- Key Features -

- ➢ **Wideband Coverage**
- ➢ **Variable-Gain**
- ➢ **High P1dB**
- ➢ **USB Controlled**
- ➢ **Affordable & Intuitive**
- ➢ **Single Voltage Input**
- ➢ **Durable & Reliable**
- ➢ **Temperature Monitor**
- ➢ **Over-current Monitor**
- ➢ **Audio Alerts**

DS Instruments

GB & PA Series

Smart Wideband Microwave Amplifiers

PA2500L, GB6000L, PA6000L, GB20000, PA20000, GB30000

The GB (*Gain Block*) & PA (*Power Amp*) Series of devices are designed as an intuitive family of smart microwave amplifiers that eliminate the need for complex power supply setup and monitoring. With a focus on simplicity and a smooth user experience, the GB and PA Series provide users with a valuable solution for many RF projects and applications. DS Instruments currently manufactures wideband models from 10MHz to 30GHz, all in compact variable-gain configurations. All are USB controlled, with some offering front buttons for stand-alone gain control.

Stand-Alone Controls

The GB and PA Series devices set themselves apart in the industry by moving all negative bias voltage control and current allocation onboard. No negative voltages or complex power-up procedures are needed from the user. Select models offer buttons in addition to USB remote operation. Simple control software via USB make these amplifiers flexible and convenient for field use, or a permanent installation in an automated test environment.

GB & PA Applications

- Electronic warfare
- Automated testing environments
- General RF lab use
- Control systems
- Satellite communications
- Line-of-sight links
- Production verification
- Educational / university lab use
- Aerospace / defense research
- Wireless infrastructure
- Radar systems
- Phased array applications

MADE IN U.S.A.

ENGINEERED IN NEVADA

GB & PA Series Amplifiers

Device Images

- Gain control buttons
- Status LEDs
- SMA ports
- USB powered

- Gain control buttons
- Gain led bar graph
- SMA ports
- USB powered

- 30VDC input jack
- Status LEDs
- SMA ports
- Internal cooling fan

- Gain control buttons (new for 2023)
- USB powered
- Status LEDs
- SMA connectors

- USB powered (new for 2023)
- SMA connectors
- Internal cooling fan
- Gain control buttons (2023 model)

- Gain control buttons
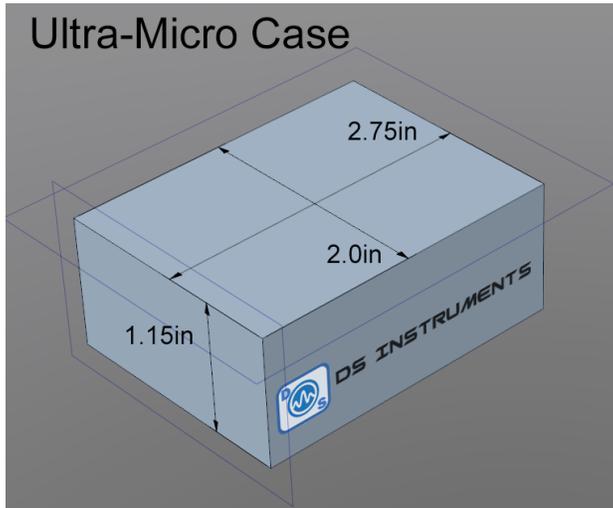- 40GHz precision 2.92mm connectors
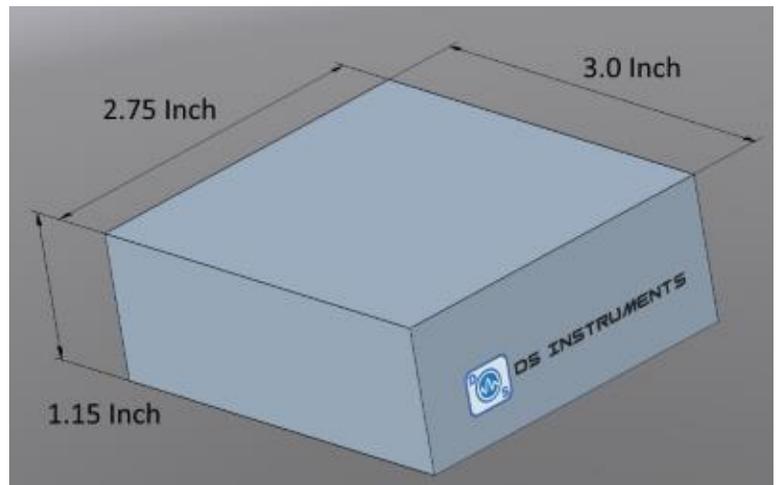- USB powered

GB & PA Series Amplifiers

Models Compared

	PA2500L	GB6000L	PA6000L	GB20000	PA20000	GB30000	
Frequency Range (GHz)	0.01-2.5	0.01-6.0	1.5-6.0	5.0-20.0	5.0-20.0	20.0-30.0	
Variable Gain Range (dB)	0-30	0-28	0-25	0-24	0-30	0-22	
0.1 dB Compression	+28	+22	+30	+20	+27	+22	
Gain Step Size (dB)	0.5	0.5	0.25	0.05	0.5	0.5	
Max Input (dBm)	+10	+10	+17	+10	+10	+10	
IP3 (dBm)	+40	+34		+28		+32	
Return Loss - typical (dB)	13.0	13.0	10.0	10.0	8.0	6.0	
Noise Figure (dB)	5.0	4.0	9.0	7.5	7.0	7.0	
Gain Flatness (dB) typ.	±3	±2	±4	±3	±2	±5	
Power Source	USB-C	USB-C	30VDC	USB-C	USB-C	USB-C	

GB & PA Series Amplifiers

Mechanical Information

Ultra-Micro Case
2.75in
2.0in
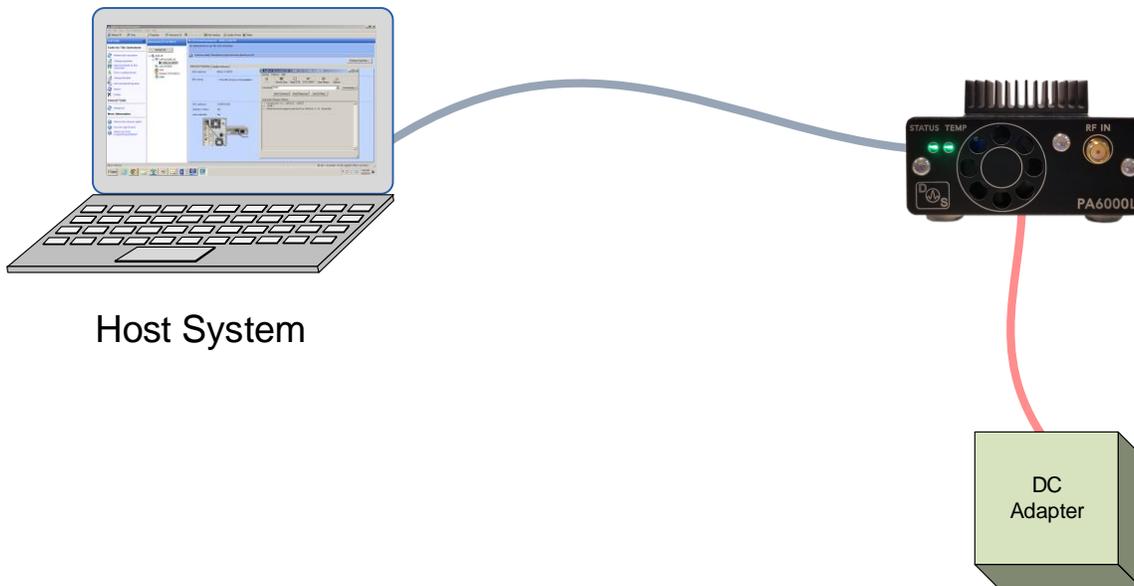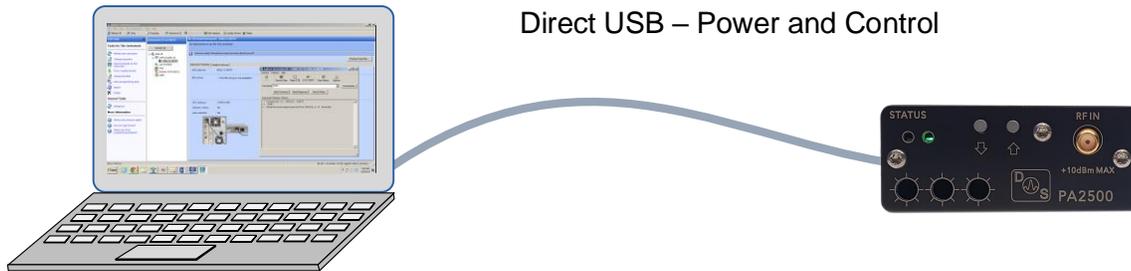1.15in
DS INSTRUMENTS

3.0 Inch
2.75 Inch
1.15 Inch
DS INSTRUMENTS

- GB6000L
- GB20000
- GB30000

- PA2500L
- PA6000L
- PA20000

GB & PA Series Amplifiers

Remote Operation Configurations

Direct USB – Power and Control

Host System

DC Adapter

Our amplifiers feature a programmable DEVICE NAME to identify each specific unit in a multi-device setup. Over 100 devices can be attached to a system, each separately programmable.

GB & PA Series Amplifiers

USB COM Port SCPI Commands

```
*IDN?                - Return standard identification string
OUTP:STAT ON         - Enable amplifier
OUTP:STAT OFF        - Disable amplifier
GAIN 10.5            - Set the amplifier gain (relative dB units)
GAIN?                - Return the current gain setting
*UNITNAME TomJ       - Set a custom nickname for this unit
*UNITNAME ?          - Return user set device nickname
*BUZZER OFF          - Turn off audio beeps – lower response time
*TEMP?               - Return the device temperature in C
*SAVESTATE           - Save the gain and output state of the amplifier as the boot default
```

(115200 Baud)
Full command lists available separately

Windows GUI – Amplifier Control

Download our lightweight and easy-to-use control software for PC at our website!

GB & PA Series Amplifiers

USB COM Port Connection

All of our products can be controlled from any serial-capable programming language or environment. No extra drovers are required. MATLAB, .NET, Linux, python are all popular. We use Visual Studio 2022 and C# for our standard GUI. First determine the port number that your device has installed itself as:
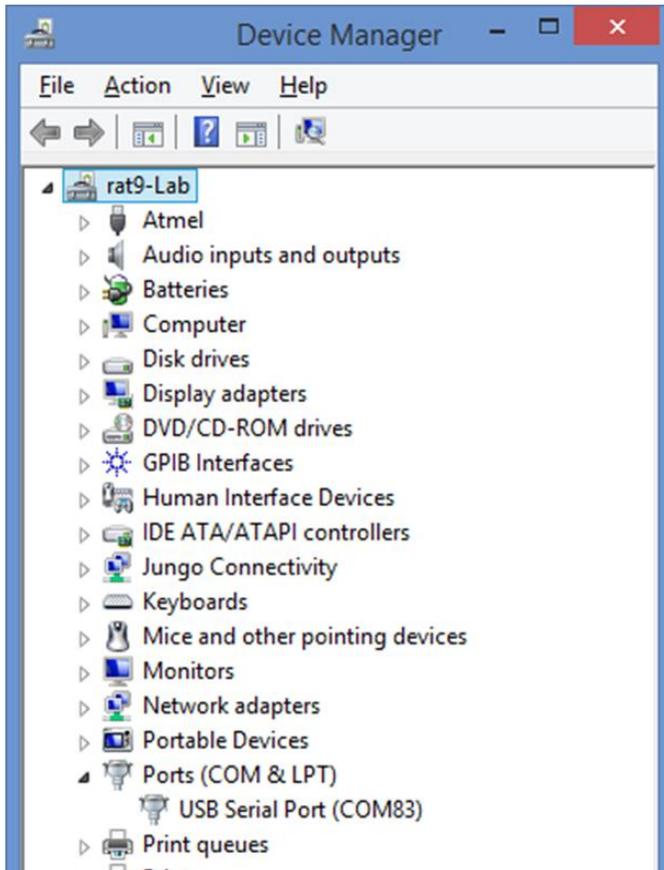
Command terminator is LINEFEED ("\n")

COM Port Settings:
115200bps, 8bits, 1 stop, no parity, no flow control

Example Code (C# .NET Framework):

```
using System;
using System.IO.Ports;    // include serial port library

SerialPort myPort = new SerialPort("COM83", 115200, System.IO.Ports.Parity.None, 8, System.IO.Ports.StopBits.One);

myPort.Open();         // open the port we just made

myPort.WriteLine("*IDN?");      // send any command here

myPort.ReadTimeout = 250;

string myResponse = myPort.ReadLine();      // read back the response

System.Threading.Thread.Sleep(30);           // delay before sending the next command
```

Never enable a power amplifier without a load attached to the output; too much reflected power from an open port can overheat and destroy the last amplifier stage.

All of our smart amplifiers ship with the default setting of RFO-disabled to prevent accidental damage. Many can be enabled by holding down both gain buttons. Another way is to connect via USB and our control software.

GB & PA Series Amplifiers

PA2500L – 2.5GHz with control buttons – USB power

GB6000L – 6GHz with control buttons – USB power

PA6000L – 6GHz - 30VDC adapter

GB20000 – 20GHz with control buttons – USB power

PA20000 – 20GHz with control buttons – USB power

GB30000 – 30GHz with control buttons – USB power

Contact Information

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