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SWISS SOUND

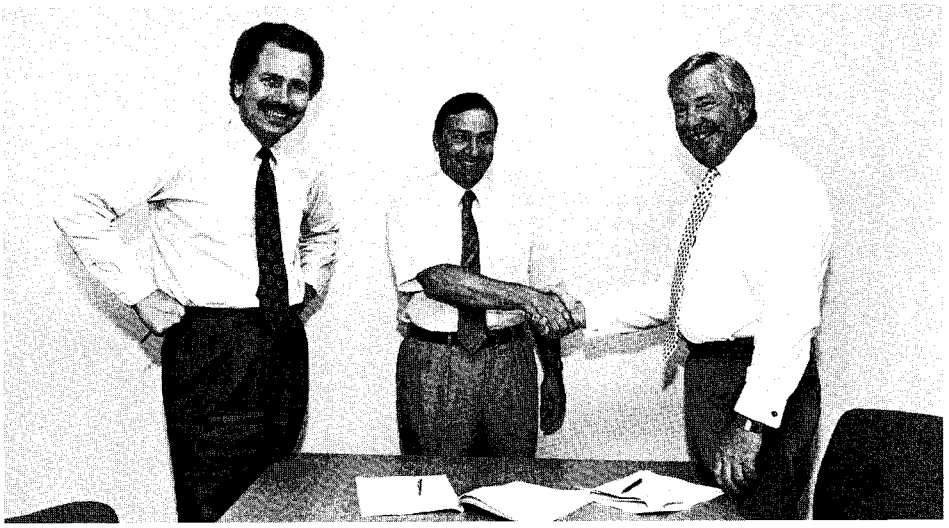
NEWS AND VIEWS FROM SWITZERLAND

STUDER REVOX

Studer Editech Corporation

Go West

In keeping with the decade of large industrial mergers and takeovers, Studer decided to buy out Integrated Media Systems (IMS) of Menlo Park, California, and rename it Studer Editech Corporation (SEC). In relation to recent airline or oil industry mergers this may not seem very significant. For Studer, however, it is an important step into a new technology that we feel will influence the future of the recording industry considerably.



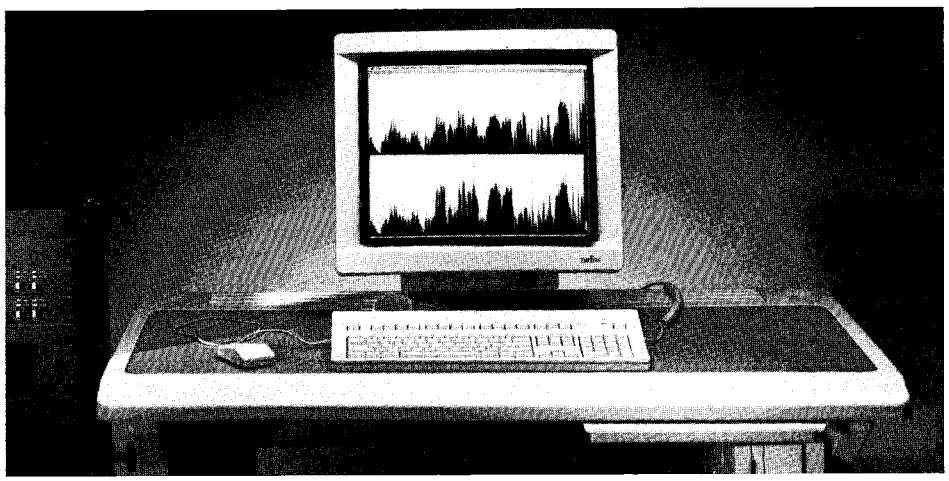
Happy faces after the signing of the acquisition papers:
f.l.t.r. Tore Nordahl (President SRA), Bill Muggler (Vice President SRA), Lee Cochran (President SEC).

Studer's understanding of digital high precision tape recorders and editors has been well proven in the market with the D820X, the DE4003 and lately with the D820-48. Studer Editech now offers a line of digital hard disk based audio workstations that will complement Studer's existing digital products very nicely, rather than replace them.

The company

IMS was founded in 1984 and sells its hard disk based workstation, the Dyaxis, to radio, television and recording facilities. When IMS was acquired by Studer in September 1989 the company had already sold more than 200 Dyaxis systems worldwide. Only one month later, at the AES convention in New York, a Dyaxis system was shown in the Studer booth where it was talking digitally to Studer's 48-track DASH machine, the D820-48. This was to demonstrate that a Dyaxis system, with its powerful editing capabilities, is an ideal addition to the D820-48 as a mass storage device with 48 track-hours. In the future, serial control interfaces will allow a complete integration of Dyaxis products into Studer environments, where the Dyaxis becomes a central working tool.

The company will continue to be headed by President and CEO Lee Cochran, who was the driving force behind the move to merge IMS into the Studer organization. VP of engineering will be assumed by Dave Haynes, and VP of marketing by Gerald Kearby, who both co-founded the company. The crew counts 23 employees of which 8 are in engineering.



Waveform editing with Dyaxis 2+2.

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Read in this issue: page

The products

The Dyaxis digital audio production system is available in a variety of configurations, with different amounts of hard disk storage. This modular design approach is very cost effective for all audio and audio-for-video production tasks. The Audio Processor is the heart of Dyaxis, and it connects to the Apple Macintosh computer. MacMix, a custom-developed software running on the Macintosh, controls the various recording, playback and editing tasks, with digitized audio signals stored and recalled from the hard disk drives.

The multichannel version, Dyaxis 2+2, is designed for radio, music and post production markets. It provides 2 simultaneous channels of recording and up to 4 channels of simultaneous playback from 2 Audio Processors. The human interface is still the Macintosh computer with an adapted version of MacMix.

The System Synchronizer is an advanced master clock module capable of syncing Dyaxis to wordclock, film tach or SMPTE/EBU timecode. Its LTC, MTC and VITC reader/generator make it a very versatile and cost effective tool for virtually all audio applications. It is also the base unit for Dyaxis 2+2.

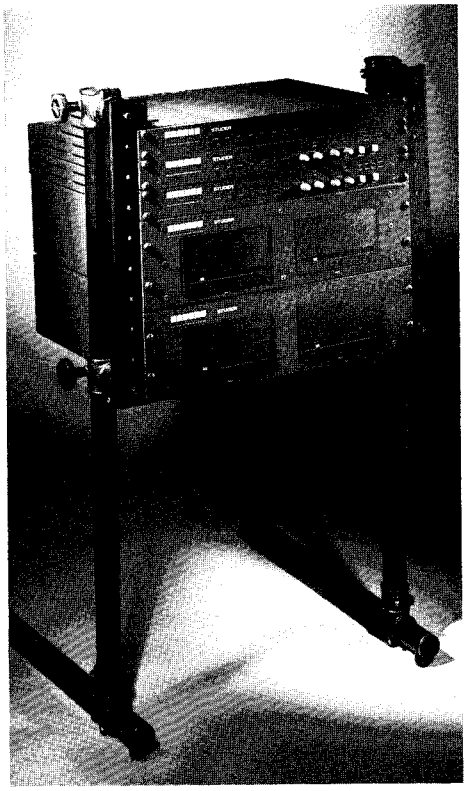
The DAT back up software package allows any Dyaxis with digital ports to use a conventional DAT machine for file backup. Sound files are stored on a DAT tape, while edit decision information is stored on a floppy diskette.

Featuring a Motorola 56000 signal processor, the Dyaxis EX-cellerator Card plugs into the Macintosh computer and provides enhanced digital signal processing capability for the Dyaxis.

With the Time Scaling software option for Dyaxis the length of a recording can be varied without the associated pitch change.

Finally the Virtual Machine Interface software allows the Dyaxis system to function as a virtual machine in video post production editing suites. With this emulation capability Dyaxis can be used as an audio production tool while being slaved to a video editor as a random-access audio-follow-video device.

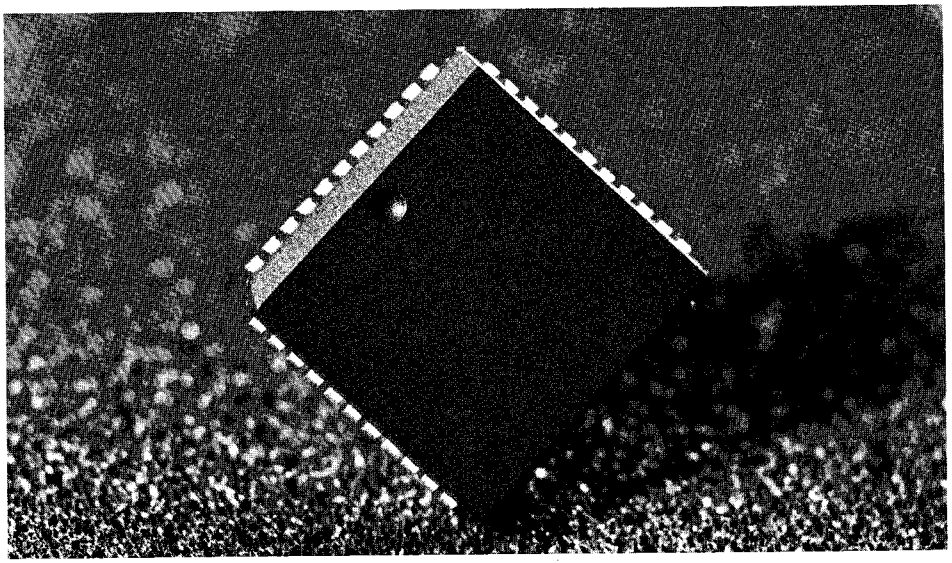
Andreas Koch



The processor rack for Dyaxis 2+2 with a System Synchronizer, 2 Audio Processors, and enough storage for 4 trackhours (4 channels times 1 hour).

Time Code Generator Adapter Studer TCGA

The Time Code Generator Chip



In Swiss Sound edition 27 we introduced our TCIA, the time code interface adapter in chip size. In order to record a time code (TC) it has to be generated first. A corresponding generator can easily be built in to audio products if it is small enough. The new "TCGA" - an appropriate generator chip to the TCIA - is explained in the following article.

The Time Code Generator Adapter TCGA is a peripheral device which can be directly connected to the 6800/6803 MPU bus with no additional circuitry. The device can be software-programmed by the MPU to satisfy a wide variety of time code based applications.

The TCGA handles different time code formats such as 24, 25, 30 frames and drop frame and has facilities for the time code rate and direction control (reverse TC generation).

Both the TC clock rate and direction are controlled by the MPU program. Additionaly, the MPU can start and stop the time code generation or "freeze" the time code (the generator will continuously send the constant time code data).

The device has 4 software selectable time code clock reference inputs. Depending on application, the signal frequency on these inputs can be controlled using 16-bit dividers (divide by M+1, N+1, K+1 counters) or multiply by 2 circuit, see Fig. 1. The internal TCGA select logic allows for the selection of fre-

quency dividers or multiplier.

The synchronization of the TCGA to the reference signals of the different video, digital audio or film standards requires only one external PLL circuit (see Fig. 2). Fig. 2 shows the two different PLL configurations which are supported using the internal select logic and the programmable dividers of the TCGA.

The device has an external control input which – if enabled by the MPU – may be used to synchronize the beginning of the time code generation to an external event.

The TCGA allows for the time code data, user bits data, the bit position or the unused bits of the time code frame to be preset during the stop or running state of the TCGA, by writing into the appropriate data buffers/registers.

Constant time code data streams may be generated by writing the data to the Time Code Data Buffer and using the command "freeze time code".

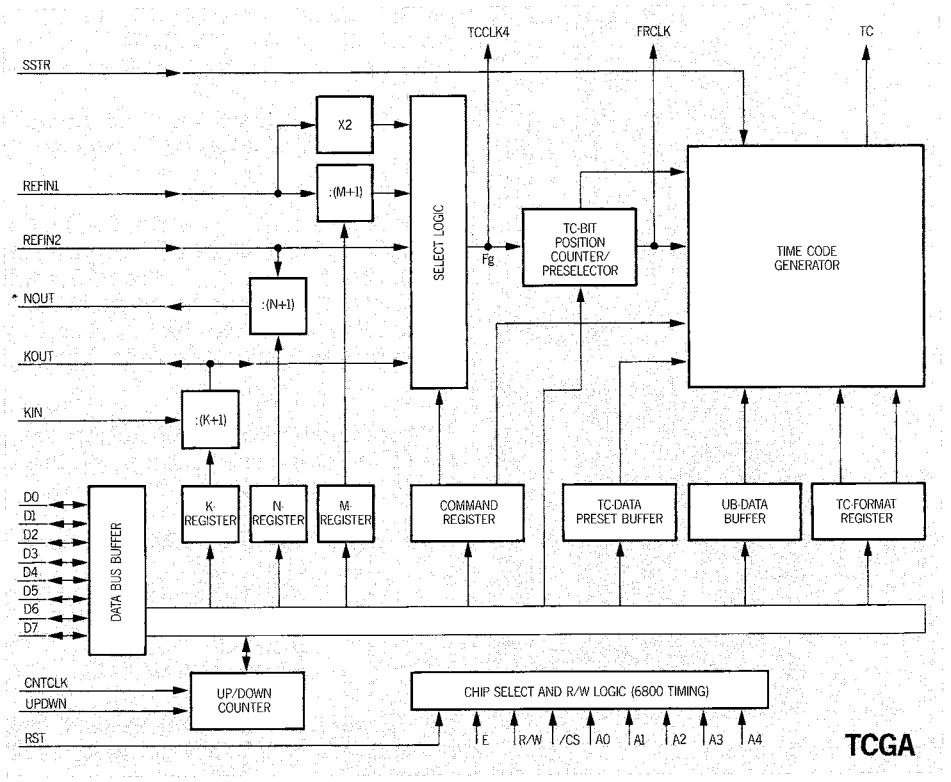


Fig. 1: TCGA block diagram

PLL Count Modifier Registers

The PLL Count Modifier Registers (K, N-Register) are 16-bit write-only registers (see Table 1). The MPU can preset the 16-bit K and N values by writing the LSB and MSB data into the corresponding 8-bit registers. The write operation to the MSB register will cause the 16 bit value to be transferred into the 16 bit counter/divider.

Table 1:

K-Register	**Address**
LSB	00H
MSB	01H
N-Register	
LSB	02H
MSB	03H

These registers may be used to program the external PLL to function as a frequency multiplier or divider (see Fig. 2).

The frequency of the TCGA clock signal "Fg" is calculated using the following formula:

$$\mathbf{Fg} = \frac{N+1}{K+1} \cdot Fr \qquad N, K: 0...65535$$

N and K are the 16-bit values loaded into the registers N respectively K. "Fr" is the frequency of the external reference signal. The circuit shown in Fig. 2 covers a range of the input reference signal frequences which can be applied to the PLL to generate the corresponding synchronous time code signal at the TCGA time code output TC. The following table (Table 2) shows some typical values.

Typical frequences "Fr" which are used to synchronise a time code generator. The nominal TC-rates "Ftc" are: 1920Hz (24Fr), 2000Hz (25Fr), 2400Hz (30Fr), 2397,6Hz (Drop). The values N+1 and K+1 in the table must be calculated for Fg = 2Ftc.

Time Code Rate Register

(M-Register), Addr. 04H, 05H

The M-Register can be used for Time Code rate (vary speed) control of the TCGA. The local reference signal frequency, applied to the REFIN1 pin, will be divided by the 16-bit value M+1. The MPU can preset the value M by writting

Table 2:

		24 Frames		**25** Frames		**30** Frames		**29.97** Frames	
Reference Frequencies		**Fg**							
		2 x 1920 Hz		2 x 2000 Hz		2 x 2400 Hz		2 x 2397,6 Hz	
Fr (Hz)		**N+1**	**K+1**	**N+1**	**K+1**	**N+1**	**K+1**	**N+1**	**K+1**
Video:									
(PAL)	15.625	68	3125	32	125	960	3125	3966	13021*
(NTSC)	15.7342	5120	20979	16000	62937	6400	20979	32	105
(30 Fr)	15.750	128	525	16	63	32	105	1332	4375
Dig. Audio:	32.000	3	25	2	16	3	20	2997	20000
	37.800	32	315	20	189	8	63	999	7875
	44.0559	3200	36713*	500	5507*	4000	36713*	16	147
	44.100	64	735	40	441	16	147	1998	18375
	48.000	4	50	2	48	2	20	999	10000
Line:	50 Hz	384	5	160	2	192	2	11998	125
	60 Hz	128	2	200	3	160	2	999	25

Note *):
TC-clock frequency errors 1.38, 0.59, 0.2, 0.74 Fr/hour respectively.

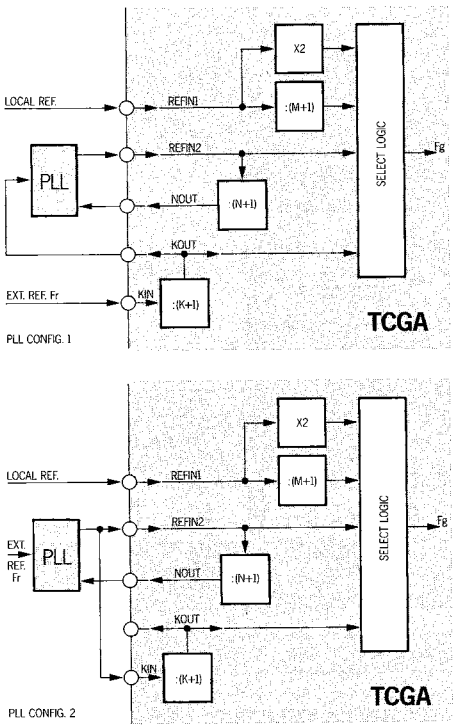


Fig. 2: PLL Configurations

into the address locations 04H (LSB) and 05H (MSB). The write operation to the MSB register will cause the 16-bit value to be transferred into the 16-bit counter.

16-Bit UP/DWN Counter

Addr. 11H, 12H

The UP/DWN Counter counts the positive transitions on its input CNTCLK. The 16-bit counter value will be incremented or decremented depending on the state of the UPDWN input. The counter will count up if UPDWN input is "high".

The 16-bit counter value can be read or written by the MPU. Both address locations (11H for LSB and 12H for MSB) must be accessed by the MPU during the write or read operation. The address location 11H (LSB) must be accessed first.

Generator Command Register

Addr. 07H

The Generator Command Register is the write-only register which is used by the MPU to start or stop the Time Code generation, define the Time Code direction (up/down), enable Start Strobe Input SSTR and freeze the Time Code Data.

bit 0: start/stop. If this bit is set to "1", the TCGA will start to generate the Time Code Signal at the TC-output. To stop the generator, this bit must be cleared.

bit 1: This bit is used to provide the direction select for the generated Time Code ("0" forward, "1" reverse).

bit 2: If this bit and bit 0 are set to "1", the positive transition at the SSTR input will initialize the beginning the Time Code generation.

The generator will stay in the running state until the bit 0 has been cleared by the MPU.

bit 3: This bit may be used to freeze the Time Code Data at the TC output. If this bit and bit 0 are set to "1", the TCGA will continuously transmit the constant Time Code Data which can be initialized by writing to the Time Code Data Buffer.

Additionaly, bit 6 and bit 7 of the Command Register can be used to select the TCGA Time Code clock reference:

bit 7	bit 6	TC-Clock Reference (see Fig. 1)
0	0	REFIN1 (divide by M+1)
0	1	REFIN1 (multiply by 2)
1	0	REFIN2
1	1	KIN (divide by K+1)

The Generator Command Register will be cleared by a hardware reset (RST-Input).

TC-Bit Position Register

Addr. 06H

The TC-Bit Position Register is a 7-bit register, used as a pointer to one of the 80 Time Code Data Bits of the Time Code Frame.

During the Time Code generation, this register is automatically incremented or decremented to point to the next TC data bit. By writing to this register, the MPU may change the pointer value allowing the TCGA to be synchronised with the accuracy of the one Time Code bit period.

Time Code Generator Adapter TCGA

- CMOS technology, TTL compatible inputs/outputs
- 6800/6803 MPU bus compatibility
- four programmable TC-formats (24, 25, 30, drop frame)
- reverse code generation
- presettable TC-data, UB-data, TC-frame bit position and the unused bits of the TC-data
- depending on application, up to 4 reference clock inputs, which can be selected by the MPU
- programmable TC generator rate (max.100 x play speed for E clock frequency 1MHz) using internal 16-bit programmable dividers (see Fig. 1)
- synchronization to the different reference signals using external PLL and internal 16-bit programmable dividers (see Fig. 2)
- direction, start/stop and "freeze" commands implemented
- integrated 16-bit up/down tape (move pulse) counter

TC - Data Preset Buffer

The TC-Data Preset Buffer consists of 4 write-only registers:

Register	Address
FRAMES	08H
SECONDS	09H
MINUTES	0AH
HOURS	0BH

The contents of the registers must be binary coded data.
Example:
Time: 10 hrs, 12 min, 18 sec, 24 frs
Register contents: 18H (fr), 12H (sec), 0CH (min), 0AH (hr)

To transfer the Time Code Data from the TC-Preset Buffer into the corresponding Time Code counters, the register 0BH (hours) must be accessed at the end of the MPU write sequency.

UB-Data Buffer

Like the TC-Data Preset Buffer, the UB (user bits)-Data Buffer consists of 4 write only registers:

Register	Address
UB-Groups 1,2	0CH
3,4	0DH
5,6	0EH
7,8	0FH

TC-Format Register

Addr. 10H

TC-Format Register is a write-only register which defines the TCGA Time Code format:

bit1	bit0	TC-format
0	0	24 fr/sec
0	1	25 fr/sec
1	0	30 fr/sec
1	1	drop-frame

Additionaly, bit2 – bit6 may be used by the MPU to write the data into the Time Code bits which are not defined by the SMPTE standard.

Register bit:	TC bit:
2	11
3	27
4	43
5	58
6	59

This register will be cleared by a hardware reset.

Miodrag Milicevic

Signal Functions

SSTR
The SSTR (Start Strobe) is a positive edge sensitive input used to initialize the start of the Time Code generation. In order for Start Strobe transition to be accepted by the TCGA, both the Start/Stop bit (bit0) and Start Strobe Enable bit (bit2) of the Generator Command Register have to be set.

REFIN1, REFIN2, KIN
The REFIN1, REFIN2 and KIN are the external time code clock inputs.

NOUT
The NOUT is the output of the programmable divide by N+1 16-bit counter.

KIN
The KIN is the input of the programmable divide by K+1 16-bit counter.

KOUT
The KOUT is the corresponding output of the K divider/counter.

RST
Reset input, active "low". If asserted, it will cause the Command Register and Format Register to be cleared.

E, RWB, CSB, A0...A4, D0...D7
The specification of these inputs/outputs will meet the timing requirements of the Motorola 6801/03 microprocessor.

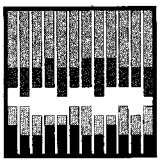
CNTCLK
The CNTCLK is the clock input for the 16-bit UP/DWN counter, internally synchronized by the negative edge of the «E» signal. The counter will be incremented or decremented by the positive transition of the CNTCLK.

UPDWN
This is the input used to control the 16-bit UP/DWN Counter. The counter will be incremented if UPDWN is "high" and decremented if UPDWN is "low". To avoid counter violation, this input must not be changed during the positive transition of the CNTCLK signal.

TC
The TC is the serial output of the SMPTE/EBU Time Code Data.

FRCLK
Active "low" output signal, one Time Code Bit Period long, used to indicate the end of the transmited Time Code Frame.

TCCLK4
The TCCLK4 is the Time Code Generator clock output signal.



Studer D820-48 – a memory with more than 16.5 GB capacity

Goldrush

In a time when the fight of optical or magnetic disk versus digital tape does not seem to have yet evolved a clear winner in the 2-track recording industry, the "disk-disease" is starting to spread into the multitrack field. Some of the manufacturers of hard-disk based workstations claim that their solution not only replaces a multitrack recorder, but also adds so many editing features that most of the existing equipment in the recording studio becomes obsolete. Such euphoric thoughts have created a "goldrush – atmosphere" in the recording business during the last few years, that is now masking some technological and operational facts.

Fig. 1: Robustness and high-precision digital technology were the design goals of our newest product.

The key technology in digital multitrack recorders, editors, workstations or whatever they may be called is still in the storage device, since the amount of data for instance for 1 hour of 24 tracks is more than 8 Gigabytes. This already exceeds the capacity of any existing disk, be it magnetic or optical. The "diskaholics" think to solve this dilemma by adding an almost unlimited number of disks and, at the same time, try not to listen to the theme song of the recording business: "can anybody afford this new machine"?

Also, when comparing prices, it becomes very obvious that digital tape with a tag of well below US-$5.– per trackhour is more cost effective than optical or magnetic disk by at least one magnitude. When it comes to a discussion about removeability of the storage media the marketing of the workstation camp gets creative and points out that optical drives with erasable media will soon be available. Today's available MO drives, however, are still too slow for audio and do not have enough capacity for multitrack applications. As soon as these technical problems with MO drives have been solved, the next question will arise immediately: will the recording format on the disk be standardised?

With the recent announcements of digital 48-track recorders the gap between disk and good old fashioned tape has even widened. Just as analog tape stayed well alive through the digital "revolution" that started already 10 years ago, it seems very probable that digital tape for multitrack recording will live well into the disk era.

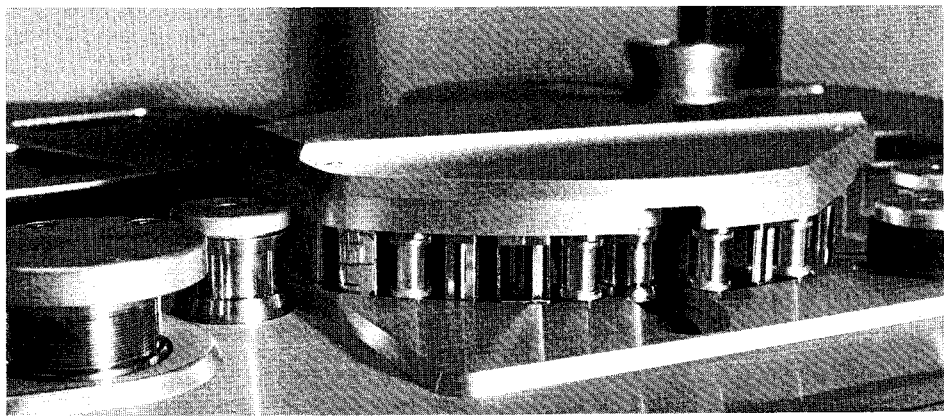


Fig. 3: The head assembly with the head configuration "write – read – write".

History

With the presentation of an 8-track DASH recorder in 1983 already Studer marked her definite entry into the digital multitrack recording market. Digital tape recording at those times was still considered as a technical gimmick rather than a true replacement of analog tape recorders. The state-of-the-art in technology made these recorders more expensive and less reliable than their analog counterparts. Nevertheless Studer decided to go along with the digital move and invested considerably in this new recording technique. Shortly afterwards, in 1984, the first version of the 2-track mastering machine, the D820, was introduced. When the DASH format was extended to include the twin feature, Studer immediately updated the D820 to the D820X, its present version.

So far the maximum number of tracks was 24 on half inch tape and a variety of existing recorders already support this single density format. A thorough feasibility study by the DASH partners showed the possibility for an extension from single to double density. The dream of 48 tracks on half inch tape should become reality and so Studer did not hesitate to launch her most ambitious project in 1986: the development of a 48-track digital tape recorder.

The transport system was quickly conceived as it is based on the rugged drive of the analog A820 series recorders. For the signal processing paths, however, new concepts had to be designed from scratch. The newest digital technology had to be utilized to make it a compact and reliable machine. Also, with a new and more powerful software based control system, the Studer D820-48 finally made its debut at the least AES show in New York 1989.

The format

Fig. 2. shows the layout of the tracks in single and double density. In both formats the width of the tracks is the same. In the double density format tracks 25 to 48 are placed between the tracks 1 to 24 of the single density format. This configuration creates a unique compatibility: Any 24-track tape can be played back and recorded on a 48-track machine and the first 24 tracks of a double density tape can be played back and recorded on a 24-track machine. For full compatibility also of the 4 auxiliary tracks to tapes recorded on 24-track machines an additional erase head has been added on the D820-48.

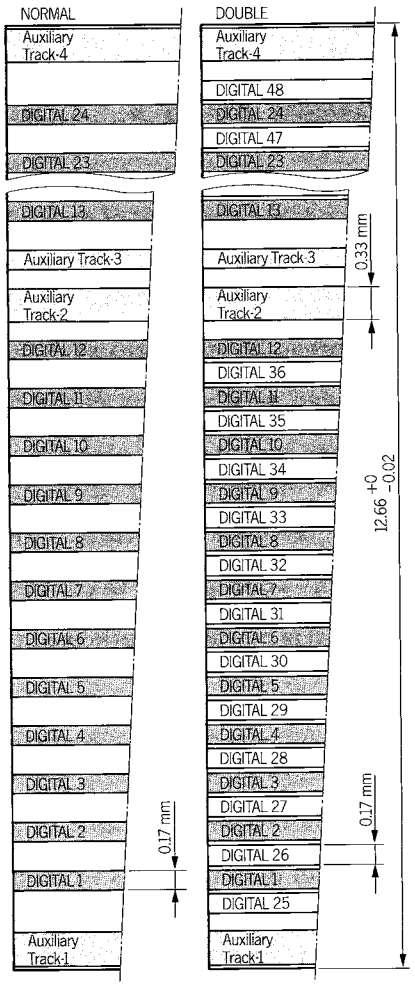


Fig. 2: The track layouts of the two formats "normal/single density" for 24 tracks and "double density" for 48 tracks.

Advanced head technology

The 48-track DASH format only became possible on half inch tape with the thin-film technology for the recording heads. The playback head is still realized in ferrite with a very good crosstalk characteristic. On the headblock of the D820-48 the playback head is placed between two identical record heads. The first record head is used to record all 52 tracks on a virgin tape, whereas the second one is the actual working head used for inserting and assembling. The insert mode assumes that there is already a valid reference code on the tape, in assembling mode the reference track can be extended continuously from an already recorded piece. When digital audio tracks are being overdubbed they are read through the playback head prior to the punch-in and fed to a signal processor where a crossfade is calculated with the new incoming signal. The result then is sent to the second record head where the punch-in and -out will happen at exactly the correct location on the tape.

The advantage of this configuration is that all the crossfades are recorded onto tape rather than being calculated during playback, which increases the data security.

General concept

With a size just slightly larger than a A820MCH it incoporates a rack for 36 double Euro-size type PCBs in addition to the head electronics and the already well known transport control circuits.

In each channel a digital signal processor is used for error correction, routing and crossfading within the range of 1 to 700ms. These processors, however, are so general purpose that they also can generate a wide selection of signal patterns for comprehensive test features. With a new integral concept of this machine, where a synchronizer and a timecode reader and generator are built-in, a new and more powerful control system became necessary. A 16 bit microprocessor from the 68000 family communicates to 4 peripheral slave processors and controls setup, running and function parameters over a proprietary serial bus, the "Serbus" (SWISS SOUND Nr. 26). Of course, Studer maintained her principle of offering all the functions on the machine itself, not only on the remote controls. Level metering, channel control and some general functions are on the metering bridge.

Setup and running parameters as well as functions regarding analog and digital input/output, tape transport, autolocator, synchronizer, varispeed, etc. can be accessed through a small menu driven display on the tape deck.

More ergonomic control of the machine is possible through a choice of remote controls: remote channel control, autolocator with synchronizer control and a parallel audio interface for channel control from a mixing console. All the remote controls can be connected to a serial remote bus with HDLC protocol.

Main features

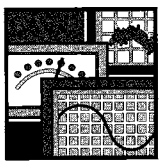
Apart from a set of 48 A/D and D/A converters, for which low noise, passive filters and oversampling techniques have been used, the D820-48 offers a selection of digital input/output formats: SDIF multichannel, AES/EBU assignable to any two channels and provisions are already made for MADI. In addition the machine can be locked to almost any external clock source, because all the different video formats and sampling rates are supported. With the feature "Ping Pong", or track bouncing, any track can

be copied digitally to one or several other tracks with precise geometrical alignment. The internal synchronizer and time code reader / generator make an integration into a larger system easy.

In the advance output mode signal delays due to external processing like mixing can be compensated, so that no accuracy in editing processes is lost.

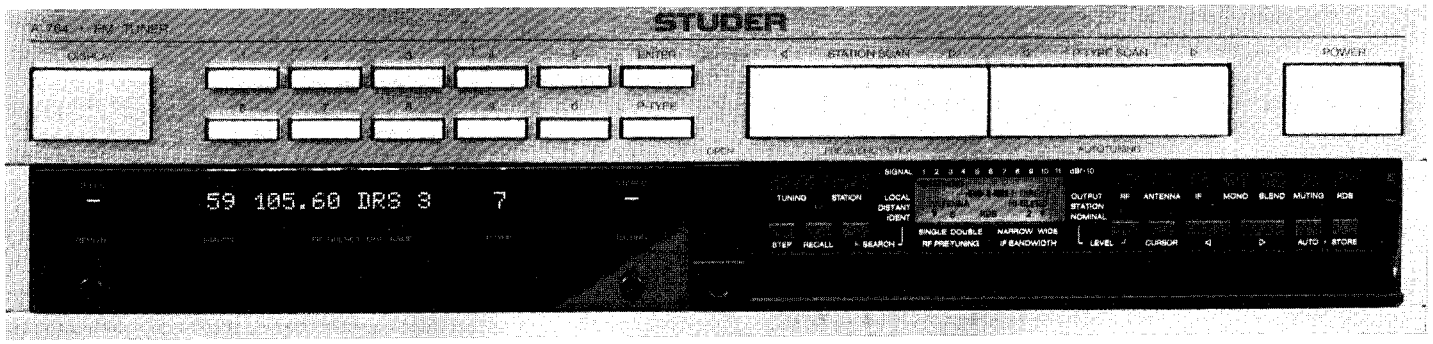
For future delivery an audio memory is in development with new and powerful editing processes which will clearly make the D820-48 Studer's new flagship.

Andreas Koch



Studer A 764 FM Monitor Tuner

FM monitoring at the highest level



A tuner used for monitoring applications today must offer more than good reception and balanced outputs. The latest Studer concept is based on the best tuner chassis, surrounded by peripheral devices that satisfy all requirements of professional users. With the greatest effort ever, the B260 has been reengineered into an A764 - the Studer FM monitor tuner. Traditional values such as reliability and stability of course are also essential features of a professional monitor tuner. The author of this report describes the development project from the viewpoint of the target specifications.

The Studer A764 is a new member of a generation of monitor tuners which have already been used for 20 years by broadcasters for quality control and as relay receivers.

However, it is more compact and offers greater performance with respect to station selection criteria, monitoring capabilities, and operating convenience. The A764 is available in two versions that differ principally in the monitoring facilities. Both are suited for a wide range of applications, as illustrated by the following examples:

Fig. 1: Transmitter monitoring in the control room

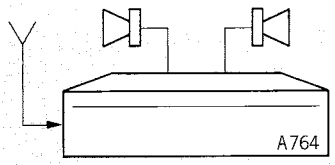


Fig. 2: Control monitoring of several transmitters by means of serial remote control or with the aid of a computer connected via the RS232 data interface.

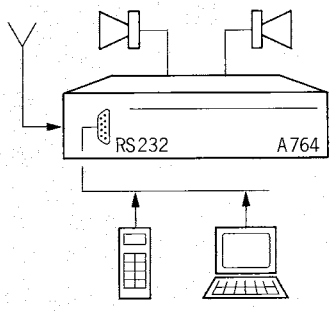


Fig. 3: Monitoring of:
- Field strength (threshold adjustable with DIP switch).
- Deviation (threshold adjustable with DIP switch).
- Audio output signal (for alarm triggering when the signal drops below the set thresholds).

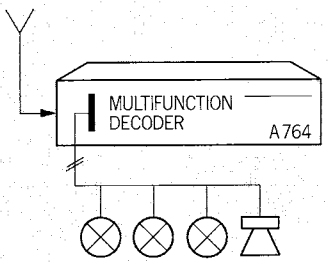


Fig. 4: Application as standby relay receiver:
- For retransmitting the MPX signal to a subsidiary transmitter.
- For feeding stations which are difficult to receive into cable systems.

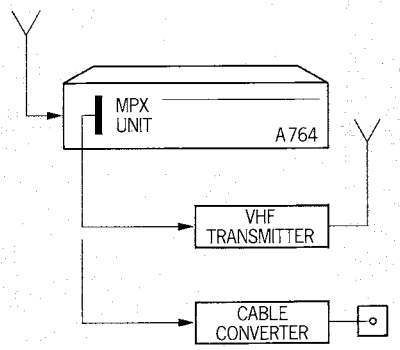
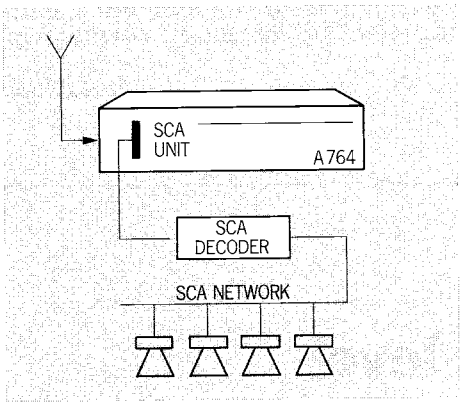


Fig. 5: Transfer of the SCA signal



User concept - version 1
Version 1 of this tuner is restricted to commonly desired characteristics and functions such as: 19" rack installation, mains connection with protective ground, as well as two balanced outputs (XLR). Advantageous is also the fact that the control panel can be locked to effectively prevent inadvertent changes in the tuner status. Via the headphones output it is possible to monitor the audio signal directly on the equipment. A switch for changing over between two equivalent antenna inputs has been provided – each input is electrically decoupled with an isolation transformer.

In applications where the transmission is to be monitored not only audibly but also visibly, the station name, the transmission frequency, and RDS information (option) can be read off the remote control module. Because the remote control signals are transmitted via the RS232 interface, a personal computer can be used as the controlling device.

User concept - version 2
Version 2 of the A764 is equipped with a multifunction decoder that outputs electrically isolated alarm signals (relay contacts) to a 15-pin connector (Fig. 6).

The following are monitored:

RDS (Radio Data System):
- Decoding of the **t**raffic **p**rogram identification «TP».
- Decoding of the **t**raffic **a**nnouncement identification «TA».
- The raw RDS data (clock, data, quality) can be picked up via a separate connector.

ARI (motorist radio information):
- Decoding of the motorist radio station identification «SK» (**S**ender**k**ennung).
- Decoding of the motorist radio announcement identification «DK» (**D**urchsage**k**ennung).

Frequency deviation:
- An analog signal that is proportional to the frequency deviation is available for controlling an external measuring instrument (75 kHz = 5 V).
- Via a relay contact a signal can be connected that is activated in 4 selectable comparator stages (40, 50, 75, 100 kHz) when the deviation is exceeded.

Signal strength:
- An analog signal that is proportional to the signal strength (0 ... 5 V) is available for controlling a measuring instrument.
- Via a relay contact a signal can be connected that is activated in 4 selectable comparator stages (30, 100, 300, 1000 µV) when the corresponding signal strength is available.

Audio L + R:
- Both outputs are continually monitored. Modulation interruptions are signalled via a relay contact after several seconds (criterion 12 sec.).

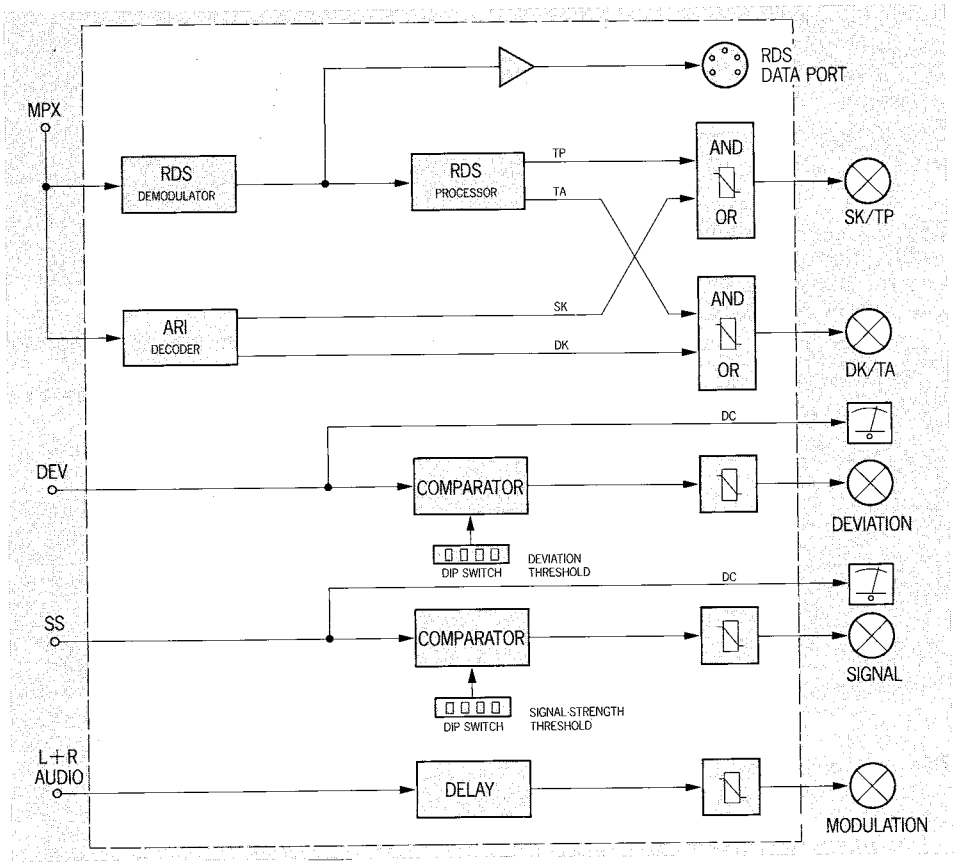


Fig. 6: Simplified block diagram of the multifunction decoder.

Options
An MPX/SCA module (Fig. 7) can be retrofitted as an option. The signal is available on a BNC connector. The amplitude response of the MPX signal is illustrated in Fig. 8 and ensures optimum transmission of programs and traffic announcements. The bandwidth (MPX/SCA) can be selected with a jumper to suit the application. The two filter paths (WIDE/NARROW) are assigned in accordance with the reception conditions (Fig. 9).

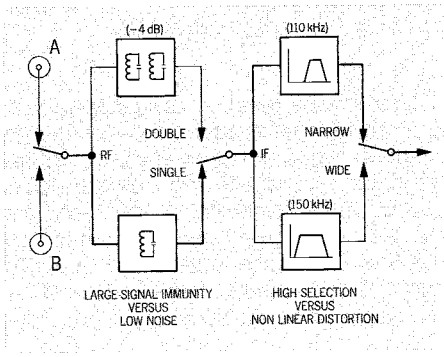


Fig. 9: Software-controlled filter facilities for optimum reception characteristics.

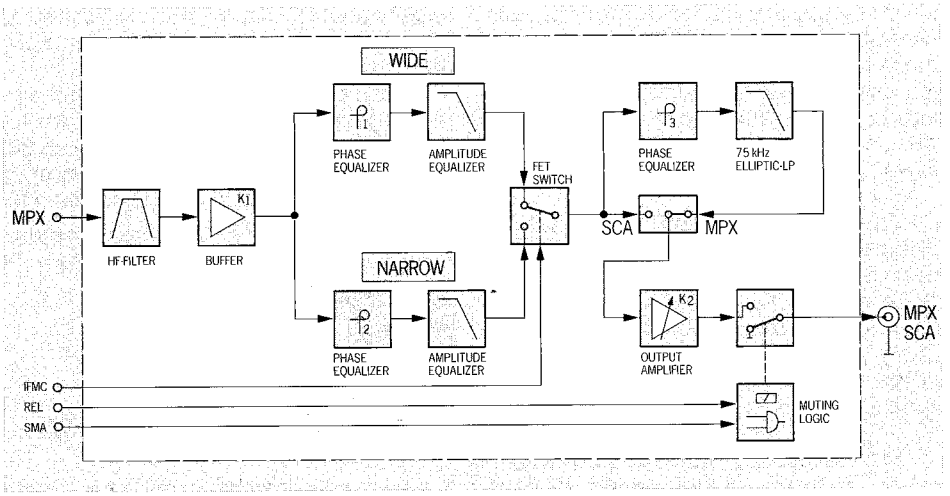


Fig. 7: Block diagram of the MPX/SCA option.

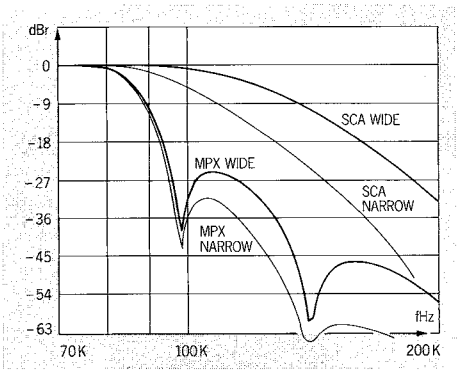


Fig. 8: Frequency range of the MPX and SCA signals for WIDE and NARROW mode.

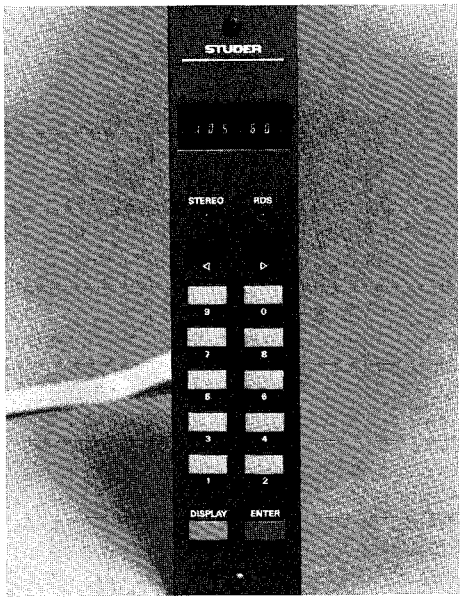


Fig. 10: Serial remote control unit for the Studer A764.

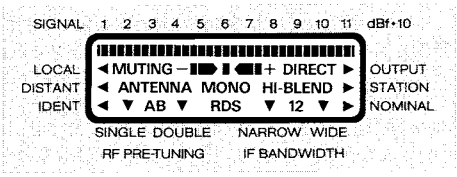
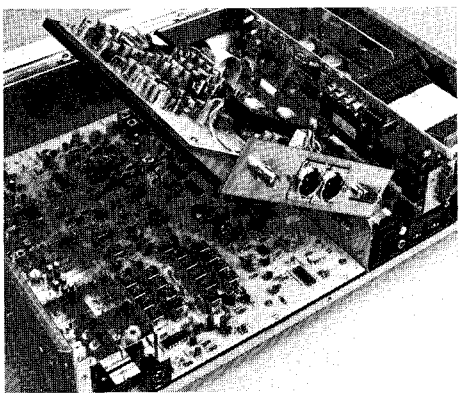


Fig. 11: LC display for indicating the reception parameters.



Remote control mode

The A764 can be remote controlled by means of a serial data format (RS232). The station name, transmitter frequency or station number can be read out by means of the display keys. Pilot LEDs have been provided for «Stereo» and «RDS» information.

Tuner section

The principal elements of the tuner section have already been described in Swiss Sound No. 24, pages 6 and 7 in a report on the new Revox FM tuner (B260).

Operator controls and display

The control panel is divided into two sections, one that is accessible directly and one that is located behind the tinted acrylic glass cover. With corresponding jumper setting, the preset function can only be changed when the acrylic glass cover is opened (safety interlock).

The accessible control section is used for selecting stations via the scan functions or by accessing one of the 60 station memories. With the STATION SCAN function, all stations are searched and tuned sequentially. By contrast, the P(rogram)-TYPE SCAN selects only stations that match the corresponding program group criterion.

The station number, tuning frequency, and the station abbreviation (4 characters) are shown on the fluorescence dot matrix display. In conjunction with RDS reception, the station identification is output on the display (8 characters) by the RDS decoder.

At the same time the RDS LED is activated in a separate field and in parallel also on the remote control module.

When the tinted acrylic glass cover is opened, the required programming functions for the receiver are shown on the LC display (Fig. 11). You can select not only the tuning steps in the 50 or 10 kHz pattern but you can store the complete set of tuning parameters in the memory of the corresponding station number.

The following parameters can be stored:

Antenna A/B:	Signal to be input from antenna A or B
RF mode:	Reception in SINGLE or DOUBLE mode
IF mode:	Reception with WIDE or NARROW filter
Mono:	Mono reception
Blend:	Two blend levels for stereo reception
Muting	
RDS:	Reception of RDS data
Signal:	Alignment of the station reception levels to identical listening levels (unbalanced outputs as well as headphones jack).

Because of its versatility for peripheral functions and its excellent reception characteristics, the A764 is **the** FM tuner for professional monitoring applications. Whether it is permanently tuned to a fixed frequency in simple monitoring applications or used for monitoring several transmitters, the design of the Studer A764 gives you the assurance that this tuner can be ideally adapted to any requirement.

Peter Joss

The Studer Group

«Who's who»

This column is reserved in order to introduce personalities from our companies and representatives in Europe and Overseas.

Marino Ludwig

Product Manager of WILLI STUDER AG, responsible for the entire REVOX range of products; member of the Board since April 1989 • born 1944 in Saint Gall, Switzerland • grew up in Zurich • school graduation in 1964, followed by one year of practical experience in mechanical and high-voltage engineering • 1965 to 1970 studies at the Swiss Federal Institute of Technology (ETH) • received degree in electrical engineering in 1970 • since 1970, development engineer at WILLI STUDER AG • 1975 project manager for development of tape recorder B77, cassette recorder B710/B215 • product manager since 1986 • married, two children (9 and 7).

As a student, Marino Ludwig worked temporarily in the Revox laboratory and test department where he experienced the start of the A76 series – the very first Revox tuner generation. He took up full-time employment in 1970, after which he became development engineer in the field of language laboratories. 1972, in the department for development of consumer products, he was a member of the Revox team which developed the A77 special versions; later he was engaged in the expansion of the Revox product range and control of the A700 series.

In 1975, Marino Ludwig was in charge of project management for the tape recorder B77; four years later the first generation of Revox cassette recorders B710 appeared and subsequently the B215. In addition, he looked after the system remote control program for complete hifi systems; their large scope of applicability increased Marino Ludwig's interest in new fields of operation, such as system control. In 1985 he took over more technical-administrative duties as an assistant of product management, and in 1986 he finally became products manager responsible for the whole Revox product range.

This challenging new task consists of critically verifying all suggestions and proposals concerning the development of new products, and considering their chances as marketconform products. Many years of experience in the development sector have helped to influence such decisions.

For the product manager, communication between development department and marketing organisation is of greatest importance. Exchange of thoughts on technical and marketing matters is essential; during his many years with the company he has a close relationship with subsidiary companies and distributors. Direct discussions with the people concerned are necessary for the feedback of information.

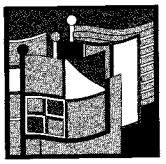
In his spare time, Marino Ludwig engages in computer technics and photography. He loves nature, goes on walking tours to the mountains, seeks out unusual sceneries and likes to work in his garden. He enjoys travelling and being able to share his life with a young family.

Marino Ludwig is no friend of half-heartedness: he believes that "full engagement in work and the enjoyment that comes when all assignments have been mastered successfully increase efficiency and satisfaction. Being involved with modern technology creates a consciousness for the perfection of nature. The realisation of technical projects today is a matter of course and highly satisfying for those taking part in development and experience. However, we should always be aware of the fact that the human being is number one and that technology is only used to serve mankind".

He is further of the opinion that "for the realization of concepts and the development of consumer goods of a quality class Revox offers, many obstacles have to be overcome before doors to new technologies are opened, especially as the Studer Revox reputation requests first-class continuity."

And we shouldn't forget what was so poignantly formulated by the famous French philosopher Descartes: "Common sense is the one property which has been most fairly distributed all over the world; every man is convinced he possesses enough of it, so that even the most greedy person does not yearn for more than he already has".

Marino Ludwig is positive that improving one's mind is more necessary today than ever before in order to grasp the limits set for all of us. Put into simple words: "Life draws the sketches, we only lack the proportions." Renate Ziemann



USSR

Moscwa Symposium

In spite of cold weather and unpleasant travelling conditions more than hundred participants joined the STUDER Symposium in Moscow on November 22 and 23. The interesting subject – digital recording and editing technique – attracted not only listeners from the capital, but also from Leningrad and the Baltic States. An extended discussion showed how eager the Sowjet experts track the latest developments in the field of professional studio technology.

K.O. Bäder

Mauritius Broadcasting Project

Studer have been in negotiation with Mauritius Broadcasting Corporation for some time regarding the renewal and extension of the existing broadcast equipment, and have now received MaBC's project order.

The project, worth over one million Swiss Francs, comprises four complete continuity studios, one master control room and additional equipment for the extension of present studios.

Objectives are equipping and opening of an FM-Stereo-Studio before the end of the year, planned and required by the Ministry of Information. Further equipment will be installed during the first half of 1990.

Rolf Breitschmid

Multi-Purpose OB-Van for Jordan

"International Broadcast Engineer" magazine has in its May issue reported in detail about this specialized vehicle which has been built and equipped at the MVC-Crow Newbury plant, and for which STUDER professional audio products were used in the vehicle's control room. After full tests, the van was delivered in March 1989 following acceptance tests by the customer, Jordan Radio and TV Corporation. It was designed and built under contract at a total cost of £280,000.

The OB-van serves to operate in towns and remote country places accessible by often primitive roads. It serves as a mobile sound-only control room, with the usual technical facilities for radio programme production and editing in locations that cannot be reached by any conventional vehicle. It can also function as a complete mobile radio station, as it is accommodated with its own broadcast transmitter. This facilitates the production and transmission of local radio programmes for remote communities. It can also transmit pre-recorded material produced at the base station.

The van is based on a Mercedes 16-ton, 4-wheel drive chassis, powered by a 220 h.p. turbo-charged Diesel engine and has been designed for road and field operation, suitable for all terrain likely to be found in Jordan. Thermal and acoustic insulation is of highest standard and the ready-made body of specialized manufacture (as produced for refrigerated vehicles).

The Electronic System

Center of action of the unit is its control room. The equipment consists of a 24-channel input, 4 groups and 2 masters output mixing console of the Studer 963 series, full monitoring with high quality loudspeakers, and three Studer A812 audio tape recorders. Provision is made for patching to any desired configuration, operating in either monophonic of stereo mode.

FM-stereo and UHF transmitters are installed for programme link to the base station. A portable UHF/FM relay unit has also been provided for long range operation. A 100W VHF/FM transmitter provides for local broadcast function that handles both mono and stereo signals. An 8 m telescopic mast carries an omnidirectional polarized antenna mounted on the van's rear panel, with a second mast mounted at the front behind the cabin.

This brilliantly thought out broadcast vehicle will undoubtedly be an excellent medium to support the Jordan Radio Corporation in their various outside activities.

Rolf Breitschmid

Sound ideas
CD archive

"Hollywood"

Together with the Sound Ideas company, we are constantly working on the expansion of the software program.

We are now introducing the new CD 4000 series "Hollywood" which was specially designed for film editing. It comprises 5 CDs with more than 2000 digital sound recordings selected for cartoons, horror, science fiction, and action films.

The "Hollywood" archive is available under order number 10.241.111.00.

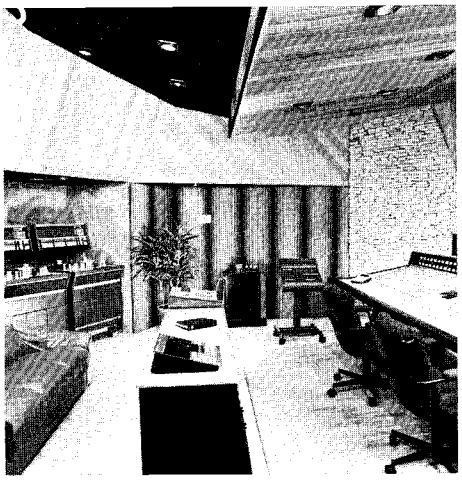
A new general catalogue is also obtainable. In addition to full information on the new "Hollywood" archive, it comprises details on the well-established LHH7910 and LH7920 as well as the "Atmosphere" archive. Order number: 10.241.188.00.

Jan van Nes

Brazil

World Class Studio in South America

Leading South American producer/Engineer, Marco A. Mazzola, has installed a 48-channel mixing console and two Studer A820-24 multichannel tape recorders, with TLS 4000 and Dolby SR, a Studer A812 stereo tape recorder with TC, two Studer A721 cassette tape recorders, and a Studer A730 CD player, in a new studio facility in Rio de Janeiro, Brazil. The facilities of IMPRESSÃO DIGITAL STUDIOS will be available to external clients in addition to being used by Mazzola for his own productions.



Kuno Lischer

Studer Training courses

Service courses for 1990, first half year

Timetable
09.00 h – 16.30 h Mo (first day of course)
08.30 h – 16.30 h Tue – Thu
08.30 h – 16.30 h Fr (last day of course)

05. 02. – 09. 02. 90 in Finnland
970 Mixing Console
Application, operation, features on modules, circuits, alignments, trouble shooting.

12. 02. – 16. 02. 90 Deutsch
A820 Mehrkanal-Tonbandmaschine
Laufwerkfunktionen, Demontage/Montage des Laufwerks, Geräteeinstellung, Schnittstellen, Erklärung der einzelnen Platinen, Fehlerbehebung.

19. 02. – 23. 02. 90 Deutsch
A807 / A810 Tonbandmaschinen
Laufwerkfunktionen, Demontage/Montage des Laufwerks, Geräteeinstellungen, Schnittstellen, Schaltungserklärungen, Fehlerbehebung.

26. 02. – 02. 03. 90 English
A820 / A827 MCH Tape Recorders
Tape deck features, ports, disassembling/assembling and alignment of tape deck, explanation of various circuits, trouble shooting.

26. 02. – 06. 03. 90 English
A827 MCH combined with the above service course **A820 MCH**
Attention: It is essential to have attended the A820 MCH service course.

08. 03. – 09. 03. 90 English
DYAXIS
Application, functions and operation system configuration, explanation of circuits, trouble shooting.

19. 03. – 30. 03. 90 Arabic
A80 / A807 Tape Recorders
Tape deck features, ports, disassembling/assembling and alignment of tape deck, explanation of various circuits, trouble shooting.
960 Mixing Console
Application, operation, features on modules, circuits, alignments, trouble shooting.

26. 03. – 29. 03. 90 in Linz, Deutsch
A807 Mehrkanal-Tonbandmaschine
Laufwerkfunktionen, Demontage/Montage des Laufwerks, Geräteeinstellung, Schnittstellen, Erklärung der einzelnen Platinen, Fehlerbehebung.

02. 04. – 06. 04. 90 Deutsch
A807 Mehrkanal-Tonbandmaschine
Laufwerkfunktionen, Demontage/Montage des Laufwerks, Geräteeinstellung, Schnittstellen, Erklärung der einzelnen Platinen, Fehlerbehebung.

09. 04. – 13. 04. 90 Deutsch
A80 VU / A80 R / A80 QC Tonbandmaschinen
Laufwerkfunktionen, Demontage/Montage des Laufwerks, Geräteeinstellungen, Schnittstellen, Schaltungserklärungen, Fehlerbehebung.

23. 04.– 25. 04. 90 Français
A807 Magnétophone
Fonction du transport de bande, ports, démontage/réassemblage et alignement du transport de bande, explications des circuits, recherche de pannes.

25. 04. – 27. 04. 90 Français
A730 / A727 Lecteurs CD
Généralités et introduction à l'audio numérique schéma bloc, démontage/réassemblage, recherche de pannes.

23. 04. – 27. 04. 90 Deutsch
A820 / A812 Tonbandmaschinen
Laufwerkfunktionen, Demontage/Montage des Laufwerks, Geräteeinstellung, Schnittstellen, Schaltungserklärungen, Fehlerbehebung.
Wichtig: Dieser Kurs ist kombiniert und erfordert die Teilnahme während der ganzen Woche.

02. 05. – 04. 05. 90 English
A807 Tape Recorder
Tape deck features, ports, disassembling/assembling and alignment of tape deck, explanation of various circuits, trouble shooting.

07. 05. – 11. 05. 90 English
A827 / A820 MCH Tape Recorders
Tape deck features, ports, disassembling/assembling and alignment of tape deck, explanation of various circuits, trouble shooting.

07. 05. – 15. 05. 90 English
A820 MCH Tape Recorder
Combined with above service course A827.
Attention: It is essential to have attended the A827 MCH service course.

16. 05. – 18. 05. 90 English
A730 / A727 CD Players
Features, ports, explanation of circuits, transport alignment.

09. 05. – 11. 05. 90 Français
960-963/970 Consoles de mélange
Applications, utilisation et fonctions des modules, description et explication des circuits, mesures et alignement, recherche de pannes.

05. 06. – 07. 06. 90 Français
TLS 4000 Synchroniseur
Fonctions et utilisation applications, explications des circuits, interfaces, recherche de pannes.

07. 06. – 08. 06. 90 Français
SC 4008 Contrôleur
Fonctions et utilisation applications, explications des circuits, interfaces, recherche de pannes.

11. 06. – 15. 06. 90 Français
A820 / A827 MCH Magnétophones multipiste
Fonction du transport de bande, ports, démontage/réassemblage et alignement du transport de bande, explications des circuits, recherche de pannes.
Attention: Il s'agit d'un cours combiné qui exige la présence pendant toute la semaine.

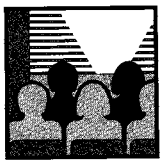
18. 06. – 20. 06. 90 Deutsch
A725 / A727 / A730 CD-Spieler
Anwendung, Schaltungserklärungen, Laufwerkfunktionen, Fehlerbehebung.

21. 06. 90 Deutsch
A721 Kassettengerät
Anwendung, Schaltungserklärungen, Laufwerkfunktionen, Fehlerbehebung.

25. 06. – 29. 06. 90 Deutsch
TLS 4000 / SC 4008 / SC 4016 Synchronisationssysteme
Funktionen und Bedienung, Anwendungen, Schaltungserklärungen.

16. 07. – 24. 08. 90 Arabic
A807 / A812 Tape Recorders
Tape deck features, ports, disassembling/assembling and alignment of tape deck, explanation of various circuits, trouble shooting.
960/900 Mixing consoles
Application, operation, features on modules, circuits, alignments, trouble shooting.

27. 08. – 30. 08. 90 Deutsch
960-963 / 970 Mischpulte
Anwendung, Bedienung der Module, Schaltungserklärungen, Eimessvorgang, Fehlebehebung.



Revox Training courses

Technical Training courses 1990

HiFi I
Tape recorders (B77, PR99 MKIII) – cassette recorder – turntable – mixing console – IR-applications
10. 09. – 14. 09. 90 English
08. 10. – 12. 10. 90 German/French

HiFi II
Active loud speakers – multiroom- and AV-concept – tuner-amplifier – CD player
17. 09. – 21. 09. 90 English
15. 10. – 19. 10. 90 German/French

C270/4/8 Log + TC
Semi-pro reel-to-reel tape recorders incl. accessories
02. 04. – 05. 04. 90 German/English

Language Laboratory
05. 03. – 09. 03. 90 German
19. 03. – 23. 03. 90 English/French

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