Production Analyzer

Rev. 1.2-1.6 (USB + FireWire)

Rev. 2.x (USB only)

H4

Analyzer Hardware for the Klippel QC Software Framework

FEATURES

- Two channel speaker monitoring
- Voltage and current Sensors
- Two channel Microphone Input
- Built in IEPE Mic power supply
- Symmetrical Line Output
- PC-controlled operation
- Digital General Purpose I/O port
- Automatic firmware update
- 19 inch / 2 RU case

The *Production Analyzer* is the sensor and data acquisition platform for the Klippel QC software. It comprises of a dedicated sensor front-end for speaker measurement as well as a professional AD/DA converter. The *Production Analyzer* is equipped with built-in current and voltage sensors, provides microphone power supply (IEPE), symmetrical in- and outputs and digital I/O. This hardware allows performing highly flexible tests on electro-acoustical transducers and audio systems. It is a two-channel system, which allows testing two devices in parallel or alternating (two lines) for time critical applications such as end-of-line testing.

NOTE: The Production Analyzer is discontinued, but fully supported by the *QC Software* framework. From QC version 6, the modular *KLIPPEL Analyzer 3* is the common hardware platform for the complete *KLIPPEL Analyzer System*. It is recommended to purchase *Production Analyzer* only for consistency reasons with existing test stations. See specification *H3 – KA3* for more information.

The support of Production Analyzer FireWire version is discontinued from KLIPPEL QC Version 7.

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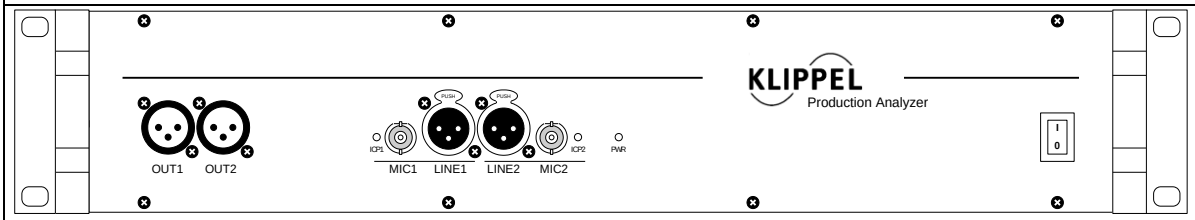
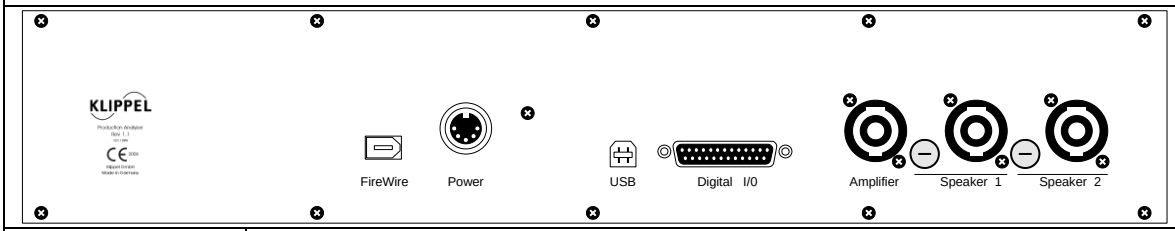
Connections





FireWire	Audio data bus from PC to Production Analyzer. Only required for PA version 1.x *The support of Production Analyzer FireWire version is discontinued from KLIPPEL QC Version 7.*
Mic 1, 2	Microphone input with internal IEPE compliant microphone power supply.
OUT 1,2	The XLR output connectors provide a symmetric analog output signal at pin 2 and 3 and ground at pin 1. If asymmetric output is required use pin 2 and pin 1. You must short pin 3 to ground (pin 1).
Power	Input from external DC Power Supply. Use Klippel power supply only.
USB	USB control bus for routing, speaker on/off, digital I/O. **Note**: For PA version 2.x (USB only) a Klippel certified USB cable must be used to ensure proper operation (e.g. KLOTZ USB-AB1).
Digital I/O	Digital inputs and outputs may be used to control external equipment such as industrial components, footswitches, buzzers etc.
Amplifier	The SPEAKON® input connector is to be connected with a 2-channel output signal of the power amplifier. The signals supplied to pins 1- and 1+ will be provided to the Speaker 1. The signal at the pins 2- and 2+ provide the signal to the Speaker 2.
Speaker 1, 2	The SPEAKON® output connector is to be connected to the terminals of the loudspeaker under test by using pins 1+ and 1- of the loudspeaker cable. The pins 2- and 2+ of the connector are used to sense the voltage at the loudspeaker terminals (Kelvin configuration).
Fuse 1, 2	Next to the connectors Speaker 1/2 connectors fuses are installed to protect the test object and the measurement hardware from excessive currents. According to the hardware version of the Production Analyzer (sensitivity and the current capability) different fuse types are installed. Please refer to the table below for more information.

Electrical Characteristics

Sampling Rates	f_{sample}	48 / 96 / 192	kHz
Upper Frequency Limit	f_{max}	20 / 40 / 80	kHz

Analog Line Inputs

Parameter	Symbol	Min	Typ.	Max	Unit
Input Voltage swing (peak)	$U_{In,\ sw}$	-10		10	V
Input Voltage (peak to peak, balanced)	U_{In}			40	V
Input Impedance	R_{In}		10		kΩ
Frequency Response 20 Hz to 20 kHz			±0.1		dB
Frequency Response 20 Hz to 40 kHz			±0.1		dB
THD @ 1 kHz (1V in,G=0 dB)	THD_{In}		90		dB
THDN @ 1 kHz (1V in,G=0 dB, BW 24 kHz)	$THDN_{In}$		85		dB
SNR (G=0 dB, 0 dB FS, BW: 24 kHz)	SNR_{In}		95		dB
Input Crosstalk attenuation (1 kHz)			90		dB
Common Mode Rejection Ratio (1 kHz)	$CMRR_{in}$		85		dB

Microphone (IEPE) Input

Constant current source	I_{IEPE}		3		mA
Input voltage swing (peak), 10dB gain input	$U_{IEPE,}$	-3.5		3.5	V
Input voltage swing (peak) High Level Version*	$U_{IEPE,}$	-25*		25*	V
Input voltage swing (peak), 0dB gain input*	$U_{IEPE,}$	-10*		10*	V
Input frequency range (+0 / -0.3dB)	f_{IEPE}	12		40k	Hz
THD @ 1 kHz (Gain 0dB, 1V)	THD_{IEPE}		90		dB
THDN @ 1 kHz (Gain 0dB, 1V, BW : 20kHz)	$THDN_{IEPE}$		85		dB
SNR (G=0dB, -6 dB FS., BW : 20 kHz)	SNR_{IEPE}		95		dB
Input crosstalk attenuation (1 kHz)			80		dB

* special option

Analog Line Outputs

Output Voltage swing (peak)	$U_{out,\ sw}$	-4		4	V
Output Voltage swing (peak)	$U_{out,\ sw}$	-10*		10*	V
Output Impedance	R_{out}		50		Ω
Frequency Response 20 Hz to 20 kHz			-0.6 / +0.1		dB
Frequency Response 20 Hz to 40 kHz			-1 / +0.1		dB
THD @ 1 kHz (1V in,G=0 dB)	THD_{out}		90		dB
THDN @ 1 kHz (1V in,G=0 dB, BW 24 kHz)	$THDN_{out}$		85		dB
SNR (G=0 dB, -6 dB FS, BW: 24 kHz)	SNR_{out}		100		dB
Output Crosstalk attenuation (1 kHz)			90		dB
Minimal Load Impedance	$R_{L,min}$	600			Ω
Output Current	$I_{out,max}$			16	mA

* special option

Speaker 1 and Speaker 2					
Parameter	Symbol	Min	Typ.	Max	Unit
Voltage, accuracy (1 kHz)			±0.1	±0.5	%
Voltage, peak	U_{peak}			200	V
Frequency response (-0.3dB)	f	12		40k	Hz
THD (10V, 1kHz)	THD_U	85			dB
THDN (10V / BW: 24 kHz)	$THDN_U$	75			dB
Current accuracy (1kHz)			±0.05	±0.3	%
Default (15A):					
Recommended for Re	R_e	<1	4	16	Ω
Frequency response (-0.3 dB)	f_l		20		KHz
THD (2A / 1kHz)	THD_l	60	65		dB
THDN (2A, 1kHz, BW: 24 kHz)	$THDN_l$	60			dB
SNR @ 1 kHz (10A / BW: 24 kHz)	SNR_l		75		dB
Current, peak (short term)	I_{peak}	40	50		A
Current, rms 10s max. (sine) (fused with 15A)	$I_{rms,10s}$		20		A
Current, rms (continuous)	I_{rms}		15		A
Fuse 15A (Manufacturer: Littelfuse)	*Type:* 313.015 = default (slow-blo®), 312.015 = alternative (fast acting)				
Fuse package size: 3AG	∅ x *l*		6.3 x 32		mm
Fuse cold resistance	R_{Fuse}	5.0 (default), 5.2 (alternative)			mΩ
Resistance primary (current sensor)	R_p		<0.5		mΩ
High Sensitivity (1A, Special version for e.g. micro speaker):					
Recommended for Re	R_e	8		100	Ω
Frequency response (-0.3 dB)	f_l		20		KHz
THD (1A / 1kHz)	THD_l	70			dB
THDN (0.1A, 1kHz, BW: 24 kHz)	$THDN_l$	60			dB
SNR @ 1 kHz (0.1A / BW: 24 kHz)	SNR_l		75		dB
Current, peak (fused with 1A)	I_{peak}		2		A
Current, rms (continuous)	I_{rms}		1		A
Fuse 1A (Manufacturer: Littelfuse)	*Type:* 312.001 = default (fast acting), 313.001 = alternative (slow-blo®)				
Fuse package size: 3AG	∅ x l		6.3 x 32		mm
Fuse cold resistance	R_{Fuse}	190 (default), 375 (alternative)			mΩ
Resistance primary (current sensor)	R_p		1		Ω
Very High Sensitivity (0.1A, Special version for e.g. headphone driver):					
Recommended for Re	R_e	100		2000	Ω
Frequency response (-0.3 dB) (-1 dB)	f_l		20 80		KHz
THD (0.1A / 1kHz)	THD_l	70			dB
THDN (0.1A, 1kHz, BW: 24 kHz)	$THDN_l$	60			dB
SNR @ 1 kHz (0.1A / BW: 24 kHz)	SNR_l		75		dB
Current, peak (fused with 0.5A)	I_{peak}		1		A
Current, rms (continuous)	I_{rms}		0.5		A
Fuse 0.5A (Manufacturer: Littelfuse)	*Type:* 312.500 = default (fast acting), 313.500 = alternative (slow-blo®)				
Fuse package size: 3AG	∅ x l		6.3 x 32		mm
Fuse cold resistance	R_{Fuse}	498 (default), 1260 (alternative)			mΩ
Resistance primary (current sensor)	R_p		10		Ω

Digital I/O					
Parameter	Pin	Min	Typ.	Max	Unit
TTL I/O (galv. coupled):					
High Level Input Voltage	*Pin 7,19*	3	3.3	3.6	V
Low Level Input Voltage	*Pin 7,19*	0		0.9	V
High Level Output Voltage	*Pin 2-5, 15-18*	4.4		5	V
Low Level Output Voltage	*Pin 2-5, 15-18*	0		0.33	V
Output Current	*Pin 2-5, 15-18*	0		+/- 8	mA
Opto I/O (galv. decoupled):					
Isolation Voltage (AC,1min., H≤60%)		5000			V_{rms}
Isolation Resistance		$5*10^{10}$	10^{14}		Ω
High Level Input Voltage	*Pin 8,10,21,22*	5		24	V[1)]
Low Level Input Voltage	*Pin 8,10,21,22*	0		1	V[1)]
Input Resistance	*Pin 8,10,21,22*		1.8		kΩ
High Level Output Voltage	*Pin 11,13,24,25*		Open collector		
Low Level Output Voltage	*Pin 11,13,24,25*			1	V[1)]
Output Current, low level	*Pin 11,13,24,25*	1		10	mA[1)]
Output Resistance, low level	*Pin 8,10,21,22*		470		Ω
Output Resistance, high level	*Pin 8,10,21,22*	100			kΩ
External Supply Voltage	*Pin 14*	4.75		5	V
External Supply Current	*Pin 14*			50	mA
Switching time (on / off)				1	ms

1) External Supply required, use appropriate ground pin (for connection examples, see QC manual / Hardware):
Input Pin 8,21: use Ground Pin 20 *Output Pin 13,25: use Ground Pin 12*
Input Pin 10,22: use Ground Pin 9 *Output Pin 11,24: use Ground Pin 23*

Recommended Operating Conditions

Parameter	Symbol	Min	Typ.	Max	Unit
Power Supply Voltage	U_{AC}	100		240	V
Power Supply Frequency	f_{AC}	47		63	Hz
Operating Ambient Temperature	T_A	0	25	45	°C
Relative Humidity	*RH*		40	90[1)]	%
Input Power	*P*		8	10	W

1) non-condensing conditions

Primary power supply connection with protective earth conductor is required!
Power supply connection with removed earth contact could cause high voltages at the enclosure of the device.

General Specifications

Dimensions	19 inch / 2 rack units
Weight	5 kg
EMC	IEC 61326:1997 + A1:1998 + A2:2000 (EN 61326:1997 + A1:1998 + A2:2001)
Safety	IEC 61010-1:2001 (EN 61010-1:2001)

Find explanations for symbols at http://www.klippel.de/know-how/literature.html

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