PRODUCT SHEET

info@biopac.com
support@biopac.com
www.biopac.com

MP150 SYSTEMS

AVAILABLE MP150 STARTER SYSTEMS

MP150 Licensed Systems – See corresponding license page for more information:

System	Windows Part #	Mac Part #
MP150	MP150WSW	MP150WS
MP150 plus Scripting	MP150-WSW-BAS	MP150-WS-BAS
MP150 plus Network Data Transfer	MP150WSW-NDT	MP150WS-NDT
MP150 plus Pressure Volume Loop Analysis	MP150WSW-PVL	MP150WS-PVL
MP150 GLP	MP150WSW-G	MP150WS-G
MP150 plus Developer Bundle	MP150WSW-ENT	N/A
MP150 plus 2-channel Vibromyography	VMG102WSW	VMG102WS
MP150 plus 4-channel Vibromyography	VMG104WSW	VMG104WS
MP150 System plus Baroreflex	MP150WSW-BRS	MP150WS-BRS
MP150 System plus Actigraphy	MP150WSW-ACT	MP150WS-ACT
System Upgrade – MP100 to MP150	MP150U-W	MP150OU-M

The MP150 high-speed data acquisition system utilizes the very latest in Ethernet technology. The MP150 is compliant with any Ethernet (UDP) ready PC running Windows or Macintosh. This next generation product takes full advantage of cutting edge technology. Access multiple MP150 devices located on a local area network and record data to any computer connected to the same LAN. Record multiple channels with variable sample rates to maximize storage efficiency. Record at speeds up to 400 kHz (aggregate).

MP150 System includes:

Data acquisition unit: MP150A-CE

Universal interface module: UIM100C

Acq*Knowledge*® software CD

License key (iLok USB) for Acq*Knowledge* 4.3+

Software Guide (PDF)

Ethernet Connection

ETHUSB Ethernet adapter
and Crossover Cable: CBLETH2

Power Supply: AC150A

See also: MP150 Specifications

Recommended MP150 configuration

For the best possible performance connect the MP System directly to the ETHUSB Ethernet USB adapter, via the CBLETH2 Ethernet crossover cable supplied with the system. This allows users to continue using an existing Ethernet card for accessing the Internet and local area network while using the MP System.

If a computer does not require simultaneous connection to the network, standard crossover Ethernet cable can be used to connect the MP System to a computer.

![BIOPAC Systems, Inc. logo]

PRODUCT SHEET

info@biopac.com
support@biopac.com
www.biopac.com

MP150 SYSTEM SPECIFICATIONS

Analog Inputs

Number of Channels:	16
Absolute Maximum Input:	±15 V
Operational Input Voltage:	±10 V
A/D Resolution:	16 Bits
Accuracy (% of FSR):	±0.003
Input impedance:	1.0 MΩ

> Application Programming Interfaces options:
> - Hardware Interface BHAPI
> - Software Interface ACKAPI

Analog Outputs

Number of Channels:	2
Max output with acquisition:	2 channels
Output Voltage Range:	±10 V
D/A Resolution:	16 bits
Accuracy (% of FSR):	±0.003
Output Drive Current:	±5 mA (max)
Output Impedance:	100 Ω

Digital I/O

Number of Channels:	16
Voltage Levels:	TTL, CMOS
Digital I/O Logic Type:	CMOS
Input Voltage Range:	-0.5 V to 5.5 V (max)
Input Clamp Current:	±20 mA (max)
Output Drive Current:	±20 mA (max)
External Trigger Input:	TTL, CMOS compatible - See also: External Trigger Inputs

Logic Level Thresholds:

Input Low Voltage:	1.50 V (max)
Input High Voltage:	3.45 V (min)

Time Base

Min Sample Rate:	2 samples/hour
Trigger Options:	Internal, External or Signal Level

Power

Amplifier Module Isolation:	Provided by the MP unit, isolated clean power
CE Marking:	EC Low Voltage and EMC Directives
Leakage current:	<8 µA (Normal), <400 µA (Single Fault)
Fuse:	2 A (fast blow)

Device specs	MP150
Max Sample Rate MP Internal Memory:	200 K samples/sec (400 K aggregate)
PC Memory/Disk:	200 K samples/sec (400 K aggregate)
Internal Buffer:	6 M samples

PRODUCT SHEET

info@biopac.com
support@biopac.com
www.biopac.com

Device specs	MP150
Waveform Output Buffer:	500 K samples
Serial Interface Type/Rate:	Ethernet: UDP (10M bits/sec)
Transmission Type:	Ethernet
Maximum cable length:	100 meters (Ethernet cable)
Power Requirements:	12 VDC @ 2 amp (uses AC150A)
Dimensions:	10 cm x 11 cm x 19 cm
Weight:	1.0 kg
Operating Temperature Range:	0-70° C
Operating Humidity Range:	0-95%
OS Compatibility	
Ethernet Interface	
Windows	Windows XP, Vista, 7, 8
Mac	OS X
USB Interface	
Windows	Not supported
Mac	Not supported

ISOLATION

Designed to satisfy the following Medical Safety Test Standards affiliated with IEC601-1:

    Creepage and Air Clearance

    Dielectric Strength

    Patient Leakage Current

Contact BIOPAC for additional details.

SIGNAL CONDITIONING MODULE COMPATIBILITY

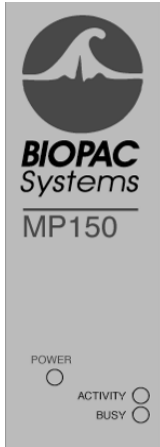|			
$CO_2$100C	EGG100C	HLT100C	PPG100C
DA100C	EMG100C	LDF100C	RSP100C
EBI100C	EOG100C	MCE100C	SKT100C
ECG100C	ERS100C	$O_2$100C	STM100C
EEG100C	GSR100C	OXY100C/E	TEL100C

CLEANING PROCEDURES

Be sure to unplug the power supply from the MP150 before cleaning. To clean the MP150, use a damp, soft cloth. Abrasive cleaners are not recommended as they might damage the housing. Do not immerse the MP150 or any of its components, as this can damage the system. Let the unit air-dry until it is safe to reconnect the power supply.

AC150/100A POWER SUPPLIES

The 12-volt in-line switching transformer connects the MP unit to the AC mains wall outlet. One transformer is included with each MP System; replacements can be ordered separately. These transformers are specified to satisfy IEC60601-1 requirements and will accommodate 120-240 VAC (50/60 Hz) mains input.

info@biopac.com
support@biopac.com
www.biopac.com

PRODUCT SHEET

MP150 SYMBOLOGY

Front panel	See "Light Status" section for functionality details.		
	POWER	**Green light**	Indicates MP150 Power status.
	ACTIVITY	**Amber light**	Indicates data traffic to or from MP150— *similar to Hard Disk activity light on any personal computer.*
	BUSY	**Green light**	Indicates MP150 data acquisition.
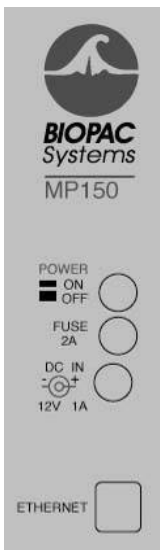
Back panel			
	Power	**ON**	Push in to power up the MP150
		OFF	Pop out to cut the flow of power to the MP150
		IMPORTANT! The MP150 does not have a "Hardware Reset" switch like a personal computer does. To reset the MP150 for any reason, turn the MP150 off, wait a few seconds, and then turn it back on.	
	Fuse 2A	2 Amp fast-blow fuse holder; the maximum capacity of the fuse is 2 Amps.	
		▪ To remove the fuse, use a screwdriver to remove the fuse cover, which is located below the word **Fuse**.	
	DC Input	Use the **DC Input** to connect a battery, AC/DC converter or other power supply to the MP150.	
		▪ The MP150 requires 12 VDC @ 1 Amp (minimum), 2 Amp (nominal)	
		▪ The receptacle can accept a "+" (positive) input in the center of the connector and a "–" (negative) input on the connector housing.	
	Ethernet	The MP150 connects to the computer via the Ethernet port, located just to the right of the word **Ethernet**.	
		▪ Uses a standard RJ-Ethernet connector (10 base T).	

Side panel			
Module connections	The two connector inputs are designed to connect directly to the UIM100C.		
	▪ **Analog signals** are transmitted through the 37-pin connector (upper right side)		
	▪ **Digital signals** are transmitted through the 25-pin connector (lower-right side)		

Bottom			
Firmware Rollback Switch	**IMPORTANT! This is NOT A RESET SWITCH** The Firmware Rollback Switch is located on the bottom of the MP150 unit and is recessed to prevent accidental activation—it is NOT A RESET for the MP150 unit.		
	Warning! Activation of the Firmware Rollback Switch will cause the MP150 unit to operate under the previous version of firmware loaded into the unit. Refer to **Appendix F** of the **Acq***Knowledge* **Software Guide** for procedural details.		

PRODUCT SHEET

info@biopac.com
support@biopac.com
www.biopac.com

ACTIVITY BUSY	MODE	LIGHT STATUS DESCRIPTION
A Bright **B Bright**	Self-Test	ACTIVITY and BUSY be bright for the duration of the self-test and setup process. This may take 3 – 10 seconds, depending on MP150 internal memory.
	Work	During data acquisition, ACTIVITY reflects command/data traffic (for acquisition speeds of 1000 Hz or more, ACTIVITY will be permanently bright or blink at a high frequency) and BUSY will be bright. It is normal for both lights to be on—this does not indicate a problem unless an Error Message is generated on the computer screen.
	Error	ERROR: In rare cases, a serious problem may prevent a self-test and the lights may be erratic: both on, both off, or any other static combination.
A Bright **B Blink**	Error	The MP150 enters the Error Mode if a fatal error occurs during the Self-test Mode. In the Error Mode, ACTIVITY is bright and BUSY is blinking at a frequency of 5 Hz.
A Blink **B Bright**	Error	If the self-test fails or setup fails, the Error mode is initiated and ACTIVITY will blink at about 5 Hz rate and BUSY will remain bright.
A Blink **B off**	Idle-1	ACTIVITY <u>blinks twice</u> with approximately 1.5-2 second interval and BUSY is OFF. Double blink means: - MP150 may be disconnected from LAN or, - MP150 is connected to LAN but did not receive IP address from network's DHCP server and default 169.254.xxx.xxx address is self-assigned to MP150. This is the standard state for MP150 connected to NIC through crossover network cable. It means the MP150 is in working condition and ready for acquisition. Acq*Knowledge* may communicate with the MP150 through a serial cable or through a network by using 169.254.xxx.xxx address and/or crossover cable.
	Idle-2	ACTIVITY <u>blinks once</u> with approximately 1.5-2 second interval and BUSY is OFF. Single blink means: - MP150 is connected to LAN and received IP address from network's DHCP server. It means the MP150 is in working condition and ready for acquisition.
A off *B off*	Self-Test	ACTIVITY and BUSY will go dark for less than 1 second at the end of the self-test before proceeding to the Idle mode.
	Wait	Under some conditions, such as when a dialog box is open, Acq*Knowledge* cannot send commands to the MP150. When command flow from the workstation stops, the MP150 acts as if there is an open dialog and enters the Wait Mode to wait for a command from the workstation it is "locked" to—commands from any other work station will be ignored. When it receives a command, the MP150 return to the Work mode. After five minutes with no command communication, the MP150 will revert to the Idle mode.
	Error	ERROR: In rare cases, a serious problem may prevent a self-test and the lights may be erratic: both on, both off, or a static combination.

PRODUCT SHEET

info@biopac.com
support@biopac.com
www.biopac.com

MP150 STATUS LIGHT PATHS

Startup (Power ON) > Self-test

When the MP150 is turned ON, ACTIVITY and BUSY will shine for the duration of the self-test and setup process. This may take 3 – 10 seconds, depending on MP150 internal memory.

Idle

MP150 is waiting for any command/request from Acq*Knoweldge* or any workstation or any interface. [See Note 1]

Error

The MP150 enters the Error Mode if a fatal error occurs during the Self-test Mode.

Work

MP150 receives/sends commands/data to/from Acq*Knowledge*. [See Note 2]

Wait

MP150 cannot receive command due to software condition (i.e., dialog box open). [See Note 3]

NOTES

1. **IDLE**—Both light patterns are normal and indicate that the MP150 is waiting for a command— neither indicates a problem with the MP150. The MP150 can switch between Idle-1 and Idle-2. Idle-1 or Idle-2 pattern indicates which IP address the MP150 is using:
    -   Idle-1: self-assigned address in 169.254.xxx.xxx network
    -   Idle-2: address from DHCP server).

2. **WORK** — When the MP150 receives any command from any workstation, it locks on to that workstation and communicates with it exclusively. The MP150 "remembers" the active workstation and will ignore commands from any other workstation. The MP150 usually remains in the Working Mode until the Acq*Knowledge* software program is closed.

3. **WAIT** — Under some conditions, such as when a dialog box is open, Acq*Knowledge* cannot send commands to the MP150. When command flow from the workstation stops, the MP150 acts as if there is an open dialog and enters the Wait Mode to wait for a command from the workstation it is "locked" to—commands from any other work station will be ignored. When it receives a command, the MP150 enters the Work mode; if the MP150 does not receive a command within five minutes, it reverts to Idle.

PRODUCT SHEET

info@biopac.com
support@biopac.com
www.biopac.com

MP150A-CE DATA ACQUISITION UNIT BLOCK DIAGRAM

The MP150 has an internal microprocessor to control the data acquisition and communication with the computer. There are 16 analog input channels, two analog output channels, 16 digital channels that can be used for either input or output, and an external trigger input. The digital lines can be programmed as either inputs or outputs and function in 8 channel blocks. Block 1 (I/O lines 0 through 7) can be programmed as either all inputs or all outputs, independently of block 2 (I/O lines 8 through 15).
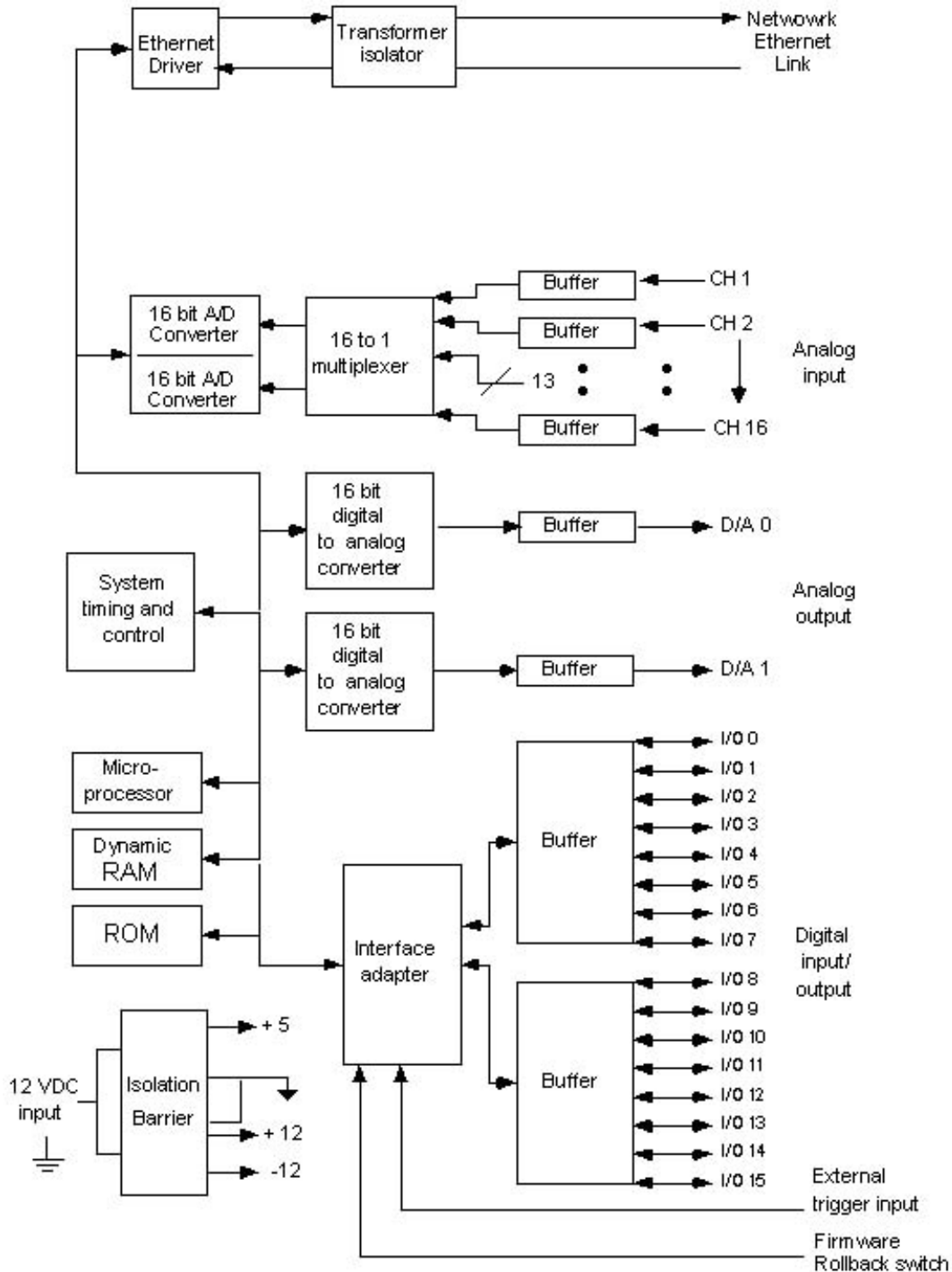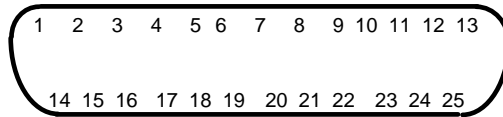

MP150A-CE block diagram

See also: MP150 Specifications

info@biopac.com
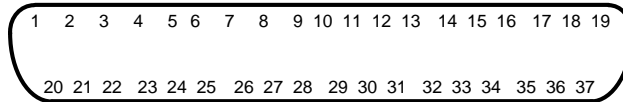**support@biopac.com**
www.biopac.com

PRODUCT SHEET

MP SYSTEM PIN-OUTS — FOR MP150

Digital DSUB 25 (male) Pin-outs

```
1  2  3  4  5 6  7  8  9 10 11 12 13

14 15 16  17 18 19  20 21 22  23 24 25
```

DIGITAL

Pin	Description	Pin	Description
1	I/O 0	**14**	I/O 4
2	I/O 1	**15**	I/O 5
3	I/O 2	**16**	I/O 6
4	I/O 3	**17**	I/O 7
5	GND D	**18**	GND A
6	GND D	**19**	Out 1
7	EXT T	**20**	Out 0
8	+5 VD	**21**	GND A
9	+5 VD	**22**	I/O 12
10	I/O 8	**23**	I/O 13
11	I/O 9	**24**	I/O 14
12	I/O 10	**25**	I/O 15
13	I/O 11		

Analog DSUB 37 (male) Pin-outs

```
1  2  3  4  5 6  7  8  9 10 11 12 13  14 15 16  17 18 19

20 21 22  23 24 25  26 27 28  29 30 31  32 33 34  35 36 37
```

ANALOG

Pin	Description	Pin	Description
1	GND A	**20**	CH 1
2	GND A	**21**	CH 2
3	GND A	**22**	CH 3
4	GND A	**23**	CH 4
5	GND A	**24**	CH 5
6	GND A	**25**	CH 6
7	GND A	**26**	CH 7
8	GND A	**27**	CH 8
9	+12 V	**28**	+12 V
10	GND A	**29**	- 12 V
11	-12 V	**30**	CH 9
12	GND A	**31**	CH 10
13	GND A	**32**	CH 11
14	GND A	**33**	CH 12
15	GND A	**34**	CH 13
16	GND A	**35**	CH 14
17	GND A	**36**	CH 15
18	GND A	**37**	CH 16
19	GND A		

PRODUCT SHEET

info@biopac.com
support@biopac.com
www.biopac.com

ETHERNET CONNECTOR PIN-OUTS (FOR MODEL MP150 ONLY)
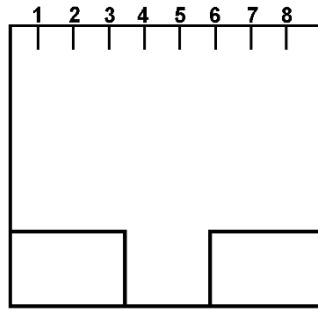
Front View

Pin	Description
1	TXD+
2	TXD-
3	RXD+
4	No Connection
5	No Connection
6	RXD-
7	No Connection
8	No Connection