STUDER TELEPHONE HYBRID TELEPHONE SYSTEM

TELEPHONE HYBRID
the telephone interview facility for the control room

The limited quality of telephone communication is a problem when the reporter transmits hot news over the telephone either for live broadcasting or recording. The STUDER TELEPHONE HYBRID processes the signals between the telephone line and the studios audio circuits in such a way that maximum transmission quality is achieved. In its design, the following technical requirements had to be taken into consideration:

- Compensation of telephone level fluctuations.
- Attenuation of sidetone signals.
- Correct termination of the telephone line.
- Compliance with the regulations of the telephone company.

EFFECTIVE SIDETONE REDUCTION

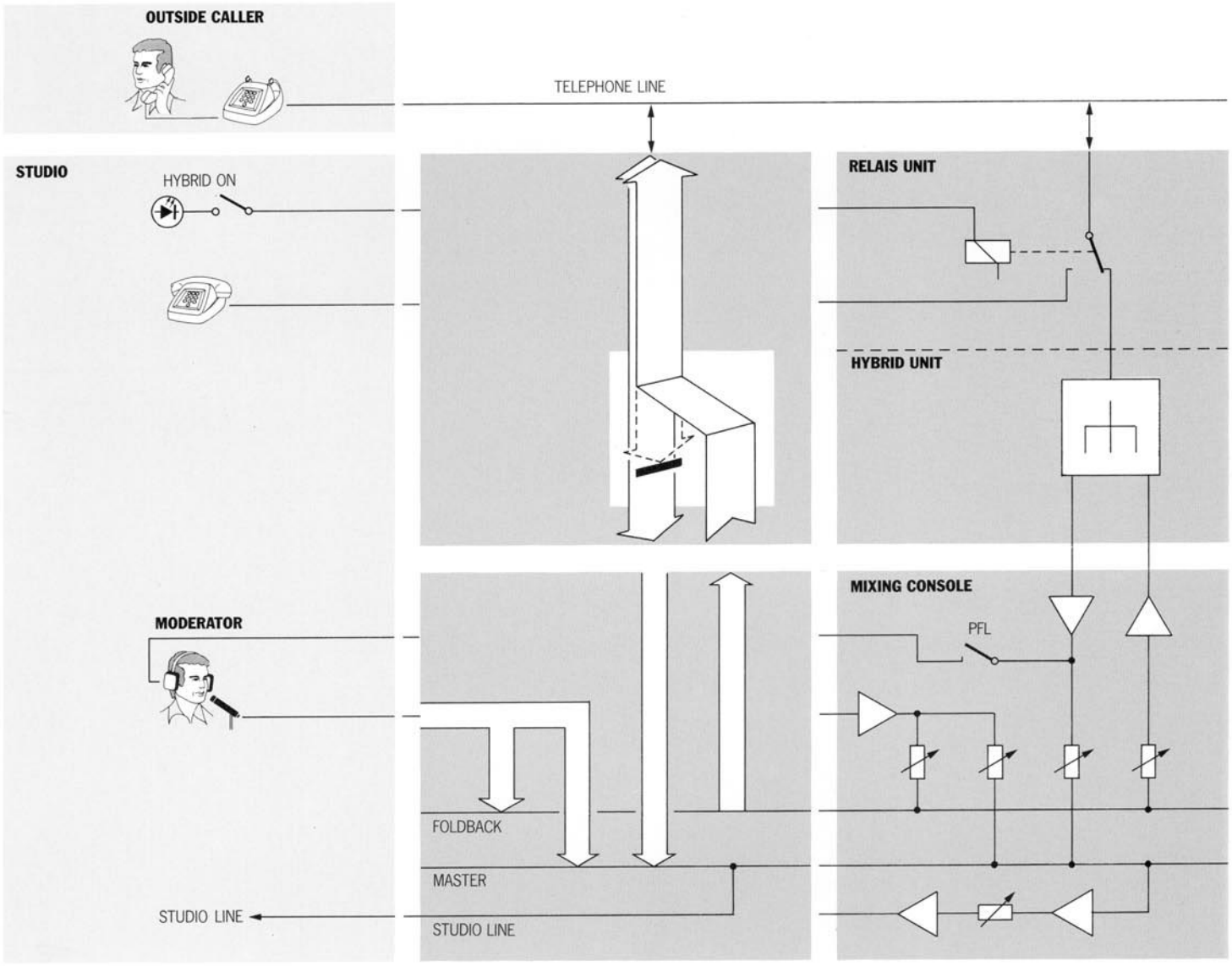
The key element is a hybrid circuit that has been expanded to an automatically adjusting bridge. It splits the bidirectional telephone line into a studio audio line with separate transmit and receive paths.
An electronic feed-back loop ensures dynamic matching to the prevailing line conditions. Line impedances consisting of R and C components are simulated and provide correct line termination. This prevents a loss of quality in the announcer signal from the studio due to superposed sidetone level components from the telephone network.

EASY OF OPERATION

No further operating is required after the TELEPHONE HYBRID has been connected to the AC outlet and to the telephone line.

Typical example:

After the connection to the called party has been established, the announcer transfers the call through the TELEPHONE HYBRID to the mixing console.
The announcer can now conduct a conversation for live broadcasting or recording through the studio microphone. With a corresponding configuration of the TELEPHONE HYBRID in the 19" rack panel unit, it is possible to conduct a telephone conversation simultaneously with two parties.



19" RACK PANEL UNIT

A universal housing designed as a 19" rack panel unit contains the power supply and provides space to accomodate three plug-in Euro-standard circuit boards. One card location is reserved for the DUAL RELAY unit, the other two are available for one or two HYBRID modules. All alignment controls required for putting the unit into service are located behind the removable front panel. The connectors are located on the rear panel:

XLR sockets for the audio input and output signals. Binding posts are provided for connecting the telephone lines. A multicontact socket permits connection of the only operating control, an external selector switch, which may be placed at the mixing console.

DUAL RELAY MODULE

This module is designed for operation with one or two HYBRID modules and is, therefore, equipped with two identical function groups. Each group fulfills three specific functions:

- Switching relay
  For switching the telephone line from the telephone set via the HYBRID modules to the mixing console input. Can be actuated from an external selector switch.
- Holding choke
  It supplies the correct DC resistance for the relay in the exchange (direct line to exchange, no local switch board).
- Compensation of the line impedance
  Two trimmer potentiometers for coarse matching of line impedances with inductive component.

The DUAL RELAY module can also be ordered as a separate item for direct installation in audio production equipment.

HYBRID MODULE

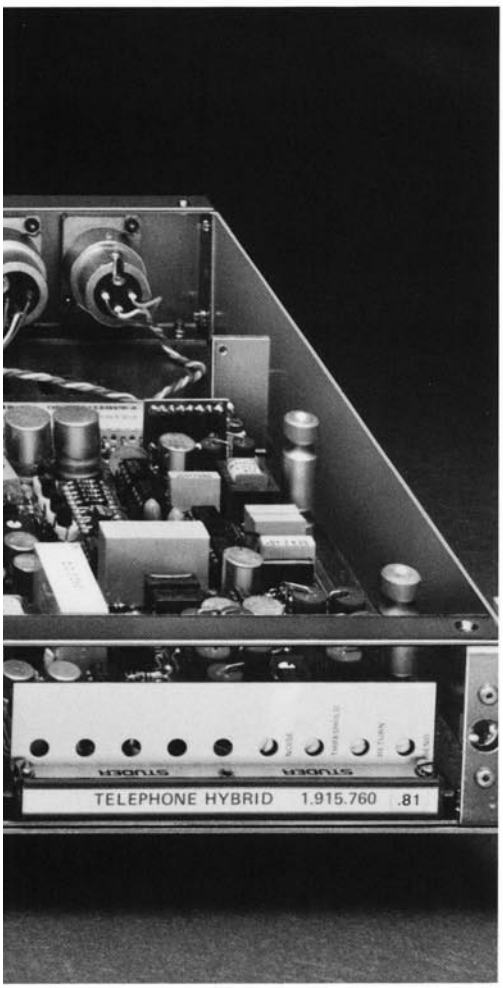
Two locations in the 19" rack panel unit are reserved for either one or two HYBRID modules.

Perfect matching of the studio and telephone lines to the prevailing levels is possible with the trimmer potentiometers accessible from the front. The attack point of the automatic control can be adjusted, if necessary, with an additional trimmer potentiometer.

Automatic matching begins as soon as modulation occurs on the signal lines.

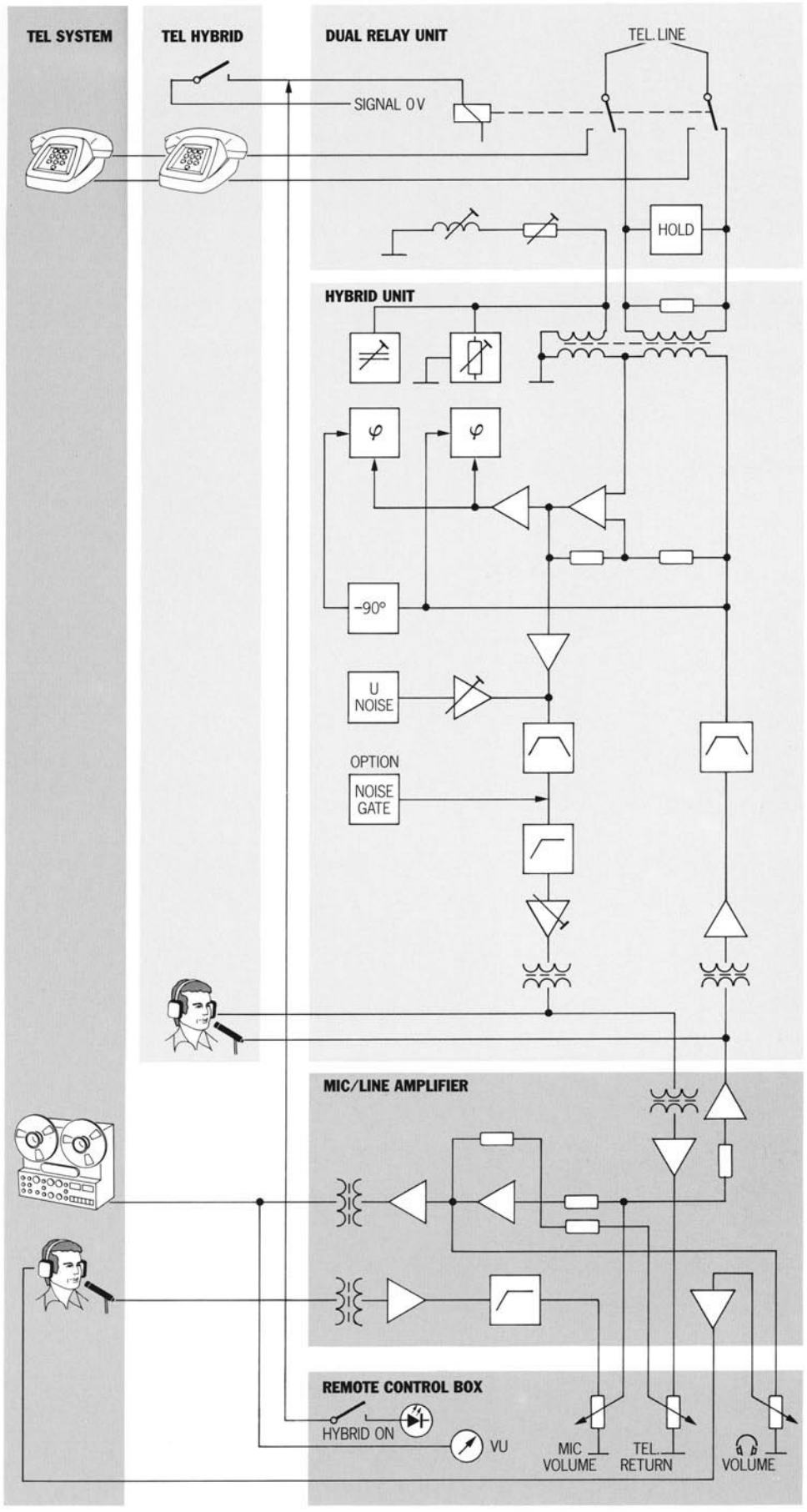
An integrated noise generator masks cross talk that frequently occurs on telephone lines so that it becomes unintelligible, as required by PTT regulations. The SN ratio can be adjusted with a trimmer potentiometer.

The HYBRID module can also be ordered as a separate item for installation in audio production equipment.



TELEPHONE HYBRID WITH NOISE GATE
This special version of the HYBRID module features an additional circuit that suppresses any noise and cross talk in the absence of modulation on the telephone line.

TELEPHONE HYBRID WITH CURRENT ADJUST
This version of the TELEPHONE HYBRID has been expanded with a holding-current preselector and is suited for use in countries, where the prescribed holding current for the exchange relay is set by the subscriber.



TELEPHONE SYSTEM
the autonomous telephone OB unit

The STUDER TELEPHONE SYSTEM is a TELEPHONE HYBRID that has been expanded to an autonomous telephone OB unit. The level of the input signals can be controlled by the reporter, independently of the mixing console in the studio.
The TELEPHONE SYSTEM is equipped with an additional Euro-standard module with integrated microphone/line amplifier and features an external remote control unit.

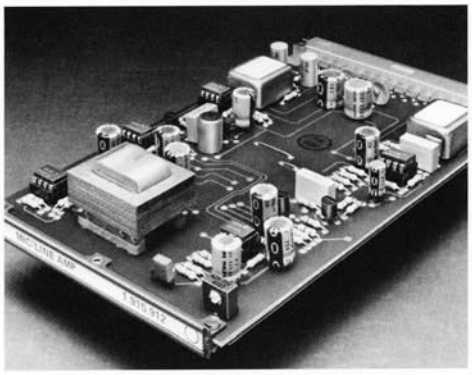
All control and monitoring elements are arranged on the remote control unit:
- Level trimmer potentiometer for microphone and telephone input.
- VU-meter for checking the audio output level.
- Headphone socket with volume control.
- Push button for switching over the telephone line with visual status indication.

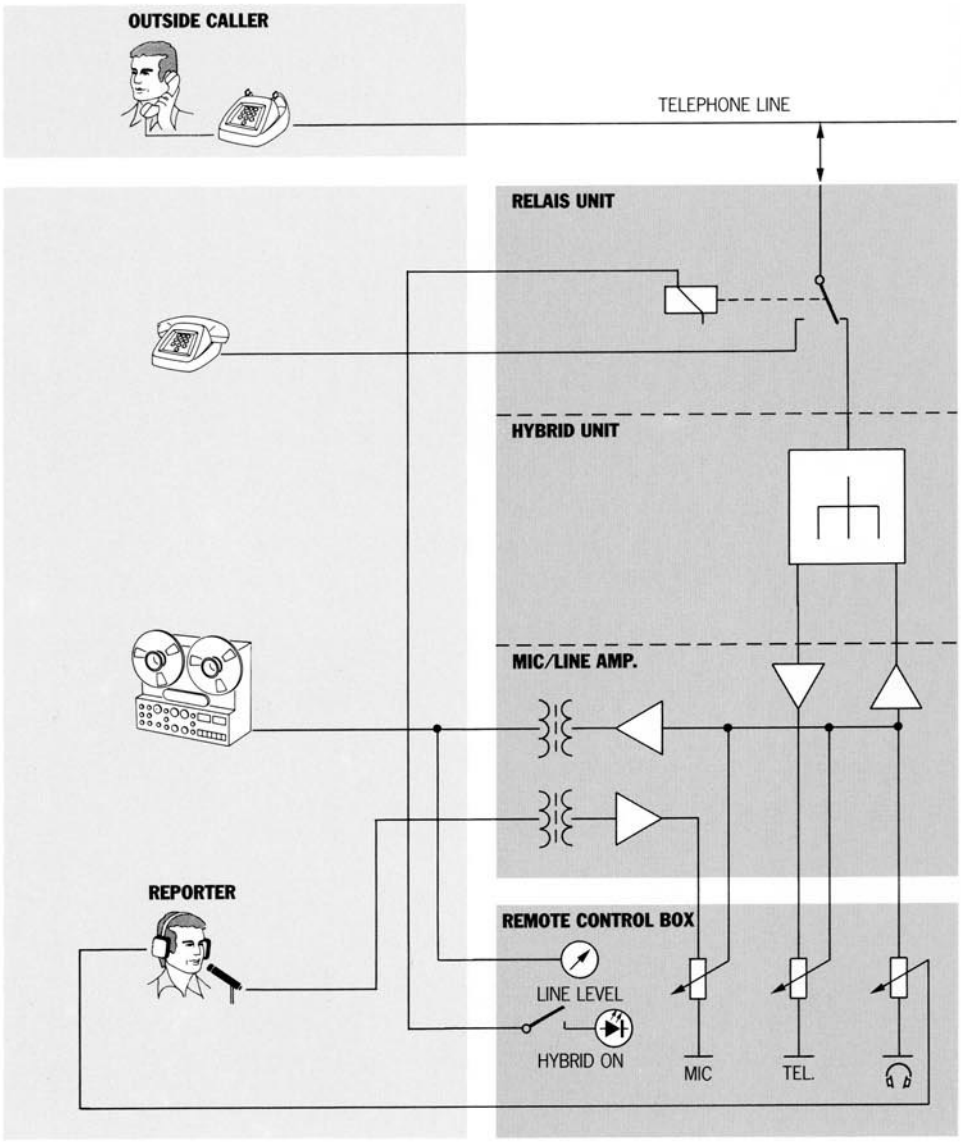
TYPICAL APPLICATION

After the reporter has established telephonic connection with the called party, he switches over to the TELEPHONE SYSTEM and starts the tape recorder.
He can listen through the headphones connected to the remote control unit and speaks into the microphone.
The reporter has access to a level control with which he can mix his own component and the one of the called party to the master.
The output level is indicated by a VU-meter on the remote control unit. The volume for the headphones can be adjusted with a separate volume control.

RACK PANEL UNIT

The same type of 19" rack panel unit with integrated power supply that is used for the TELEPHONE HYBRID also accommodates the control electronics.
A multiconductor cabel connects the remote control unit with the rack panel unit. The balanced and floating microphone input and line output are wired to XLR sockets.





Technical specifications

REQUIREMENTS:	
Levels in dBu are referred to	0.775 V
0 VU ≙ 1 mW at 600 Ohms, measured with voice to ASA C 16.5	
Lead	8 dB
Supply voltage stabilized	±15 V or –22 V
Supply current	33 mA or 28 mA

TRANSMIT CIRCUIT	
Input sensitivity, adjustable	+6 dBu ... +15 dBu
Input impedance	>5 kOhms
Input symmetry	>60 dB
Input balanced and floating	
Bandpass in transmit circuit producing frequency response of a telephone capsule	300 Hz ... 3400 Hz (–3 dB), 12 dB/oct.
Transmit level	–13 VU at 600 Ohms
Total harmonic distorsion	<1%

RECEIVE CIRCUIT	
Input level, nominal	–13 VU at 600 Ohms
Max. input level	+3 VU
Output sensitivity, adjustable	+6 dBu ... +15 dBu
Output balanced and floating	
Output impedance	≦50 Ohms
Load	≧200 Ohms

Frequency response: bandpass	300 Hz ... 3400 Hz (–3 dB), 30 dB/oct.
Built-in noise generator, level adjustable	
Total harmonic distorsion	<1%
Threshold fixed	at approx. +16 dBu
Attack time	approx. 0.5 msec
Release time (IEC 268-8)	approx. 0.5 sec

HYBRID CIRCUIT	
Input/output balanced and floating	
Test voltage	1 kV
DC input/output impedance	1500 Ohms
Balancing range R	200 Ohms ... 2000 Ohms
Balancing range C	0 ... 0.1 µF
Sidetone attenuation-sine wave (dummy load)	>40 dB
Sidetone attenuation-white noise (dummy load)	>30 dB
Sidetone attenuation on an exchange line, depending on quality of line (measured with voice)	approx. 20 dB
Symmetry	>60 dB
Matching is controlled by the voice signal in the transmitted circuit. Threshold adjustable, rang	0 ... –25 dB

MICROPHONE / LINE AMPLIFIER	
HYBRID INPUT	
Nominal level	+6 dBu
Max. input level	+24 dBu
Input impedance	≧10 kOhms
MICROPHONE INPUT	
Nominal level	–60 dBu
TAPE INPUT	
Nominal level	+6 dBu
Max. output level	+22 dBu
Load impedance	≧50 Ohms
HEADPHONES OUTPUT	
Load impedance	≧600 Ohms
Max. output level	+24 dBu
HYBRID OUTPUT	
Nominal level	+6 dBu
Max. level	+22 dBu
Load impedance	≧200 Ohms

We reserve the right to make alterations as technical progress may warrant.

Ordering information

STUDER TELEPHONE HYBRID

Comprising:	Specification	Article No.
● 19" Rack panel unit ... with CURRENT ADJUST	CA	1.918.102.00 1.918.105.00
● Power supply, integrated		1.918.099.81
● DUAL RELAY module		1.915.762.81
● HYBRID module(s) depending on version:		
– STANDARD version	ST	1.915.760.81
– NOISE GATE version	NG	1.915.764.00
– equipped with 1 channel	1CH	
– equipped with 2 channels	2CH	

Versions:		
STUDER TELEPHONE HYBRID	– 1CH-ST	75.700.89118
	– 2CH-ST	75.700.89228
	– 1CH-NG	75.700.89114
	– 2CH-NG	75.700.89224
	– 1CH-ST/CA	75.700.89116
	– 2CH-ST/CA	75.700.89226
	– 1CH-NG/CA	75.700.89117
	– 2CH-NG/CA	75.700.89227

STUDER TELEPHONE SYSTEM

Comprising:	Specification	Article No.
● 19" Rack panel unit ... with CURRENT ADJUST	CA	1.918.106.00 1.918.116.00
● Power supply, integrated		1.918.099.81
● DUAL RELAY module		1.915.762.81
● Microphone/line amplifier		1.915.906.01
● Remote control unit		1.915.766.00
● HYBRID module(s) depending on version:		
– STANDARD version	ST	1.915.760.81
– NOISE GATE version	NG	1.915.764.00
– equipped with 1 channel	1CH	
– equipped with 2 channels	2CH	

Versions:		
STUDER TELEPHONE SYSTEM	– ST	75.700.89111
	– ST/CA	75.700.89112
	– NG	75.700.89113
	– NG/CA	75.700.89115

STUDER REVOX sales offices in:

USA, Nashville, Phone (615) 254-5651
Austria, Vienna, Phone 47 33 09 / 47 34 65
Canada, Toronto, Phone (416) 423-2831
Hong Kong, Phone 5-441-310 / 5-412-050
France, Paris, Phone (1) 45 33 58 58
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Japan, Tokyo, Phone (03) 465-2211
Singapore, Phone 2507222/3

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Worldwide: STUDER International, a division of STUDER REVOX AG, Switzerland
CH-8105 Regensdorf, Althardstr. 10 · Phone +41 1 870 75 11 · Fax +41 1 840 47 37