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UNITED STATES TARIFF COMMISSION

CAPACITORS AND SEMICONDUCTORS:  
SPRAGUE ELECTRIC COMPANY  
North Adams, Mass.

Report to the President on Investigation No. TEA-F-22 Under  
Section 301(c)(1) of the Trade Expansion Act of 1962



TC Publication 394  
Washington, D. C.  
May 1971

UNITED STATES TARIFF COMMISSION

Glenn W. Sutton

Bruce E. Clubb

Will E. Leonard, Jr.

George M. Moore

J. Banks Young

Kenneth R. Mason, *Secretary*

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Address all communications to  
United States Tariff Commission  
Washington, D.C. 20436

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REPORT TO THE PRESIDENT

U.S. Tariff Commission,  
May 14, 1971.

To the President:

In accordance with section 301(f)(1) of the Trade Expansion Act of 1962 (76 Stat. 885), the U.S. Tariff Commission herein reports the results of an investigation made under section 301(c)(1) of that act relating to a firm engaged in the production of certain capacitors, transistors, and integrated circuits.

On March 15, 1971, the Commission received a petition filed on behalf of the Sprague Electric Company, North Adams, Mass., for a determination of its eligibility to apply for adjustment assistance. On March 29, 1971, the Commission instituted an investigation (TEA-F-22) to determine whether, as a result in major part of concessions granted under trade agreements, articles like or directly competitive with the capacitors, transistors, and integrated circuits produced by the aforementioned firm are being imported into the United States in such increased quantities as to cause, or threaten to cause, serious injury to the firm.

Public notice of the receipt of the petition and institution of the investigation was published in the Federal Register on April 2, 1971 (36 F.R. 6124). No public hearing was requested, and none was held.

The information in this report was obtained chiefly from the petitioner, other domestic producers of capacitors, transistors, and integrated circuits, domestic producers of end products in which the named components are used, the Electronic Industries Association, and the Commission's files.

#### Finding of the Commission

On the basis of its investigation, the Commission 1/ finds (Commissioner Moore dissenting) that articles like or directly competitive with the capacitors, transistors, and integrated circuits produced by Sprague Electric Company are not, as a result in major part of concessions granted under trade agreements, being imported into the United States in such increased quantities as to cause, or threaten cause, serious injury to the firm.

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1/ Commissioners Clubb and Young did not participate in the decision.



Views of Presiding Commissioner Sutton  
and Commissioner Leonard

This investigation relates to a petition filed on behalf of the Sprague Electric Company, North Adams, Massachusetts, for a determination under section 301(c)(1) of the Trade Expansion Act of 1962 of that firm's eligibility to apply for adjustment assistance. Our determination is in the negative. The criteria established by section 301(c)(1) have not, in our judgment, been met.

Sprague Electric, a multiproduct corporation, has been engaged primarily in the manufacture of capacitors, transistors, and integrated circuits; the company's principal product has been capacitors. With respect to each of these articles, we have concluded that the increased imports have not resulted in major part from trade-agreement concessions. The rate of duty applicable to capacitors in the Tariff Act of 1930 was 35 percent ad valorem; the same rate would have applied to transistors and integrated circuits had they been articles of commerce in 1930. Trade-agreement concessions resulting in reductions in that rate of duty were made in 1939, 1948, and 1951; the duty was reduced thereby to 25 percent, 15 percent, and 12½ percent ad valorem. In our view, these concessions granted 20 to 30 years ago could not have been the major cause of the recent increases in imports of the articles concerned here. More recent concessions were granted in the Kennedy Round of negotiations under the General Agreement on Tariffs and Trade; those concessions resulted in only a minor reduction in the rate of duty on capacitors (from 12½ percent to 10 percent ad valorem), but a somewhat greater reduction

in the rate on transistors and integrated circuits (from 12½ percent to 7 percent ad valorem). We have concluded, however, that the recently increased imports of the articles concerned have not been caused in major part by the concessions. The Kennedy Round concessions, which reduced already moderate rates, were too small to have been the major cause of the increased imports of those articles. Most of the increased imports of these articles, moreover, have entered the United States under the provisions of items 807.00 or 806.30; these tariff provisions, which have not been the subject of trade-agreement concessions, accord under specified circumstances a duty exemption on the value of the U.S. fabricated components or metal articles contained therein.

In light of the above circumstances, we have made a negative determination.

### Dissenting Views of Commissioner Moore

It is my opinion that an affirmative determination should be made in this case, by reason of the fact that the requirements of section 301(c)(1) of the Trade Expansion Act of 1962 have been met.

The firm, Sprague Electric Company, is engaged in the manufacture of capacitors, transistors, integrated circuits, and other electronic components. The bulk of the company's output consists of capacitors, of which it makes virtually every type. In 1970, the firm experienced a sharp decline in sales and employment, and it sustained a substantial net operating loss.

The Tariff Commission has frequently ruled that the Trade Expansion Act provides four requirements for relief to a firm:

1. Imports of articles like or directly competitive with those produced by the firm must be increasing;
2. The increased imports must be a result in major part of concessions granted under trade agreements;
3. The firm must be seriously injured or threatened with serious injury; and
4. The increased imports resulting in major part from trade-agreement concessions must be the major factor causing or threatening to cause serious injury.

#### Increased imports

It is clear that imports of articles like or directly competitive with those made by the Sprague Electric Company have increased. U.S. imports of capacitors rose from \$24 million in 1966 to \$33 million in 1970; imports of transistors, from \$29 million in 1966 to \$60 million

in 1970, and imports of integrated circuits from an estimated \$4 million in 1967 to \$69 million in 1970.

The increased imports of these components have been accompanied by increased imports of finished articles in which they are used-- primarily consumer electronic products, data processing equipment, and electronic instruments. U.S. imports of these finished products generally have increased in recent years. Entries of television receivers, for example, rose from 1.5 million sets in 1966 to 4.5 million sets in 1970; imports of calculating machines increased from \$36 million in 1966 to \$158 million in 1970; and imports of certain electrical instruments and apparatus increased from \$50 million in 1968 (the first year for which data are available) to \$78 million in 1970. Although the volume of components like or directly competitive with those produced by Sprague that were contained in U.S. imports of finished articles cannot be estimated, a conclusion that the volume has markedly increased is valid without question.

It is evident that imports of capacitors, transistors, and integrated circuits have increased, both separately and as integral parts of electronic products.

#### In major part

The requirement that increased imports be due in major part to tariff concessions granted under trade agreements is also met. As I have stated in previous cases, this requirement is satisfied if, except for trade-agreement concessions, imports would not be at substantially their present level. 1/

1/ See, for example, Buttweid Pipe, Inv. No. TEA-W-8 (1969) at 8-11  
Transmission Towers and Parts, Inv. No. TEA-W-9 and TEA-W-10 (1969) at  
10-11.

In another recent case, 1/ I concluded that increased imports of high-voltage aluminum capacitors had resulted in major part from trade-agreement concessions. For much the same reasons, I have concluded in this case that the increased imports of all capacitors, as well as transistors and integrated circuits, are due in major part to concessions granted under trade agreements. Since 1930 the rate of duty applicable to capacitors has been reduced progressively from 35 percent to 10 percent ad valorem, and that applicable to transistors and integrated circuits, from 35 percent to 7 percent ad valorem. During the course of the investigation, the Commission obtained extensive information on the selling prices of Sprague components as compared with the prices of comparable imported articles. The price relationships varied somewhat, as one would expect in view of the highly heterogeneous nature of the products involved. In most instances, however, the imported product probably would not have been able to undersell Sprague's component, or would have been able to undersell it to only a small degree. had the 1930 rate of duty applied rather than the 1971 rate. Consequently, I am satisfied that imports would not be at substantially their present level save for the trade-agreement concessions. The second requirement thus has been met.

#### Threat of injury

This requirement has clearly been met. Sprague's sales dropped sharply in 1970, amounting to \$109 million in that year compared with \$134 million in 1969. The petitioner submitted extensive data indicating both the loss of business to lower priced imported components and

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1/ Electrolytic Capacitors: Ion Capacitor Corporation, Inv. No. TEA-F-11 (1970) at 8-9.

the loss of sales revenue when meeting prices of imported components in order to retain, sometimes only in part, some orders. Sprague's employment declined \* \* \*.

The conclusion is evident; the company is threatened with serious injury and will suffer such injury if the recent trends continue.

#### Major factor

The previous requirements having been met, the final requirement is that the imports resulting in major part from tariff concessions must be the major factor threatening the serious injury. This requirement is satisfied if, in the absence of increased imports of the articles concerned (separately and in finished products), Sprague would not be threatened with serious injury.

The recent deterioration in Sprague's sales, employment, and profit position has coincided with the increased imports of competitive electronic components. While Sprague has been competitive in price with other domestic firms, generally it has not been able to match the price of imported components, except in some instances when it has accepted the loss in sales revenue to retain business. Had there been no trade-agreement concessions, the delivered price of the imported components would have been appreciably higher and the import penetration of the U.S. market would have been considerably lower. Under these circumstances, it is unlikely that Sprague would have been so adversely affected. Thus, I have concluded that the increased imports have been the major factor threatening injury to the petitioner.

Conclusion

Since the requirements of the act have all been met, I have made an affirmative determination.





## INFORMATION OBTAINED IN THE INVESTIGATION

Description and uses

The articles which are the subject of the Sprague Electric Company petition include seven specific types of fixed capacitors and two types of semiconductor devices. The specific types of capacitors named are metal case tubular aluminum electrolytic, small can twist-prong aluminum electrolytic, ceramic disc, paper dielectric nonmetal case, film dielectric nonmetal case, metallized dielectric nonmetal case, and dual-dielectric nonmetal case. The specific semiconductors named are transistors and silicon monolithic integrated circuits.

Capacitors.--A capacitor is a device used to store electrical energy. It is composed of two conductors of electrical energy (plates) separated by a nonconducting material (dielectric). When a voltage is applied between the two plates (acting as electrodes), passage of electrons through the dielectric is restricted and they collect at one dielectric-electrode interface. The measure of the capacitor's ability to store electrical energy is its capacitance, expressed in microfarads and picofarads (one-millionth of a microfarad, formerly micro-microfarads). Capacitance increases as the ratio of plate area to dielectric increases, thus the thinner the dielectric, the higher the capacitance. A capacitor is designed to a specific voltage rating, indicating the maximum voltage it can withstand without being destroyed.

Most capacitors are fixed, that is, the rated capacitance cannot be altered at will. Some capacitors, however, are variable, that is,

the capacitance can be altered by means of a screw, as in trimmers, or by turning a rod, as in tuning capacitors.

Capacitors are made of various materials, the choice of materials depending on the specific capacitance, voltage rating, and degree of dependability required. The types of capacitors are generally designated by the dielectric material used; sub-types reflect differences in such features as configuration, method of attachment and covering material.

Aluminum electrolytic capacitors are usually made for use in DC (direct current) circuits. The DC capacitor consists of two sheets of aluminum foil, one of which has a coating of aluminum oxide, separated by paper impregnated with a wet electrolyte. The coated foil is the anode or positive plate (electrode) of the device, the aluminum oxide coating is the dielectric, and the electrolyte-impregnated paper backed by the second sheet of foil form the cathode or negative plate. The sandwich is rolled up, giving it a tubular appearance, and encased in metal or a non-metal; it has wire leads for both anode and cathode. A multisection electrolytic capacitor has two to four anodes in one unit using a common cathode, and takes the place of as many capacitors as it has anodes; this type of capacitor is generally the twist-prong (also called twist-lug or twist-tab) type, the prongs permitting simple and secure attachment to the chassis of the electronic equipment in which it is used. For AC (alternating current) use, such as AC electric motor starts, the capacitor basically consists of two DC aluminum electrolytic capacitor assemblages back-to-back. Aluminum electrolytic capacitors have high values of capacitance for their size, and are used principally

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at audio frequencies for bypass purposes and in power supplies for filtering purposes.

Ceramic capacitors are of several types, but basically they are composed of a ceramic dielectric thinly coated on each side with silver which forms the conductors or electrodes. The ceramic disc capacitor is the most common type, the name describing its shape. Ceramic capacitors usually have very low values of capacitance and are used at high radio frequencies for coupling and bypass purposes.

Paper capacitors use paper impregnated with dielectric liquids as the dielectric, the metal foil plates and the dielectric being rolled into a tube and encased in metal or plastic.

Film capacitors utilize thin plastic films made of various polymers, instead of impregnated paper, as the dielectric. Metallized dielectric and dual dielectric capacitors are modifications and combinations of the paper and film capacitors; in metallized dielectric capacitors, thin coatings of metal deposited directly on the dielectric serve as the plates. For many applications, the four types of capacitors using paper and film dielectrics are interchangeable. As used in power plants, these capacitors may be room sized, whereas for consumer electronic use, as in television sets and radios, they may be quite small.

Tantalum electrolytic capacitors may be used in lieu of aluminum electrolytic capacitors at the lower voltages, but they are more expensive and are used mainly for military purposes because of a reputation for greater dependability. Mica, glass, and vitreous enamel capacitors can be used for the same purposes as ceramic capacitors, but are more expensive. Paper and film capacitors have a very wide range of use, both as to capacitance and voltage.

U.S. tariff treatment

All capacitors are dutiable as "electrical capacitors" under item 685.80 of the Tariff Schedules of the United States. The rate of duty is currently 10 percent ad valorem, which is 71 percent less than the statutory rate of 35 percent established under the Tariff Act of 1930. (If of Canadian origin and intended for use as original equipment in the manufacture in the United States of a motor vehicle, capacitors may be entered free of duty under item 685.81.)

Transistors and integrated circuits are dutiable under item 687.60 at 7 percent ad valorem, which is 80 percent less than the statutory rate of 35 percent ad valorem. (If of Canadian origin and intended for use as original equipment in the manufacture in the United States of a motor vehicle, transistors and integrated circuits may be entered free of duty under item 687.61.) The intermediate rates established by various trade agreements, and the reduction scheduled under the Kennedy Round of the General Agreement on Tariffs and Trade (GATT), are indicated in the following table:

## Capacitors and semiconductors: U.S. tariff rate history, 1930-72

(Rate in percent ad valorem)

Tariff Act or Trade Agreement	Effective date	Capaci- tors 1/ (TSUS Item 685.80)	Semiconductors 1/ (TSUS item 687.60)
Tariff Act of 1930-----	June 1930	35	35
Bilateral Agreement with United Kingdom-----	Jan. 1939	25	25
GATT, Geneva-----	Jan. 1948	15	15
GATT, Torquay-----	June 1951	12-1/2	12-1/2
TSUS-----	Aug. 1963	12-1/2	12-1/2
GATT, Kennedy Round-----	Jan. 1968	12	11
	Jan. 1969	11	10
	Jan. 1970	11	8.5
	Jan. 1971	10	7
	Jan. 1972	10	6

1/ Included as radio apparatus until August 31, 1963.

The duties on the principal articles which incorporate capacitors, transistors, and integrated circuits of the types cited by Sprague were 35 percent to 40 percent ad valorem in 1930 but have been reduced considerably as a result of negotiations under the GATT. Articles of major importance in the entertainment market, including television and radio receivers, phonographs, and tape recorders, were all dutiable at 35 percent ad valorem in 1930, but now the tariff rates range from 6 percent to 10.4 percent ad valorem, reductions of 83 percent to 70 percent. Commercial articles of major importance included calculators, computers, and other data processing machines, and certain electrical measuring, checking, analyzing or automatically-controlling instruments and apparatus; duties on these articles in 1930 of 35 percent to 40 percent ad valorem were lowered to a current range of 6 percent to 10 percent ad valorem, reductions of 83 to 75 percent.

U.S. consumption and shipments

Capacitors.--Annual consumption dropped sharply in 1967 \* \* \* from \* \* \* 1966 \* \* \*; it rose \* \* \* through 1969, but then dropped \* \* \* in 1970 (appendix table 1, page Z-1). Apparent annual consumption of the major categories of fixed capacitors--electrolytic, paper and film, ceramic, and other--generally followed the same fluctuations (appendix tables 3, 4, 5, and 6 on pages Z-4 through Z-7).

\* \* \* \* \*

U.S. producers' shipments fluctuated with consumption (appendix table 2, page Z-2). The share of the total value of U.S. consumption of fixed capacitors supplied from domestic production during 1966-70 declined \* \* \*.

Transistors.--Annual U.S. consumption of transistors fluctuated widely during 1966-70. Consumption declined from \* \* \* 1966 to \* \* \* 1967, rose \* \* \* in 1969 but then dropped severely \* \* \* in 1970 (appendix table 7, page Z-8).

U.S. producers' shipments experienced a strong downward trend during 1966-70 (appendix table 8, page Z-9). The share of total U.S. consumption of transistors, by quantity, supplied from domestic production decreased from \* \* \* 1966 to \* \* \* 1970. The decline is attributed largely to extensive use of foreign manufacturing facilities by U.S. producers and the importation of transistors under TSUS items 806.30 and 807.00.

Integrated circuits.--The value of U.S. consumption of integrated circuits increased rapidly from \* \* \* 1967 to \* \* \* 1970. Data on consumption by quantity were available for 1970 only (appendix table 9, page Z-10). The share of the total value of consumption of integrated

circuits supplied from U.S. production declined despite an increased value of shipments of domestically produced units. In 1967, \* \* \* percent of consumption was represented by domestically produced units, in 1970, \* \* \* percent. The decline is attributed largely to the increased use of foreign manufacturing facilities by U.S. firms and the importation of integrated circuits under TSUS item 806.30.

U.S. imports

All fixed capacitors.--The value of U.S. imports of fixed capacitors increased from \* \* \* 1966 to \* \* \* 1970 (appendix table 10, page Z-11). The value of imports from Japan, the principal source, generally declined \* \* \*. The bulk of the increase in the value of imports of fixed capacitors is attributed to imports from Mexico and Taiwan where U.S. firms utilized foreign facilities to process capacitors prior to importation into the United States under TSUS items 806.30 or 807.00.

U.S. imports of fixed capacitors dutiable under the regular provisions of the TSUS rose from \* \* \* 1966 to \* \* \* 1970; entries dutiable under the provisions of items 806.30 and 807.00 rose from \* \* \* 1966 to \* \* \* 1970. The share of the total value of imports of fixed capacitors entered under items 806.30 and 807.00 increased from 1.3 percent in 1966 to 27.6 percent in 1970. In 1970, 806.30/807.00 imports from Mexico accounted for 13.6 percent of the total value of imports and those from Taiwan, 6.7 percent (appendix table 11, page Z-12).

\* \* \* \* \*

Semiconductors and parts.--The total value of U.S. imports of semiconductors (including transistors and integrated circuits) and parts increased from \$50.2 million in 1966 to \$189.3 million in 1970. The great bulk of the value of imports is attributed to less developed countries (LDC's) such as Mexico, Hong Kong, Korean Republic, Singapore, Ireland, and Taiwan.

Virtually all semiconductors imported from LDC's are entered into the United States under the provisions of items 806.30 and 807.00. In 1970, imports of semiconductors (largely transistors) under item 807.00 accounted for 66 percent of the total value of imports of semiconductors and parts, and imports under item 806.30 (principally integrated circuits) accounted for an additional 17 percent of the total (appendix table 16, page Z-17).

The total value of U.S. imports of transistors declined from 1966 to 1967 and then increased to \$59.8 million in 1970. Mexico and Hong Kong were the principal sources (appendix table 17, page Z-18).

The total value of U.S. imports of transistors increased rapidly, while U.S. producers' shipments \* \* \* declined, using 1966 as a base year, as shown below.

\* \* \* \* \*

The total value of U.S. imports of integrated circuits was \$69.4 million in 1970, the only year for which official statistics are available. According to trade sources, imports of integrated circuits rose rapidly from \$4.0 million in 1967 to \$30.0 million in 1969.



The value of imports of semiconductors (including integrated circuits) other than transistors and parts thereof increased from \$21.5 million in 1966 to \$129.6 million in 1970 (appendix table 18, page Z-19). The Korean Republic, Singapore, Hong Kong, and Mexico were the four principal sources.

Although the value of U.S. imports of integrated circuits is estimated to have increased much more rapidly than U.S. producers' shipments, domestic shipments increased far more in absolute terms than imports. \* \* \*

\* \* \* \* \*

#### U.S. exports

Capacitors.--The total value of U.S. exports of fixed capacitors increased from \$21.2 million in 1966 to \$29.5 million in 1969 before declining to \$26.6 million in 1970. Principal markets were developed countries such as Canada and the countries in the European Economic Community. The bulk of the value of exports consisted of capacitors for electronic applications and was principally electrolytic capacitors. U.S. exports to Mexico, the fourth largest market, were largely parts of capacitors which are believed to be assembled in Mexico for export, as completed capacitors, to the United States (appendix table 19, page Z-20).

Transistors and integrated circuits.--The total value of U.S. exports of transistors increased from \$46.4 million to \$88.9 million from 1967 to 1970 and of integrated circuits from \$26.5 million to \$99.8 million. The major markets were developed countries, principally Japan (appendix tables 20 and 21, pages Z-21 and Z-22).

## Sprague Electric Company

Company organization and product line

Sprague Electric Company, incorporated in 1926, is a multiproduct, multinational corporation consisting of 19 manufacturing establishments and subsidiaries and an affiliated company in the United States and 13 manufacturing facilities and affiliated companies in foreign countries, principally in the European Economic Community, the Far East, and Mexico. The firm's headquarters are at North Adams, Mass. In its early years, Sprague produced capacitors, principally, but gradually expanded its production to other electronic components and networks such as pulse transformers, pulse-forming networks, electronic filters, resistors, inductors, and shift registers. In 1956, the firm commenced production of transistors and, in 1966, of integrated circuits. The bulk of Sprague's production consists of capacitors of virtually every type. Sprague is reported by Standard & Poor's to be the largest producer of capacitors in the United States.

\* \* \* \* \*

Capacitors.--Capacitors are produced at ten of Sprague's domestic establishments, five of which are involved in petitions for adjustment assistance. \* \* \*

\* \* \* \* \*

Transistors.--Transistors are produced at two of Sprague's domestic establishments; however, each establishment produces a different type, the types produced are dissimilar in use, and production facilities used to produce the different types are considerably different. \* \* \*

\* \* \* \* \*

Integrated circuits.--Integrated circuits (IC's), produced by Sprague initially in 1966, are produced in one of the firm's domestic establishments and also by an affiliated firm in which Sprague owns a minority interest. The IC's cited in the firm petition are different from those produced by the affiliated firm and the processes used in production are quite different. \* \* \*

\* \* \* \* \*

Markets

The principal users of products produced by Sprague are original equipment manufacturers in electronic industries such as consumer electronic products, data processing, and electronic instruments. The following sections indicate trends in domestic shipments and imports of major articles produced.

Television receivers.--The quantity and value of shipments of U.S.-produced television receivers declined from 1966 to 1970 except in 1968 as shown below.

Television receivers and combinations: Shipments of U.S.-produced units, 1966-70

Item	1966	1967	1968	1969	1970
Quantity---million units--	11.7	9.7	10.3	8.9	7.8
Value---million dollars--	2,349.6	2,191.5	2,222.5	1,859.5 <sup>1/</sup>	1,700.0

<sup>1/</sup> Estimated by the Tariff Commission staff.

The market is supplied by imported television receivers in increasing amounts as shown below.

Television receivers and combinations: U.S. imports for consumption, 1966-70

Item	1966	1967	1968	1969	1970
Quantity-----million units--	1.5	1.6	2.7	4.0	4.5
Value-----million dollars--	115.7	125.6	203.8	295.9	315.7

\* \* \* \* \*  
Electronic computing equipment.—The value of U.S. shipments of electronic computing equipment is estimated by the Bureau of Domestic Commerce to have declined in 1970 after a 3-year increase as shown below.

Electronic computing equipment: Value of shipments by U.S. producers, 1967-70

(In millions of dollars)

Item	1967	1968	1969	1970
Value of shipments-----	3,761	4,151	<sup>1/</sup> 4,421	<sup>1/</sup> 4,200

<sup>1/</sup> Estimated by the Bureau of Domestic Commerce.

The share of the market supplied by imported electronic computing equipment is unknown. Available import data on certain computing

equipment and parts are shown below. Such data are not necessarily representative.

Specified computing equipment: Value of U.S. imports, 1966-70

(In millions of dollars)

Item	1966	1967	1968	1969	1970
Accounting, computing and other data processing machines-----	5.6	8.3	11.1	14.8	17.6
Calculating machines especially constructed for multiplying and dividing-----	36.3	49.9	74.0	108.1	158.1
Parts of machines incorporating a calculating mechanism-----	28.4	39.4	50.3	99.2	120.0

Laboratory and engineering instruments.--The value of U.S. shipments of laboratory and engineering instruments increased from \$1 billion in 1967 to an estimated \$1.25 billion in 1970.

Laboratory and engineering instruments: Value of shipments by U.S. producers, 1967-70

(In billions of dollars)

Item	1967	1968	1969	1970
Value of shipments-----	1.00	1.12	<sup>1/</sup> 1.15	<sup>1/</sup> 1.25

<sup>1/</sup> Estimated by the Bureau of Domestic Commerce.

The share of the market supplied by imported laboratory and engineering instruments is believed to be small but increasing.

Available data on certain instruments are shown below. Such data are not necessarily representative.

Certain electrical measuring, checking, analyzing, or automatically controlling instruments and apparatus, and parts thereof: Value of U.S. imports for consumption, 1966-70

(In millions of dollars)

Item	1966	1967	1968	1969	1970
Value of U.S. imports -----	1/	1/	49.8	56.7	77.8

1/ Not available.

\* \* \* \* \*

Prices

A comparison has been made of domestic and foreign prices of the products cited in the petition from purchase data submitted to the Commission \* \* \*. The data include prices paid, and prices quoted, for delivered purchases from foreign suppliers, Sprague, and other domestic suppliers of like items, and the quantities involved. \* \* \*

\* \* \* \* \*

Profit and loss experience

Sprague Electric Co. submitted profit and loss data on their total domestic operations as well as on their individual product lines. Data applicable to foreign operations are not included in the profit or loss tables.

\* \* \* \* \*

STATISTICAL APPENDIX





Table 1.--Fixed capacitors: Total U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1966-70

Year	U.S. producers' shipments <u>1/</u>	Imports <u>2/</u>	Exports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity (million units)					
1966-----	***	***	111	***	***
1967-----	***	***	92	***	***
1968-----	***	***	99	***	***
1969-----	***	***	134	***	***
1970-----	***	***	97	***	***
Value (1,000 dollars)					
1966-----	***	***	21,171	***	***
1967-----	***	***	20,289	***	***
1968-----	***	***	22,263	***	***
1969-----	***	***	29,494	***	***
1970-----	***	***	26,551	***	***
<u>1/</u> * * *					
<u>2/</u> * * *					

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 3 .--Capacitors, fixed electrolytic: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1966-70

Year	Domestic shipments <u>1/</u>	Im-ports <u>2/</u>	Exports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity (million units)					
1966-----	***	***	21	***	***
1967-----	***	***	7	***	***
1968-----	***	***	13	***	***
1969-----	***	***	25	***	***
1970-----	***	***	37	***	***
Value (1,000 dollars)					
1966-----	***	***	8,913	***	***
1967-----	***	***	7,055	***	***
1968-----	***	***	8,498	***	***
1969-----	***	***	12,872	***	***
1970-----	***	***	16,934	***	***
<u>1/</u>	***				
<u>2/</u>	***				

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 4 .--Capacitors, fixed, paper or film dielectric: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1966-70

Year	Domestic shipments <u>1/</u>	Imports <u>2/</u>	Exports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity (million units)					
1966-----	***	***	8	***	***
1967-----	***	***	11	***	***
1968-----	***	***	7	***	***
1969-----	***	***	11	***	***
1970-----	***	***	11	***	***
Value (1,000 dollars)					
1966-----	***	***	2,168	***	***
1967-----	***	***	2,538	***	***
1968-----	***	***	2,156	***	***
1969-----	***	***	2,895	***	***
1970-----	***	***	3,022	***	***
<u>1/</u> ***.					
<u>2/</u> ***.					

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 5.--Capacitors, fixed ceramic: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1966-70

Year	Domestic shipments <u>1/</u>	Im-ports <u>2/</u>	Exports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity (million units)					
1966-----	***	***	<u>3/</u> 18	***	***
1967-----	***	***	<u>3/</u> 13	***	***
1968-----	***	***	<u>3/</u> 17	***	***
1969-----	***	***	<u>3/</u> 17	***	***
1970-----	***	***	14	***	***
Value (1,000 dollars)					
1966-----	***	***	<u>3/</u> 1,817	***	***
1967-----	***	***	<u>3/</u> 1,626	***	***
1968-----	***	***	<u>3/</u> 1,820	***	***
1969-----	***	***	<u>3/</u> 2,008	***	***
1970-----	***	***	1,892	***	***

1/ \* \* \*

2/ \* \* \*

3/ Estimated by the staff of the U.S. Tariff Commission.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 6.--Capacitors, fixed, other than electrolytic, paper and film:  
U.S. producers' shipments, imports for consumption, exports of  
domestic merchandise, and apparent consumption, 1966-70

Year	U.S. producers' shipments <sup>1/</sup>	Im-ports <sup>2/</sup>	Exports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity (million units)					
1966-----	***	***	<u>3/</u> 56	***	***
1967-----	***	***	<u>3/</u> 39	***	***
1968-----	***	***	<u>3/</u> 44	***	***
1969-----	***	***	<u>3/</u> 40	***	***
1970-----	***	***	<u>3/</u> 35	***	***
Value (1,000 dollars)					
1966-----	***	***	<u>3/</u> 7,226	***	***
1967-----	***	***	<u>3/</u> 5,729	***	***
1968-----	***	***	<u>3/</u> 5,522	***	***
1969-----	***	***	<u>3/</u> 5,688	***	***
1970-----	***	***	<u>3/</u> 4,703	***	***

<sup>1/</sup> \* \* \*

<sup>2/</sup> \* \* \*

<sup>3/</sup> Estimated by the staff of the U.S. Tariff Commission.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.



Table 7.--Transistors: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1966-70

Year	U.S. producers' shipments <sup>1/</sup>	Imports	Exports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity (1,000 units)					
1966-----	***	261,945	72,248	***	***
1967-----	***	296,657	85,410	***	***
1968-----	***	451,375	123,359	***	***
1969-----	***	701,360	280,222	***	***
1970-----	***	602,343	249,529	***	***
Value (1,000 dollars)					
1966-----	***	28,657	54,053	***	***
1967-----	***	26,890	46,434	***	***
1968-----	***	44,889	51,052	***	***
1969-----	***	59,001	83,092	***	***
1970-----	***	59,819	88,898	***	***
1/ * * *					

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 9.--Integrated circuits: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1966-70

Year	U.S. producers' shipments <sup>1/</sup>	Imports	Exports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity (1,000 units)					
1966-----	***	N.A.	N.A.	***	***
1967-----	***	N.A.	10,251	***	***
1968-----	***	N.A.	20,974	***	***
1969-----	***	N.A.	54,811	***	***
1970-----	***	248,710	66,003	***	***
Value (1,000 dollars)					
1966-----	***	N.A.	N.A.	***	***
1967-----	***	<sup>2/</sup> 4,000	26,468	***	***
1968-----	***	<sup>2/</sup> 13,000	36,152	***	***
1969-----	***	<sup>2/</sup> 30,000	72,425	***	***
1970-----	***	69,444	99,768	***	***
<sup>1/</sup> * * *					

<sup>2/</sup> Data obtained from a trade article, Microelectronics Shakedown and Shakeout, prepared by Quantum Science Corp.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.



Table 11.--Electrical capacitors (all types): Percent of total value of U.S. imports supplied by principal sources and percent supplied by TSUS item 806.30 and 807.00 imports, 1965-70

Source	1965	1966	1967	1968	1969	1970
Percent supplied by principal sources						
Japan-----	66.2	68.8	66.2	54.6	46.3	39.4
Mexico-----	.2	.9	1.4	4.9	7.7	15.1
Taiwan-----	.4	.6	3.7	6.1	8.2	9.5
West Germany-----	8.3	7.5	7.7	11.2	11.0	9.0
Canada-----	.4	1.1	2.2	1.5	2.2	5.1
Netherlands-----	8.1	6.8	5.8	5.7	4.7	4.9
Italy-----	6.5	4.7	3.5	2.9	3.9	4.4
Jamaica-----	-	-	-	1.9	2.9	2.9
Portugal-----	-	-	-	1.7	3.2	2.6
Hong Kong-----	2.1	2.1	1.8	1.5	2.8	2.0
All other <sup>1/</sup> -----	7.8	7.5	7.7	8.0	7.1	5.1
Percent supplied by item 806.30 and 807.00 imports						
Japan-----	<u>2/</u>	0.01	0.03	0.04	0.05	0.02
Mexico-----	<u>2/</u>	.44	.80	4.18	7.21	13.61
Taiwan-----	<u>2/</u>	.64	2.69	4.93	6.64	6.66
Canada-----	<u>2/</u>	.24	.03	.02	.10	.74
Italy-----	<u>2/</u>	-	-	-	-	.04
Jamaica-----	<u>2/</u>	-	-	1.90	2.78	2.93
Portugal-----	<u>2/</u>	-	-	1.33	3.18	2.62
Hong Kong-----	<u>2/</u>	-	-	.18	.42	.84
All other-----	<u>2/</u>	-	-	-	.10	.14
Total-----	<u>2/</u>	1.33	3.60	10.87	20.48	27.60

<sup>1/</sup> Adjusted to add to 100 percent.

<sup>2/</sup> Data on item 807.00 imports in 1965 are incomplete.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 16.--Semiconductors (including transistors and integrated circuits) and parts thereof: Percent of total value of U.S. imports entered under items 806.30 and 807.00 and percent of total value of imports entered duty exempt

(Percent)										
Source	:	1966	:	1967	:	1968	:	1969	:	1970
Imports under item	:		:		:		:		:	
807.00:	:		:		:		:		:	
Total-----	:	63	:	72	:	75	:	69	:	66
Duty-free-----	:	23	:	40	:	43	:	40	:	39
Imports under item	:		:		:		:		:	
806.30:	:		:		:		:		:	
Total-----	:	-	:	-	:	3	:	13	:	17
Duty-free-----	:	-	:	-	:	2	:	4	:	8

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 17.--Transistors: U.S. imports for consumption,  
by principal sources, 1966-70

Source	1966	1967	1968	1969	1970
Quantity (1,000 units)					
Mexico-----	991	9,450	80,918	135,699	80,085
Hong Kong-----	154,045	161,122	200,555	277,270	255,160
Ireland-----	59,455	83,127	85,725	124,426	98,973
Singapore-----	-	-	-	33,153	52,179
Japan-----	22,754	13,574	25,052	26,832	17,161
Portugal-----	-	613	1,176	22,421	22,860
Taiwan-----	2,246	9,022	21,346	41,645	20,776
Korean Republic-----	7	2,616	3,539	9,752	31,705
All other-----	22,446	17,133	33,064	30,162	23,444
Total-----	261,944	296,657	451,375	701,360	602,343
Value (1,000 dollars)					
Mexico-----	295	1,653	11,874	11,753	18,384
Hong Kong-----	11,563	11,394	13,930	19,422	17,257
Ireland-----	7,897	7,640	7,543	9,345	7,298
Singapore-----	-	-	-	4,790	5,334
Japan-----	3,358	2,411	3,824	4,295	3,283
Portugal-----	-	89	184	2,009	2,218
Taiwan-----	169	682	1,791	2,217	1,490
Korean Republic-----	2	256	349	565	1,421
All other-----	5,372	2,624	5,226	4,605	3,134
Total-----	28,656	26,749	44,721	59,001	59,819

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 18.--Semiconductors (including integrated circuits) other than transistors and parts thereof: U.S. imports for consumption, by principal sources, 1966-70

(In thousands of dollars)

Source	1966	1967	1968	1969	1970
Korean Republic-----	18	597	8,366	18,892	22,188
Singapore-----	-	-	-	7,533	21,292
Hong Kong-----	7,503	6,899	6,663	12,565	19,017
Mexico-----	3	1,164	3,657	12,290	15,798
Japan-----	5,111	4,683	4,659	7,937	10,496
Taiwan-----	214	2,240	5,563	7,878	9,401
Netherlands Antilles-----	-	-	849	11,185	5,993
Ireland-----	-	451	3,537	3,297	5,623
All other-----	8,693	7,938	12,450	15,263	19,771
Total-----	21,542	23,972	45,744	96,840	129,579

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 19.--Electrical capacitors, all types: U.S. exports of domestic merchandise, by principal markets, 1966-70

(In thousands of dollars)

Market	:	1966	:	1967	:	1968	:	1969	:	1970
France-----	:	4,697	:	3,852	:	3,545	:	4,673	:	6,646
Canada-----	:	7,526	:	6,882	:	7,213	:	6,946	:	6,246
West Germany-----	:	1,812	:	1,808	:	2,541	:	4,087	:	5,513
Mexico-----	:	519	:	796	:	1,982	:	3,077	:	4,643
United Kingdom-----	:	3,147	:	2,897	:	2,513	:	3,206	:	3,429
All other-----	:	9,093	:	9,556	:	11,231	:	16,291	:	21,375
Total-----	:	26,794	:	25,791	:	29,025	:	38,280	:	47,852

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 20.--Transistors: U.S. exports of domestic merchandise,  
by principal markets, 1966-70

Source	1966	1967	1968	1969	1970
	Quantity (million units)				
Japan-----	5.4	10.2	14.4	35.7	53.1
West Germany-----	2.8	3.9	8.7	23.9	41.6
Switzerland-----	12.7	9.6	9.1	27.8	33.2
United Kingdom-----	8.9	5.7	7.7	13.7	20.6
France-----	6.2	10.8	25.3	37.5	23.7
Canada-----	6.9	8.5	14.2	18.4	18.4
Hong Kong-----	16.3	19.9	20.3	63.2	24.4
All other-----	13.3	16.8	23.7	60.0	34.5
Total-----	72.5	85.4	123.4	280.2	249.5
	Value (1,000 dollars)				
Japan-----	3.6	4.8	5.4	10.0	16.3
West Germany-----	3.0	3.6	5.3	10.0	14.4
Switzerland-----	11.0	9.3	7.4	11.7	13.2
United Kingdom-----	8.2	5.0	6.4	8.3	10.2
France-----	7.3	6.5	7.2	11.2	9.6
Canada-----	6.3	5.5	5.9	6.4	5.9
Hong Kong-----	3.9	1.9	2.5	4.4	2.4
All other-----	10.8	9.8	11.0	21.1	16.9
Total-----	54.1	46.4	51.1	83.1	88.9

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 21.--Integrated circuits: U.S. exports of domestic merchandise, by principal markets, 1967-70

Source	1967	1968	1969	1970
Quantity (million units)				
Japan-----	2.8	8.6	14.2	17.7
West Germany-----	.7	1.3	6.1	19.1
Switzerland-----	1.8	2.9	6.4	6.3
United Kingdom-----	1.4	1.8	4.9	4.1
Netherlands-----	.4	.8	2.7	5.4
France-----	.7	1.5	3.6	2.3
All other-----	2.5	4.1	16.9	11.1
Total-----	10.3	21.0	54.8	66.0
Value (1,000 dollars)				
Japan-----	5.2	10.5	19.5	47.8
West Germany-----	2.1	2.9	8.3	15.1
Switzerland-----	4.9	4.7	8.0	9.6
United Kingdom-----	4.1	4.3	8.6	6.9
Netherlands-----	1.2	2.4	4.2	5.7
France-----	3.1	3.3	6.4	4.8
All other-----	5.9	8.1	17.4	9.9
Total-----	26.5	36.2	72.4	99.8

Source: Compiled from official statistics of the U.S. Department of Commerce.







