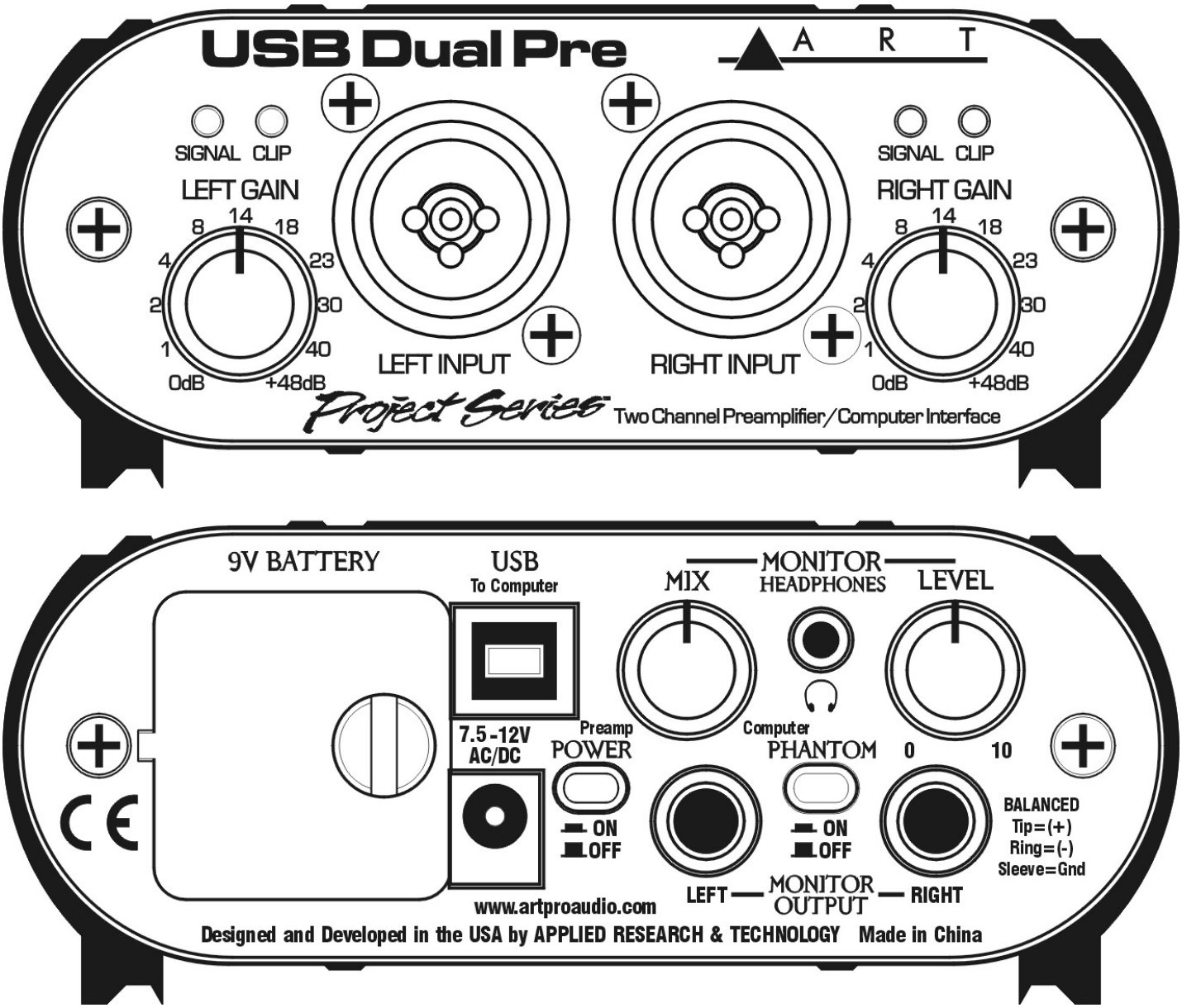
USB Dual Pre

Project Series™



User's Manual

A R T

APPLIED RESEARCH AND TECHNOLOGY

IMPORTANT SAFETY INSTRUCTION – READ FIRST

This symbol, whenever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure-voltage that may be sufficient to constitute a risk of shock.

This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

Read instructions:
Retain these safety and operating instructions for future reference. Heed all warnings printed here and on the equipment. Follow the operating instructions printed in this user manual.

Do not open:
There are no user serviceable parts inside. Refer any service work to qualified technical personnel only.

Power sources:
Connect the units power supply to mains power only of the type described in this user manual or marked on the power supply.

Power supply:
Use the power supply with sealed mains plug appropriate for your local mains supply as provided with the equipment. If the provided supply does not fit into your outlet consult your service agent. Route the power cord so that it is not likely to be walked on, stretched or pinched by items placed upon or against it.

Grounding:
Do not defeat the grounding and polarization means of the power supply.

Moisture:
To reduce the risk of fire or electrical shock do not expose the unit to moisture or use in damp or wet conditions. Do not place container of liquid on unit.

Heat:
Do not locate the unit close to excessive heat or direct sunlight, as this could cause a fire hazard. Locate the unit away from any equipment, which produces heat such as: power supplies, power amplifiers and heaters.

Environment:
Protect from excessive dirt, dust, heat, and vibration when operating and storing. Avoid tobacco ash, drink spillage and smoke, especially that associated with smoke machines.

Handling:
Protect the controls from damage during transit. Use adequate padding if you need to ship the unit. To avoid injury to yourself or damage to the equipment, take care when lifting, moving, or carrying the unit.

Servicing:
Unplug power immediately if equipment is exposed to moisture, the power supply becomes damaged during a lightning storm or if smoke odor or noise is noted. Refer servicing to qualified technical personnel only.

Installation:
Install the unit in accordance with the instructions printed in the user manual.

INTRODUCTION:

The **USB Dual Pre** is a full-featured high quality dual portable preamplifier and computer interface packed into a compact rugged case. It is designed to work over a wide variety of applications from remote field recording to desktop/studio tracking. Each of the two low noise input channels has up to 48 dB of clean gain with signal present and clip LED indicators. Inputs can be either XLR balanced or 1/4-inch TRS. Each of the 1/4-inch TRS outputs is buffered low impedance balanced.

The **USB Dual Pre** can be externally powered from the mains via a wide range of external power adapters, or from an internal 9 Volt battery, or from the USB bus itself, or any combination of these power sources. When running off of the battery alone, you should get in excess of 50 hours of operation when phantom power is off. Battery life drops to around 20 hours (depending on microphone) when phantom powering from the battery alone (still enough time to get through a session).

The built-in low noise +48 Volt phantom power supply allows you to power up to 2 microphones as well as the preamplifier when running from any power sources including the USB bus.

For monitoring, an 1/8-inch TRS mini headphone jack with level and monitor mix controls on the rear allow for latency free local monitoring of the inputs while recording as well as playback monitoring of the USB bus. The monitor mix is also routed to the ¼-inch TRS balanced outputs. This lets you use the 1/4-inch outputs as either a preamplifier out or as the monitor feed to your powered monitors.

The USB interface is fully compliant with the USB 1.1 specification and uses USB adaptive mode for playback and USB asynchronous mode for record. It will work with the USB audio device drivers built into Windows 98SE/ME/2000/XP/Vista 32bit and Apple OS9.1/OSX computers with native USB support. No special drivers are needed.

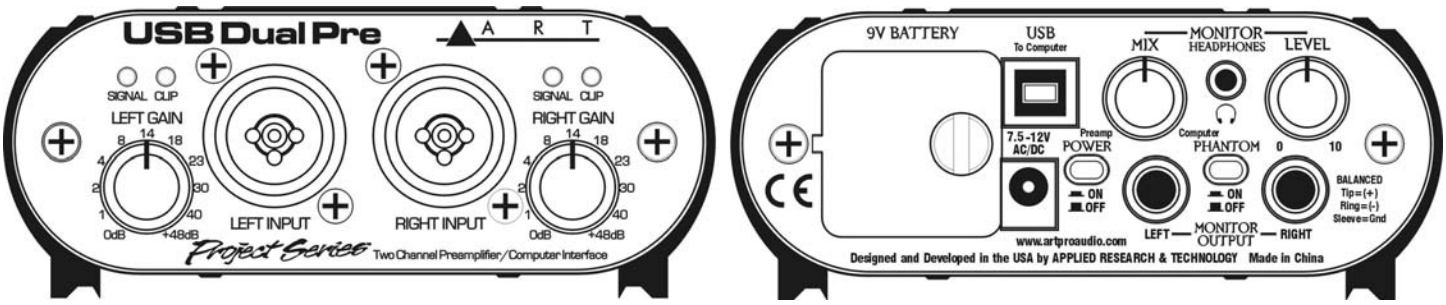
The compact black anodized all aluminum case with rubber sides makes for a rugged design. The **USB Dual Pre** will provide years of trouble free service and its high quality audio channels and versatile powering options make the **USB Dual Pre** the obvious choice in a wide variety of applications from Podcasting/Broadcasting to Tracking and Monitoring.

With the **USB Dual Pre**, your laptop, and a pair of quality microphones you can do some serious remote recording.

Key Features Include:

- USB Connectivity to Desktop and Laptop Computers
- Low Noise Fully Balanced XLR and 1/4-inch TRS “Combo” Inputs
- Up to 48 dB of Clean Gain
- Built-in Low Noise +48 Volt Phantom Power Supply
- Latency Free Monitoring Mix and Level Controls
- Independent Channel Gain Controls
- 1/4-inch TRS Balanced Monitor and 1/8-inch Headphone Monitor Outputs
- Includes Recording & Production Software
- Compact, Stackable all Aluminum Chassis
- Flexible 3-way Power from USB, External Supply, or 9 Volt Battery

CONNECTIONS:



Left and **Right** "Combo" jacks on the front allow for either XLR or 1/4-inch TRS input connections.

The **XLR Input** connections are used primarily for balanced microphone input. Pin 2 is positive, pin 3 is negative, and pin 1 is ground. +48 Volt phantom power (when enabled) is supplied to pins 2 and 3 and pin 1 acts the ground return. Do not lift pin 1 when using phantom power. If you are using the XLR Inputs with a balanced low line level signal or a microphone that does not require phantom power, make sure that phantom power is turned off. Maximum gain from the balanced XLR Inputs to the balanced 1/4-inch TRS Monitor Outputs is 48 dB. These inputs can handle microphone signals up to +6dBu before clipping.

The **1/4-inch Input** connections are used for instrument or low line level balanced or unbalanced signals. The high fixed input impedance works well with guitar and other passive instrument pickups. You can use an unbalanced or balanced plug with this connection. Maximum gain from the 1/4-inch input to the balanced 1/4-inch TRS Monitor Output is 48 dB with a balanced source and 42 dB with an unbalanced source. When the Gain control is at minimum, this input can handle signals up to +6dBu.

The **1/4-inch Monitor Output** jacks are active balanced with the Tip positive, Ring negative, and Sleeve ground. With an output impedance of 600 Ohms and a maximum output level of +10dBu it can provide clean balanced signals for long cable runs. Normally you would use this output to go directly into a power amplifier, powered monitors, recording system, or a mixer's balanced line or insert inputs. Though we do not recommend it, if you have to go directly into the balanced microphone input on a mixer make sure that phantom power is off at the mixer. The mixers input pad and level controls should be set for minimum gain, and the Monitor Level control on the **USB Dual Pre** should be set at a low enough level to prevent overdriving the mixers input section.

The **1/8-inch Headphone Monitor Output** jack is stereo unbalanced TRS and has an output impedance of 50 Ohms. It can accommodate a wide variety of headphone models. Maximum output level is +4dBu.

The **power connector** on the rear allows for external AC powering. The **USB Dual Pre** can operate from any external power source that provides 7.5 Volts to 12 Volts, AC or DC @ 150mA or more. Battery and USB bus powering are also possible when AC power is not available.

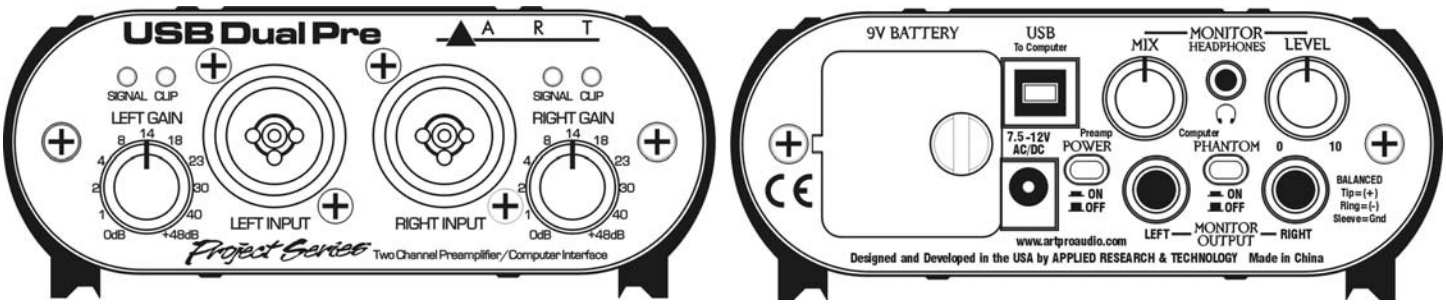
The **USB connector** is USB 1.1 compliant and should be used to connect directly to one of the USB connections on your computer. This connection also powers the USB circuitry inside the **USB Dual Pre** and will power the whole product if no other power source is available or active. To your computer this connection looks like a “USB Audio CODEC” and your computer then controls the sample rate.

Since the USB connection will be carrying high quality digital audio to and from your computer as well as bus powering the USB interface, we suggest that you use a high quality shielded USB cable for best performance. Ideally you should connect directly to one of the USB inputs on your computer. Connecting through a shared hub can reduce power and bandwidth that is available for each USB device and should be avoided when possible. Though the **USB Dual Pre** is compatible with USB 1.1 and 2.0 interfaces, USB 2.0 is preferred for the cabling and computer connection as it allows for more system bandwidth. If you must use a hub, it should be a powered USB 2.0 compliant hub for best results, This is especially important if you plan on using multiple units for more channels of simultaneous digital audio input.

Both analog output jacks and the USB Out can be used at the same time, which is handy when you want to run to a mixer and instrument amp in a live situation, or when connecting to a computer or recording system and locally monitoring your source with headphones.

For a typical recording application where you want to add tracks of audio using the USB bus to your computer, while monitoring the mix externally for low latency, we suggest the following: Connect your instrument and/or microphone to the **USB Dual Pre** inputs, then connect to your computer with a USB cable. Use the 1/4-inch monitor output jacks to feed your powered monitors or analog monitor system and/or use the 1/8-inch jack for local headphone monitoring. Then use the Monitor Mix control to locally adjust between the new tracks and the computer playback signal. The new track that you are recording will be in real time and have no latency in your monitoring system.

CONTROLS and OPERATION:



The **Left Gain** and **Right Gain** Controls directly adjust the input amplifiers giving you control over the dynamic range of your source. You get from 0 to 48dB of gain depending on settings. Set the controls counterclockwise to minimum gain when connecting the inputs.

The **Monitor Mix** control allows you to directly blend between the internal preamplifier signals and the playback signals from your computer. When recording new tracks only or just using the **USB Dual Pre** as a microphone or instrument preamplifier set the Mix control to “Preamp”. When using the **USB Dual Pre** for USB to audio output monitoring of your computers playback signal, you would set the Mix control to “Computer”. When set in the middle you get a blend of the direct preamp signal and signals coming from your computer.

Some recording programs and computer systems provide what is called a “Play-Through” function. This can be performed through software or hardware. When Play-Through is set to ON, the computer will output the audio that is being recorded. There is a short delay, or latency with this audio signal. There is also a potential for the computer’s audio inputs and outputs to be connected together thereby forming a feedback loop. This can accidentally create very loud and disturbing sounds. Therefore “Play-Through” is usually set to OFF as the “default” setting in both software and hardware.

If Software/Hardware Play-Through is set to ON and the Monitor Mix is set in the middle, then you will most likely hear the original preamp signal together with the computer audio signal slightly delayed, thereby creating an echo effect. This is normal behavior, so while using various Monitor Mix settings it may be preferable to leave Play-Through set to OFF.

The **Monitor Level** control adjusts overall monitor level after the mix circuitry and before the monitor output amplifiers. This control affects the signal levels at both the 1/8-inch headphone and 1/4-inch balanced monitor output jacks.

The **Phantom** power switch, on the rear, applies +48 Volt phantom power to the XLR input jacks for powering microphones, if needed. It is slow at turning on and off and is current limited to protect sensitive microphones and reduce audible pops. It is not lit, even when on, to maximize battery life. Ideally, when connecting a microphone that requires phantom power, you should first turn down gain, next connect the microphone, next switch on the phantom power, and finally bring the gain back up to the desired level. This minimizes pops in your system and stress on the microphone.

The **Power** switch, on the rear, is used to turn on power from the battery or external power supply. Turning this switch off disables these two power sources but if the USB bus is still active then the **USB Dual Pre** will be powered by the USB bus alone and the red power LED will still light to indicate that USB power from your computer is still on. When the switch is in the on position and all three power sources are available, the USB interface will be powered by the USB bus but the preamp and phantom power sections will draw their power from the external AC power source or from the battery if an external source is not available. Normally in a desktop, studio, or home recording setting the power modes would not be an issue. When used in a portable or remote recording situation the **USB Dual Pre**, a laptop computer, a pair of microphones, and a set of headphones, become your entire system. In this setting you can either power everything from your laptop or if you have a 9 Volt battery installed and the Power switch is on, power to the preamp and phantom powering sections will come from the battery and the laptop will only be powering the USB interface. This helps to maximize your remote recording time.

LED metering circuitry on each channel aids in setting gain and has a fast attack to help indicate any clipping. The metering is located in the signal chain just after the preamp circuitry to help in setting signal levels going to your computer. The Monitor controls come after the metering so that you can use the meters to set the overall input gain on each channel for best recording dynamic range and then trim the Monitor Mix and Level to the monitor system you are driving. The red “Clip” LED comes on just before clipping (2dB before digital clipping and 6 dB before analog clipping) and should light on musical peaks only. The green “Signal” LED comes on around 10dB before the “Clip” LED and indicates how far below clipping your signal is. The “Signal” LED has a longer release time and should be on much of the time during performance and if not it indicates that your signal or input gain may be too low for best results.

A brief note from customer service:

Once in a while a customer will call and say: I think my ART preamp is "noisy". What's wrong?

If you experience unwanted "noise" in your system when you use a stand-alone preamp, please consider what your signal is and where you're sending it. Some people send the signal from their preamp to a mic input (they figure, "well, I'm using a mic!") on the board or recorder. This is in fact incorrect and could create higher overall noise. ART preamps are actually intended to output a nice fat LINE LEVEL signal. If you send that line level signal to a recorder or mixer's Mic input, that circuit will usually add more gain to the signal. Gain on top of gain will indeed result in noise. Please treat the output signal as line level and you'll be pleasantly surprised at your new clean and warm sound.

The same rule applies for guitar and bass players that use ART preamps as their front end. Send the signal from your preamp to a low gain input on your amp, or even a "loop return" jack which allows you to bypass the amp's solid state preamp altogether.

USB OPERATION:

Connect your analog jacks and external power supply first. If you are using one of the analog outputs for local low latency monitoring, connect that to your monitor system or headphones. Next, set the front panel controls for proper operation as per the previous sections. Then connect the USB cable to the appropriate input on your computer and lastly to the USB connector on the **USB Dual Pre**.

Once the USB connection is made and your computer is on, the USB interface circuitry will be powered by your computer over the USB bus and the unit will automatically connect and try to set your computer "Default Audio Device" to be "USB Audio CODEC". Usually the computer will do this automatically whenever a USB device is first connected, but it is sometimes necessary to make the selection manually. The same settings may need to be made in your particular audio application as well (Check your application instructions). These settings should be made while the two units are connected and powered on. Select one of the following sound recording (input) settings:

WINDOWS 98SE: *Settings => Control Panel => Multimedia*
Choose the preferred device: "USB Audio Device"

WINDOWS XP: *Settings => Control Panel => Sounds and Audio Devices => Audio.*
Choose the mixer device: "USB Audio CODEC"
or *Programs =>Accessories =>Entertainment =>Volume Control=> Options=> Properties*
Choose the mixer device: "USB Audio CODEC".

WINDOWS VIsta: *Settings => Control Panel => Sound => Playback Tab and Record Tab.*
Choose: "USB Audio CODEC"

Mac OS9.1+: *Control Panels => Sound.*
Choose: "USB Audio CODEC"

Mac OS10+: *System Preferences => Sound.*
Choose: "USB Audio CODEC"

Your computer audio output "Speaker" is now set to be the "USB Audio CODEC" and playback audio is routed to the **USB Dual Pre**. This must be done while the **USB Dual Pre** is connected to the computer and powered on. After the above settings are made, your computer will automatically reconfigure itself back to these settings every time the **USB Dual Pre** is reconnected to the computer.

At this point your recording software will select and control which channels are being recorded and which channels are being monitored. There are many computer recording software packages available today that allow for multi-track recording. If you are using multiple units and connecting more than one over the USB bus, they will appear as "USB Audio CODEC 1", "USB Audio CODEC 2", etc. in your recording application. Please refer to your recording software documentation for the best way to assign channels and set recording and monitoring parameters.

Latency, the time delay between your audio input and the USB output to your computer, is very short (under 2 milliseconds) in the **USB Dual Pre**. The latency of your recording software and computer software drivers can be much more than this. Typically on a Mac the core audio interface has low latency so this is usually not an issue. USB audio drivers that come with Windows can have enough latency to cause a discrete delay when monitoring live. If this becomes an issue there are low latency ASIO drivers available that can greatly reduce your Windows audio latency. Two current resources for low latency ASIO drivers that will work with the **USB Dual Pre** are: **www.asio4all.com** and **www.usb-audio.com**

APPLICATIONS:

Microphone Pre Amplifier:

The **USB Dual Pre** can be used as a high quality microphone preamplifier suitable for all dynamic, condenser, and ribbon microphones. Most conventional mixers utilize budget minded microphone preamps and while very functional, they do not sound all that great. The **USB Dual Pre** serves as a quality upgrade that will give you more flexibility and a more robust tone than standard mixer preamps.

Simply plug a microphone into the XLR input. Apply phantom power if using a condenser. Then dial up the gain and you are ready to go. Refer to the LEDs on the front for a visual measure of input gain, and then route the output to a mixer, workstation, or computer via the 1/4-inch or USB output. The overall analog output level can be adjusted right at the unit.

Since the **USB Dual Pre** can be battery powered or run totally off the USB bus, it is ideal as a portable microphone preamp for remote performance or laptop recording.

Phantom Power Supply:

Many mixers, workstations, and computer interface boxes will not supply +48 Volt phantom power on all microphone inputs. This is a critical feature if you plan to use a condenser microphone. The **USB Dual Pre** is a perfect solution to this problem, letting you connect any microphones to your existing mixer or computer. Operation is identical to what is covered above. Once again portable laptop recording with high quality condenser microphones that require real phantom power is possible.

Instrument DI:

The **USB Dual Pre** will work well as a very functional DI for Bass, Acoustic Guitar and virtually any other instrument with a 1/4-inch or XLR output. Many people prefer the sound of ART preamps for responsiveness instead of standard DI's and preamps. You will also enjoy more flexibility and control over a standard DI.

Operation is simple, insert the output of the instrument into the input of the **USB Dual Pre**. Make sure the volume on the bass or guitar is up most of the way. If you are using any effects, make sure that the overall output is not greatly increased when the effect is on. Adjust the input gain knob and refer to the LEDs on the front for a visual measure of input gain. Then route the output to a mixer, workstation or computer via the 1/4-inch, or USB output. The overall output can be adjusted at the unit. Both analog outputs and the USB port may be used at the same time so the 1/4-inch can be routed to an amplifier or monitor system and the USB to a computer. Using the built-in monitor mixer for monitoring during the record process gives you the most flexibility.

WARRANTY INFORMATION:

Limited Warranty

Applied Research and Technology will provide warranty and service for this unit in accordance with the following warrants:

Applied Research and Technology, (A R T) warrants to the original purchaser that this product and the components thereof will be free from defects in workmanship and materials for a period of **three** years from the date of purchase. Applied Research and Technology will, without charge, repair or replace, at its option, defective product or component parts upon prepaid delivery to the factory service department or authorized service center, accompanied by proof of purchase date in the form of a valid sales receipt.

Exclusions

This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. This warranty is void if the serial number is altered, defaced, or removed.

A R T reserves the right to make changes in design or make additions to or improvements upon this product without any obligation to install the same on products previously manufactured.

A R T shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitations of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific rights and you may have other rights, which vary from state to state.

For units purchased outside the United States, an authorized distributor of Applied Research and Technology will provide service.

SERVICE:

The following information is provided in the unlikely event that your unit requires service.

1) Be sure that the unit is the cause of the problem. Check to make sure the unit has power, all cables are connected correctly, and the cables themselves are in working condition. You may want to consult with your dealer for assistance in troubleshooting or testing your particular configuration.

2) If you believe the ART unit is at fault, go to www.artproaudio.com. You may contact Customer Service for more assistance, or directly request a Return Authorization for service in the “resources” area of the website.

3) If you are returning the unit for service, pack the unit in its original carton or a reasonable substitute. The original packaging may not be suitable as a shipping carton, so consider putting the packaged unit in another box for shipping. Print the RA number clearly on the outside of the shipping box.

5) Include, with your unit, a note with the RA number and your contact information including a daytime phone number, preferably attached to the top of the unit.

SPECIFICATIONS:

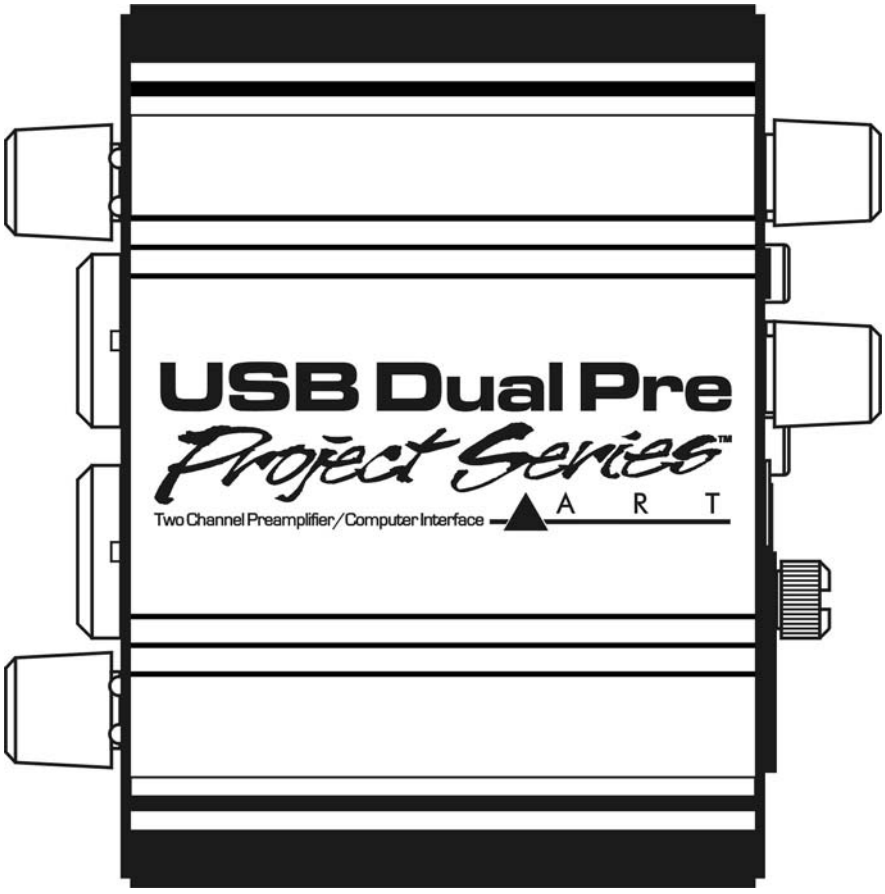
Frequency Response:	20 Hz – 20 kHz (+0, -1 dB)
THD:	<0.01% @ 1 kHz
CMRR:	>60 dB
Channel Separation:	>75 dB
Signal to Noise Ratio:	>90 dB (Ref 0 dBu)
Equivalent Input Noise:	-120 dBu typical (XLR balanced, gain @ maximum)
Input Impedance:	>300k Ohms 1/4-inch input, >4k Ohms XLR input
Output Impedance:	600 Ohms (balanced 1/4-inch), 50 Ohms (headphone 1/8-inch)
Maximum Signal Level:	+6 dBu in, +10 dBu out (balanced), +4 dBu out (single ended)
Maximum Gain:	+48 dB (balanced in-out)
Phantom Power:	Switch selectable, +48Volts DC, filtered, current limited
Input Connections:	XLR / 1/4-inch TRS “Combo” jack balanced or unbalanced
Output Connection:	1/4-inch TRS balanced, 1/8-inch TRS headphone mini jack
A/D-D/A:	16 Bit, 44.1 kHz or 48 kHz, USB selectable from computer
	0.4 ms A/D latency @ 44.1 kHz
Computer Interface:	USB 1.1 compliant, Windows 98SE/ME/2000/XP/Vista32bit,
	Apple OS9.1/OSX computers with native USB support
Chassis Type:	All aluminum black anodized with integral rubber sides
Power Requirements:	7.5-12V AC or DC @ <150mA (external) or USB bus powered
	or 9V Battery @ 20mA typical, 50mA max. (phantom power)
Dimensions:	1.75inch H x 4.6inch W x 4.7inch D (44.5mm x 117mm x 119mm)
Weight:	1.3 lbs. (0.59 kg)

Note: 0 dBu = 0.775Vrms

ART maintains a policy of constant product improvement.
Therefore, specifications are subject to change without notice.

Go to **www.artproaudio.com** for the latest information and support on the **USB Dual Pre**.

APPLIED RESEARCH AND TECHNOLOGY



www.artproaudio.com
E-mail: cserve@artproaudio.com