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ECONOMIC INTELLIGENCE REPORT

SOVIET BLOC PRODUCTION OF CIVILIAN RADIO AND TELEVISION RECEIVERS

CIA/RR 11

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SECURITY INFORMATION

SOVIET BLOC PRODUCTION OF CIVILIAN RADIO AND TELEVISION RECEIVERS*

Summary

Soviet Bloc production of civilian radio and television receivers has increased heavily since the end of World War II, being estimated at $12 million in 1946 and at $37 million in 1951. There is strong evidence to indicate that the Soviet Bloc governments wish to exploit mass communications to their fullest extent. Military commitments, however, restrict the production of civilian radio equipment to minimum levels.

In 1951 it is estimated that 1,650,000 civilian radio receivers were manufactured in the Soviet Bloc, including 450,000 crystal receivers and 550,000 small receivers without short-wave bands. In the USSR alone, 962,000 civilian receivers were produced, including the 450,000 crystal sets and also 450,000 small receivers without short-wave bands. Most of these radios were produced at 19 assembly plants, of which 10 are in the USSR, 4 in East Germany, 2 in Czechoslovakia, 1 in Hungary, 1 in Bulgaria, and 1 in Rumania.

During 1951 it is estimated that 39,000 television receivers were manufactured in the Soviet Bloc -- in East Germany and the USSR -- all for sale in the USSR. These television receivers were produced in one East German and two Soviet factories.

As of 1 January 1952, approximately 5 million civilian radio receivers capable of receiving short-wave broadcasts were in use in the Soviet Bloc, plus another 3.5 million radios without short-wave bands, including crystal sets. Of these, 1.3 million short-wave sets and 2 million receivers without short-wave bands, including crystal sets, were in use in the USSR. In addition, approximately 41,000 television receivers were in use in the USSR.

Despite a considerable expansion of the Soviet Bloc electronics industry, especially since 1948, the percentage of industry effort devoted to the manufacture of civilian radio and television receivers remained low, being estimated for 1951 to be 10 percent for the Soviet Bloc as a whole and 4 percent for the Soviet industry alone.

* This report contains information available to CIA as of 1 April 1952.

It is concluded that the Soviet electronics industry continues to be engaged predominately in military work, at the expense of civilian products; that there is no indication of a changing trend in this situation; and that the number of radio sets capable of receiving foreign shortwave broadcasts is extremely limited, especially within the USSR.

I. Introduction.

A. Statement of the Problem.

1. Various estimates of Soviet Bloc production of civilian radio receivers have been prepared in the past, largely based upon plan figures and published statistics. This report reviews these estimates, correlates the reported substantive data with spot reports on the operations of industrial facilities, and attempts to expand the data by providing an estimate of production broken down by type and class of receiver.

2. It is intended that this report serve three purposes: (a) provide a consolidated reference for intelligence consumers of available data on Soviet Bloc radio and television receivers, including quantities produced, descriptions of sets, and information on the principal manufacturing plants; (b) extend the scope of required information in support of policies and procedures related to international broadcasting; and (c) provide an indication of the relative amount of effort devoted by the Soviet Bloc electronics industry to civilian products.

B. Definition of Product Category.

1. The products covered in this report are civilian radio receivers intended for the reception of radio broadcasts and civilian television receivers intended for the reception of television broadcasts. This report does not consider industrial communications receivers, military radios, or related apparatus.

2. Most of the receivers discussed are distributed to individual civilian purchasers, to institutions, to public places, and to wired-radio receiving points.

C. General Description of the Soviet Bloc Electronics Industry.

1. For all practical purposes, the Soviet Bloc electronics industry is concentrated in the USSR, East Germany, Hungary, and Czechoslovakia. These industries are organized on a broad base to produce a wide variety of electronic apparatus for military, industry, and civilian uses; telecommunications equipment for both military and civilian application; and all necessary electronic components and tubes. To a certain extent, these industries are dependent upon imports from the West of specialized raw and semifabricated production materials and test equipment. The Soviet Bloc electronics industry is comparable in size to that of all Western Europe, excluding the UK.

2. In the USSR, East Germany, Hungary, and Czechoslovakia the industry effort devoted to the manufacture of civilian radio and television receivers is a relatively small portion of the total electronics industrial program.

3. A much smaller quantity of simple electronic apparatus, including civilian and military radios, is assembled in other Soviet Bloc countries. In general, these operations are limited by the lack of technological capacities and by the need for importing nearly all tubes and component parts.

D. Production of Civilian Radio Receivers.

1. In general, the production of civilian radio receivers for consumer use is a relatively simple undertaking. Given the supply of tubes and components, it is possible to produce large numbers of these sets of varying degrees of complexity and quality with little or no capital equipment and a minimum of skilled labor. In the Soviet Bloc there is ample capacity and skill for the production of these sets on almost any scale desired. However, the limited supply of tubes and components engendered by the emphasis on military electronics production has made large-scale production of radios for civilians, as it is known in the US, impossible for the Bloc.

2. Communist policymakers, nevertheless, realizing the value to the regime of the effective mass communication medium of radio, have concentrated available resources on the production in larger quantities of smaller, less complex sets. Thus the production of sets with four or fewer tubes has become very common in the Soviet Bloc, and even simple crystal sets are being produced in large numbers in the USSR.

3. The extreme of this trend is found in the wired-radio networks, which comprise many loudspeakers connected to a central radio receiver and able to serve a large number of households. In this way it is possible for the Soviet Bloc to increase its domestic listening audience and at the same time to avoid excessive demands on its tube and component supplying industries.

4. The Soviet Bloc produces radios in a large number of sizes. There are about 20 plants in the Bloc as a whole which have quantity output of radios, and there are many more which produce only a small number as a sideline. (A tabulation of types of Soviet Bloc radio receivers is given in Table 4, Appendix A.)

5. In the Soviet Bloc, East Germany and Hungary are perhaps the countries with the most experience in this production, since they were large prewar producers and exporters of radios. The USSR had begun its radio production well before World War II, but it was never an exporter, and the number of sets produced was very low. Since the war the efforts of the Soviets to boost production have been relatively successful.

6. Before the war, there were in Czechoslovakia German- and Dutch-owned plants which produced radios according to the German and Dutch designs. These plants were incorporated into the Tesla combine after the Communists gained power in Czechoslovakia, and although production of radios is still on a fairly large scale, there are indications that production of radios fluctuates widely as military needs vary.

E. Production of Civilian Television Receivers.

1. At the present time, television manufacturing is carried on in the USSR and in East Germany. Hungary has the technical capability for such production, but no television receivers are actually made there. The sets produced in East Germany are all sent to the USSR, and that country is the only one in the Bloc enjoying the use of television. (A tabulation of types of Soviet Bloc television receivers is given in Table 5, Appendix A.)

2. The production of television receivers in the USSR and in East Germany is on a limited basis. The principal reasons for any production at all are the propaganda value of being able to point to this production as a great Soviet achievement and the experience and training which such production provides for engineers, technicians, and repair men. Because of the similarity of techniques employed, this training is invaluable in the establishment of a corps of personnel able to design, build,

and maintain military electronic equipment.

3. There is little chance that the production of television sets for civilian use will be vastly increased, because of the very large drains such production would make on the tube and component facilities of the Soviet Bloc, which are, as has been pointed out, already overloaded.

II. Summary of 1946-51 Production of Civilian Radio and Television Receivers.

A. Radio Receivers.

1. Tables 1 and 2* show the production of civilian radio receivers in various combinations of country, year, class, and type according to available data. The class designations in these tables are, in the case of Soviet radios, official Soviet designations indicating the quality and complexity of the particular radios. First-class receivers are superheterodynes of good quality having complete long-, medium-, and short-wave coverage and usually having six or more tubes. Second-class receivers are five-, six-, or seven-tube superheterodynes with four or five broadcast bands and either one or no short-wave bands. Fourth-class receivers are TRF (tuned radio frequency) sets -- two- and three-tube superheterodynes, one-tube sets, and crystal sets -- and usually have only broadcast band coverage. These designations have been applied to the receivers of other countries by this report in order to facilitate comparison of these sets and Soviet sets. It should be recognized that the designations as applied to Satellite sets are approximations and are not necessarily used by the countries in question.

2. Table 1 gives an approximation of the production of various individual radio receivers in the USSR for the year 1949. From this table it is possible to get an idea of the breakdown of short-wave and non-short-wave sets in the USSR.

3. Table 2 gives data on the production of civilian radio receivers by year and country and by short-wave receiving capability.

4. The 1951 production of civilian radio receivers for the Soviet Bloc as a whole was, therefore, 1,654,000 sets, 648,000 of which had short-wave bands and 1,006,000 of which had no short-wave bands. Total production for the years 1946-51 was about 6,488,000 sets, of which 3,963,000 had short-wave bands and 2,525,000 of which had no short-wave bands.

* Table 1 follows on p. 6; Table 2, on p. 7.

Table 1

Estimated Annual Production in the USSR of Major Radio Receivers by Type
1949

Class	Type	Characteristics	Manufacturer a/	Units
1	Radiotekhnika	9 tubes b/	Radiotekhnika	2,400
1	T-689	9 tubes, 3 SW c/	Radiotekhnika	10,000
1	Beloruss	13 tubes, 4 SW	Molotov	4,800
1	Leningrad	12 tubes, 3 SW	Kazitskiy	11,000
1	Neva	9 tubes, 3 SW	Leningrad	8,000
1	PTS-47	4 SW b/	Unknown	2,000
2	Baku	6 tubes, 2 SW	Baku	3,000
2	Rodina	6 and 7 tubes, 1 SW, battery	Several manufacturers	110,000
2	Minsk	2 SW b/	Molotov	30,000
2	T-755	5 tubes, 1 SW	Radiotekhnika	25,000
2	Ural	10 tubes, 1 SW	Ordzhonikidze	15,000
2	VEF	6 tubes, 1 SW	VEF	8,000
2	Vostok	1 SW b/	Lenin	10,000
2	VV-662	6 tubes, 4 bands (including 1 SW)	Punane Ret	5,000
3	Rekord	5 tubes, 1 SW	ARZ	150,000
3	Pioner	3 tubes b/	Minsk	10,000
3	Leningradets	no SW b/	Kazitskiy	7,000
4	Moskvich	4 tubes, no SW	Order of Lenin	8,000
4	ARZ	3 tubes, no SW	ARZ	60,000

a. For full factory names, see Appendix B.
b. No other information available.
c. SW indicates short-wave bands.

5. The estimates of Soviet production in Table 2 were obtained primarily from the Soviet press. An estimate of Soviet production for 1949 obtained by adding together individual plant totals is in very close agreement with the total for 1949 in Table 2.

6. Crystal set production, which began in large quantity in 1948 and 1949, is estimated at 177,000 sets for 1948 and at 230,000 sets for 1949. These estimates were obtained by comparing total set production estimated

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Table 2

Estimated Production of Civilian Radio Receivers in the Soviet Bloc
1946-51

Thousand Units

Country	1946		1947		1948		1949		1950		1951 c/	
	SW a/*	Non-SW b/	SW	Non-SW	SW	Non-SW	SW	Non-SW	SW	Non-SW	SW	Non-SW
USSR d/												
Tubes	237	# e/	335	#	391	31	400	90	75	416	62	450
Crystals	#	#	#	#	#	177	#	230	#	409	#	450
Total	237	#	335	#	391	208	400	320	75	825	62	900
Czechoslovakia	75	#	163	#	267	#	275	#	200	#	150-180	#
Hungary	4	7	5	10	6	18	13	38	25	75	28-54	83
Poland	#	#	#	#	1	#	2	#	3	#	4	#
Rumania	8	#	9	#	10	#	#	20	6	18	8	23
Bulgaria	#	#	#	#	#	#	#	#	#	#	75-162	#
East Germany f/	60	#	100	#	150	#	220	#	275	#	321-513	#
Total	384	7	612	10	825	226	910	358	584	918	648	1,006

* Footnotes for Table 2 follow on p. 8.

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Table 2

Estimated Production of Civilian Radio Receivers in the Soviet Bloc
1946-51
(Continued)

a. SW indicates receivers with one or more short-wave bands; hence the capability of receiving the Voice of America (VOA).
b. Non-SW indicates that the sets have no short-wave bands. Usually these sets have one or more long-wave bands, but no capability of receiving foreign broadcasts including the VOA.
c. The estimates for 1951 are highly speculative. In particular, there is actual information only for East Germany and Bulgaria, and the information on Bulgaria is dependent on the reliability of the report involving movement of Czechoslovakia production facilities to Bulgaria in 1951.
d. Since crystal sets are a significant part of Soviet total production in recent years, they are included in this table. These sets have no short-wave capabilities. As far as is known, there is no crystal set production in any of the other Soviet Bloc countries.
e. The symbol # in this table denotes a negligible quantity.
f. The total number of civilian receivers produced in East Germany for 1951 is approximately 321,000 units. The breakdown between receivers having short-wave and those not having short-wave for East Germany is arbitrary.

from press releases and factory totals (which include all types of sets) with production of tube sets estimated by examining output data on individual sets.

7. The 1950 Plan called for the production of 925,000 sets. There is evidence that this total was not achieved. This report estimates the number of tube sets for 1950 at 491,000 sets. If production came near the Plan goal for 1950, then the discrepancy can be explained only by the production of about 410,000 crystal sets. There is evidence consistent with this estimate.

8. Thus production of tube sets is substantially lower than a superficial reading of the Plan would indicate, and production of short-wave sets is lower still.

9. Production of tube sets for the Bloc as a whole is estimated for 1951 at 1,204,000 sets. The breakdown of Soviet Bloc production with respect to short-wave receiving capabilities is believed to be 648,000 short-wave sets and 1,006,000 sets with no short-wave capabilities, including crystal sets.

B. Television Receivers.

Production of civilian television receivers in the Soviet Bloc for 1949-51 is given in Table 3.*

II. Trends, Indications, and Conclusions.

A. Trends in Production Levels.

1. Radio Receivers.

Generally speaking, the Soviet Bloc trend in radio receiver production is upward. Both the Satellites and the USSR are increasing their radio output as fast as is compatible with growing military requirements.

However, the number of radio sets is not the only relevant variable indicative of Soviet Bloc capacities and production effort. In addition to the number of sets, the size and complexity of sets must be taken into consideration in evaluating the extent of the production effort, and the proportion of sets with short-wave bands is of obvious significance in the estimation of the capacity of Western broadcasts to reach the Bloc.

* Table 3 follows on p. 10.

Table 3

Estimated Production of Civilian Television Receivers in the Soviet Bloc
1947-51

Units

Country	Manufacturer [a]	Type	1947	1948	1949	1950	1951	1946-51 Total
USSR	Order of Lenin	T-1 [b]	800	2,500	4,200	5,000	3,000	15,500
		KVN-49				3,000	6,000	9,000
	Kazitskiy	T-1 [c]	200	500	800	800		2,300
		T-2 [d]				200	1,000	1,200
Total			1,000	3,000	5,000	9,000	10,000	28,000
East Germany	Sachsenwerk-Radeberg	T-2 [d]	0	0	0	0	29,000	29,000

a. For full factory names, see Appendix B.
b. Moskva T-1 Television Receiver.
c. Leningrad T-1 Television Receiver.
d. Leningrad T-2 Television Receiver.

It is fairly clear that the number of tubes and circuits in sets is declining. An index of this tendency is the large and growing production of crystal sets, which, of course, have no tubes and have only one very simple stage employing the fewest possible number of components.

The trend in the number of short-wave bands is also fairly clear, especially in the USSR: a far larger percentage of radio sets without any short-wave bands is being put out than ever before. The trend is much clearer in the USSR than in the Satellites, especially East Germany, where the types of sets produced are not so discernible.

Thus, although the number of radio sets produced continues to rise, the proportion of resources devoted to civilian radio production does not rise correspondingly.

2. Television Receivers.

Although the Soviet 1946-50 Five Year Plan scheduled the production of civilian television receivers to reach an annual rate of 85,000 sets by 1950, and much publicity has been devoted to the extension of television in the USSR, actual performance fell far short of this goal. Furthermore, there are strong indications that recent domestic production has not been expanded over the 1950 level but rather may have been curtailed in favor of imports from East Germany. It is believed that this situation will continue, that the primary source for Soviet television receivers will be the East German industry, and that the Soviet facilities will be too heavily engaged in military work to permit any extensive output of civilian television sets. In addition to the stations presently operating at Moscow and Leningrad, the Kiev television station was scheduled to operate full time in May or June 1952. There is a small transmitter in operation at Khar'kov, and transmitting equipment is under construction for Sverdlovsk and, possibly, for Odessa. It appears most probable that the demand for television receivers will continue to outstrip the supply for several years.

In East Germany the production of television receivers can be expected to be high for the next few years. It is probable that the estimate of 50,000 receivers in 1952 can be realized and that some increase over this figure can be obtained, especially if reported plans for expanding the East German tube industry are implemented. In any case, the capability of East Germany to supply television sets in quantity will be limited primarily by tube availability, and the effect upon other East German electronics programs may become serious. Although some work has been done on television broadcasting and an East German experimental television transmitter was completed late in 1951, it is probable that the priority assigned

to Soviet demands will limit television in East Germany to a very low level of operation, primarily for propaganda.

Television progress in the Satellite countries has been limited to a small amount of experimental effort; occasional closed-circuit demonstrations in Czechoslovakia, Poland, and Hungary; and plans for 1954 and 1955. No evidence exists of any 1952 program for the production of television receivers. It is possible that television broadcasting and public distribution of receivers on a limited basis may be established in some of these areas by 1954. The capacity to accomplish such a program certainly exists, especially at the United Incandescent Lamp Company (UILCO "Tungsram") in Hungary and at Tesla in Czechoslovakia. Actual initiation of production will be a matter of Soviet Bloc policy.

B. Proportion of Industry Effort Devoted to the Production of Receivers.

1. Proportion of Tube Production Effort.

a. The total Soviet Bloc tube production for 1951 is valued at $52 million. The average number of tubes per radio in the 1951 Bloc production is six for Classes 1 through 3 and three and a half for Class 4 sets. This makes the total number of tubes used in 1951 radio production 648,000 x 6 plus 556,000 x 3.5, or 3,888,000 plus 1,946,000, or 5,834,000 tubes.

b. Television tube use in 1951 is estimated as follows: 30,000 T-2 sets with 32 tubes per set plus 9,000 non-T-2's with 20 tubes per set equals 1,140,000 tubes. There are also 20,000 picture tubes.

c. The combined number of radio and television receiving tubes (not counting picture tubes) is 6,974,000 receiving tubes. At an average of $0.54 per tube, this represents an aggregate value of $3,766,000. The $800,000 value of the picture tubes brings the total to $4,566,000.

d. If it is assumed that 25 percent of the total tube production of the Soviet Bloc is used for replacement purposes, a total tube production value of $39 million may be compared with the value of tubes used in receivers.

e. The result is that approximately 11.7 percent of the total tube production for new sets is represented by television and radio receivers.

2. Proportion of Total Electronics Production Effort.

a. The total value of Soviet Bloc electronics output is $420 million. The total value of radio set output, at an average of $15 per set for Class 4 sets, and $30 per set for sets in Classes 1 to 3, comes to approximately $8,340,000 plus $19,440,000, or $27,780,000.

b. The total value of television set production, assuming an average price of $200 per set, is $7.8 million.

c. Crystal set production may total as much as 450,000 sets in 1951. At $4 per set this is an additional $1.8 million.

d. The total value of receiver production is, thus, approximately $37,380,000. This represents about 8.9 percent of the total value of electronics production in the Soviet Bloc.

e. Thus the percentage of total electronics effort in the Soviet Bloc accounted for by civilian radio and television receiver production is probably somewhere between 8.5 and 12 percent.

f. By similar reasoning, the share of the Soviet electronics industry devoted to civilian radio and television production is about 4 percent, indicating a substantially lower percentage than that of the Soviet Bloc as a whole or of the Satellites as a group.

C. Estimated Number of Sets in Use.

1. Radio Receivers.

The number of civilian radio sets in use in the Soviet Bloc is estimated on the basis of the estimated number of sets on hand as of 1 January 1946 and the yearly production figures appearing in Table 2, above. A rate of retirement of 10 percent is assumed.

The number of sets in the Soviet Bloc capable of receiving short-wave broadcasts is estimated as of 1 January 1946 to have been about 3 million sets, while the number of sets not capable of receiving short-wave broadcasts as of the same date is very roughly estimated to have been 300,000 sets.

Thus the number of sets in use in the Soviet Bloc as of 1 January 1952 is estimated to have been about 5 million sets with one or more short-wave bands and about 3.5 million sets without short-wave

bands, including crystal sets.

The grand total of sets in use, then, is approximately 8.5 million sets, including both tube and crystal types.

Comparable estimates for the USSR are, as of the same date, 1.3 million sets with one or more short-wave bands, and 2,060,000 sets with no short-wave bands, including crystal sets.

It is of interest that the production of sets with short-wave bands in the USSR is less than sufficient to make up for the number of sets of this type retired every year, so that the total number of these sets is declining absolutely in the USSR year by year.

2. Television Receivers.

As of 1 January 1952, the has estimated that television sets in use in the USSR total 30,000 in the Moscow area, 10,000 in Leningrad, and 1,000 in Kiev. In view of the late 1951 delivery of sets from East Germany and the time interval required for installation, this estimate agrees closely with the cumulative production estimate of 57,000 receivers which was obtained from other sources. The estimate is believed to be an accurate estimate of sets in use at the beginning of 1952. It is likely that an additional 60,000 sets can be installed in the USSR during 1952, primarily in the above areas, and possibly including some in Khar'kov and Sverdlovsk. No television receivers are in use in East Germany or the Satellite countries, nor are any significant installations anticipated during 1952.

D. Indications.

The trends suggest very strongly that the authorities in the Soviet Bloc countries feel the value to the regime of maintaining a maximum amount of contact with their people by means of radio and at the same time incurring a minimum drain on their already taxed electronics industry. The devices employed to provide this economical broadcasting coverage include production of sets with few tubes, production of sets with few or no short-wave bands, production of crystal sets, and wired radio.

Another indication which is fairly clear from the above is that the Soviet Bloc, in achieving economical broadcasting, is, in the process, cutting down the number of people who can be reached by Western propaganda broadcasts. This is principally because of the increasing number of sets with no short-wave bands and sets which cannot be tuned at the option of

the listener, even on the broadcast band.

Despite heavy publicity accorded the progress of television in the USSR, there is strong evidence to indicate that the Soviet civilian television program is purposely restricted to a modest scale and that for some time to come the television audience in the Bloc will be limited to a small number of residents of the USSR.

The major effort of the Soviet Bloc electronics industry is devoted to the manufacture of military electronics products. Despite recent and planned increase of considerable magnitude in industry output, there is no indication of a significant increase in the supply of civilian radio and television products.

E. Conclusions.

1. The governments of the Soviet Bloc are serious in their desire to communicate with their people and are trying to achieve the maximum amount of such communication by radio.

2. Capacity for the production of civilian radios is growing and would be well up to the highest possible civilian needs of the Soviet Bloc if the Bloc authorities were willing to substitute the production of civilian sets for military production.

3. Military commitments hinder the production of sets on a scale comparable with the US. Aside from the resources denied civilian radio production because of military needs, it is to the Soviet Bloc's political interest to produce the simplest sorts of sets, since these are almost impossible to reach by Western broadcasts. Unless the tension between East and West is relieved, it is unlikely that production of civilian radios and television receivers in the Bloc will reach significant quantities, as viewed by Western standards.

4. It will become progressively harder to reach the Soviet Bloc by the Voice of America and other Western broadcasts as the existing short-wave sets wear out and are replaced by non-short-wave sets.

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APPENDIX A

TABULATION OF TYPES OF SOVIET BLOC RADIO AND TELEVISION RECEIVERS

Table 4

Radio Receivers

Country	Type	Class	Characteristics	Manufacturer a/*	Price Where Known (Rubles)
USSR	Moskva	1	10 tubes, radio-phonograph	Molotov	1,200
	Leningrad	1	12 tubes, 3 SW b/	Kazitskiy	
	Marshall	1	8 tubes c/	Leningrad	
	Neva	1	9 tubes c/	Leningrad	
	SVD-9 (SVD-1)	1	Unknown	ARZ	
	Radiotekh-nika	1	9 tubes c/	Radiotekhnika	1,600
	Riga T-689	1	9 tubes, 3 SW	Radiotekhnika	
	Radiola D-11	1	11 tubes, radio-phonograph	Unknown	
	Beloruss	1	13 tubes, 4 SW	Molotov	2,000
	Latvia	1	Unknown	VEF	1,200
	Ukraina	1	8 tubes c/	Dneprpetrovsk	
	PTS-47	1	4 SW b/	Unknown	
	TM-7	1	Unknown	Unknown	
	Teknik	1	Unknown	Unknown	
	Vostok (7N-27)	2	7 tubes, 1 SW	Lenin	
	Pioner (New Model)	2	6 tubes c/	Molotov	700
	EL-2	2	Unknown	Elektro-signal	

* Footnotes for Table 4 follow on p. 19.

Table 4

Radio Receivers
(Continued)

Country	Type	Class	Characteristics	Manufacturer [a]	Price Where Known (Rubles)
USSR (Continued)	Baku	2	6 tubes, 3 SW	Baku	
	RZ-14	2	6 tubes [c]	VEF	
	Rodina	2	6 and 7 tubes, battery, 1 SW	Lenin, ARZ, and others	
	VEF M-557	2	6 tubes, 1 SW	VEF	
	Baltika	2	Unknown	VEF	680
	Ural	2	10 tubes, 1 SW	Ordzhonikidze	
	Minsk	2	2 SW [c]	Molotov	1,200
	VV-661	2	Unknown	Punane Ret	
	VV-662	2	6 tubes, 1 SW	Punane Ret	
	T-755	2	5 tubes, 1 SW	Radiotekhnika	
	Partizan	2	4 tubes [c]	Molotov	700
	EFIR	3	Portable [c]	ARZ	
	Rekord	3	5 tubes, 1 SW	ARZ and others	
	RV-461	3	4 tubes, battery	Punane Ret	400
	Salyut	3	Unknown	ARZ	
	Leningradets	3	No SW [c]	Kazitskiy	
	Iskra	3	Unknown	ARZ	220
	Kuzbas	3	5 tubes [c]	Beloye	
	ARZ	4	3 tubes, no SW	ARZ	300
	Moskvich	4	3 tubes, no SW	Order of Lenin	250
	B-912	4	2 tubes, no SW	Radiotekhnika	
	SIM-1	4	No SW [c]	Molotov	
	Tula	2	2 tubes, no SW	Tula	
Poland	Pionier	2 (?)	4 tubes, 6 bands	Dzerzoniow	750

Table 4

Radio Receivers
(Continued)

Country	Type	Class	Characteristics	Manufacturer a/	Price Where Known (Rubles)
Hungary	Orion 881	1 (?)	6 tubes, 4 SW	Orion	
	Orion 330	3 (?)	6 tubes, 1 SW	Orion	
	Orion 324	3 (?)	4 tubes, no SW	Orion	
	Orion 323	3 (?)	4 tubes, no SW	Orion	
	Orion 221	3 (?)	5 tubes, 1 SW	Orion	
	Orion 313	4 (?)	4 tubes, 2 stations only	Orion	
Rumania	Radio-Popular	3 (?)	5 tubes, 1 SW	Radio-Popular	
	Pionier	4 (?)	3 tubes, no SW	Radio-Popular	
Czechoslovakia	Kongres	2 (?)	6 tubes, all bands	Tesla	
	Harmonia	2 (?)	6 tubes, all bands	Tesla	
	Largo	2 (?)	6 tubes, all bands	Tesla	
	Klasik	2 (?)	6 tubes, all bands	Tesla	
	Rytmus	3 (?)	4 tubes, all bands	Tesla	
	Pionier	3 (?)	4 tubes, all bands	Tesla	
	Talisman	3 (?)	4 tubes, 1 SW	Tesla	
	T-444	3 (?)	3 tubes, 3 SW	Tesla	
East Germany	Skala	3 (?)	5 tubes, no SW	Siemens	

a. For full factory names, see Appendix B. These names represent the principal manufacturers. Some sets are produced by more than one manufacturer.
b. SW indicates short-wave bands.
c. No other information available.

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Table 5

Television Receivers

Model Number	Manufacturer	Retail Price (Rubles) a/*	Picture Tube			Number of Receiving Tubes	Features of Receiver
			Type	DIA	Screen Dimension		
Moskva T-1	Order of Lenin	1,500	18 LK1B	7 inches, round	14 x 10.5 cm	20	Table model receiver, tuneable for probably 1, possibly 2, TV channels at about 50 mc and for FM radio at about 70 mc. 625-line picture.
Leningrad T-1	Kazitskiy	2,000	18 LK1B	7 inches, round	14 x 10.5 cm	22	Table model receiver, probably for 441 and 625-line pictures.
KVN-49	Order of Lenin	1,275	18 LK1B	7 inches, round	14 x 10.5 cm	16	Table model receiver, designed for lower production cost; probably similar to T-1.
Leningrad T-2	Sachsenwerk-Radeberg	2,196.50	23 LK1B	9 inches, round	18 x 13.5 cm	32	Combination table model receiver for AM radio, TV, and FM radio. Three picture channels (49.75, 59.25, 77.25 mc); FM radio band at 67 mc; low- and medium-wave AM radio bands. Both 441- and 625-line pictures.
Leningrad T-3	Kazitskiy	Unknown	30 LK1B	12 inches, round	24 x 18 cm	34	Console model TV, AM radio and phonograph combination; probably for standard 625-line picture. Prototype models only.

* Footnotes for Table 5 follow on p. 21.

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Table 5

Television Receivers
(Continued)

Model Number	Manufacturer	Retail Price (Rubles) a/	Picture Tube			Number of Receiving Tubes	Features of Receiver
			Type	DIA	Screen Dimension		
T-4	Unknown	Unknown	LK100	Unknown	Approximately 90 x 67 cm	Unknown	Projection console model TV, AM radio and phonograph combination, for use in public places. Prototype models.
T-5, T-6	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	New models, scheduled to appear in 1952.
OSW	Sachsenwerk-Radeberg	Unknown	Unknown	9 inches, rectangular	18 x 13 cm	Unknown	New set in design in East Germany (early 1952) to replace Leningrad T-2 production. To use miniature receiving tubes and rectangular picture tube. It is possible in this way for it to become T-5 or T-6.

a. Prices on the Moskva T-1 and Leningrad T-1 were reduced from 3,000 rubles as of July 1949.

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APPENDIX B

DETAILED LIST OF RADIO AND TELEVISION RECEIVER MANUFACTURING PLANTS IN THE SOVIET BLOC

A. Radio Manufacturing Plants.

1. USSR.

a. Baku Radio Plant, Baku, Azerbaydzhan SSR.

This plant was constructed in 1946 and 1947 and began production in 1947 with the Rekord and the Baku receivers. It is administered by the Ministry of Local Industry. The best estimate of the approximate scale on which this plant produces is obtained from a report of February 1948, indicating that the planned production for 1948 was at the rate of 3,300 receivers. It is not known if this goal was met.

b. Ordzhonikidze Radio Plant, Sarapul', Udmurt ASSR.

This plant makes military and civilian radio equipment. Among its civilian products are the Ural and the Moskvich-V receivers.

c. Radiotekhnika, Riga, Latvian SSR.

Scheduled in 1950 to produce 40,000 receivers as well as telephone and telegraph apparatus, this plant is among the larger of the Soviet Bloc radio producers. Made here are, among others, the T-755, Riga, T-689, Radiotekhnika, and U-207 receivers, the latter for wired reception. There is also evidence of extensive manufacture of crystal sets at this plant.

d. Vaists Elektrotekhniska Fabrik (VEF), Vidzemes Soseja, Riga, Latvian SSR.

This is a really large plant making machine tools, army signal equipment, general electrical appliances, telephone and telegraph apparatus, as well as civilian radio receivers. The 1946 output of radios was approximately 27,000 receivers, and the 1950 output is believed to have been 40,000 sets. Among the sets produced here are the Latvia and the M-557.

e. Punane Ret, Tallin, Estonian SSR.

Formerly the Radio-Pioner plant, this plant assembles radios from components that it makes itself. The 1951 output of radios was probably about 25,000 receivers, and in addition there was quantity production of loudspeakers. The labor force is estimated to have been 800 working in three shifts. The sets produced here include the RV-563 and the mass-produced VV-662.

f. Radiozavod imeni Molotov, Kemerovskaya Ul., Minsk, Belorussian SSR.

Construction of this plant began in 1946 and was completed in 1949. During the construction there was some output of radios. Until June 1948 the principal radio output consisted of Partizan and Pioner sets, but subsequent to that time the Minsk, a larger set than the Partizan, was substituted for the Partizan. In 1950 the Minsk-4, a cheaper version of the Minsk, was put into production. Also produced here are the Rodina and the Beloruss. In 1949 it is estimated that as many as 72,000 receivers of all types were produced here.

g. Radiozavod Elektrit, Ul., Mindaugenes 16, Vilnyus, Lithuanian SSR.

Radios were the principal product of this plant until April 1946, when a line of test equipment was added. The radios made here include the Pioner and the Marshall sets. The Marshall set was made from German components, and there are indications that at the time these components were exhausted the plant shifted to the manufacture of military aircraft equipment. The labor force as of September 1947 is estimated to have been 700.

h. Elektrosignal Radio, Factory Nos. 938 and 728, Voronezh Oblast, RSFSR.

In 1949, with a labor force of approximately 1,200, this plant was making radios, wire, motors, and railway electrical equipment. At this time it is estimated that 500 workers were engaged in radio production. The plant began to manufacture the Rodina set after the siege of Voronezh was lifted. In 1946, machinery from the Telefunken plant in Erfurt was imported. Many reports indicate that the radios produced here resemble the Telefunken radios. Radios produced by this plant include the EL-2, the Rodina, Radio Signal (possibly Elektrosignal), and, in 1950, there was a report that a sizable number of crystal sets were being produced.

i. Aleksandrovskiy Radiozavod, Factory No. 3, Aleksandrov, Vladimir Oblast, RSFSR.

This very important plant, often abbreviated ARZ, has made, at various times, the Rodina, Iskra, SVD-M, Moskvich-V, ARZ, and Rekord sets. Mass production of the ARZ, Moskvich-V, Rodina, Iskra, and Rekord sets makes this plant one of the large quantity producers of the Soviet radio industry.

j. Lenin Radio and Telephone Factory, Factory No. 590, Novosibirsk, Novosibirsk Oblast, RSFSR.

This plant was constructed in 1941 from equipment evacuated from Voronezh. Up to May 1948, 50,000 sets were produced, mostly the 7N-27 or Vostok. At that time, preparations were underway to manufacture an improved Vostok, and in 1949 the Vostok-49 appeared. Later sets were the Novosibirsk and the ZOL. Output probably exceeded 10,000 in 1948, at which time the labor force was 1,500.

2. Hungary.

a. Orion Radio Factory, Vaci-ut 79, Ujpest.

Plant A of the Orion firm in Ujpest is concerned with the manufacture of the Orion line of commercial radios which this firm has been producing since before World War II. There are many models, and a large percentage were exported before the war. Since the war, output has varied with the supply of parts. In May 1948, production capacity was approximately 50,000 sets of all types, but output was only about 50 percent of this number. Approximately 10,000 sets went to the USSR for reparations in 1948. The rate of retirement was reported to be high in 1947. A report of 1951 indicates the possibility that civilian production has decreased, possibly to as low as 5,000 sets per year, which could conceivably be due to increased military requirements.

3. Bulgaria.

a. Radio Factory, Sofia.

This is the former Philips plant in Sofia. As of 1949, it is reported to be making commercial receivers from components imported from Switzerland and the Netherlands. There are indications, unconfirmed, that the civilian radio manufacturing facilities of the Tesla combine in Czechoslovakia has ceased operations in this field and that the equipment for

making radios has been sent to Bulgaria, presumably to this plant.

4. Rumania.

a. Radio-Popular, Baicului 82, Bucharest.

This is the former Philips plant in Bucharest. Output consists of loudspeakers, chassis, commutators, and a small number of tubes, as well as radios. In 1950, this plant began the production of the Pionier set. Up to that time it had been making older, Philips-type sets. The Pionier set receives only domestic stations. The Rodina set also is made at this plant, as well as a set called the Radio-Popular. Both of these sets have short-wave bands and can be tuned at the discretion of the listener. Output is approximately 30,000 sets of all kinds. Components are imported, chiefly from Czechoslovakia, Hungary, and the USSR.

5. Poland.

a. Panstwowa Fabryka Aparatow Radiowych, Dzerzeniow, Wroclaw.

This plant manufactures radios, microphones, components, and loudspeakers. The Polish Pionier is made here. In 1951 the monthly norm was 350 sets but was never attained. Production is reportedly being carried on under unfavorable conditions, and the result is a high rate of retirement.

6. Czechoslovakia.

a. Tesla-Prelouc, Prelouc.

This is the former Radiotechnica plant in Prelouc which was incorporated into the Tesla combine when all the electrotechnical plants in Czechoslovakia were incorporated into that organization. It was formerly a Telefunken subsidiary. Radios made here include the Klasik, Kongres, Romance, and Harmonia sets. This plant may have been moved to Bulgaria as indicated in 3, above.

b. Tesla Hloubetin I, Ulice 186, Prague.

This was formerly a Philips plant until taken over by Tesla. The Largo, Pionier, Rytmus, Talisman, Melodnik, Romance, and Kvinta sets are among those which are and have been produced here. Output probably approaches 2,000 sets of all types per month. However, as has the Prelouc plant, this plant may have been moved recently to Bulgaria.

7. East Germany.

a. AEG (Allgemeine Elektricitaets Gesellschaft) Apparatus Factory-Treptow, Hoffmannstrasse 15-23, Berlin-Treptow.

This plant, built between 1915 and 1920, is at present owned by the AG Isolator, Berlin-Weissensee. In 1950, this plant, of modern construction, was reported to be making two medium-sized superheterodyne receivers and a line of test equipment, transformers, small motors, switches, switchboards, and artillery sighting equipment. Monthly output of radios was approximately 1,500 in 1950. Affiliated with this plant is a laboratory working on the development of prototype models for production in Russia.

b. Elektro-Apparate-Fabrik (EAK), Koeppelsdorf-Neuhaus.

This factory is part of the Hescho-Werk, the main offices of which are in Hermsdorf, Thuringia. It manufactures three- and five-tube sets. A report of April 1948 indicates that output was approximately 18,000 sets per year, while another report indicates that output may have reached a level of 90,000 sets per year in 1949. In 1949 the labor force was approximately 900 workers, but since the firm was unable to dispose of all the output of the plant, a cut in the labor force became necessary. There has been some exporting of the output of this plant to Norway.

c. VEB Fernmeldewerk (formerly Opta), Leipzig.

Not much is known concerning the output of this plant. There was production of radios in 1948, but there were layoffs at that time because of shortages of materials. In addition, there was a shortage of tubes. The only way tubes could be obtained was to export sets without tubes to Western Germany in exchange for tubes. In September 1948 the number of workers laid off totalled 200. Radar and navigational aids are also made here.

B. Television Manufacturing Plants.

1. USSR.

a. Leningrad Radio Factory imeni Kazitskiy, Vasilevskiy Ostrov, Vasileostrovskiy Rayon, Leningrad.

This plant, in conjunction with the Leningrad Television Institute 380, has produced several successive models of television sets. The responsibility for development and design appears to have been centered in the laboratory facilities of Institute 380, while the Kazitskiy plant

has been concerned with the assembly and distribution of receivers. Both establishments are large and competent electronics organizations. They have a combined labor force estimated to be from 8,000 to 12,000, and they are engaged heavily in the production of military radios and electronic equipment. Both establishments are under the administration of the Ministry of Communications Equipment Industry. It has been reported that a television receiver production rate of about 1,000 sets per year was reached by this plant in 1950. More recently, there is evidence that the program may have been curtailed in favor of military products and that the major Soviet requirement for television receivers may have been subcontracted through Institute 380 to the East German industry.

b. Moscow Order of Lenin Radio Factory, Moscow.

This plant, of which Baranov is the Director and which is believed to be located at Bol'shaya Kalitnikovskaya 65, is one of the large equipment assembly facilities under the administration of the Ministry of Communications Equipment Industry. The plant has mass-produced the three-tube Moskvich-V and the battery-operated Rodina radio receivers and, since 1948, has manufactured television receivers, models Moskvich T-1 and KVN-49. By 1950, output of television sets reached 8,000 sets per year. As is the Kazitskiy factory, this Moscow plant is engaged in the manufacture of military radio equipment, which apparently has limited its capability to make increased quantities of television sets.

2. East Germany.

a. Sachsenwerk-Radeberg (member firm of the SAG Kabel), Fritz-Elber Strasse 70, Radeberg, Saxony.

This plant, one of the key facilities in the Soviet-owned SAG Kabel electrotechnical corporation, has nearly 4,000 employees and is engaged in the manufacture of electric motors, switchgear, communications equipment, decimeter directional radio-relay equipment, and television receivers. In early 1950 the Leningrad T-2 television set design, originated at Institute 380, Leningrad, was turned over to the SAG Kabel for production at Radeberg. The USSR ordered 250,000 television sets for delivery during the period of the Five Year Plan, of which 40,000 were scheduled for 1951. Of these, 50,000 were to be the T-2 model. Actually, Sachsenwerk-Radeberg completed 100 sets in the first quarter of 1951 and 4,000 sets in the first half of 1951 and reached an assembly rate of 100 sets per day by September 1951. Deliveries to the USSR started in August 1951 and totalled 29,201 sets by mid-December, when the Soviets stopped deliveries because of quality troubles. The Leningrad T-2 receiver

appears to be of a conservative design, showing great improvement over the T-1 model, although its production cost is obviously high and its screen small. The most serious trouble experienced in East Germany has been in obtaining enough tubes and capacitors of proper quality and in avoiding excessive factory cost. The price allowed the SAG Kabel was 1,000 East Deutsche Mark (EDM), with an original product cost estimated at 450 EDM. Actual factory cost has been reported to be about 1,600 EDM. It is evident that poor technical performance has been a result and that field trouble in the USSR should be expected. An improved set has been designed at the Werk fuer Fernmeldewesen HF (OSW), Berlin, intended to replace the T-2 production at Radeberg. The new set, using miniature tubes and a 9-inch rectangular picture tube, may go into production at an early date (if tubes are made available), especially in view of both German and Soviet dissatisfaction with the Leningrad T-2. The 1952 television set production plan was 60,000 receivers for delivery to the USSR. It is probable that this figure may be curtailed to 45,000 or 50,000.

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APPENDIX C

GAPS IN INTELLIGENCE

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APPENDIX D

METHODOLOGY

1. Radio Receiver Analysis.

a. The method of this report in the estimation of civilian radio receiver production in the USSR consists of confirming, as far as is possible, the results of unclassified evaluated intelligence studies by comparison with the available intelligence materials gathered from covert sources. The principal sources utilized by the unclassified studies consisted of excerpts from the Soviet press and books printed in the USSR. After confirmation is established, conclusions are drawn on the basis of the rather complete estimates found in the unclassified studies.

b. Production of Satellite sets has been estimated almost entirely from classified sources, as there is no unclassified research study of the Satellite radio production.

2. Television Receiver Analysis.

a. The analysis of television receiver production and distribution in the Soviet Bloc is based upon the correlation of three independent sets of substantive data: information reported in the Soviet Press and from official sources, especially as consolidated and submitted by the in Moscow; manufacturing schedules of the two Soviet producers, as reported by competent observers; and complete details of contract plans, production, and deliveries of the Soviet television sets made in East Germany. By comparing the numbers of sets in use at different times in the Soviet television centers with reported factory output, a reasonably accurate picture of the Bloc television program is provided.

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APPENDIX E

SOURCES AND EVALUATION OF SOURCES

1. Evaluation of Sources.

a. Radio Receivers.

(1) The principal sources used in this report have been the Soviet press in the case of the USSR and the intelligence reports of and the military intelligence agencies in the case of the Soviet Bloc.

(2) In general, the classified sources tended to confirm the reports from the Soviet press.

(3) The sources used for the Satellites were scanty, often vague, and, in the case of the reports, not oriented to the needs of this report.

(4) In general, there is a serious dearth of information from 1950 on.

b. Television Receivers.

(1) The sources used for the sections of the report which deal with television receivers differ from the sources pertinent to radio receivers and fall into one of the following categories:

(a) Reports published in the Soviet press, generally qualitative in nature, as made available through Summary documents.

(b) Information available from public press and official sources relative to sets in use in the USSR, as ably presented in recent reports.

(c) Descriptive and quantitative data provided on television development, production methods, and plant operations through the information of competent technical observers at the Soviet plants.

(d) Covert collection of information

(e) Documentary evidence, including official reports of the German Democratic Republic, relative to production plans and actual output at the Sachsenwerk-Radeberg factory.

(2) All of these categories of sources have included a sufficient amount of useful information, in their respective areas of coverage, to permit good evaluation of individual reports and to permit an acceptably reliable analysis of the industry operations.

2. Sources.

a. Source references for the production of radio receivers are listed below. Sections I, II, and III of this report are covered by these references.

[redacted]

[redacted]