

iWorx TA-220 Control Module

Hardware Manual



iWorx TA Control Module (IX-TA-220)

Overview

At the heart of iWorx TA teaching system is a next generation, multi-channel data recorder and control module with built-in stimulators, on-board sensors, and control capabilities. Incorporating innovative iWire™ serial interface technology and advanced LabScribe data acquisition and analysis software, the iWorx TA Control Module accommodates a wide range of sensors, transducers, and other devices. Designed for plug and play ease of use, the iWorx TA Control Module is offered in all-in-one, preconfigured kits, which include professionally developed courseware and high performance components for performing experiments in human physiology (including psychological and exercise physiology), animal physiology, neurobiology, and general biology and ecology.

Included Items

IX-TA-220 TA Control Module

USB cable (C-USB)

Universal 12 VDC power supply (A-UP12-DC-25-1A)

LabScribe data acquisition software and Quick Start guide (LS-20)

The TA Control Module is included in a number of comprehensive teaching kits.

See the kits at www.iworx.com.



iWorx Systems, Inc.

www.iworx.com

LabScribe is a trademark of
iWorx Systems, Inc.
©2015 iWorx Systems, Inc.

Front Panel



iWorx TA Control Module Front Panel

iWorx TA-220 Control Module

A1: Accepts the flow head and tubing (A-FH-300L) for the internal spirometer. The TA Heart Sounds Monitor (HSM-220) also connects here.

A2: Accepts the TA Blood Pressure Monitor (BP-220) and the TA Force Dynamometer (FT-220).

A3 and A4: BNC connectors for single-ended transducers.

A5 and A6: Each channel is equipped with a transducer amplifier to allow connection of virtually any physiologic transducer via a DIN8 connector.

A7: Accepts the ISE-730 O2 Sensor.

A8: Accepts the TA Thermometer (TM-220) and the TA Striated Muscle Transducer (SMT-220).

iWire Connectors: Accept up to two serial iWire interfaces like the iWire-B3G. Each iWire-B3G interface can record up to four channels of data. Three of the channels are isolated biopotential amplifiers capable of recording ECGs, EMGs, EOGs, EGGs, and EEGs, while the fourth is a dedicated GSR amplifier (used with the C-ISO-GSR sensor).

S1 and S2: Low voltage stimulators. Parameters for the stimulators, such as pulse width, frequency and amplitude, may be changed on the fly using controls located in the LabScribe software toolbar. Standard protocols include Pulse, Train, Step, Triangle, Ramp, and Custom. BNC connectors.

HV Stimulator: High voltage isolated stimulator. Suitable for human striated muscle studies. Connected via HV safety connectors.

Rear Panel



iWorx TA Control Module Rear Panel

Power switch

DC Power connector: Accepts 12VDC, 1.5 A DC converter.

Ground: Accepts a banana plug.

EM1 and EM2: Accept the TA Event Marker (EM-220) and certain other transducers (including the FRS-220 Foot Reaction Switch and the PHRM-100 Polar Heart Rate Monitor receiver).

Sync-Out, Sync-In: To synchronize recordings across multiple TA Control Modules so that channels from multiple devices can be sampled simultaneously. BNC connectors.

USB connector

Digital Input/Output 1 and 2: Up to eight digital inputs and outputs are available to monitor and control external TTL devices like pumps and valves.



iWorx Systems, Inc.

www.iworx.com

iWorx TA-220 Control Module

SPECIFICATIONS	
SPIROMETER INPUT (A1)	
Range	±10 cm water
PRESSURE TRANSDUCER INPUT (A2)	
Range	500 mmHg – 1700 mmHg
BNC INPUTS (A3 and A4)	
Number of inputs	2
Input range	±10 VDC
Resolution	16 bit
Connector	BNC cable
DIN8 TRANSDUCER INPUTS (A5 and A6)	
Number of inputs	2
Input range	±10 VDC
Resolution	16 bit
Isolation	No
Excitation	±5 VDC, 100 mA
Connectors	DIN8 (see figure below for pin configuration)
Gain	Programmable with input resistor
HIGH VOLTAGE STIMULATOR OUTPUT	
Connectors	HV Safety
Output range	0-20 mA
Compliance	100 V
Max ON time	10 ms
LOW VOLTAGE STIMULATOR OUTPUTS (S1 and S2)	
Resolution	16 bit
Connectors	BNC
Output range	±15 VDC at 35 mA
Modes	Pulse, Train, Constant, Step, Ramp, Triangle, Custom
DIGITAL INPUTS and OUTPUTS	
Input	8 independent lines, TTL input, 1 Megohm input impedance, 5 V maximum
Output	8 independent lines, TTL output level, 24 mA maximum load per line
A/D CONVERTER	
Sampling speed	200k Hz aggregate
Interface	USB 1.1, 2.0, full speed



iWorx Systems, Inc.

www.iworx.com

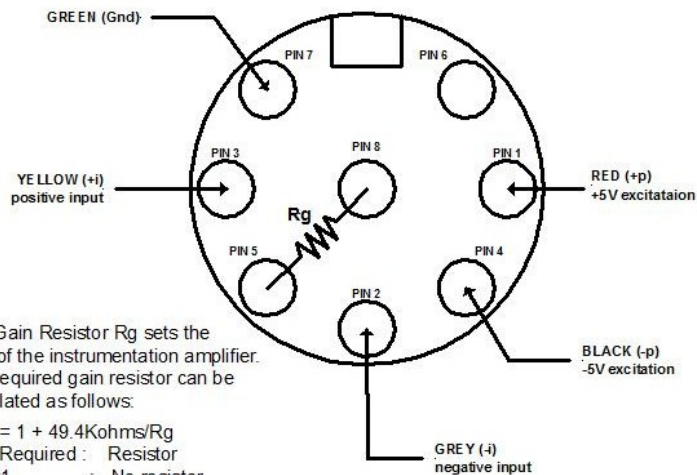
iWorx TA-220 Control Module

SPECIFICATIONS

GENERAL

Power	12 VDC, 1.5 A
Enclosure and Dimensions	Plastic; 23 cm W, 15 cm D, 6.5 cm H
Weight	725 g
Warranty	3 years
Software	LabScribe recording and analysis software

CONN-DIN8-M-SolderSide
for IX-TA, IX-RA, IA-400, IX-228 etc...



The Gain Resistor R_g sets the gain of the instrumentation amplifier. The required gain resistor can be calculated as follows:

Gain = $1 + 49.4\text{Kohms}/R_g$
Gain Required : Resistor

- x1 : No resistor
- x10 : 5.49Kohm
- x100 : 499 ohms

DIN8 transducer connector pin configuration

How to Use the iWorx TA Control Module

The iWorx TA Control Module is controlled by LabScribe recording and analysis software. LabScribe has an intuitive interface for setting up acquisition screens, calibrating signals, and analyzing data on up to 128 channels simultaneously at sampling rates as high as 200K samples/second.

LabScribe includes dozens of laboratory exercises, categorized by subject areas. Each experiment contains a preconfigured settings file and experiment pdf files, including complete instructions for student data recording and analysis.



iWorx Systems, Inc.

www.iworx.com

iWorx TA-220 Control Module

To set up and start to use the iWorx TA Control Module:

- 1) Download LabScribe from www.iworx.com. Be sure to install the software for the appropriate computer platform (Windows or Mac OS) before connecting the hardware for the first time. In order to download software from the iWorx website, you will need to first register as a user.
- 2) Plug in and switch on the iWorx TA Control Module. If you will be running an experiment that uses an iWire device, connect the device before turning on the TA Control Module.
- 3) Double-click on the LabScribe shortcut to open the software. You should see a message indicating that the iWorx TA Control Module has been recognized by the software.
- 4) Load the appropriate Settings group and select an experiment. The experiment opens with LabScribe already preconfigured with the appropriate settings. Follow the instructions on the accompanying pdf documents to set up and perform the lab exercise. There is no need to configure the settings manually. If you need to connect an iWire device once the TA Control Module is already running, it must be turned off, the device connected, and then the TA Control Module turned back on, before loading the experiment.
- 5) Connect the desired transducers to the appropriate channels.
- 6) Channels can be configured manually by using the LabScribe Preferences panes, accessed in the Windows Edit menu, and the Macintosh LabScribe menu. Here channels can be turned on or off, pre-set filters can be selected, and computed channels can be configured. Views can be configured, and stimulator parameters can be set. See the LabScribe User Manual for details.
- 7) Some channel parameters can also be changed from the individual channel menus in the recording window.
- 8) If you are using the Low Voltage Stimulator or the isolated High Voltage Stimulator, connect your stimulating electrodes to the appropriate stimulator and use LabScribe to control the stimulator as instructed in the experiment or the LabScribe manual.



iWorx Systems, Inc.

www.iworx.com

iWorx Systems, Inc. 62 Littleworth Road, Dover, New Hampshire 03820
(T) 800-234-1757 / 603-742-2492 (F) 603-742-2455