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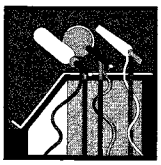
VIEWS AND NEWS FROM SWITZERLAND

STUDER REVOX



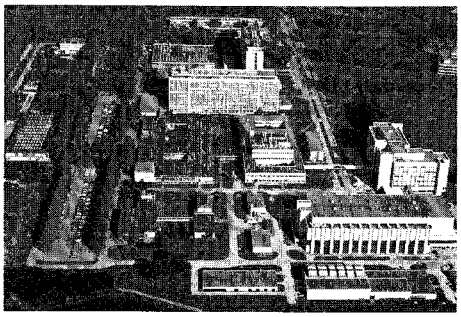
Interview with Dr. Piet Berkhout (Philips NL)

From the CD to the system of the future

When the compact disc was introduced at the Düsseldorf Hi-Fi Exhibition in 1982 it came as a revelation.

Digital recording on an optical medium was something really new. The developments since then have confirmed the most optimistic forecasts.

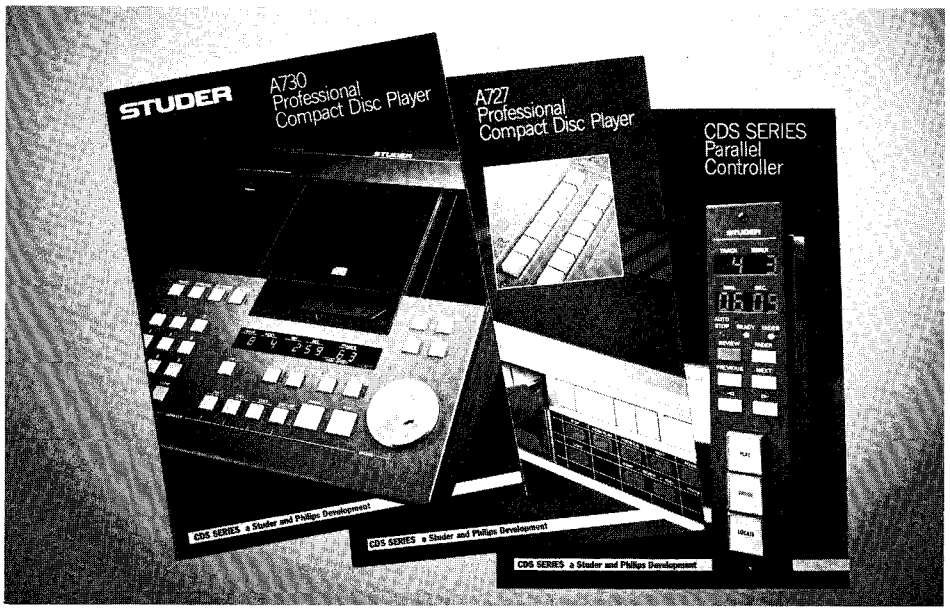
As a consequence, optical recording has become a technology with a very bright future. The joint venture enterprise with Philips is a visible response to this evolution. SWISS SOUND talked to Dr. Piet Berkhout, Managing Director of Studer and Philips CD System AG, about the background and future developments.



The R&D building complex of Philips in Eindhoven, where the compact disc system was developed and research work is done on future technologies of optical recording.

Dr. Berkhout, although your background is in basic physical research, you have entered the field of optical disc mastering which is a specialty on the fringes of the electronic sciences. Is this normal?

At Philips it is quite normal that people with different backgrounds are given assignments where they can bring new insights into certain areas, e.g. physicists in electronics, electronics specialists in physics, or chemists in physics or vice versa. In my previous assignment I was the only physicist in a group of electronics engineers, and as such I had experience of experiments with lasers, their optical systems, and all associated components.



The «CDS SERIES a Studer and Philips Development» label identifies the print documentation of all products of the Studer and Philips CD Systems AG.

Two processes are particularly critical for CDs: optical scanning and electronic signal processing.

Yes, and during the recording process the mechanical components are also extremely important because the blank master disc carries no information whatsoever. The substrate is simply coated with a photosensitive film on which the bits are recorded as a spiral in intervals of only 1.6 µm (1.6 microns). The accurate layout of such a spiral imposes extraordinary demands on mechanical systems. But also the precision of the optical system is very important.

Was the well-known ODM Group (Optical Disc Mastering) of Philips created for the purpose of developing the CD invention into an industrial process?

Yes, the ODM Group evolved from the department for professional recording technique of the ELA Group. It was staffed with people who already had experience with laser technology for video discs, then called VPL. The first master discs were produced by this group, while the first CDs were produced in the Blackburn plant in England. The ODM Group had built a system for Polygram and around 1983 the ODM Group decided that mastering systems should also be produced for sale to third parties.

That was so to speak the first technical decision that paved the way for the worldwide breakthrough of the CD.

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Yes, one of the most important pioneers was my former boss, Wim Verkaik, who was convinced that Philips should introduce these systems to the market.

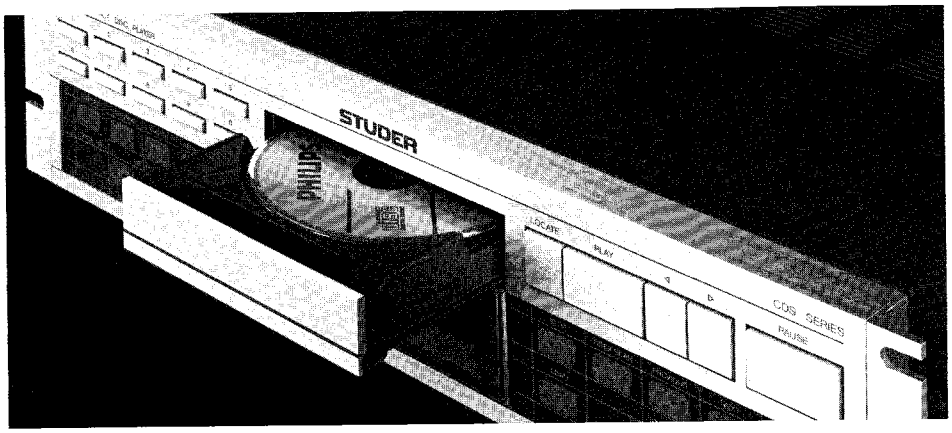
As a consequence, Polygram became our first customer. Only later did Sonopress, who already had experience with Laservision, enter the market in Germany. Also 3M had purchased Laservision systems from us and was one of the first to enter the field of CD mastering. And we must be aware that the price of such a system was in the magnitude of 5 million Dutch Guilders which at the time correspond to about 4 million Swiss Francs.

Subsequently the market was penetrated rapidly. Europe is well represented: in Switzerland it is ICM, in Germany there are several installations, in England it is EMI Disctek, etc. Although many competitors from the Far East have in the meantime entered the market, Philips, with a market share of $^{2}/_{3}$ is still the leader, and has even delivered mastering systems to Japan.

An incredible success for a completely new technology. Did this success lead to plans on how to progress in the future, plans which ultimately lead in the direction of joint ventures?

As soon as ODM had received inquiries for CD mastering systems from third parties, the time had come to give some thought to the organization. A product group structure was established into which also the departments for marketing, purchasing, logistics, and production were integrated. The marketing department was managed by Mr. v.d. Spank, a former TV broadcast marketing manager who proposed right from the start not only to build mastering units but also to expand the professional area. After extensive discussions with NOS, BBC, and WDR the first professional CD player was developed and introduced as the System LHH 2000. The ODM product group grew from 70 employees in 1983 to over 200 by the beginning of 1987. However, we should also mention here that during this time we were strongly dependent on outside suppliers. With the creation of a professional CD line it also became clear that development, production and marketing of these products would be different from those of the mastering systems.

Again it was Wim Verkaik who at the end of 1985 took the initiative to find a suitable partner. The existing contacts with Studer proved highly opportune since they already had a successful pro-



The first CD player of the CDS series: Studer A727.

fessional marketing organization in the audio and broadcast sector. Discussions took place at the end of 1985 and at the beginning of 1986, and these seemed to be a good chance for future cooperation. Philips was able to provide optical technology and experience with CD systems, while Studer had experience in the production of small series at the professional level and the desired marketing organization. These findings subsequently led to the joint venture.

In your explanations so far you have given us a glimpse of the basic structure of CD development. Our talk has brought us to the beginning of the joint venture before the foundation of a special company, STUDER and PHILIPS CD SYSTEMS AG. In those days much thought must have been given to future development.

Yes, an important factor was to obtain as broad a perspective as possible, i.e. to develop not only CD equipment but also related products such as subcode generators. But if you think about the broadcasting industry, public demand is not limited to professional audio players, because there has been considerable interest in the in-house recording of CDs.

Having clarified this, we can now discuss the present: The state of the art has developed to the point where at the beginning of 1988 Philips and Sony jointly proposed a new standard for write-once compact discs. Basically, all broadcast programs could be written on a storage medium and implemented with CD changers and process control systems.

The new company has now completed its first business year: The principal task was the development of a range of CD equipment that reflects a system concept. At the beginning of the joint venture we had our LHH 2000 and the Studer A725, for which a successor, the A727, was already under development and subsequently brought to maturity within the framework of the joint venture.

At the same time Philips had plans for a desktop model. The basic development for this audio player originated in Eindhoven while the design, precision engineering, and final system development took place in Regensdorf. This unit will also be produced by Willi Studer AG under the designation A730. Another product worth mentioning is the Philips PQ editor for generating cue information. PQ editing was originally the exclusive domain of the CD manufacturing plants. The PG editor LHH 3050 allows this technique to be transferred to the studio and consequently the Studer customer, which means that this equipment fits well into the product range of the joint venture.

As we look into the future it is only natural that we compare the optical recording process with other systems that are now available on the market, e.g. DAT, disc storage, etc.

Optical disc recording is at first glance a normal technical evolution of the well-known compact disc. Not only in the audio sector but also in data processing the optical disc is very successful, i.e. a low-cost 600 megabyte storage device is now in sight. This application, the CD ROM, also has a standardized format for storing data. The developments have proceeded in the direction of write-once discs which offer interesting possibilities for professional applications.

A key advantage of the optical disc is its fast access in data processing and audio applications, particularly when we compare it with tape-oriented systems

such as R-DAT which still requires 7 to 8 seconds for searching a specific address. Another eminently important advantage of optical systems is that they do not make any contact with the storage medium during the read or write operation. This greatly influences the reliability, also of the discs stored in the library. Today we expect optical recordings to be able to be stored longer than magnetic recordings, even though the magnetic recording technology has proven that tapes can still be played back after 40 years (with a certain loss of quality). From the optical recording technology we expect archival storage capabilities of 50 to 80 years without playback difficulties.

Does this also apply to write-once discs?

Yes, the same expectations hold true for the write-once disc which has undergone climatic tests. In addition, experience with optical discs goes back as far as 15 years. Many experiments have been conducted during this time. The joint venture, of course, was set up because a medium existed that is compatible with the normal CD; with simple modifications write-once is suited for reproduction on normal CD players.

Certain basic components such as ICs, player mechanisms, etc. were originally developed for the consumer market. Is this of any significance?

It is true that the basic specifications of such professional systems have been determined by consumer standards. This means, for example, that the parameters: 16 bits and 44.1 kHz of the CD will in the long run not be ideal for professional systems. The quality of the original recording should be higher, because additional performance capacity is required for audio dubbing. It is reasonable to expect that as soon as write-once systems have proven themselves, e.g. in the data processing market, a similar technology will be developed without today's CD specifications, but with its own formats for purely professional applications, as was the case with the DASH format.

That is looking very far ahead. Let us dwell on it for a moment. Imagine that other developments in CD and competitive products are open too.

Competition is what the future is all about. By this I do not simply mean today's competitors and their equipment. Additional competitors are technologies that come from other fields: the Winchester systems for example, or the read-only memories or RAMS which can be expected in the future.

With respect to professional applications we have talked about possible systems with greater resolution, e.g. 24 bits. But there are also developments in the opposite direction, with so-called reduction systems.

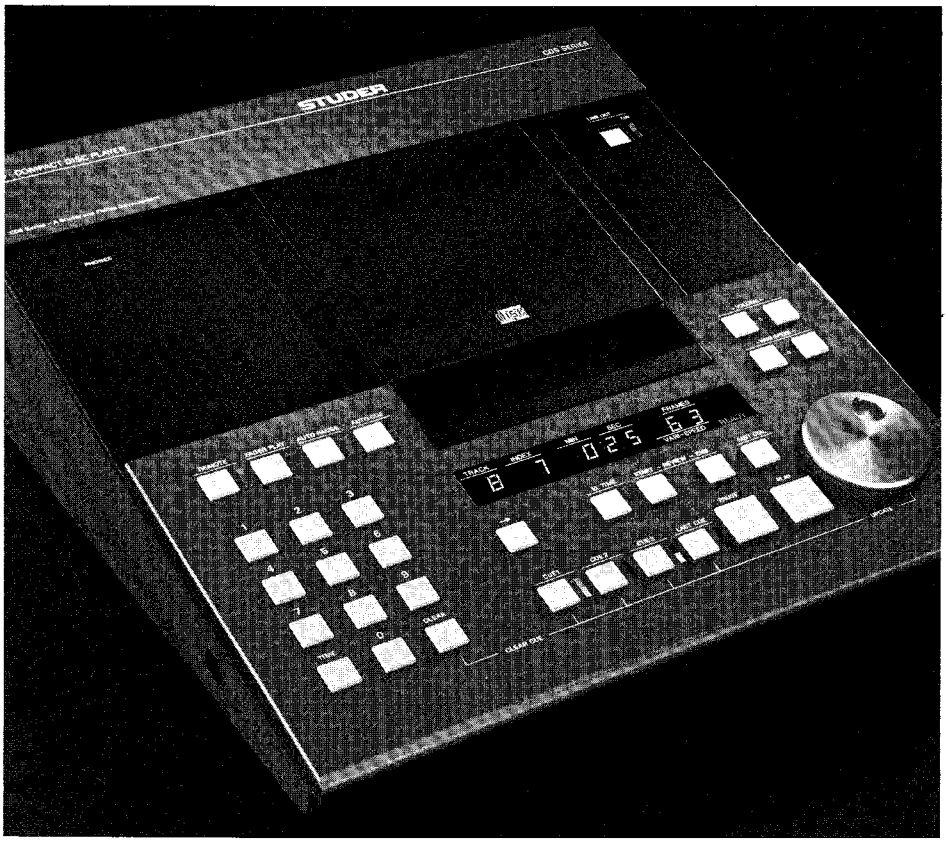
Yes, that is also an interesting aspect. Experience has shown that 16 bits provide a dynamic range of over 90 dB and that the low distortion is more than adequate for playback at home. The fact is that for many applications, in the car, as background music, or the walk-man, a far smaller dynamic range is sufficient.

The CDI (CD Interactive) for example which has already been standardized for interactive applications – data, image, audio (with reduced quality) – provides storage capacities of up to 8 hours for music (mono) or 16 hours for speech. This opens the way to totally new applications, for example libraries for the blind, voice logging systems, etc.

At the moment we do not look forward to this development with much enthusiasm, because all these «deviations» require new formats. This is not necessarily conducive to compatibility.

For the professional media the developments go surely in the opposite direction, i.e. greater resolution and greater linear storage capacities.

What we can expect is development in two fields. On the one hand it is highly probable that today's capacities of optical discs can be increased by a factor of 2 to 4, analogously to what has been happening with magnetic tape. On the other hand we have the development of signal processing ICs for more intelligent data processing. Currently we are recording PCM signals linearly, we can process and store them linearly and we still have the original available. However, we must not forget that a 16- or 20-bit PCM recording is nothing more than a copy of the original. If we could achieve the same with fewer bits per sample and more intelligent processing, the question would also be valid in the professional area: Do we have the optimal system with a 16-bit linear record?



First model of a CD player resulting from joint-venture development: Studer A730.

The problem of storage density faces everyone concerned with development regardless which field they are engaged in.

In 1979 we had a large main frame computer in the research laboratory. This computer was equipped with 250 megabyte disk drives for storing audio data. This machine was amazing. The disk drive alone cost at that time 250'000 Guilders. Today you can get a Winchester drive together with its PC at a price of 1000 to 2000 Guilders, and portable systems with up to 100 megabytes can be put on a desk! We know today that storage capacity is no longer a problem for most applications; almost everybody can afford a 100 megabyte disk, and yet actual application has become more important than ever. This is also the case in the audio field.

The fascinating aspect is the interaction of physics, electronics, and software engineering.

Correct. If we look at the basic strategy of the Philips Group, we see that the principal activities are found in consumer electronics, telecommunication, data processing and components. This produces considerable synergy effects; the technologies are the same, e.g. every engineer needs the same type of digital processing chip and uses his own algorithms for it.

The joint venture should also produce some synergy effects.

Certainly. Since the complexity of today's systems is so great that it is no longer possible or prudent for a company to undertake the development on its own, synergies in many forms are desirable. In the age of cross-disciplinary technologies it is necessary to know not only your own market but also to know how a given technology could be used in other fields. For example: the liaison between Philips and ATT is very strong. We have in the past been very successful in supplying Saudi Arabia, now it is Indonesia, etc. These are markets with which Philips has been familar for many years, but not the Americans. They have their new technologies, we know the market. How do you combine this?

At Studer the situation is similar: they know the market, but there are also questions concerning technologies, what should be used and what are the competitors up to. This is an important task for the joint venture even though it isn't an easy one.

A further product of the CDS range – the PQ-Editor Philips LHH 3050.

In closing we would like to ask a personal question: what, Dr. Berkhout, was the decisive factor for accepting the position of Managing Director in this joint venture?

I already outlined my technical background at the beginning. I like physics and have always considered it as a basis for achieving something. I have conducted basic research. At Philips I have seen its application, taken interest in it, and always had the impression that I should employ my skills very pragmatically. This was the prerequisite for transferring to the ODM Group, where not only research is conducted but where contact to the customer, to production and field service are important. It was a real challenge. When I was approached within the ODM group to actively enter into the joint venture, I found a field of activity that was very much to my liking.

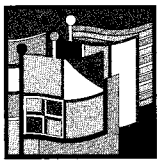
The wide range of responsibilities, also organizational questions within both companies, were of great interest to me.

Also the international cooperation?

Naturally; but today this has become almost a matter of course. Since my activities with ODM I have had many international contacts in the USA concerning subcode and CD-ROM, later on CD video standardization with the Japanese. And now the intensive contacts in Switzerland, where we have established common goals within the joint venture. This is indeed an attractive task for me.

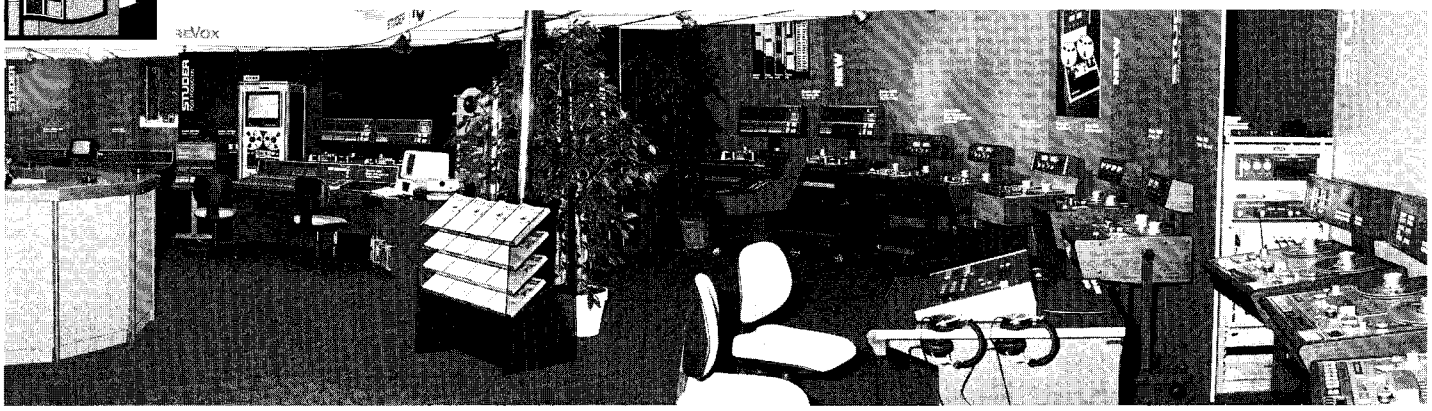
Dr. Berkhout, thank you for this interview.

Dr. Piet Berkhout (39)
Grew up in a small town in northern Holland. Studied physics and mathematics at the University of Amsterdam. Graduated in 1972 with a diploma in physics. Five years of research activity and dissertation in the field of light scatter on solid hydrogen under high pressure. Joined the basic research team of Philips in 1977; activities in the field of digital signal processing with gradual transition (1983) to research and development on optical disc mastering. Since July 1986 Managing Director of Studer and Philips CD Systems AG founded within the framework of the joint venture agreement.



84th AES Convention in the Palais des Congrès, Paris

Meeting-place Paris



Partial view of the elegant STUDER booth, covering an exhibition area of totally 1'940 sq. ft.

From the 1st to the 4th of March Paris was the center of the audio world.

Once again records were set: with 260 exhibitors it was the largest AES exhibition ever held in Europe. Also unsurpassed was the program with 85 sessions and workshops on state-of-the-art audio engineering.

Our company group was represented at the AES with two stands of different sizes. At the smaller stand, REVOX FRANCE SA exhibited the Revox product line with emphasis on the new tape recorder generation C270, C274, and C278. In the 180 square meter demo room, STUDER INTERNATIONAL AG, in cooperation with STUDER FRANCE S.A.R.L., gave a comprehensive presentation of its professional product line.

Already during the planning phase it had become clear that this exibition, which coincided with the 40th anniversary of our company's inception should demonstrate the unequalled scope of the Studer audio product line. Following the principal theme defined by STI's Managing Director, Eugen Spörri (the «allround program»), the product groups were arranged in segments of a circle in order to produce an encompassing «wide-angle» show. New developments were exhibited in almost all of these sectors. The Studer stand enticed a permanent crowd of visitors, its main attractions being the analog tape recorder sector with the new A820 8-track multichannel machine and the attractive A807 4-channel 1"-machine, the digital tape recorder sector with the brand new digital editor DE 4003, the CDS product sector with the new CD player A730, which is considered to be a sure winner; the mixing console sector with a complete local studio 970 and a TV audio production console 904 with stereo multiplex modules and bargraph screen presentation, brand new on the market, and finally the demo setup in the audio dubbing sector with the new «Take List Editor».

At the REVOX stand, the new tape recorder models of the C270 range dominate.

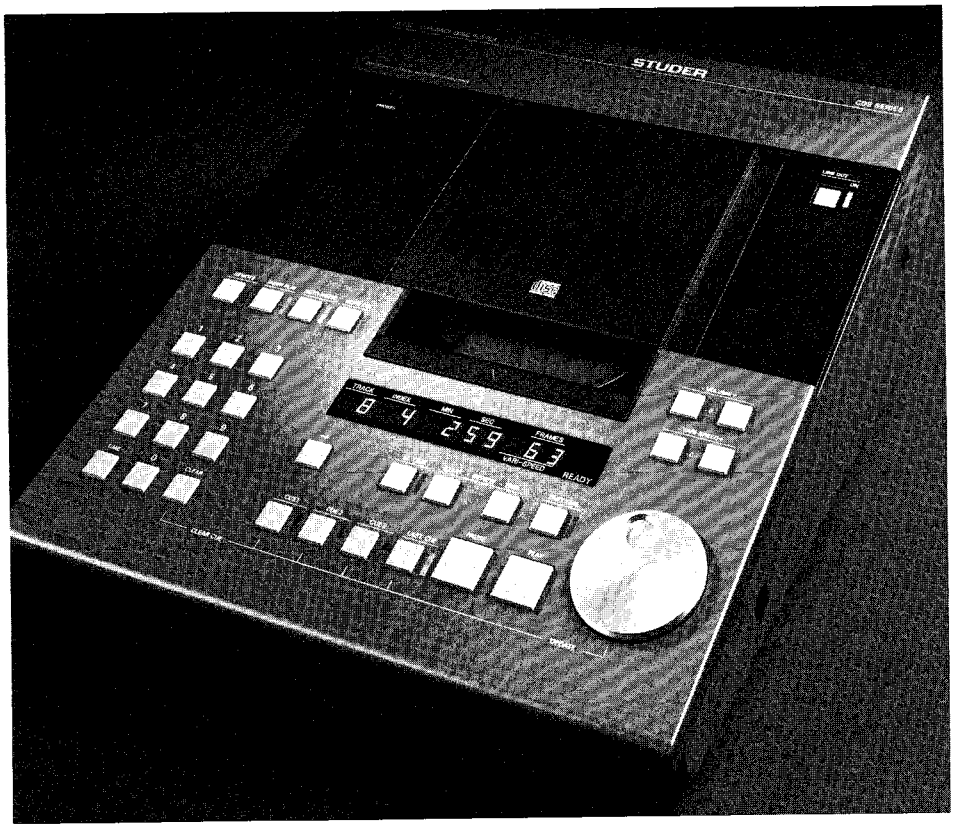
A small display of STUDER oldtimers recalls the good old tube age...

The enormous effort and the vast amount of equipment certainly paid off – there were some 20 tons of it, including machines lent to other exhibitors with whom we have long-standing contacts, plus 10 tons of stand material. The intent was to show the audio world that Studer offers a range of products that is more comprehensive and more competitive than ever before.

Marcel Siegenthaler

New professional CD player STUDER A730

Joint venture makes its name in Paris



The new professional CD player STUDER A730 in desktop design

The happy joint venture parents introduced their first offspring to an amazed audience at the AES in Paris.

The new, professional CD player, STUDER A730, born out of the cooperation between Studer and Philips, is an ergonomically well-engineered top premium product, simple to operate and suitable for daily use. The experience and know-how of both companies in the professional CD sector had a decisive influence on this development. A report by the development manager from Eindhoven in SWISS SOUND introduces the new unit.

The A730 is a top-loader model. Its special design and the arrangement of the controls clearly indicate that this unit is intended for professional users.

In contrast to the professional A727 which is equipped with a drawer, this unit features a rugged, easily accessible compartment through which the disc can be placed directly onto the platter. This means that the CD can be changed more quickly. Furthermore, the CD player can be installed flush with the desk top. The cover is locked while the «ON AIR» function is active so that it cannot be unintentionally opened. The CD player is designed in such a way that the new 8 cm CDs (so-called singles) can also be played without adapter.

Of course, many achievements from advanced technologies have been incorporated in the A730, both with respect to the player mechanism and the electronics. For example, 16-bit four-way oversampling and DACs selected for maximum linearity are used. We have also developed a new player mechanism that is geared to professional CD ROM drives. All electronic circuits are implemented on multilayer PCBs, which results in short connections, less cross talk, and consequently improves the audio specifications.

Also worth mentioning is the heavy, rigid front panel which consists of a die-cast aluminum alloy section, which together with the mechanically decoupled die-cast player chassis gives the unit the desired ruggedness and shock resistance.

The A730 is controlled by a microcomputer circuit which comprises two powerful microprocessors (type 80C31). The advantage of this design is that one processor is dedicated to the servo system while the other handles all other control functions. This permanent monitoring and control of the servo system – together with the new servo electronics – achieves very fast access time to the tracks (average 0.5 s) and optimal tracking.

The processor for the remaining control functions is responsible for:

- Accepting and executing commands entered via the keyboard,
- Controlling the LED display,
- Accepting and executing commands offered via the RS422/RS232 interface, and output of player information and status feedbacks,
- Interpretation of control commands from the remote and auxiliary bus,
- Internal control over several functions such as monitor volume, varispeed, etc.

The fact that the A730 differs greatly from a CD player designed for home use, becomes evident from the following professional functions:

Top-loader with compartment for normal CDs and 8 cm singles

In the raised position, the die-cast aluminum alloy front panel provides access to the easy-to-maintain internal components.

– **SEARCH DIAL**
In this function a short passage of music (approx. 0.5 s) is continually repeated. This «music window» can be shifted as desired by means of the thumbwheel. In this way the start position can be located with an accuracy of one CD frame. In combination with the «Fast Dial» key, the user can generate a fast research across the disk during which audio fragments can be heard for orientation. In the fast dial function the cue points can also be set on the fly.

– **AUTO CUE**
In this function the player automatically detects a certain audio level threshold at the beginning of a track and identifies it as the starting point. The same procedure is also possible for the end of the track.

– **VARISPEED**
With this function the user can vary the motor speed and consequently the pitch and rhythm by ±10%. A preselected value can be stored in memory.

– **REVIEW START-STOP**
After a start position has been defined, the start (fader start) of the music selection can be checked by pressing the START REVIEW key. The last 8 seconds of the selection before the stop position can be checked by pressing the STOP REVIEW key.

– **MONITOR** speaker on the front panel: For prelistening during the programming operation.

– **DISC RECOGNITION**
The purpose of the automatic disc recognition is to set up and maintain an internal ranking list of CDs from which one or several selections have previously been reproduced on the corresponding player. The order within the list is determined by the frequency that a CD is played. This function is always active. When a disc is started a special program checks whether or not the player already knows this disc.

If not, up to three cue points of the disc can be programmed, which together with the identification code of the disc are stored in the ranking list.

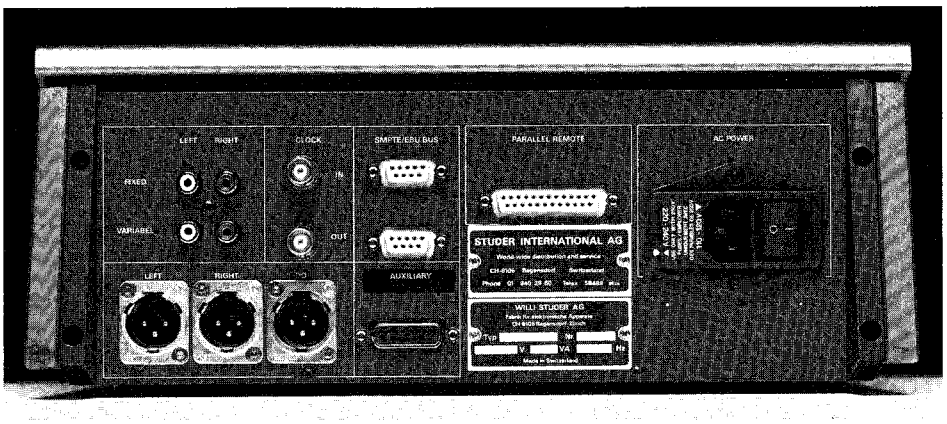
If the CD already knows the disc, the preprogrammed information is retrieved and can be used for the broadcast. This system offers the eminent advantage that frequently used CDs do not have to be reprogrammed; a complete program can be prepared and stored in the memory.

The disc recognition function requires no additional operating steps.

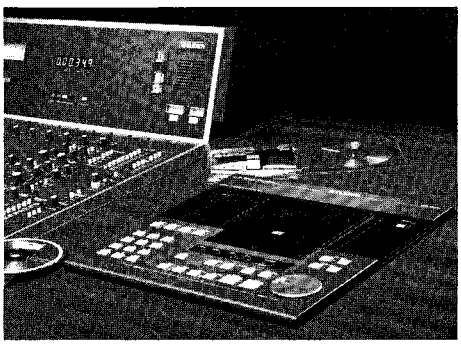
All other functions can be activated via the ergonomic keyboard on the front panel. On the rear of the player the following interfaces for expanded functions are available:

– **SMPTE / EBU BUS**
Because of its RS422 SMPTE / EBU bus, the A730 can function not only as a stand-alone player but also within a system comprising several units. Such a system can be controlled by a PC, for example. The RS422 interface can be switched internally to RS232.

– **PARALLEL REMOTE BUS**
The CD player can also be operated from the mixing console by means of the same (fully compatible) remote control (with or without feedback indication) available for the A727.



The logically arranged connector panels satisfies even the most demanding users.



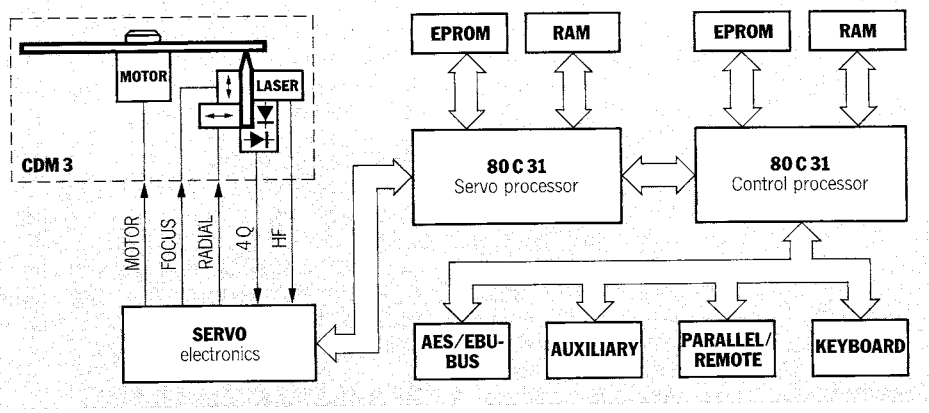
The flush-mount design makes new variations possible.

– **AUXILIARY BUS**
Remote control is also possible via the auxiliary bus which recognizes and executes simple start/stop impulses.

The player supplies status signals, for example 5 secs before the end cue point is reached (preparatory signal for the moderator) and an additional signal when the actual end cue point is reached. A subsequent unit can for example be started with these signals.

– **WORD CLOCK IN / OUT**
Clock input/output for 44.1 kHz for «slave» mode or for additional possibility of using the player as the master.

The following audio signal outputs are available:
– Balanced, floating **ANALOG** with XLR connectors,
– Balanced, floating **DIGITAL** (consumer format) with XLR connector,
– Fixed and variable **MONITOR** analog signals with cinch connectors.

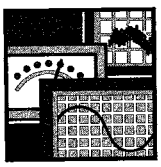


The A730 is equipped with two microprocessors. The block diagram illustrates the allocation of the functions between servo and control processor.

Wiel Louvenberg (39)
Received his electrical engineering diploma from the Technical University Eindhoven (Netherlands). Subsequently active at Philips as a development engineer; his specialty is servo systems for optical components. Since 1981 project manager for the test facilities in the area of CD glass mastering and since 1983 project manager for the development of professional CD players at Philips. Since 1986 responsible for the development work conducted in the Eindhoven laboratory within the framework of the joint venture.

In view of these characteristics it should become clear that the Studer A730 CD player is not a «normal» but a truly professional product that excels through its versatility. It establishes a new standard for players in studios, discotheques, as well as audio dubbing applications. It will also find enthusiastic users in the high-end consumer market.

Wiel Louvenberg



Studer faders for mixing consoles

Fader design

The simplicity of the word «fader» and the simplicity of its appearance stand in stark contrast to the actual complexity of its design and manufacture.

Faders are used by balancing engineers, audio engineers, and program moderators for stepless and click-free control of the audio signals.

They accurately fix or smoothly vary levels and mixing ratios. For the person operating the mixing console the fader is consequently one of the 'man-electronics' interfaces through which creative work with a mixing console becomes possible.

Stringent requirements

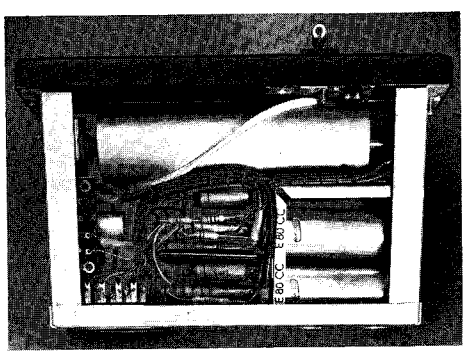
Studer faders have an almost 30-year tradition. Strange to say, a large proportion of people who use mixing consoles are not sufficiently aware of the sophisticated functions that a fader is capable of. Worldwide there are very few manufacturers of professional faders, which seems to indicate the difficulties involved in developing and manufacturing them.

In the hand of the balancing engineer, a fader should develop a conveniently uniform sliding resistance. He must be able to 'feel' the fader, and equally important, this fader feeling should remain constant throughout the life of the fader. Close, electronic tolerances are important because all fader positions for a given input signal and level must be identical (reproducibility). Insensitivity to dirt is also a significant criterion, because cigarette ash and coffee stains are practically unavoidable in environments where allnight sessions are no exception.

And finally, the fader should be easy to service, i.e. cleaning should not present any problems.

Studer faders have tradition

Studer produced its first mixing console in 1958. Even in those days the faders were developed and manufactured in-house. The first designs were based on an idea by Dr. W. Studer: the linear movement was transferred via a spiral path to a cylinder that drove a high-quality potentiometer. One of these audio mixers was installed at the UN headquarters in Geneva and was not replaced by a new series 900 model until 1982.

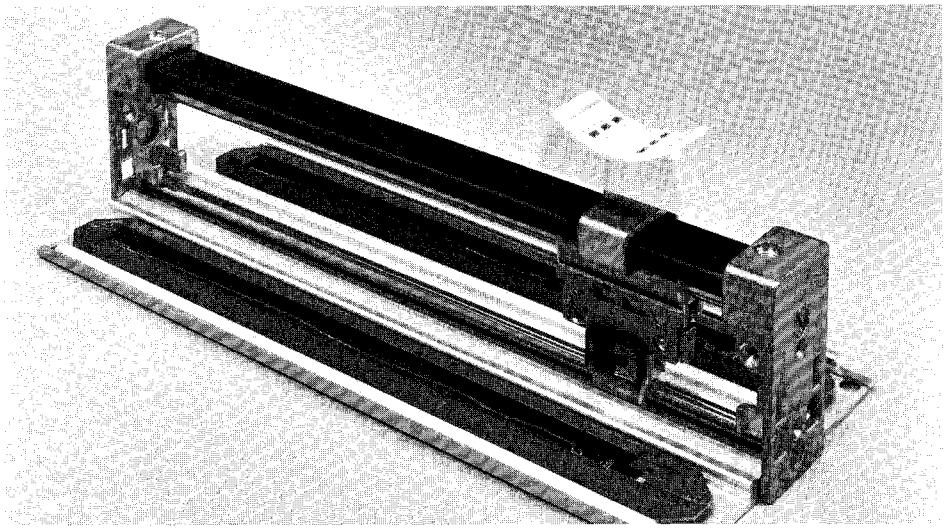


Studer fader module, model 1958, in tube technology and with drive spiral.

Since these early days the design and the electrical specifications of Studer faders have been continually improved. Today's faders are used in all professional mixing consoles of the series 961-962-963-970, and since one year also in the series 900.

Concept of the new Studer fader

The most critical part of the fader is the contact strip. It determines the electrical characteristics and partially also the life duration. A resistance film made of conductive plastic is screen-printed on a substrate which has partially been plated with hard gold. The fader limit switch is integrated in the gold pattern. When the fader is closed, the slide closes a contact. This arrangement functions without an additional microswitch, and no switching point needs to be adjusted. Nevertheless such a switch is not without problems. No DC voltage must be formed at the wiper because it would produce a switching click on the audio output. For this reason a very small residual resistance R2 and a small current through R1 are required.

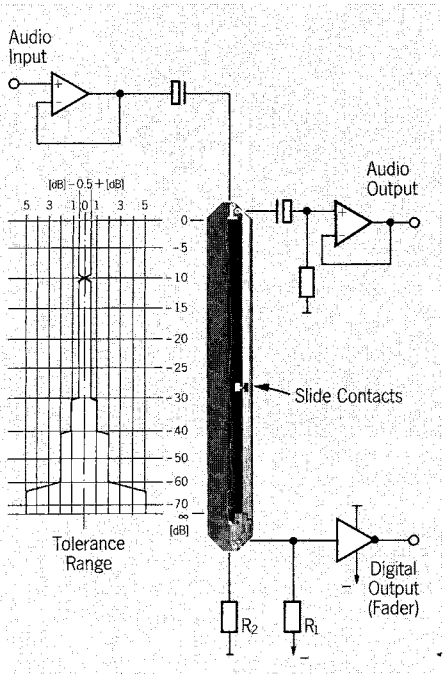


Tilted up fader of the latest design. Quickly removable and easy to clean by lifting the hinged side covers.

Up to seven printing passes are needed for the logarithmic film in order to achieve a resistance characteristic of the desired basic precision. After the resistance film has been baked, it is trimmed by means of computer milling in such a way that the stringent tolerance requirements of the individual broadcasters can be satisfied.

A chemically stable, smooth, and abrasion resistant fader path is achieved through special alloying of the printed films. To prevent the fader from producing 'noise' when it is actuated, no DC voltage must reach the film, e.g. by offset voltages from opamps. Even thermovoltages originating from different materials in the contact strip could produce undesirable scraping noise if the combination of the selected materials is unfavorable. Since the film surface is not absolutely smooth, the resistance changes in stepwise fashion when the wiper is moved in the microrange. Together with DC voltage this would result in noise. A loaded fader can even produce harmonic distortion. The preconditions for this are satisfied if a semiconductor junction is formed at the contact point between the film and the wiper, which can easily occur with unsuited material combinations, dirt, and unfavorable wiper shape.

The designer must also take care that the wiper does not lift off even when accelerated very quickly. Experience has shown that the materials and tolerances of the contact strip, the wiper, guide bars, bearing bushings and the housing must be carefully selected and matched.



Diagrammatic sketch of the fader circuit with tolerance diagram of the resistance film.

Only if all these factors are taken into consideration will a fader perform professionally: a fader that readily fulfills its important function even in heavy duty and under difficult climatic conditions over many years.

Franz Voser
Alfred Eckert

The Studer Group

«Who is who»

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

Clary MacDonald

General Manager of Studer Revox Canada Limited, Toronto ● born 1937 in Lismore, Nova Scotia ● graduated from East Pictou High School in June 1953 ● Diploma in Radio and TV Electronics from Halifax Vocational School, Nova Scotia in June 1957 ● Diploma in AM/FM Transmitter Theory, Algonquin College, Ottawa, in 1971 ● married, 4 daughters.

When Clary MacDonald joined the Studer group in 1984, he brought along with him a fair package of experience in the electronic field; there were building and testing electronic equipment at the Naval Research Establishment of Darthmouth, Nova Scotia; demanding operation duties and technical maintenance in operations and transmitter departments of CBC (Canadian Broadcasting Company) in Halifax, New Brunswick, Montreal and Ottawa.

In order to get in touch with the activities in the Canadian market, Clary MacDonald left CBC after almost 12 years of gratifying employment and joined Rupert Neve of Canada as Sales Engineer. In his position, he travelled throughout Canada, to the USA and occasionally to Latin America which provided practical experience in the audio market; after two years Clary became General Manager. In 1982, he joined a large Japanese company as manager of a new division and set up a network of dealers for professional audio equipment in Canada.

Thus armed, Clary MacDonald joined Studer Revox Canada Limited in 1984

as General Manager. It coincided with a period where the market opened up for multichannel equipment. The Studer recording machines A80VU-24-channel, A800-24, and the then new A810 1/4" broadcast recorder as well as the new generation mixing console 900 fully met with market requirements – a good basis for increased activities. With 14 employees in sales, service and administration, Studer Revox Canada Limited markets professional products both directly and through a dealer network.

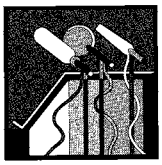
Even more hi-fi dealers handle the Revox product range. Clary MacDonald prefers to personally look after dealership and customers. In the course of a business year, he spends much of his time travelling across Canada; after all, there are 5187 kilometers that part the eastern coast from the western regions in which the Studer Revox dealer network is spread out. With 31 television and 68 radio stations, CBC are the largest clients of Studer Revox Canada Limited. The company also supplies equipment to other radio- and television companies, to recording and film studios, and the various levels of government institutions. Here as well, efficient care for the customer before and after sales pays out; a network of sales offices and service centres in all regions provides for permanent presence of both product lines. All customers – whether large or small – profit from the service rendered. Without the engagement, the exemplary cooperation and the esprit de corps, the various tasks could not be mastered. Clary MacDonald underlines that he works with one of the best teams.

Considering the size of the Canadian countryside, the great number of fresh water lakes and rivers, Clary has quite obviously choosen the right pastime activities in which his wife and his four daughters join him, namely cross country skiing, fishing and canoeing – an excellent compensation for his rather hectic business life. During the hunting season, he also goes moose shooting.

In business also, Clary MacDonald holds a positive and optimistic position.

He is very conscious of the customers needs and adjusts his assistance accordingly. «Do others as you would have them do to you» – his simple and wise principle.

Renate Ziemann



Studer Sales Seminar in Taiwan

Sales seminars are not only held in Regensdorf

Music recording studio at the CHUNG CHENG MEMORIAL building. The project engineer describes the system.

Many good reasons have induced us to arrange a sales seminar in Taiwan for distributors of the neighbouring Far East countries, for Australia and New Zealand. Main purpose of such extraordinary involvement is the enhancement of the relationship between the various distributors, also to bridge the distance to Switzerland and eliminate any inconveniences that often occur in connection with a journey to Europe. Furthermore, Taiwan is geographically conveniently placed, the climate is mild and, last not least, its kitchen of excellent reputation.

In addition, November 1987 was an ideal time choosen because

- the new analogue tape recorder program had been completed;
- marketing activities of the Studer synchronisation system with controllers SC4008 and SC4016, TLS 4000 MK I and MK II had brought encouraging results, and
- on the digital recording sector, Studer gradually gained ground.

Besides, the participants of the seminar were anxious to freshen up their know-how on the rather complex technology of the new mixing console range.

Guided by a crash program of five days, 20 participants from 11 countries exchanged information and talked about practical experience under one of the worlds most attractive shelters, the Grand Hotel Taipei. Such exchange of thoughts proved most valuable for both distributor and supplier. Our local distributors, Linfair Engineering & Trading Limited, headed by Duncan Chang and assisted by his wife Sheila, have splendidly organized the seminar and provided for a smooth-running course.

The event was crowned by a visit to the Chung Cheng Memorial, a project where all seven control rooms where equipped with Studer 900 mixing consoles and several Studer tape recording machines for various application purposes.

Paul Meisel

Right on success

Studer worldwide

CALGARY 1988

The XV. Olympic Winter Games in Calgary

Artificial Snow of Yesterday?

Slogans like «Hidy'n'Howdy», «Chinook» etc., or headlines such as «...another gold (silver, bronze) medal for X, Y or Z» have cleared the way for other news.

In addition to the many contestants, there were anonymous people working miracles in the background – no top ranking sportsmen, though, but rather expert «managers» of picture-and-sound.

A «high-tech» enterprise from Regensdorf nr. Zurich was also there, behind the scene, represented by a substantial number of Studer mixing consoles of the 960 series, tape recorders of the PR99, A807 and A810 type which were operated in various studios and – quod erat demonstrandum – guaranteed excellent sound.

We, the Studer-people, are as happy about this as we are about the medals of «our» athletes.

Studer implements a new private local radio studio

«Radio in Berlin»

Engineers of the Studer service center Berlin during the sound check

A new private radio station, «Radio in Berlin», inaugurated on December 21 1987 by the city's mayor, Diepgen, is now on the air with superb FM stereo quality.

At the ceremonious inauguration of the studio: from left to right Johannes J. Frank, Managing Director, «Radio in Berlin»; Eberhard Diepgen, Mayor of Berlin; Bernd Shiphorst, Managing Director and Rolf Jablonski, Program Manager of «Radio in Berlin».

Our Studer representative in Berlin, the «Service Center Berlin», managed by Eberhard Kaulbach, completed the project within approx. 4 months. Five of his 60 employees had been assigned full time.

Almost all of the equipment is from the Studer product range. In the center are the new mixing consoles of the series 970 as well as the latest tape recorders A807. Cassette recorders A721, CD players A727, telephone hybrids, small audio mixers as well as a multitude of so-called components are used.

From the control room 1, the control or production studio 2, to the copying room, the moderator booth and the control center, an absolutely autonomous local radio station has been created. The German Federal Post Office, which operates the transmitter, broadcasts the «Radio in Berlin» program on 103.4 MHz.

Czechoslovakia

CS Television Prague

The Prague television company has been operating Studer synchronization systems for several years now. The development of the modern synchronizer TLS 4000 offered new opportunities in combination with Studer tape recording machines A810-2-TC VU, which lead to a substantial order. End 1987, another lot of system controllers SC 4008 and synchronizers TLS 4000 were supplied together with Studer tape recorders of the A820-2-TC and A820-8-1 type for accommodation in the new post production studios of the television company in Prague.

New Patents

Shorter start-up times for digital units

Turntables or tape recorders which store audio signals in digital form can be designed in such a way that the wow and flutter produced by mechanical components becomes inaudible. To this purpose the signals, which arrive in somewhat irregular intervals, are buffered in a memory. They are retrieved in quartz-accurate rhythm in order to completely eliminate wow and flutter. After the play mechanism has been started, the memory must first be filled up before it can be read out. This results in long start-up times.

The patent proposes that the player mechanism should run at excess speed while the memory is being filled. This reduces the filling time and shortens the start-up time which is so important to many users.

The invention is credited to Philip S. Gaskell, Dr. Roger Lagadec, and Guy W. W. McNally, and a patent application was filed in the USA in October 1986, number 4,620,238.

Method for recording PCM signals on machines with multiple magnetic tracks

Because of the high recording density of PCM signals, this process is sensitive to drop outs. Missing information can be reconstructed by distributing redundant information for each track in longitudinal direction. However, editing problems occur if the data are stretched out too far longitudinally.

The present invention proposes to distribute the information somewhat less longitudinally and to distribute it to all the tracks instead.

For this invention of Dr. Toshitada Doi, Claudia Brandes and Dr. Roger Lagadec, a patent application was filed in the US on November 11, 1986, number 4,622,598.

Method for serial transmission of digital data

Serial digital data such as those occurring in digital audio technology, can, according to this invention, be broken down into groups. A check bit per group as well as a parity check is available for each group. In addition, each group contains identification information. This was done in order to improve the transmission quality.

For this invention of Dr. Toshitada Doi, Claudia Brandes, and Dr. Roger Lagadec, a patent application was filed in the US on February 17, 1987, number 4,644,546.

Clock frequency = power supply frequency

Units equipped with analog-digital converters can only function accurately and reliably if the scanning frequency is accurate and free of jitter. In addition, the analog signal must not contain any components with a frequency higher than half the scanning frequency. These conditions are difficult to fulfill if the electronics is fed by a clocked power supply.

The patent proposes to synchronize the power supply frequency with the clock frequency of the digital equipment. This decreases interferences in the order of several magnitudes.

This invention is credited to Dr. Roger Lagadec and Robert Müller and was patented in the USA on June 9, 1987, number 4,672,527.

Method for reconstructing the time relationship of digital signals

In contrast to the analog recording technique in which the signals can be recorded without much preparation, digital recording requires an extensive amount of signal preprocessing. This processing takes time. Since an existing time code or another signal may require less time under certain conditions, a time offset can occur between the signals during the reproduction process.

The patent describes a process for reconstructing the time relationship between two signals. An auxiliary signal is admixed to the signals which are to be compared.

The Patent of Dr. Roger Lagadec was registered in the USA on Nov. 24, 1987, No. 4,709,278.

Paul Zwicky

Studer Training courses

13.04. – 15.04.88
Studer A812 1/4 inch Tape Recorder German
Laufwerkfunktionen, serielle / parallele Schnittstellen, Erklärung der einzelnen Platinen, Demontage / Montage des Laufwerkes, Geräteeinstellungen, Fehlerbehebung

18.04. – 22.04.88
Studer A820 Multichannel Tape Recorder English
Studer A820 1/4 inch Tape Recorder
Both transports are explained simultaneously. To be familiar with either of the transports does require to attend the whole course.
Tape deck features, parallel serial ports, tape deck and amplifier layout, explanation of various circuits, disassembling / assembling and alignment of tape deck, trouble shooting.

23.04.88
Studer TLS 4000 Synchronizer English
Briefing on operation, features and ports of the system. Circuit description based on block diagram level.

25.04. – 27.04.88
Studer A807 1/4 inch Tape Recorder English
Tape deck features, parallel serial ports, tape deck and amplifier layout, explanation of various circuits, disassembling / assembling and alignment of tape deck, trouble shooting.

28.04. – 29.04.88
Studer A727 CD Player English
Studer A725 CD Player (up-dates)
Features, parallel serial ports, explanation of circuits, transport alignment.

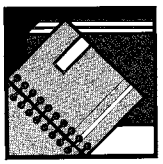
03.05. – 06.05.88
Studer A820 Mulitchannel Tape Recorder German
Laufwerkfunktionen, serielle / parallele Schnittstellen, Erklärung der einzelnen Platinen, Demontage / Montage des Laufwerkes, Geräteeinstellungen, Fehlerbehebung

16.05. – 19.05.88
Studer A807 1/4 inch Tape Recorder German
Laufwerkfunktionen, serielle / parallele Schnittstellen, Erklärung der einzelnen Platinen, Demontage / Montage des Laufwerkes, Geräteeinstellungen, Fehlerbehebung

19.05. – 20.05.88
Studer A721 Cassette Recorder German
Laufwerkfunktionen, Schnittstellen, Erklärungen zu den einzelnen Platinen, Demontage / Montage des Laufwerkes, Geräteeinstellungen, Fehlerbehebung

06.06. – 09.06.88
Studer A810 1/4 inch Tape Recorder German
Laufwerkfunktionen, serielle / parallele Schnittstellen, Erklärung der einzelnen Platinen, Demontage / Montage des Laufwerkes, Geräteeinstellungen, Fehlerbehebung

Courses will be held only after enrolment of at least 5 participants and require reasonable knowledge of electronics.
Kurse werden nur nach Anmeldung von mindestens 5 Teilnehmern durchgeführt. Ausreichende Elektronikkenntnisse werden vorausgesetzt.



From the printers

Studer
10.26.0581 **A807 data sheet** (g)
10.26.0591 **A807 data sheet** (e)
10.26.0640 **A727 leaflet** (g)
10.26.0650 **A727 leaflet** (e)
10.26.0660 **Sound Library leaflet** (g)
10.26.0670 **Sound Library leaflet** (e)
10.26.0750 **A812 data sheet** (g)
10.26.0760 **A812 data sheet** (e)
10.26.0770 **963 data sheet** (g)
10.26.0780 **963 data sheet** (e)
10.26.0790 **A721 leaflet** (g)
10.26.0800 **A721 leaflet** (e)
10.26.0820 **970 data sheet** (g)
10.26.0830 **970 data sheet** (e)
10.26.0850 **963 leaflet** (jap)
10.26.0860 **CD Parallel Controller leaflet** (g)
10.26.0870 **CD Parallel Controller leaflet** (e)
10.26.0890 **A730 leaflet** (g)
10.26.0900 **A730 leaflet** (e)

Revox
10.29.1180 **C242 leaflet** (g/e/f)
10.29.1190 **Mixer Carrying Case leaflet** (g/e/f)
10.29.1202 **C270 leaflet** (g/e/f)
10.29.1220 **B226 leaflet** (g/e/f)
10.29.1320 **Separate print «Interview Dr. Studer»** (f)
10.29.1360 **C270 data sheet** (e)
10.90.1820 **Separate print «UE/HIFI VISION 1/88»** (g)
10.90.1850 **Revox brochure** (g)
10.90.1860 **Revox brochure** (e)
10.90.1870 **Revox brochure** (f)
10.90.1900 **Revox brochure** (d)

g = german
e = english
f = french
jap = japanese
d = dutch

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