STUDER REVOX

SWISS SOUND

VIEWS AND NEWS FROM SWITZERLAND

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Editorial

Safety standards... a nightmare?

When a new product is designed, its specifications must be established first. One of the indisputable conditions which have to be met, of course, are the internationally accepted IEC-65 Electrical Safety Standards.

Because regulations have to be enforced, we have to accept the existence of testing institutions and the costs resulting from the necessary tests must be absorbed. This article does in no way intend to question the need for testing authorities and their regulations, especially after I have had the chance to visit the horror chamber of such an institution myself. No need, therefore, to speak of nightmares!

Practice, unfortunately, looks somewhat different. Even though the majority of countries have accepted these safety standards unconditionally, there are, nevertheless, still several markets which recognize the tests or verifications of their own national testing institute exclusively. This is the point where our nightmare begins, because there are no limits to human imagination. The interpretations of these seemingly uniform regulations are almost as numerous as there are testing laboratories. While the methods for measurements and tests are usually the same, this is not so, however, as far as the theories are concerned when defects, which have been detected, are being analyzed. The use of a symbol for double insulated equipment is compulsory in most countries for example, yet it may be prohibited in others, unless additional costly tests are performed. This has the effect that we have to produce special versions, more often than not in inadequate quantities, thus resulting in an unnecessary price increase in the country concerned.

It is a matter of fact that product liability, as understood by the consumer, results in an automatic escalation of the interpretation of safety standards, because it is the testing laboratory which is burdened morally with the responsibility for the consequences of any accident. But what's more: Governmental bureaucracy is slow. From country to country it may take anywhere from two to six months before tests are completed. In case of a rejection, these periods become correspondingly longer. The resulting travels, discussions, exchange of correspondence, the resubmission of samples, test reports and re-examinations – and partly even language problems – may develop into a real nightmare for the manufaturer; and indirectly for importers and dealers also who have to stand hands-in-pocket just to see that the same product is being sold freely in neighbouring countries. Because the life cycles of new products in the field of entertainment electronics become shorter continually, their introduction and presentation by the trade press occurs at an increasing pace, yet the financial losses resulting from delays due to testing can hardly be compensated by "time delayed" sales.

Matters become even more complicated, because most testing laboratories do not only examine the product as such, in addition they demand that the components used (cables, plugs, receptacles, switches) all carry the seal of approval. To find components, however, which have been tested and approved in Europe and America as well, is a most difficult task, frequently resulting in unacceptable bottleneck situations on the component market.

The end to this nightmare is not yet within sight. Well meant efforts, such as IEC-65, CENELEC and others, adopted to achieve reciprocal acceptance, keep running up against numerous difficulties, such as protectionism of domestic equipment and component manufacturers, protectionism of importers against third party imports, job security and the struggle of the testing laboratories to prove their right for existence; but above all, there is the slowness of the governmental institutions.

This article was triggered by an upcoming decision which the Swiss government has to take. A sensible proposal which would accept foreign test results on their own merit, while domestic verification could be chosen, if so desired. The preparation of this proposal has taken nearly 20 years. It is to be hoped that the Swiss politicians and party executives will vote for this solution with the same common sense and courage as was shown recently by the Swiss voting public when it declined to embody into the Federal Constitution an additional week of holidays.

Utopia or a pipe dream? I hope not, because as everybody knows, even the worst nightmare will come to an end eventually.

Michel Ray

From the audio mixer Series 169/269 to the Series 961/962

The new portable ones

During the AES in Hamburg, the new STUDER audio mixer Series 961/962 was for the first time introduced to a larger group of professionals. The new, advanced concept was very well received: first orders have already been booked for these mixing consoles that become available after the middle of this year.

Of course, it is not just by chance that the type numbers of the field-proven Series 169/269 have been regrouped into the new model numbers, because the new mixing consoles are the direct successors of the Series 69 of which several thousand units have been manufactured. Similarities, even if they apply only to the exterior, are therefore not unintentional. The shape and the dimensions have remained the same, and also the practical concept of transporting the instrument panel well protected in the rear of the mixing console has been retained. Following the general trend to glare-free

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STUDER 962 with up to 20 modules.

surfaces, the anodized operating surfaces have been changed to the "Studer grey" color tone of the Series 900. User-friendly and well-arranged controls are the main external features of the new Series: for example all toggle switches have been replaced by push buttons.

The new design specifications incorporate many suggestions and recommendations of our customers and dealers. The main objectives of this new development were:

- Excellent technical data, "PCM capability".
- State-of-the-art components.
- Solid engineering, e.g. use of coupling capacitors between the op.amps to keep possible offset voltages away from switches and potentiometers.
- Field-effect transistors as switching elements in all critical audio paths.
- Quasi-symmetrical bus technique
- Insert point of all units electronically balanced. Level at insert point +6 dBm.
- Cost effective manufacturing methods.

A glance at the circuit boards of the plug-in modules shows that the number of electronic assemblies has increased by a factor of three; by contrast the number of manually soldered connecting cables has dropped to nearly zero. Only by implementing these measures was it possible to manufacture the new mixing console economically and to achieve a good price/performance ratio. Instead of plugging in resistors, capacitors, and cables manually, the circuit boards are now assembled fully automatically and error-free by an inserter. New methods are also used for testing the completed assemblies. "In-circuit-testers" measure each individual component with robot-like confidence and they reject even the most minute deviation from the desired value.

New modules:
Three basic types of input modules are available:

- Mono input unit with equalizer section
- Stereo input unit without equalizer
- Stereo input unit with equalizer

Each of these assemblies can be installed without modifying the basic chassis in any location of the left-hand mixer section.

The mono input module processes mono sources or one channel of a stereo pair operating with microphone or line level. Already the first stage of this module, the microphone amplifier, features a sophisticated circuit design. We let its inventor describe this part in another article of this issue.

Other circuit details worth mentioning are:

- Three separate inputs for microphone, line, and audio generator are connected into the circuit by field-effect transistors. Mic and line input are balanced and floating.
- Switch-selectable phantom supply.
- Defeatable treble and bass shelving equalizer and presence/absence filter with adjustable center frequency.
- Insert point electronically balanced. Level +6 dBm. The compressors built into the master channel or external effect devices can be looped in through two bantam jack sockets on the rear panel of the mixing console.
- Newly designed linear faders with improved gliding characteristics, accuracy, and maintainability.
- Click-free electronic muting switch, can be controlled through the built-in mute button as well as through external signals. Cough buttons or remote control by means of a video switcher are therefore easier to implement.
- Master selection via two or four buttons and a switch-selectable panorama potentiometer.
- Two separately controllable auxiliary outputs that can be connected before and after the linear faders.
- Pre-fader listening button.
- LED-type peak-level indicator.
- Studio signalization and fader start (LINE) via remote control relay.

The stereo input units have no microphone input, i.e. they can only process high-level signals. The following circuit features are worth mentioning:

- Stereo high-level input, balanced and floating.
- Level correction potentiometer.
- Equalizer (only on units with equalizer) with identical facilities as on the mono module, for common correction of both channels.
- Insert points, muting circuit, auxiliary outputs, and fader start facilities identical to those on the input unit.
- Stereo fader
- Stereo prelistening
- Master selection with one or two buttons, switch-selectable balance potentiometer.

The master unit consists of three separate functional assemblies:

- Master channel with summing amplifier, balanced insert point, linear fader, prelistening button, and balanced and floating line amplifier.
- One additional high-level input with rotary potentiometer, pre-fader listening button, 2 auxiliary outputs, and master selection with panorama potentiometer.

- Limiter/compressor in PDM technique (pulse duration modulation) which can be connected as a line protection limiter directly to the master, or as a compressor via jack cable to any input path. For stereo channels the control voltages can be coupled via the link button. The compression ratio and the release time are adjustable.

Also the aux and talk-back unit comprises several functional assemblies:

- Summing amplifier and potentiometer for the AUX channels 1 + 2.
- Talk-back microphone, amplifier, and talk buttons for studio, aux, and master outputs.
- Socket and switch for a utility light.

As an alternative a version with an optional studio monitor is available which contains all necessary elements for inserting a stereo source into the studio speakers as well as all amplifier and control elements for two-way communications between the studio and the control room.

The c. r. monitor unit controls the control room speakers and the headphones. The built-in automatic pre-listening circuit permits disconnecting of the monitor speakers from the selected source when any prelistening button is pressed, and to switch them to the PFL signal.

For the headphones it is also possible to listen to the monitor signal on one earpiece and to the pre-fader signal on the other earpiece.

Depending on the configuration of the mixing console, the instrument panel is equipped with 1 to 4 VU meters or peak program meters (PPM). For PCM recording the response time of the PPM can be reduced from 10 ms to 0.1 ms. A correlation meter is available as an option. The instrument panel also features output meters for the auxiliary channels, signal lamps, a prelistening speaker, and gain reduction meters for the limiters/compressors.

Connector panels (accessory) simplify the set-up of a complete system, particularly in the case of outside broadcasts.

For additional information please refer to the brochure E 10.26.0260 and the product information 14/85.

Hermann Stierli

Microphone input transformers for mixing consoles Series 961/962

The hot input

Microphone inputs are critical elements because conflicting requirements such as high sensitivity and high signal-to-noise ratio in conjunction with long microphone lines are to be satisfied; low distortion and high dynamic range across a broad frequency band are the reasons why the design engineers are still confronted with a challenging problem. The following report demonstrates that the "old" input transformer is still not obsolete.

Professional mixing consoles use balanced signal lines that are terminated by an input that should feature excellent common-mode rejection. This requirement has traditionally been satisfied with input transducers or transformers. The design specifications call for a common-mode rejection of at least 50 to 60 dB.

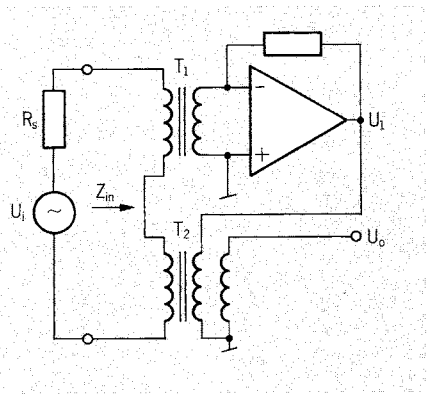
However, input transformers have lately fallen into disrepute: the frequency response and equalization ratings no longer satisfy the demands of critical users. For this reason active, transformerless input circuits are developed and used. Such circuits can feature superb electroacoustical data, but **two disadvantages** still remain:

- Common-mode rejection at low frequencies is inadequate. Desired are values of 100 dB and higher, which have long been taken for granted on transformer-type inputs.
- The maximum possible input voltage is reduced by the simultaneously available common-mode voltage.

If such disadvantages cannot be accepted, the solution is to retain the transformer while simultaneously establishing more stringent design specifications for it. These read approximately like this: at a lower cut-off frequency of 30 Hz, the input voltage may reach up to +6 dBU; the ohmic resistances relative to the input circuit shall not exceed 100 ohms (because only in this case can a good noise factor be attained), and finally the distortion may not exceed 0.1 %.

Such requirements are difficult to satisfy. A transformer with these characteristics has a volume of approximately 40 cm^3, weighs approximately 200 g and costs around 30 Dollars.

In connection with the new audio mixers of the Series 960 the problem was to find a solution that features even less distortion but which can still be economically justified. The solution to this problem is illustrated in Fig. 1, an arrangement with series negative feedback to the primary circuit.



The transformer T1 is terminated by a virtual short circuit (OPAMP input). The voltage modulation is nearly zero and the distortion becomes negligible. To ensure that the input impedance (Zin) becomes high, a voltage must be opposed to the source voltage (U_i). This is accomplished by returning the voltage U_1 into the primary circuit **(series negative feedback).**

The transformer T2 is driven by the amplifier with low impedance which means that distortion remains within acceptable limits even for high levels. Through the effect of negative feedback, the distortions of the induced output voltage in T2 are reduced to appro-

Paul Zwicky (49): Graduated 1960 in the field of telecommunications at Zurich ETH (Federal Institute of Technology). Joined WILLI STUDER in 1961. Supervised the development of the first transistorized STUDER professional tape recorder A62, as well as the audio mixing console series 089 ... 389 and 169 ... 369. Was appointed laboratory head in 1977 and since March 1985 manager of the application labs.

ximately 0.3 %. This voltage (U_0) is available on the third winding of T2. Other measures which are not discussed here, further reduce the distortion to extremely low values. Distortion of less than 0.01 % is attained, even at frequencies of 30 Hz and with an input signal voltage of 1.55 V. Together these two transformers weigh only 33 g and cost only 6 Dollars!

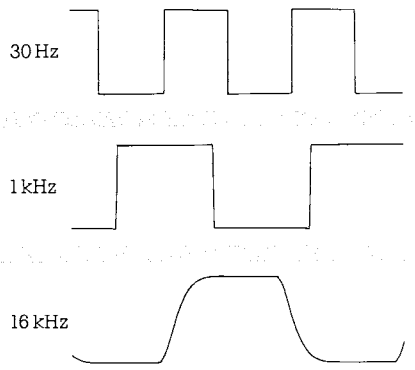
A patent application has been filed for this solution.

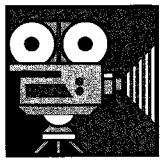
Paul Zwicky

Technical data
for microphone input stage 961/962

Gain:		15 dB
Noise factor:		< 3 dB
Input impedance:		2 kohms
Frequency response:	10 Hz	-0.1 dB
	16 kHz	0 dB
	66 kHz	-3 dB
Input voltage: 30 Hz ... 20 kHz		max. +6 dBU
Distortion: U_i max.		< -80 dB
Common-mode rejection:	50 ... 60 Hz	> 120 dB
	4 kHz	> 90 dB
	16 kHz	> 75 dB

Square-wave passages for the frequencies 30 Hz, 1 kHz and 16 kHz:





Studer Revox America Inc.

Independent Dealers Support Studer Distribution

The USA is a big country. How big? If you re-shaped Switzerland to fit, you could place three Switzerlands East to West across Studer Revox America's home state of Tennessee and only a few odd cantons would bulge out into Arkansas. There are 33 states in the USA larger than Tennessee.

Until recently, all distribution and technical support of the entire Studer product line for this vast area was handled exclusively by Studer Revox America, Inc. All sales, service, and parts activities were channeled through **six offices:** the Nashville headquarters and five field offices in New York, Los Angeles, Chicago, Dallas, and San Francisco.

This system worked fine with moderate sales volumes and a limited product line. But as the Studer line broadened and sales volumes increased dramatically, this system of direct distribution came under increasing strain. Therefore, a Studer dealer program was initiated in 1983.

"We found there was a distinct advantage in supplementing our factory sales force with **independent local dealers,**" says Thomas E. Mintner, Vice President and General Manager of Studer Revox America. "We can now utilize our factory sales engineers in the field in two capacities: one is direct sales, and the other is functioning as sales representatives working with the dealers to support them in their technical and marketing activities".

Studer Revox America now employs a two-tiered structure of distribution. One group of Studer products (the A810 recorder, telephone hybrid systems, cassette decks, speakers, etc.) is distributed by independent dealers. A second group of products (A800 and A80 VU 16/24 track recorders, mixing consoles, etc.) remains under exclusive direct distribution by Studer Revox America.

"We've found that our dealers have been very effective in selling the A810 2-track recorders", Mintner comments. "This is particularly true of local broadcast stations, where their engineers have been doing business with independent equipment suppliers for years."

Studer dealers make up a small, exclusive group. Dealerships are limited in number to allow close supervision of dealers performance by SRA and to maintain reasonable profitability. Dealers are selected on the basis of their reputation within the industry and on their willingness to provide the high level of technical and service support Studer customers have come to expect.

Prospective dealers must agree to relatively demanding sales and service requirements if they wish to join the Studer dealer network. They must stock a minimum quantity of products for demonstration and they must maintain a substantial inventory of spare parts. In addition, dealers must send their key sales and technical personnel to Nashville for **training seminars.** Held annually in Nashville, these intensive workshop courses combine the technical and marketing aspects of each product in a single comprehensive session. The SRA marketing philosophy stresses the full technical competence of all sales personnel associated with the Studer product line.

Since the dealer program was inaugurated in July of 1983, Studer Revox America Inc. has experienced a steady increase in sales of dealer products, according to Mintner. The dealer network now consists of 12 companies with a total of 15 separate locations. Studer dealers are located in every geographic region of the USA and in nearly all the nation's major metropolitan areas.

Thanks to the dealer network, Studer Revox America now finds it easier to keep Studer customers satisfied – "from Broadway to Burbank, from Miami to Maine".

Bruce Borgerson

Dealer training seminar, 1984.

Portrait of a Company

Studer France S.à.r.l.

France is a big country, economically and politically under central government, with typically Roman characteristics where decisions are made by instinct rather than serious thought, with a flair for modernism and no respect for established values.

From the left to the right: François Gibouin, François Tournier, Geneviève Calisti, Ronald Wolezyk, Oldrich Mikoska, Jacky Juin, Jaqueline Galopin, Rosel Gay, Didier Grondin.

The French market includes overseas territories as well – such as Tahiti in the Pacific Ocean, the Antilles in Central America, Guayana in South America, Réunion Island in the Indian Ocean, New Caledonia in the neighbourhood of Australia and – not to forget – the St. Pierre-et-Miquelon archipelago islands, situated a few miles off Newfoundland. These territories are not mentioned as a curiosity – in fact, STUDER products are well represented there in broadcast and recording studios.

STUDER has been distributed in France since 1960; in 1971, when STUDER FRANCE was established, the company's fate was in hands of a few people only: A. Uebersfeld, former distributor of STUDER, O. Mikoska who had come from EMI (also a STUDER customer) and – last not least – Mme. G. Calisti and R. Arnaud, both working part-time.

Some time later, the team was increased by a technician; Mme. Calisti and M. Arnaud were employed full-time. Office premises did not suffice any more and were transferred to the 15th Arrondissement of Paris City. The former STUDER distributor handed his company shares over to Studer International AG and Oldrich Mikoska was appointed managing director of STUDER FRANCE. On its 10th Anniversary just recently, the company premises were redecorated; nine employees now form an efficient and dynamic team under the management of O. Mikoska.

The STUDER FRANCE Family

Oldrich Mikoska, Director and General Manager, is mainly busy in administration and sales promotional activities; he also controls the technical side of the business. As a graduated engineer, he became interested in the financial side of the enterprise at a later period and – liked it. Converted from an active musician to a demanding music listener, his professional "ear" is an asset in his business. His favourite spare time occupation is skiing.

Geneviève Calisti, assistant of the general manager, solves problems occuring in administration and organisation, and is also responsible for advertising work and organizing exhibitions. In her spare time, Mme. Calisti reads good literature and prefers Swiss mountains for skiing.

Ronald Wolezyk, technically and commercially engaged, represents STUDER products with great enthusiasm – especially in the video area of our business. He actually came from the "Centre Européen de Recherche Musicale" – another STUDER customer – and is also an active musician: he plays his alphorn daily!

Didier Grondin, accountant and responsible for all financial matters, has for one year now been particularly busy feeding the computer with as many data as possible and teach it to "walk". He is greatly interested in anything that moves on wheels and floats on the water.

Rosel Gay, secretary, multi-lingual, originates from the lovely Black Forest area where inhabitants are said to have the most methodical and exact working habits. She loves to listen to music and enjoys the shortest route to work: 25 m back and forth – much envied by her colleagues.

Jaqueline Galopin, most important link to our clientèle for she sends out all invoices, works as our receptionist and answers the telephone. Her life at the office has lately been grossly dominated by a new "employee" – our computer HP 250, that holds hardly any secrets for her. Her enthusiasm for data processing is only shared by her love for water sports activities in the Mediterranean.

François Gibouin and François Tournier form our technical team, supported by Jacky Juin, guaranteeing the very exact and regular checkup of all equipment leaving for the user. They also look after all service matters. François Gibouin is an EDP fan, whilst François Tournier favours music in his leisure time: Jacky Juin, also in charge of the spare parts store and delivery service, is our "self-made" man who has acquired considerable technical know-how during the last six years (and nevertheless manages to be available wherever he is needed).

Our Customers

Broadcast companies represent major part of our clientèle. France offers a rare variety of stations, ranging from small 25 W FM transmitters to giants like EUROPE 1 and RMC who transmit on 3500 kW. Apart from these Big Two, everybody knows RADIO FRANCE, RADIO

TELE LUXEMBOURG, and SUD RADIO. We particularly enjoy the fact that all studios presenting prestige programs (France Culture and France Musique) at RADIO FRANCE are equipped with STUDER products. We are also represented at FR 3, ANTENNE 2, RFO (overseas services) and lately CANAL PLUS television companies.

A range of recording studios is also included, although their signification has changed over the last few years. We have now entered the video area in its full expansion which at long last stresses the importance of good sound quality. In this field, we have equipped one of the largest advertising studios with our products.

Looking at the years ahead, we are convinced that we will conquer an even greater share of the market. Our activities will be supported by new STUDER products and a dedicated and efficient company team.

Oldrich Mikoska

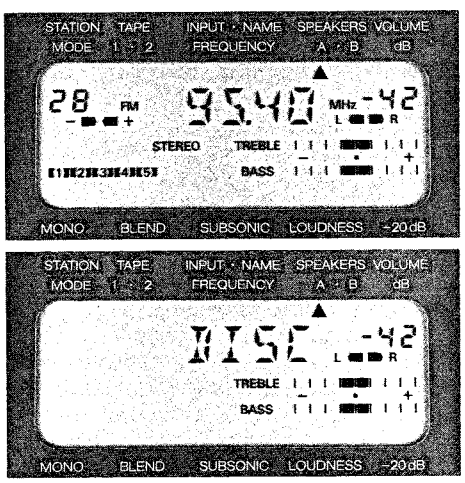
Ronald Wolezyk, sales engineer at his desk.

B285, the new REVOX receiver

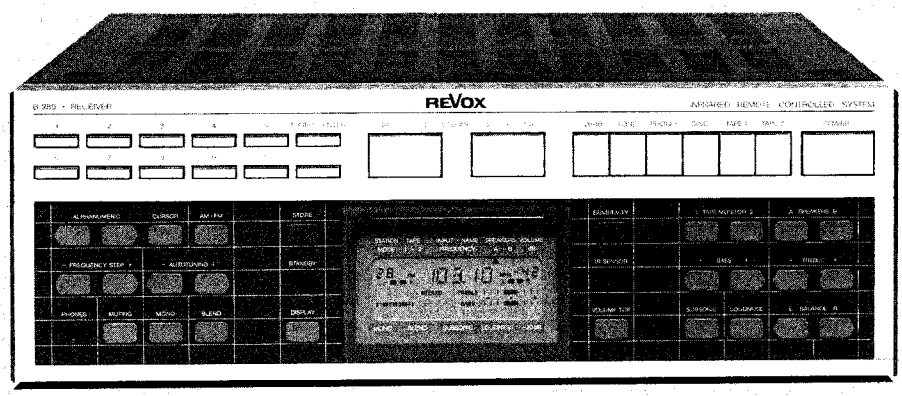
High performance from a compact unit

The new REVOX B285 receiver incorporates the same technology and operating convenience as the B261 tuner and the B251 amplifier and consequently combines many of their advantages in a new, compact unit. An intelligent, easily understandable operating concept, a well-structured internal layout as well as the implementation of new, efficient circuit technologies have improved many specifications and characteristics of the predecessor model, the B780.

Since this receiver is operated exclusively by means of push buttons, the design of the front panel was of crucial importance. Particular attention has been given to the visually supported grouping of the controls (arrangement: primary keys on top, secondary keys on bottom, tuner area on the left, amplifier area on the right).



Extensive information made visible on the large multifunction LC-Display.



Receiver REVOX B285; also available as Preceiver with model designation B286.

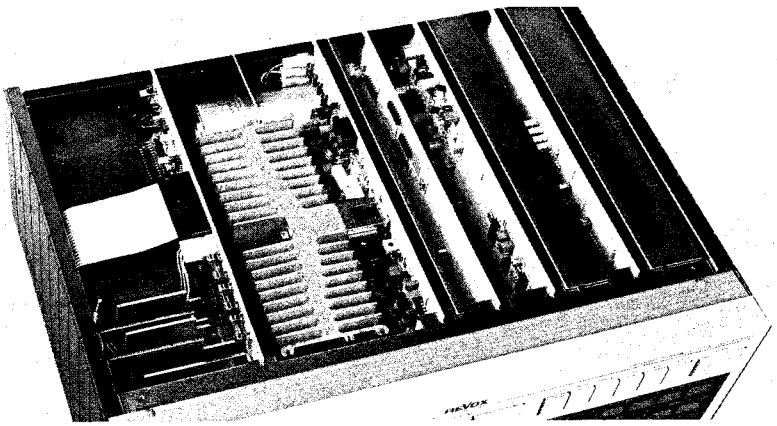
A central display field with a special LCD designed for this receiver provides information on all tuner and amplifier functions.

Only by using push buttons that act indirectly on the electronic control elements via a microprocessor was it possible to implement this convenient, well-arranged front panel which provides some interesting **operating features:**

- 29 Memories for storing either AM or FM stations:
  The memories can be addressed with the station pretuning buttons 0 to 9 and the ENTER key. For each memory location not only the station frequency but also the name and the reception mode (muting, mono, blend) can be programmed.
- Alphanumeric input of station name:
  With the aid of a CURSOR and two ALPHANUMERIC keys, up to four characters A to Z or digits 0 to 9 can be entered and stored.
- Sensitivity-programmable inputs:
  when the SENSITIVITY buttons are pressed, the VOLUME buttons become internal level controllers so that the volume of different audio sources can be matched to each other. As an added convenience not only the external inputs (phono, disc, tape 1 + 2) but all 29 stations can be calibrated!
- Volume top for tailored volume:
  With the VOLUME TOP button a maximum listening volume can be independently defined for the speaker pairs A and B and the headphones.

All operating functions can be controlled remotely through the infrared receiver on the front panel or the serial terminal (REVOX BIBUS) on the rear panel.

Some of these functions are required in conjunction with the IR remote control B205 or the timer controller B203. The entire spectrum of these facilities is exploited during the final inspection of the receiver by the computer-controlled



Professional design and workmanship inside the B285: plug-in modules, perfectly shielded and a minimum of wiring.

measuring stations. All electronic assemblies are implemented on printed circuit boards, from the tuner RF section to the 2 x 220 W output stage, which means that a high packing density can be achieved in a housing with the standard dimensions of the REVOX B series.

The vertical arrangement of the printed circuit boards results in improved air circulation within the housing and consequently minimal heat build-up and maximum reliability in operation. The power transformer which is also vertically arranged is fully encapsulated in a separate box in order to avoid hum vibrations.

The push buttons and the IR commands for controlling the equipment and the display are supported by two coupled microprocessors. One of these controls the nonvolatile memory (EAROM) which contains the amplifier and tuner data. The content of this memory is not affected by power interruptions.

Communication between these two processors and with the peripheral assemblies in the unit is implemented through a serial, bidirectional 2-wire (I^2C) control bus.

The B285, a milestone in operating convenience, also excels through its refined state-of-the-art technology

The transition from the good old variable capacitor to the frequency synthesizer principle of the first digital tuner A720 some 10 years ago, was a giant step toward greater operating convenience. Since then we have continuously refined this successful principle. In conjunction with highly advanced receiver technology, this tuning method today can easily outperform any conventionally operating FM tuner.

The **tuner** of the B285 receiver which comprises an FM stereo and an AM section is a new development and contains some improvements over its predecessor in the following key areas:

- RF intermodulation immunity:
  The highly selective input section with seven tuned RF circuits and RF amplifiers connected in parallel features an RF signal-to-intermodulation ratio of over 90 dB.
- Static selection:
  The selectivity of the IF section has been improved by some 20 dB by inserting a second IF block filter.
- Signal-to-noise ratio:
  A new, highly linear PLL FM demodulator improves the weighted signal-to-noise ratio by approximately 10 dB in stereo mode.

These enhancements and optimizations have resulted in further improvement of the general reception characteristics.

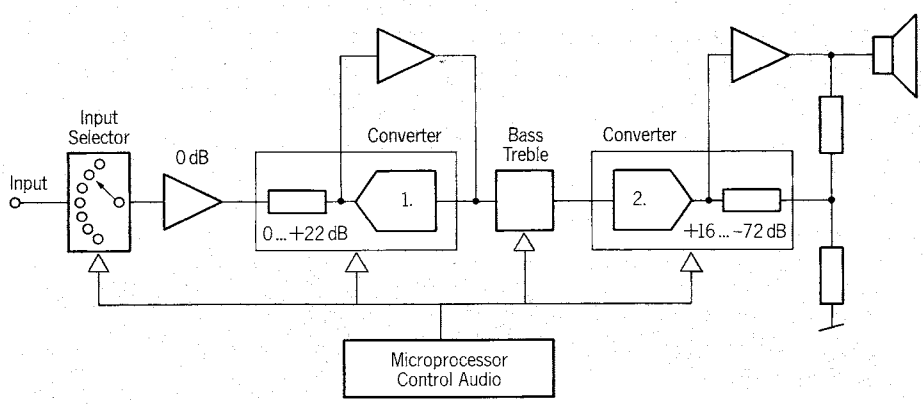
For the first time all operating and control functions of a REVOX **amplifier** section have been implemented with electronic control elements. This resulted in some major additional benefits:

- Optimum signal routing for minimum channel cross talk and high immunity to magnetic fields.
- Extremely low noise at any listening volume by implementing the volume regulation with two electronic controllers: a controlled amplifier after the impedance converter and a controlled attenuator in the output stage. Both level controllers operate with a multiplying DA converter and a DC servo in the negative feedback for suppressing switching clicks.
- The parametric BASS and TREBLE control can be varied both individually and automatically as a function of the VOLUME setting (LOUDNESS).

The powerful, extremely **compact output stage** produces a balanced, neutral sound impression. With a music power of 2 x 220 W and a dynamic range of 115 dB the B285 receiver is eminently suited for the age of digital audio electronics.

The effect of advanced components and highly efficient manufacturing techniques is readily apparent in the good price/performance ratio. We have intentionally foregone some of the less frequently used operating refinements; these are left to the larger and more expensive twins, the B251 amplifier and the B261 tuner.

This new, attractively priced REVOX B285 receiver again combines exquisite operating convenience with sophisticated technology and enhanced technical specifications. Many audiophiles will be enthused.

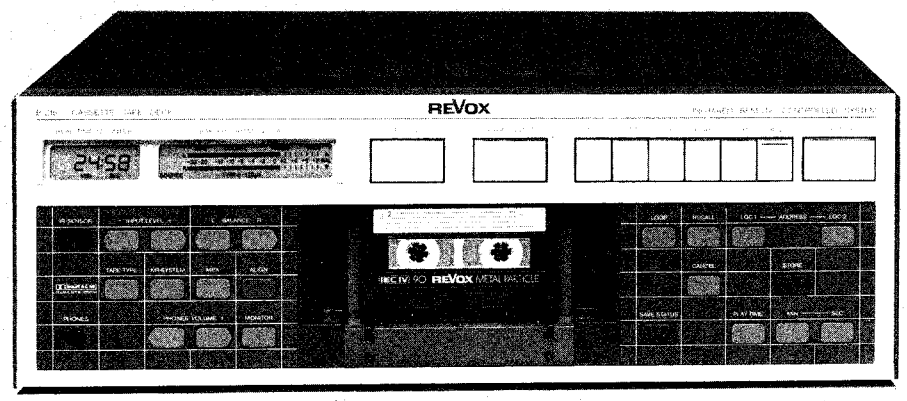


Volume is adjusted in the amplifier by means of two converters. In the upper range, from 0 ... 22 dB, converter 1 is effective, while in the lower range from +16 ... -72 dB the signal is attenuated by converter 2.

Ernst Mathys / Jurgen Hartwig

B215, the new REVOX cassette tape recorder

Intelligent precision



Cassette recorder REVOX B215 offering a multitude of automatic functions.

To consistently apply the knowledge gained from experience while simultaneously exploiting state-of-the-art technologies is certainly the most promising objective of any development. The following report demonstrates this based on the REVOX B215.

As was the case already with the first units of the REVOX Series 200, special attention has been given to convenient operating also on the B215. The operating concept has been designed to be self-explanatory as far as possible. This has been ideally accomplished for example through logical grouping of the front panel controls:

the primary, upper section contains all functions required for producing high-quality recordings, the less frequently used functions that give a high degree of versatility are arranged in the lower, secondary section.

Looking at the front panel in detail you find various interesting **display and control elements:**

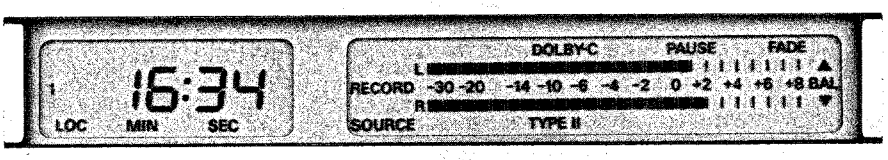
- The display field with two LCDs graphically indicates in an easy-to-follow manner all information concerning the tape recorder status.
- Real-time counter display in minutes/seconds which also works for cassettes that have not been completely rewound before insertion. The same display can also give information on the input signal setting of the digital level controller.
- Markings appear in the display for assigned address memories as well as in loop mode.
- The program level meter, implemented with a 24-segment bar graphic, also gives information on possible balance deviation from the center setting.

In addition to the normal tape transport keys, there are two **special functions** in the main operating section:

- With FADE IN/OUT the modulation can be faded in and out softly during a recording. Together with the PAUSE command it is possible to achieve a gapless transition between music sections.
- The SET LEVEL button is an aid for limiting the maximum level (which must always be known) of certain passages, taking into consideration the type of tape currently used. In this way the capabilities of the tape can be fully exploited without incurring distortions and without sacrificing the signal-to-noise ratio.

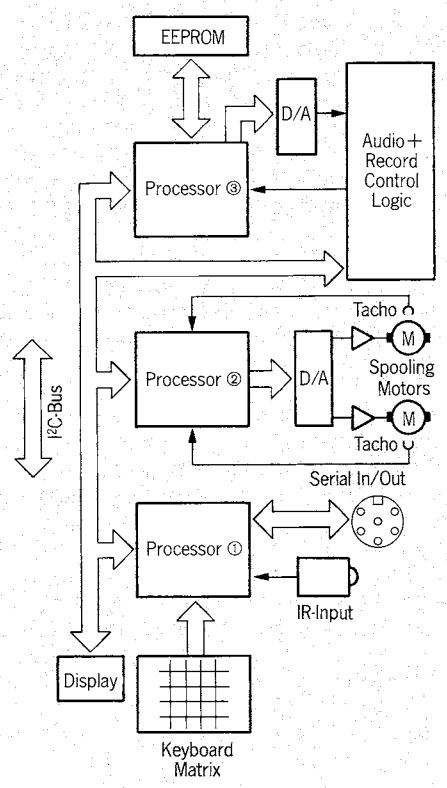
The largely automated MONITOR change-over (manual influencing is still possible) and automatic selection of the tape type according to the encoding on the cassette further simplify the operation. This operating concept is supported by storing the equipment status in the EEPROM (e.g. for selecting the NR system, MPX filter, setting of the 60-position input controller including balance and listening volume of the headphones). These parameters are always saved when the unit is switched off, however

REAL TIME COUNTER PEAK PROGRAM INDICATOR



Multifunction twin LC-Display.

The basic arrangement of the front panel may at best show the "external features", but also a number of "internal features" are very attractive.



Block diagram of the multiprocessor logic.

saving can also be forced with the SAVE STATUS command.

The internal functions of the unit are coordinated by 3 separate 1-chip microprocessors, each with 4 kbyte of memory.

Processor 1: Processing of the commands entered through the keyboard matrix of the front panel, processing of the IR commands, control of the bidirectional, serial interface (on the rear panel).

Processor 2: Decoding of the tacho signals from the two reel shafts, for computing the real time as well as for controlling the tape motors in play and spooling mode, including braking phase.

Processor 3: Preparing the function sequences for audio mode, particularly control of the D/A converters the signal path and control of the automatic alignment for the different tape materials. This also requires memory management for the EEPROM.

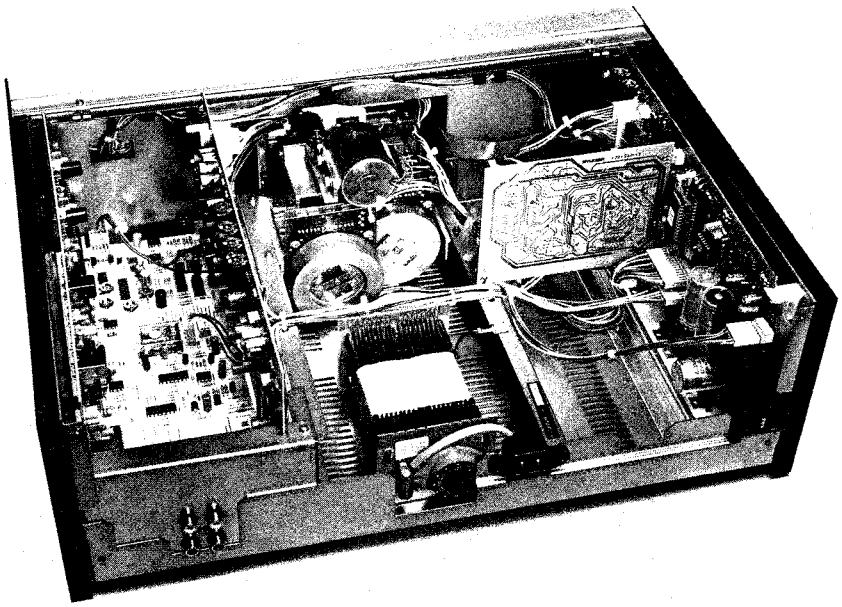
Only by employing a bus design is it possible to attain such comprehensive communication between the electronic assemblies. In addition, 6 different sets of parameters relating to specific cassette brands can be stored in the nonvolatile memory where they are protected from power failures.

Through the **automatic alignment process** implemented with this logic structure it is possible to create optimum conditions within 20 seconds for a broad range of audio tape materials with respect to dynamic response, frequency response, and distortion by means of 3 measuring frequencies and the DOLBY HX professional* circuit integrated in the audio electronics. Together with the tolerances of the Dolby B/C components which are taken into consideration during calibration, audio data can be achieved that satisfy even the most stringent requirements. Through the built-in phase compensation in the recording path, the square-wave reproduction off the tape is of truly professional quality.

The tape transport assembly has been optimized with the same tape guidance successfully used in the B710. The basic principle with two directly driven capstan shafts, two DC spooling motors and extremely rigid die-cast pivoting carrier which has proven itself in tenthousands of units has, of course, been retained.

The remote-control socket provides new facilities for operating the B215 in coordinated configurations with even greater convenience, quasi as a "linking" element to the Series 200.

As a last item also the improved price/performance ratio is worth pointing out.

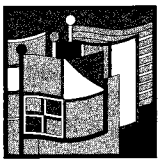


Clear layout and easy accessibility due to the modular construction of the B215.

The elements where savings have been achieved become readily apparent by a glimpse at the inside of the unit: compromises have been made neither in the circuit technology nor the solid design of the chassis nor the maintainability. The secret is in the grouping of the circuitry into logical subassemblies consisting of large-scale modules that have been assembled nearly 100 % automatically. This resulted in considerable reduction of costly wiring work.

Marino Ludwig

* Noise reduction and headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX-Professional originated by Bang and Olufsen. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

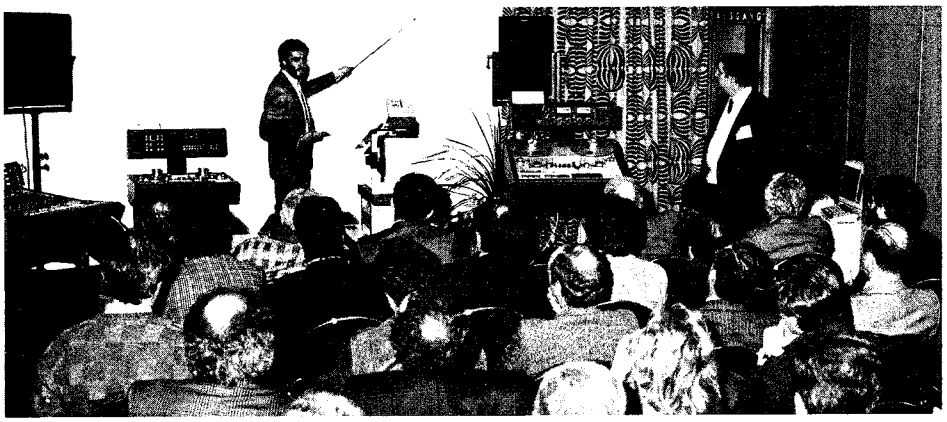


Big Action at STI

77th AES Convention in Hamburg

Studer International AG presented their range of professional audio equipment on more than 1000 sq.ft. The new products – STUDER A820 analogue recorder, digital recorder D820X and STUDER mixing console versions 961/962 – were focus of special attention.

In a separate demonstration room, special product presentations were held throughout the day to familiarize our customers with STUDER products in detail. Larger groups of visitors were individually entertained.



Presentation of STUDER A820 new analogue recorder by Louis Keller, STI.

For STUDER REVOX as one of 163 exhibitors, the Hamburg AES Convention and Exhibition was great success.

Individual presentation of digital recorder STUDER D820 X to Prof. Jakob Stämpfli, Zurich.

The Studer Group of Companies

"Who is who"

This column has been reserved for introduction of personalities of our affiliated companies and representations in Europe and Overseas.

Introducing:

Margrit Meyer

Head of Sales Administration of Studer International AG • born in Aadorf, Canton of Thurgau • childhood and schooling at Ibach, Canton of Schwyz and Wettingen, AG • since 1962 with the company group.

When Margrit Meyer joined the predecessor of Studer International AG after successfully graduating from commercial school, business matters were still school theory. However, practical business was already in sigh – the first series of STUDER C37 were waiting to be exportet to foreign countries. The distributing company was very small in those days, but the contribution of each employee counted a lot. Goods were packed and invoiced by one and the same person and the rather direct touch conveyed excellent knowledge of the product range.

In 1969, Margrit Meyer took on management of sales administration and received company's power of attorney. Export markets opened up and even included China. One year later, 1970, a new generation of professional tape recorders – the STUDER A80 – was introduced: the entirely new concept attracts business in many European and Overseas markets.

In the sales administration area, Margrit Meyer dismissed a card index system for spare parts stock control in favour of a more advanced disquette system. A new scheme for long-range planning of equipment is fully activated. The new premises at Wettingen Hardstrasse permit the expansion of spare parts stock holding.

More work generates; staff is increased, reorganisation carried out. Within the range of organisational measures, company premises of Studer International AG are transferred to Regensdorf – the fifth company move Margrit Meyer experiences.

In the meantime, the number of official STUDER representatives has increased in foreign markets and new products enlarge the equipment range. Sales activities increase. Electronic data processing is at the doorstep; Margrit Meyer is also busy in this area. The objective – fully integrated order processing – is still to be accomplished.

Sales administration offers a wide scope of responsibilities; Margrit Meyer heads the centralized services of the company (telephone, telex, mail department, EDP), buying, warehousing and shipping; budgeting and long-term procurement of all required equipment and replacement parts, coordinating sales administration with the field sales organisation. This job requires good experience in export business as well as a great deal of personal engagement.

In her spare time, Margrit Meyer plays golf, takes long walks, swims and skies; she also reads a great deal, prefers classical music and collects icons.

"Procrastination is the thief of time" – an old proverb Margrit Meyer has adopted as her work principle. This and her resolute approach in all business matters does not necessarily make life easier for herself – however, success proves her point.

Renate Ziemann

Big Rush at STI

Service courses

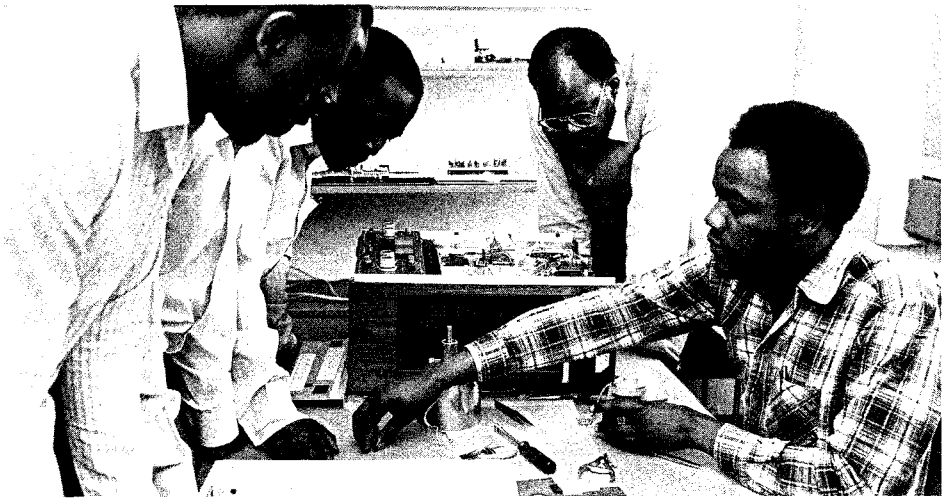
Continued technical education is essential – a good service technician would know this by his own experience. Latest technologies of new products require a profound knowledge.
Studer International AG consequently offers an extensive training and education program.

Last year, for example, 13 service courses were held at Studer International AG in a total of 54 work days from September until the end of 1984; the majority took place in Regensdorf.

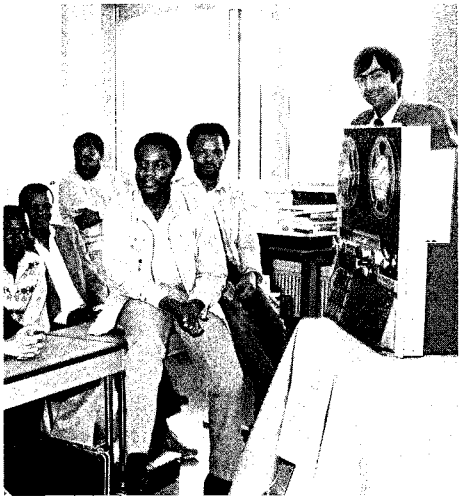
For several lectures, the training engineer travelled to remote locations in Melbourne, Sydney, Singapore and Helsinki. Courses were mainly held in English language, with some French and German lectures as well.

Course subjects varied; emphasis, however, was placed on Tape Recording Machines A810, A800, B67 and Mixing Console 900. Participants came from various countries to familiarize themselves in detail with theory and practice of STUDER equipment. Visits to the production field and test department gave visitors an impression on activities "behind the scene". Meeting people made a welcome change to dealing with extremely technical matters most of the time.

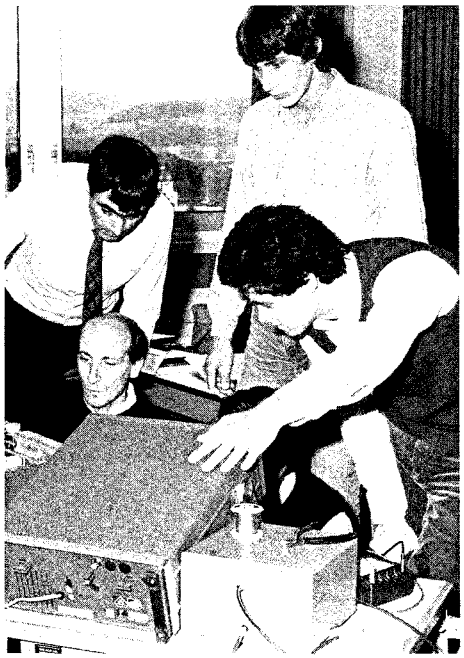
An impressive demonstration of the STUDER A820 by Heinz Schiess (Area Sales Manager).



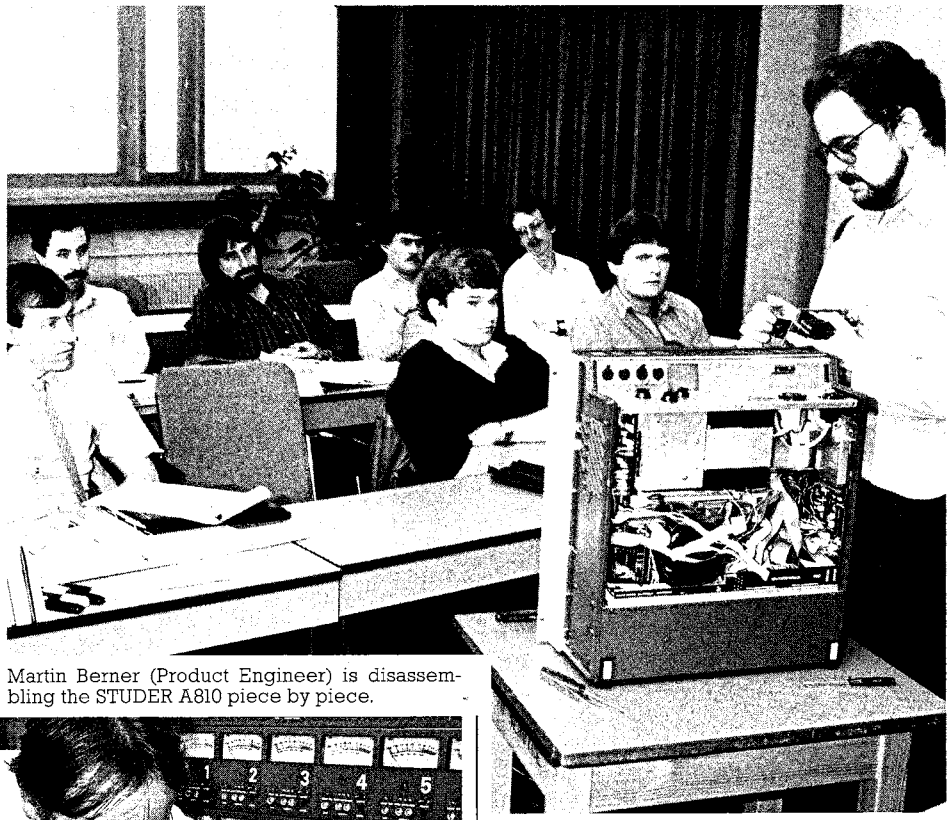
Training down to the last screw.



Training for Broadcast Engineers of various countries.



Trouble shooting on a A800.



Martin Berner (Product Engineer) is disassembling the STUDER A810 piece by piece.

Mechanical alignment with J.F. Raoult (Product Engineer).

Service courses require a great deal of engagement from participants and training staff. It is rewarding to see that at the end of a course, satisfied participants take home new motivation.

Service courses 1985

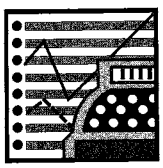
For the below listed courses, participants are still welcome. If you are interested to enrol, please advise your STUDER distributor.

Peter Joss

Training courses on professional STUDER equipment

24.06. – 27.06.85 **STUDER A820,** Tape Recorder	English
02.09. – 06.09.85 **STUDER 900/961,** Mixing Console	German
09.09. – 12.09.85 **STUDER A810,** Tape Recorder	German
12.09. – 13.09.85 **STUDER TLS 4000,** Synchronizer	German
16.09. – 20.09.85 **STUDER 900/961,** Mixing Consoles	English
23.09. – 26.09.85 **STUDER A810,** Tape Recorder	English
26.09. – 27.09.85 **STUDER TLS 4000,** Synchronizer	English
21.10. – 24.10.85 **STUDER A810,** Tape Recorder	French
24.10. – 25.10.85 **STUDER TLS 4000,** Synchronizer	French
28.10. – 31.10.85 **STUDER 900,** Mixing Console	French
21.10. – 25.10.85 **STUDER 900,** Mixing Console	Arabic
28.10. – 01.11.85 **STUDER A80 RC,** Tape Recorder	Arabic
04.11. – 07.11.85 **STUDER A820,** Tape Recorder	English
07.11. – 08.11.85 **STUDER TLS 4000,** Synchronizer	English
11.11. – 15.11.85 **STUDER D820,** PCM Recorder	English
18.11. – 22.11.85 **STUDER A800,** Tape Recorder	English

The courses are not fully booked yet. Each course takes 8–12 people and demands reasonable knowledge of electronics.
Course fee is sFr. 110.– per day.



Right on success

Studer worldwide

Belgium

Radio Télévision Belge de la Communauté Francophone (RTBF)

Within the requirements of a tender opened for the renewal of studio equipment (film/video audio post synchronisation), STUDER received an order for 13 tape recorders A810-2 TC with Tape Lock System TLS 4000, and 15 STUDER A810-0.75 version. This machine has once more succeeded to become Number One of the broadcast machines. Included in the RTBF order for tape recording machines is a STUDER 903 Mixing Console – the fourth model of the 900 series RTBF has in operation.

Denmark

Danmarks Radio (DR)

The Danish broadcasting company has also decided for the STUDER A810 professional tape recorder and Tape Lock System TLS 4000. Up to the end of March 1985, 22 STUDER A810 and 6 TLS 4000 were supplied to DR.

Australia

Australian Broadcasting Commission (ABC)

At the House of Parliament in Melbourne, STUDER machines are operated in an interesting configuration. Parliamentary discussions are recorded with SMPTE time code on STUDER A810-2 TC. With the aid of the Tape Lock System TLS 4000, any tape position can be accurately located with reference to the exact time of day at which the recording took place. It is thus extremely simple to select any desired sequence for direct inclusion in the evening news.

Within the last two years, STUDER REVOX have supplied some 180 B67 and PR99 machines; in addition, 20 STUDER A810 tape recorders are also in operation at ABC.

Canada

Canadian Broadcasting Corporation (CBC)

STUDER REVOX heads for success in North America; 75 STUDER A810, 5 A80 RC professional tape recorders, 1 A80 VU-16-2" multichannel machine, 12 PR99 MK II version, 6 mixing consoles STUDER 169/269 and 18 Compact Disc Players STUDER A725 were supplied to CBC within the last few months.

For further information please contact

Forthcoming events

1985 May 3 – 6
78th AES Convention, Anaheim

1985 May 14 – 16
W.A.B.C., Calgary

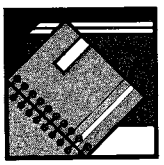
1985 May 16 – 17
Exhibition for TV and Motion Picture, Tokyo

1985 June 6 – 12
14th International TV Symposium, Montreux

1985 June 12 – 14
APRS, London

1985 August 28 – September 2
FERA, Zurich

1985 August 30 – September 8
Internationale Funkausstellung, Berlin



From the printers

10.26.0191	**D820 X,** Flyer (e)
10.26.0220	**A820,** Leaflet (g)
10.26.0230	**A820,** Leaflet (e)
10.26.0250	**961/962,** Leaflet (g)
10.26.0260	**961/962,** Leaflet (e)
10.85.0770	**961/962,** PI 14/85 (g)
10.85.0780	**961/962,** PI 14/85 (e)
10.23.1831	**A80 QC MK II,** SI (g/e)
10.85.0761	**A725,** PI 13/85 (g/e/f) prel. Operating instructions
10.27.0220	**A80 VU MK IV,** Complementary to SI (g/e)
10.18.5091	**PR99 MK II,** Leaflet (span)
90.1452	**Revox product catalog '85** (g)
90.1462	**Revox product catalog '85** (e)
90.1472	**Revox product catalog '85** (f)
90.1492	**Revox product catalog '85** (danish)
90.1512	**Revox product catalog '85** (dutch)
10.29.0110	**B77 MK II special versions,** Leaflet (span.)
10.29.0191	**Piccolo-Bass,** Leaflet (g/e/f)
10.30.0400	**B215,** OI (i)
10.30.0260	**B225,** OI (dutch)
10.30.0241	**B285,** OI (g/e/f)
10.30.0340	**B205,** OI (g/e/f)

PI = Product information
TI = Technical information
OI = Operating instructions
SI = Service instructions
SD = Set of diagrams

Sets of diagrams, operating and service instructions available at nominal charge.

Please mail your letters to:
SWISS SOUND, STUDER INTERNATIONAL AG
Althardstrasse 10, CH-8105 Regensdorf
Phone 01/840 29 60 · Telex 58 489 stui ch
Telefax 01/840 47 37 (CCITT 3/2)

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