



Revox 1948-1979

**From
prototype
to world
exports**

STUDER REVOX



Revox 1948–1979



From prototype to world exports

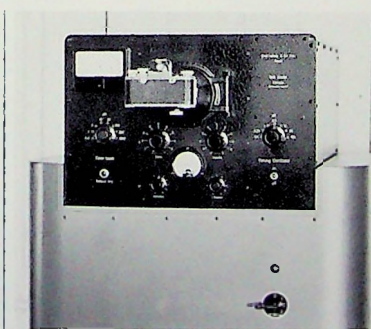


I am sure you have heard of those famous cases of an emigrant to the land of unlimited opportunity who, far from home, by the sweat of his brow, raised himself from dish-washer to shoe-shine boy to factory owner and, of course, became a millionaire. Our usual, if somewhat envious, reaction is that this may well still be possible in North America. However, the following story shows that here at home, iron resolution, persistence and bold endeavour can produce also the same results. The story of Willi Studer and his Revox company is one of the many examples in Switzerland. However, it does not start with washing dishes because, without a sound technical training, this particular success story would verge on the impossible.



1948

It started with a solid professional training followed by some hard years of further education. At the beginning of 1948, Mr. W. Studer founded his first own business, after he had been working in Research and Development for several firms, some of which had been founded on his initiative. Since there were no capital resources, the first order was financed by the first customer's deposit. After working for six months, nearly day and night, the first 10 high tension oscilloscopes are produced and ready for delivery. Other oscilloscopes, which were sold directly to industrial users, followed soon. In September of the same year, the young firm moves to Wehntalerstrasse in Zurich into the basement of an old post office building. The decisive turn to today's activities took place in these rooms. The staff consisted of 3 people.



First high tension oscilloscope made by Willi Studer, Herisau.



1949

The first tape recorders are imported from the USA. They are not marketable without modifications. The importer approached Messrs. Studer to modify these devices by replacing capstan-shafts, friction pulleys and rollers. Slowly the idea of developing and constructing better tape recorders emerges. With the purchase of 500 recorders from the

importers development on the first Studer designed tape recorder Dynavox begins. The lack of accurate measurement facilities presents enormous obstacles.

For this first series in-house designed magnetic heads are used already. The telephone's dialtone is utilized to check wow and flutter. The great talent to improvise and the very strong will to introduce a high quality product leads up to the first European designed amateur tape recorder ready for quantity production. The staff numbers 6 people.





1950

The assembly line for the Dynavox-series is now ready for production. Therefore the number of employees rises to 25 by year's end. The development of tape recorders is undertaken. As the first production batch of the Dynavox-series is nearing completion, economic considerations call for the formation of a marketing organisation which is to operate under the control of the manufacturer.



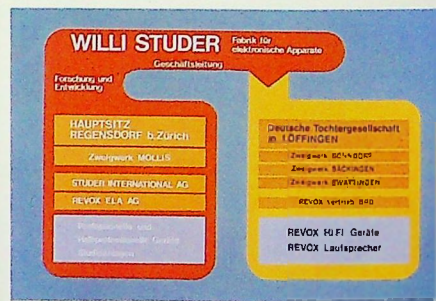
1951

Distribution by the own marketing company commences on the 27th of March. The new firm is called ELA AG. Simultaneously with this event, the name of the amateur-products is changed to «REVOX».

The prototype of the first professional studio tape recorder is ready for operation and it is used by the Swiss Broadcasting Corporation to record on tape for the first time the performances at the Lucerne International Music-Festival.

1952

In addition to the production of the REVOX tape recorder T 26—the successor-model of the Dynavox series—100 studio tape recorders are being built.



2

1953

Larger production areas and new machines at Wehtalerstrasse make it possible to take

1 Geographical location of the various factories of the Willi Studer Company.

2 Structure of the Willi Studer company.

3 The Revox ELA AG and Studer International AG sales organizations are now located in the former production facilities.

4 The plant at Mollis GL supplies all Studer factories with components.

5 The view of the production block of the Willi Studer GmbH subsidiary at Loffingen in the Black Forest.

6 The Bonndorf factory in the Black Forest produces mainly printed circuit cards, motors, and component assemblies.

7 The Sackingen factory combines metal finishing (galvanising and spraying), metalworking, cable production and turntable assembly.

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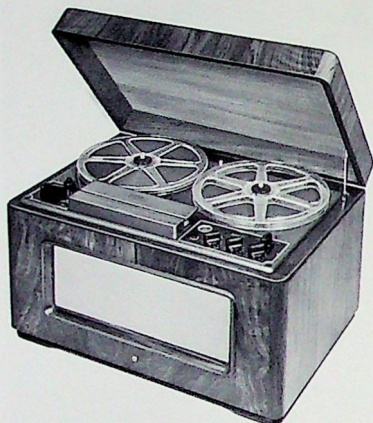
From prototype to world exports



A hard test for an amateur tape recorder. Recording session in the Sahara desert.



Former chief engineer of Radio Basle, Albert Müller, using the studio tape recorder 27.



REVOX T26 as presented in the first sales folder.



STUDER 27. Shown above, the amplifier unit, also used as mobile mixing console.

on production of many parts that had to be obtained from outside sources previously. The Revox model T26 was built also in Radio-Recorder Combination. A comparison of prices with today's devices is quite interesting:

The standard version T26 carried a price tag of SFr. 1395.-. As production of the T26 series comes to an end, the number of units built totals 2500.

The development of the first 3 motor amateur tape recorders is now in progress.

1954

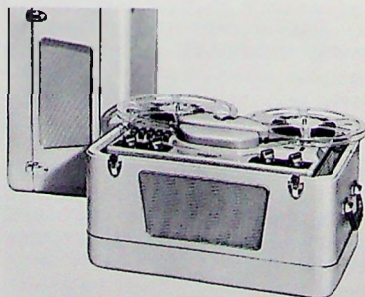
The form is cast: The first tape recorder of the successful 36 series goes into production and is introduced to the market. It features 3 motors, push button control, and the remarkable direct drive without belts or pulleys. The annual production amounts to 2500 units.

1955

A new era of professional studio tape recorders begins with the development of the series Studer A37 and B37. A monophonic high fidelity amplifier is added to the Revox line and it appears on the market well timed with the break-through of the long playing record. A simultaneous attempt to produce a Hi-Fi turntable fails, because of insufficient production capacity.

1956

A new development, the modular plug-in microphone pre-amplifier for professional audio mixing consoles enlarges the basic range of products.



REVOX A36 first version of the 36-series.

The new Revox B36 features separate heads for recording and replay, which enables the amateur to take advantage of before and after tape monitoring.

1957

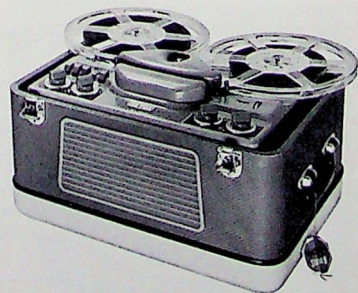
Presentation of the portable compact studio tape recorder Studer B30 for mobile purposes with impulse push button control, interchangeable tape adapters and plug-in head assembly.

1958

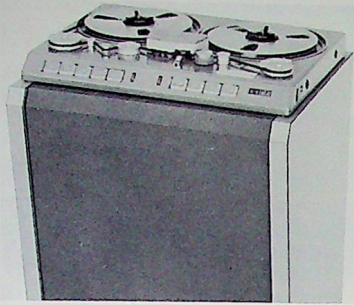
The prototype of the first portable Studer model 69 mixing console is completed. But before it can be offered to the Swiss Broadcasting System, it has to pass many hard tests in the Inspection Department of the Swiss postal authority.



Drama students listening to speech tests on the Revox T26 in the Zurich radio studio (photo: Comet).



First stereo tape recorder REVOX D36.



Studer C37.



Revox G36.



Studer A62.

Additional space is required for the already 120 people that are employed by now and the acquisition of a 38,700 sq.ft. (3600 m²) building site in Regensdorf near Zurich is the first step towards the erection of a wholly owned plant.

1959

The construction of what is known today as plant I commences. Half of the land stays unused for future expansion. Additional mixers for the Swiss radio-studios, ordered by the Swiss postal authority, are being produced.

1960

The new factory is ready for occupancy. Various, rather heavy transitory technical and economical difficulties are caused by the conversion from the previous mono-units to the new stereo tape recorder Revox D36. Studer C37, the newly developed studio tape recorder, is ready for small quantity production. Within a very short time it becomes standard equipment in many famous studios. In view of the forthcoming multichannel versions, it is equipped with an extremely rugged transport mechanism and very compact amplifier electronics.

1961

With the introduction of the model 40 stereo-amplifier, Revox presents a high quality product for the disc enthusiast. An improved tape recorder, the Revox model E36, is now released on the market.

1962

The incisive event of this year—with far reacting consequences—is the Swiss Government's coercive measure of reducing the number of foreign workers in the country. This has the effect that the force of over 200 employees has to be reduced to 187. In production is now the again improved tape recorder F36.

1963

An innovation in the Studer program is the introduction of the fully transistorized professional tape recorder A62.

1964

Presentation of the prototype version of the 4-channel-studio tape recorder J37. It represents the up to now most complex, tube

equipped machine, which paves the way for the acceptance of Studer products by well known disc recording studios the world over. «Face lifting» and quite a number of important improvements are reflected in the Revox G36, the last model within the 36-series. In July the foundation of a German daughter company takes place in the Black Forest. 86000 sq.ft. (8000 m²) provide for the company's steady growth which has been halted in Switzerland due to Federal Government's restrictive measures. The new computer-system IBM 360/20 is ordered in November.

1965

A dried-up labour market in Switzerland combined with the general restrictions justify the move to Germany.

1966

Official opening of the new factory at Loffingen, Black Forest. The hitherto separate

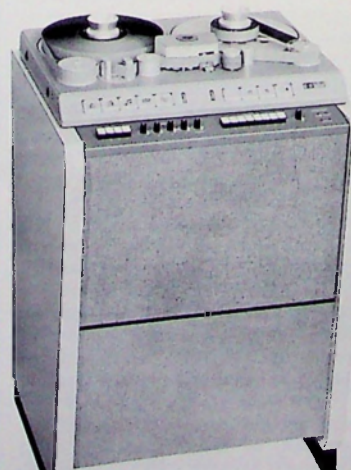
marketing organisation in Germany becomes integrated into the Willi Studer GmbH. Computers are being installed in Regensdorf and Loffingen.

1967

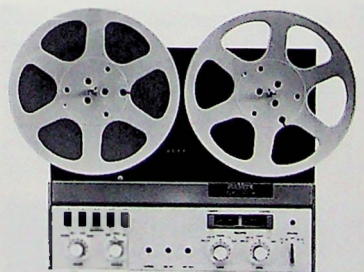
On the land held in reserve in Regensdorf since 1958, a second factory is being built. The very successful series of model 36-recorders, of which more than 80000 units have been produced, comes to an end. The new Revox-generation is presented at consumer shows in Zurich and Berlin. The completely restyled and newly designed stereo tape recorder A77 is complemented by the matching stereo amplifier A50 and a separate FM stereo tuner. All these units are fully transistorized and of modular construction. These characteristics as well as the drive system of the A77, with its servo controlled capstan motor, are the beginning of a new technical era.



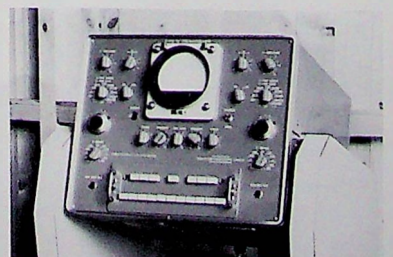
First integrated stereo amplifier.



Studer J37.



Revox A77.



Last STUDER made double beam oscilloscope for high tension measurements.

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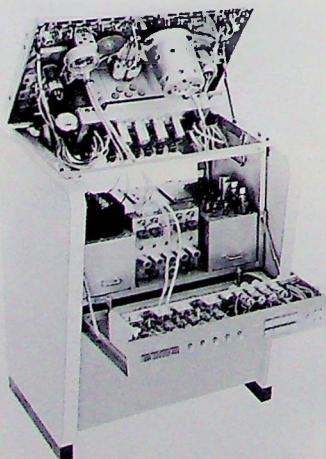
1968

The officially opened new building in Regensdorf makes the long overdue expansion of research and engineering possible. It also allows the creation of two new departments, one for the in-house design of test equipment and the other for custom building of Studio equipment. At the Zurich consumer show «fera» the following units are shown:

Revox-FM-stereo-tuner A76, Revox trainer language laboratory A88 and the mixing console Studer 089.

Among the internationally leading FM-tuners, Revox immediately finds its place in the top-ranks. Its unconventional circuitry sets new measures. New possibilities for the use of the A77 are provided by the newly developed language laboratory A88. For the first time, numerous integrated circuits are used for logic control. A new audio mixer, Studer 089, is offered by the studio equipment division. Compact moduls, which provide for a multitude of adjustments in each channel, form the nucleus of this new product.

The last series of high tension oscilloscopes is being delivered to the customer. Herewith a 20 years' partnership terminates. The ever present strive to become more and more in-



Precision mechanics and electronics in close harmony. A view of the «insides» of the Studer J37 4-track studio tape recorder.



*REVOX FM-Tuner A77 - Amplifier A78 -
A music system perfectly matched in styling and performance.*



The A88-Mono language lab., the first in-house development of the new Revox Trainer department. Prior to its introduction, recorders had been used in language laboratories since 1962.

dependent from external suppliers of semifinished products finds its reflection in the structuring of a motor production in a newly acquired plant in Ewattingen, Germany.

1969

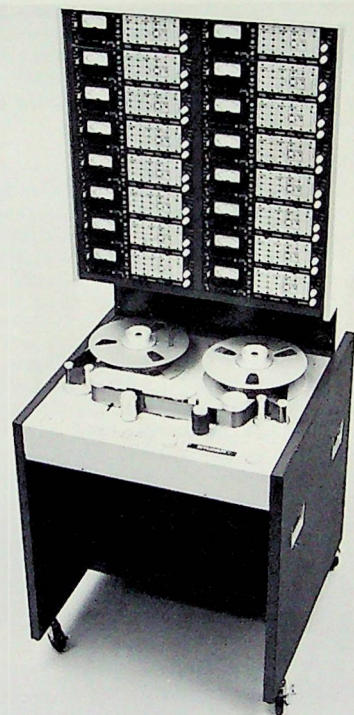
In order to take excessive workloads from the mainplant at Regensdorf a new plant for sub-assembly production goes into operation at Mollis in the canton of Glarus (Switzerland).

1970

The new generation of the series A80 professional studio tape recorders is introduced in the spring of this year. The entirely new design concept satisfies a wide range of possible applications while its well conceived modular construction is optimized from a production point of view as well. Some of its outstanding characteristics are:

Sturdy tape transport mechanism with integrated logic control, electronically controlled tape tension even during fast wind and the braking phase, electronic sensing of tape motion and direction, electronic tape timing, electronic speed control, plug-in amplifier modules with separately pluggable equalization and level pre-sets plus electronic equalization changeover.

Presentation of the first Revox Multi-programme Language Laboratory at the «Didacta» exhibition in Basle.



STUDER A80 for 16 tracks on 2" wide tape.

Construction of an extension to the existing plant at Löffingen increases the total floor space to 51700 sq.ft. (4800 m²). A teleprocessing terminal is installed in the central Research & Development Department at the Regensdorf Headquarters. This terminal is utilized for technical-scientific calculations and for the production of punched tape as required for the operation of numerically controlled (NC) production centres. In recognition of his achievements in the field of Audio, Mr. Studer is made a Fellow of the «Audio Engineering Society».

1971

In Wettingen, Switzerland, the partly owned marketing company for professional studio equipment, Studer Franz AG, starts its activities with the delivery of the first units of the improved version of the B62 series

recorders. The Revox line appears in a new styling while several special versions of the A77 such as the models A77-PTT, A77 ORF and A77-Dolby are already in production. A new studio tape recorder, the model A80/R «Broadcasting Version» complements the A80 series. The capacity of central data processing at the Regensdorf Headquarters is increased with the installation of the IBM 360/20-5 system complete with five magnetic disc storage units. The hitherto used IBM 360/20 cardsystem is transferred to the German sister company at Löffingen. At the end of the year the number of employees exceeds 1000 people.

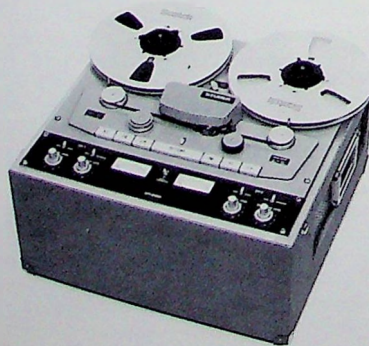
1972

An urgently needed increase in production capacity is met with the addition of a further plant in Bonndorf, Germany. On a floor area of 56000 sq.ft. (5200 m²) the production facilities for motors and printed circuits are accommodated.

In the department for studio equipments, the so far biggest professional audio mixing consoles, Studer 289 with 30 input channels for drama and music recording, are being produced for the Swiss Broadcasting Corporation. The versatile concept of the professional studio recorder A80 permits its conversion into a quadrofonic model, which is called A80 RT-Quadra.

1973

On the day of the firm's 25th anniversary, Messrs. Willi Studer purchase the factory building of Hermes-Precisa GmbH in Sackingen, Germany. This new acquisition is to operate under control of the Löffingen branch. The Sackingen plant specializes in non-cutting shaping operations, galvanising, spray painting and sub-assembly production. In Switzerland the Mollis branch starts construction work on a new building (first phase) with a total floor area of 26 900 sq.ft. (2500 m²) to accommodate 200 workers. Planning goes under way for the construction of a new building at Regensdorf which is to house the headoffice of the Studer group of companies while also providing room for expansion for research, engineering and central administration. On a total floor area of 91 500 sq.ft. (8500 m²) it will also accommodate the production facilities for studio equipment and other special products.



Studer B62-VU.

1979

All of these projected extensions have now been completed. The Mollis branch supplies all the Studer factories with components, and the new building at Regensdorf has been completed and production is in full flow. Revox's new product line includes a digital tuner, an amplifier, a tape recorder and a record player. This new series, known as the «B-Series», is enormously successful on the market. However, there are some innovative developments in studio equipment as well. There is the Studer A800, a microprocessor-controlled multi-track unit, and a new mixing console for transportable applications, both developed in 1978. So far this year the following products have been put into full production: the Studer 069 reporting unit for outside radio transmissions by land line; another item is a new style remote-control system for modern tape recorders.

Conversation with Dr. Studer

During my visit to the Revox head office in Regensdorf, I had a lengthy talk with Dr. Willi Studer who still has this great undertaking under his energetic and forceful control. Asked whether he would extend the Revox line to the lower price categories, Dr. Studer said he would not do so, for the following reasons: Primarily, Revox is and remains a product devoted to reproducing music at the highest possible quality level. This was and still is, of course, a question of price. With modern technology, which Revox always utilises, it might perhaps be possible to increase quality somewhat further without at the same time making the product more expensive, but the scope for doing so was small. Nor is there much chance of Revox transferring production to low-cost labour countries. At the present time Dr. Studer felt that stabilisation of the national economy was indispensable and production abroad in this way was the wrong line to take. Revox would instead, by a logical approach to products and jobs, ensure that its equipment would offer good value for money.

8 The latest computer-controlled tools for efficient production to very close tolerances are located throughout the factory.

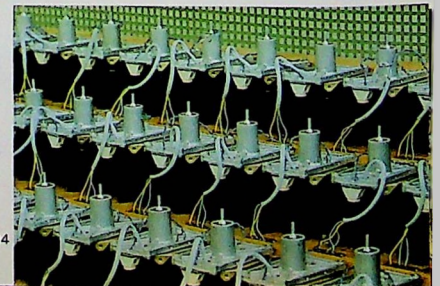
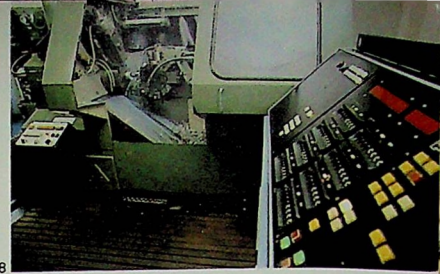
9 Precision craftsmanship for toolmaking.

11 Winding of loudspeaker voice coils on metal bobbins at the Ewattigen factory.

12 The company also makes its own motors. Here, stators are being wound on small semi-automatic machines. These AC motors are of a very simple design and are consequently extremely reliable.

13 This is the hydraulic press for cupping the motor shells.

14 Capstan motors undergo continuous testing before final inspection.



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All said and done, therefore, thoughts are not turning to extending the range into the lower priced consumer market.

As regards Revox's actual product line for the near future, note might be taken of a minor sensation. My question «Will Revox ever produce a cassette unit?» was answered by Dr. Studer with a spontaneous, affirmative «soon». Developing this a little further, he explained that his engineers had of course been hard at work throughout the period in which the compact cassette has been developed. However, only now are the conditions right for Revox to develop and manufacture a cassette unit that would do justice to the high standards of Revox equipment. Dr. Studer felt that this would have no direct effects on the reel to reel tape recorder market since, for the time being at least, the requirements for live recording can be met only by such recorders. Only reel to reel recorders suit the requirements of radio, TV, film and record producers.

However, it was quite possible to meet consumer quality standards with appropriate, quality cassette units. Such a unit, which would not be inexpensive, was now being developed by Revox and would be put into production in due course. Unfortunately, Dr. Studer would not give me any precise dates. Meanwhile the existing line would for the time being be continued without further changes. Revox would naturally continue to keep in touch with market trends. There are plenty of

examples of products whose introduction was premature.

I should now like to pass on to an assessment of the general market situation by a very highly competent expert. In recent times a number of companies have lamented the poor state of business, of shown their concern through increased advertising pressure. The Press of course took this up immediately with appropriate commentaries and forecasts. Many dealers are very uncertain and feel out of touch with the existing market situation. Added to this is the increasingly evident market saturation, particularly in the television receiver industry, and the resulting drop in sales. Retailer bankruptcies are an almost daily occurrence. Amongst consumers the confusion is generally even greater, since what they chiefly see are continuously falling prices, generally due to manufacturers or dealers who want to save their skins with price reductions but in fact achieve the exact opposite. Revox has radically reorganised its sales strategy and so made a move which will guarantee stability to consumers.

How has Revox's new approach worked out in practice? Dr. Studer indicated that Revox as well was forced to accept a drop in sales brought about by the general situation. Sales figures achieved during the boom years would certainly never return. Revox had even introduced short-time working at a branch in Germany so that certain types of equipment would not be over-stocked.

What Revox wanted particularly to avoid was to end up in the kind of situation in which the German TV industry had become embroiled.

Owing to unlimited output, these manufacturers had over a million colour sets in stock and were now facing worker layoffs.

At Revox, however, capacity is generally in balance with demand. In the studio equipment sector there has even been some slight growth. This new approach to sales has certainly proved its worth and offered the company more security against price pressures from outside. The new concept of contracting dealers has been particularly useful to consumers; they are now better advised by dealers and are receiving better back-up service. These points had been generally neglected by the major dealers. Finally, Dr.

Studer was confident that Revox would be able to maintain its market position with improved quality and service—i.e. would be able to offer more for the same cost.

Revox today

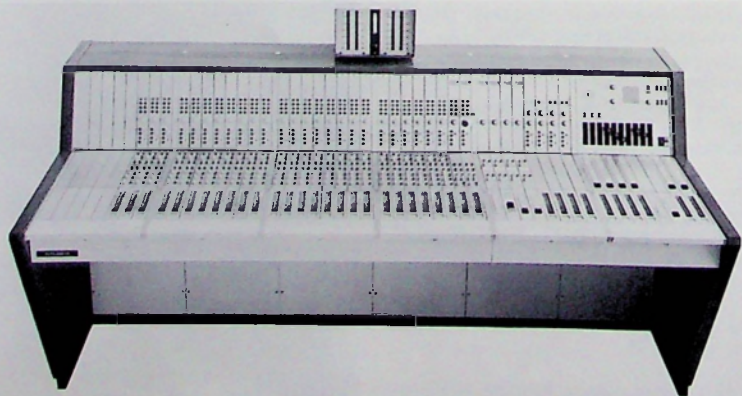
As you already know from the foregoing, the company has passed through a difficult period. However, Revox has not merely expanded at random, but has followed a long-term plan throughout. Fig. 1 shows the present location of the various factories, with the head office at Regensdorf, which I will deal with in more detail when describing my tour of inspection. In Mollis there is a branch



Studer A80/RT-Quadra.

which supplies components to all the Studer factories. In Germany there are three branches, the factory at Loffingen in the Black Forest, mainly handling final assembly of the various Revox components and loudspeakers; the Bonndorf factory, also in the Black Forest, where printed circuits, motors and component assemblies are made, and the third factory at Sackingen, whose activities cover chiefly metalworking, galvanising, cable manufacture and turntable assembly.

I was not of course able to visit all the factories and describe them for you in detail, although, each of them no doubt has something interesting to see, since Messrs. Revox produce practically all their own parts. Production covers all fields of metalworking, galvanising, electrical engineering and electronics. If there is no process for producing a particular component they develop the necessary technology and construct the necessary production facilities, test equipment and machines in their own factories. Nothing of this is possible, of course, without perfect planning and control, and the entire organisation of production is therefore computer-controlled. The program contains each individual part to be produced and each individual process down to the smallest detail, and these are checked by the computer throughout their course. In this way the existing state of production can be determined at any time, and breakdowns and unforeseen delays effectively dealt with. Without such a system this extensive production in the various factories would hardly be possible. However, this is by



Studer 289 sound control console.



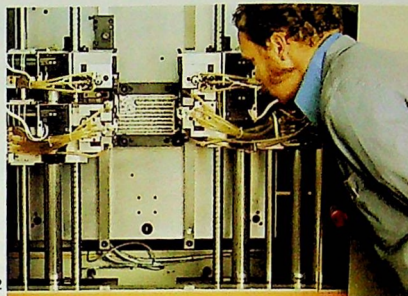
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21



16



22

no means saying that the system subordinates man to the machine; quite the contrary, on my inspection in the main factory I found that particular importance is attached to the ergonomics of the work station.

And now for my inspection tour. We started on the ground floor of the main building. It was noteworthy that the production division



17

15 In-house printed-circuit production starts with the print layout on a computer-controlled photo-plotter.



23

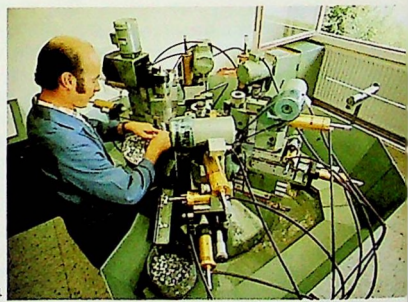
16 Circuit boards of all kinds are produced in a special department at the Bonndorf factory.

17 A look at the metal-coating installation at the Sackingen factory.



18

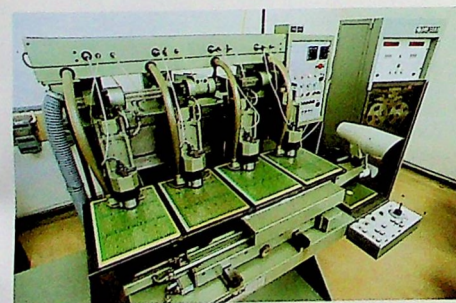
18 Process water from the metal-coating plant where metals are refined and from printed circuit production is treated in an extensive plant which also serves to recover valuable raw materials.



24

19 Circuit boards are simultaneously drilled by computer from punch tapes.

20 Electronic cards are manufactured in bright, cheerful rooms.

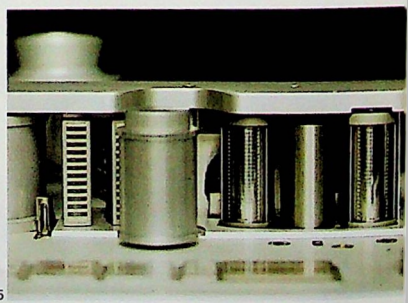


19

21 Testing and retesting is the prerequisite of strictly controlled manufacturing. For many components, special test equipment had to be developed in the company's instrument-making department.

22 A modern computer controlled wire-wrapping machine is used for wiring complex circuits.

23 Lapping of the two halves of the core in tape head production.



25

24 Transfer machine for producing carrier parts for metal tape heads.

25 At Studer-Revox all tape heads for consumer and professional use are made in-house.

26 Personal attention in the assembly of professional studio tape recorders.



20



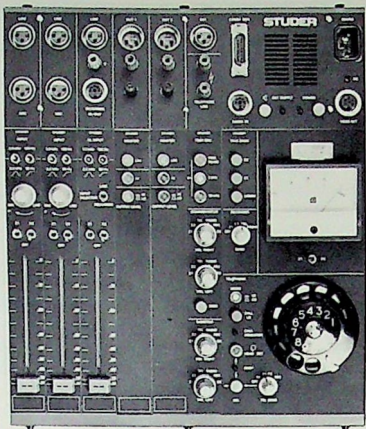
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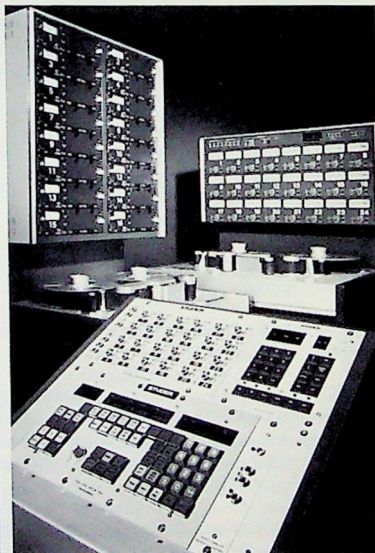
is not housed in a large hall but in a compact building of several floors. The various metalworking departments are on the ground floor. Here are the turning, milling and drilling shops, etc., all of them tidy, clean rooms fitted with the latest machinery. All tools are in fact produced in the machine tool department. All the necessary facilities are available for this purpose, and a great deal of very precise manual work is also required here. New entrants are trained in an apprenticeship department. From metalworking we then go on to actual electronics, beginning with the assemblies. Transformers, motors, and voice coils for loudspeakers are all produced in the factory. Several sequences of this production line are shown in the illustrations adjoining. Electronically controlled winding machines, for example, wind the coils for the transformers and for the motors. This is accomplished with great speed and precision. A hydraulic press produces the rotor shells for spooling motors and capstan motors by a cupping process. The finished motors are subjected to a rigorous endurance test before they are passed for installation into the equipment after a strict final inspection. Even the system for inspecting each individual part or component at Revox is impressive. In order to maintain the high quality of the final product, the individual parts and components are subjected to continuous strict inspection. Anything that does not conform exactly to standard is thrown out. For this purpose, too, data processing is used as much as possible.



Studer A800, studio multi-track tape recorder. Micro-processor-controlled very fast reaction, particularly suited for use with VTR via the TLS 2000 tape-lock system.



Studer 069, reporting unit for radio transmissions «in the field» via land line.



Studer remote control systems for modern tape recorders: TLS 2000 tape-lock system for electronic synchronisation and electronic editing, remote audio-channel control and auto-locator with 20 stored tape addresses.



Studer 269, control console for portable or permanent use, highly compact design.

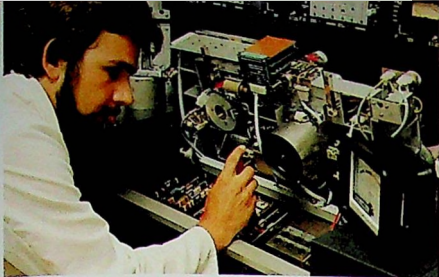
Workers who do not have the necessary precision are moved to another job. This comprehensive supervision appears somewhat severe at first glance, but really the main question is how management goes about it. If an employee does not fit well into a job, another place is sought in the factory where he can use his skills to the fullest. After all, job satisfaction is as important as monetary rewards.

The printed circuits, too, are produced by Revox itself. For this purpose a computer-controlled photo-plotter is used to produce the print layout from the design stage. This process is one of the most modern available in this sector. In one sequence the machine produces the production pattern for the printed circuit, makes a punch tape for the automatic drills, and sets down the layout for the circuit printing, which subsequently enables the service technician to trace a component. Galvanising is done, as already mentioned, at Bonndorf; I have included a few pictures of this department to give you a better understanding of the process.

Fig. 16 shows parts of the automatic etching installation, where all the surplus copper is etched from the copper-coated cards. Other coating processes are used to protect conductor strips or to gold-plate terminal points, etc. Since toxic substances are used in certain cases here, the safety of the work station is of prime importance. Through automation, man has really become only an inspector. Particular attention is also paid to environmental protection. External treatment installations clean the contaminated water from the galvanising plant and are used to recover valuable raw materials. The most up to date computer-controlled multi-spindle drills then drill the holes required for inserting the components into the printed cards. The cards are as usual given a final inspection before being distributed to the various factories for inserting the components.

At the main factory in Regensdorf this is done in two ways. The components are first threaded up in the right sequence for this purpose by a machine. Then there are robot devices which insert components on the cards by computer control. Since the proportion of circuits that can be inserted up automatically is still small, many cards are assembled by hand.

Various factories have circuit assembly departments. Fig. 20 gives a good indication



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of one such department. These sub-assemblies again require countless inspections. Fig. 21 shows a typical work station where sub-assemblies are checked and calibrated. Certain complicated circuits, mainly for digital control techniques, are so complex that no printed circuits can be used for connecting up all the contact points of the component. These circuits are wired by the «wire-wrap» technique, in which all contact points are tiny rectangular pins. The wire-wrap automat wraps the previously stripped wire round this pin and then conveys it to the next contact point where the wire is similarly stripped for winding round the terminal pin. In this way the wires criss-cross the circuit card several times, and the number of connections that can be made in this small space would never have been possible with printed circuit cards. The process originated from computer technology. Fig. 22 shows the operational area of an automat machine of this kind.

Another very interesting department is that of tape head production. Here all parts of the tape heads are produced and assembled. Fig. 23 und 24 show the machines used for producing the often very small individual parts from metal. The head gap is measured in micro-millimeters and is formed in a metal vaporising chamber under high vacuum. Work in these departments is virtually always under germ-free conditions, and most handling is so fine that it has to take place under the

microscope. Fig. 25 gives a view of a completed 24-track head assembly. The erase head can be seen to be divided up into two staggered 12-track units to the left of the picture, with the record and reproduce heads to the right.

Our inspection tour continues into the departments where the components are finally assembled into finished units. Revox tuners are assembled here in Regensdorf, while the major part of the production area is used to assemble professional Studer equipment. In addition to the portable studio tape recorders are the large 4 to 24 track machines, several mixing consoles and various peripherals which are generally specially made up from a basic model according to customer specifications. Equipment is no longer assembled here on a conveyor belt, as is sometimes the case with Revox units. In this case individual assembly, or at least assembly in small batches, is the usual procedure. Fig. 29 shows the mechanical and electrical adjustment of Revox equipment as compared to the individual adjustment of a studio unit in Fig. 30. Readings are duly taken at each measuring point. The work involved in inspecting an individual studio unit takes up days. The same effort is used in checking mixing consoles. Here too most assembly is on an individual basis. Again, most equipment departs from the basic design and is custom produced according to customer requirements. Figs. 31 and 32 give you an impression of the extent of such installations.

The numerous hours spent checking and adjusting thousands of measuring points enable sound engineers to achieve the high quality of present day music recordings.

That ends my tour of inspection of the firm of Studer-Revox. I have seen and experienced so many interesting things that it would need far more than this article to deal with everything. I have tried to give you an impression of what lies behind the world-renowned name of Revox. I hope I have succeeded. I should like to take this opportunity of cordially thanking all staff at Messrs. Studer-Revox whose help makes the compilation of this report possible. Special thanks are also due to Dr. Studer personally, for providing me with much important information for our readers in the course of an interesting discussion.

27 Following extensive quality control checks, machines are calibrated to meet the specific customer's requirement.

28 Tape heads are very delicate components, and are checked optically by microscope and magnifying glass.

29 Each unit is measured to ensure it meets exacting specifications.

30 Performance characteristics of each individual machine are documented during final quality control.

31 Broadcast and recording consoles receive their final check.

32 The sound you hear on radio and records is mixed on a console like this one.

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