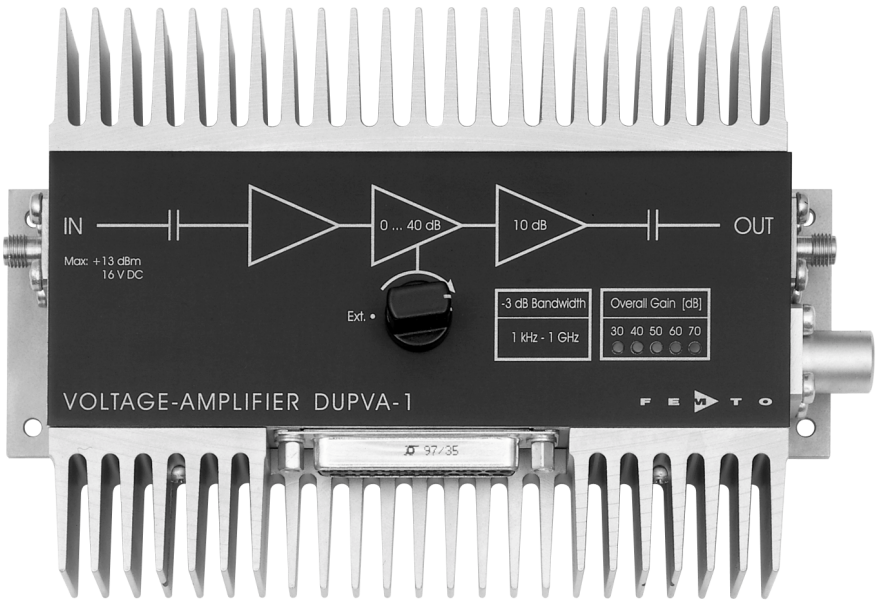
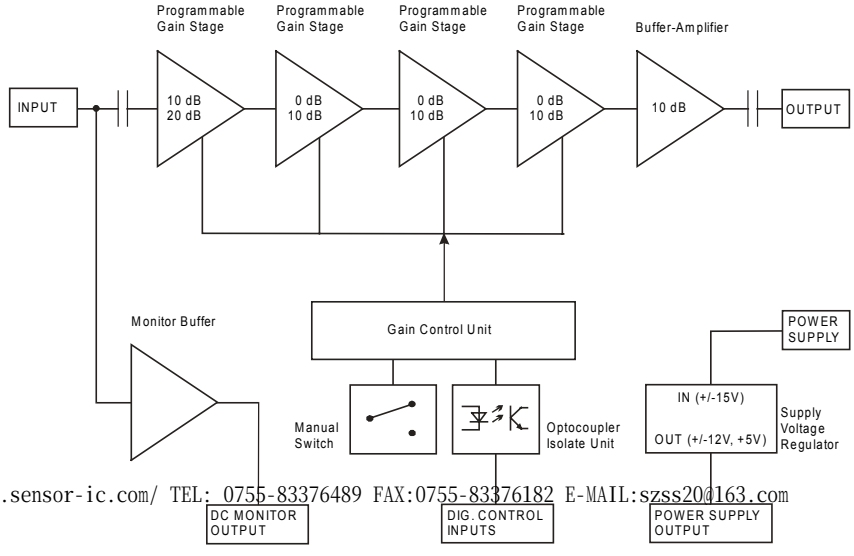
Electro Optical Components, Inc.
5460 Skylane Boulevard, Santa Rosa, CA 95403
Toll Free: 855-EOC-6300
www.eoc-inc.com | info@eoc-inc.com

Datasheet DUPVA-1-60

Variable-Gain Ultra-Wideband Voltage Amplifier



Features	• **Variable Gain 20 to 60 dB, switchable in 10 dB Steps** • **Bandwidth 1 kHz ... 1.2 GHz** • **Bandwidth, Frequency- and Pulse Response independent of Gain Setting** • **Local and Remote Control** • **DC Monitor Output**
Applications	• **Oscilloscope and Transient-Recorder Preamplifier** • **Photomultiplier and Microchannel-Plate Amplifier** • **Signal-Booster for Optical Receivers and Current Amplifiers** • **Time-Resolved Pulse and Transient Measurements** • **Automated Measurement Systems**
Block Diagram	

Variable-Gain Ultra-Wideband Voltage Amplifier

Specifications	*Test Conditions*	*Vs = ±15 V, Ta = 25°C, System Impedance = 50 Ω*	
Gain	Gain Values	20, 30, 40, 50, 60 dB	
	Gain Accuracy	± 0.1 dB	(between Settings)
		± 1 dB	(Overall)
	Gain Flatness	± 0.15 dB	
Frequency Response	Lower Cut-Off Frequency	1 kHz	
	Upper Cut-Off Frequency	1.2 GHz	
	Upper Cut-Off Frequency Rolloff	40 dB/Oct.	
Time Response	Rise / Fall Time (10% - 90%)	380 ps	
	Group Delay	2.2 ns	
Input	Input Impedance AC	50 Ω	
	Input Impedance DC	100 kΩ	
	Input VSWR (@ 20 dB Gain)	1.12 : 1	(f < 1 GHz)
		1.7 : 1	(f < 2 GHz)
	Input VSWR (@ 30 – 60 dB Gain)	1.2 : 1	(f < 1 GHz)
		1.75 : 1	(f < 2 GHz)
	50 Ω Noise Figure	3.0 dB	(@ 60 dB Gain)
		3.5 dB	(@ 30 – 50 dB Gain)
	Equivalent Input Voltage Noise	450 pV/√Hz	(@ 60 dB Gain)
		500 pV/√Hz	(@ 30 – 50 dB Gain)
	1/f-Noise Corner	40 kHz	
Output	Output Impedance	50 Ω	
	Output Power P_{1dB}	13 dBm	(@ 100 MHz)
		10 dBm	(@ 500 MHz)
	Output Peak-Peak Voltage for linear Amplification	2 V	(@ 100 MHz)
		1.7 V	(@ 500 MHz)
	Output VSWR	1.77 : 1	(f < 1 GHz)
		2.0 : 1	(f < 2 GHz)
	Third Order Intercept Point IP_3	21 dBm	
	Reverse Isolation	80 dB	
	Dynamic Range (w/o Average)	70 dB	(P_{1dB} – Min. Detectable Signal)
Monitor Output	Monitor Output Gain	1	
	Monitor Output Voltage Range	± 10 V	
	Monitor Output Current	± 25 mA	
	Monitor Output Bandwidth	DC ... 100 kHz	
Digital Control	Control Input Voltage Range	Low: - 0.8 ...+ 0.8 V	
		High: + 1.8 ... + 12 V	
Power Supply	Supply Voltage	± 15 V	
	Supply Current	+ 350 / -100 mA	
	Stabilized Power Supply Output	± 12 V / max. 100 mA, + 5V / max. 50 mA	
Case	Weight	510 gr. (1.2 lbs)	
	Material	AlMg4.5Mn, nickel-plated	
Temperature Range	Storage Temperature	-40 ... +100 °C	
	Operating Temperature	0 ... +60 °C	

Variable-Gain Ultra-Wideband Voltage Amplifier

Absolute Maximum Ratings

Signal Input Power	+ 13 dBm (f > 1 kHz)
Signal Input DC Voltage	± 16 V
Signal Output Reverse Power	+ 20 dBm
Signal Output Reverse DC Voltage	+ 20 V / - 12 V
Control Input Voltage	+ 16 V / - 5 V
Power Supply Voltage	± 17 V

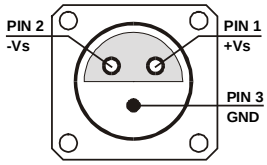
Connectors

Input SMA

Output SMA

Power Supply LEMO Series 1S, 3-pin fixed Socket

Pin 1: + 15V
Pin 2: - 15V
Pin 3: GND



Control Port Sub-D 25-pin, female, Qual. Class 2

Pin 1: +12V (Stabilized Power Supply Output)
Pin 2: -12V (Stabilized Power Supply Output)
Pin 3: AGND (Analog Ground)
Pin 4: +5V (Stabilized Power Supply Output)
Pin 5: Monitor Output
Pin 6 - 8: NC
Pin 9: DGND (Ground f. Digital Control Pin 10 - 25)
Pin 10 - 13: NC
Pin 14: Digital Control Input: Gain, LSB
Pin 15: Digital Control Input: Gain
Pin 16: Digital Control Input: Gain, MSB
Pin 17 - 25: NC

Remote Control Operation

General Remote Control Input Bits are opto-isolated and connected by logical OR to local switch setting. For remote control of the gain setting, set the local switch to “Ext.” and select the wanted gain setting via a 3-bit-code at the corresponding digital inputs:

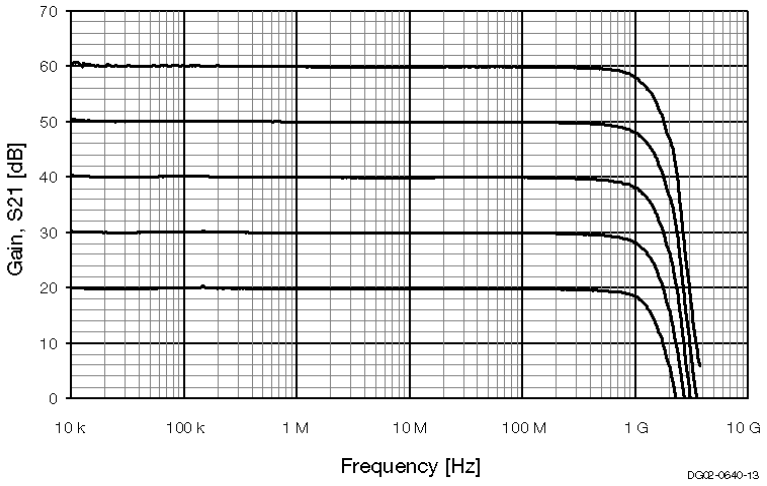
Gain Setting - Corresponding Inputs

Gain	Pin 14	Pin 15	Pin 16
20 dB	Low	Low	Low
30 dB	High	Low	Low
40 dB	Low	High	Low
50 dB	High	High	Low
60 dB	Low	Low	High

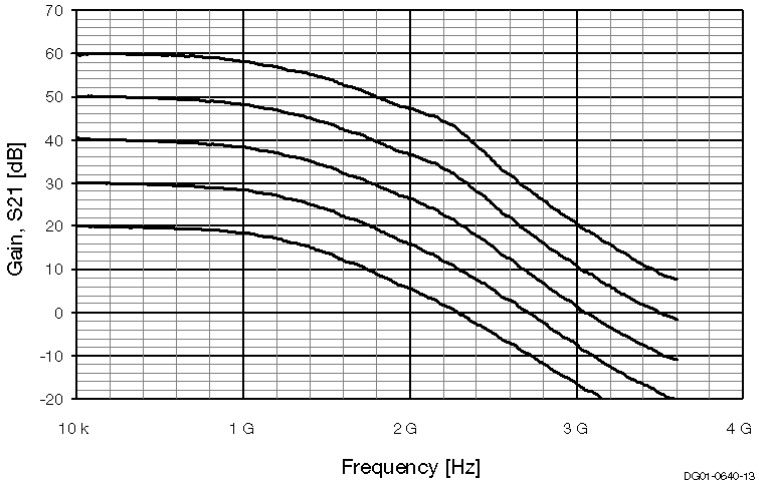
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance Characteristics

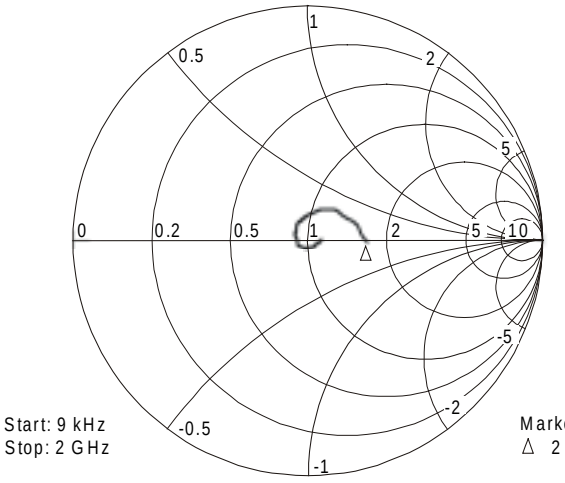
Frequency Response (Logarithmic)



Frequency Response (Linear)



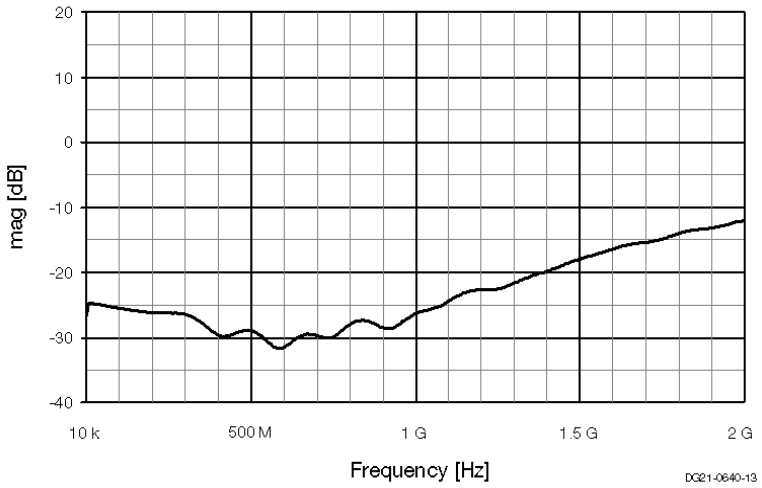
Input Reflection, S11



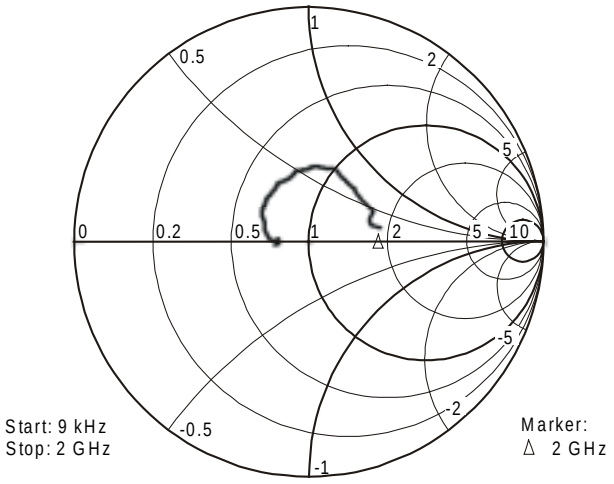
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance Characteristics

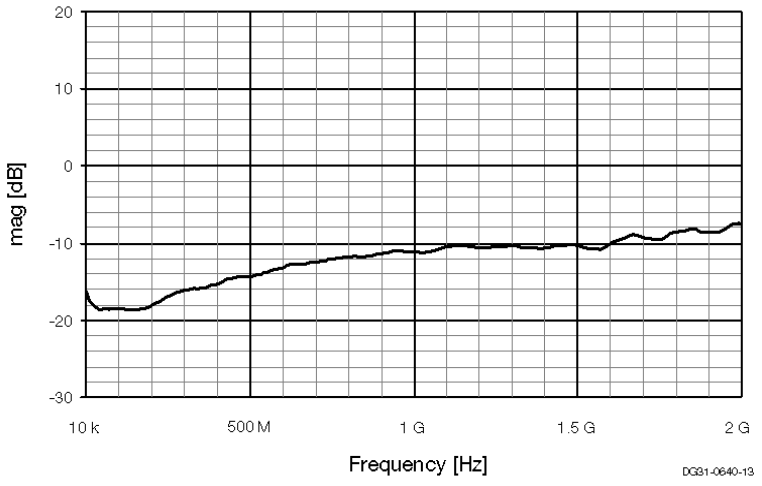
Input Return Loss, S11 (Linear Magnitude)



Output Reflection, S22



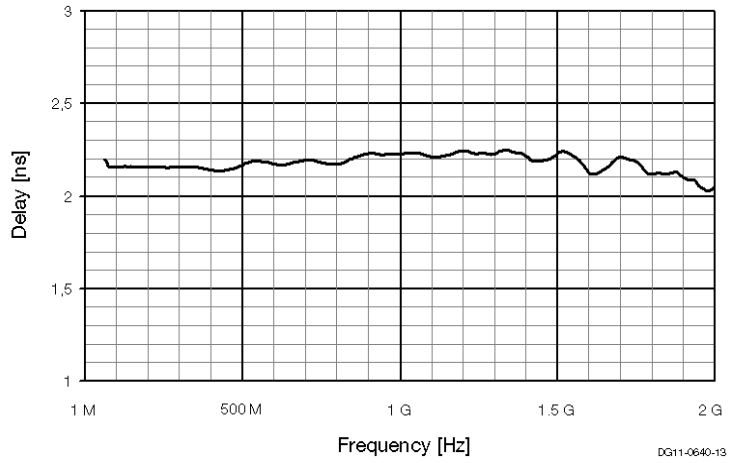
Output Return Loss, S22 (Linear Magnitude)



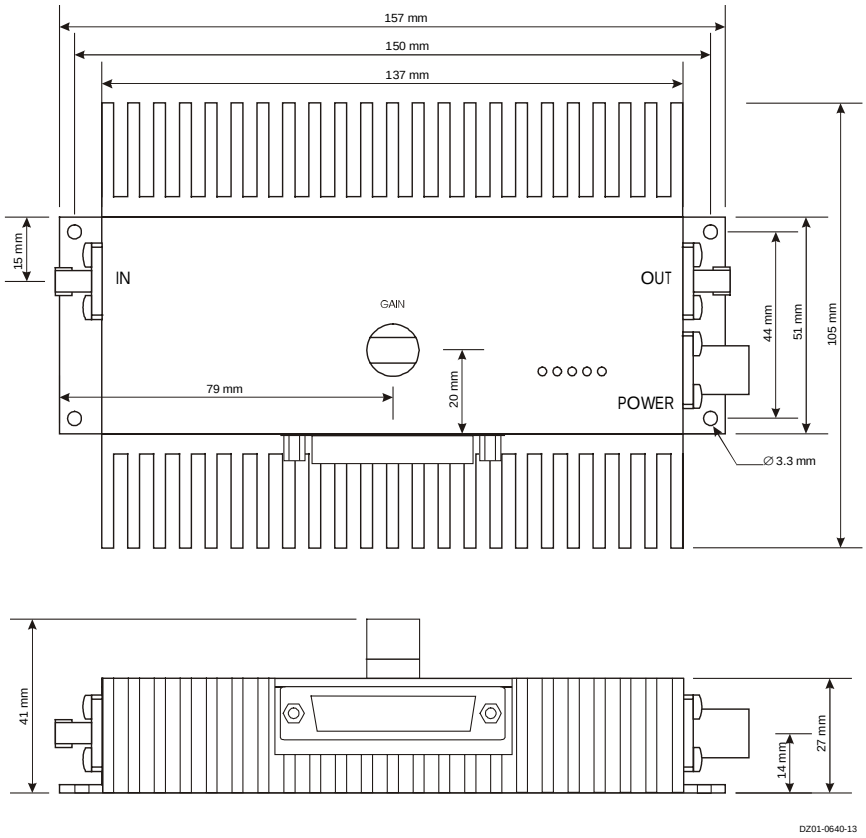
Variable-Gain Ultra-Wideband Voltage Amplifier

Typical Performance Characteristics

Group Delay



Dimensions



Accessories

BNC-Adapterset	Model No.: ADAP-SMA-BNC-1 - Set of 2 SMA to BNC Adapters

FEMTO Messtechnik GmbH
Paul-Lincke-Ufer 34
D-10999 Berlin · Germany
Tel.: +49 (0)30 – 4 46 93 86
Fax: +49 (0)30 – 4 46 93 88
e-mail: info@femto.de
http://www.femto.de

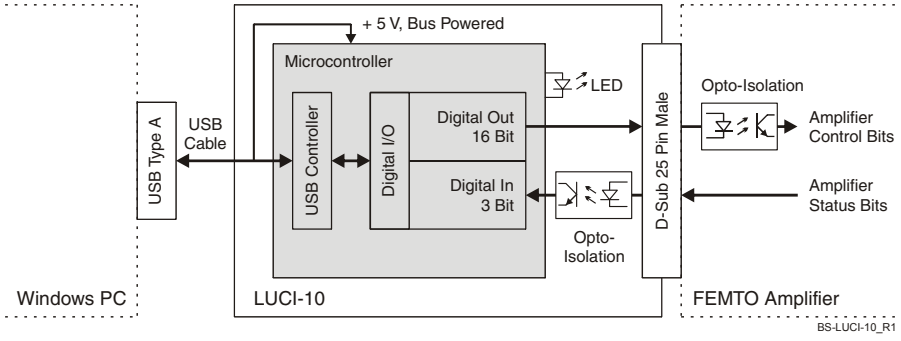
Electro Optical Components, Inc.
5460 Skylane Boulevard, Santa Rosa, CA 95403
Toll Free: 855-EOC-6300
www.eoc-inc.com | info@eoc-inc.com

Datasheet LUCI-10

USB to D-Sub Control Interface for FEMTO Amplifiers

Features	• **Compact Digital I/O Interface for USB Remote Control of FEMTO Amplifiers** • **Supports Opto-Isolation of Amplifier Signal Path from PC USB Port** • **16 Digital Outputs, 3 Opto-Isolated Digital Inputs** • **Bus-Powered Operation** • **System Driver, Application Software and VI's for use with LabVIEW™ Included**
Applications	• **Remote Control of FEMTO® Amplifiers and Photoreceivers Directly from a PC**

Block Diagram



Hardware Specifications

General Characteristics	Bus Interface	USB 2.0 (full-speed)
	Digital I/O Channels	16 output lines 3 opto-isolated input lines
	Supply	PC USB port, + 5 V, typ. 100 mA, bus-powered (no auxiliary power supply required)
	Connectors	USB type A D-Sub, 25 pin, male
	Cable	AWG 28, length 1.8 m
Output	Number of Channels	16 output lines, supporting opto-isolation inside FEMTO amplifiers and photoreceivers
	Output Voltage Range	LOW bit: 0 … + 0.5 V (@ 0 … 2 mA output current) HIGH bit: + 4 … + 5.5 V (@ 0 … 2 mA output current)
	Max. Current	6 mA per channel
	Writing Rate	max. 800 operations per second

USB to D-Sub Control Interface for FEMTO Amplifiers

Input	Number of Channels	3 opto-isolated input lines
	Input Voltage Range	LOW bit: - 20 … + 1.5 V HIGH bit: + 3 … + 20 V
	Switching Current	1 mA typ. @ 5 V
	Reading Rate	max. 400 operations per second
Power Supply	USB Port, Bus Powered	+ 4.5 … + 5.5 V DC
	Active Current	max. 200 mA / typ. 100 mA
	Suspend Current	< 0.5 mA (standby mode of Windows®)
Case	D-Sub Case	metal hood (EMI/RFI shielding), with jack screws
	Weight	130 g (0.3 lb.)
	Material	zinc die-cast, nickel plated
Temperature Range	Storage Temperature	- 40 … + 100 °C
	Operating Temperature	0 … + 50 °C
Absolute Maximum Ratings	Max. Voltage at Input	+/- 30 V
	Max. Short Circuit Output Current	+/- 20 mA per channel, 200 mA total
	Max. Isolation Voltage	+/- 60 V (Input Ground to Output Ground)
Connectors	Device Port	D-Sub, 25 pin, male Pin 1: NC Pin 2: NC Pin 3: GND (IN) Pin 4: NC Pin 5: Digital IN Pin 6: Digital IN Pin 7: Digital IN Pin 8: NC Pin 9: GND (OUT) Pin 10: Digital OUT Low Byte, LSB Pin 11: Digital OUT Low Byte Pin 12: Digital OUT Low Byte Pin 13: Digital OUT Low Byte Pin 14: Digital OUT Low Byte Pin 15: Digital OUT Low Byte Pin 16: Digital OUT Low Byte Pin 17: Digital OUT Low Byte, MSB Pin 18: Digital OUT High Byte, LSB Pin 19: Digital OUT High Byte Pin 20: Digital OUT High Byte Pin 21: Digital OUT High Byte Pin 22: Digital OUT High Byte Pin 23: Digital OUT High Byte Pin 24: Digital OUT High Byte Pin 25: Digital OUT High Byte, MSB
	PC Port	USB type A

USB to D-Sub Control Interface for FEMTO Amplifiers

Software Specifications

Software (included on CD)

Device Driver	dynamic link library (DLL) for integration in Microsoft Windows® operating system for use with C/C++, LabWindows™ /CVI™ or LabVIEW™
Application Software	GUI (graphical user interface) programs for simple remote control of FEMTO amplifiers and photoreceivers provided as executable programs and LabVIEW projects
LabVIEW Programs	sample programs to control and test the LUCI-10 hardware (including front panel and block diagram)
LabVIEW Library	special VI toolkit for integration in LabVIEW development environment

Note: A National Instruments LabVIEW™ license is not included in this software package. For use of the GUI application programs the LabVIEW Run-Time Engine is required. If not detected on the host PC during the installation process the LabVIEW Run-Time Engine will be installed automatically from the CD.

System Requirements

Operating System	Microsoft Windows XP with Service Pack 2, or higher
Processor	Intel Pentium III or AMD Athlon, or better
System Memory	512 MB of RAM, or more
Hard Disk Space	about 200 MB
Interface Port	USB 1.1 or USB 2.0
Supported FEMTO Modules	any standard FEMTO amplifier or photoreceiver with 25 pin D-Sub socket, except model HLVA-100

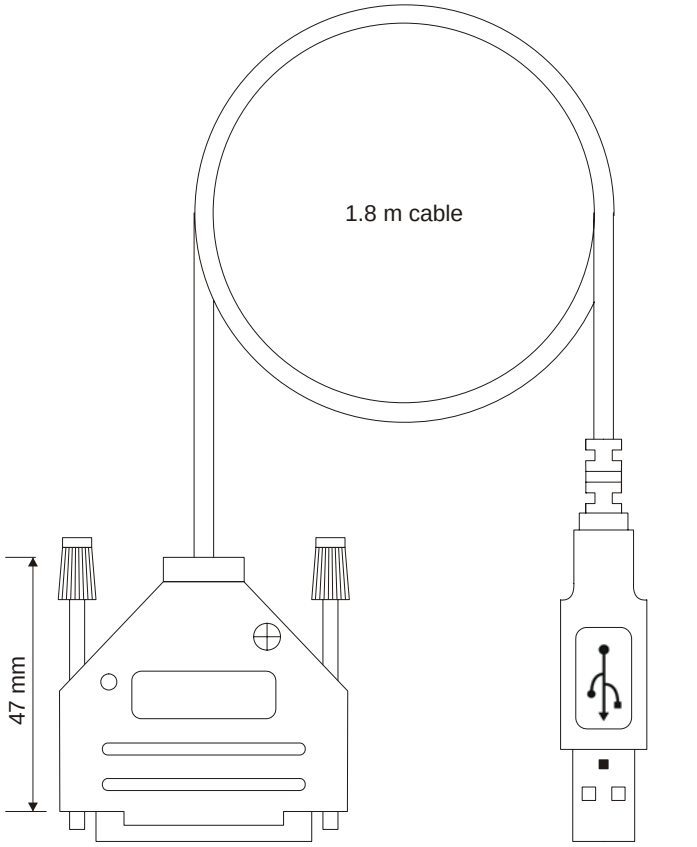
Optional Requirements

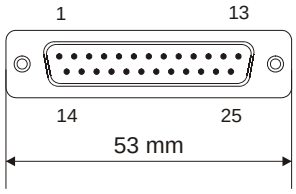
For development of own application programs an additional development environment like LabVIEW Version 8 (or higher) or C/C++ is required.

Legal Notice

USB to D-Sub Control Interface for FEMTO Amplifiers

Dimensions





DZ-LUCI-10_R1

FEMTO Messtechnik GmbH
Paul-Lincke-Ufer 34
D-10999 Berlin · Germany
Tel.: +49 (0)30 – 4 46 93 86
Fax: +49 (0)30 – 4 46 93 88
e-mail: info@femto.de
http://www.femto.de