STUDER REVOX

SWISS SOUND

VIEWS AND NEWS FROM SWITZERLAND

A PUBLICATION BY STUDER REVOX

4/83
December 1983

Editorial

Two years

Nearly two years have passed since we published the first edition of our customer magazine SWISS SOUND. When we first played with the idea of creating this magazine, we only had a goal and a suggestion for a title, nothing more. The title we have changed, but the goal has remained the same: to provide our customers and friends (customers can and should be friends) with background information and to acquaint them with personalities and developments. After two years and six (internally) turbulent editions, we have now achieved a circulation of 10,500 English and 4,400 German copies. We now have (are) an experienced production team and our articles have already been reprinted in professional journals. In short, we have become an institution.

However, an editorial should not simply harp at the positive aspects; this is boring and suspect. We too have our problems: promised articles are not handed in on time; the diametrically opposed requirements of the various departments with respect to content have to be resolved; there is an eternal dilemma in the publication of sales successes between "may" (competition) and "must" (PR).

However, our main problem lies not in the material we receive (even if late); what concerns us the most are the reactions (or nonreactions) from the circle of our readers. What we have stated already in the first edition of SWISS SOUND is still true today: although it may be possible to produce a magazine in a vacuum, this is unsatisfactory and in the long run even dangerous because it is all too easy to get on the wrong track, i.e. out-of-touch with the real world. It is our aim to be a medium that "lives for and by the communication with its readers".

The address of the editors can, as always, be found on the last page.

Massimo Schawalder

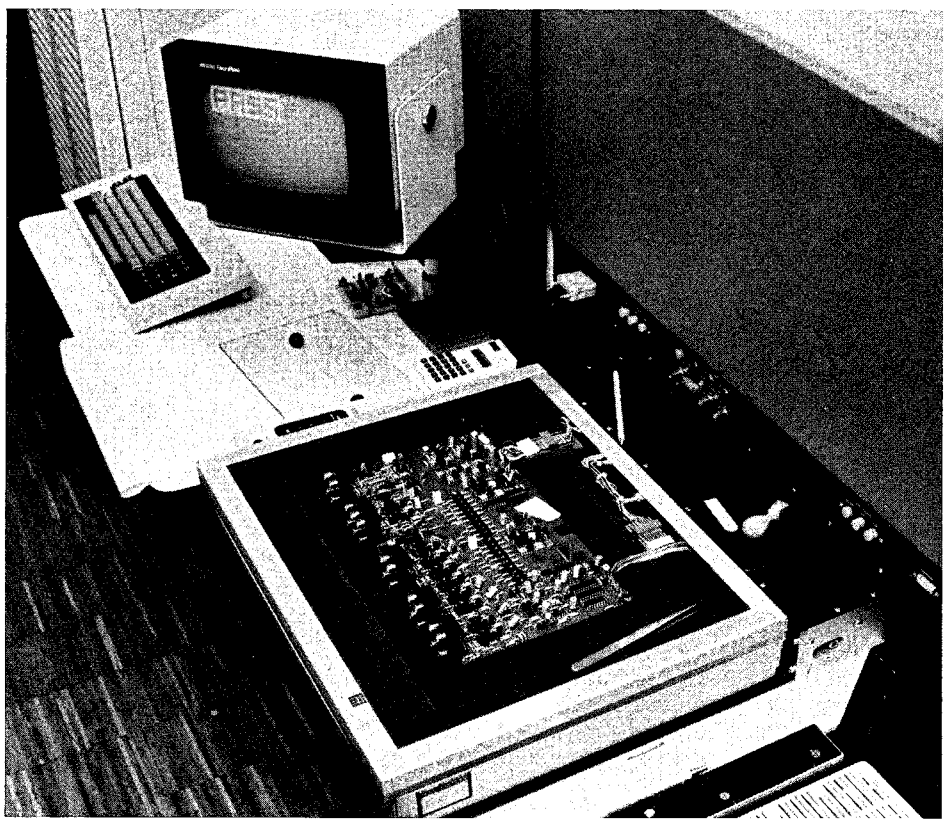
M. Schawalder

P.s.: We hope that we will be able to publish some interesting editions also during the coming year. We wish all our readers a prosperous and successful 1984.

In-Circuit Board Testing System GenRad 2271

Trust is good, verification is better!

In our context, this frequently quoted statement by Lenin which has its roots in a Russian proverb, is not intended as a socio-critical dogma, but it would be difficult to describe the key aspect of quality control more concisely.



It is impossible to achieve quality and reliability without inspection. In recognition of this fact, the Studer Company has decided at an early stage in favor of modular electronics. Pretested assemblies improve not only the general quality standard but also the productivity because fault tracing during final inspection is limited to a few untested areas.

New technologies require new testing methods

With the introduction of digital circuits, a viable alternative to the traditional functional test has become available. Digital comparison, in which the device to be tested is checked for identical input and output parameters based on a reference specimen, produces quick and

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Read in this issue: page

clear-cut results even for smaller production lots. Such testing systems (e.g. our FLUKE-TRENDAR) are designed virtually exclusively for comparing digital circuits. But the digital technology has also spread to a number of "analog" assemblies. As a result, an increasing number of so-called hybrid assemblies can be expected. These in turn can now become rather complex, and their testing becomes a correspondingly sophisticated task.

In-circuit test (ICT) = testing of components in the assembled circuit board

The newest and certainly also the most complex testing system at Studer is a so-called In-Circuit Tester of which the first unit is in operation at the Löffingen factory. A second unit will soon be installed in Regensdorf. The investment for each of these expensive testing systems: approximately one half million hard Swiss Francs!

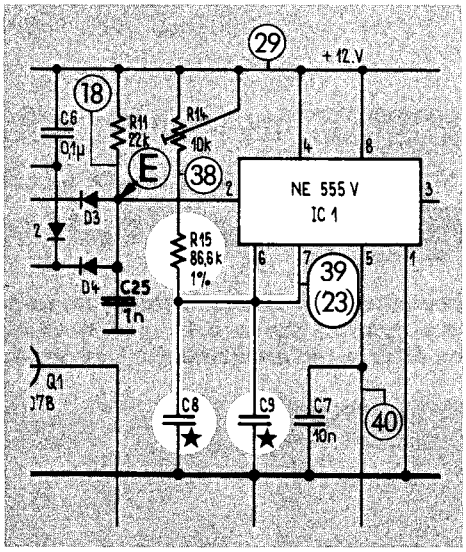
The ICT introduces a new testing concept to our production operation because far more extensive testing is now possible, i.e. the ICT is able to test the position, function, rating, and tolerance of individual components such as resistors, diodes, transistors, IC's, directly in the assembled circuit board as if they were "isolated". The ICT accomplishes this with the aid of a fast computer that features a large memory capacity and its own expandable library of programs as well as all required measuring instruments and peripheral equipments such as keyboard, screen, printer, and pin adapter for accessing the circuit board junctions (interconnections between individual components).

How does the ICT function?

The principle of operation and the testing procedure can best be explained through a simple example (portion of a tacho control board).

1. Circuit description is adequate as a base

Programming starts as soon as the circuit diagram has been finalized (and possibly before the first printed board assembly has been produced). The junctions are consecutively numbered and the designation, rating, and tolerances of all components connected to each junction are entered. For circuit boards developed via CAD (Computer Aided Design), this information is already available for direct input.



From these specifications the ICT recognizes the circuit type and checks the plausibility of the entries. R15, for example, must have been defined at junctions 39 (23) and 38, otherwise the computer requests the mission data.

2. Automatic test program generation (ATG)

From the junction specifications, the ICT automatically generates a test program that is designed in such a way that adjacent components will not be overloaded or worse yet, destroyed. Through suitable control of the surrounding junctions, the test object is "isolated" and through accurate control of voltage and current magnitudes as well as accurate timing of the test sequence the surrounding components are protected (guarding).

The ICT also computes the tolerances to be maintained, possible delay times (influenced by C8 in our example) for correct measuring, and determines the test voltage as well as the junction and guard points.

In order to generate the test program, the ICT fetches the required information from its program library and interprets this data correspondingly. The program is subsequently printed out for verification purposes. (Fig. 1).

```
/* ATGMN309-AO 325        6-SEP-83  6:56                PAGE 28.1 */

        USE FSUB=FAILSUB;

                  Test point      Guard point      Delay in µs
R15:    MEAS R AT(38:39:29:29)  RDLY=143.375U
          CMSG='R15' DMSG='86.6K' HI=88.947K LO=84.295K
          V=1  MAX=86.621K;
        Center of tolerance limits  Desired value  Tolerance limits

R28:    MEAS R AT(50:59:19,51,52:19,51,52)  RDLY=12.011M
          CMSG='R28' DMSG='4.7K' HI=4.977K LO=4.428K
          V=1  MAX=4.703K;
```

Fig. 1

```
ANALOG ATG(ATGMN309-AO) REPORT FOR 325   6-SEP-83  6:56          PAGE 9
R Component results
-------------------------------------------------------------------------
Name    Value      Tols%  Err%   Lib Directory Test   Result    Page
R13     10K          2    1.17   SYS RES       RGRD     S       26.1
R15     86.6K        2    0.72   SYS RES       RGRD     S       28.1
                                                                 Superior Test
R16     22K          2    1.07   SYS RES       RGRD     S       26.1

Component Test Statistics
    13 Superior Tests  (Average err:  2.65%)   (92.86%)
     0 Adequate Tests
     1 Unsuccessful Tests                      (7.143%)
     0 Not Testable Characteristics
    14 Total Component Tests Processed
```

Fig. 2

3. Program test phase
During the test phase, the ICT verifies each measurement and compares it with the required tolerance values. It subsequently prints a qualification report. (Fig. 2).

For all "U" comments (unsuccessful), the corresponding guard points must be modified manually until correct testing is possible.

4. Wire-wrap list for pin adapter
The GenRad Tester 2271 can process up to 960 pins (junctions). To make the wiring of the adapter easier, the tester prints a wire-wrap list that specifies the connection from the originally specified junction (23) to the ICT connector panel (39). The junctions are then assigned an ICT-specific, definite number (23 changes to 39).

5. Trial run with the first printed board assembly
Trial runs can be made with the first printed board assembly as soon as the adapter has been wired. The printer subsequently outputs statistics for qualitative evaluation. Unfavorable results or variations can now be corrected through manual debugging.

6. Storing the test program
The definitive, optimized test program is now ready for productive use. A listing and a copy on a back-up disk will of course be created. The program in the ICT is automatically initiated when the corresponding pin adapter is inserted.

7. Automatic testing
As soon as the contact pins rest on the junctions with negative pressure, a short-circuit check is made with a test voltage of 0.2 V. Operator information is displayed on the screen, e.g. control settings. The analog test routine checks discrete components such as R, C, L, diodes and transistors; for transistors the gain is measured in two operating points (Beta test); for the smallest resistors (e.g. fuses) true four-wire measurement is possible; for capacitors and inductors true reactance measurements are performed in order to exclude parallel real components. The digital test routine checks all components with the nominal operating voltage, from the simple gate to complex VLS-ICs.

The test cycle of the ICT is very short. The circuit board of the input section in the B251 amplifier comprising 381 resistors, 147 capacitors, 3 inductors, 41 diodes, 184 transistors, 2 switches, and 13 integrated circuits, can be tested by the ICT in only 58 seconds!

8. Accurate tracing of defects
Defects detected by the ICT are signalled with a corresponding message on the screen, and a report with the position number, the actual value, and the desired value is printed out. Pin-point repair is now no longer a dream!

For trend analysis at the batch level, the ICT automatically creates meaningful statistics.

9. Summary and future outlook
With the in-circuit test systems, the quality assurance department now has access to costly and efficient testing equipment.

The experience accumulated so far demonstrates that the ICT method is superior to the standard functional test. One of the main reasons is that the component-specific tolerance parameters are taken into consideration.

Through proper selection of these parameters, even "sick" components can be detected that would easily survive a functional test. The result: great diagnostic depth; an effect that can ultimately be attributed to the much higher information density of the ICT method. The introduction of the ICT system is an important advancement in the field of computer-aided component testing, a step which in the final analysis could have similar consequences as the computerized processing of data. The central goal behind this significant investment has already been defined in Section 2 of our corporate strategy: **"It is and remains our goal to put only top-quality products [...] on the market."**

Marcel Siegenthaler

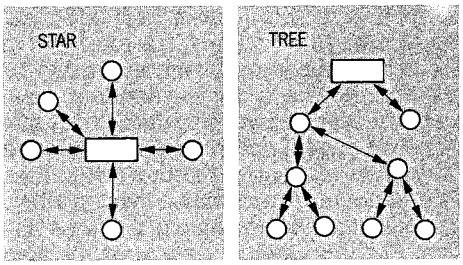
Bus Systems

Nerve centers of tomorrow's recording studios

Automation is now increasingly introduced to recording studios. In the future complete play lists or editing lists will be processed under computer control. Modern studio hardware is now equipped with microprocessors and powerful interfaces based on the concept of "distributed intelligence". However, a decentralized configuration also requires effective intercommunication of the type that up to now has been the exclusive domain of computer systems.

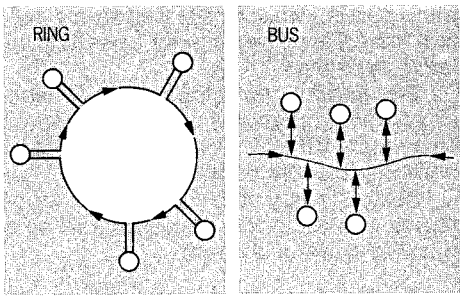
One of the main reasons for distributing the computer electronics to individual devices is the price development of the microelectronics. Up to 1970, computers were relatively costly in comparison with communication facilities. Since microprocessors are being used on a large scale, these constraints have quickly disappeared. The traditional philosophy based on a single computer that controls all functions was replaced by an architecture in which a number of interconnected computers share the work to be performed. Such a computer network also has the advantage that a failure in one of the units does not cause a breakdown of the complete system. A simplified software design can also be expected (aside from the communications software which is a onetime effort) because the tasks can be delegated to specialized devices.

Point-to-point circuits



- Typical: 2...20 connections
- Total failure in the event of a malfunction in the central unit

Multipoint circuits



- Predictable response time
- 10...200 ports
- Defective devices are bypassed
- Example: HASLER bus, 2 MBit/sec; at ZDF (German TV-network)

- Collisions possible
- 10...200 ports
- Defective devices do not interfere
- Example: ETHERNET; for office applications

Fig. 1: Network topologies

Topology of the "intelligence"

How can such "distributed or decentralized intelligences" be interconnected?

Fig. 1 illustrates the basic connection methods. "Star" and "Tree" structures are point-to-point circuits. By contrast "Ring" or "Bus" structures are so-called multipoint (broadcasting) systems.

The latter have the advantage that messages output by a given device can be simultaneously picked up at all other bus ports. An address is, therefore, included that defines the intended destination. Collisions occur if two or more devices connected to the bus start to transmit simultaneously. In this case, messages can become corrupted or lost completely. This is why special techniques must be implemented. In parallel systems, accurate synchronization is necessary while in serial systems, for example, each originator of a message must first ensure that the line is free before it starts to transmit. If a collision occurs despite this precaution, the devices again contend for bus access after a pause, the length of which is controlled by random generators (CSMA/CD procedure).

In the so-called token Ring, one message always circulates in a loop, but in contrast to the bus system, only in one direction. Before a device sends a message, it first checks whether or not this token is busy; if not, the device replaces it with its message. Serious difficulties are encountered in such a system when the token is lost because of a station failure. For this reason, new versions also use the CSMA/CD procedure (contention ring).

The adventage of ring systems is that the response time is predictable, i.e. each port is sure to get its turn after a certain time. This is especially beneficial in large systems.

Star and tree structures are still used as special highspeed computer links or as so-called RS 232 connections for less complex remote control functions.

Basically, any of these network topologies can either be implemented as a parallel or serial system.

Parallel systems

These are normally incorporated in the equipment as single- or multi-processor networks.

A typical example of this is the parallel processor bus of the A810, illustrated in Fig. 2. Let us assume that the key "T" is to be read in through this bus.

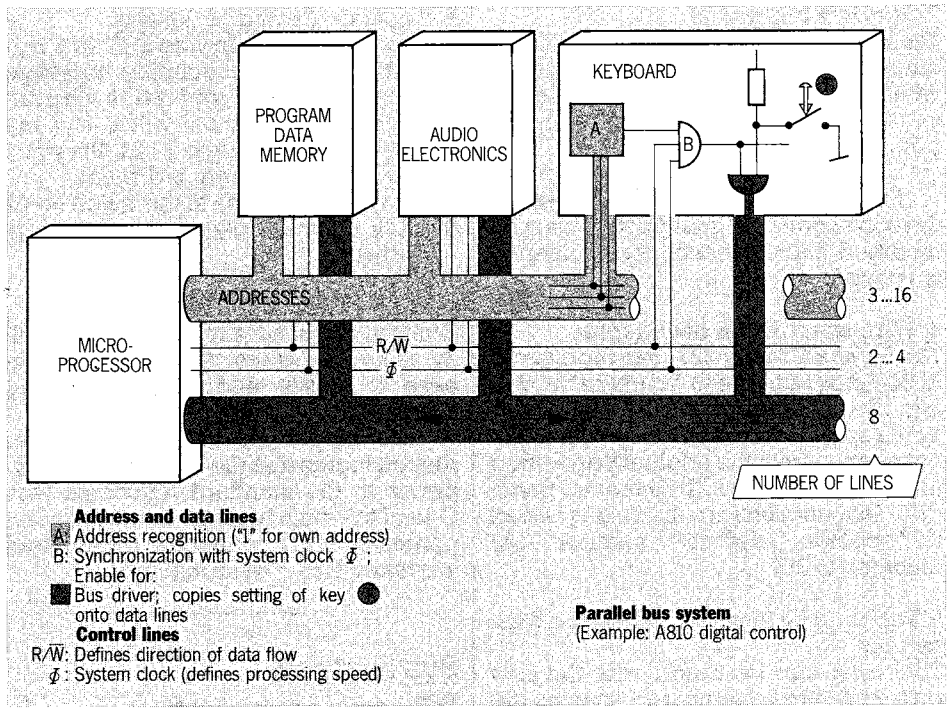


Fig. 2: parallel bus system

Initially, the processor places the addresses on the bus, i.e. the communications partner is defined. This activates the address recognition (A) in the device. The R/W signal defines the direction of the data transmission (1 = device/processor, 0 = processor/device). The data phase is initiated with the system clock. In our example, the bus driver in the device is switched from high-impedance to active and the position of key "T" is copied to the data line so that it can be registered by the processor. Data of other devices connected to the bus are processed in the same manner.

Characteristics of parallel bus systems:

- Fast, very powerful
- Complex wiring
- Accurate synchronisation required
- Only suited for equipment-internal use (short distances)
- Error detection/correction possible with sophisticated and fast supplementary electronics
- Transmission capacity 1... 500 Mbit/sec (A810 logic with 8-bit processor approx. 10 Mbit/sec)

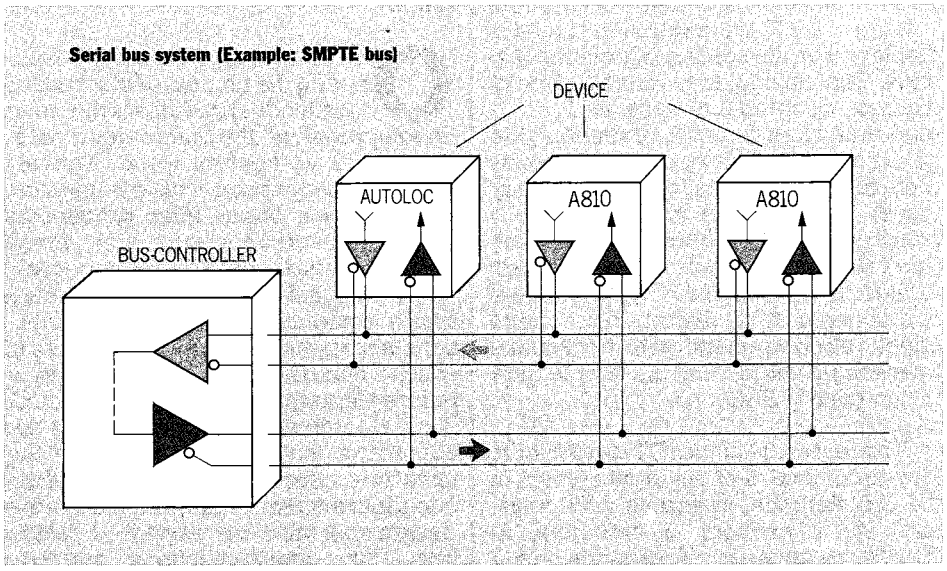


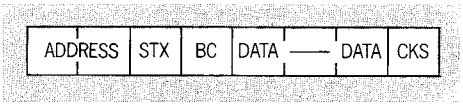
Fig. 3: Serial bus system

Serial systems

Transmission over greater distances is generally implemented with serial systems. The SMPTE bus system, for example, comprises a bus controller and typically approximately 32 ports.

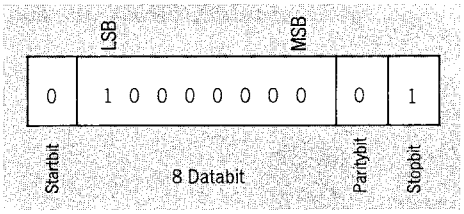
After it has been switched on, the bus controller creates a so-called session directory in which the type and the address of each device is recorded. A master unit (e.g. Autolocator) is subsequently authorized to control one or several slaves (e.g. tape machines). As illustrated in Fig. 3, all data flows through the bus controller which can stop the transmission at any time and initiate new master devices.

Message format:



Address: device address (2 bytes)
STX: start of text character
BC: byte count (number of subsequent data bytes, max. 255)
DATA: coded commands or status messages
CKS: sum of BC + DATA

The checksum (CKS) is used for verifying that a message has been correctly received. Depending on the result, the device responds either with ACK or NACK. The foregoing messages are converted to a binary bit string with the aid of shift registers. Additional bits must be added so that the start and the end of a message can be recognized:



Example:
Transmission of the character STX (= 01)

The parity bit P is used for error detection at the lowest level and is omitted in less sophisticated systems. The start and stop bits can be eliminated for synchronous interfaces because special clock lines are used. The data transmission rate of the SMPTE bus is 38400 bits/sec.

Serial bus systems today are generally preferred for cost reasons.

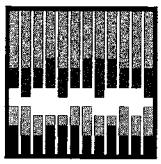
Characteristics of serial bus systems:

- Virtually any transmission distance feasible because optical links are also possible. (SMPTE: max. distance = 1200 m)
- Error detection possible at all levels
- Simple wiring; balanced transmitters/receivers are used for larger distances.
- Transmission capacity 10 K ... 20 Mbit/sec

The RS 232 interface as implemented in the A810 will be discussed in a subsequent issue of Swiss Sound.

Bruno Wacker

Bruno Wacker (30): Basic training at the Swiss Federal Institute of Technology in Zurich, graduate electrical engineer specialized in control engineering and computer software. Joined our development department for professional recorders in 1977; initially worked on A80/A800 autolocator; collaborated in the A800 team; subsequently promoted to group leader for digital control engineering (hardware and software) of the A810; currently responsible for the development of internal and external communications techniques in multiprocessor systems.



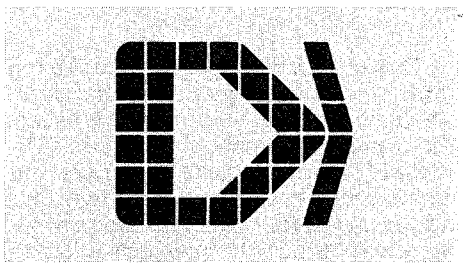
Digital standards

The slow Rush

The 74th AES Convention in New York gave some indications of things to come in the area of Digital Audio, with good news relating to standards.

The many existing formats in digital audio recording seem to dwindle to smaller numbers. Today, we can speak of four major formats: the 2-channel 1610 from Sony, based on rotary-head technology; the aging 3M DMS; the Mitsubishi format; and finally the newly announced DASH, supported by Studer, Sony and Matsushita, along with (no surprise) MCI, a subsidiary of Sony Corporation of America.

Thus, four major formats remain (the optimal number is one), and maybe it is not premature to risk some conclusions.



The DASH format (a markedly improved version of the original format jointly announced by Studer and Sony in May 1980) has gained a partner, Matsushita, which has very strong technological resources. The new format also allows the design of a practical 2-channel recorder with the advantages of stationary heads, which will mean the end of the transitory period where 2-channel recordings were done with rotary-head recorders. So maybe we will go from four formats to three. It also seems that the pionieering 3M DMS system is past its prime and thus no longer a serious contender for future standardization. This may mean two formats (not surprisingly both for stationary-head recording), roughly comparable in performance, reliability and costs, and totally incompatible.

Other areas of standardization deserve mentioning. Thanks to the efforts of a dedicated group of individuals, and the energetic chairmanship of Mr Alastair Heaslett, an almost final draft of the AES-EBU Digital Audio Interface now exists. As an AES recommended practice, and an EBU specification, it could, in the very near future, answer the simple question of how to connect digital audio products. The contribution of Studer to this Interface has been essential.

Further, a Working Group on Measurement Techniques has begun its activities. The array of tasks it must deal with is formidable, but at least work has now begun, and the first guidelines have been proposed and discussed.

Finally, Working Groups have been put together for two of the most vital aspects of Digital Audio: system synchronization and the definition of user's data ("Labels").

Studer has originated much of the above activity; Labels, for example, are a joint concept and proposal of Studer and the BBC. Studer also has contributed, and will go on contributing, to all the efforts of the AES towards standards and orderly progress in digital audio. It is very unexciting work, with no reward in sight. Professional companies may either contribute now, or follow later. As a leader in audio, Studer must, and does, participate.

Dr. Roger Lagadec
Product Manager, Digital Audio & New Technologies

Introduction of a Subsidiary

STUDER REVOX in Singapore

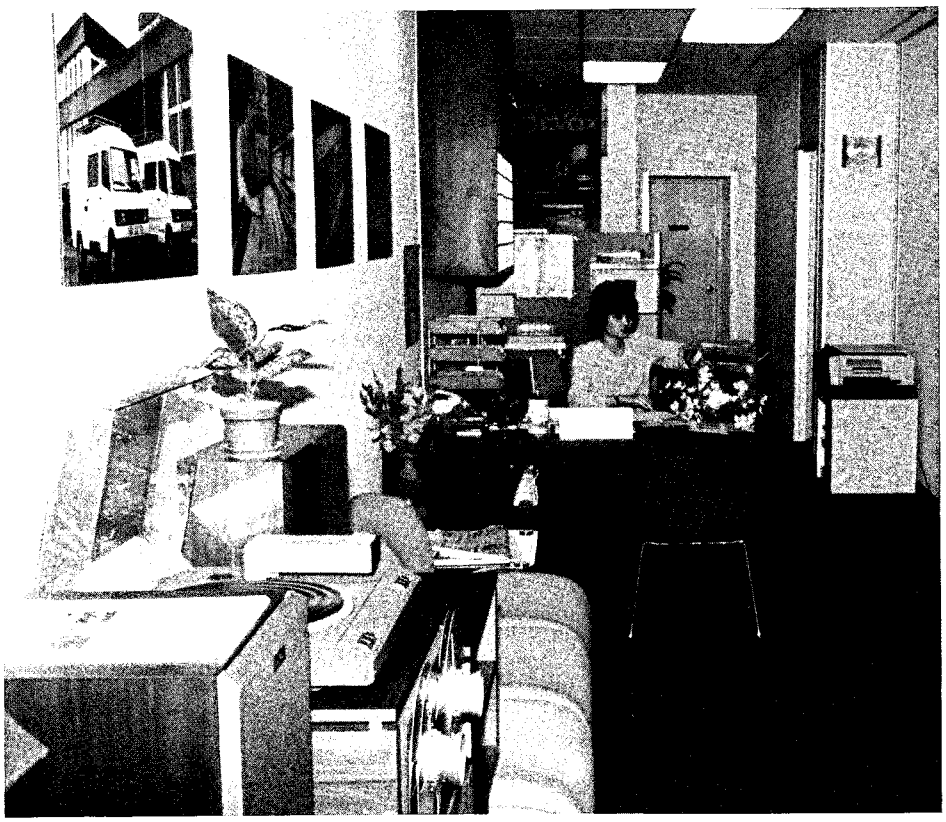
Eastward of India, the Far East begins – a vast geographical area of Eastern charm inspite of the pros and cons of civilisation. Compared with China, the Far East forms a labyrinth of islands and peninsulas – Hong Kong, Thailand, the Philippines, Malaysia, Singapore, Indonesia, Japan Korea etc. In a jet airplane, the area can be crossed in about 6 to 8 hours.

As a sales territory for STUDER REVOX, Far East markets have offered relatively slim chances a decade ago, and were handled from a central point without great expenditure.

A remarkable expansion of business in the audio field over the last few years and an increasing trend towards economical and national autonomy in the various Far Eastern areas have asked for more sales and service activities in order to secure our presence in these markets. In addition, a fast-moving technology and greater complexity of systems and turnkey projects demanded technical engagement to a larger extent.

For this reason, a new company was founded in Singapore on June 1st, 1983 – STUDER REVOX AUDIO PTE. LTD., our third daughter in the Far East. With affiliates in Hong Kong and Japan, a "tripod" system of business stabilisation was introduced.

Mr Val Ortega (commercial director).



Facilities of STUDER REVOX AUDIO PTE. LTD. Jenny Lim, Secretary.

The activity and excellent technical know-how of our 5-men team in Singapore have already brought good results. The organisation not only handles STUDER REVOX products in Singapore, but in Malaysia, Sabah, Sarawak, Brunei and Indonesia as well. Although the prevailing situation affects business in these markets (monetary situation, import and budgetary restrictions etc.), commercially and technically demanding projects are being realized.

The new company has its domicile at Goldhill Centre, Singapore; it accommodates office premises, showroom, workshop and storage facilities under the same roof, and is managed by Mr Val Ortega (commercial) and Mr Chan K.W. (technical).

Mr Chan K. W. (technical director).

Paul Meisel

For the hi-fi fan? For the professional?

REVOX reel-to-reel recorders

Without claiming to be scientifically researched, this series of articles outlines a number of application possibilities for REVOX reel-to-reel recorders and introduces the types suitable for various fields of application.

Already back in 1949, Willi Studer developed his first recorder for home use, which in 1950 became available in Switzerland under the name of Dynavox.

The first recorder with the brand name Revox, the T26K, left the factory in 1951. This reel-to-reel recorder featured a one-motor tape transport, a combined record/reproduce head, 5 amplifier tubes, and weighed 18 kg.

Today – 32 years later – we have arrived at the REVOX B77, the 10th generation of REVOX reel-to-reel recorders. These machines are slimmer and trimmer and weigh "only" 17 kg, however, their performance is beyond comparison with the specifications of yesteryear.

The B77 is available in countless versions and if we also include her big sister, the PR99, we may claim with pride that we can offer a suitable version for virtually any conceivable application.

Let us examine some of the main fields of application in more detail.

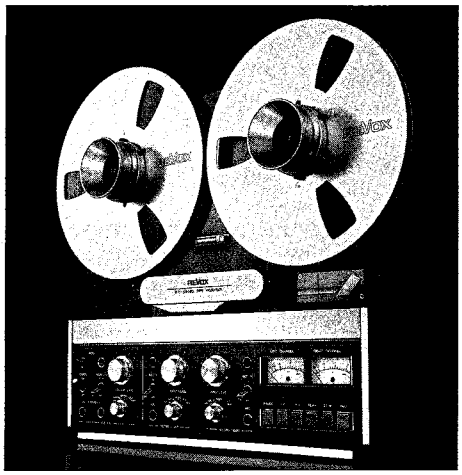
Hi-fi fans
The B77 readily integrates into a hi-fi system as a high-quality long-term music storage facility.

Tape amateurs
For creative audio enthusiasts, for live recordings, tape editing, with or without audiovisual synchronization.

Professionals
Compact studio machine, in theaters, or for general acoustic irradiation.

Industrial users
For data logging, e.g. monitoring of tower communications and other AF recordings. Digital recording of clock time or analog recordings of satellite images.

With respect to the first user group we would like to discuss the benefits offered by the B77 to the sophisticated audiophile.



The following four B77 versions can basically be recommended:

- Standard 3.75 / 7.5 ips
  2-track / 4-track
- High speed (HS) 7.5 / 15 ips
  IEC 2-track / NAB 2-track

2-Track Recorders
In this configuration, a single stereo recording pass fills the full tape width with music information. Tape editing does not pose any problems. Each track has a recorded width of 2 mm, or twice as high as in the 4-track version. The stored magnetic energy is higher and excellent stereo separation is achieved. The HS versions of 2-track recorders are a link between consumer and professional users.

4-Track Recorders
This version of the REVOX B77 is mainly popular in the US where prerecorded tapes are available on the market. The advantage is that the playing time is twice as long because the reels can be swapped and the other two tracks recorded along the full tape length. However, tape editing is not possible when 4 channels are recorded because the opposite track pair would also be cut by the editing process. The track height is 1 mm which means that the ratings for dynamic range, distortion, and signal-to-noise ratio are somewhat less favorable than on comparable 2-track machines.

The following basic rules may be followed in order to simplify the choice of tape speeds:

3.75 ips
Can be recommended for voice recordings or background music.

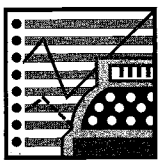
7.5 ips
Satisfactory for recordings from analog discs and FM stereo.

15 ips
Recommended for music recordings with microphones or from CD player.

In our next edition of SWISS SOUND we shall discuss the requirements of the **tape amateur** in more detail.

Bruno Baronio

Bruno Baronio is responsible for technical information and training on REVOX products at Revox ELA AG.



Middle-East

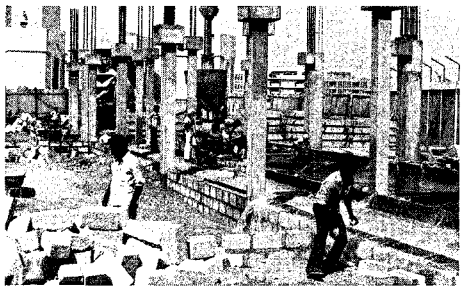
Mixing console for Jordan

After many years of tough negotiations, our Middle-East specialist Rolf Breitschmid made a break-through in Jordan with a mixing console 903 (20 in/6 out). The contract was not signed until our partners from Jordanian Broadcasting were convinced that the STUDER fader technology was at least equal if not superior to other products.

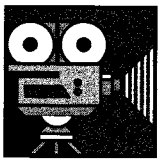
Jordan has for some time been a satisfied user of our tape recorders. The fact that Studer has been able to supply within a very short time a number of A80 RCs for the "Middle East Peace Conference" left a lasting impression.

Running Projects

SW center Abu Dhabi



The Abu Dhabi short wave center (SWISS SOUND 1/83) is making excellent progress. Construction work is proceeding on schedule which means that the first partial shipment of STUDER equipment can take place in January 1984. Installation is scheduled to commence in May 1984 and the first programs should go on air by the end of 1984.



TV-production

Mixing consoles 169/269

Because of several unique features, the 169/269 mixing consoles have for some years now been particularly successful in the field of TV-production.

169/269 mixing consoles, key to success

The moderate size and weight of these consoles in relation to their flexibility and channel density as well as their overall audio quality and rugged construction were the major factors that contributed to their success.

The mixing consoles 169/269 have been in operation in nearly every recording situation where high quality combined with reliability are of prime importance: disc recording studios, radio stations, TV-production facilities, motion picture sound recording companies etc.

Tokyo Broadcasting Systems, TV stereo sound postproduction studio (Studer 269).

TV-Production

On stage, the compact size of the 169 mixing console opens the possibility to use it right behind the cameras without disturbing the video shooting process. Direct mix of live action is thus possible with a very limited risk of errors. In addition, the built-in communication facilities help a great deal in avoiding bulk wiring and extra gear for intercom only.

Many TV-broadcasting stations also use the 169/269 mixing consoles as continuity mixing consoles for ON-AIR TV-transmissions. The fader start facilitiy triggers the different machines replaying the station jingles for the different programs while the main audio lines from the different studios are fed to some dedicated stereo highlevel inputs.

Sarajevo '84

Studer Sound

Winter Olympics in Sarajevo

There will be many winners and loosers, also among the Swiss teams. One winner from Switzerland has already been established: the sound of this mammoth sports event will come from Studer.

Studer International AG will supply 30 tape recorders type A80 RC in consoles with monitor panel for a broadcasting building to be completed on time for the Winter Olympics. A large contingent of cassette tape recorders STUDER A710 in a special console with monitor panel is also part of this order.

Because this broadcasting building can satisfy the requirements of the Winter Olympics only to a limited extent, radio and television organizations from seven Yugoslav republics will assist in transmitting the various events. Again, mainly STUDER equipment will be used because the Yugoslav broadcasting corporations have confidence in Studer quality already since the days of the STUDER C37 (1963), and this for good reasons: most of these C37s are still in productive use. The broadcasting corporations of the various republics also use a complete line of STUDER mixing consoles, starting from the portable 069 and the 169/269/369 models to the series 900. In the field of tape recorders, the new STUDER A810 is already in operation.

A further milestone in the build-up of our excellent relationship was the development of local radio stations in close cooperation with the Yugoslav authorities (1976/1977). Seventy complete installations have been supplied so far.

Dieter Busse, our specialist for contacts with Eastern European countries, places great emphasis on personal contacts and the establishment of a long-term basis of trust. "Even under difficult conditions we have always placed great value on immaculate after sales service. The fact that for last minute orders a delivery date for the middle of January has been scheduled although the games already start on February 9, clearly demonstrates how much this customer trusts us. I wish to express my sincerest thanks to our Yougoslav friends for their great confidence".

Massimo Schawalder

TV-post production

On another hand, audio post production for video programs is quite a complicated process and the 169/269 mixing consoles are used for the simplest operations only, e.g. pre-mix editing, dubbing, post-synchronisation and simple mix-downs. However, there are many companies which do perform dialog-replacement on a daily basis using 269 consoles in a very professional way.

Obviously the compactness of this unit is of prime importance when mobile operation is to be performed. There are numerous examples of this application.

Good tools support good work

Companies (TV-stations or video productions) using the 169/269 mixing consoles for their daily work consider them as tools; tools of high quality and great reliability, just like a C.R.T. scope or a wrench. They appreciate its professional finish and the rugged construction. They have to earn their living with them and know that they can rely on them.

The 169/269 mixing consoles: a success story in the incredible world of video.

André Bourget

V.T.F., Video Tele France, Paris. Audio section in TV-OB van (Studer 169, 269 and two Studer B67's).

Radio Suisse Romande, Geneva

New 24-channel audio production

As part of a recent symposium by the Swiss Section of the AES, the interested professionals had the opportunity to visit the new Audio Studio 11 at the radio and television building of the Swiss Broadcasting Company in Geneva. The audio production and studio 11 have been modernized according to the latest technology for the production of light music.

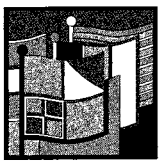
The center-piece in the large control room is a 48-channel console for mix-down and sound balancing. A second large console is available for mixing the reinjection to the speakers or the infrared headphones and direct mix-down of live programs. This interesting console features three Studer 169. Additional units for reverberation, filtering, delay, etc. are located in a cockpit penthouse above the main mixing console.

The recording equipment has also been supplied by Studer and comprises an A800-24-2", two A80-2-1/4", and an A710 cassette deck.

Studio 11 with an area of some 400 m² has also been adapted to the new purpose. It is, for example, equipped with two separate, sound-proof booths for installing instruments with pulse-shaped sound characteristics such as drums and vibraphone.

On the whole, this new recording complex for light music can be considered as one of the most modern in Switzerland.

Marcel Siegenthaler



Germany

International Radio- & Television Fair Berlin 1983

For 10 days Berlin was again the international meeting place for consumerinformation, and communications electronics. For professionals, this annual fair in the exhibition facility below the radio tower is the most important fair of this type in Europe: most new products and technologies of this industry make their premiere here.

More than 425,000 visitors were able to familiarize themselves with a great multitude of products.

Studer participated with a 340 m² stand on which the complete REVOX hi-fi line including prototypes of the REVOX CD player were exhibited.

The visitor frequency of dealers and end-users at the Revox stand fully met our expectations.

Jürgen Reith

Austria

Electro-Broadcasting-HiFi 83 in Vienna

Largest hi-fi exhibition for Studer Revox Vienna.

From September 10 – 18 we were able to demonstrate all new Studer Revox products to the interested public on a truly impressive stand. The new Series 200 equipment exhibited on the 65 m² stand received much attention; especially the CD player attracted many admirers.

In order to underscore our position as a manufacturer of top-quality audio equipment, a number of professional units were also exhibited (of course "online").

Evidence of the strong interest are the 7,000 Revox documentation sets which were handed out on request only.

Dealer visits were less overwhelming, however, this is probably due to the fact that many gathered their information at the Berlin Radio and Television Fair which took place nearly at the same time.

In retrospect we are convinced that the large effort invested will again pay dividends this year and that the feedback from this exhibition permits us to look into the future with confidence.

Franz Wagner

Seminar

STUDER Mixing Console Series 900

With the introduction of the STUDER 900 Mixing console it became clearly evident that its users will gain a lot in professional versatility. This new concept was the special reason for Studer Sales Engineers from all over the world to attend the "Seminar 900" in Regensdorf.

The modular concept of the console is providing high flexibility to cover a wide variety of applications. The fact that every console is different from the other requires best detailed knowledge of its construction in the mechanical or electrical domain.

The flexibility and the modular design ensure that all applications in

- Radio Broadcast
- Multichannel Techniques
- Sound dubbing and sweetening

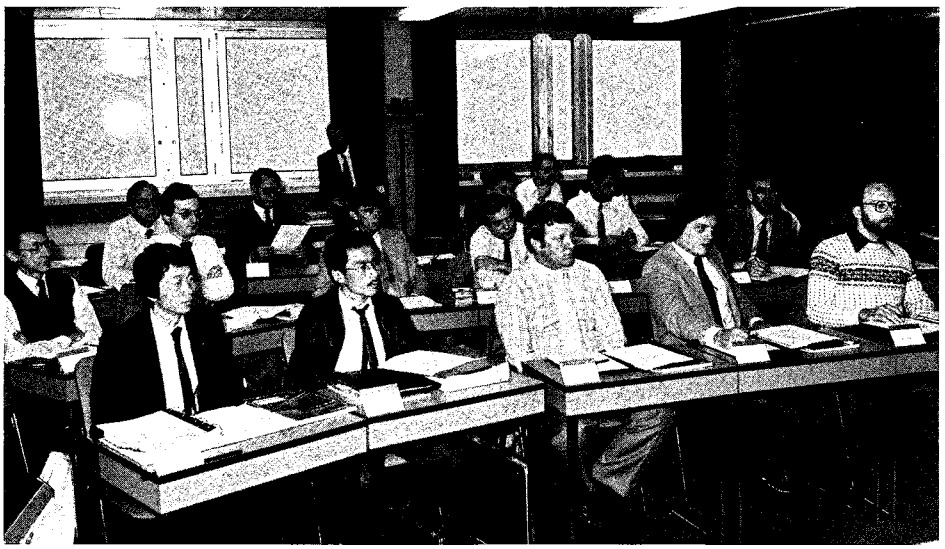
meet the requirements of the user. Obviously, this well aimed approach of Studer into the Mixing console market requires heavy investments.

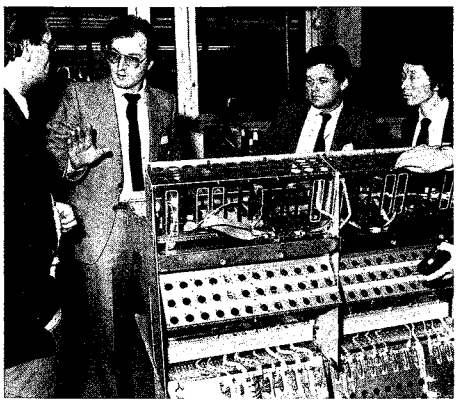
The seminar provided all the information and activities which are required to support the sales engineer in his every day approaches. Module explanation, various applications, layouts, practical workshops and sample quotations formed the contents of the intensive program.

An important seminar and an important step – but everything can be further improved. And this is what will be considered next time, when undoubtedly the new PCM transports will be introduced.

I sometimes wonder where the reason can be found for the interest and motivation of the engineers attending the seminar. A direct answer might not be possible, but what certainly counts is the fact that at Studer, the future ahead of us is obvious and clear.

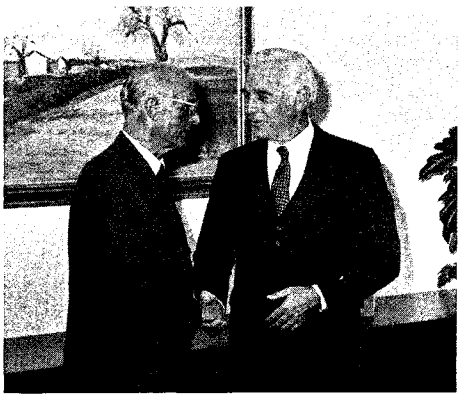
Peter Joss





The uncompromising circuit design, the very efficient production facilities and the highly automated measuring and testing facilities ensure a product of highest professional electrical and mechanical quality and performance.

Nashville in Regensdorf



Guests of high standing in Regensdorf. The mayor of Nashville, accompanied by a delegation, visited the headquarters of Studer Revox.

Mayor Richard Fulton was deeply impressed by the short information on the company and the following factory tour. The highlight of the visit was certainly the reception with Dr. h.c. Willi Studer in which course the friendship between Nashville and Regensdorf was deepened. Visible proof of this friendship was the presentation of the key of Nashville to Dr. Willi Studer.

Already on the occasion of the opening of our American subsidiary (situated in Nashville), Dr. Studer has been made honorary citizen of Tennessee.

Awarded

Fellowship of the Audio Engineering Society (AES) to Dr. Roger Lagadec

Dr. Roger Lagadec
Fellow of the AES

For his contributions towards digital signal processing and recording, Dr. Roger Lagadec has been awarded the fellowship of the AES.

Dr. Roger Lagadec joined Studer in 1979 as product manager for Digital Audio & New Technologies. Before, he had worked (after studies in Paris and Zurich) with the Swiss Federal Institute of Technology (ETH) in Zurich as assistant, researcher and lecturer.

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:

Hermann Stierli

Product Manager Mixing Consoles and Studio Systems at Willi Studer AG, Regensdorf • born 1936 and grown up in Brugg (AG) • trained radio electrician • studies of engineering • technical adviser for broadcasting and production of Radio DRS Berne, co-operator maintenance and planning sector of DRS.

Hermann Stierli joined WILLI STUDER in 1968 as manager of the mixing console department. The first mixing console – STUDER 089 – had just been developed by Paul Zwicky and went into serial-production shortly after introduction.

Production of the models 089/189 was carried out under the supervision of Hermann Stierli with a team of two female assembly workers, one mechanic and one test field assistant.

Parallel to the introduction of the STUDER 089 mixing console, the first FM stereo tuner REVOX A76 and Trainer A88 were presented at the 1968 FERA in Zurich.

Production was in full swing at all angles; the mixing console department increased drastically. To absorb the expansion, its domicile was temporarily moved to premises outside the company and housed development and laboratory, manufacture and quality control.

The well-known STUDER 169 was realized, and the special versions of 289/389 almost hand-made to meet customers specifications. When the department in 1970 finally moved into the new premises at headquarters, Althardstrasse No. 30, it had grown to 20 members.

Technology moved fast and was handled with an eye on the future. There was gradually a great demand for complete studio systems. Turnkey projects were carried out and local broadcast studios equipped for operation in Europe and Overseas.

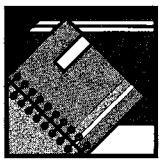
The new mixing console generation STUDER 900 took a big step forward; the best today's technology offers was combined in a functional and attractive design of a mixing console.

In the meantime, the 900 series has been accepted with great enthusiasm worldwide; its production capacity is almost booked out.

Hermann Stierli's work is his pleasure. He still finds time to spend on his hobbies which are family, photography and reading. His real passion is alpine skiing in which he indulges as often as possible.

He does not follow any particular guiding principles. He rejects aphorism and is very clear in his speech. If any, his fundamental principle would follow Pythagoras who said "Keep silent, or speak better than silence votes..."

Renate Ziemann



From the printers

10.23.8350 **B67 MK II Sync,** SI (d/e)
10.85.0710 **CAMOS 3000,** PI (d/e)
10.18.2370 **Interface 884,** SI (d/e/f)
10.19.0911 **REVOX 884,** OI (d/e/f)
10.19.1010 **REVOX D88 Professional,** Leaflet (d/f/e)

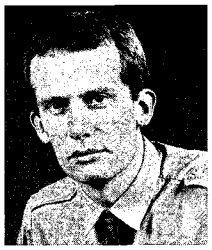
PI = Product information
OI = Operating instructions
SD = Set of diagrams
SI = Service instructions

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

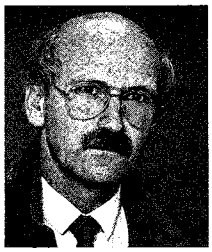
For further information please contact

The editorial team

After two years and six (more or less) successful editions of SWISS SOUND we would like to briefly introduce those responsible for this project (that is, ourselves):



Massimo Schawalder (27): following his Certificate de Maturité in Appenzell he studied English philology at the University of Zurich. After teaching German in England for one year he joined Willi Studer. Basic internal training in the field of professional tape recorders, transferred to the PR department 2 years ago. Currently responsible for public relations, editing of internal company information and editor of SWISS SOUND.



Marcel Siegenthaler (49): Basic training in electromechanics, continued professional training in development laboratories for telephony and industrial electronics. Subsequently control room operator for multiplex telegraphy at Radio Swiss Ltd. Beginning in 1958 training as audio control engineer at Radio Bern (Swiss Broadcasting Company). First publications as author for space explorations and for test reports on hi-fi equipment. Since 1965 at Studer, development of technical documentation and promotion department. Currently responsible for promotion of professional products at Studer International AG and editing of technical articles in SWISS SOUND. Member of the Audio Engineering Society (AES), Union Internationale de la Presse Radiotechnique et Electronique (UIPRE), and Swiss Public Relations Society (SPRG).

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