

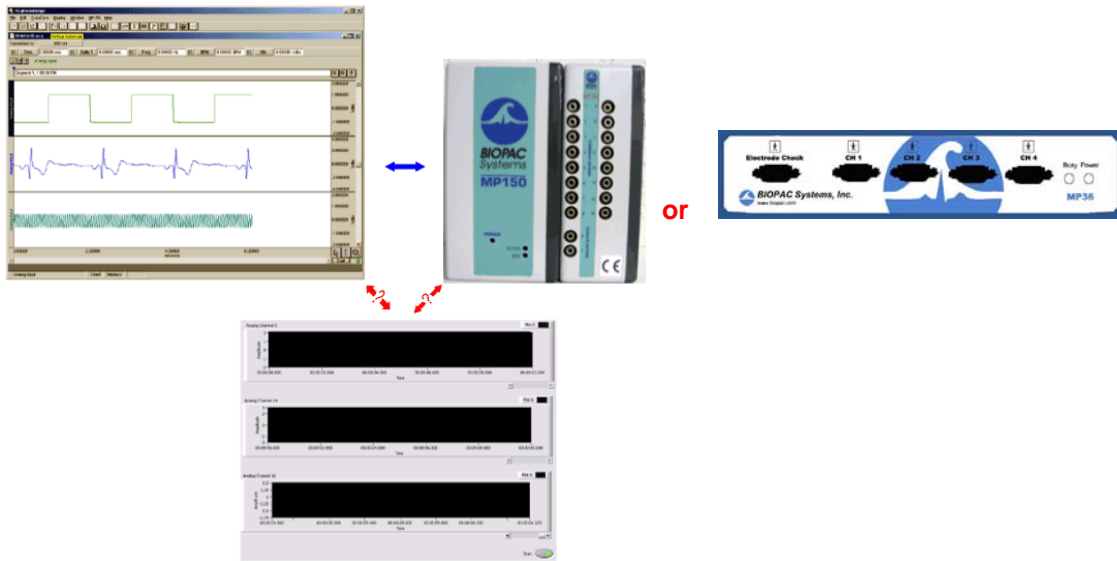
## Application Note 218: BHAPI BIOPAC Hardware API

This Application Note provides an overview of the [BIOPAC Hardware API](#). If you have specific questions or interface needs not addressed, please [contact BIOPAC](#).

### What is the API?

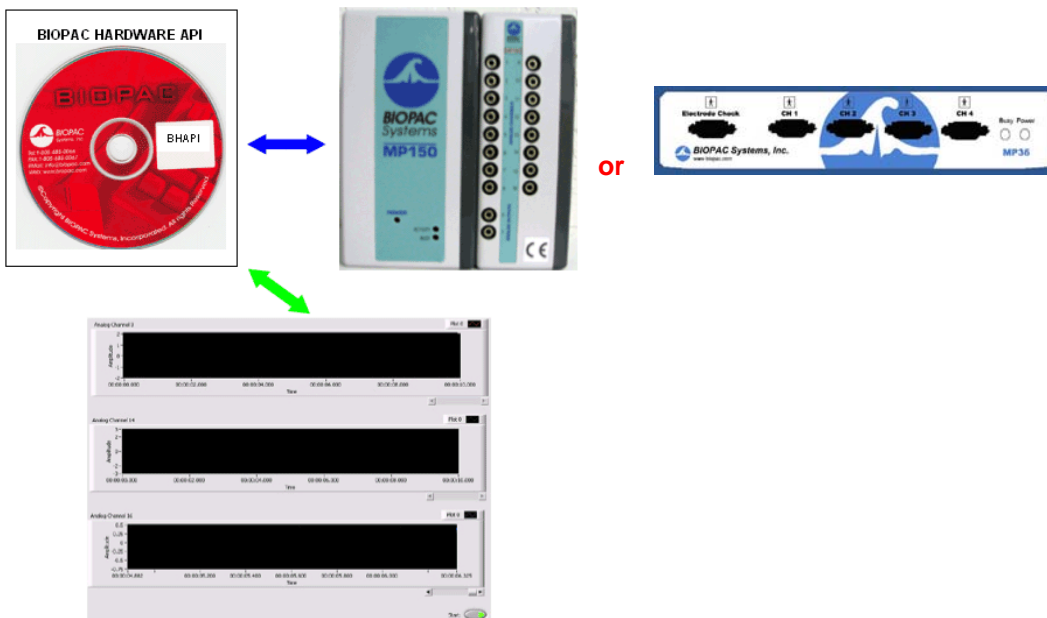
The BIOPAC Hardware API is a tool to permit third-party software programs to communicate with an MP150 unit (Ethernet/UDP protocol), an MP36, or an MP35 for basic data acquisition.

Before the BIOPAC Hardware API, third-party software programs had no way of communicating with an MP Device, either directly or via BIOPAC software:



Before BHAPI Hardware API

With the BIOPAC Hardware API, third-party software programs can communicate with an MP Device through a DLL using several API functions:



With BHAPI Hardware API

## Glossary

- **API Application Programming Interface or Abstract Programming Interface:** A set of routines, protocols, and tools for building software application; it hides the details and complexities of how things are done. A good API makes it easier to develop a program by providing all the building blocks. A programmer puts the blocks together. (Webopedia)
- **DLL:** Dynamic Link Library is a type of library commonly used in Windows environment; it uses the file extension ".DLL"
- **Header File:** Traditionally, serves as a manifest for what is in a source file(s) of programs written in C/C++ language; it uses the file extension ".h" Serves as a contract for programmers and does not contain all the details of the implementation.
- **Library:** A group of precompiled routines, methods, functions and objects that a program can use. It allows software developer to reuse code without revealing the implementation and source code.

## What is included?

Programmers receive the files necessary to use the API as easily as possible:

- mpdev.dll
- mpdev.lib
- mpdev.h
- Documentation – [preview reference manual](#)
- Sample Browser
- Hardware Utilities
- Sample Programs\*
  - [download C/C++ sample projects](#)
  - [download LabVIEW sample projects](#)

### \*Sample programs

|         |   |
|---------|---|
| C/C++   | mp1XXdemo: Demonstrates basic usage of BHAPI's methods.   |
| C#      | Biofeedback: A simple biofeedback application that uses BHAPI.<br>GoalKick: A simple game that uses BHAPI and a transducer as a human interface.<br>MPCommander: A command line interface to the MP35, MP36 and the MP150 using BHAPI.<br>TemperatureControl: A temperature control system using BHAPI, BIOPAC transducer and common electronic parts.<br>VideoStimulus with MP35: A video stimulation application using BHAPI to acquire data from MP35 device.<br>VideoStimulus with MP36: A video stimulation application using BHAPI to acquire data from MP36 device.  |
| LabVIEW | getBufferDemo with MP35: Demonstrates how to use BHAPI's getMPBuffer() function to acquire data from MP35.<br>getBufferDemo with MP36: Demonstrates how to use BHAPI's getMPBuffer() function to acquire data from MP36.<br>listAllMP150Demo: A VI that list all MP150s in the network<br>startAcqDaemonDemo with MP35 device: Demonstrates how to use BHAPI's startAcqDaemonDemo() and receiveMPData() functions to acquire data from MP35.<br>startAcqDaemonDemo with MP36 device: Demonstrates how to use BHAPI's startAcqDaemonDemo() and receiveMPData() functions to acquire data from MP36.<br>temperatureDemo: A VI that monitors temp. and outputs voltage to a specified Analog Output given a threshold. |
| MATLAB  | mpdevdemo: Demonstrates basic usage of the BHAPI's methods.   |
| VB .NET | bhapibasics: Demonstrates the basic usage patterns of the BHAPI.<br>FunctionGenerator: A program that transforms an MP device to an arbitrary waveform generator using BHAPI.<br>ImageStim with MP35: An image stimulation program that acquires data from MP35 device using the BHAPI.<br>ImageStim with MP36: An image stimulation program that acquires data from MP36 device using the BHAPI.   |

## User requirements

You must have programming knowledge to use the BIOPAC Hardware API. The BHAPI is a development tool and it will require programming on the part of the customer.

## System Requirements

- OS: Windows Vista, XP, or 2000
- NET Framework (for the sample browser)
- MP150: Ethernet/UDP protocol supported. For DLC, firmware upgrades may be required; USB not supported; generates communication errors.
- To update firmware, set scaling, etc.: contact BIOPAC and use *AcqKnowledge* 3.7.3 or higher

## Installation

The BHAPI installer is called BHAPISetup.exe. The Installer will not install if the target machine does not have the .NET Framework. Additional files.

## Sample Browser

The Sample Browser makes the API Reference Manual and Documentation accessible in one program. Requires the .NET Framework to run.

## Tech Support Guidelines

### Code Support

The API can be used by a wide array of third-party programs for custom applications, which makes targeted technical notes impractical. Users can generally detect a problem with the API in a C/C++ or C# program that is less than 50 lines. If there is a problem with the API, it can usually be recreated with a program that is less than 25 lines of code.

To submit code for technical review, you must contact BIOPAC for authorization and then submit:

- A sample program (from the original API) modified to replicate the problem, or
- A stand-alone program of 50 lines or less written in C/C++ or C#

These guidelines will help BIOPAC resolve technical issues related to the BHAPI. Users are responsible for debugging large programs or problems with any third-party software used with the API.

### OS Support

The BHAPI has been tested for Windows Vista and XP, and should work for 2000 (contact BIOPAC if using an earlier release).

### Protocol Support

BIOPAC only supports MP150 Ethernet/UDP and MP36/35 USB. MP150 USB is known to cause acquisition errors.

## Development

Development plans include:

- Variable Sampling Rate support
- .NET Framework to allow automatic compilation of C# and VB .NET sample programs
- Programming language options (JAVA, Python, etc.)
- Developer's Forum
- Dedicated web page(s)

[Contact BIOPAC](#) with feature suggestions or other API comments.