# COMMANDER® ECHO

## INSTRUCTIONS FOR USE


Note: Device colors and art may vary

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JTECH MEDICAL
MEASURING HUMAN PERFORMANCE

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# Contents

## Graphic Symbol Definitions

| Symbol | | Meaning |
|---|---|---|
|  | An ISO 7010-M002 symbol | Consult Instructions |
|  | An ISO 15223 symbol | Keep Dry, do not immerse in water or other liquids |
|  | | Information symbol |
| IPXN | An IEC 60529 symbol | IPXN, N=0 no protection against ingress of water.<br>N=1 protection against vertically falling water drops |
|  | An ISO 7000-0434A symbol | Caution |
|  | An IEC 60417-5840 symbol | Indicates type of protection against electric shock:<br>Type B applied part |
|  | An IEC 60417-5140 symbol | Non-Ionizing Radiation |
|  | An ISO 15223 symbol | Warning: devices are non sterile |
| FC | FCC Logo | Devices comply with Part 15 of the FCC Rules |
|  | An IEC 60878 symbol | Indicating Degree of protection against electric shock:<br>Class 2 Electrical equipment |
|  | An ISO 15223 symbol | Indicating upper and lower temperature limits |
|  | An ISO 15223 symbol | Indicating upper and lower humidity limits |
|  | An ISO 15223 symbol | Indicating upper and lower atmospheric pressure limits |
| CE 2797 | “Conformité Européenne” (“European Conformity”) | Devices meet the provisions of the Council Directive 93/42/EEC |
|  | An EN 980 symbol | Identifying the Manufacturer |
| EC REP | An EN 980 symbol | Identifying the Authorized Representative for European Communities |
|  | An IEC 60878 symbol | Signifying Alternating Current |
|  | An IEC 60878 symbol | Signifying Direct Current |
| MD | An ISO 15223 symbol | Identifying the device as a medical device |
| UK CA 0086 | | Devices meet the provisions of the UK MDR |

## Conventions Used Throughout This Manual

The following conventions are used in the manual to describe the Console, devices, and operation:

**Calibration** - The process of using a known force or angle to adjust the device parameters so that any arbitrary force or angle input can be accurately determined.

**Control Stick** - The singular multi-axis button on the Commander Echo Console, which can be moved up, down, left, right, and pressed, in order to operate the Console.

**CV** - The coefficient of variation (CV) is defined as the ratio of the standard deviation (σ) to the mean (μ), or in mathematical terms, CV = σ / μ. In probability theory and statistics, CV serves as a normalized measure of variability to help describe the relative scatter or spread of a data sample. A smaller CV suggests a higher level of consistency. A calculated CV less than 15% (0.15) is often used as an indicator of consistent effort by subjects during biometric strength tests. This value is displayed in the review screen of the Console. Commander Echo calculates CV using population standard deviation. Note that this differs from CV calculated using the sample standard deviation, which can give a very different result.

**Device** - Refers to both the Commander Echo Console and any device.

**Exam** - This term is used to refer to a group of tests performed with the same device.

**Hold** - Indicates that the Control Stick should be pressed and held.

**Device** - This refers to a JTECH Medical testing device, used in conjunction with the Commander Echo Console to record test data.

**Press** - Indicates that the Control Stick should be pressed and released.

Repetition, or Rep - A single instance of measuring performance for a designated device.

**RF** - Radio Frequency.

**ROM** - Range of Motion.

**Side** - Either left or right, noted as L and R, respectively.

**Test** - Used to refer to a group of repetitions performed for one or more sides with a given device.

**Threshold** - The minimum force or angle that must be exceeded to start or end a repetition.

**Zero or Zero Calibration or Set Zero** - The process of determining the device parameters when no force or angle is applied to the device.

## Conventions Used Throughout The Console Menus

The following additional conventions are used throughout the Console menus:

**Cal.** - See Manual convention Calibration.

**CV%** - See Manual convention CV (Coefficient of Variation).

**DEF%** - Percent Deficiency, a value calculated from test information and displayed in the review screen.

**DEG.** - Abbreviation on the Console for degree.

**DEL.** ALL - Abbreviation on the console for Delete All. A global function that deletes all test data.

**DIFF.** - Abbreviation on the Console for difference. A calculated value for the Maximum angle.

**FAT%** - Fatigue Percent, a value calculated from timed test information and displayed in the review screen.

**INC** - Abbreviation on the Console for Inclinometer.

**MMT** - Abbreviation on the Console for Manual Muscle Tester.

**Press any key** - Indication to press the Control Stick in any direction or into the console.

**Press Enter** - Indication to press the Control Stick into the console.

**PRI.** - Abbreviation on the Console for Primary Inclinometer.

**POS** - Refers to the calibration position for the Inclinometer.

**Ready Time** - Starting delay before a test rep begins recording data, this is used to ensure transient forces are not recorded.

**REPS** - See Manual convention Repetition.

**REV** - Revision. Hardware Rev is specified on Device label. Firmware REV is noted in the information screens

**SEC.** - Abbreviation on the Console for Secondary Inclinometer.

**SFG** - Abbreviation on the Console for Static Force Gauge.

**SN** - Serial Number also referred to as device ID#.

**WT. CT** - Weight Count. Device reading of a known physical value which is not neutral or minimal.

**Zero CT** - Zero Count The value of a force or angle input when the device is neutral or equal to zero.

| Console LED/LCD states | | LCD | Explanation |
|---|---|---|---|
| Left | Right | | |
| Off | Off | Off | Off power state. |
| Off | Off | On | The Console is on for navigating menus. |
| Off | Rapidly blinking RED | | Battery is dead, and an attempt was made to turn the console on. |
| Off | Solid RED | | Battery voltage is critically low (Less than 20 minutes remaining). |
| Solid GREEN | Off | | The Console is plugged in and receiving power from an external source. The current charging status is indicated on the LCD screen. |
| Solid GREEN | Solid GREEN | Logo | The Console is booting into Charging mode. |
| Off | Solid GREEN | | The Console is booting up. |
| Off | Off | | The Console is shutting down. |
| Off | Blinking BLUE 1 time per second | On | The Console is in testing mode and actively communicating with the device. |
| Off | Blinking BLUE 1 time per second | Scanning | Console is attempting to scan for and register a new device. |
| Off | Off | Scanning Channels | Console is scanning the RF channels and will automatically set the best one. |

| Device LED States | Explanation |
|---|---|
| Off | Off power state. |
| Solid GREEN | Device is indicating that the battery has completed charging. |
| Blinking BLUE 1 time per second | The device is in testing mode and actively communicating with the Console. |
| Solid BLUE blinking OFF 1 time per second | Attempting to reestablish communication with the Console. |
| Blinking BLUE 10 times per second | The device is attempting to establish a communication link with the Console. |
| Blinking RED 10 times per second | The device has a low battery and is attempting to establish a communication link with the Console. |
| Solid RED | Battery is critically low (Less than 20 minutes remaining). |
| Blinking RED 5 times per second | Battery is dead. This happens on any attempt to turn the device on. |
| Blinking RED 1 time per second | The device has a low battery and actively communicating with the Console. |
| Solid RED blinking OFF 1 time per second | The device has a low battery and is attempting to reestablish communication with Console. |
| Solid Green, blinking BLUE 1 time per second, | The device is plugged in, receiving power from an external source, and the battery is actively charging. |
| Solid Green, blinking BLUE 5 times per second | The battery is overheated (thermal fault) warning. |
| Orange | Unknown battery charging status. |

**Messages**

A number of messages exist that will be displayed on the Console LCD when certain conditions are met. Each message is displayed with a message number as described below.

| Message # | Message | Description |
|---|---|---|
| Message 1: | No Communication Received | This is displayed anytime that a connected device fails to communicate with the Console for approximately 10 seconds. It indicates that communication between the device and the Console has been lost. |
| Message 2: | All Tests Have Been Completed | This is displayed any time the user tries to begin a new test and no free tests exist within the set testing range. For example, if the user sets the number of tests (in settings) to 5, enters test mode, and completes 5 tests (in any order) then this message will be displayed at the conclusion of the 5th test.<br>Note that if the user deletes a single test (such as test #2) and then enter test mode again, as soon as they complete test #2 the message will reappear. If the user deletes a single test, deletes all tests, or increases the number of tests (in settings) they can continue testing. |
| Message 3: | Primary Device Buffer Overflow | This is displayed during testing if the primary device's sample data buffer is filled to capacity (due to communication issues). This stops testing to prevent loss of sampled data. |
| Message 4: | Secondary Device Buffer Overflow | This is displayed during testing if the secondary device's sample data buffer is filled to capacity (due to communication issues). This stops testing to prevent loss of sampled data. |
| Message 5: | No Communication, Primary Device | This is identical to message 1 except it is displayed when two devices are connected (like Dual Inclinometry) to indicate that communication between the primary device and the Console has been lost. |
| Message 6: | No Communication, Secondary Device | This is identical to message 1 except it is displayed when two devices are connected (like Dual Inclinometry) to indicate that communication between the secondary device and the Console has been lost |
| Message 7: | There Are No Saved Tests To Review | This message is displayed if the user tries to enter the review screen when there are no saved tests. It is also displayed if the user is in the review screen and deletes the last saved test. |
| Message 8: | Program Timeout | This message is displayed when the Console starts-up after a forced restart. |
| Message 9: | Device Not Synced | This message is displayed when two devices (Dual Inclinometry) lose synchronization. This prevents two sampled data values from different times from being used in the device calculations. |
| Message 10: | Bad Time-Stamp, Primary Device | This message is displayed during testing mode if the Console receives an out-of-order RF packet from the primary device. This ensures data integrity is maintained. |

**Messages (continued)**

A number of messages exist that will be displayed on the Console LCD when certain conditions are met. Each message is displayed with a message number as described below.

| Message # | Message | Description |
|---|---|---|
| Message 11: | Bad Time-Stamp, Secondary Device | This message is displayed during testing mode if the Console receives an out-of-order data packet from the secondary device. This ensures data integrity is maintained. |
| Message 12: | Bad Sample Number, Primary Device | This message is displayed during testing mode if the Console receives an out-of-order sample value from the primary device, or in cases of RF interference. This ensures data integrity is maintained. |
| Message 13: | Bad Sample Number, Secondary Device | This message is displayed during testing mode if the Console receives an out-of-order sample value from the secondary device, or in cases of RF interference. This ensures data integrity is maintained. |
| Message 14: | Must Connect To Primary First | This message is displayed if the user attempts to connect to a secondary device (Secondary Inclinometer) without first connecting to a primary device for testing. |
| Message 15: | No Registered Devices | This message is displayed if the user attempts to connect to a device when no devices have been registered with the Console. |
| Message 16: | Test Data Corrupted, Test Deleted | This message is displayed if corrupt test data is found while the user is in review mode. The corrupt test will automatically be deleted. This ensures data integrity is maintained. |
| Message 17: | Primary Device Calibration Is Corrupted | This message is displayed if the Console receives corrupt calibration from the primary device before entering a test. In some cases, if the user enters the settings menu and restores user calibration then the problem will be fixed. This will work only if factory calibration has not been corrupted. If factory calibration has been corrupted then the calibration values will have to be restored through a production utility or through recalibration. |
| Message 18: | Secondary Device Calibration Is Corrupted | This message is displayed if the Console receives corrupt calibration from the secondary device before entering a test. In some cases, if the user enters the settings menu and restores user calibration then the problem will be fixed.<br>This will work only if factory calibration has not been corrupted. If factory calibration has been corrupted then the calibration values will have to be restored through a production utility or through recalibration. |
| Message 19: | Zero Out Of Range | This message is displayed if the Console receives a device zero that is +/- 1 pounds from the factory zero using factory calibration information. This does not prohibit the user from testing. |
| Message 20: | Calibration Out Of Range | This message is displayed if the Console receives device calibration data that is +/- 10% of the factory calibration information. This does not prohibit the user from testing. |
| Message 21: | No Free Device Slots | This message appears if trying to register a new device when 20 devices have already been registered. |

## Warnings and Notifications

| | |
|---|---|
|  | Protection against ingress of liquids: Not protected against ingress of liquids. Keep Dry, do not immerse in water or autoclave any portion of Commander Echo Console, devices, or accessories. |
|  | Type of protection against electric shock: Type B applied part. |
|  | Devices emit non-ionizing radiation. |
|  | **Warning:** Devices are not sterile. |
|  | **Warning:** Devices should only be used by trained professionals. JTECH provides optional training to increase user efficiency and accuracy. Users should not use data from devices solely for diagnosis. |
|  | **Warning:** No modification of equipment is allowed. Do not open the Console, device, transceiver or receiver housings. Opening of housings by anyone other than an authorized JTECH service representative will void your warranty. Devices have no user servicable parts. |
|  | **Warning:** Enusre accessories are properly and fully inserted prior to use. |
|  | **Warning:** Use only a factory-supplied, medical-grade power supply certified to charge medical devices. Use of another charger may result in electrical shock or equipment damage. It is not recommended that you charge the devices by connecting them to a computer. |
|  | **Warning:** Devices are not intended for use while attached to the charger. Never attempt to operate the device while it is connected to the charger as electrical shock or damage to the device may occur. |
|  | **Warning:** Users should corroborate data from devices with their visual observations of the patient's capabilities |
|  | **Warning:** This device is not suitable for use in the presence of flammable anesthetic mixture with air, with oxygen or nitrous oxide, or in magnetic environments such as near MRI. |
|  | **Warning:** Follow all directions as specified by the CaviWipe product being used. Allow devices to dry before use. |
|  | **Notice:** Devices are precision medical devices and should be treated with care. Avoid dropping, banging, or other impacts to the devices. |
|  | **Notice:** Use only within designated operating parameters, i.e. temperature and humidity limits specified in this manual. |
|  | **Notice:** Any serious incident that has occurred in relation to these devices should be reported to the manufaturer and competent authority of the Member State in which the user and/or patient is established. |
|  | **Warning:** Discontinue use of any product if skin irritation develops. |

## Waste Disposal

| | |
|---|---|
|  | **Warning:** Devices contain Lithium Polymer batteries. Do not dispose of any device in fire. |
| | **Disposal Instructions:** Devices are not known to contain any hazardous materials. Consult your local waste management facility on proper disposal of solid waste. Recycling should be used where available. |

## EMC Notice

The Commander Echo wireless system includes a variety of devices containing a built-in radio frequency transceiver that transmits to, and receives data from, the Commander Echo Console. For more information on EMC see appendix “EMC Guidance” on page 61.

| | |
|---|---|
| ⚠ | **WARNING:** Medical Electrical Equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this manual. Carefully read the information contained in this section. |
| ⚠ | **WARNING:** The use of portable and mobile RF equipment can affect the normal operation of medical electrical equipment. |
| ⚠ | **WARNING:** Making any modifications or using any accessories not specifically approved by JTECH Medical may reduce immunity to electromagnetic interference or increase electromagnetic emissions. |
| ⚠ | **WARNING:** The Commander Echo Console and devices should not be used while stacked on, or adjacent to, other electrical or medical electrical equipment. If stacked or adjacent use is necessary, all electrical equipment should be observed to verify normal operation. |

## Wireless information

The Commander Echo Console and devices transmit in a 2.4 GHz wireless frequency.

**Contains FCC ID: OUR-XBEE or MCQ-S2CTH**

**Contains IC: 4214A-XBEE or 1846A-S2CTH**

**Contains: 005NYCA0378 or R210-105563**

FC This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i) this device may not cause harmful interference and (ii) this device must accept any interference received, including interference that may cause undesired operation.

## Declaration of Conformity

These devices are:

Class I measuring medical devices per Annex VIII of Regulation (EU) 2017/745 and UK MDR 2002
Class I medical devices per CFR Title 21 Part 888 Subpart B
Class II medical devices per Schedule 1, Part 1 of SOR/98-202

These devices also meet the following Technical Standards, to which Conformity is declared:

IEC 60601-1
IEC 60601-1-2

These devices are designed and manufactured in a facility certified to the following international standards:

ISO 13485

## Intended Use

The intended use is to assist the clinician with establishing an objective assessment of a person’s physical strength, range of movement, and (with the Algometer) establishing pain tolerance levels. The devices are intended to be used as non-invasive, non-surgical and transient devices.

## Indications/Contraindications for Use

The devices are indicated for use when objective assessment of strength, range of motion, or pain tolerance is required. The devices should not be used in the following circumstances: on or near the eyes, on or near fractures, on or near open wounds, on or near burned tissue, with patients suffering with severe osteoporosis, and for any purpose other than indicated.

## System Setup

The JTECH Medical Commander Echo Console is able to interface with up to seven (7) different device types. The devices and accessories will vary depending on which devices you have chosen to purchase for use with your Console. Refer to each device's section within this manual to ensure you received the proper items and accessories.

## Initial Battery Charge

Performing the required initial charge for your new device batteries is essential before attempting to use them. After initial charging is complete, you can begin testing immediately.

| | |
|---|---|
| ⚠ | **Warning:** Devices should not be used for testing while connected to the charger. |
| ⚠ | **Warning:** Use only a factory-supplied power supply to charge medical devices. Use of another charger may result in electrical shock or equipment damage. It is not recommended that you charge the devices by connecting them to a computer. |
| ℹ | **Notice:** Device batteries must be fully charged before attempting to use them with your Commander Echo System. Each device must charge for at least four (4) continuous hours before its first use. |
| ℹ | **Notice:** Be careful not to drop devices while connected to the charger as it may cause damage to the device. |

### Charging Device Batteries

1. Plug the battery charger USB daisy chain plug into the USB device charging jack. You can charge up to four devices at a time with one battery charger.
2. Place the device on a flat level surface or back in the case while it charges.
3. Plug the battery charger into a properly rated wall outlet. Batteries should be charged until the device indicates that charging is complete with a solid Green LED (approximately four (4) continuous hours each time you charge).
4. Once a device is charged, disconnect it from the USB daisy chain to avoid damage to the battery.
5. Charge all devices and the Console before establishing communications with your Console.

### Charging the Console Batteries

1. Plug the battery charger USB daisy chain plug into the USB Console charging jack. You can charge up to four devices at a time with one battery charger.
2. Place the Console on a flat level surface or back in the case while it charges.
3. Plug the battery charger into a properly rated wall outlet. Batteries should be charged until the Console indicates that charging is complete on the LCD screen (approximately four (4) to six (6) hours to fully recharge).
4. Once the Console is charged, disconnect it from the USB daisy chain.
5. Charge the Console and all devices before establishing communications between your Console and devices.

### Battery Life

The Commander Echo Console and devices have rechargeable Lithium Polymer batteries. The Console is able to operate for approximately thirteen (13) hours of continual use. The devices are able to operate between ten (10) and fourteen (14) hours of continual use. In order to conserve battery life, the Console has an automatic shut-off, which will trigger after 255 seconds (4.25 minutes) of inactivity (Note: test data and defaults will not be affected by the unit turning off).


## Commander Echo Console (9RF316)

Used to record information from the testing devices.

1. Press the Control Stick to enable the Commander Echo Console.
2. Select “Test”
3. Select the desired device.
4. Push the “On” button on the desired device to enable communication with the Commander Echo Console.

To turn the Console off, hold the Control Stick down for 2 seconds. (Note: in some menus you have to exit the menu before you can turn off the Console)

For detailed instructions on operating the Commander Echo Console, please refer to pages 12-19 in the manual.

For instructions for specific devices, please refer to Device Section of the manual that includes the Device you are interested in.

For instructions on performing specific tests, refer to the optional Multimedia Help.

For troubleshooting information, please see page 42

For technical specifications, please see page 50

## Accessories

Wrist Lanyard (7AC006) – The Wrist Lanyard is used to help prevent dropping the Commander Echo Console when carrying the Console.

# Using The Commander Echo Console

## Operating the Console Control Stick

The Commander Echo Console is fitted with a Control Stick, which allows you to turn the Console on and off, navigate through the menus, and make your selections. Refer to the following list in order to operate the Control Stick:

- Press the Control Stick to turn on the Commander Echo Console.
- From the main screen, hold the Control Stick to turn off the Commander Echo Console.
- With the Commander Echo Console turned on, pressing the Control Stick will select the highlighted menu option.
- Move the Control Stick up or down to navigate the menus and tests.
- When in the settings menu, move the Control Stick left or right to adjust test defaults.
- Hold the Control Stick to the left to return to the previous menu (Note: This function does not work while in the Setting Menu, changing the test settings, or when reviewing specific test information. Please select the “Exit” option from the menu in order to leave these screens).

## Main Menu

When the Commander Echo Console is powered on, the main menu will always be the starting screen. From the main menu, you can select the following options:

Test - Select this option to begin performing tests.
Review - Select this option to review any completed test data, or delete specific tests.
Settings - Select this option to set test defaults, see device info, or delete all test data.

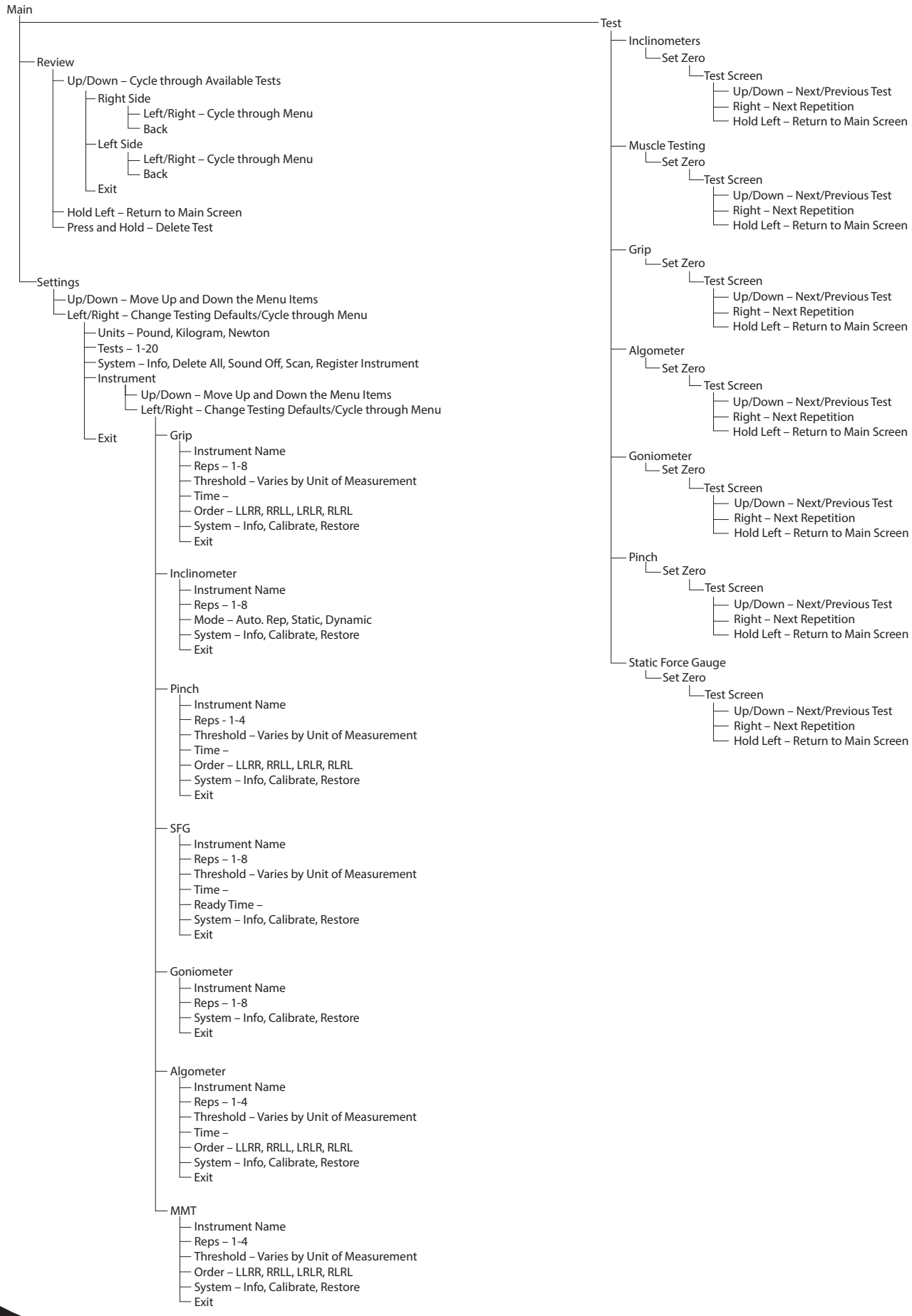
### Viewing And Changing Testing Defaults

The Commander Echo system allows for up to seven (7) different device types to be used with the same Console. The Commander Echo Console has several global settings, which will change the defaults for all of the devices. Other settings are device specific, and will be changed only when accessed via the specific device’s menu.

### Global System Settings

Wt. Units - Record and display in either Pounds (lb), Kilograms (kg), or Newtons (N).
Tests - Choose from 1-20 tests per exam.
System menu- View Device Info, Delete All Exam Data, or Turn the Sound On/Off.
Scan - Used to scan the RF channels and automatically set the best one.
Register - Used to register new devices to the Console.

# Console Menu Tree



## Device Specific Settings

### Inclinometer

Reps - Select from 1-8 repetitions (Note: This device does not differentiate between sides).
Mode - Select either Static, Dynamic, or Auto-Rep.
Info. - Displays device information (SN, REV, Battery, POS1-4)
Calibrate - Perform a full calibration of the selected device.
Restore - This will restore the device's calibration to factory settings.

### Muscle Tester (MMT)

Reps - Select from 1-4 repetitions, per side.
Threshold - Select a threshold at which the device will begin to record test data (1, 3, 5, 10, 20 lb).
Order - Select the order, in which the test will switch sides (LLRR, RRLL, LRLR, RLRL).
Info. - Displays device information (SN, REV, Battery, Zero CT, WT CT, Weight)
Calibrate - Perform a full calibration of the selected device.
Restore - This will restore the device's calibration to factory settings.

### Grip

Reps - Select from 1-8 repetitions, per side.
Threshold - Select a threshold at which the device will begin to record test data (3, 5, 10, 20 lb).
Time - Select a time, in seconds, for the test (1, 2, 3, 4, 5, or not timed).
Order - Select the order, in which the test will switch sides (LLRR, RRLL, LRLR, RLRL).
Info. - Displays device information (SN, REV, Battery, Zero CT, WT CT, Weight)
Calibrate - Perform a full calibration of the selected device.
Restore - This will restore the device's calibration to factory settings.

### Algometer

Reps - Select from 1-4 repetitions, per side.
Threshold - Select a threshold at which the device will begin to record test data (0.2, 0.4, 1, 3 lb).
Time - Select a time, in seconds, for the test (1, 2, 3, 4, 5, 30, or not timed).
Order - Select the order, in which the test will switch sides (LLRR, RRLL, LRLR, RLRL).
Info. - Displays device information (SN, REV, Battery, Zero CT, WT CT, Weight)
Calibrate - Perform a full calibration of the selected device.
Restore - This will restore the device's calibration to factory settings.

### Goniometer

Reps - Select from 1-8 repetitions (Note: This device does not differentiate between sides).
Info. - Displays device information (SN, REV, Battery, Zero CT, WT CT, Angle)
Calibrate - Perform a full calibration of the selected device.
Restore - This will restore the device's calibration to factory settings.

**Device Specific Settings (continued)**

**Pinch**

Reps - Select from 1-4 repetitions per side.
Threshold - Select a threshold at which the device will begin to record test data (0.4, 1, 3, 5 lb).
Time - Select a time, in seconds, for the test (1, 2, 3, 4, 5, or not timed).
Order - Select the order, in which the test will switch sides (LLRR, RRLL, LRLR, RLRL).
Info. - Displays device information (SN, REV, Battery, Zero CT, WT CT, Weight)
Calibrate - Perform a full calibration of the selected device.
Restore - This will restore the device's calibration to factory settings.

**Static Force Gauge (SFG)**

Reps - Select from 1-8 repetitions (Note: This device does not differentiate between sides).
Threshold - Select a threshold at which the device will begin to record test data (5, 10, 20 lb).
Time - Select a time, in seconds, for the test (1, 2, 3, 4, 5, or not timed).
Ready Time - Select a Ready Time, in seconds, which will run prior to the start of each repetition (0, 1, 2, 3s).
Info. - Displays device information (SN, REV, Battery, Zero CT, WT CT, Weight)
Calibrate - Perform a full calibration of the selected device.
Restore - This will restore the device's calibration to factory settings.

## Performing an Exam

Prior to beginning a test, ensure that the test defaults are set as desired (i.e. unit of measurement, number of tests, number of repetitions, etc.). Once test defaults are set, choose the "Test" option from the main menu, and follow the instructions listed under the specific device you will be testing with.

"Wireless Dual Inclinometers (9RF303, 9RF304)" on page 19.
"Wireless Muscle Tester (9RF305)" on page 22.
"Wireless Grip (9RF306)" on page 24.
"Wireless Algometer (9RF307)" on page 26.
"Wireless Goniometer (9RF308)" on page 28.
"Wireless Pinch Gauge (9RF309)" on page 30.
"Wireless Static Force Gauge (9RF310)" on page 32.

### Reviewing and Deleting a Test

Once a test has been completed, it will be stored on the Commander Echo Console until it is deleted. To view the completed test data, follow these steps:

1. From the main menu, select "Review."
2. Move the Control Stick up or down to navigate between the completed tests.
3. Press the Control Stick to view more specific information regarding a specific test (Note: moving the Control Stick up and down while viewing specific test information will move between tests).
4. Move the Control Stick left and right, and press to view more information for a specific side, or to exit the test information screen.
5. Hold down the Control Stick to delete individual tests.

### Redo Last Rep

While performing a test, you have the option to redo the last rep. After recording a rep:

1. Move the Control Stick left.
2. The LCD screen will display "REDO LAST REP?" Select "NO" or "YES".

### Skip Current Rep

While performing a test, you also have the option to skip the current rep. After recording a rep:

1. Move the Control Stick up, down or right.
2. The LDC screen will display "SKIP CURRENT REP?" Select "NO" or "YES".

## Calibration Settings

### Restoring Factory Calibration

Each device has been factory calibrated to ensure accuracy. It is possible that the user calibration may be different from these pre-set parameters, which may lead to invalid force/angle reading. Prior to performing a full calibration, attempt to restore the factory calibration stored on each device. If this does not correct the problem a full calibration may be required.

Follow these steps to restore the factory calibration:

1. Select "Settings" from the main menu.
2. Select "Device" from the Settings menu.
3. Select the Device, for which you wish to restore the factory calibration.
4. Highlight the "System" option in the Device menu.
5. Move the Control Stick left or right until you highlight "Restore."
6. Press the Control Stick to select restore.
7. The LCD screen will display the device ID at the top and Disconnected at the bottom.
8. Press the "On" button for the corresponding device followed by pressing the Control Stick on the Console to establish connection.
9. The LCD Screen will show the device is connecting.

10. If the device connects to the Console, the LCD screen will display “RESTORE CALIBRATION.”
    i. Select, “No” to return to the Settings menu.
    ii. Select “Yes” to restore the factory calibration settings.

ℹ Note: restoring the factory calibration only overwrites the user calibration data with the factory calibration data stored on the device.

**Performing a Full Calibration**

(For all Devices Except the Inclinometers and Goniometer)

Follow these steps to perform a full calibration:

1. Select “Settings” from the main menu.
2. Select “Device” from the Settings menu.
3. Select the Device, for which you wish to perform a full calibration.
4. Highlight the “System” option in the Device menu.
5. Move the Control Stick left or right until you highlight “Calibration.”
6. Press the Control Stick to begin calibration.
7. The Commander Echo Console will now attempt to connect to the selected device. Press the “On” button for the corresponding device followed by pressing the Control Stick on the Console to establish connection.
8. Follow the prompt to Press the Control Stick to set the device zero.
9. Move the Control Stick up and down to select the desired weight to be used for calibration.
10. Once the proper weight has been selected, and this weight is currently being applied to the device, press the Control Stick to enter the calibration point.

**Performing a Full Calibration on the Inclinometers**

Follow These Steps to Perform a Full Calibration:

ℹ Note: The angles for a full calibration on the inclinometers must be exact for the calibration to be valid. It is recommended to use a T-Square or other tools that have exact right angles.

1. Select “Settings” from the main menu.
2. Select “Device” from the Settings menu.
3. Select “Inclinometer.”
4. Select the device ID for the Device which you wish to perform a full calibration.
5. Using the joystick, scroll to the “System” option in the Device menu.
6. Move the joystick left or right until you highlight “Cal.”
7. Press the joystick to begin calibration.
8. The Commander Echo Console will now attempt to connect to the selected device.
9. Press the “on” button for the corresponding device to establish connection.
10. Set the inclinometer in the upright position.
11. Press the joystick to save this position.
12. Rotate the inclinometer 90 degrees to the left.
13. Press the joystick to save this position.
14. Rotate the inclinometer 90 degrees more to the left, so it is 180 degrees from the starting position.
15. Press the joystick to save this position.
16. Rotate the inclinometer an additional 90 degrees to the left, so it is 270 degrees from the starting position.
17. Press the joystick to save this position.

**Performing a Full Calibration on the Goniometer**

Follow These Steps to Perform a Full Calibration:

1. Follow Steps 1-9 as above, selecting the goniometer in Step 3
2. Fully close the arm of the goniometer.
3. Press the joystick to set the device zero.
4. Open the arm of the goniometer to 180°

5. Press the joystick to save the calibration.

## Registering a New Device For Use With Your Commander Echo Console

The Commander Echo Console comes with all devices pre-registered for use; however, should you purchase a new device at a later time, the following instructions can be used to add or remove a device. If you need additional help registering new devices with the Console, contact customer service.

### Instructions for registering a new device

1. Select “Settings” from the main menu.
2. Highlight “System.”
3. Press left/right until “Register” is displayed.
4. Turn on the device followed by pressing the Control Stick.
5. If the Console successfully registers the device then the Console will return to the settings screen. Otherwise, once the device turns off, turn the device back on to try again.
6. To exit the registration without registering a device, hold left for 2 seconds.

### Instructions for deleting a registered device

1. Select “Settings” from the main menu.
2. Select “Device.”
3. Select the device type for the device ID you wish to delete and press the Control Stick.
4. Highlight “System.”
5. Press left/right until “Info” is displayed, and press the Control Stick.
6. Press up/down until the device ID that you wish to delete is displayed.
7. Hold the Control Stick until the Console returns to the settings screen.

### Instructions for changing the RF channel

1. Select “Settings” from the main menu.
2. Highlight “System.”
3. Press left/right until “Scan” is displayed, and press the Control Stick.
4. Wait approximately 10 seconds, when the Console is finished it will have set the best channel found at the time.

### Instructions For Multiple Commander Echo Consoles

1. After turning on a Console enter the “Test” menu to connect any device.
2. Next turn on an additional Console then follow the instructions for “changing the RF channel.
3. Connect to a device.
4. Repeat as necessary for each additional system
   This will insure that each Console does not interfere with any other Console at your location. A total of 12 systems can be setup to operate without interfering with each other. The 12 system limit does not account for possible interference from wireless systems other than Commander Echo.

### Displaying Device Battery Level

1. Select “Settings” from the main menu.
2. Select “Device.”
3. Select the device type for the device ID you wish to display battery level.
4. Highlight “System.”
5. Press left/right until “Info” is displayed, and press the Control Stick.
6. The Console will now attempt to connect to the selected device. Press the “On” button for the corresponding device followed by pressing the Control Stick on the Console to establish connection.
7. Once connected the Console LCD will show the device’s serial number, revision, battery level and calibration information.

**Displaying Console Battery Level**

1. Select “Settings” from the main menu.
2. Highlight “System.”
3. Press left/right until “Info” is displayed, and press the Control Stick.
4. The Console LCD will show the Console’s serial number, firmware revision, battery level, and RF channel.

## Features and Benefits

- The Commander Echo system is a battery powered portable wireless testing system, which allows for unprecedented mobility.
- Connect up to seven (7) different device types with one Commander Echo Console.
- Easy-to-read 2.5” diagonal LCD.
- Straightforward and easy to navigate menus and testing screens.
- Test settings can be changed to accommodate many different testing goals.
- The Console records repetition time period for timed force tests.
- The Console calculates and displays FAT% and Maximum force or maximum angle (DIFF) for each repetition.
- The Console calculates and displays Maximum force or Maximum Angle, CV%, Average of rep maximums, and DEF% for each test.
- Test data for up to 20 tests are stored on the Console until deleted, which allows for the freedom of testing now, and reviewing the tests at a later time.
- Additional device specific Features and Benefits can be found under the device specific sections.
- Hands Free Wireless Testing - no tethers or cables to interfere with testing or Clinic set up.
- Impact resistant PVC plastic housings.
- Ergonomic designs.
- Designed to meet testing criteria for published research.
- Long life rechargeable Lithium Polymer batteries, No replacement batteries needed.
- Displays calibration force in user’s preferred unit
- Quick data review of the last rep

## Available Upgrades

In addition to adding devices to your Commander Echo Console, the following upgrade products are available:

Commander Echo Downloader™ Software - Download stored tests from your Commander Echo Console into a spreadsheet like report and save the report in .rtf format for word processing software.

For more information on upgrades, contact your JTECH sales representative. See “Contact Information” on page 22.

Incorrect motion

Correct motion

# Wireless Dual Inclinometers (9RF303/9RF304, 9RF403/9RF404)

Used to convey functional abilities concerning Range of Motion (ROM).

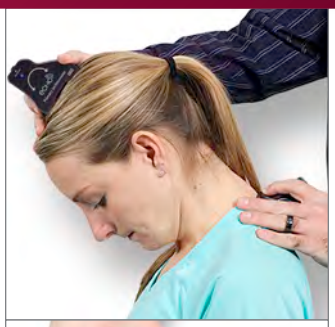
1. If using the alignment rails accessory, attach the alignment rail to the inclinometer by setting the “Feet” of the inclinometer on top of one alignment rail. Repeat for other inclinometer. To remove the alignment rail, grasp the alignment rail and inclinometer in opposite hands and pull to separate.
2. If using VELCRO® straps, attach the VELCRO® strap to the subject and then attach the back of the inclinometer to the VELCRO® strap using a slight twisting motion. To remove the inclinometer from the VELCRO® strap, peel the inclinometer from the VELCRO® strap and then remove the strap from the subject.
3. Push the “On” button on the inclinometer to enable communication with the Commander Echo Console. If necessary, repeat this procedure for the other inclinometer.

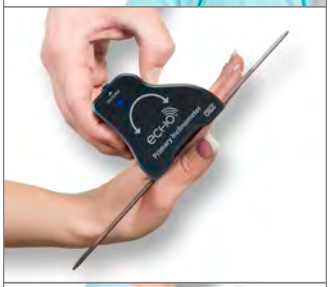
For instructions on operating the Commander Echo Console, please refer to the Console Section of the manual.

For instructions on performing specific tests, please refer to the optional Multimedia Help.

For troubleshooting information, please see page 43

For technical specifications, please see page 51





## Accessories

Alignment Rails (8MH068) – The Alignment Rails magnetically attach to the Inclinometers for easy visual confirmation of alignment.

VELCRO® Straps (AA 026) – The VELCRO® straps can be used for dynamic range of motion inclinometry testing. Comes in a set with Small, Medium, and Large straps.

Wrist Lanyard (7AC006) – The Wrist Lanyard is used to help prevent dropping devices when carrying, or when performing some tests.

## Introduction to Dual Inclinometers

JTECH Medical Dual Inclinometers were designed to make measuring spine and large extremity ranges of motion faster, easier and more accurate. Using Dual Inclinometers fulfills the requirement to capture the compound motion of the spine by measuring two points concurrently. Our Dual Inclinometers can be used to measure extremities using either single or dual inclinometry.

## Features

- Eliminates calculation, placement changes, and repeat procedures.
- Provides recording of the Total Range of Motion, Upper Segment Extreme and Lower Segment Extreme for spine range of motion measurements (vital data for AMA-based impairment rating).
- Records up to eight repetitions per test, for up to 20 tests.
- Features Dynamic, Static, and Auto-rep testing modes for the spine and extremities.
- In Auto-rep testing mode, the Console automatically records movement end-points so testing is more convenient.
- Measure extremities with either dual or single inclinometry.
- Capable of simulated goniometry.

## General Inclinometry Testing

Prior to beginning a test, ensure that the test defaults are set as desired (i.e. unit of measurement, number of tests, number of repetitions, etc.). Once test defaults are set, choose the "Test" option from the main menu, and follow these steps:

1. Select "Inclinometer" from the Test menu (Note: if you have purchased a new inclinometer and it is not on the list, see page 17 for instructions or contact customer service to register your new inclinometer).
2. Upon selection, the Commander Echo Console will attempt to connect with the Primary Inclinometer.
3. Press the "On/Enter" button for the Primary Inclinometer to establish a connection with the Commander Echo Console.
4. After successful connection to the Primary Inclinometer, the Console will ask if you want to "Connect to Secondary Device?" Select "Yes" or "No."
    i. If you select "Yes", Press the "On" button for the Secondary Inclinometer to establish a connection with the Commander Echo Console.
5. The Commander Echo will automatically advance to the next available test in the series. If no test data is currently being stored for the device, it will begin with Test 1. If all of the selected tests already have data stored, then the Commander Echo Console will display Message 2 on the LCD and not allow further testing until the data has been erased, or the test settings have been altered to allow for more tests.
6. Ready the patient and begin the test (Note: see the optional Multimedia Help for further information on specific testing procedures).
7. Once you have completed the pre-set number of repetitions for each side/test, the Commander Echo will automatically advance to the next test in the exam.
8. Once all tests have been completed, the Commander Echo Console will display Message 2 on the LCD to notify you that there are no more empty tests available. Pressing the Control Stick will bring you back to the main menu.

ℹ Note: The Commander Echo Console does not require a zero calibration of the Inclinometers prior to starting each exam.

## Static Testing Mode

Each individual rep is zeroed by pressing the Enter button at the beginning of the rep and ended by pressing the Enter button at the end of the repetition.
Static testing can be performed using either single or dual inclinometry protocols. Static testing means the patient's range of motion is measured in a static position. In Static Testing Mode, ROM is also only measured for a single joint movement, such as single inclinometry elbow flexion or dual inclinometry thoracic kyphosis. To perform static tests you must change into Static Testing Mode.

## Dynamic Testing Mode

Each TEST is zeroed on the first repetition. After being zeroed on the first rep, each rep is ended by pressing the Enter button again. This is similar to Static Testing Mode except that there is only one zero (at the beginning of rep 1).
Using dual inclinometry in Dynamic Testing Mode is the preferred method for measuring most spine ranges of motion. Dynamic Testing Mode measures movement pairs, such as cervical flexion/extension, or left and right cervical lateral flexion. To perform Dynamic tests you must change into Dynamic Testing Mode.
Dynamic tests can be performed using dual or single inclinometry. For dual inclinometry, the display provides three measurements: movement of both sensors and Total Range of Motion. For single inclinometry, the display only shows the Primary device's movement. Dynamic Testing Mode for dual or single inclinometry is essentially the same.

## Auto-rep mode:

Each TEST is zeroed on the first repetition. After being zeroed on the first rep, the inclinometer moves to some max angle (greater than 10 degrees from zero), and then returns to within 10 degrees of the zero position. The maximum angle will automatically be stored and the next rep will start.

## Extremity Protocols

Dual or single inclinometer methods can be used for measuring range of motion of each joint. Choose the method most comfortable for you to use. Dual or single inclinometer methods can be used with the protocols for measuring ankylosed joints. For instructions on performing specific tests, please refer to the optional Multimedia Help.

## Simulated Goniometer

The Inclinometers can be used to simulate a goniometer, both in dual and single inclinometry modes, when measuring extremity ranges of motion. While the individual angles of the Primary and Secondary units are displayed for dual inclinometry, only the Total Range of Motion value is typically required for extremity range of motion. The Dual Inclinometers are very accurate for measuring extremity ranges of motion because it effectively eliminates goniometer alignment errors and substantially increases inter- and intra-rater repeatability. For instructions on performing specific tests, please refer to the optional Multimedia Help.


# Wireless Muscle Tester (9RF305/9RF405)

Used to convey a subject's ability to resist force for a given muscle or muscle group. Also used for determining Max force a subject can exert.

1. Attach appropriate accessory to Muscle Tester by inserting the metal shaft on the accessory into the accessory receptacle on the Muscle Tester. **Note:** A Flat Pad, or Curved Pad must be used with the Muscle Tester.
2. Push the "On" button to enable communication with the Commander Echo Console.

For instructions on operating the Commander Echo Console, please refer to the Console Section of the manual.

For instructions on performing specific tests, please refer to the optional Multimedia Help.

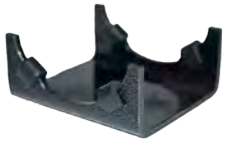
For troubleshooting information, please see page 43

For technical specifications, please see page 52

## Accessories

Flat Pad (8AC008) – The flat pad can be used for exerting force against flat items.

Curved Pad (8AC009) – The curved pad can be used for exerting force against items that are not completely flat.



Muscle Tester Cradle (9AC001) – The Muscle Tester Cradle provides a stable platform to rest the muscle tester.

Wrist Lanyard (7AC006) – The Wrist Lanyard is used to help prevent dropping devices when carrying, or when performing some tests.

## Features and Benefits

Muscle Tester Dynamometer:

- Produces very stable make or break tests.
- Reduces “roll-over” and tilting with a 2.4” high ergonomic design that fits in the palm.
- Uses snap-in-place Quick Connect™ system for changing accessory pads, which is much faster than old-fashion screw-on methods.
- Axis Compensation™ “smart” load cell technology. Maintains accuracy even when force is applied off-center.
- Measures up to 200 pounds.
- Test protocols can be customized according to number of tests, Threshold, Newtons, Kilograms or Pounds and number of repetitions.

## General Muscle Testing

The Muscle Tester was designed to fit comfortably in the palm of your hand during muscle testing. It can be used to test with either hand. Its slim profile and ergonomic design helps prevent rollover.

Prior to beginning a test, ensure that the test defaults are set as desired (i.e. unit of measurement, number of tests, number of repetitions, etc.). Once test defaults are set, choose the “Test” option from the main menu, and follow these steps:

1. Select “MMT” from the Test Menu (Note: if you have purchased a new device and it is not on the list, see page 17 for instructions or contact customer service to register your new Muscle Tester).
2. Upon selection, the Commander Echo Console will attempt to connect with the chosen device.
3. Press the “On” button for the corresponding device to establish a connection with the Commander Echo Console.
4. The Commander Echo Console will require a device zeroing prior to starting each exam. With the device in a neutral position (no pressure applied), press the Control Stick to set the device zero.
5. The Commander Echo will automatically advance to the next available test in the series. If no test data is currently being stored for the device, it will begin with Test 1. If all of the selected tests already have data stored, then the Commander Echo Console will display Message 2 on the LCD and not allow further testing until the data has been erased, or the test settings have been altered to allow for more tests.
6. Ready the patient and begin the test (Note: see the optional Multimedia Help for further information on specific testing procedures).
7. Once you have completed the pre-set number of repetitions for each side/test, the Commander Echo will automatically advance to the next test in the exam.
8. Once all tests have been completed, the Commander Echo Console will display Message 2 on the LCD to notify you that there are no more empty tests available. Pressing the Control Stick will bring you back to the main menu.

# Wireless Grip (9RF306/9RF406)

Used to convey functional abilities concerning grip strength.

1. Attach the positionable handle on the appropriate rung of the Grip gauge by placing the Y-end on the chosen rung, then rotating the C-end to the opposing rung and pushing the quick lock spring over the rung, locking the handle in place.
2. Push the “On” button to enable communication with the Commander Echo Console.

For instructions on operating the Commander Echo Console, please refer to the Console Section of the manual.

For instructions on performing specific tests, please refer to the optional Multimedia Help.

For troubleshooting information, please see page 43

For technical specifications, please see page 53

## Rung Positions


## Accessories

Grip Cable (9AK103) – The Grip Cable is used for attaching weights to the Grip.

Wrist Lanyard (7AC006) – The Wrist Lanyard is used to help prevent dropping devices when carrying, or when performing some tests.

## Features and Benefits

Grip Dynamometer:

- Uses standard gauge for comparison to published norms.
- Up to eight repetitions per side.
- Helps determine consistency of effort in workers compensation and FCE exams.
- Measures up to 200 pounds for very strong performers.
- Test protocols can be customized according to number of tests, starting force, newtons/kilograms/pounds, test time and number of repetitions.
- Axis Compensation™ "smart" load cell technology. Maintains accuracy even when force is applied off-center.

## General Grip Testing

In order for a grip test to be used as a validity check, a minimum of two repetitions must be performed bilaterally. Additionally, to obtain fatigue data the test must be timed (see Setup Mode on page 7). Validity is based on the coefficient of variation (CV) of the completed repetitions for the hand and grip position. Generally, CVs greater than 15% denote inconsistency of effort. If a strength deficit greater than 15% exists bilaterally, weakness is indicated. For proper documentation purposes, make sure that the grip position corresponds with the test number selected on the Commander Echo Console.

Prior to beginning a test, ensure that the test defaults are set as desired (i.e. unit of measurement, number of tests, number of repetitions, etc.). Once test defaults are set, choose the "Test" option from the main menu, and follow these steps:

1. Select "Grip" from the Test Menu (Note: if you have purchased a new device and it is not on the list, see page 17 for instructions or contact customer service to register your new device).
2. Upon selection, the Commander Echo Console will attempt to connect with the chosen device.
3. Press the "On" button for the corresponding device to establish a connection with the Commander Echo Console.
4. The Commander Echo Console will require a device zeroing prior to starting each exam. With the device in a neutral position (no pressure applied), press the Control Stick to set the device zero.
5. The Commander Echo will automatically advance to the next available test in the series. If no test data is currently being stored for the device, it will begin with Test 1. If all of the selected tests already have data stored, then the Commander Echo Console will display Message 2 on the LCD and not allow further testing until the data has been erased, or the test settings have been altered to allow for more tests.
6. Ready the patient and begin the test (Note: see the optional Multimedia Help for further information on specific testing procedures).
7. Once you have completed the pre-set number of repetitions for each side/test, the Commander Echo will automatically advance to the next test in the exam.
8. Once all tests have been completed, the Commander Echo Console will display Message 2 on the LCD to notify you that there are no more empty tests available. Pressing the Control Stick will bring you back to the main menu.


# Wireless Algometer (9RF307/9RF407)

Used to convey pain response and pressure threshold.

1. Attach appropriate accessory to Algometer by inserting the metal shaft on the accessory into the accessory receptacle on the Algometer. **Note:** One of the Algometry Tips must be used with the Algometer.
2. Push the "On" button to enable communication with the Commander Echo Console.

For instructions on operating the Commander Echo Console, please refer to the Console Section of the manual.

For instructions on performing specific tests, please refer to the optional Multimedia Help.

For troubleshooting information, please see page 43

For technical specifications, please see page 54

## Accessories

0.5cm² Algometer Tip (8AC006) – The 0.5cm² Algometer Tip can be used for cervical testing.

1.0cm² Algometer Tip (8AC005) – The 1.0cm² Algometer Tip conforms to normative testing.

Finger Tip Adapter (8AC007) – The Finger Tip Adapter converts the Algometer for testing individual finger strength.

Wrist Lanyard (7AC006) – The Wrist Lanyard is used to help prevent dropping devices when carrying, or when performing some tests.

## Features and Benefits

- Measures up to 25 lb
- Multiple tip sizes for different testing applications
- Replaceable rubber tips
- Use for both Algometry and Finger strength testing
- Axis Compensation™ "smart" load cell technology. Maintains accuracy even when force is applied off-center.

## General Algometry Testing

Prior to beginning a test, ensure that the test defaults are set as desired (i.e. unit of measurement, number of tests, number of repetitions, etc.). Once test defaults are set, choose the "Test" option from the main menu, and follow these steps:

1. Select "Algometer" from the Test Menu (Note: if you have purchased a new device and it is not on the list, see page 17 for instructions or contact customer service to register your new device).
2. Upon selection, the Commander Echo Console will attempt to connect with the chosen device.
3. Press the "On" button for the corresponding device to establish a connection with the Commander Echo Console.
4. The Commander Echo Console will require a device zeroing prior to starting each exam. With the device in a neutral position (no pressure applied), press the Control Stick to set the device zero.
5. The Commander Echo will automatically advance to the next available test in the series. If no test data is currently being stored for the device, it will begin with Test 1. If all of the selected tests already have data stored, then the Commander Echo Console will display Message 2 on the LCD and not allow further testing until the data has been erased, or the test settings have been altered to allow for more tests.
6. Ready the patient and begin the test (Note: see the optional Multimedia Help for further information on specific testing procedures).
7. Once you have completed the pre-set number of repetitions for each side/test, the Commander Echo will automatically advance to the next test in the exam.
8. Once all tests have been completed, the Commander Echo Console will display Message 2 on the LCD to notify you that there are no more empty tests available. Pressing the Control Stick will bring you back to the main menu.

# Wireless Goniometer (9RF308/9RF408)

Used to convey functional abilities concerning hand and extremity Range of Motion (ROM).

1. If necessary, attach the Goniometer extension arms by aligning the extension's metal pins or holes with the metal pins or holes on the Goniometer. Press straight down until the extension makes contact with the Goniometer arm.
2. If necessary, to remove the extension arms grasp the extension arm near the metal pins and gently wiggle the extension as you pull it away from the goniometer arm. Do not bend, or twist the extension to disengage as the extension may break.
3. Push the "On" button to enable communication with the Commander Echo Console.

For instructions on operating the Commander Echo Console, please refer to the Console Section of the manual.

For instructions on performing specific tests, please refer to the optional Multimedia Help.

For troubleshooting information, please see page 43

For technical specifications, please see page 55



## Accessories

Goniometer Extension arms (9AK113) - Aids in visual confirmation of alignment, or in aligning the Goniometer to extremities. Comes in a set of two (2) arms.

Wrist Lanyard (7AC006) – The Wrist Lanyard is used to help prevent dropping devices when carrying, or when performing some tests.

## Features and Benefits

- Real-time Numerical Data
  As the goniometer is opened and closed, the degrees of motion from the neutral starting position of the goniometer are displayed in realtime on the Console screen.
- Measure up to 210°
- Can be used for small digit Hand Range of Motion (ROM)
- Accommodates flexion through hyperextension
- Extensions for large extremity alignment

## General Goniometry Testing

The Goniometer is used to evaluate range of motion of the extremities, including fingers and toes. Standard range of motion protocols are published in the Guides to the Evaluation of Permanent Impairment, Fifth Edition (AMA), Measurement of Joint Motion: A Guide to Goniometry (Norkin and White), and Clinical Assessment Recommendations: 2nd Edition (ASHT).

Prior to beginning a test, ensure that the test defaults are set as desired (i.e. unit of measurement, number of tests, number of repetitions, etc.). Once test defaults are set, choose the “Test” option from the main menu, and follow these steps:

1. Select “Goniometer” from the Test Menu (Note: if you have purchased a new device and it is not on the list, see page 17 for instructions or contact customer service to register your new device).
2. Upon selection, the Commander Echo Console will attempt to connect with the chosen device.
3. Press the “On” button for the corresponding device to establish a connection with the Commander Echo Console.
4. The Commander Echo Console will require a device zeroing prior to starting each exam. With the device in a neutral position (the small arm fully closed), press the Control Stick to set the device zero.
5. The Commander Echo Console will automatically advance to the next available test in the series. If no test data is currently being stored for the device, it will begin with Test 1. If all of the selected tests already have data stored, then the Commander Echo Console will display Message 2 on the LCD and not allow further testing until the data has been erased, or the test settings have been altered to allow for more tests.
6. Ready the patient and begin the test (Note: see the optional Multimedia Help for further information on specific testing procedures).
7. Once you have completed the pre-set number of repetitions for each side/test, the Commander Echo Console will automatically advance to the next test in the exam.
8. Once all tests have been completed, the Commander Echo Console will display Message 2 on the LCD to notify you that there are no more empty tests available. Pressing the Control Stick will bring you back to the main menu

## Extensions

For most extremity range of motion measurements the goniometer should be used with the plastic “extension” arms attached. With large extremity measurements, the extensions help provide better alignment to landmarks to make your goniometry measurements more accurate and repeatable. The extensions should be removed for finger and toe measurements.


# Wireless Pinch Gauge (9RF309/9RF409)

Used to convey functional abilities concerning pinch strength.

1. Push the “On” button to enable communication with the Commander Echo Console.

For instructions on operating the Commander Echo Console, please refer to the Console Section of the manual.

For instructions on performing specific tests, please refer to the optional Multimedia Help.

For troubleshooting information, please see page 43

For technical specifications, please see page 56





## Accessories

Wrist Lanyard (7AC006) – The Wrist Lanyard is used to help prevent dropping devices when carrying, or when performing some tests.

## Features and Benefits

Pinch Dynamometer:

- Uses standard gauge for comparison to published norms.
- Axis Compensation™ "smart" load cell technology. Maintains accuracy even when force is applied off-center.
- Measures up to 50 pounds for very strong performers.
- Helps determine consistency of effort in workers compensation and FCE exams.

## General Pinch Testing

Prior to beginning a test, ensure that the test defaults are set as desired (i.e. unit of measurement, number of tests, number of repetitions, etc.). Once test defaults are set, choose the "Test" option from the main menu, and follow these steps:

1. Select "Pinch" from the Test Menu(Note: if you have purchased a new device and it is not on the list, see page 17 for instructions or contact customer service to register your new device).
2. Upon selection, the Commander Echo Console will attempt to connect with the chosen device.
3. Press the "On" button for the corresponding device to establish a connection with the Commander Echo Console.
4. The Commander Echo Console will require a device zeroing prior to starting each exam. With the device in a neutral position (no pressure applied), press the Control Stick to set the device zero.
5. The Commander Echo will automatically advance to the next available test in the series. If no test data is currently being stored for the device, it will begin with Test 1. If all of the selected tests already have data stored, then the Commander Echo Console will display Message 2 on the LCD and not allow further testing until the data has been erased, or the test settings have been altered to allow for more tests.
6. Ready the patient and begin the test (Note: see the optional Multimedia Help for further information on specific testing procedures).
7. Once you have completed the pre-set number of repetitions for each side/test, the Commander Echo will automatically advance to the next test in the exam.
8. Once all tests have been completed, the Commander Echo Console will display Message 2 on the LCD to notify you that there are no more empty tests available. Pressing the Control Stick will bring you back to the main menu.


# Wireless Static Force Gauge (9RF310/9RF410)

Used to convey functional abilities concerning static strength in a variety of applications such as lifting, pushing, or pulling, or to convey a subject's ability to resist force for a given muscle or muscle group.

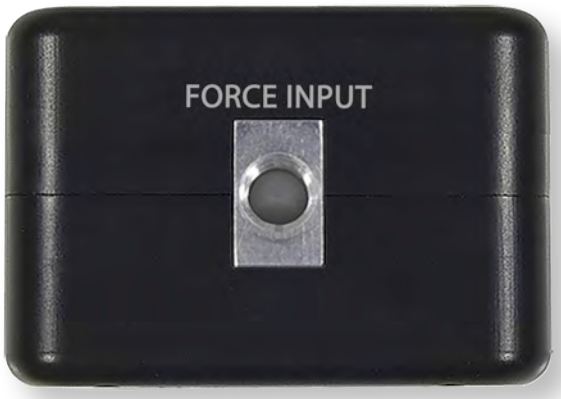
1. Attach appropriate accessory to Static Force Gauge by threading the metal shaft on the accessory into the accessory attachment receptacle or force input receptacle on the Static Force Gauge.
2. Push the "On" button to enable communication with the Commander Echo Console.

For instructions on operating the Commander Echo Console, please refer to the Console Section of the manual.

For instructions on performing specific tests, please refer to the optional Multimedia Help.

For troubleshooting information, please see page 43

For technical specifications, please see page 57


# Wireless Static Force Gauge MAX (RF119)

Designed for greater capacity (750 lbf). Used to convey functional abilities concerning static strength in a variety of applications such as lifting, pushing, or pulling, or to convey a subject's ability to resist force for a given muscle or muscle group.

1. Attach appropriate accessory to Static Force Gauge by threading the metal shaft on the accessory into the accessory attachment receptacle or force input receptacle on the Static Force Gauge.
2. Push the "On" button to enable communication with the Commander Echo Console.

For instructions on operating the Commander Echo Console, please refer to the Console Section of the manual.

For instructions on performing specific tests, please refer to the optional Multimedia Help.

For troubleshooting information, please see page 43

For technical specifications, please see page 58





## Accessories

T-Bar (AC012) – The T-Bar is essential for doing lifting or pulling tests that require the use of two hands. Attaches to the Accessory Attachment receptacle.

D-Handle (9AC003)– The D-Handle is the perfect choice for doing one-hand lifts or pulls. Attaches to the Accessory Attachment receptacle.

Hook w/Stud (741) – The hook attachment allows you to use virtually any item for lifting or pulling tests. Attaches to the Force Input receptacle.

Threaded Pad Adapter (8MH097) – Adapts the threaded Force Input receptacle to allow the metal shafts on the flat or curved pads to be inserted into the Static Force Gauge.

Flat Pad (8AC008)– The flat pad can be used for exerting force against flat items, or muscle testing. Attaches to the Threaded Pad Adapter.

Curved Pad (8AC009)– The curved pad can be used for exerting force against items that are not completely flat, or muscle testing. Attaches to the Threaded Pad Adapter.

12” Cable (9AC007) – The cable can be used for different lifting, pushing or pulling, or static strength tests.

4” Push Disk (9AC004) – The 4” Push Disk can be used for exerting force against flat items. The Push Disk offers more surface area for pushing activities, and greater flexibility for various testing applications than the Flat pad. Attaches to the Force Input receptacle.

Optional V-Slot (745) – The optional V-Slot makes it easy to exert force against the corner of walls or other structures for doing push tests. Attaches to the Force input receptacle.

Optional 16” T-Bar – The 16” T-Bar allows for wider placement between hands when performing lifting or pulling tests.

## Features and Benefits

- Standard Static Force Gauge measures up to 500 lb. Static Force Gauge MAX measures up to 750 lb.
- Six (6) different accessories to create the tests you want
- Auto Direction (push or pull) selection after first rep
- Determine weight or mass of objects
- Axis Compensation™ "smart" load cell technology. Maintains accuracy even when force is applied off-center.

## General SFG Testing

To conduct a test, force in excess of the default threshold must be exerted on the gauge. The test begins when either the ready time expires after the threshold has been crossed or, if no ready time is set, the default threshold force must be exceeded. A test ends when test time expires or the force on the gauge drops back below the threshold. The display then indexes to the next repetition in the series. After all repetitions for a test are completed, the display indexes to the next sequential test number. Continue testing with this method until all tests are recorded in the Console's memory.

Prior to beginning a test, ensure that the test defaults are set as desired (i.e. unit of measurement, number of tests, number of repetitions, etc.). Once test defaults are set, choose the "Test" option from the main menu, and follow these steps:

1. Select "SFG" from the Test Menu (Note: if you have purchased a new device and it is not on the list, see page 17 for instructions or contact customer service to register your new device).
2. Upon selection, the Commander Echo Console will attempt to connect with the Static Force Gauge.
3. Press the "On" button for the corresponding Static Force Gauge to establish a connection with the Commander Echo Console.
4. The Commander Echo Console will require a device zeroing prior to starting each exam. With the device in a neutral position (no pressure applied), press the Control Stick to set the device zero.
5. The Commander Echo will automatically advance to the next available test in the series. If no test data is currently being stored for the device, it will begin with Test 1. If all of the selected tests already have data stored, then the Commander Echo Console will display Message 2 on the LCD and not allow further testing until the data has been erased, or the test settings have been altered to allow for more tests.
6. Ready the patient and begin the test (Note: see the optional Multimedia Help for further information on specific testing procedures).
7. Once you have completed the pre-set number of repetitions for each side/test, the Commander Echo will automatically advance to the next test in the exam.
8. Once all tests have been completed, the Commander Echo Console will display Message 2 on the LCD to notify you that there are no more empty tests available. Pressing the Control Stick will bring you back to the main menu.

ℹ Note: In review mode, the Console differentiates between SFG push/pull by designating push values as negative and pull values as positive. In test mode, SFG displays the magnitude as positive regardless of direction until the value crosses the threshold. For the rest of the test, the values will be positive for the force direction that is in direction of the crossed threshold and negative in the opposite direction. The Console will only record positive test values.

# Optional Commander Echo Downloader® Software

## User Manual for Commander Echo Downloader®

The Optional Commander Echo Downloader software provides an easy-to-use interface for creating reports which can be printed, or saved, from data on your Commander Echo Console. The reports are stored in .rtf format, which allows the user to open the reports using Microsoft Word 2007, or newer.


## Computer Specifications

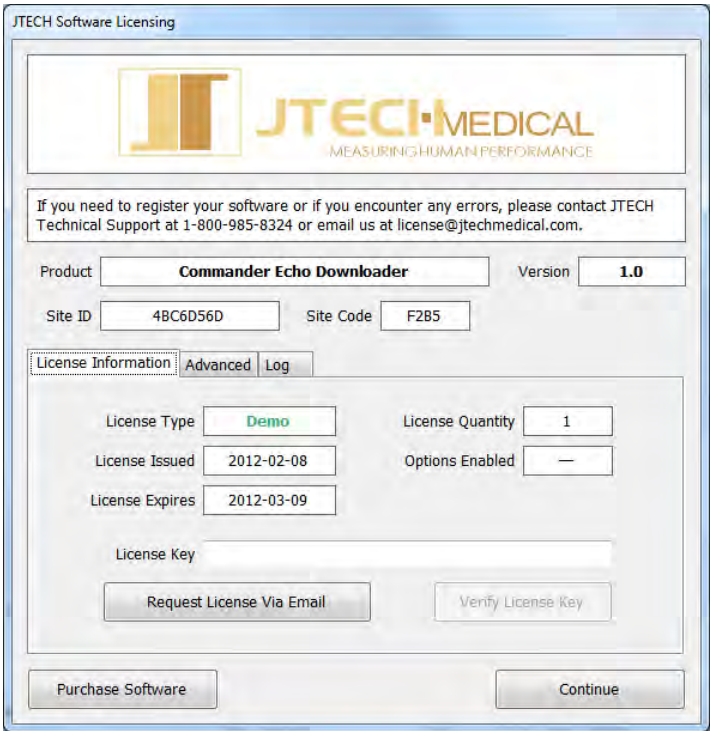
For system requirements please visit: https://www.jtechmedical.com/system-requirements.

## Installing From a Flash Drive

1. Insert the JTECH Medical Commander Echo Downloader Software USB drive into one of your computer's available USB ports. If the folder for the USB does not open automatically, locate the USB drive and open the folder.
2. Browse the files and double-click on the "DownloaderSetup.exe" file to launch installer. If you are prompted to install Microsoft Visual C++ 2008 SP1 Redistributable Package (x86), click the "Install" button. If you are prompted by User Account Controls, select the "Allow" option.
3. Follow the on-screen instructions to complete the Commander Echo Downloader installation.

## First Time Using Commander Echo Downloader

When you first open the Commander Echo Downloader Software, you will need to contact JTECH Medical customer service in order to register your software, and receive a license for continual use.
The following form will open:




License Screen


About Screen

Contact JTECH Medical at (385) 695-5000 or click the "Request a License Via Email" button in order to obtain a license key.

## Using Commander Echo Downloader

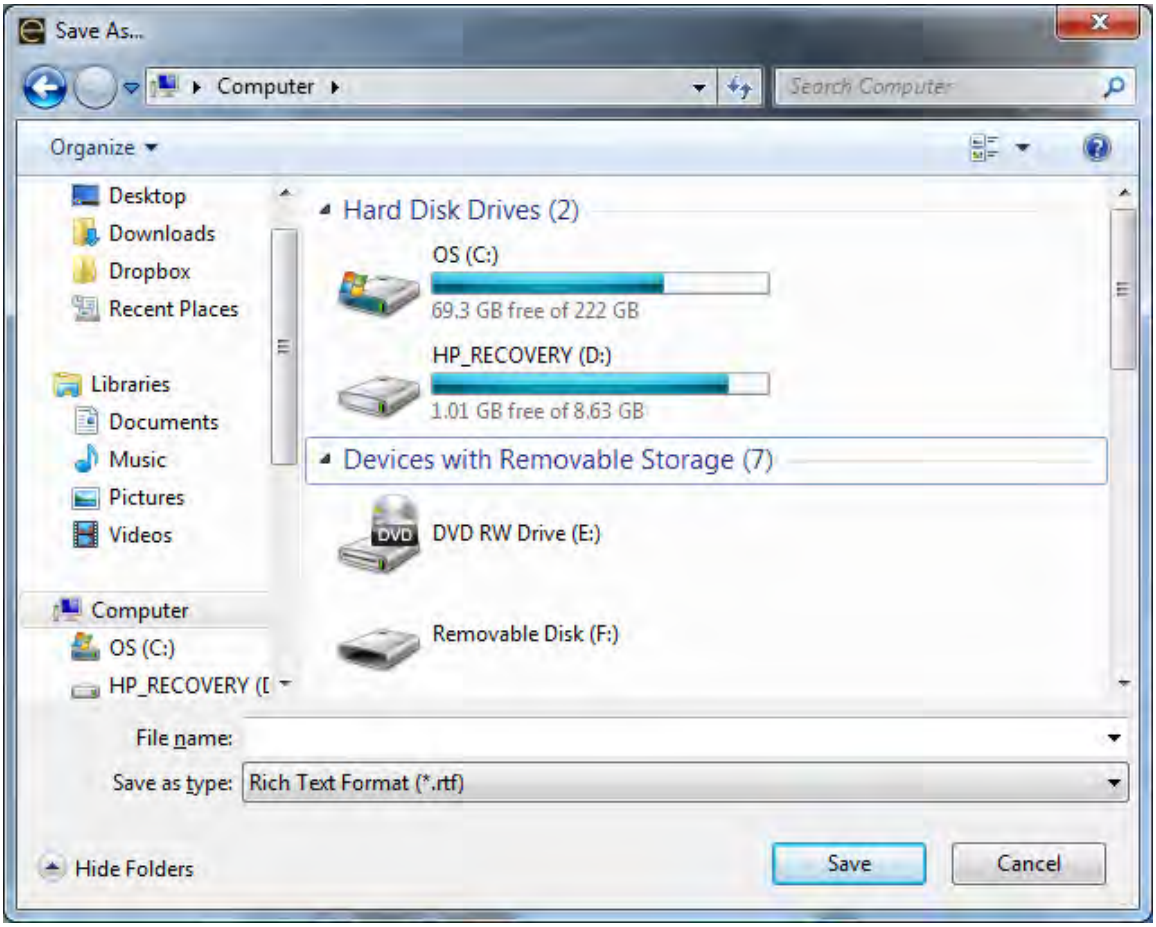
With the Commander Echo Console connected to the computer with the supplied USB cable, open the Commander Echo Downloader Software. The software should show that the Console's status is Connected, and the firmware box should be populated.


Click on the "Load Tests" button to import the test data you have collected on your Commander Echo Console. Once the tests have been loaded, the software will display "Test Data Loaded!"
Choose any options you would like to include on the reports from the "Report Fields" and "Report Footer" boxes. You may also change the color that the report uses for its headers and table fields.
Once you have these options selected, press the "Save Report" button.

A dialogue box will launch, at which point you will choose a name and location to save the document onto your computer.
Once you have chosen a name and location for your report, click on the “Save” button. Your report will be saved, and the computer will automatically open the report with the program you have chosen as the default for opening .rtf files, at which point you can review and print your reports.

## Notes about the Software

Click the “Manual” button to open the Commander Echo manual through the software. It will automatically attempt to open the manual with the program you have chosen as the default for opening .pdf files.
Click the “Exit” button, or the ‘X’ in the top-right of the software, to close the software and save your current program settings.
Click the “About” button to open the About Form. The About Form provides software version information as well as JTECH contact information and links to our websites. The “License” button on the About Form will close the About Form and open up the JTECH Software Licensing form.



## General Information

The following section is provided to help you with questions about your JTECH Medical Wireless Functional Testing System.

What happens if I take the device out of range during a test?

*If the device is transmitting to the receiver when it moves out of range (beyond 3 meters), communications for all active devices can be lost and the data cannot be retrieved. To re-establish communications, move the device back within the transmission range and restart the test.*

Can my Commander Echo Console pick up signals from other devices like wireless phones or wireless networks?

*Wireless networks, cordless phones or other devices can potentially cause interference with your Commander Echo System. As a precaution, we recommend that you minimize their usage within the transmission range of your Commander Echo System. We have taken every precaution and tested to the highest standards to ensure accurate data transmission with your System. The main reason for linking your JTECH Medical wireless devices with your Console is to reduce the potential for unintentional data transfer from other devices, including other Commander Echo systems operating in the area. We have also incorporated state-of-the-art methods, such as direct sequence spread spectrum, modulation, and unique device identification to reduce the possibility of miscommunication.*

Is there any other type of interference I need to worry about?

*As with any radio transmission, high-powered electromagnetic devices should be avoided. For example, you should not operate your system near microwave ovens or X-ray machines.*

Can I block the signal during testing?

*Unlike infrared systems, JTECH Medical's wireless is not based on line of sight, so standing between the device and the receiver should not interfere with the signal, provided you are within the operational distance.*

How do I know when the device's battery is low?

*The LED on the device will begin rapidly blinking Red instead of Blue when connected (see the device LED codes on page 4). Additionally, there is a "low battery" indicator on the Console's LCD screen. If the LED is Rapidly blinking Red, this indicates that less than 20 minutes of battery power remains.*

How long do devices continue to operate after the low power signal?

*The amount of operational time for each device varies, but approximately 20 minutes. Like a cell phone, the device uses more power when active and sending data than when in the off power state. Our recommendation is to place the device on the charger as quickly as possible after the low power signal comes on.*

Can I use the device without fully charging it?

*Yes. The device will function without a full charge, but the operational time will be significantly reduced. You should place the device back on the charger to completely charge the battery as soon as possible.*

**Warning:** Devices are not intended for use while attached to the charger. Never attempt to operate the device while it is connected to the charger as electrical shock or damage to the device may occur.

**Warning:** Use only a factory-supplied, medical-grade power supply certified to charge medical devices. Use of another charger may result in electrical shock or equipment damage. It is not recommended that you charge the devices by connecting them to a computer.

How long do the batteries take to charge?

*The initial charge takes four (4) continuous hours of charging to complete. The first charge is important as it can affect the amount of power the battery will hold. Subsequent charges should also be completed in four hours, or until the device indicates that charging is complete.*

What happens if I leave the device on the charger too long?

*We have designed special circuitry to protect the device's electronic components. The device automatically turns off after four (4) to six (6) hours, or when charging is complete. Devices should be left to charge until they indicate that they are done. As with any Lithium Polymer battery, leaving devices connected to the charger for extended periods (e.g. weeks) can reduce the overall life of the battery. Leaving devices connected over the weekend should not affect the life of the batteries.*

What happens if my device does not recharge?

*Because of the sensitive electronics inside, devices are not designed for battery replacement in the field. If a device fails to hold a charge, contact JTECH Medical Customer Service.*

What are the current travel restrictions for JTECH Medical Wireless Devices?

*Current regulations do not prohibit carrying on JTECH Medical wireless devices or checking them in baggage. Since the batteries are already installed safely in the devices, there are no FAA, TSA or DOT restrictions on checking the devices. If the devices are checked, they should be secured properly in the hard case to guard against the device being turned on during transport.*

More information and Frequently Asked Questions are available for your JTECH Medical Commander Echo Console and devices by visiting our customer portal at http://help.jtechmedical.com

## Troubleshooting Your Console

| Problem | Probable Cause | Possible Solution |
|---|---|---|
| The Windows "Found New Hardware" process is triggered when the Console is connected via USB. | First time installation or plugging the Console into a different USB port. | Please select yes, install, or continue, this is expected behavior and should be allowed to run. No specified drivers are included as Windows includes the default drivers. |
| Console does not appear to respond to the charger. The green-colored LED does not light. | Bad Connection or Inoperable Battery. | Check the USB 4-Way Splitter connection to the charger and the Console. If the 4-Way Splitter connections appear to be good; remove all other devices and try connecting the Console to a different USB connection on the 4-Way Splitter. If the LED does not light up after 60 minutes, contact JTECH Customer Service for repair options. |
| The Control Stick will no longer click when pressed. | Possible damaged switch. | Please contact JTECH Support for repair options. |
| Console LED blinks rapid red and does not stop. | Dead battery indicator. | Charge the Console for one complete cycle (up to 6 hours) and attempt to use it again. |
| Console does not turn on and/or the LED does not blink when trying to turn on. | The Console software has locked up or the battery charge is fully depleted. |  Use reset pin to press the reset switch through the reset pin hole on the backside of the Console. If the Console still does not turn on, connect the Console to the charger for 1 hour. If the Console turns on after 1 hour, allow the Console to continue charging. Otherwise contact JTECH support for repair options. |
| Console Displays "Bad Sample" message | RF interference or other wireless systems using the same radio spectrum. Can also be caused by additional Commander Echo systems in operation. | Initiate an auto scan to try switching radio channel to one which has less RF interference. This can resolve most problems with RF interference and multiple Commander Echo systems being in use. |

Additional Console troubleshooting information can be found by visiting our customer portal at http://portals.jtechmedical.com

## Troubleshooting Your Devices

| Problem | Probable Cause | Possible Solution |
|---|---|---|
| Device does not appear to respond to the charger. The LED does not light. | Bad Connection or Inoperable Battery. | Check the USB daisy chain connection to the charger and the device. If the daisy chain connections appear to be good; remove all other devices and try connecting the device to a different USB connection on the USB daisy chain. If the LED does not light up after 60 minutes, contact JTECH Customer Service for repair options. |
| The Enter button will no longer click when pressed. | Possible damaged switch. | Please contact JTECH Support for repair options. |
| Device LED blinks rapid RED and then stops after a few seconds on any attempt to turn the device on. | Dead battery Indicator. | Charge the device for one complete cycle (up to 6 hours) and attempt to use it again. |
| Device does not turn on and/or the LED does not blink when trying to turn on. | The device software has locked up or the battery charge is fully depleted. |  Use reset pin to press the reset switch through the reset pin hole on the device. If the device still does not turn on, connect the device to the charger for 1 hour. If the device turns on after 1 hour, allow the device to continue charging. Otherwise contact JTECH support for repair options. |
| LED blinking rapidly while attempting to connect, but device does not connect. | Radio needs to be reconfigured. | Connect to charger for 10 - 20 seconds minimum (This will reconfigure the radio). Disconnect and attempt wireless connection again. |

Additional device troubleshooting information can be found by visiting our customer portal at http://help.jtechmedical.com

## Storage and Cleaning of Devices

**Notice:** The Commander Echo Console and its devices are sensitive electronic devices, and should be handled with care. If handled and cared for properly, the devices have all been designed and manufactured to provide years of accurate and reliable use. Avoid dropping, banging, or other impacts to the devices. Use only within designated operating temperatures.

### Storage

When devices are not in use, store them in the protective carrying case.

1. If devices are stored for periods longer than 30 days, recharge batteries before using.
2. Store in an area with a controlled temperature within the recommended temperature range. (see temperature and humidity limits in “Technical Specifications” on page 50)
   **Important Notice:** Never store devices in an automobile, except when transporting them, regardless of the season.

### Cleaning, Disinfection, and Sterilization

**Warning:** Keep dry, do not immerse any part of any Commander Echo Console, devices, Console transceiver, receiver, or accessory in water or any other fluid.


Commander Echo Console, devices and accessories are non-sterile devices and are not compatible with sterilization techniques such as autoclave.

- Do not autoclave devices or accessories.
- Do not clean with abrasive materials.
- Do not clean with solvents, or disinfectant not approved by JTECH Medical.

**Recommended Cleaning of Commander Echo Console and Devices**

- Wipe surfaces with a soft, dry cloth.

**Recommended Alternative Method for Cleaning Devices and Accessories.**

- CaviWipes disinfecting towelette
  - Use only as directed, following all instructions and warnings on the CaviWipes packaging.

**Warning:** Follow all directions as specified by the CaviWipe product being used. Allow devices to dry before use.

## Preventative Inspection

Devices have no associated methods of preventative inspection.

**Maintenance**

Devices are not user serviceable and do not include a service manual.
For any service including maintenance, repair, and calibration, contact JTECH Medical Customer Support.

## Calibration of Device

### Zero Calibration

The devices have all been factory calibrated using weights certified by the National Institute of Standards and Technology (NIST). Factory calibration information is stored directly on the device itself. Should the Console ever begin to display erroneous information from a device, the factory calibration can be restored from within the Commander Echo Console menus, see “Restoring Factory Calibration” on page 15 for more information. If necessary, a full calibration can also be performed. Refer to “Performing a Full Calibration” on page 16 for further information on this process.

In order to continue testing with a high level of accuracy, the Commander Echo unit requires a zero calibration of the device being used prior to the start of each exam. For more detailed explanation of this process, refer to the “Performing an Exam” on page 15.

### Factory Calibration

ℹ Note: For information on recommended annual factory recalibration, contact JTECH Customer Service. See “Contact Information” on page 48.

## Product Registration

Please register your Commander Echo System as soon as possible. Your registration ensures that you have easy access to JTECH Medical Customer Service and Support. Software registration is required to receive your site key, which is necessary to run the software.

To register your system, contact JTECH Medical Customer Service. See “Contact Information” on page 48.

## Repair Policy

ℹ **Important Notice:** JTECH will not accept any products without a JTECH issued RMA number.

⚠ **Warning:** Commander Echo Console and devices have no user serviceable parts.

To have your Commander Echo Console or testing device repaired

Although the Commander Echo Console and JTECH Medical testing devices are manufactured with great care, and tested thoroughly prior to shipment, it is possible that your Echo Console or accompanying devices may require repair. If this unlikely event arises, please follow these instructions in order to ensure accurate and prompt servicing of your devices.

1. Contact JTECH Medical Customer Support to obtain a Return Material Authorization (RMA) number. See “Contact Information” on page 24.
2. Carefully package all devices, mark the RMA# on the outside of the package, and ship the devices using a service that offers both insurance and tracking of your package. Return just the component(s) (including all accessories) postage paid and insured to JTECH Medical.

ℹ **Notice:** JTECH reserves the right to refuse or to return-collect any merchandise sent for repair without prior authorization from our Customer Service Department. Please refer to page 47 for steps on requesting an RMA.

Authorized repairs must be shipped to:
JTECH Medical
7633 S Main, Bldg D
Midvale, UT 84047
ATTN: RMA# (insert number)

ℹ **Notice:** JTECH Medical is not responsible for loss or damage during shipping.

## Customer Support

JTECH Medical provides customer support for all the products we sell.
You may register up to three individuals from your office to serve as eligible customer support contacts (this can be done anytime during your support agreement). The three contacts are registered for the life of your support agreement. Please note that support will only be available to the registered individuals from your office.

## Support Policies

**Hardware**

Your hardware is shipped with a limited warranty (Please refer to the warranty section on page 48). You will be charged for any hardware issues (repair, replacement, shipping, etc.), after the initial warranty time period. You can buy extended warranties for your hardware.
Please contact JTECH Medical Customer Service for more information on JTECH Guardian Hardware Maintenance plans.

**Optional Commander Echo Downloader Software**

One registered user is eligible to receive Echo Downloader software support for six (6) months from the date of purchase.

## Before Calling for Support

1. Refer to the Console or Device user's guide in this manual first.
   This User's guide was written to acquaint you with the Console and devices. The guide explains how to use the Console and devices and how to review the data. Please read through this documentation carefully.

2. Refer to the Troubleshooting section in your documentation. Many hardware issues can be resolved by referring to this section on page 42. Additional troubleshooting information can be found by visiting our customer Help site at http://help.jtechmedical.com

3. If your question deals with the optional Echo Downloader software usage, refer to the software user's guide in this manual first.
   The User's guide was written to acquaint you with the software. The Echo Downloader User guide explains how to install and use the Echo Downloader program. Please read through this documentation carefully.

4. If you are unable to solve your problem using the included documentation, please have a registered support contact call JTECH Medical Customer Support. See "Contact Information" on page 48.

**To receive more accurate and efficient support**

1. Name of clinic and support contact
2. Customer number
3. Date of purchase
4. Product name or type and Product serial number(s)
5. Description of the problem

If you are calling in regards to the Optional Commander Echo Downloader Software please also have the following:

6. Computer specifications

## Product Return Policy

- New hardware may only be returned for credit within 15 days of receipt. No cash refunds will be issued.
- No returns of used or purchased demonstration inventory will be accepted.
- No software returns will be allowed after the seal on the software package is broken.

Hardware items returned for credit within 15 days will be subject to a 20% restocking fee*, provided the items are in new condition and in the original packaging. If items require refurbishing or repair, the cost of service or repair will be deducted from the amount of credit. A Return Material Authorization (RMA) number must be obtained from JTECH Customer Service prior to returning any merchandise. When phoning or writing for an authorization number to return merchandise, please provide the Customer Service Department with:

1. Your name or customer number as it appears on the invoice or packing slip.
2. Your telephone number and person to contact.
3. Your P.O. number if applicable.
4. The part or catalog number(s) and description.
5. The reason for the return.

JTECH reserves the right to refuse or to return-collect any merchandise sent back without prior authorization from our Customer Service Department. Authorized returns must be shipped to:

JTECH Medical
7633 S Main, Bldg D
Midvale, UT 84047
ATTN: RMA# (insert number)

When returning merchandise, please include a copy of your original invoice or packing slip to ensure prompt issuing of credit. Return the component(s) (including all accessories) postage paid and insured to JTECH Medical.

**Notice:** JTECH Medical is not responsible for loss or damage during shipping.
**Important Notice:** JTECH will not accept any products without a JTECH issued RMA number.

*Restocking fee does not apply to government contracts.

## Hardware Limited Warranty

The Commander Echo Console and devices are designed to perform reliably, meet manufacture's specification, and provide long lasting service. In spite of diligence in manufacturing, eliminating malfunctions resulting from random component failure is impossible. Should the product fail to work properly within the designated warranty period, JTECH will, at its option, repair or replace the product with a new or reconditioned unit at no charge. Warranty begins at the date of purchase. New hardware includes a standard one year limited warranty.

In view of the varied conditions in which the equipment will be used, it is sold "as is" and JTECH's responsibility does not go beyond the terms set forth above. JTECH will not be responsible for medical expenses or any direct, incidental, or consequential damages arising from the use of this product. JTECH shall in no way be liable for the loss of revenue or profits resulting from, or alleged to result from, use of this product.

THIS WARRANTY IS MADE EXPRESSLY IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING AN IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. UNDER NO CIRCUMSTANCES SHALL JTECH BE LIABLE FOR ANY DIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. THE REMEDIES SET FORTH IN THIS WARRANTY SHALL BE THE ONLY REMEDIES AVAILABLE, EXCEPT AS SPECIFICALLY PROVIDED BY STATE LAW. NO PERSON HAS ANY AUTHORITY TO BIND JTECH TO ANY REPRESENTATION OR WARRANTY EXCEPT AS SPECIFICALLY SET FORTH HEREIN.

**Note:** Commander Echo Downloader Software is covered by a separate license and warranty agreement. See the software licensing and warranty agreement below.

**For Government Use:** Please refer to the hardware warranty on the installation media you received.

## Optional Commander Echo Downloader License Agreement and Limited Warranty

JTECH Medical grants the customer rights to use this software on a single computer at a single location as long as the customer complies with the terms of this license. JTECH reserves the right to terminate this license if the customer violates any provisions thereof. The customer agrees to return the software to JTECH in the event of termination. This software is the sole and exclusive property of JTECH Medical. The customer's ownership is limited to the media. The customer agrees to make no more than two copies of the software for archival purposes. In the event the customer uses the software simultaneously on more than one computer, the customer agrees to pay license fees for each additional user copy. Installation of the software from the media constitutes agreement to the terms of this licensing agreement by the customer.

## Contact Information

Phone: (385) 695-5000
Email: info@jtechmedical.com
Website: www.jtechmedical.com
Chat online: chat.jtechmedical.com

Address:
7633 S Main, Bldg D
Midvale, UT 84047
United States of America

**Transfer and Reproduction Restrictions:** The customer agrees to take all reasonable steps and exercise diligence in protecting the software from all unauthorized reproduction, publication, disclosure, or distribution. Unauthorized transfer and/or reproduction of these materials may be a crime subjecting the customer to civil and criminal prosecution. The customer may not transfer any copy of the software to any other person without the prior written consent of JTECH. JTECH reserves the right to revoke this license and/or seek any other legal remedies to which it is entitled should these conditions be violated.

**Limited Warranty:** This software is sold AS IS without further warranty as to performance, merchantability, or fitness for a particular purpose. The entire risk as to the results and performance of this software is assumed by the customer. JTECH warrants the media on which the software is recorded to be free from defects in materials and workmanship under normal use for a period of ninety (90) days from the date of purchase. If during the ninety day period the media should become defective, it may be returned to JTECH for replacement without charge. In addition, JTECH warrants the software to be free from significant errors that make it unusable for a period of ninety (90) days from the date of purchase. In the event such errors are found, JTECH will reasonably attempt to correct them, or help the customer avoid them, with efforts JTECH believes suitable to the problems or, at JTECH's option, authorize a refund of the license fee upon return of the program.

The customer's sole and exclusive remedy in the event of a defect is expressly limited to the above provision. JTECH makes no warranty against material that has been lost, stolen, or damaged by accident, misused, modified without authorization, or for conflicts that arise out of the use of software not supplied by JTECH. JTECH makes no other warranty express or implied to the customer or any other entity or persons, specifically, JTECH makes no warranty that the software is fit for a particular purpose, any implied warranty of merchantability is expressly and specifically disclaimed.

JTECH will not be liable for special, incidental, consequential, indirect, or other similar damages even if JTECH or its agent has been advised of the possibility of such damages. JTECH is not responsible or liable for damages or costs incurred as a result of loss of time, loss or damage of data, loss of profits or revenue, loss of use of the software, or any other losses whatsoever. In addition, JTECH is not responsible or liable for damages or costs incurred in connection with obtaining substitute software, claims by others, inconvenience or similar costs. In no event will JTECH's liability for any damages to the customer or any other entity or person ever exceed the price paid for the license to use the software, regardless of any form of the claim.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

The customer and JTECH acknowledge that the software is not intended as a consumer good under state and federal warranty laws.

# Technical Specifications


## Commander Echo Console (9RF316)

Used to record information from the testing devices.

## Technical Specifications

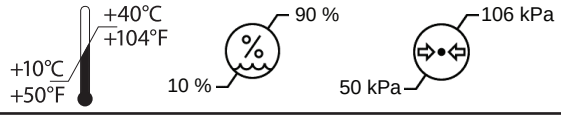
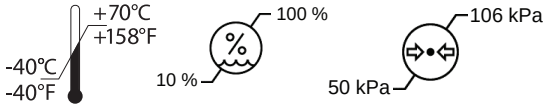
| | |
|---|---|
| Dimensions | 11.8 cm x 6.6 cm x 2.4 cm (4.66 in x 2.61 in x 0.96 in) |
| Weight | 0.21 kg (0.46 lb) |
| Operating Temperature, Humidity, and Atmospheric Pressure | +40°C +104°F<br>+10°C +50°F<br>90 %<br>10 %<br>106 kPa<br>50 kPa |
| Transportation and Storage Conditions | +70°C +158°F<br>-40°C -40°F<br>100 %<br>10 %<br>106 kPa<br>50 kPa |
| Internal Power Source | Non-User serviceable,<br>Lithium Polymer battery |
| Recharge time | Four(4) - six(6) continuous hours of charging following initial charge |
| Battery conservation | Devices transition to “off power” state when not in use |
| Specified Power Supply, (Battery Charger) | JTECH Medical PN: PW012 |
| Type of Operation | Continuous |
| Type of Protection against electric shock | Internally powered equipment |
| Degree of protection against electric shock | Type B equipment |
| Protection against harmful ingress of water | IPX0 - ordinary equipment |
| Degree of Safety of Application in the presence of flammable mixtures | This device is not suitable for use in the presence of flammable anesthetic mixture with air, or with oxygen or nitrous oxide |
| This device contains: | **Contains FCC ID: OUR-XBEE or MCQ-S2CTH**<br>**Contains IC: 4214A-XBEE or 1846A-S2CTH**<br>**Contains: 005NYCA0378 or R210-105563** |
| RF operating distance | 3 meters (9.8 feet) from device, indoor environment |
| RF frequency | 2.4GHz wireless frequency |
| RF transmit power | 1-6.3 mW (0-8 dBm) |
| Symbols | IPX0 NON STERILE CE 2797 MD UK CA 0086 |
| Medical Device Class | Class I measuring medical device per Annex VIII of Regulation (EU) 2017/745 and UK MDR 2002<br>Class I medical device per CFR Title 21 Part 888 Supbart B<br>Class II medical device per Schedule 1, Part 1 of SOR/98-282 |


(9RF304) (9RF303)

# Wireless Dual Inclinometers (9RF303,/9RF304, 9RF403/9RF404)

Used to convey functional abilities concerning range of motion (ROM).
Note: color and printing may differ from image.

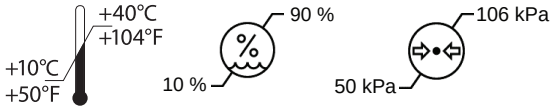
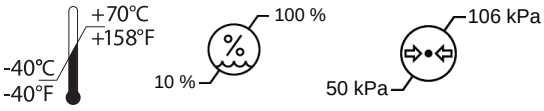
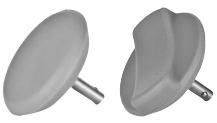
## Technical Specifications

| | |
|---|---|
| Dimensions/Weight | 7.2 cm x 2.7 cm x 6.6 cm (2.85 in x 1.07 in x 2.59 in)/ 0.09 kg (0.20 lb) |
| Accuracy | ±2° |
| Operating Temperature, Humidity, and Atmospheric Pressure |   |
| Transportation and Storage Conditions |   |
| Internal Power Source | Non-User serviceable,<br>Lithium Polymer battery |
| Recharge time | Four(4) - six(6) continuous hours of charging following initial charge |
| Battery conservation | Devices transition to “off power” state when not in use |
| Specified Power Supply, (Battery Charger) | JTECH Medical PN: PW012 |
| Type of Operation | Continuous |
| Type of Protection against electric shock | Internally powered equipment |
| Degree of protection against electric shock | Type B equipment |
| Protection against harmful ingress of water | IPX0 - ordinary equipment |
| Degree of Safety of Application in the presence of flammable mixtures | This device is not suitable for use in the presence of flammable anesthetic mixture with air, or with oxygen or nitrous oxide |
| This device contains: | **Contains FCC ID: OUR-XBEE or MCQ-S2CTH**<br>**Contains IC: 4214A-XBEE or 1846A-S2CTH**<br>**Contains: 005NYCA0378 or R210-105563** |
| RF operating distance | 3 meters (9.8 feet) from Console, indoor environment |
| RF frequency | 2.4GHz wireless frequency |
| RF transmit power | 1-6.3 mW (0-8 dBm) |
| Symbols | IPX0 NON STERILE CE 2797 MD UK CA 0086 |
| Medical Device Class | Class I measuring medical device per Annex VIII of Regulation (EU) 2017/745 and UK MDR 2002<br>Class I medical device per CFR Title 21 Part 888 Supbart B<br>Class II medical device per Schedule 1, Part 1 of SOR/98-282 |


# Wireless Muscle Tester (9RF305/9RF405)

Used to convey a subject's ability to resist force for a given muscle or muscle group. Also used for determining max force a subject can exert.
Note: color and printing may differ from image.

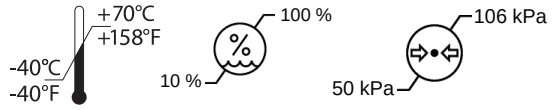
## Technical Specifications

| | | |
|---|---|---|
| Dimensions/Weight | 10.2 cm x 6.1 cm x 5.3 cm (4.02 in x 2.40 in x 2.11 in)/0.2 kg (0.45 lb) | |
| Accuracy | ±9 N (2 lbf) | |
| Maximum Force Input | 890 N (200 lbf) | |
| Operating Temperature, Humidity, and Atmospheric Pressure |   | |
| Transportation and Storage Conditions |   | |
| Internal Power Source | Non-User serviceable, Lithium Polymer battery | |
| Recharge time | Four(4) - six(6) continuous hours of charging following initial charge | |
| Battery conservation | Devices transition to "off power" state when not in use | |
| Specified Power Supply, (Battery Charger) | JTECH Medical PN: PW012 | |
| Type of Operation | Continuous | |
| Type of Protection against electric shock | Internally powered equipment | |
| Degree of protection against electric shock | Type B equipment | |
| Protection against harmful ingress of water | IPX0 - ordinary equipment | |
| Degree of Safety of Application in the presence of flammable mixtures | This device is not suitable for use in the presence of flammable anesthetic mixture with air, or with oxygen or nitrous oxide | |
| This device contains: | **Contains FCC ID: OUR-XBEE or MCQ-S2CTH**<br>**Contains IC: 4214A-XBEE or 1846A-S2CTH**<br>**Contains: 005NYCA0378 or R210-105563** | |
| RF operating distance | 3 meters (9.8 feet) from console, indoor environment | |
| RF frequency | 2.4GHz wireless frequency | |
| RF transmit power | 1-6.3 mW (0-8 dBm) | |
| Symbols | IPX0 NON STERILE CE 2797 MD UK CA 0086 | |
| Medical Device Class | Class I measuring medical device per Annex VIII of Regulation (EU) 2017/745 and UK MDR 2002<br>Class I medical device per CFR Title 21 Part 888 Supbart B<br>Class II medical device per Schedule 1, Part 1 of SOR/98-282 | |
| Flat Pad (8AC008)/Curved Pad (8AC009)  | Dimensions (l x w) | 1.49 x 2.25 in. / 1.68 x 2.25 in |
| | Weight | 0.15 lb. |
| | Maximum Force Input | 500 lbf* |
| | Material Type | Rubber Pad: Silicone / Shaft: Stainless Steel |

# Wireless Grip (9RF306/9RF406)

Used to convey functional abilities concerning grip strength.
Note: color and printing may differ from image.

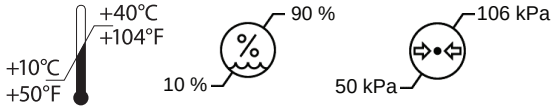
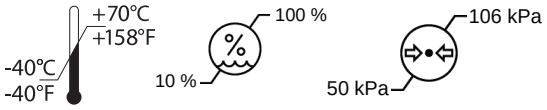
## Technical Specifications

| | |
|---|---|
| Dimensions/Weight | 20.7 cm x 4.1 cm x 10.2 cm (8.15 in x 1.62 in x 4.01 in)/0.42 kg (0.92 lb) |
| Accuracy | ±9 N (2 lbf) |
| Maximum Force Input | 890 N (200 lbf) |
| Operating Temperature, Humidity, and Atmospheric Pressure |  |
| Transportation and Storage Conditions |  |
| Internal Power Source | Non-User serviceable,<br>Lithium Polymer battery |
| Recharge time | Four(4) - six(6) continuous hours of charging following initial charge |
| Battery conservation | Devices transition to “off power” state when not in use |
| Specified Power Supply, (Battery Charger) | JTECH Medical PN: PW012 |
| Type of Operation | Continuous |
| Type of Protection against electric shock | Internally powered equipment |
| Degree of protection against electric shock | Type B equipment |
| Protection against harmful ingress of water | IPX0 - ordinary equipment |
| Degree of Safety of Application in the presence of flammable mixtures | This device is not suitable for use in the presence of flammable anesthetic mixture with air, or with oxygen or nitrous oxide |
| This device contains: | **Contains FCC ID: OUR-XBEE or MCQ-S2CTH**<br>**Contains IC: 4214A-XBEE or 1846A-S2CTH**<br>**Contains: 005NYCA0378 or R210-105563** |
| RF operating distance | 3 meters (9.8 feet) from console, indoor environment |
| RF frequency | 2.4GHz wireless frequency |
| RF transmit power | 1-6.3 mW (0-8 dBm) |
| Symbols | IPX0 NON STERILE CE 2797 MD UK CA 0086 |
| Medical Device Class | Class I measuring medical device per Annex VIII of Regulation (EU) 2017/745 and UK MDR 2002<br>Class I medical device per CFR Title 21 Part 888 Supbart B<br>Class II medical device per Schedule 1, Part 1 of SOR/98-282 |


# Wireless Algometer (9RF307/9RF407)

Used to convey pain response and pressure threshold.
Note: color and printing may differ from image.

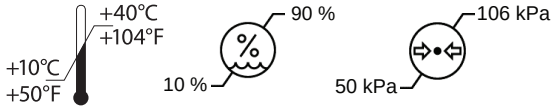
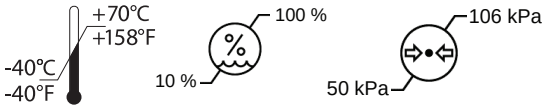
## Technical Specifications

| | |
|---|---|
| Dimensions/Weight | 6.5 cm x 4.6 cm x 7.3 cm (2.58 in x 1.81 in x 2.88 in)/0.16 kg (0.35 lb) |
| Accuracy | ±1 N (0.3 lbf) |
| Maximum Force Input | 111 N (25 lbf) |
| Operating Temperature, Humidity, and Atmospheric Pressure |  |
| Transportation and Storage Conditions |  |
| Internal Power Source | Non-User serviceable,<br>Lithium Polymer battery |
| Recharge time | Four(4) - six(6) continuous hours of charging following initial charge |
| Battery conservation | Devices transition to “off power” state when not in use |
| Specified Power Supply, (Battery Charger) | JTECH Medical PN: PW012 |
| Type of Operation | Continuous |
| Type of Protection against electric shock | Internally powered equipment |
| Degree of protection against electric shock | Type B equipment |
| Protection against harmful ingress of water | IPX0 - ordinary equipment |
| Degree of Safety of Application in the presence of flammable mixtures | This device is not suitable for use in the presence of flammable anesthetic mixture with air, or with oxygen or nitrous oxide |
| This device contains: | **Contains FCC ID: OUR-XBEE or MCQ-S2CTH**<br>**Contains IC: 4214A-XBEE or 1846A-S2CTH**<br>**Contains: 005NYCA0378 or R210-105563** |
| RF operating distance | 3 meters (9.8 feet) from console, indoor environment |
| RF frequency | 2.4GHz wireless frequency |
| RF transmit power | 1-6.3 mW (0-8 dBm) |
| Symbols | IPX0 NON STERILE CE 2797 MD UK CA 0086 |
| Medical Device Class | Class I measuring medical device per Annex VIII of Regulation (EU) 2017/745 and UK MDR 2002<br>Class I medical device per CFR Title 21 Part 888 Supbart B<br>Class II medical device per Schedule 1, Part 1 of SOR/98-282 |

# Wireless Goniometer (9RF308/9RF408)

Used to convey functional abilities concerning hand and extremity range of motion (ROM).
Note: color and printing may differ from image.

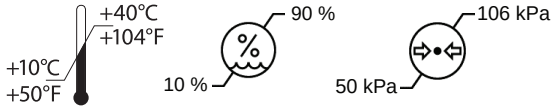
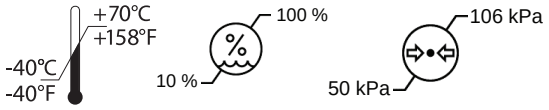
## Technical Specifications

| | |
|---|---|
| Dimensions/Weight | 27.4 cm x 4.1 cm x 3.6 cm (10.8 in x 1.61 in x 1.42 in)/0.14 kg (0.30 lb) |
| Accuracy | ±1° |
| Maximum angle | 225° |
| Operating Temperature, Humidity, and Atmospheric Pressure |  |
| Transportation and Storage Conditions |  |
| Internal Power Source | Non-User serviceable,<br>Lithium Polymer battery |
| Recharge time | Four(4) - six(6) continuous hours of charging following initial charge |
| Battery conservation | Devices transition to “off power” state when not in use |
| Specified Power Supply, (Battery Charger) | JTECH Medical PN: PW012 |
| Type of Operation | Continuous |
| Type of Protection against electric shock | Internally powered equipment |
| Degree of protection against electric shock | Type B equipment |
| Protection against harmful ingress of water | IPX0 - ordinary equipment |
| Degree of Safety of Application in the presence of flammable mixtures | This device is not suitable for use in the presence of flammable anesthetic mixture with air, or with oxygen or nitrous oxide |
| This device contains: | **Contains FCC ID: OUR-XBEE or MCQ-S2CTH**<br>**Contains IC: 4214A-XBEE or 1846A-S2CTH**<br>**Contains: 005NYCA0378 or R210-105563** |
| RF operating distance | 3 meters (9.8 feet) from console, indoor environment |
| RF frequency | 2.4GHz wireless frequency |
| RF transmit power | 1-6.3 mW (0-8 dBm) |
| Symbols | IPX0 NON STERILE CE 2797 MD UK CA 0086 |
| Medical Device Class | Class I measuring medical device per Annex VIII of Regulation (EU) 2017/745 and UK MDR 2002<br>Class I medical device per CFR Title 21 Part 888 Supbart B<br>Class II medical device per Schedule 1, Part 1 of SOR/98-282 |


# Wireless Pinch Gauge (9RF309/9RF409)

Used to convey functional abilities concerning pinch strength.
Note: color and printing may differ from image.

## Technical Specifications

| | |
|---|---|
| Dimensions/Weight | 10.9 cm x 5.4 cm x 4.0 cm (4.28 in x 2.11 in x 1.58 in)/0.21 kg (0.45 lb) |
| Accuracy | ±2 N (0.5 lbf) |
| Maximum Force Input | 222 N (50 lbf) |
| Operating Temperature, Humidity, and Atmospheric Pressure |  |
| Transportation and Storage Conditions |  |
| Internal Power Source | Non-User serviceable,<br>Lithium Polymer battery |
| Recharge time | Four(4) - six(6) continuous hours of charging following initial charge |
| Battery conservation | Devices transition to “off power” state when not in use |
| Specified Power Supply, (Battery Charger) | JTECH Medical PN: PW012 |
| Type of Operation | Continuous |
| Type of Protection against electric shock | Internally powered equipment |
| Degree of protection against electric shock | Type B equipment |
| Protection against harmful ingress of water | IPX0 - ordinary equipment |
| Degree of Safety of Application in the presence of flammable mixtures | This device is not suitable for use in the presence of flammable anesthetic mixture with air, or with oxygen or nitrous oxide |
| This device contains: | **Contains FCC ID: OUR-XBEE or MCQ-S2CTH**<br>**Contains IC: 4214A-XBEE or 1846A-S2CTH**<br>**Contains: 005NYCA0378 or R210-105563** |
| RF operating distance | 3 meters (9.8 feet) from console, indoor environment |
| RF frequency | 2.4GHz wireless frequency |
| RF transmit power | 1-6.3 mW (0-8 dBm) |
| Symbols | IPX0 NON STERILE CE 2797 MD UK CA 0086 |
| Medical Device Class | Class I measuring medical device per Annex VIII of Regulation (EU) 2017/745 and UK MDR 2002<br>Class I medical device per CFR Title 21 Part 888 Supbart B<br>Class II medical device per Schedule 1, Part 1 of SOR/98-282 |


# Wireless Static Force Gauge

(9RF310/9RF410)

Used to convey functional abilities concerning static strength in a variety of applications such as lifting, pushing, or pulling, or to convey a subject's ability to resist force for a given muscle or muscle group. Note: color and printing may differ from image.

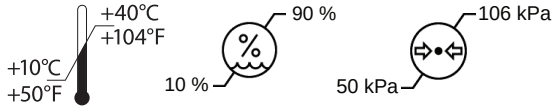
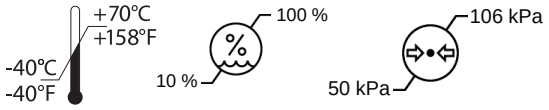
## Technical Specifications

| | |
|---|---|
| Dimensions/Weight | 7.1 cm x 4.6 cm x 5.0 cm (2.80 in x 1.80 in x 1.97 in)/0.18 kg (0.40 lb) |
| Accuracy | ±98 N (22 lbf) |
| Maximum Force Input | 2224 N (500 lbf) |
| Operating Temperature, Humidity, and Atmospheric Pressure | +40°C +104°F<br>+10°C +50°F<br>90 %<br>10 %<br>106 kPa<br>50 kPa |
| Transportation and Storage Conditions | +70°C +158°F<br>-40°C -40°F<br>100 %<br>10 %<br>106 kPa<br>50 kPa |
| Internal Power Source | Non-User serviceable,<br>Lithium Polymer battery |
| Recharge time | Four(4) - six(6) continuous hours of charging following initial charge |
| Battery conservation | Devices transition to "off power" state when not in use |
| Specified Power Supply, (Battery Charger) | JTECH Medical PN: PW012 |
| Type of Operation | Continuous |
| Type of Protection against electric shock | Internally powered equipment |
| Degree of protection against electric shock | Type B equipment |
| Protection against harmful ingress of water | IPX0 - ordinary equipment |
| Degree of Safety of Application in the presence of flammable mixtures | This device is not suitable for use in the presence of flammable anesthetic mixture with air, or with oxygen or nitrous oxide |
| This device contains: | **Contains FCC ID: OUR-XBEE or MCQ-S2CTH**<br>**Contains IC: 4214A-XBEE or 1846A-S2CTH**<br>**Contains: 005NYCA0378 or R210-105563** |
| RF operating distance | 3 meters (9.8 feet) from console, indoor environment |
| RF frequency | 2.4GHz wireless frequency |
| RF transmit power | 1-6.3 mW (0-8 dBm) |
| Symbols | IPX0 NON STERILE CE 2797 MD UK CA 0086 |
| Medical Device Class | Class I measuring medical device per Annex VIII of Regulation (EU) 2017/745 and UK MDR 2002<br>Class I medical device per CFR Title 21 Part 888 Supbart B<br>Class II medical device per Schedule 1, Part 1 of SOR/98-282 |


# Wireless Static Force Gauge MAX (RF119)

Used to convey functional abilities concerning static strength in a variety of applications such as lifting, pushing, or pulling, or to convey a subject's ability to resist force for a given muscle or muscle group.
Note: color and printing may differ from image.

## Technical Specifications

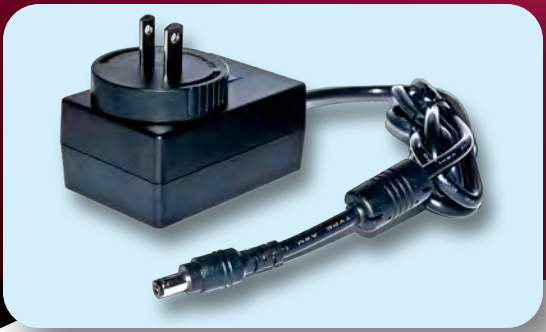
| | |
|---|---|
| Dimensions/Weight | 8.89 cm x 6.35 cm x 6.68 cm (3.5 in x 2.5 in x 2.63 in)/0.43 kg (0.94 lb) |
| Accuracy | ±98 N (22 lbf) |
| Maximum Force Input | 336 N (750 lbf) |
| Operating Temperature, Humidity, and Atmospheric Pressure |  |
| Transportation and Storage Conditions |  |
| Internal Power Source | Non-User serviceable,<br>Lithium Polymer battery |
| Recharge time | Four(4) - six(6) continuous hours of charging following initial charge |
| Battery conservation | Devices transition to "off power" state when not in use |
| Specified Power Supply, (Battery Charger) | JTECH Medical PN: PW012 |
| Type of Operation | Continuous |
| Type of Protection against electric shock | Internally powered equipment |
| Degree of protection against electric shock | Type B equipment |
| Protection against harmful ingress of water | IPX0 - ordinary equipment |
| Degree of Safety of Application in the presence of flammable mixtures | This device is not suitable for use in the presence of flammable anesthetic mixture with air, or with oxygen or nitrous oxide |
| This device contains: | **Contains FCC ID: OUR-XBEE or MCQ-S2CTH**<br>**Contains IC: 4214A-XBEE or 1846A-S2CTH**<br>**Contains: 005NYCA0378 or R210-105563** |
| RF operating distance | 3 meters (9.8 feet) from console, indoor environment |
| RF frequency | 2.4GHz wireless frequency |
| RF transmit power | 1-6.3 mW (0-8 dBm) |
| Symbols | IPX0 NON STERILE CE 2797 MD UK CA 0086 |
| Medical Device Class | Class I measuring medical device per Annex VIII of Regulation (EU) 2017/745 and UK MDR 2002<br>Class I medical device per CFR Title 21 Part 888 Supbart B<br>Class II medical device per Schedule 1, Part 1 of SOR/98-282 |

# Static Force Gauge Accessory Technical Specifications and Warnings

| | | |
|---|---|---|
| T-bar (AC012)  | Dimensions (l x w x d) | 12.375 x 1.2 x 1.7 |
| | Weight | 1.41 lb. |
| | Maximum Force Input | 750 lbf* |
| | Material Type | Rubber Grip: Vinyl / Handle: Aluminum |
| D-Handle (9AC003)  | Dimensions (l x w x d) | 4.75 x 1 x 5.25 in. |
| | Weight | 0.60 lb. |
| | Maximum Force Input | 500 lbf* |
| | Material Type | Rubber Grip: Vinyl / Handle: Aluminum |
| Hook w/ Stud (741)  | Dimensions (l x w) | 2.6 x 0.6 in. |
| | Weight | 0.09 lb. |
| | Maximum Force Input | 500 lbf* |
| | Material Type | Stainless Steel |
| Threaded Pad Adapter (8MH097)  | Dimensions (l x w) | 0.82 x 0.63 in. |
| | Weight | 0.02 lb. |
| | Maximum Force Input | 750 lbf* |
| | Material Type | Stainless Steel |
| Flat Pad (8AC008)  | Dimensions (l x w) | 1.49 x 2.25 in. |
| | Weight | 0.15 lb. |
| | Maximum Force Input | 750 lbf* |
| | Material Type | Rubber Pad: Silicone / Shaft: Stainless Steel |
| Curved Pad (8AC009)  | Dimensions (l x w) | 1.68 x 2.25 in. |
| | Weight | 0.15 lb. |
| | Maximum Force Input | 750 lbf* |
| | Material Type | Rubber Pad: Silicone / Shaft: Stainless Steel |
| 4” Push Disk (9AC004)  | Dimensions (l x w) | 1.0 x 4 in. |
| | Weight | 0.40 lb. |
| | Maximum Force Input | 400 lbf* |
| | Material Type | Rubber Pad: Neoprene / Metal Disc: Aluminum |
| 4” Push Disk is not for use on skin. Intended use is to press against inanimate objects. | | |
| 12” Cable (9AC007)  | Dimensions (l) | 12 in. |
| | Weight | 0.08 lb. |
| | Maximum Force Input | 500 lbf* |
| | Material Type | Vinyl Coated Steel cable |
| *Optional* V-Slot (745)  | Dimensions (l x w) | 1.13 x 1.25 in. |
| | Weight | 0.14 lb. |
| | Maximum Force Input | 750 lbf* |
| | Material Type | Nickel Plated Steel |
| 16” T-bar (AC014)  | Dimensions (l x w x d) | 16.375 x 1.2 x 1.7 |
| | Weight | 1.1 lb. |
| | Maximum Force Input | 750 lbf* |
| | Material Type | Rubber Grip: Vinyl / Handle: Aluminum |

* ℹ Notice: Accessory Maximum Force Input applies to the accessory only, and does not apply to the accessory when attached to any device.

⚠ Warning: Discontinue use of any product if skin irritation develops.



# Specified Power Supply (Battery Charger) (PW012*)

Used with the Daisy Chain for charging your Echo devices.

*Power supply connection may vary according to the country shipped to. Picture may be different than actual power supply

## Technical Specifications

| | |
|---|---|
| Dimensions | 8.4 cm x 5.6 cm x 3.79 cm (3.3 in x 2.2 in x 1.5 in) |
| Weight | 0.21 kg (0.38 lb) |
| Operating Temperature, Humidity, and Atmospheric Pressure | +40°C +104°F<br>+10°C +50°F<br>90 %<br>10 %<br>106 kPa<br>50 kPa |
| Transportation and Storage Conditions | +70°C +158°F<br>-40°C -40°F<br>100 %<br>10 %<br>106 kPa<br>50 kPa |
| Type of Operation | Continuous |
| Input Voltage | 100-240 VAC ~ |
| Input Frequency | 50-60 Hz |
| Input Current | 0.5 A (rms) for 115 VAC<br>0.3 A (rms) for 240 VAC |
| Enclosure Leakage Current | 100 uA max. @ 264 VAC, 63 Hz |
| Maximum Output Voltage/Current | 5 V / 3 A ⎓ |
| Maximum Output Power | 15 W |
| Type of Protection against electric shock | ⧈ Class II |
| Manufacture, Model | JTECH Medical PN: PW012 |
| Protection against harmful ingress of water | IPX0 - ordinary equipment |
| Degree of Safety of Application in the presence of flammable mixtures | This device is not suitable for use in the presence of flammable anesthetic mixture with air, or with oxygen or nitrous oxide |
| Symbols | ⧈ IPX0 NON STERILE CE |

## EMC Guidance

| | |
|---|---|
| ⚠ | **WARNING:** Medical Electrical Equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this manual. Carefully read the information contained in this section. |
| ⚠ | **WARNING:** The use of portable and mobile RF equipment can affect the normal operation of medical electrical equipment. |
| ⚠ | **WARNING:** Making any modifications or using any accessories not specifically approved by JTECH Medical may reduce immunity to electromagnetic interference or increase electromagnetic emissions. |

| **Guidance and Manufacturer's Declaration - Electromagnetic Emissions** | | |
|---|---|---|
| The Commander Echo System is intended for use in the electromagnetic environment specified below. The customer or user of the Commander Echo System should assure that it is used in such an environment. | | |
| **Emissions test** | **Compliance** | **Electromagnetic environment - guidance** |
| RF emissions<br><br>CISPR 11 | Group 2 | The Commander Echo System must emit electromagnetic energy in order to perform its intended function. Nearby electronic equipment may be affected. |
| RF emissions<br><br>CISPR 11 | Class B | The Commander Echo System is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes. |
| Harmonic emissions<br><br>IEC 61000-3-2 | Class A and D | |
| Voltage fluctuations/ flicker emissions<br><br>IEC 61000-3-3 | Complies | |

| | |
|---|---|
| ⚠ | **WARNING:** The Commander Echo Console and devices should not be used while stacked on, or adjacent to, other electrical or medical electrical equipment. If stacked or adjacent use is necessary, all electrical equipment should be observed to verify normal operation. |

| Guidance and Manufacturer's Declaration - Electromagnetic Immunity | | | |
|---|---|---|---|
| The Commander Echo System is intended for use in the electromagnetic environment specified below. The customer or user of the Commander Echo System should assure that it is used in such an environment. | | | |
| **Immunity test** | **IEC 60601 test level** | **Compliance level** | **Electromagnetic environment - guidance** |
| Electrostatic discharge (ESD)<br><br>IEC-61000-4-2 | ± 6 kV contact<br><br>± 8 kV air | ± 6 kV contact<br><br>± 8 kV air | The Commander Echo System must emit electromagnetic energy in order to perform its intended function. Nearby electronic equipment may be affected. |
| Electrical fast transient/burst<br><br>IEC 61000-4-4 | ± 2 kV for power supply lines<br><br>± 1 kV for input/ output lines | ± 2 kV for power supply lines<br><br>± 1 kV for input/ output lines | Mains power quality should be that of a typical commercial or hospital environment. |
| Surge<br><br>IEC 61000-4-5 | ± 1 kV line(s) to line(s)<br><br>± 2 kV line(s) to earth | ± 1 kV line(s) to line(s)<br><br>± 2 kV line(s) to earth | Mains power quality should be that of a typical commercial or hospital environment. |
| Voltage dips, short interruptions and voltage variations on power supply input lines<br><br>IEC 61000-4-11 | <5 % $U_T$ (>95 % dip in $U_T$) for 0,5 cycle<br><br>40 % $U_T$ (60 % dip in $U_T$) for 5 cycles<br><br>70 % $U_T$ (30 % dip in $U_T$) for 25 cycles<br><br><5 % $U_T$ (>95 % dip in $U_T$) for 5 s | <5 % $U_T$ (>95 % dip in $U_T$) for 10ms<br><br>40 % $U_T$ (60 % dip in $U_T$) for 100ms<br><br>70 % $U_T$ (30 % dip in $U_T$) for 500ms | Mains power quality should be that of a typical commercial or hospital environment. |
| Power frequency<br><br>(50/60 Hz) magnetic field<br><br>IEC 61000-4-8 | 3 A/m | 3 A/m | Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment. |
| NOTE $U_T$ is the a.c. mains voltage prior to application of the test level. | | | |

| Guidance and Manufacturer's Declaration – Electromagnetic Immunity | | | |
|---|---|---|---|
| The Commander Echo System is intended for use in the electromagnetic environment specified below. The customer or the user of the Commander Echo System should assure that it is used in such an environment. | | | |
| **Immunity test** | **IEC 60601 test level** | **Compliance level** | **Electromagnetic environment – guidance** |
| | | | Portable and mobile RF communications equipment should be used no closer to any part of the Commander Echo System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. |
| Conducted RF<br>IEC 61000-4-6 | 3 Vrms<br>150 kHz to 80 MHz | 3 Vrms<br>150 kHz to 80 MHz | **Recommended separation distance**<br>$d=1.2\sqrt{P}$ |
| Radiated RF<br>IEC 61000-4-3 | 3 V/m<br>80 MHz to 2.5 GHz | 3 V/m<br>80 MHz to 2.5 GHz | $d=1.2\sqrt{P}$ 80 MHz to 800 MHz<br>$d=2.3\sqrt{P}$ 800 MHz to 2.3 GHz<br>where $P$ is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and $d$ is the recommended separation distance in meters (m).<br>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b]<br>Interference may occur in the vicinity of equipment marked with the following symbol:  |
| NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.<br>NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people. | | | |
| [a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Commander Echo System is used exceeds the applicable RF compliance level above, the Commander Echo System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Commander Echo System.<br>[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than [$V1$] V/m. | | | |

| Recommended separation distances between portable and mobile RF communications equipment and the Commander Echo System | | | |
|---|---|---|---|
| The Commander Echo System is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Commander Echo System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Commander Echo System as recommended below, according to the maximum output power of the communications equipment. | | | |
| **Rated maximum output power of transmitter**<br>W | **Separation distance according to frequency of transmitter** m | | |
| | **150 kHz to 80 MHz**<br>**$d=1.2\sqrt{P}$** | **80 MHz to 800 MHz**<br>**$d=1.2\sqrt{P}$** | **800 MHz to 2.5 GHz**<br>**$d=2.3\sqrt{P}$** |
| 0.01 | 0.12 | 0.12 | 0.23 |
| 0.1 | 0.38 | 0.38 | 0.73 |
| 1 | 1.2 | 1.2 | 2.3 |
| 10 | 3.8 | 3.8 | 7.3 |
| 100 | 12 | 12 | 23 |
| For transmitters rated at a maximum output power not listed above, the recommended separation distance $d$ in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where $P$ is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.<br><br>NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.<br><br>NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people. | | | |

### Transmitter and Receiver Specifications

| | |
|---|---|
| Bandwidth | 2.4GHz |
| Modulation | DSSS |
| ERP | 0 dBm |

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