.	100
WCAE	245.8	1220	Pittsburgh, Pa.	1000
KYA	243.8	1230	San Francisco, Cal.	1000
WXYZ	241.8	1240	Detroit, Mich.	1000
WAAM	239.9	1250	Newark, N. J.	1000
KUOA	238.0	1260	Fayetteville, Ark.	1000
WFBR	236.1	1270	Baltimore, Md.	500
WCAM	234.2	1280	Camden, N. J.	500
KTSA	232.4	1290	San Antonio, Tex.	1000
WHAZ	230.6	1300	Troy, N. Y.	500
WHAT	228.9	1310	Philadelphia, Pa.	100
WSMB	227.1	1320	New Orleans, La.	500
WDRC	225.4	1330	Hartford, Conn.	1000
WSPD	223.7	1340	Toledo, Ohio	1000
KWK	222.1	1350	St. Louis, Mo.	1000
WFBL	220.4	1360	Syracuse, N. Y.	1000
WDAS	218.8	1370	Philadelphia, Pa.	100
WSMK	217.3	1380	Dayton, O.	200
KOY	215.7	1390	Phoenix, Arizona	500
WLTH	214.2	1400	Brooklyn, N. Y.	500
WSFA	212.6	1410	Montgomery, Ala.	500
WMAS	211.1	1420	Springfield, Mass.	100
WHP	209.7	1430	Harrisburg, Pa.	500
KXYZ	208.2	1440	Houston, Tex.	250
WHOM	206.8	1450	Jersey City, N. J.	250
KSTP	205.4	1460	St. Paul, Minn.	25000
KGA	204.0	1470	Spokane, Wash.	5000
KOMA	202.6	1480	Oklahoma City, Okla.	5000
WCKY	201.2	1490	Covington, Ky.	5000
WWRL	199.9	1500	Woodside, N. Y.	100

MEDIUM AND LONG WAVE STATIONS

Europe

STATION LOCATION	WAVE LENGTH (Meters)	FREQUENCY (Kilocycles)	POWER (Watts)
Huizen, Holland	1875	160	8500
Radio, Paris	1725	174	75000
Berlin, Germany	1635	183.5	60000
Daventry National	1554.4	193	30000
Warsaw I, Poland	1412	212.5	120000
Luxembourg	1190	252	200000
Oslo, Norway	1083	277	60000
Budapest No. 1, Lakihegy (Hungary)	550	545	18500
Florence, iFI, Italy	500.8	599	20000
Prague (Czechoslovakia)	488.6	614	120000
North Regional (Manchester) England	480	625	50000
Langenberg, (Germany)	472.4	635	60000
Beromunster (Schweizerischer Landessender) (Switzerland)	459.4	653	60000
Rome, IRO	441.2	680	50000
Moscow, Russia	424.3	707	100000
Katowitz (Poland)	408.7	734	16000
Toulouse (Radiophonie di Midi) (France)	385.1	779	8000
London Regional (Brookmans Park)	355.9	843	50000
Poste Parisien (France)	328.2	914	60000
Hilversum (Holland)	296.1	1013	20000
Heilsberg (Germany)	276.5	1085	60000
London National and West National	261.5	1147	50000
Toulouse, PTT (France)	255.1	1176	700
Nurnberg (Germany)	238.9	1256	2000