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Report on the Status of the Manufacture  
of Telecommunications Equipment  
(including low-cost receivers for sound  
broadcasting and television)

Vienna, 13 - 24 October 1969

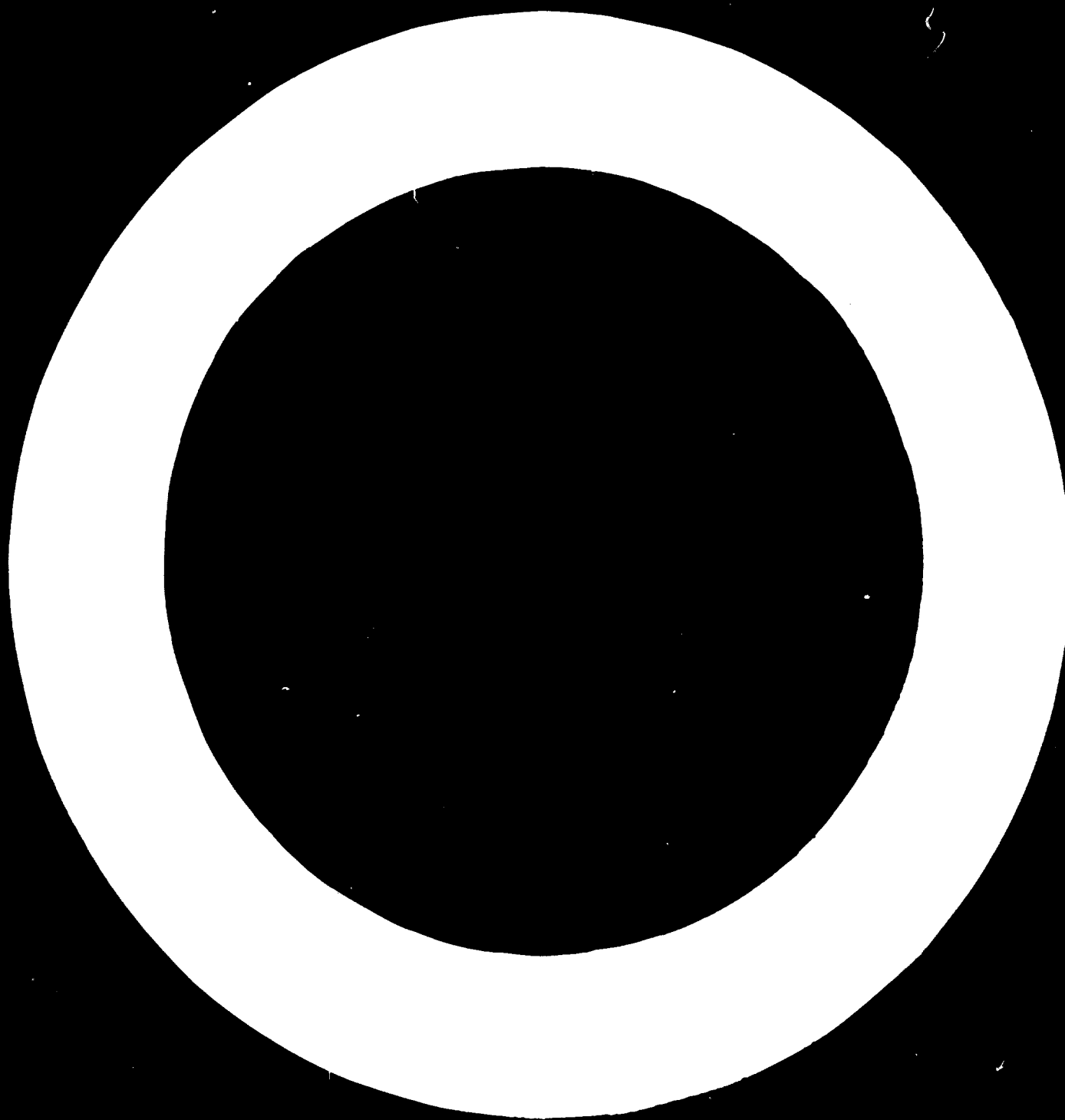
STATUS OF MANUFACTURE OF TELECOMMUNICATIONS  
EQUIPMENT IN ARGENTINA<sup>1/</sup>

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<sup>1/</sup> The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO. This document has been reproduced without formal editing.

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In the drawing up of this paper the following hypotheses have been taken into account:

1. Adoption of a growth strategy towards the interior with due regard to the possibilities which the future markets may bring.
2. Consideration that the electronics industry should play an important role as one of the generating and motivating factors of the economic development process.
3. Assignment of a fundamental role to the practice of scientific and technical investigation in the development of the electronic industry.

General objectives in the long term:

- 1.1 Achieve the consolidation and sustained growth of the electronic industry.
- 1.2 Achieve the regularization of the internal demand and an increased participation of local industry in the satisfaction of same.
- 1.3 Achieve a regional distribution which permits optimum utilization of the natural and manpower resources in each zone.
- 1.4 Achieve a maximum level of gross output by utilizing productive resources under optimum conditions.

2. General Objectives in the Medium term:

- 2.1 Achieve stable and high rate of employment in manpower and maintenance of the human asset by avoiding the exodus of professionals, technicians and specialized labour towards other activities not specifically pertinent to their training.
- 2.2 Utilization of the unemployed element.
- 2.3 Achieve a greater vertical integration in the manufacturing processes as far as the electronic industry is concerned.
- 2.4 Achieve the adoption of new and indigenous technologies bearing in mind the requirements of the new manufacturing programmes, continuation of the process of import substitution and delivery by the electronic industry of capital goods to industry as a whole which will require machinery and equipment of increasing complexity and sophistication.

3. Specific objectives in the medium term:

- 3.1 Facilitate investments in the electronic industry for satisfying the requirements of the demand for priority for the correction of production problems and for the improvement in productivity.
- 3.2 Maximized technological independence with a view to overall consolidation of the market.
- 3.3 Develop the engineering element with due regard for the economic and industrial structure of the countries.
- 3.4 Achieve optimum structures in the individual companies of the industry.

- 3.5 Achieve a change of mentality of and towards the electronics industry by stressing its industrial reality and its importance to the national interest.
- 3.6 Achieve the cancellation of distortions in the internal demand (amongst others those due to the disequilibrium in the balance of payments).
- 3.7 Educate the purchaser (public and private) in the face of the anomalies brought about by a product of restricted supply.
- 3.8 Ensure that the key industries in this field as regards the development and security of the nation do not lose their independence and do not disintegrate during periods of economic instability not related to such industries.
- 3.9 Within the context of industrial legislation due attention should be paid to the particular characteristics of the electronic industry.
- 3.10 Ensure that in the projects involving new public investments (elecommunications, energy distribution, transportation etc.) due attention is paid to the potential of local industry.
- 3.11 Obtain improvements in the efficiency and the quality of goods so as to improve the internal market and face up to international competition.
- 3.12 Set a course towards full utilization of the productive resources without protecting indirectly those inefficient companies which as a result of their installed capacities hinder the birth of new companies or the grouping of existing companies which would deploy more appropriate technologies, higher productivity etc., and which would render a better service to the country.
- 3.13 Discourage investment in the manufacture of electronic components, parts, or equipments which are inappropriate for manufacture within the country, so as to avoid the establishment of a fait accompli.
- 3.14 Apply pressure to obtain price levels in conformity with those operating in the internal markets of the exporting countries.
- 3.15 To decrease prices of equipment sets whether of national origin or imported in line with those of the export countries.

- 3.16 To rationalize financial mechanism to cover the various particular aspects which the electronics industry requires for its development.

#### 4.1 Evaluation Criteria

The variables which must be taken into account in order to study the evolution of the electronic industry, would be

- 4.1 Participation of the electronic industry in the gross manufacturing product.
- 4.2 Rate of utilization of the productive resources.
- 4.3 Evolution of the occupational structure.
- 4.4 Evolution of the qualitative and quantitative production.
- 4.5 Evolution of importation as to components, parts, equipments utility sets, overall competition and place of origin.
- 4.6 Evolution of exports as to the aggregate, the composition and the destination.
- 4.7 Evolution of the tender capability, both qualitatively and quantitatively
- 4.8 Evolution of the demand in the public sector, in the private sector and also in the composition of same.
- 4.9 Evolution of the production profile.

#### 5. Strategy

##### Public Sector Demand

Bearing in mind that the demand and especially the regular demand is an autonomous element for dynamism for guaranteeing and promoting the electronic industry, the purchasing commitment as an instrument of economic policy is a readily manageable tool which conditions and orients the production of the companies as well as their investments towards increasing the capacity of production or towards the adoption of new technologies. And assuming that the private sector (tendering) responds to a programme of purchasing by the public sector and that it is capable of providing the private sector with a running production:

It is considered necessary to prepare and put into effect a Centralized Medium Term purchasing plan for the Public Sector.

- 5.1 Within a framework of free contracting, the public sector, as a major purchaser should operate in accordance with the demand and the tender with a view to achieving the objectives mentioned.



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- 5.2 It is recommended that a study should be studied for the possibility of putting into effect a system of direct purchase and sale negotiations, costing alternatives, a reduction of the margin, etc.) which would improve the situation of tendering especially in the case of major purchases, where the number of alternatives are restricted.
  - 5.3 In the case of foreign alternatives, reports which contain extensive sets of equipment preference should be given to those agencies who recognize the value of maximizing the amount of capital goods manufactured within the country and necessary practical measures to this end should be adopted.
  - 5.4 Existing methods of financing should be subjected to continuous improvement treatment in reports electronic component parts and equipment of national origin on the part of the private sector.
  - 5.6 The rehabilitation of production structures which are deficient should be encouraged (establishment of production rates, technological improvements, organizational change, etc.) through a medium which would facilitate the concentration or fusion of companies.
  - 5.7 A study should be undertaken in order that the progressive diminution of import tariffs, especially for those products bearing a heavy price burden, with a view to discouraging the survival and creation of inefficient industrial structures. At the same time the import duties for the assemblies of such products should also be diminished.
  - 5.8 Local engineering resources should be encouraged by legislative, financial or other means as convenient. In the case of State enterprise projects a high degree of preference should be given to the contracting out of such research facilities.
  - 5.9 In the study courses at university level the production facilities of the country and the local manufacturing possibilities of the electronic industry should be propagated. In addition such courses should include such activities which reduce disquiet and produce incentives for investment aimed at the development of technologies appropriate to the economic structure in this particular industry.

5.10 The overall framework of industrial promotion should not be contradictory to the expansion of the electronics industry.

5.11 It is important to avoid taking conflicting measures which might compromise the objectives laid down, or which might place in jeopardy the continuity of the lines of action taken.

It is proposed that a study should be undertaken to arrive at the promotion system whose objectives would be to implement the efficient and methodical development of the electronics industry.

Proposition:

- A. Sub-division of the electronics industry
- B. Validation
- C. Promotional System
- D. Implementation and Strategy

A. Sub-division of the Electronic Industry:

According to the characteristics of their demand, the goods produced by the electronics industry can be sub-divided as follows:

- A.1 Entertainment equipments: These include; radio and television sets, tape recorders, etc.; for domestic use.
- A.2 Telecommunications Equipment: These include: telephone exchanges, radio and television transmitting equipment, microwave equipments, transmission and reception stations via satellite, etc.
- A.3 Equipments for military use and for security: These include; some of the equipment of Sections 21+22, radar, sonar, aerial navigation equipment, tracking and firing control equipment, etc.
- A.4 Electronic Equipment for Industrial application: These include: ultrasonics, high-frequency thermal treatments, telemetering, telecontrols, servo-mechanisms, automation, etc.
- A.5 Data processing equipment: i.e. computers, simulators, etc.
- A.6 Electronic Equipment for Medical Application: These include: X-rays, electro-cardiographs, electro-encephalographs, radio-isotopes equipment, etc.
- A.7 Electronic Components: These include; valves and tubes, transistors, capacitors, etc. These constitute the major part of the equipment assemblies mentioned above.

The products included in A.1 are considered to be durable consumer Goods, those in A.2 to A.4 are Capital Goods, and those of A.5 are Intermediate Goods.

#### Origin of the Demand

The demand for products included in A.1 and A.2 originates mainly from the private sector. That of the products in A.3 and A.4 originates in the public sector. That of all products included in A.5 and A.6 originates in both sectors and the demand for electronic components depends indirectly on these last.

#### B. Validations:

- B.1 The projection of the demand in the private sector and especially the ordering of the demand in the private sector within a unified purchasing plan on a medium term basis, would constitute an important instrument which would permit the effective application of a Special Promotional method which together with its counterpart for the orientation of the trader should be particularly beneficial to the economy of the country.
- B.2 From a preliminary estimate of the demand it would be seen that this would be of such scope as to justify the concerted promotion of the offer under good conditions of operation.
- B.3 Advantage should be taken of the opportunity presented by an ordered demand. In the ultimate this is the principle exogenous factor which will define the interest of the investors and its regularity as well as its growth the fundamental for the economic considerations of production.
- B.4 Out of Phasing conditions between demand and supply should be avoided since in the ultimate this would result in a negative balance of payments or in a high rate of unemployment but particularly in the loss of opportunity or at least in its deterioration.

#### C. Promotional System

Based on the aforesaid considerations and bearing in mind the conclusions which the study in greater depth of the subject might engender, it is felt that the application of a special system of promotion would be appropriate. Such a system should operate as a control

of the demand and should orient the supply side to achieve the maximum of economy in its operation and the greatest extent of development compatible with the internal and external market. In addition the "organization of the assets" should be reviewed in order to take advantage of the direct and indirect results brought about by the promotion of this activity within the various economic and social activities through the medium of its products and its demand.

Via a process of diminishing costs (and prices) this would culminate in the achievement of a higher performance for the public and private investments. As far as its operation is concerned the promotional mechanism should basically, consider the following points:-

- C.1 Selection of the products acceptable for promotion taking into account the level of demand also the manufacturing technologies, the price levels achievable in the internal market at the time of consolidated activity and related to the prices of the internal markets in the exporting countries, etc.
- C.2 Diminuting or rationalization of the import tariffs for such products and for those assemblies whose local manufacture is not possible or inappropriate.
- C.3 Progressive integration with electronic components of local manufacture.
- C.4 Utilization of the unemployed production element.
- C.5 Promotion of local investigation facilities and adoption of home technologies appropriate to the characteristics of the market to which certain priorities should be granted to an extent which does not jeopardize the quality of the products.
- C.6 In the case of products which must be manufactured under licence, permission for such licence should be conceded without difficulty.
- C.7 The promotion system should be conceived in such a way that its application implies the use of simple and effective control mechanisms.
- C.8 Forming part of this system, adequate fiscal measures should be considered to cater for financing and promotion of exports.

D. ANALYSIS OF THE SITUATION

Once the operational system has been established, the strategy to be followed, would have to form the subject of a complementary analysis which, in its essential element, would refer to:-

- D.1 Basic study on supply and demand bearing in mind the various objectives. Such a study would fundamentally orient all action to be taken.
- D.2 Relationship or consultation with the various national elements.
- D.3 Relationship or consultation with the demand-originating agencies.
- D.4 Relationship or consultation with other State agencies which would need to collaborate and co-ordinate in accordance with their particular attributes.

The Electronic Industry in the Argentine

Foreword

After 1930, as a consequence of the world crisis and the Second World War, there began in Argentina an industrial development which, by 1945, was able to achieve a product superior to that of agriculture. It was at this time that the Government contributed to the invigorating of industrialization aided by a so-called nationalism, thus producing an outward growth in our industry. Importation of industrial products were successively substituted by national products but without the necessary complementary supply of the critical parts which had to be imported, thus arriving at a scarcity of component parts for which our industry had not the technological resources to manufacture. In this way, our country lost the opportunity to develop an industry of successive replacement while obtaining support from the productive resources of Europe and North America, acquiring from these the essential elements and the experience. We are well aware that our industrial production at that time was suffering grave childhood pains with regard to quality, and that its integration had been too precipitate. At the start of the 50s decade towards 1952, the system of quotas and importation licences was adopted in order to resolve the problem of foreign exchange shortage. This system remained in force until 1956. The demand for foreign exchange for the importation of capital goods and consumer goods was dealt with in 1958 by the imposition of a system of very high customs charges. It is evident that the establishment of high charges on importation was an indiscriminate incentive to the national industrial production, having established a new internal exchange parity which only had the effect of raising the prices of internal products in keeping with the high prices of imported industrial products used for their manufacture. The industry had already become established as a wholesale importer, but its production costs were raised by the incidence of the high charges levied on its production capital goods. Salaries were then forced up to the new level of prices, so that a further escalation of relative costs was produced with the prices of industrial manufacturers taking the highest position, salaries just below that, next the services, and finally the agropecuarians products.

### The customs problem

The high import charges coupled to the high specific cost (21.00 per cubic cm) of electronic equipment and materials had turned the electronic industry into one of the major outlets for contraband of two types: the direct type and the laral type, which is achieved by the under-invoicing of the imported products. In order to resolve this last aspect, the customs authorities had to control the declared value of the merchandise and had to resort to contacting the parent undertaking in order to verify such assessments. The industry accepted to collaborate with this system in view of the fact that the customs had already ceased to be the central element in the use of foreign exchange, in order to become a form of industrial protection, or, in other words, the very industrial incentive which is so necessary in a country wishing to encourage its development.

### The importance of industry

The development of national industry is not intended as a favour for the industrialist. It is an imperious national decision whose benefits have already erased the last vestiges of disapproval which it had inspired at the beginning. It is a criterion already subscribed to by all the countries of the world that the development of technology is the principal factor in the overall development of the people. It is in the light of such concepts that the customs tariffs must be drawn up not only for the raw materials and component parts which the country does not produce, but also for the finished equipment, whether these be of national production, of possible national production, or whether they be necessarily imported. The fiscal authority holds in this measure a secondary advantage in that it can transfer the tax to any other stage of the production, but, in whichever form, the tax must exist in its character of a limiting factor in the importations so as to encourage national industry. The industrial sector produces 67% of the negotiable assets consumed. It is the major consumer of services, the major employer and the highest tax payer. Undesirable imports which displace the sale of similar

national products produce a customs earning, but this is very much smaller than the internal fiscal wastage in view of the fact that the fiscal income from customs is 13% of the total income. It is evident that as far as industrial development is concerned the customs authority must not be considered as a tax collecting medium.

#### Capital Assets

Investment in production is considered to be desirable and appropriate and therefore merits preferential treatment. In spite of the serious difficulties which the nation has met in the past an important production of capital goods has been developed. It is evident that the industrial development and the maintenance of an increasing technological level require that all possible facilities must be made available so that the companies may acquire such capital goods whether these be of national or imported origin.

#### Future of the Electronic Industry

It is hardly necessary to repeat the large number of arguments which demonstrate that the electronic industry, in spite of its relative youth, has characteristics of such a particular nature as to render it a decisive factor in the technological development. Legislation should be put in hand to the effect that the electronic industry should have its products protected in accordance with the development rate proposed, should establish tariffs at reasonable levels for the raw materials not produced in the country, should authorize medium and long-term credits and should make tax concessions aimed at fomenting a steady development in the production of components enabling the industry to arrive at international price levels thus encouraging a strong increase in the production of electronic engineering equipments by employing highly qualified manual labour as well as the engineers and technicians whom we are actually exporting at present.

During the last five years negotiations under the auspices of the A.L.A.L.C. have demonstrated that our electronic industry cannot accept the challenge of a total and reciprocal tax removal since the distortion produced in its costs structure by the tariffs imposed on its imported assemblies cannot be compensated by the draw-back and renders inefficient the engineering function and the productive capacity of our companies.



### Educational Television

The role of television in education has been exhaustively discussed and has resulted in unanimous opinions on an international scale to the effect that this medium is the most powerful cultural tool of the first magnitude.

This theme appears in many publications of the United Nations amongst which we may mention volume I on the application of science and technology in the development of agriculture (1961) and the South American edition of ILO (1961) as well as in the report and papers on mass communication no. 3 (UNESCO 1963).

These judgments result from affirming that educational television will be able to introduce a new dimension in the educational process by conveying to the pupil the actual scene in which the drama of the human history is developing, with all the force of its vitality, every student in the position of the first row spectator and to remain particular points in the pedagogical sense such as the simplified representation of the most abstract ideas and the most exact representation of all the world wide and universal events enriched by direct vision.

Television is the unsurpassable instrument which enables us to overcome the educational crises of our times as well as the excessive increase in general knowledge and the equally explosive increase in the student population, with all that this implies, not to mention the shortage of tutors and professors.

Classes of any type could be planned and put forward by a relatively small body of specialists and without the necessity for an enormous multiplicity of didactic equipment, video tape or video film recordings and re-transmissions in whatever localities required including unlimited repetition of programmes. Furthermore, the courses, conferences and classes transmitted directly without recording can reach a number of students which could easily exceed by 30 or 40 times the capacity of the main lecture hall in the type of our facilities.

This is a field especially interesting in our country where distances are immense and a considerable proportion of the population is distributed outside the radius of influence of our urban centres, this being aggravated by the fact that the State does not possess the economic means necessary to create and equip educational establishments in all the localities where these are required.

A further very grave local problem no longer applicable in the rural zones is the enormous crisis of space availability and scarcity of equipment and personnel suffered by the teaching institutions.

As we have said, all the considerations made have been accepted internationally and shared by our educators, but that which has not been considered in depth, except in a few highly developed countries, is the practical realization and effective utilization of this system of teaching.

In our expose we will take as reference the projects undertaken in the United States of America since it is in this country that this subject has been the most intensely developed as far as present information reveals.

The distinction must be made between:

- a) educational television channels
- b) educational television on closed circuits

The basic and fundamental medium is the educational television channel since the closed circuit system either receives the transmission from the main channel in order to distribute it within the establishment or it generates the signal itself within the establishment. In both cases we are dealing with a signal transmission network similar to those already existing in various towns of the country. As a system for distributing an image received over the air from a main channel it is convenient and easy to achieve, as such it deserves no particular comment. Generation of the signal itself is also possible, but it limits vision to the installations of the institutions which possess them and furthermore it is comparatively expensive.

The most appropriate and effective medium, the broadcasting television channel implies certain considerations which confirm its feasibility and necessity for official authorization and regulation.

The existing television channels in our medium occupy the V.H.F. frequency bands (channels 2 to 13 - 54 to 216 Mc/second). The U.H.F. frequency bands (channels 14 to 33 - 470 to 790 Mc/second), are reserved for the installation of retransmitter stations, a measure which will inexorably encourage the development of telecommunications such as occurred in Europe and in the United States. We must therefore devote other frequency ranges to educational TV and it will be found that the most appropriate in this respect is the range between 2400 and 2600 Mc/second. This technique is operating with considerable success in the United States. Apart from avoiding all interference with present and future broadcast channels, the

almost optical propagation of the picture in large dimensions and the application of transmission equipments of reduced output (100 watts max.), enables the coverage to be limited to a pre-determined area, thus permitting the simultaneous use of a large number of different educational programmes on the same channel and a high degree of flexibility with regard to frequency.

In the same field the Commission has also studied the possibility of setting courses for different levels or specializations at the same time, since the spectrum admits of a frequency range of 100 Mc. The Federal Communications Commission is now studying the possibility of doing this.

The necessary extension of this technology, as witnessed today, and its origins in the year 1950, can be traced to the Educational Technology Division of Litten Industries (L.I.I.) through a grant of the Federal Communications Commission installed on this system on an experimental basis in the student district of Hempstead, Long Island. According to the Superintendent of Schools at Hempstead, these experiments demonstrated high pedagogical value, low cost and simplicity of operation.

The approval and realization of this system in Argentina is a social necessity which should be argued with all the arguments in favour of the cultural elevation of the people.

Its practical realization is within the means of the national industry which means that there would not be any economic drawback as regards imports but in fact an industrial reactivation through the opening up of a new home market.

#### Level of qualification in the electronic industry

It is of interest to reveal the conclusions in the investigation carried out by the Commission on behalf of the study of the fixed terms by the Logistics Division of the Ministry of Defense, to regard the important subject of professional qualification.

In considering the different levels of qualification to be encountered and their most important characteristics, the following classification may be made:

##### 1. Qualification inferior to that of Operators

There are approximately 20 private institutions dedicated to such work and these pass through trainees at the rate of 1500 per annum.

##### 2. Training of Operators

There are 20 State establishments grouped under the COMAF organization whose through-put is 400 operators per annum.

### 3. Higher cycle

In the industrial schools and the recognized private establishments numbering approximately 6 official schools in total some 350 trainees per annum are passed through. There is an equal number of private type schools having a through-put of some 200 trainees per annum.

### 4. University level

The electronic engineering career is catered for in the respective faculties of the following universities:

- 5 Technological universities
- 4 National universities
- 1 Technological institute.

The total through-put of trainees in the electronic speciality field reached the figure of 490 in the year 1968.

There is in addition a "Scientific Computer" career in the National University of Buenos Aires, Faculty of Exact Sciences which has not been taken into account in the present statistics.

Thus, what is the present availability of technicians and specialized operators in electronic engineering? A relatively close approximation to the reality can be arrived at as follows. Based on the fact that in 1960 the industrial labour force comprised approximately 7,900,000 people of which 0.6% were technicians and 0.4% were professionals or scientists. The following analysis was arrived at:

#### a) Technicians

Starting from the hypothetical basis that in 1960 1% of technicians belonged to the electronic specialization, we find that of the 40,000 technicians available, 400 correspond to the electronic industry. Since from the start of 1961 the number of trainees passed through the technical schools increased its growth rate to 10% per annum, the total output of electronic trainees during the years 1961 to 1968 must have reached 3,186, which figure added to the previously mentioned 400 of 1960 brings the overall total to 3,586. From this overall total approximately 200 emigrated technicians and 318 technicians who changed their professional field should be withdrawn. As a result the estimated availability of technicians in electronics would amount to 3,068.

b) Engineers

Hypothetically, in 1960, 2% of practicing engineers switched to the electronics specialization, that is to say approximately 21,000 electronic engineers out of a total of 10,000 in this list of professions. The number of trainees would not in this speciality increase at the rate of 20% per annum which means that the total in the period 1961 to 1968 must have been of some 745,000 and as a result the total availability of electronic engineers must amount to some 1,215,000. Again, if the 60, which it is assumed have changed their activity in 1960 which have changed their field of activity are removed from the total, the availability of electronic engineers now becomes 955,000.

c) Specialized Operators

It is understood that the term, specialized operator applies to one who has completed his primary education and in addition has taken specialization courses or acquired equivalent practical experience.

On the basis that for each technician in electronics there are 10 specialized operators, the total of specialized operators would reach some 30,000.

THE EXTERNAL TRADING RESULTS OF AGRICULTURE IN ELECTRONIC PRODUCTS

Consideration of the available statistics on imports and exports as recorded for the different sectors of the electronics industry in the last three years constitutes a further indication of the importance of this industry within the overall industrial activity.

Thus when considering Table 1, it will be seen that the figures show a notable consistency with a slight indication of a steady increase. The importation of electronic products (final or intermediary) reached a maximum in 1968 with a value of U.S.\$37,000,000.

Approximately 53% of external purchases were destined for consumption within the home production processes of the local electronics industry. To this end our industry imported goods to the value of U.S.\$19,664,166, while also importing articles under other industrial headings to a value of U.S.\$10,402,020.

Exports for their part also show an increasing tendency, in spite of the small recess in 1968 and on the overall scene there has been a steady advance in intermediary products within the total of exports. Nevertheless the products attracting the highest tariffs are those corresponding to electronic computing machinery.

Table 2. shows the make-up of the external demand in rather more detailed form showing that there are certain predominant headings (qualifying as such those whose value exceeds \$1,000,000) including amongst these final products such as statistical machines, television and radio transmitting and receiving apparatus, phonographs, dictaphones and other apparatus for the reproduction of sound.

Amongst the intermediary goods which the electronic industry also uses for the manufacture of final goods and whose import value exceeded U.S.\$1,000,000 are those such as capacitors, switching devices, joints and connectors for electrical circuits, non-heating resistances potentiometers etc. also electronic lamps, tubes or valves and the carbon or graphite products or parts, with or without metal inserts, for electrical or electronic usage.

In general the reactivation of demand which operated within the industry during 1968 resulted in an increase of intermediary product imports, these being goods which for the greater part, are the object of specific agreements on a complimentary basis with other countries of the continent.

Table 3. shows the breakdown of exports. If we consider only those groups of items whose overall value exceeds U.S.\$100.00 it will be seen that there is a range of lines where the activity levels reached encourage the hope of an increase in these tendencies, these being generally positive, which these electronic exports reveal for the external trade of Argentina.

It is worth noting in this respect, the following items amongst the final products there are: the statistical machines; electrical apparatus for telephony and telegraphy with wires; transmitting and receiving apparatus for radio telegraphy and radio telephony; radio and television transmitters and receivers; etc.

As regards intermediary products, noteworthy amongst these are: equipment for circuit breaking, for sectionalizing, for protection, jointing or connecting electrical circuits; also non-heating resistances, potentiometers etc., and the electronic lamps, tubes or valves, cathode tubes etc.

Within the total of export, the category of major relevance is composed of statistical machines (computers) which account for 69% of the total (81% of the final goods).

Following these in order of importance, are, electrical apparatus for telephony and telegraphy with wires (whose export value has exceeded, for the first time in 1968, the million dollar mark) with radio and television transmitting and receiving apparatus whose category has achieved notable progress in this difficult world market. As regards the export of intermediary products the co-ordination agreement on electronic valves concerning which we have already referred to in our bulletin no. 15, has brought about a considerable increase in the export of such goods, giving them a 12% share of the overall total and an 85.6% share of the intermediary products total.

The remainder of exported products reveal erratic tendencies from year to year, although their respective high points constitute an interesting perspective for the local products which could use them as a point of reference to be considered.

#### THE ARGENTINE ELECTRONICS INDUSTRY

The National Electronics industry produces a volume of goods valued at (Argentinian currency) \$81.70.000.000.000 (U.S.\$ 200.000.000) corresponding to the year 1968.

The figure of personnel employed reaches 70,000, amongst whom are included those in charge of marketing and services.

The fundamental characteristic of this industry is its high rate of integration, since local manufacture covers the range from basic components to radio and television receivers, measuring instrumentation, communications equipment, radio and television transmitters, industrial and medical electronics etc. This also applies to the telephony sector which covers the integral manufacture from domestic telephones to the large automatic exchange equipments and their accessories.

Up until little more than 15 years ago a large part of components for the electronic industry was imported. Since then the industry has experienced an extraordinary rate of development in depth and today practically all components in radio and television are manufactured within the country. The market is amply supplied with loudspeakers, variable

condensers, radio and television coils, transformers, valves, transistors television tuners, cathode ray tubes, wave change switches, etc. etc., all produced on a national scale.

Furthermore, a large part of the second grade component requirements is manufactured within the country nowadays, these being components forming parts of, for instance: loudspeaker cones, ferrite cores for television transformer coils, contacts and mechanical parts for television tuners etc.

In total, out of the U.S.\$200,000,000 the share of imported components does not even reach 40%. The state of development reached by the component manufacturing industry is even more commendable when it is considered that this industry since its creation had to fight against not only the innumerable difficulties as to raw material supplies, but also the disloyal competition from contraband operations, either direct or legalized, for foreign produced components.

For a more detailed view we will now analyse the industrial situation according to fields of activity:

#### Entertainment

The nation is served by 25 television stations, five of which are the repeater type and 15 are closed circuit types, under municipal control. In radio broadcasting, approximately 85 stations are operating, these being<sup>unevenly</sup> distributed particularly in so far as there are no transmitters on the frontiers.

The number of television receivers is realistically estimated at approximately 2,500,000 (1 receiver for every 10 inhabitants), this being a high proportion when it is considered that many interior cities and their corresponding zones of influence in the countryside, are lacking this service altogether.

It is estimated that there is a total of 12,000,000 radio receivers (1 receiver for every two persons) which indicates the use of several receivers for each home, if we distribute the population according to the family pattern.

Except on a very small scale there is no frequency modulated transmission (FM) nor stereophonic transmission. Neither is there any service in colour television, although the subject is already being discussed in technical and official circles. The most important point under consideration



revolves around the choice of system. This is a somewhat complicated dilemma since it involves decisions of technical, commercial and even political character.

There are approximately 25 main companies engaged in the manufacture of radio and television receivers. These employ a total of 400 people representing 60% of the market. The rest of the market is covered by very much smaller concerns distributed across the entire country.

#### Present state of the entertainment market

##### Television receivers:

It is estimated that the present market is 400,000 units per annum, with a predominance of 19 inch and 21 inch models. The year that the portable models were introduced, with 11 inch picture tubes and independent source of supply. These serve as second receivers in the high concentration zones and as main receivers in rural areas having no distribution agent. Prices range between m\$n 15,000 to 20,000 (US\$30 to 40), this being the cash price ex factory. The rate of integration is very high, when the term integration applied to the percentage of basic material manufactured locally as compared with the overall assembly.

##### Domestic Radio receivers:

Here the market is estimated at 50,000 units per annum. The dominant type is the transistorized receiver in types ranging between the large table model and the medium sized portable. These of the pocket variety are manufactured on a much smaller scale, but are not strictly of an industrial or mass nature, but due to the impossibility of competing with the foreign sets introduced illegally into the country by direct contraband means or by simple customs evasion.

It is already a market fact that the valve type receiver is tending to disappear.

On an ex works cash payment basis receiver prices vary between m\$n 3,500 and 20,000 (US\$70. to 57). There is a tendency towards the use of high **quality**, high priced receivers ranging in price from m\$n 10,000 to 35,000. Production integration is almost complete in this case.

### Radio Receivers for Office Use

The probable annual market is 200,000 units with an average ex works cash price of m\$12,000 to 25,000 (US\$ 20. to 40.) This market is totally for transistor receivers and generally with fixed tuning features, ensuring precise and stable tuning. A large part of the production in this major field is absorbed by the motorcar industry, this is becoming more and more multifunctional and utilizes more and more accessories previously considered as optional, such as radio and heating.

### Radiograms and Gramophone Players

This classification includes sets exclusively designed for record reproduction as well as those equipped for radio reception. The cash price ex-works is very variable due to the fact that production includes simple record players with rotary mechanism and small amplifier (two valves or three transistors) as well as the very luxurious models with radio receiver of high sensitivity and stereophonic sound system. Prices of these can range between m\$2,000 and 150,000 (US\$ 3 to 700). The market accounts for 320,000 units per annum, having almost complete integration.

### Amplifiers

High fidelity and public address type amplifiers are included in this category. The market is estimated at 20,000 units per annum with unit values varying between m\$2,000 and 60,000 (US\$ 3 to 110). The integration of national production is practically complete.

### Recorders

There are several firms carrying out the manufacture of this type of product. The more advanced as far as integration is concerned, are now only importing the recording head. The most economical model is offered at m\$28,000 (US\$ 40.) cash price ex works, and the market is estimated at 75,000 units per annum. Again the variety of models and types is extremely diverse.

### Antenna

The market is estimated at 500,000 units per annum for television. (There is practically no series production in this line for radio). The cash price ex works is m\$2,500 each accounting for market value at m\$1.250.000.000 (US\$ 3.500.000) with a high rate of integration on a national scale.

## Professional and Business Instruments

### Transmitters

There are at present three companies covering the requirements for transmission of radio broadcast in output ranges of from 100 watts to 100 kw. These companies also cover an wide range of other radio range of complementary material, such as transmitters for aircraft, industrial speaker consoles, transmitters for equipment used in scientific and study, maritime and via satellite transmitters for the power line system, also other transmitting material. The demand for this material is also very extensive.

Two companies are competing in the manufacture of industrial transmitters up to 500 watts, also studio control lines, control lines, television transmitting material up to 500 kw output and also to 10 kw of gain etc. In this field national manufacturing is also present. This is a special equipment market estimated to be worth some **210,000** million (US\$ 1,000,000) per annum.

### Communications Equipments

The categories enjoying the greatest demand are those covering equipments for the Short Wave Band (SWB) or (SHW) in the short wave band, as well as the transceiver equipments in the very high frequencies (VHF), either fixed or portable, also equipment of the citizens band, which enjoys a high demand due to complete lack of control, and a trend of transmitters and receivers, as well as power amplifiers. The rate of integration to national production is very high and the existing equipment market value is estimated at **50,000,000** (US\$ 1,500,000).

### Measuring Instruments

These can be divided into two major categories: analog type instruments (for laboratories, etc. etc.) and electronic instruments (for laboratories and production lines).

The analog type of instrument covers a wide range, including, with instruments of various types, the measuring instruments to 6 inches in diameter.

Electronic types include laboratory instruments, instruments for production lines and for the tests. These are frequency generators and also produced, including for television use, also portable instruments, impedance

bridges, oscilloscopes, conduction meters, etc. The ex factory cash price market value is estimated at m\$n 30,000,000 (US\$260,000,000).

### Industrial Electronics

The development of industry in general has engendered a <sup>remarkable</sup> demand for electronic products connected with automation systems, controls and quality improvements and improvements in efficiency. The market for this type of electronic products started as such only a few years ago, but the industry now already manufactures in standard form, equipments for dielectric heating, induction heating, welding, controls and systemization. Several companies operate in this field, although many of these special developments are designed to particular engineers in the field, for which reason it is somewhat difficult to estimate the overall value of the market.

### Electronic Computers

Since 1961 our country has been manufacturing computers of the electronic type. One main company exists and this produces US\$5,000,000 worth annually, most of which is destined for exportation. The rate of integration is quite considerable and the capital investments in the industry exceed US\$2,000,000 with a still greater expansion in this industry envisaged.

At the present time three companies have begun assembly of electronic machines aimed at the home market, as well as ALLIC, to which organization Argentina already exports 25% of its production.

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Annex I  
ELECTRONICS: GENERAL TRADE  
 (U.S. Dollars)

I T E M S	1966	1967	1968
<b>A. <u>IMPORTS</u></b>			
1. Raw materials assembled directly (Production by other sectors)	11,026,172	11,993,163	10,307,070
2. Intermediate electronic products	15,237,510	16,007,101	17,004,100
<u>Total imported assemblies:</u>	<u>26,263,682</u>	<u>28,000,264</u>	<u>27,311,170</u>
3. Final electronic products	13,171,004	14,211,501	16,948,772
<u>Total of intermediate plus final products (2+3)</u>	<u>28,408,514</u>	<u>30,212,602</u>	<u>34,260,942</u>
<b>B. <u>EXPORTS</u></b>			
1. Intermediate products	707,431	616,328	1,076,542
2. Final products	5,422,553	7,220,124	6,363,333
<u>Total exports (1 + 2)</u>	<u>6,129,984</u>	<u>7,836,452</u>	<u>7,440,875</u>

TABLE No.2: BREAKDOWN OF IMPORTS  
(U.S.Dollars)

NADI	DESCRIPTION	1966	1967	1968
<u>Final products</u>				
84.53.	Statistical machines and others	3.988.572	7.378.868	6.769.381
85.03.	Electric batteries	2.431	6.510	2.811
85.13.	Electrical apparatus for tele- phone and wireless telegraphy	4.701.116	1.762.135	3.702.055
85.15.	Transmitting and receiving apparatus for radio telephony and telegraphy; radio and television transmitters and receivers	2.124.366	2.099.037	3.094.869
85.22.	Electrical machines and equipment not included under the present heading	567.623	197.528	851.135
85.23.	Stranded wires and cables, in- cluding coaxial, platted, bars and the like, electrically insulated, (including lacquered and anodised) with or without connecting parts.	606.436	761.689	1.750.155
92.11.	Phonographs, dictaphones and other apparatus for the recording and reproduction of sound, including record players with or without pick-up or recording head for tape, wire or records.	685.834	772.845	1.042.217
92.13.	Other parts, loose components and accessories for apparatus included in NADI item 92.11	1.095.526	903.889	713.163
	Sub-total	13.771.604	14.482.501	17.945.786
<u>Intermediary Products</u>				
85.01.	Electric generators, rotary con- verters, motors	147.557	289.508	566.200
85.02.	Electro-magnets, permanent magnets (magnetized or not)	393.942	175.101	158.603
85.12.	Heating resistances	1.643	5.574	11.077
85.14.	Microphones and stands, loud- speakers and low frequency electric amplifiers	313.900	331.461	375.181
85.18.	Electric capacitors, fixed, variable and adjustable	2.070.121	2.095.894	1.865.387
85.19.	Apparatus and materials for circuit breaking, sectionalizing, protection jointing, connecting of electric circuits, non-heating resistances, potentiometers and rheostats; automatic voltage regulators using switching of resistances, inductances, vibrating contacts for motors, control panels or distribution boards.	4.495.531	5.102.345	6.651.402

NAFI	DESCRIPTION	1966	1967	1968
85.21.	Electronic lamps, tubes or valves	5,164,203	5,583,292	6,315,630
85.24.	Parts and products of carbon or graphite, with or without metal inserts for electric machinery uses such as electric machine brushes, carbons for lamps, batteries or accumulators, furnace electrodes, welding equipment, electrolysis installations, etc.	1,814,959	1,544,245	2,003,040
85.25.	Insulators of whatever material	77,782	107,774	97,815
85.26.	Insulating parts entirely composed of insulating materials or which include simple connecting devices.	338,694	383,063	459,926
85.27.	Insulating tubes and their jointing parts, of common metals insulated internally.	39,000	305	1,128
85.28	Loose parts and products	361,418	308,772	406,175
	Sub-total	15,230,910	16,007,104	19,564,166
	<u>OVERALL TOTAL</u>	29,007,918	30,484,605	37,067,952

TABLE No. 3 BREAKDOWN OF EXPORTS  
(U.S. Dollars)

HS Code	DESCRIPTION	1966	1967	1968
<u>Final Products</u>				
84.53	Statistical machines and similar with punched cards	4,551.862	6,637.003	5,152.339
85.03	Electric batteries	20.091	2.085	2.322
85.13	Electrical apparatus for tele- phone and wireless telegraphy	732.146	431.098	1,139.190
85.15	Transmitting and receiving apparatus for radio telephony and telegraphy; radio and tel- vision transmitters and receivers	79.014	144.567	149.047
92.11	Phonographs, gramophones and other apparatus for recording and reproduction of sound, including record players with or without pick-up or recording head for tape, wire or records	39.440	12.171	429
	Sub-total:	5,422.553	7,228.124	6,343.333
<u>Intermediary Products</u>				
85.04	Electrical accumulators	10.073	2.008	8.329
85.14	Microphones and stencils, loud- speakers and low frequency electric amplifiers	1.402	1.925	212
85.19	Apparatus and materials for cir- cuit breaking, sectionalizing, protection, jointing, connecting of electric circuits, non-shunting resistances, potentiometers and rheostats; automatic voltage reg- ulators using switching of resistances, inductances, vibrating contacts for motors, control panels or distribution boards.	164.047	66.968	150.067
85.21	Electric lamps, tubes or valves, cathode tubes, tubes and valves for TV camera etc., photoelectric cells, diodes, triodes, etc., mounted piezo-electric crystals.	531.879	544.681	917.097
85.26	Insulating parts entirely composed of insulating materials or which include simple connecting devices.	30	140	837
	Sub-total	707.431	610.328	1,070.541
	<u>TOTAL GENERAL</u>	6,129.984	7,838.452	7,413.875







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