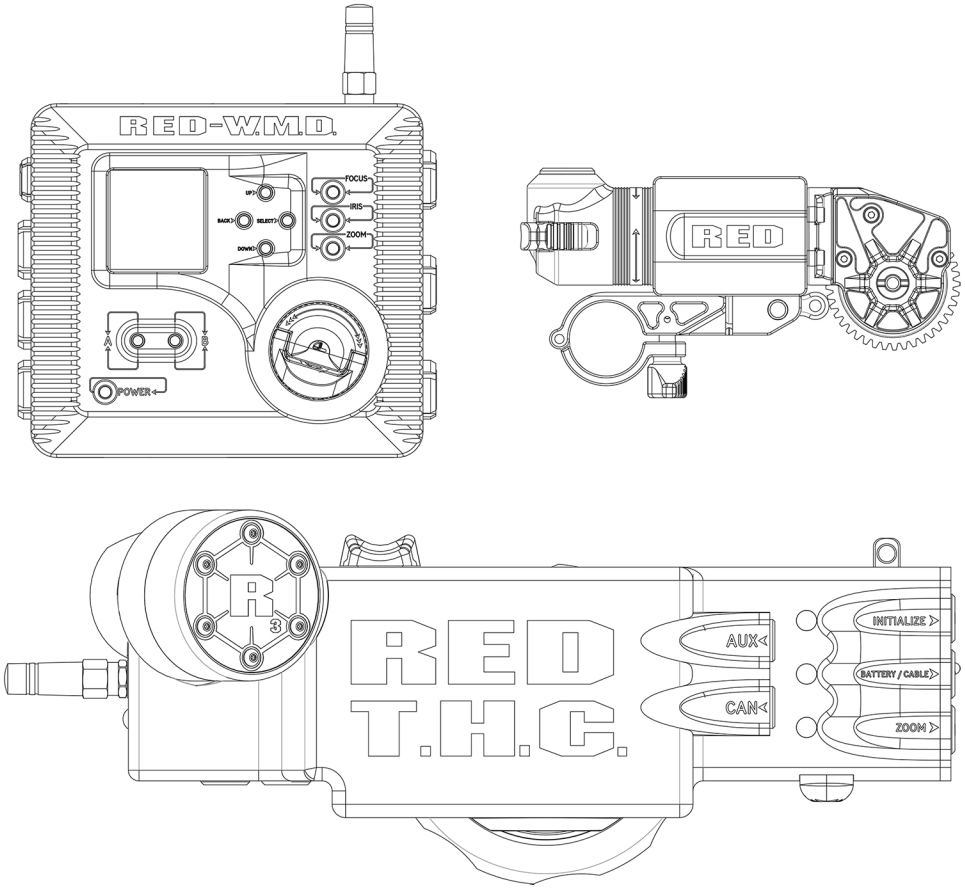
RED 3-AXIS
LENS CONTROL SYSTEM
OPERATION GUIDE



W.M.D. | T.H.C. | RED LENS CONTROL MOTOR

RED.COM

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COMPLIANCE STATEMENTS

INDUSTRIAL CANADA EMISSION COMPLIANCE STATEMENTS

This device complies with Industry Canada license-exempt RSS standards RSS 139 and RSS 210. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus complies with Canadian ICES-003.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

FEDERAL COMMUNICATIONS COMMISSION (FCC) STATEMENTS

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the users authority to operate this equipment.

NOTE: This device complies with Part 15 of the FCC Rules.

Operations subjected to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including that may cause undesirable interference.

CAUTION: Exposure to Radio Frequency Radiation.

The device shall be used in such a manner that the potential for human contact is minimized.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

CAUTION: Regulations of the FCC and FAA prohibit airborne operation of radio- frequency wireless devices because there signals could interfere with critical aircraft instruments.

CAUTION: If the device is changed or modified without permission from RED, the user may void his or her authority to operate the equipment.

AUSTRALIA AND NEW ZEALAND STATEMENTS

RED declares that the radio equipment described in this document comply with the following international standards.

- IEC 60065 – Product Safety
- ETSI EN 300 328 – Technical requirement for radio equipment

RED declares digital devices described in this document comply with the following Australian and New Zealand standards.

- AS/NZS CISPR 22 – Electromagnetic Interference
- AS/NZS 61000.3.2 – Power Line Harmonics
- AS/NZS 61000.3.3 – Power Line Flicker

JAPAN STATEMENTS

This is a Class B product based on the standard of the Voluntary Control Council for Interference (VCCI) for information technology equipment. If this equipment is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

本機器は、情報処理装置等電波障害自主規制協議会(VCCI)の基準に基づくクラスB情報技術装置です。 この装置は家庭環境で使用することを目的としていますが、ラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをしてください。

EUROPEAN UNION COMPLIANCE STATEMENTS

RED declares that the radio equipment described in this document comply with the R&TTE Directive (1999/5/EC) issued by the Commission of the European Community.

Compliance with this directive implies conformity to the following European Norms (in brackets are the equivalent international standards).

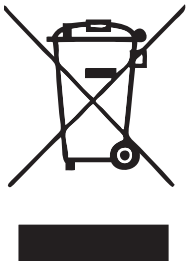
- EN 60065 (IEC 60065) – Product Safety
- ETSI EN 300 328 Technical requirement for radio equipment
- ETSI EN 301 489 General EMC requirements for radio equipment.

INFORMATION

Products with the CE marking comply with the EMC Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC) issued by the Commission of the European Community. Compliance with these directives implies conformity to the following European Product Family Standards.

- EN 55022 (CISPR 22) – Electromagnetic Interference
- EN 55024-1 (CISPR 24) – Electromagnetic Immunity
- EN 61000-3-2 (IEC610000-3-2) – Power Line Harmonics
- EN 61000-3-3 (IEC610000) – Power Line Flicker
- EN 60065 (IEC60065) – Product Safety

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

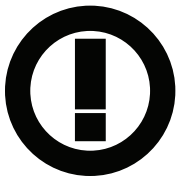


The Waste Electrical and Electronic Equipment (WEEE) mark applies only to countries within the European Union (EU) and Norway. This symbol on the product and accompanying documents means that used electrical and electronic products should not be mixed with general household waste. For proper treatment, recovery and recycling, please take this product to designated collection points where it will be accepted free of charge. Alternatively, in some countries you may be able to return your products to your local retailer upon purchase of an equivalent new product.

Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling. Contact your local authority for further details of your nearest designated collection point. Penalties may be applicable for incorrect disposal of this waste, in accordance with you national legislation.

For business users in the European Union, if you wish to discard electrical and electronic equipment, contact your dealer or supplier for further information.

USAGE RESTRICTIONS FOR PRODUCTS THAT INCORPORATE R.C.P.



Products that fall into this category are denoted by inclusion of the Class 2 identifier symbol (exclamation mark in a circle) accompanying the CE Mark on the products regulatory label, example to the left.

FRANCE

Usage Restrictions - Geographic Area Where Restriction Applies : France

For mainland France

- 2.400 - 2.4835 GHz (Channels 1-16) authorized for indoor use
- 2.400 - 2.454 GHz (Channels 1-10) authorized for outdoor use

Restrictions d'utilisation - Zone géographique où les restrictions s'appliquent : France

Pour la France métropolitaine

- 2.400 - 2.4835 GHz (Canaux 1 à 16) autorisé en usage intérieur
- 2.400 - 2.454 GHz (Canaux 1 à 10) autorisé en usage extérieur

NORWAY

This subsection does not apply for the geographical area within a radius of 20 km from the centre of Ny-Ålesund

Dette gjelder ikke for det geografiske området innenfor en radius av 20 km fra sentrum av Ny-Ålesund

RESPONSIBLE PARTY

RED Digital Cinema

34 Parker

Irvine, CA 92618

USA

SAFETY INSTRUCTIONS

- DO NOT use the camera or accessories near water. Avoid exposing your camera to moisture. The unit is not waterproof, so contact with water could cause permanent damage to the unit as well as electric shock and serious injury to the user. DO NOT use the camera in the rain or under other conditions with high moisture without appropriate protection, and immediately remove power source if camera or accessories are exposed to moisture.

WARNING: To reduce the risk of fire or electric shock, do not expose the camera to rain or moisture.

- DO NOT expose the camera to laser beams, as laser beams may damage the sensor.
- DO NOT expose your camera to excessive vibration or impact (shock). Be careful not to drop your camera. Internal mechanisms may be damaged by severe shock. Mechanical alignment of optical elements may be affected by excessive vibration.
- ELECTROMAGNETIC INTERFERENCE: The use of devices using radio or other communication waves may result in the malfunction or interference with the unit and/or with audio and video signals.
- Clean only using a dry cloth. When cleaning your camera, remember that it is not waterproof and moisture can damage electronic circuitry. DO NOT rinse or immerse any element of the camera, lens or other accessory, keep them dry at all times. DO NOT use soaps, detergents, ammonia, alkaline cleaners, and abrasive cleaning compounds or solvents. These substances may damage lens coatings and electronic circuitry.
- Maintain sufficient ventilation—DO NOT block any ventilation openings or obstruct cooling fan airflow.

CAUTION: Proper camera ventilation requires a minimum 0.5" (1.25 cm) clearance between the camera ventilation openings and external surfaces. Verify that objects that can block the fan intake and exhaust ports do not impede airflow. Failure to permit adequate airflow may result in overheating of the camera, degraded operation and in extreme situations, damage to the camera.

- DO NOT operate or store near any heat sources such as radiators, heat registers, stoves, or any other apparatus that produce heat. Store in a protected, level and ventilated place. Avoid exposure to temperature extremes, damp, severe vibration, strong magnetic fields, direct sunlight or local heat sources during storage. Remove any batteries from the camera before storage. Recommended storage and usage temperatures for your camera, lenses and other accessories are:
  - Operating range: 0°C to 40°C (32°F to 104°F)
  - Storage range: –20°C to 50°C (–4°F to 122°F)
- If there are any performance issues with your camera or accessories when operating within this temperature range, submit a Support ticket at https://support.red.com.
- Modules, expanders, and lens mounts are NOT HOT SWAPPABLE, meaning you cannot remove or install them while the camera is turned on. Before installing or removing any of these accessories, you MUST turn off the camera. Failure to do so may result in damage to the accessory or camera that will not be covered under warranty.
- DO NOT bypass the third prong of the grounding-type plug on the power cord of the DSMC AC Power Adaptor. A grounding-type plug has two blades and a third "grounding" prong. The third prong is provided for your safety. A grounding-type plug shall be connected to an outlet with a protective earthen connection. If the grounding-type plug does not fit into your outlet, do not attempt to modify the plug or outlet, consult a qualified electrician.
- Protect all power cords from being pinched, walked on or driven over by a vehicle. Replace any power cords suspected of sustaining damage due to crushing or other forms physical damage.

Products marked with this symbol are class 2 devices. These devices are not provided with a grounding type plug.

CAUTION: The power cord plug for the DSMC AC Power Adaptor is used as the power disconnect. To disconnect all power from the DSMC AC Power Adaptor, unplug the power cord plug from the wall outlet. During use, the power cord plug should remain easily accessible at all times.

- Lithium-ion batteries may be subject to special handling requirements pursuant to federal and local laws. Refer to specific shipping instructions included with your battery regarding proper transport of your battery. Do not handle your battery if it is damaged or leaking. Disposal of batteries must be in accordance with local environmental regulations. For example, California law requires that all rechargeable batteries must be recycled by an authorized recycle center. Storing batteries fully charged or in high temperature conditions may permanently reduce the life of the battery. Available battery capacity may also be temporarily lessened after storage in low temperature conditions.

WARNING: DO NOT expose the battery to excessive heat.

WARNING: Danger of explosion if an incorrect battery is charged with the RED Charger or is used to power the camera and accessories. Replace only with the same or equivalent type battery.

CAUTION: Refer all service and repair to qualified RED service personnel. To reduce the risk of electric shock, and damage to the camera or accessories, DO NOT attempt to perform any servicing other than any procedures that are recommended in the operating instructions.

INDOOR USE ONLY: Products marked with this symbol are designed for use indoors only.

BATTERY STORAGE AND HANDLING

WARNING: Failure to read, understand, and follow these instructions may result in overheating, chemical leakage, smoke emission, fire, or other potentially harmful results.

Always follow proper battery handling and storage practices. Improper handling and/or failure to abide by proper storage instructions may cause permanent damage to batteries, or degrade charge capacity. Improper handling practices or failure to comply with instructions may also put you at risk.

LONG TERM STORAGE AND HANDLING

Lithium-Ion batteries, like the RED Li Battery 7.2V, REDVOLT®, REDVOLT XL, and RED BRICK®, self-discharge over time. When storing for long periods of time, store batteries separately from the camera or charger and remember to charge batteries to a capacity level of 40% to 60%. If batteries will be stored for long periods of time, RED recommends that you check the charge level at least once every six (6) months, and recharge batteries to a capacity level of 40% to 60%.

When not in use, remove the battery from the camera or charger and store the battery in a cool, dry place. Avoid non-insulated storage areas with fluctuating temperatures, extreme hot temperatures (such as inside a hot car), corrosive gas, and direct sunlight. The optimal storage temperature for batteries is between –20°C to 20°C (–4°F to 68°F).

BATTERY CAUTIONS AND WARNINGS

WARNING: Batteries stored for a prolonged period of time at less than 50% charge level may permanently lose the ability to hold a charge.

WARNING: DO NOT use the battery for purposes other than those specified.

WARNING: If recharging operation fails to complete even after the specified recharging time has elapsed, immediately stop further recharging.

- Store batteries out of the reach of children.
- DO NOT store batteries in a fully charged or discharged state for extended periods of time.
- DO NOT store batteries in a camera, camera module, or charger for extended periods of time.
- DO NOT store batteries in extreme hot or cold temperatures.
- DO NOT expose batteries to fire or excessive heat.
- DO NOT store batteries in direct sunlight.
- DO NOT store, use, or recharge batteries near a heat source such as a fire or a heater.
- DO NOT use third-party chargers with your RED batteries.
- DO NOT disassemble or modify batteries.
- DO NOT overcharge batteries. Overcharging may increase internal temperature beyond the recommended limits and cause permanent damage.
- DO NOT connect the positive (+) and negative (-) terminals to a metal object such as a wire.

- DO NOT allow batteries to get wet.
- DO NOT transport or store batteries together with metal objects such as jewelry, hairpins, etc. as they may generate heat if they come into contact with the battery.
- DO NOT pierce batteries with pointed or other sharp objects.
- DO NOT step on, throw, or strike batteries with a hammer.
- DO NOT use batteries that appear to be deformed or damaged.
- DO NOT put batteries into pressurized containers or microwave ovens.
- DO NOT use or subject batteries to intense sunlight or hot temperatures such as a vehicle on a hot day.
- Battery incorporates built-in safety devices. DO NOT use it in a location where static electricity may be present.
- DO NOT exceed the recharging temperature range of 0℃ to 40℃ (32℉ to 104℉).
- Only use RED chargers to recharge RED batteries.
- If a battery leaks or gives off a bad odor, discontinue use immediately.
- If a battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appears abnormal during use, recharging or storage, immediately remove it from the equipment or battery charger and discontinue use.
- If electrolyte from batteries comes into contact with skin or clothing, immediately wash the area with running water. Failure to do this may result in skin inflammation.
- If electrolyte reaches the eyes, DO NOT rub them. Instead, rinse the eyes with clean running water and immediately seek medical attention. Failure to do this may result in eye injury.
- If you find discoloration, a bad odor due to leakage, overheating and/or other irregularities when using a battery for the first time, submit a Support ticket at https://support.red.com immediately.

NOTE: For more information regarding RED battery charging and instructions for care, refer to our Terms and Conditions.

SHIPPING DISCLAIMER

Unless you have been certified to ship dangerous goods, you must work with a Dangerous Goods, Class 9-certified shipper to assist you with a shipment that includes a RED BRICK (or other regulated lithium ion batteries). Note that applicable laws prohibit the shipping of batteries that are physically damaged. We urge you to look into the formal rules and regulations of shipping Class 9 Dangerous Goods prior to preparing your shipment. For more information on these regulations, visit www.iata.org and www.dot.gov.

For more information, see our FAQs for Dangerous Goods (Regulated Items).

CHAPTER 1:

3-AXIS SYSTEM OVERVIEW

INTRODUCTION

The RED® 3-Axis Lens Control System is a versatile and highly accurate wireless lens control system. Use the RED Wireless Motor Driver (W.M.D.), RED Tactical Hand Controller (T.H.C.), RED Lens Control Motor, and related RED accessories to configure a low-profile lens control system for your camera rig. This guide provides setup and operation instructions for the RED Lens Control Motor, W.M.D., T.H.C., and related accessories.

The T.H.C. is also compatible with the R.C.P.™ Bridge for wireless control of supported Canon® and Nikon® motorized lenses. For more information, see the camera operation guides, available at www.red.com/downloads.

The T.H.C. cannot pair directly to the WEAPON®, RED EPIC-W®, SCARLET-W®, and RED RAVEN® cameras. To use the T.H.C. with WEAPON, EPIC-W, SCARLET-W, or RED RAVEN, the T.H.C. needs to be connected to the W.M.D. (either wired or wirelessly).

WARNING: ALWAYS use the RED motor cable with the appropriate internal identification resistor when using RED Lens Control Motors with third-party motor drivers. Any damage caused to motors or motor drivers resulting from the use of third-party cables is not covered under warranty.

NOTE: The camera does not require a minimum firmware version for operation with the W.M.D., T.H.C., RED Lens Control Motor, and other components of the RED 3-Axis Lens Control System.

Figure: 3-Axis Lens Control System

3-AXIS SYSTEM COMPONENTS

RED offers the following RED 3-Axis Lens Control System components individually, enabling you to customize your lens control setup. For more information, visit the RED Store at www.red.com/store.

ITEM	PART NUMBER
RED 3-Axis Lens Control System	760-0147
RED W.M.D. (Wireless Motor Driver)	790-0414
RED T.H.C. (Tactical Hand Controller)	790-0413
RED Lens Control Motor	760-0146
RED Lens Drive Gear M 0.8	760-0139
RED Lens Drive Gear M 0.6	760-0140
RED Lens Drive Gear M 0.5	760-0141
RED Lens Drive Gear M 0.4	760-0142
19mm-to-15mm Rod Reducer Kit	760-0151
RED Lens Control Motor Mounting Bracket (Standard)	760-0137
RED W.M.D. Motor Cable 7-Pin Straight to 7-Pin Right (12")	790-0434
RED W.M.D. Motor Cable 7-Pin Straight to 7-Pin Right (18")	790-0406
RED W.M.D. Motor Cable 7-Pin Straight to 7-Pin Right (24")	790-0412
RED Lens Motor Cable (3.3KΩ version) 18"	790-0439
RED Lens Motor Cable (3.3KΩ version) 24"	790-0438
RED W.M.D. Power Cable 2-Pin 1B to 2-Pin 0B (18")	790-0410
RED W.M.D. Power Cable 2-Pin 1B to 4-Pin XLR (8')	790-0411
RED CAN Command Cable (5')	790-0407
RED CAN Command Cable (50')	790-0408
RED CAN Command Cable (100')	790-0409
R.C.P.™-to-T.H.C. Connector Cable (3')	790-0444
RED Start/Stop Cable (1B to Sync, Ctrl, BNC)	790-0415
RED Start/Stop Cable (1B to BNC)	790-0416
RED Start/Stop Cable (1B to 00B Sync)	790-0428
3BNC-to-00 LEMO® Sync Cable	790-0154
Accessory Mount (V-Lock)	790-0370
RED T.H.C./W.M.D. Antenna	790-0420

ITEM	PART NUMBER
T.H.C. Focus Marking Ring	790-0430
Lanyard, RED Digital Cinema	010-0119
RED Li Battery 7.2V	740-0032
RED Li Battery Charger 7.2V	740-0033
3-Axis Systems Storage Case	790-0421
BNC-to-BNC Adaptor	790-0435

ADDITIONAL RESOURCES

The following resources offer additional information about RED, the DSMC® system, and the RED community:

- **RED.com**: Check the official RED website for the latest information about RED products.
- **RED Learn Articles**: RED offers in-depth technical articles about RED cameras, post-production, and digital cinematography.
- **RED Downloads**: Go to RED Downloads to download the latest firmware, operation guides, and post-production software.
- **DSMC Toolkit**: Go to RED Downloads to find the DSMC Toolkit, which offers many helpful tools and resources to customize and improve your camera workflow.
- **RED Support**: Check the RED SUPPORT site for FAQs, or to file a support ticket.
- **In-Camera Help**: Select the Help button on an in-camera screen to open up the help for that screen.
- **REDUSER**: Discuss all things RED on the REDUSER third-party forum.

CHAPTER 2:

3-AXIS SYSTEM LAUNCH SEQUENCE

This section offers condensed installation and operating instructions to help you get started using the RED® 3-Axis Lens Control System.

WARNING: The camera must be turned off during any installation process.

RECOMMENDED EQUIPMENT

The following RED products are suggestions for use with the 3-Axis Lens Control System:

- 12 - 18 VDC power source
  - DSMC® AC Power Adaptor with REDVOLT® XL Module
  - RED Quickplate (Short) Module with attached RED BRICK®
  - Backpack Quickplate (Short) with attached RED BRICK
- Mounting platform
  - DSMC Tactical Cage
  - DSMC Tactical Right Plate
- Mounting system
  - DSMC Modular Assault Plate Pack
  - Quick Release Platform or Quick Release Platform (Mini)
- 15mm or 19mm support rods
  - RED CARBON-X Rod (Carbon Fiber)
  - Black Rod (Aluminum)
  - Steel Rod (Steel)

NOTE: For more information and other compatible products, visit the RED Store at www.red.com/store.

PREPARE THE CAMERA

1. Install a mounting platform for the Wireless Motor Driver (W.M.D.) (Example: DSMC Tactical Cage or Tactical Right Plate)
2. Install a support rod system. (Example: DSMC Modular Assault Plate or Quick Release Platform)
3. Install 15mm or 19mm support rods.

INSTALL THE 3-AXIS SYSTEM

These instructions show a tactical cage or other cheeseplate. For more information and other installation methods, go to "Mount the W.M.D." on page 23

1. Mount the W.M.D.
   A. Remove the guide pin from the recessed storage location on the bottom of the unit.
   B. Insert the guide pin into the bottom right mounting hole on the back of the W.M.D. for 18 mm mounting configurations. Use the left mounting hole for 25 mm configurations.

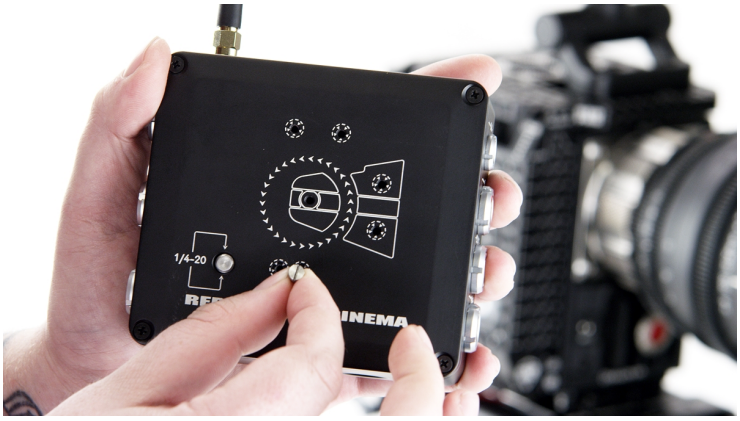


Figure: Install the W.M.D. Guide Pin

   C. Position the W.M.D. on the mounting platform, using the guide pin for alignment.
   NOTE: Ensure that you leave enough clearance on the sides to connect cables.
   D. Push in and turn the 1/4-20 captive thumbscrew to initiate threading.

Figure: Mount the W.M.D

   E. Tighten the thumbscrew.
   WARNING: DO NOT OVERTIGHTEN.

2. Install the RED Lens Control Motor Mounting Bracket.
   A. Push the lock button on the RED Lens Control Motor Mounting Bracket to disengage the locking mechanism.
   B. Slide the dove-tail rail on the RED Lens Control Motor Mounting Bracket into the dove-tail slot on the RED Lens Control Motor.
   C. Release the lock button.
   D. Tighten the M4 thumbscrew on the side of the Lens Control Motor Mounting Bracket to lock the bracket in place.
3. Mount the RED Lens Control Motors to the support rods.
   A. If you are using 15mm support rods, install the 19mm-to-15mm Reducer Bushings into the clamp.
   B. Position the RED Lens Control Motors on the support rods.
   C. Use the thumbscrew to tighten the clamp on the RED Lens Control Motor Mounting Bracket.

   NOTE: For more information, go to "Lens Control Motor" on page 46.

Figure: Mount RED Lens Control Motors

CONNECT THE 3-AXIS SYSTEM

1. Connect the RED Lens Control Motors.
   A. Connect the RED W.M.D. Motor Cable to the pivoting connector on each RED Lens Control Motor.
   B. Connect the opposite end of the RED Lens Control Motor Cable to the lens function that you want.
   C. Repeat instructions A and B for additional motors.
2. Connect a RED Start/Stop cable.
   A. Connect the RED Start/Stop cable to the W.M.D. **EXP** port.
   B. Connect the RED Start/Stop cable to the appropriate **SYNC** and/or **CTRL** ports on the camera.

   WARNING: DO NOT connect to the SYNC connector to the CTRL port. This may cause the camera to crash.

   NOTE: For more information, go to "W.M.D. Overview" on page 18.

Figure: Connect RED Start/Stop Cable

3. Connect power to the W.M.D.
   A. Connect a W.M.D. Power Cable to the W.M.D. **PWR** port.
   B. Connect the opposite end of the W.M.D. Power Cable to a 12 V DC power supply with sufficient amperage.

   NOTE: RED recommends that you connect the W.M.D. to a dedicated power source when operating power intensive configurations or stiff lenses that require high torque settings.

   NOTE: For more information, go to "Wireless Motor Driver (W.M.D.)" on page 18.
4. Connect the T.H.C.
   A. Connect the 4-pin RED CAN Command Cable to the **CAN** connector port on the W.M.D.
   B. Connect the opposite end of the RED CAN Command Cable to the T.H.C. (**CAN**) port.
   C. Toggle the T.H.C. power switch to **Cable** mode.

   NOTE: The T.H.C. communicates wireless settings information via the RED CAN Command Cable. For more information, go to "Tactical Hand Controller (T.H.C.)" on page 37.

CONFIGURE THE 3-AXIS SYSTEM

1. Pair the T.H.C.
   A. Ensure that the W.M.D. is receiving power.
   B. Connect the T.H.C. to the W.M.D. using a RED CAN Command Cable.
   C. Toggle the T.H.C. power switch to **Cable** mode.

      The T.H.C. automatically syncs wireless information when a cabled connection is established with the W.M.D.
   D. Remove the RED CAN Command Cable.
   E. Install a RED Li Battery 7.2V.
   F. Toggle the T.H.C. power switch to **Battery** mode.

      The T.H.C. searches for the wireless connection. The wireless LED stops flashing and remains solid blue when connected.

      NOTE: For more information, go to "Pair the T.H.C." on page 42
2. Set motor type.
   A. Go to **W.M.D. main menu** > **Focus/Iris/Zoom** > **Model**.
   B. Select your motor type.

      NOTE: For more information, go to "Select Motor Type/Model" on page 27.
3. Configure wireless settings.
   A. Select **Wireless** in the W.M.D. main menu.
      - If you are operating the T.H.C. in close proximity (up to 25 feet), select **Low**.
      - If you are operating the T.H.C. from greater distances (over 25 feet), select **High**.
      - If operating multiple systems in the same vicinity, select a unique wireless channel.

        NOTE: For more information, go to "Configure Wireless Settings" on page 28.
4. Initialize motors.
   A. Press and hold the **Initialize** button on the T.H.C., or the **B** button on the W.M.D. for two (2) seconds.

      NOTE: For more information, go to "Initialize the System" on the next page.

The RED 3-Axis Lens Control System is now successfully setup and ready for wireless operation. The remainder of this section offers further guidance on initialization.

INITIALIZE THE SYSTEM

In order for the W.M.D. to safely control the motors, it must be initialized to detect the range of motion for each motor. At shutdown, the W.M.D. saves the range of motion for each motor along with the current position for 14 hours. You can turn on/off the W.M.D. without initializing again. Initialization needs to be performed if something changes with the the physical setup. W.M.D. LEDs display motor initialization status. Red LEDs indicate a motor error, solid green LEDs indicate motors that are initialized, and flashing green LEDs indicate that an initialization process is in progress. No LEDs indicate that a motor is not detected.

To initialize the system, perform one of the following actions:

- Press and hold the **Initialize** button on the T.H.C. for two (2) seconds to initialize all connected motors.
- Press and hold the **B** button on the W.M.D. for two (2) seconds to initialize all connected motors.
- Press and release the **Initialize** or **B** button to initialize only motors that need it.
- A single motor can be initialized by disconnecting and reconnecting the motor cable.

IMPORTANT: Initialize motors any time a modification is made.

NOTE: The W.M.D. must be unlocked for the **B** button to be active. Press and hold the **A** button for two (2) seconds to unlock the unit and access the menu.

CHAPTER 3:

WIRELESS MOTOR DRIVER (W.M.D.)

W.M.D. OVERVIEW

The RED® Wireless Motor Driver (W.M.D.) is the brain of the RED 3-Axis Lens Control System. The W.M.D. receives control signals from the RED Tactical Hand Controller (T.H.C.) to drive up to three (3) RED Lens Control Motors. With the W.M.D., you can adjust the following settings for each motor:

- Torque
- Direction
- Type/Model
- Backlash
- End Stop

R3D® metadata integration is a standard on the W.M.D., allowing your recorded lens control information to carry over into post production. Expansion ports, tool-free installation, and start/stop connectivity make the W.M.D. versatile and easy to use.

NOTE: DO NOT USE the Pro I/O Module to power the RED W.M.D. The Pro I/O Module does not provide enough power and is not designed to support the W.M.D.

NOTE: For more information on compatibility, go to "3-Axis System Compatibility" on page 61.

Figure: RED W.M.D.

W.M.D. CONTROLS

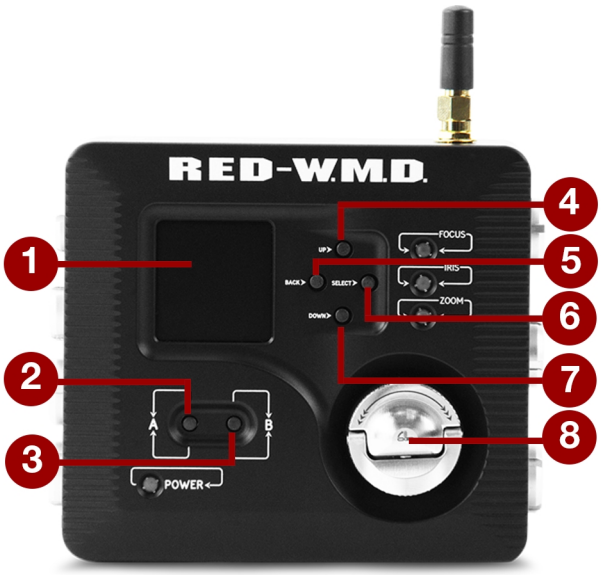


Figure: W.M.D. Controls

#	CONTROL	DESCRIPTION
1	LCD display	View the W.M.D. menus
2	A button	Return to home screen; Toggles button lock
3	B button	Short press initializes motors that are in an error state; long press initializes all motors
4	Up button	Navigate up through the W.M.D. main menus
5	Back button	Return to the previous menu
6	Select button	Enter or adjust the selected (highlighted) menu or item
7	Down button	Navigate down through the W.M.D. main menus
8	Mounting thumbscrew	Press and turn to install (CW) or uninstall (CCW) the W.M.D. to a mounting plate

W.M.D. LEDS

Figure: W.M.D. LEDs

#	LED	COLOR/FLASHING	DESCRIPTION
1	Power	Off	No power connected
		Green	Power on; Firmware upgraded
		Green flashing	Firmware upgrading
		Amber flashing	System boot indicator or initialization in progress
		Red	Power error
2	Focus, Iris, Zoom	Off	No motor connected
		Green	Initialized and ready for operation
		Green flashing	Initialization in progress
		Red	Motor error or failed initialization

W.M.D. CONNECTORS

Figure: W.M.D. Connectors (Side)

Figure: W.M.D. Connectors (Bottom)

#	CONNECTOR	DESCRIPTION	COMPATIBLE PARTS	PART NUMBERS
1	Wireless antenna	Removeable antenna	RED T.H.C./W.M.D. Antenna	790-0420
2	Focus connector (7-pin 1B LEMO®)	Connect the W.M.D. to the Focus RED Lens Control Motor	RED W.M.D. Motor Cable 7-Pin Straight to 7-Pin Right (12")	790-0434
			RED W.M.D. Motor Cable 7-Pin Straight to 7-Pin Right (18")	790-0406
			RED W.M.D. Motor Cable 7-Pin Straight to 7-Pin Right (24")	790-0412

#	CONNECTOR	DESCRIPTION	COMPATIBLE PARTS	PART NUMBERS
3	Iris connector (7-pin 1B LEMO)	Connect the W.M.D. to the Iris RED Lens Control Motor	RED W.M.D. Motor Cable 7-Pin Straight to 7-Pin Right (12")	790-0434
			RED W.M.D. Motor Cable 67-Pin Straight to 7-Pin Right (18")	790-0406
			RED W.M.D. Motor Cable 7-Pin Straight to 7-Pin Right (24")	790-0412
4	Zoom connector (7-pin 1B LEMO)	Connect the W.M.D. to the Zoom RED Lens Control Motor	RED W.M.D. Motor Cable 7-Pin Straight to 7-Pin Right (12")	790-0434
			RED W.M.D. Motor Cable 7-Pin Straight to 7-Pin Right (18")	790-0406
			RED W.M.D. Motor Cable 7-Pin Straight to 7-Pin Right (24")	790-0412
5	CAN connector (4-pin 0B LEMO)	CAN port for T.H.C. wired communication	RED CAN Command Cable (5')	790-0047
			RED CAN Command Cable (50')	790-0408
			RED CAN Command Cable (100')	790-0409
6	Expansion port (14-pin 1B LEMO)	Expansion port to connect to camera via the SYNC port, control Start/Stop functions on the camera, and support R.C.P. communication to the camera	RED Start/Stop Cable (1B to Sync, Ctrl, BNC)	790-0415
			RED Start/Stop Cable (1B to BNC)	790-0416
			RED Start/Stop Cable (1B to 00B Sync)	790-0428
			3BNC-to-00 LEMO Sync Cable	790-0154
			BNC-TO-BNC Adaptor	790-0435
7	232/422 port (10-pin LEMO)	Serial port to communicate with third-party devices	N/A	N/A
8	PWR connector (2-pin 1B LEMO)	Power in	RED W.M.D. Power Cable 2-Pin 1B to 2-Pin 0B (18")	790-0410
			RED W.M.D. Power Cable 2-Pin 1B to 4-Pin XLR (8')	790-0411
9	MicroSD® card slot	MicroSD card slot for upgrading W.M.D. firmware	MicroSD card	N/A
10	Guide pin	1/4" guide pin to install the V-LOCK to a DSMC Tactical Right Plate	1/4" guide pin	N/A

MOUNT THE W.M.D.

The W.M.D. is designed to support various mounting requirements, enabling you to customize your setup for your own camera configuration.

ATTACH THE W.M.D. TO THE DSMC TACTICAL RIGHT PLATE

When the V-LOCK is removed from the back of the W.M.D., it can be attached to a DSMC® Tactical Right Plate using the built-in thumbscrew and guide pin.

The W.M.D. can be attached to a DSMC Tactical Right Plate or other mounting plate with 1/4-20 screw holes. The built-in thumbscrew and 1/4" guide pin provide convenient, tool-free attachment for the W.M.D.

1. Ensure that the V-LOCK is removed from the back of the W.M.D. For more information about how to remove the V-LOCK, go to "Mount the W.M.D. to a V-Mount Receiver" on the next page.
2. Use a slotted screwdriver to remove the guide pin from the bottom of the W.M.D.

Figure: Remove Guide Pin

3. Use a slotted screwdriver to install the guide pin in the appropriate mounting hole on the back of the W.M.D. Select the mounting hole based on your mounting configuration:
   - **DSMC Tactical Right Plate**: Use the screw hole closest to the 1/4-20 screw for 18 mm spacing.
   - **Third-party cheeseplate**: Use the screw hole farthest from the 1/4-20 screw for 25 mm spacing.

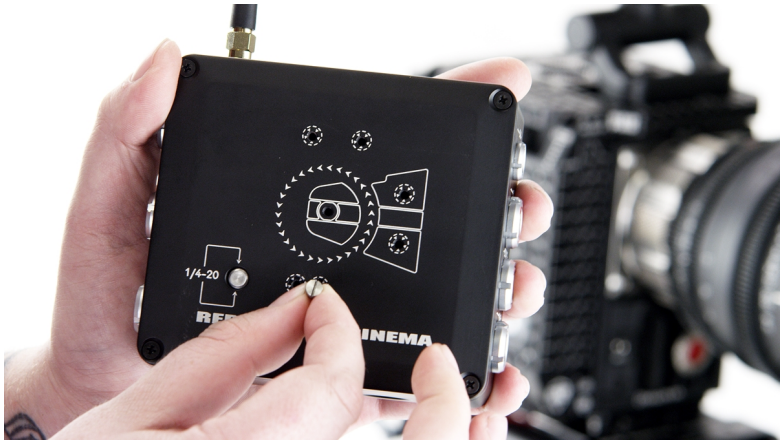


Figure: Install Guide Pin

4. Place the W.M.D. against the Tactical Plate so that the guide pin and 1/4-20 screw each align with a 1/4-20 screw hole.
5. Tighten the W.M.D. 1/4-20 thumbscrew.

   WARNING: DO NOT OVERTIGHTEN.

Figure: Push and Turn Thumbscrew

MOUNT THE W.M.D. TO A V-MOUNT RECEIVER

The W.M.D. ships with a V-LOCK to mount the W.M.D. to most industry-standard female v-mount receivers.

1. Align the V-LOCK on the back of the W.M.D.
2. Use a Phillips® #1 screwdriver to install three (3) M3 x 0.5 x 8 mm flathead screws that attach the V-LOCK to the W.M.D. Fully tighten.

   WARNING: DO NOT OVERTIGHTEN.
3. Use a Phillips #1 screwdriver to remove the three (3) M3 x 0.5 x 8 mm flathead screws, when finished.

Figure: W.M.D. Rear (V-Lock Installed)

POWER THE W.M.D.

1. Connect the 2-pin 1B LEMO connector of a RED W.M.D. Power Cable to the **PWR** port on the W.M.D.
2. Connect the opposite end to a 12 VDC power source with sufficient amperage.

   NOTE: The W.M.D. is powered on when the power cable is connected to a live power source. Disconnect the power cable to turn off the W.M.D.

CONNECT MOTORS

1. Connect a RED W.M.D. Motor Cable to the 7-pin LEMO connector on the motor.
2. Connect the opposite end of the RED W.M.D. Motor Cable to the corresponding lens function 7-pin LEMO connector on the W.M.D.
3. After connecting all motors to the W.M.D., configure the settings for that motor. For more information about configuring motor settings, go to "Configure Focus, Iris, and Zoom Motors" on the next page.

INITIALIZE WITH THE W.M.D.

In order for the W.M.D. to safely control the motors, the W.M.D. must be initialized to detect the range of motion for each motor. At shutdown, the W.M.D. saves the range of motion for each motor along with the current position for 14 hours. You can turn on/off the W.M.D. without initializing again. Initialization needs to be performed if something changes with the the physical setup.

To Initialize ALL Motors:

- Press and hold the **B** button on the W.M.D. for two (2) seconds.

To initialize ONLY motors with errors:

- Press and release the **B** button.
- A single motor can be initialized by disconnecting and reconnecting the motor cable.

  WARNING: It is important to initialize every time a change is made to a lens or a motor. Failing to initialize may damage lenses or motors.

W.M.D. MAIN MENU

The W.M.D. home screen displays the following system information for convenient user access:

- Lock status icon
- R.C.P. status icon
  - **R**: Indiciates W.M.D. is configured for R.C.P., but is not connected.

    NOTE: R.C.P. Active displays on the LCD when the R.C.P. communication is established.
- Wireless power setting icon
  - **H**: Wireless power set to High
  - **L**: Wireless power set to Low
- Currently selected lens profile
  - **White**: Designates a default profile
  - **Yellow**: Designates a modified and saved User profile
  - **Red**: Designates a modified profile that has not been saved

When changes are made to these W.M.D. main menu settings, they automatically update on the home screen.

AUTO-LOCK FEATURE

The W.M.D. features a menu lock function to prevent inadvertent changes to system settings. When locked, the lock status indicator is displayed in the upper left corner of the W.M.D. home screen.

The W.M.D. automatically locks after 60 seconds of non-use. To manually lock the W.M.D. menu, press the **A** button.

UNLOCK THE W.M.D.

When the W.M.D. is locked, only the **A** button remains active. Unlock the W.M.D. to return to the main menu.

- Press and hold the A button for two (2) seconds to unlock the W.M.D.

W.M.D. BUTTON LOCK

In the W.M.D. Options menu, the Button Lock feature provides the user with the ability to disable the auto-lock feature when a menu time-out occurs. When the lock is disabled, the W.M.D. does not automatically lock after 60 seconds. Regardless of the setting, holding and pressing the **A** button locks the W.M.D.

- Go to **Options** > **Button Lock** and disable the auto-lock.

CONFIGURE FOCUS, IRIS, AND ZOOM MOTORS

After initializing the W.M.D. with a RED Lens Control Motor, you may need to adjust the following settings:

- Torque
- Direction
- Type/Model
- Backlash
- End Stop

ADJUST TORQUE

Keep the torque setting as low as possible to avoid damaging the lens and lens motors. Increase the torque setting if the motor does not successfully initialize or an error message is displayed.

1. Select one of the following motors in the W.M.D. main menu:
   - Focus
   - Iris
   - Zoom
2. Select **Torque**.
3. Press **Select** to cycle through to a torque setting. (Example: **Low**, **Medium**, **High**)

CHANGE MOTOR DIRECTION

The last direction of the motor persists between reboots.

1. Select one of the following motors in the W.M.D. main menu:
   - Focus
   - Iris
   - Zoom
2. Select **Direction**.
3. Press **Select** to toggle to motor direction.

SELECT MOTOR TYPE/MODEL

1. Select one of the following motors in the W.M.D. main menu:
   - Focus
   - Iris
   - Zoom
2. Select **Model**.
3. Navigate to a motor model.
4. Press **Select**.

   NOTE: For a list of default motor profiles, go to "3-Axis System Compatibility" on page 61 or the "W.M.D. Main Menu Map" on page 92.

ADJUST BACKLASH

The RED Lens Control Motor offers next to zero backlash when properly installed. However, you may experience backlash with third-party motors, or certain lens and motor combinations.

The W.M.D. allows you to compensate for any backlash. Select an anti-backlash setting in the range of 0 to 3,000 encoder counts.

1. Select one of the following motors in the W.M.D. main menu:
   - Focus
   - Iris
   - Zoom
2. Select **Backlash**.

3. Use the **Select** and **Back** buttons to navigate between digit values.
   - Press **Select** to move the cursor to the right one (1) digit.
   - Press **Back** to move the cursor to the left one (1) digit.
   - Press **Up** to increase the value or press **Down** to decrease the value.
4. Adjust the setting until backlash is removed.
5. Deselect the digits and return to the menu.

ADJUST END STOP

The W.M.D. provides a buffer for the end stops. However, different lenses have varying requirements for this buffer. Some lenses require the motor to drive the lens right up to the end stop. Other lenses do not require the motor to drive the lens, and instead allow a large buffer to prevent high speed moves from overshooting into the end stop.

The W.M.D. allows you to compensate for the end stop buffer range. Select an end stop setting in the range of 0 to 3,000 encoder counts.

1. Select one of the following motors in the W.M.D. main menu:
   - Focus
   - Iris
   - Zoom
2. Select **End Stop**.
3. Use the **Select** and **Back** buttons to navigate between digit values.
   - Press **Select** to move the cursor to the right one (1) digit.
   - Press **Back** to move the cursor to the left one (1) digit.
   - Press **Up** to increase the value or press **Down** to decrease the value.
4. Adjust the settings as needed.
5. Deselect the digits and return to the menu.

CONFIGURE WIRELESS SETTINGS

In order for the T.H.C. to wirelessly control the W.M.D., the RED 3-Axis Lens Control System uses a Frequency-Hopping Spread Spectrum (FHSS) wireless link and offers 42 channels.

1. Select **Wireless** in the W.M.D. main menu.
2. Select a **Channel**.
3. Select a power setting for the strength of the wireless signal.
   - **Low**: The power setting balances range and low power and is appropriate in most cases.
   - **High**: The power setting can be used for maximum range.

   NOTE: Set the W.M.D. wireless settings appropriately. If the W.M.D. wireless setting is set to High and the T.H.C. is used within one (1) meter, you may lose connection.

   NOTE: When you are using wireless on High, place the T.H.C. at least one meter from the W.M.D. for proper operation.

VIEW MOTOR STATUS

This section describes each motor status and provides tips on how to resolve issues if an error occurs.

In the W.M.D. main menu, select Status to view the state of each motor.

MOTOR STATUS	DESCRIPTION/POSSIBLE CAUSES	TROUBLESHOOTING OPTIONS
—	Motor not detected	▸ Disconnect and reconnect the motor to the W.M.D. ▸ Ensure that the LEMO connectors on both ends of the cable are fully seated and locked
Control Error	W.M.D. cannot detect that the motor is moving ▸ Torque setting is too low for the lens ▸ Bad cable or malfunctioning motor ▸ Motor is obstructed and cannot move	▸ Increase torque until the status changes to “OK” ▸ Ensure that the correct motor model is selected in the W.M.D. menu ▸ Try a different RED W.M.D. Motor Cable ▸ Try a different motor
Homing	W.M.D. cannot find the End Stops after moving the motor for 60 seconds	▸ Ensure that the teeth on the motor drive gear fully mesh with the teeth on the lens gear ▸ Ensure that the pin on the motor drive gear properly engages the slot on the motor hub
OK	Motor functioning correctly	N/A
Over Drive	Incorrect motor control parameters	▸ Ensure the correct motor type is selected on the W.M.D.
Over Torque	▸ Motor was disengaged and reengaged without re-initializing the motor, which allowed the motor to drive into a hard stop ▸ Lens is obstructed and cannot move ▸ Torque setting is too low for the lens	▸ Initialize the motor ▸ Ensure that lens movement is not obstructed ▸ Increase torque and initialize
Hard Stop	Motor hits a hard stop ▸ Wrong motor type is selected ▸ Motor position on lens was moved since last initialization	▸ Verify correct motor type is selected ▸ Initialize motor

CONFIGURE START/STOP, GENLOCK, TIMECODE, TALLY

This section explains how to set up start/stop, genlock, and timecode with the W.M.D. and a camera.

For more information about cables and configurations, go to "3-Axis System Cables" on page 75.

1. Configure Start/Stop in the camera menu.
   A. Go to **Menu** > **Settings** > **Setup** > **GPIO/Sync** > **Brain GPIO**.
   B. Select **General Purpose In** from the **Camera In** drop-down menu.
2. Connect a RED Start/Stop Cable(s) for the configuration that you want.

FUNCTIONS	CABLE	PART NUMBERS	HOW TO CONNECT
R.C.P., Start/Stop with Tally, allows Genlock and Timecode to be connected to the camera	RED Start/Stop Cable (1B to Sync, Ctrl, BNC)	790-0415	1. Connect the 14-pin 1B LEMO to the **EXP** port on the W.M.D. 2. Connect the 4-pin LEMO start/stop connector to the **CTRL** port on the camera. 3. Connect the BNC connector to the White BNC connector of the 3BNC-to-00 LEMO Sync Cable using a BNC-TO-BNC Adaptor (included with the RED 3-Axis Lens Control System).
	3BNC-to-00 LEMO Sync Cable	790-0154	1. Connect the 4-pin 00 LEMO connector to the **SYNC** port on the camera.
Start/Stop, allows Genlock and Timecode to be connected to the camera	RED Start/Stop Cable (1B to BNC)	790-0416	1. Connect the 14-pin 1B LEMO to the **EXP** port on the W.M.D. 2. Connect the BNC connector to the White BNC connector of the 3BNC-to-00 LEMO Sync Cable using a BNC-TO-BNC Adaptor (included with the RED 3-Axis Lens Control System).
	3BNC-to-00 LEMO Sync Cable	790-0154	1. Connect the 4-pin 00 LEMO connector to the **SYNC** port on the camera.
Start/Stop	RED Start/Stop Cable (1B to 00B Sync)	790-0428	1. Connect the 14-pin 1B LEMO to the **EXP** port on the W.M.D. 2. Connect the 4-pin 00 LEMO connector to the **SYNC** port on the camera.

3. Configure Start/Stop in the W.M.D. main menu.
   A. Select **Start/Stop**.
   B. Select a start/stop option based on the intended functionality and cables used.

FUNCTIONS	START/STOP CABLE	PART NUMBER	TYPE
Disable Start/Stop	N/A	N/A	Off
R.C.P., Start/Stop with Tally, allows Genlock and Timecode to be connected to the camera	RED Start/Stop Cable (1B to Sync, Ctrl, BNC)	790-0415	DSMC+Tally
Start/Stop, allows Genlock and Timecode to be connected to the camera	RED Start/Stop Cable (1B to BNC)	790-0416	DSMC
	3BNC-to-LEMO Sync Cable	790-0154	DSMC
Start/Stop with camera	RED Start/Stop Cable (1B to 00B Sync)	790-0428	DSMC
Start/Stop with RED ONE	RED currently does not provide start/stop cables to connect the W.M.D. to the RED ONE	N/A	RED ONE

   C. Press **Select**.

W.M.D. LENS PROFILES

The W.M.D. includes default lens profiles, as well as the capability to modify default profiles for fine tuning. Lens profiles are separated into three (3) menu categories: Prime (default), Zoom (default), and User (modified). If a modification is made to a lens profile, the modified version can be saved under the User category.

NOTE: If a particular lens does not have a default profile, the W.M.D. does not support lens metadata. The lens may still be compatible with the system. For more information, go to "3-Axis System Compatibility" on page 61.

The following lenses are supported with default profiles in the W.M.D. firmware:

PRIME LENSES

- **ARRI® Ultra Prime**: 14mm, 16mm, 20mm, 24mm, 28mm, 32mm, 50mm, 65mm, 85mm, 100mm, 135mm
- **ARRI Master Prime**: 14mm, 16mm, 18mm, 21mm, 25mm, 27mm, 50mm, 65mm, 75mm, 150mm
- **Cooke® S5**: 25mm, 32mm, 50mm, 75mm
- **Cooke S4**: 14mm, 18mm, 21mm, 25mm, 27mm, 32mm, 35mm, 50mm, 65mm, 75mm, 100mm, 300mm
- **Elite Digital**: 18mm, 24mm, 35mm, 50mm, 75mm, 100mm, 135mm
- **Leica® Summilux-C**: 21mm, 25mm, 40mm, 50mm, 75mm, 100mm
- **RED PRO PRIME**: 18mm, 25mm, 35mm, 50mm, 85mm, 100mm, 300mm

ZOOM LENSES

- **Angénieux Optimo**: 15-40mm, 17-80mm, 30-80mm
- **ARRI/Fujinon® Alura**: 18-80mm T2.6
- **Fujinon Cine**: 14.5-45mm T2, 19-90mm
- **RED ZOOM**: 17-50mm, 18-85mm, 18-50mm T3, 50-150mm T3

SELECT A LENS PROFILE

Default lens profiles are located in the Prime or Zoom menus. Modified lens profiles are saved in the User menu.

1. Select **Profiles** in the W.M.D. main menu.
2. Select one of the following lens profile types:
   - Prime
   - Zoom
   - User
3. Select the manufacturer.
4. Select the model.
5. Select the focal length.
6. Press **Select** to choose the lens profile for the specific lens.

Figure: Select a Lens Profile

CLEAR THE ACTIVE LENS PROFILE

The clear function deselects the current lens profiles. This clears the active profile. Reselect a lens profile if you want to view metadata.

1. Select **Profiles** in the W.M.D. main menu.
2. Select **Clear**.
3. Press **Back** to exit to the Profiles menu, or press **A** to lock the W.M.D. and return to the home screen.

MODIFY A LENS PROFILE

The W.M.D. allows you to modify the encoder position related to a specific data point to fine-tune the active lens profile.

1. Select **Profiles** in the W.M.D. main menu.
2. Select **Modify**.

   NOTE: The 60-second auto-lock feature is disabled while the Modify menu is open.
3. Select one of the following lens functions.
   - Focus
   - Iris
   - Zoom
4. Perform fine-tuning adjustments to calibrate the selected lens.
   A. Adjust the gear so that the physical marking on the lens matches the **Mrk** value on the W.M.D. screen.
   B. Press **Select** to update. The updated encoder position **At** value matches the **Mrk** value.
   C. Repeat for each focal position on the lens as needed.
5. Press one of the following:
   A. **Down**: Saves the lens profile and exits to the Profiles menu
   B. **Back**: Does not save the lens profile and exits to the Profiles menu
   C. **A**: Does not save the lens profile, exits to the home screen, and locks the W.M.D.

SAVE A LENS PROFILE

If save a lens profile, follow the instructions below:

1. Select **Profiles** in the W.M.D. main menu.
2. Select **Save**.

VIEW LENS METADATA

Metadata format is dependent on your lens profile setting:

- **Lens profile is selected (Select > Profiles)**: Focus, Iris, and Zoom data extrapolated from the motor encoder positions displays for each lens function (Focus, Iris, Zoom).
- **Lens profile is not selected**: Hexadecimal motor position data displays for each lens function (Focus, Iris, Zoom).

Once you select a lens profile, you can view lens metadata on the W.M.D. screen.

NOTE: If a lens does not support a particular lens function or a motor is not connected, the resulting value is displayed as a hexadecimal value.

EXPORT LENS PROFILES

Use the export function to save modified profiles to the microSD card for repeat use and sharing.

1. Select **Profiles** > **Save** in the W.M.D. main menu.
2. Select **Export**.
3. Choose one of the following options:
   - **Overwrite**: Exports all profiles, overwriting any differences on the microSD. Saves existing profiles.
   - **Keep**: Adds W.M.D. profile library to existing microSD contents.
   - **Only**: Clears the microSD and replaces contents with the existing W.M.D. profile library.

   The W.M.D. displays “success” when the export is complete.
4. Press **Back** to exit, or press **A** to lock the W.M.D. and return to the home screen.
5. Remove the microSD card.

IMPORT LENS PROFILES

Use the import function to load modified profiles onto the W.M.D. from the microSD card.

1. Ensure that the profile “.pfl” files are loaded on the microSD card.
2. Insert the microSD card into the W.M.D.
3. Select **Profiles** > **Import** in the W.M.D. main menu.
4. Choose one of the following options:
   - **Overwrite**: Imports all profiles, overwriting any differences on the W.M.D. Saves existing profiles.
   - **Keep**: Adds microSD contents to the existing W.M.D. profile library.
   - **Only**: Clears the W.M.D. and rebuilds the profile library with the microSD contents.

   The W.M.D. displays “success” when the import is complete.
5. Press **Back** to exit, or press **A** to lock the W.M.D. and return to the home screen.

MANAGE LENS PROFILES

The W.M.D. automatically reads lens information and renames the profile on import. This effectively removes any custom profile names. For this reason, RED recommends saving .pfl files in custom named folders, rather than changing the lens profile name.

After exporting lens profiles from the W.M.D., save them to your computer.

1. Insert the microSD card into your computer. Use a microSD to SD adaptor, if necessary.
2. Save the .pfl files to a safe location on your computer.
   A. Create a new folder on your desktop and label it appropriately. (Example: “WMD_Jun8”)
   B. Place .pfl files into the new folder.

ACCESS W.M.D. DIAGNOSTIC DATA

To view the hardware status data for each W.M.D. component, go to the W.M.D. main menu and select **About**.

ERASE SETTINGS ON THE W.M.D.

If you are experiencing problems with the W.M.D. or for other reasons want to reset the unit to factory default settings, follow the instructions below:

1. Select **Options** in the W.M.D. main menu.
2. Select **Erase Settings**.

   NOTE: Erasing settings deletes all existing User profiles and other adjustments that have been made on the W.M.D. RED recommends that you export User profiles and save them to your computer before erasing all settings on the W.M.D.

ROTATE SCREEN

To rotate the screen on the W.M.D., follow the instructions below:

1. Unlock the W.M.D. For more information, go to "Unlock the W.M.D." on page 26.
2. Select **Options** in the W.M.D. main menu.
3. Select **Rotate Scrn**.

CONFIGURE R.C.P. COMMUNICATION

You can connect the W.M.D. to the camera via R.C.P. to allow the camera to configure and control the W.M.D. Some of the features included sharing lens metadata, motor configuration, lens profiles management, and wireless settings. To set up R.C.P. communication, follow the instructions below:

1. Connect the RED Start/Stop Cable to the EXP port on the W.M.D.
2. Connect the opposite end to the CTRL port on the camera.
3. Go to **Options** > **EXP Port** > **R.C.P.** in the W.M.D. main menu.
4. A red 'R' icon displays on the W.M.D. when the EXP port is configured for R.C.P. communication.
5. Go to **Settings** > **Setup** > **Communication** > **Serial** in the camera menu.
6. Select **R.C.P. Command Protocol** from the **Ctrl Protocol** drop-down menu.

   The W.M.D. displays an indication that the R.C.P. is active.

NOTE: All configuration is now managed from the camera menu under **Settings** > **Motor Control**.

CAMERA METADATA INTEGRATION

When you use a lens profile on the W.M.D., metadata is produced. When the W.M.D. is configured to communicate to the camera via R.C.P., metadata is shared. The camera uses the metadata for displays and stores it in an R3D file. To retreive the metadata, use REDline through Terminal or Command Line to run the following command:

redline --printMeta 5 -i /path/to/file.R3D

For more information about REDline, see the camera operation guides, available at www.red.com/downloads.

NOTE: To use camera metadata, you must first configure the R.C.P. communication. For more information, go to "Configure R.C.P. Communication" above.

NOTE: If you use a lens mount that provides metadata, then the camera uses the lens mount metadata instead of the W.M.D. metadata. To set the camera to use the W.M.D. metadata, go to **Settings** > **Setup** > **Lens** on the camera menu and deselect the **Enable Power to Lens** check box.

FUNJINON LENS CONTROL

The W.M.D. can control Fujinon lenses through serial communication. There are two modes of control:

- **ENG+FIZ**: Controls focus, iris and zoom.
- **ENG+I**: Controls iris only.

To enable Fujinon lens control, follow the instructions below:

1. Go to **Options** > **232/422 Port** in the W.M.D. main menu.
2. Select **ENG+FIZ** or **ENG+I**.
3. Go to **Settings** > **Setup** > **Lens** in the camera menu.
4. Deselect the **Enable Power to Lens** check box.

NOTE: The (791-0582) Fujinon Eng Lens Cable with P-tap Power is available through Element Technica.

TECHNICA PROTOCOL

You can connect a third-party system to the W.M.D. through Technica Protocol. Technica Protocol allows configuration and control at update rates that ensure smooth motor control. Technica Protocol is available via the following ports:

- **232/422 Port**: Go to Options > 232/422 Port on the W.M.D. and select Technica Protocol.
- **EXP Port**: Go to Options > EXP Port on the W.M.D. and select Technica Protocol.

STREAM METADATA

You can stream metadata to an external device if the W.M.D. is not connected to a RED camera. Streaming metadata exports data at a rate of 25 updates per second. To configure streaming metadata, follow the instructions below:

- **232/422 Port**: Go to Options > 232/422 Port on the W.M.D. and select Metadata Protocol.
- **EXP Port**: Go to Options > EXP Port on the W.M.D. and select Metadata Protocol.

SET UNITS

You can set the focus data to display in Imperial units or Metric units. To set units, go to **Options** > **Units** in the W.M.D. menu and select **Imperial** or **Metric**.

SYSTEM POWER

Low Power mode limits the W.M.D.'s maximum power. To set Low Power mode, go to **Options** > **System Power** on the W.M.D. and select **Normal** or **Low Power**.

CHAPTER 4:

TACTICAL HAND CONTROLLER (T.H.C.)

T.H.C. OVERVIEW

The RED® Tactical Hand Controller (T.H.C.) works with the RED Wireless Motor Driver (W.M.D.) and RED Lens Control Motor to provide wireless operation of lens adjustments (Focus, Iris, Zoom). The T.H.C. delivers on-the-fly precision tuning with independent Focus, Iris, and Zoom adjustment controls.

Up to two (2) T.H.C. units can be wirelessly paired with a W.M.D. for individual operator control during shoots. The T.H.C. uses a 2.4GHz Frequency-Hopping Spread Spectrum (FHSS) wireless link with multiple channel support. The T.H.C. also features a field replaceable marking ring for convenient lens adjustments. A lanyard loop provides a secure place to attach the T.H.C. to a lanyard or wristband.

The Tactical Hand Controller is also compatible with the R.C.P.™ Bridge for wireless Iris and Focus control of supported Canon® and Nikon® motorized lenses. For more information, see the camera operation guides available at www.red.com/downloads.

Figure: RED T.H.C. Kit

T.H.C. CONTROLS

Figure: T.H.C. Controls

Figure: T.H.C. Controls

#	CONTROL	DESCRIPTION
1	Run button	Record button for mobile Start/Stop
2	Iris slider[1]	Adjusts motor connected to Iris port
3	Zoom wheel[1]	Adjusts motor connected to Zoom port
4	Initialize button	Press and hold for two (2) seconds to initialize the system; OR press and release to initialize only motors with errors
5	Battery/Cable switch	Toggles power source from cabled to battery mode
6	Zoom button	Hold down to set the “zoom” lens limit or lens lock
7	Focus wheel[1]	Adjusts motor connected Focus port
8	Iris Limit button	Hold down to set the “iris” lens limit or lens lock

#	CONTROL	DESCRIPTION
9	Focus Limit button	Hold down to set the “focus” lens limit or lens lock
10	Eject battery release	Press to release the rechargeable battery from the T.H.C.

1. Focus, Iris, and Zoom controls can be used interchangeably by connecting the RED Lens Control Motor to a lens function connector that you want on the W.M.D.

T.H.C. LEDS

Figure: T.H.C. LEDs

Figure: T.H.C. LEDs

#	LED	COLOR/FLASHING	DESCRIPTION
1	Focus Limit	Off	Function active; no limits set
		Green flashing (slow)	Actively setting limit (User is holding the limit button down)
		Green flashing (fast)	Function locked: no position updates are sent to the W.M.D.
		Green	Limit is enabled

#	LED	COLOR/FLASHING	DESCRIPTION
2	Iris Limit	Off	Function active; no limits set
		Green flashing (slow)	Actively setting limit (User is holding the limit button down)
		Green flashing (fast)	Function locked: no position updates are sent to the W.M.D.
		Green	Limit is enabled
3	Wireless	Off	Off/wired connection; not attempting to connect
		Blue flashing	Attempting to connect to W.M.D.
		Blue	Connected to W.M.D.
4	Battery/Tally[1]	Green	Charged battery
		Amber	Low battery
		Red	Very low battery (replace immediately to avoid power loss)
		Flashing	Tally on; camera is recording
		Solid	Tally off; camera is not recording
5	Initialize	Off	One or motor motors must be initialized; no motors detected
		Green flashing	Initialization in process
		Green	All detected motors are initialized
6	Battery/Cable	Off	Power off
		Green	Power on
7	Zoom	Off	Function active; no limits set
		Green flashing (slow) Zoom	Actively setting limit (User is holding the limit button down)
		Green flashing (fast)	Function locked: no position updates are sent to the W.M.D.
		Green	Limit is enabled

1. The tally feature is only supported with specific cabling configurations. Refer to "Configure Start/Stop, Genlock, Timecode, Tally" on page 30.

T.H.C. CONNECTORS

Figure: T.H.C. Wired Connections

Figure: T.H.C. Battery, microSD, and Antenna

#	CONNECTOR	DESCRIPTION	COMPATIBLE PARTS	PART NUMBERS
1	AUX port	Auxiliary power and communication for accessories	R.C.P.-to-T.H.C. Connector Cable (3')	790-0444
2	CAN port	CAN communication and power	RED CAN Command Cable (5')	790-0407
			RED CAN Command Cable (50')	790-0408
			RED CAN Command Cable (100')	790-0409
3	Battery compartment	Holds the RED Li Battery 7.2V	RED Li Battery 7.2V	740-0032
4	MicroSD® slot (under battery)	Standard microSD slot used to upgrade T.H.C. firmware	Standard microSD	N/A
5	Wireless antenna	Removeable antenna	RED T.H.C./W.M.D. Antenna	790-0420

WIRED OPERATION

1. Connect the T.H.C. to the W.M.D. using the RED CAN Command Cable (provided).
2. Toggle the T.H.C. power switch to **Cable** mode.

   The T.H.C. is connected and ready for wired operation.

Figure: T.H.C. Wired Connection

PAIR THE T.H.C.

Connect and pair the T.H.C. with your W.M.D. to operate in wireless mode. Once paired, the T.H.C. stores wireless information for that W.M.D. and automatically reconnects when in range.

1. Ensure the W.M.D. is receiving power.
2. Connect the T.H.C. to the W.M.D. using a RED CAN Command Cable.
3. Toggle the T.H.C. power switch to **Cable** mode.

   The T.H.C. automatically syncs wireless information when a cabled connection is established with the W.M.D.
4. Remove the RED CAN Command Cable.
5. Install a RED Li Battery 7.2V.
6. Toggle the T.H.C. power switch to **Battery** mode.

   The T.H.C. searches for the wireless connection. The wireless LED stops flashing and remains solid blue when connected.

NOTE: The RED CAN Command Cable also provides power to the T.H.C. up to approximately 500 ft. When using a cable longer than 500 ft, insert a battery and toggle the T.H.C. power switch to **Battery** to provide sufficient power. The CAN cable continues to support wired communication over a much longer distance.

NOTE: For more information, go to "Configure Wireless Settings" on page 28.

CHANGE THE WIRELESS CHANNEL

The best way to update the wireless channel on the T.H.C. is to repeat the pairing process by establishing a wired connection to the W.M.D. If it is inconvenient to establish a wired connection, you can manually set the wireless channel on the T.H.C.

1. Power off the T.H.C. by toggling the T.H.C. power switch to **Cable** mode.
2. Press and hold the **Focus Limit** button, and toggle the T.H.C. power switch to **Battery** mode.

   The focus and iris LEDs alternate turning on and off.

3. After a few seconds, release the **Focus Limit** button. Iris Limit and Focus Limit LEDs flash corresponding to the current channel setting:
   - **Iris Limit**: Flashes to represent the tens.
   - **Focus Limit**: Flashes to represent the ones.

   For example, if the Iris LED flashes twice and the Focus LED flashes once, the current channel is 21.
4. After LEDs stop flashing, press the Iris Limit and Focus Limit buttons to set the new channel:
   - **Iris Limit**: Press to set the tens.
   - **Focus Limit**: Press to set the ones.

   For example, to set the channel to 14, press the Iris button once, and press the Focus button four (4) times.
5. Wait a few seconds for the Iris Limit and Focus Limit LEDs to flash indicating the new channel.

NOTE: For more information, go to "Configure Wireless Settings" on page 28.

WIRELESS SETTINGS

The wireless settings for the T.H.C. are managed in the W.M.D. menu. If the wireless channel is changed in the W.M.D., the T.H.C. must be connected via a wired connection to obtain the new wireless information.

NOTE: For an alternate method, go to "Change the Wireless Channel" on the previous page.

NOTE: For more information, go to "Configure Wireless Settings" on page 28.

CONNECT TWO (2) T.H.C. UNITS

The W.M.D. supports up to two (2) T.H.C. units. Both units have full control over all adjustment functions. Use the lens lock function to prevent both controllers from sending conflicting commands while both units are in operation.

Connect a second T.H.C. using the same method described in "Pair the T.H.C." on the previous page.

INITIALIZE WITH THE T.H.C.

In order for the W.M.D. to safely control the motors, it must be initialized to detect the range of motion for each motor. At shutdown, the W.M.D. saves the range of motion for each motor along with the current position for 14 hours. You can turn on/off the W.M.D. without initializing again. Initialization needs to be performed if something changes with the the physical setup.

To initialize ALL motors:

- Press and hold the **Initialize** button on the T.H.C. for two (2) seconds.

To initialize ONLY motors with errors:

- Press and release the **Initialize** button.
- A single motor can be initialized by disconnecting and reconnecting the motor cable.

WARNING: Initialize the system every time a modification is made to a lens or a motor. Failing to perform the initialization sequence may cause severe damage to your lens, motor, or camera.

SET A LENS LIMIT

The T.H.C. enables precision on-the-fly adjustments for lens functions.

1. Adjust a lens function knob/slider (Focus, Iris, or Zoom) to the min/max position.

   For example, zoom out to capture full setting.

2. Press and hold the corresponding **Limit** button (Focus, Iris, or Zoom) on the T.H.C.

   The corresponding LED blinks to indicate a lens limit is being set.

Figure: Hold Limit Button and Adjust

3. Adjust the corresponding lens function knob/slider (Focus, Iris, or Zoom) to the max/min position.

   For example, zoom in on target.

4. Release the **Limit** button.

   The corresponding LED turns on to indicate an enabled limit.

NOTE: The T.H.C. is a persistent state device, meaning that the lens limit is maintained even if the unit is powered down.

NOTE: NOTE: When you hold a lens limit button for three (3) seconds without moving the adjustment knob/slider, the lens function limit locks. For more information, go to "Set a Lens Lock" on the next page.

ENABLE/DISABLE LENS LIMITS

1. Press and release the corresponding **Limit** button.

   The lens limit is deactivated. The LED turns off to indicate that the lens limit is not enabled.

2. Press and release the **Limit** button again to enable the limit.

   The corresponding LED turns on to indicate an enabled limit.

   NOTE: Holding down the limit button for three (3) seconds without any change to any input locks the respective lens adjustment function on that T.H.C. unit. For more information, go to "Set a Lens Lock" on the next page.

SET A LENS LOCK

The W.M.D. can support wireless communication with up to two (2) T.H.C. units at any given time. Use the lens function lock feature on the T.H.C. to prevent conflicting commands from two (2) T.H.C. units.

1. Press and hold the **Limit** button for a lens function for three (3) seconds. DO NOT make adjustments to the knob/slider during this time.

Figure: Hold Limit Button for 3 sec

2. Release the **Limit** button when the corresponding LED changes from long blinks to quick blinks.

   The lens function is now locked for that T.H.C. unit. The lens function LED quickly flashes green to signal an active lens lock.

REMOVE A LENS LOCK

1. Press and hold the **Limit** button for a lens function for three (3) seconds.
2. Release the **Limit** button once the corresponding LED becomes solid.

   The lens function is now unlocked.

RECORD START/STOP WITH THE T.H.C.

The Battery/Tally LED, near the top of the T.H.C., flashes when the camera is recording.

1. Press and release the **Run** button to start recording.
2. Press and release the **Run** button again to stop recording.

   NOTE: The Battery/Tally LED serves a dual purpose on the T.H.C. Flashing indicates that the camera is rolling, color indicates battery charge level.

   NOTE: Note: The W.M.D. must be configured for the Start/Stop operation. For more information, go to "Configure Wireless Settings" on page 28.

CHAPTER 5:

LENS CONTROL MOTOR

RED LENS CONTROL MOTOR OVERVIEW

The RED® Lens Control Motor delivers precision control and flexibility in a slim, lightweight design. The RED Lens Control Motor features dual-sided dovetail rails, a tool-free mounting clamp, and a rotating 7-pin LEMO® connector for space-saving low profile configuration. It is also engineered with mounting options for 15mm or 19mm support rods, and a magnetic-locking gear system to accommodate a wide variety of lenses.

The RED Lens Control Motor is also compatible with third-party motor drivers using the appropriate RED motor cable with the proper resistance identification. For more information, visit the RED Store at www.red.com/store or submit a Support ticket at https://support.red.com.

WARNING: ALWAYS use the RED motor cable with the appropriate internal identification resistor when using RED Lens Control Motors with third-party motor drivers. Any damage caused to motors or motor drivers resulting from the use of third-party cables is not covered under warranty.

NOTE: For more information on compatibility, go to "Compatible Motor Drivers" on page 61.

This section provides information on the following RED Lens Control Motor components:

- RED Lens Control Motor
- RED Lens Control Motor Mounting Bracket
- 19mm-to-15mm Rod Reducer Kit
- RED Lens Control Motor Gear M 0.8

Figure: RED Lens Control Motor with Lens Control Motor Mounting Bracket

RED LENS CONTROL MOTOR MOUNTING BRACKET

Mount the RED Lens Control Motor to 15mm or 19mm support rods using the flexible and tool-free RED Lens Control Motor Mounting Bracket. The bracket securely attaches to the built-in dove-tail mounting rails on the RED Lens Control Motor. The bracket is designed for 19mm support rods and is also compatible with 15mm support rods using snap-on reducer bushings.

Figure: RED Lens Control Motor Mounting Bracket

19MM-TO-15MM ROD REDUCERS

The 19mm-to-15mm Rod Reducers enable the RED Lens Control Motor Mounting Bracket to attach to 15mm diameter support rods. Snap the 19mm-to-15mm Rod Reducers into the RED Lens Control Motor Mounting Bracket and it accommodates 15mm support rods.

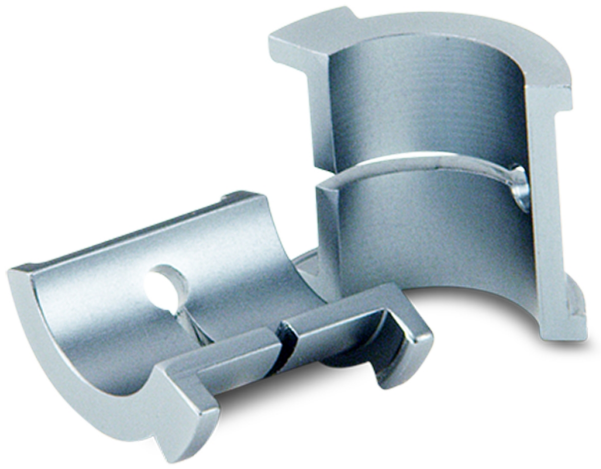


Figure: 19mm-to-15mm Rod Reducers

LENS DRIVE GEARS

RED Lens Drive Gears are magnetic-locking and interchangeable without the use of any tools. Additionally, RED Lens Drive Gears can be installed on either side of a RED Lens Control Motor for optimized motor orientation and low profile setup.

Figure: RED Lens Drive Gear M 0.8

ATTACH THE RED LENS CONTROL MOTOR MOUNTING BRACKET

1. Align the dove-tail bracket on the RED Lens Control Motor Mounting Bracket with a mounting rail on the RED Lens Control Motor.
2. Insert the RED Lens Control Motor Mounting Bracket and compress the locking guide pin to attach.
3. Slide the RED Lens Control Motor Mounting Bracket into place.
4. Tighten the adjustment knob to secure the RED Lens Control Motor Mounting Bracket into place.

REMOVE A RED LENS CONTROL MOTOR MOUNTING BRACKET

1. Loosen the adjustment knob to allow the RED Lens Control Motor Mounting Bracket to slide.
2. Compress the locking guide pin and slide the RED Lens Control Motor Mounting Bracket off of the dove-tail mount.

INSTALL THE RED LENS CONTROL MOTOR

Dual dove-tail mounting rails on both sides of the RED Lens Control Motor offer flexible and convenient installation, regardless of your camera setup. With the RED Lens Control Motor Mounting Bracket attached to the RED Lens Control Motor, perform the following instructions:

1. Loosen the thumbscrew lock and open to clamp on the RED Lens Control Motor Mounting Bracket.
2. Install 19mm-to-15mm Rod Reducers as necessary.
3. Position the RED Lens Control Motor Mounting Bracket on the support rod. Ensure that the RED Lens Control Motor gear can reach a lens adjustment gear.

   NOTE: Allow for a small amount of give between the motor gear and the lens adjustment gear when mounting the RED Lens Control Motor.
4. Close the clamp and move the pivoting RED Lens Control Motor Mounting Bracket lock into place.
5. Tighten the thumbscrew lock on the RED Lens Control Motor Mounting Bracket to secure the RED Lens Control Motor to the support rod.

CONNECT THE RED LENS CONTROL MOTOR

1. Connect a RED W.M.D. Motor Cable to the rotating connector on the RED Lens Control Motor.
2. Connect the opposite end of the RED W.M.D. Motor Cable to the corresponding lens function (Focus, Iris, Zoom) 7-pin LEMO port on the W.M.D.
3. Retract the spring-loaded thumb latch to rotate the connector to the position that you want.
4. Release the thumb latch and the rotating connector locks in place.

INSTALL A RED LENS DRIVE GEAR

1. Insert the RED Lens Drive Gear mounting rod into theRED Lens Control Motor.
2. Twist the RED Lens Gear to align the guide pins.
3. Continue to apply light pressure, the gear magnetically snaps into place when properly aligned.

Figure: RED Lens Drive Gear M 0.8 Installed

REMOVE A RED LENS DRIVE GEAR

1. Push on the RED Lens Drive Gear axle to eject the RED Lens Drive Gear from the RED Lens Control Motor.

   Alternatively, grasp the RED Lens Drive Gear by the gear teeth and pull to disengage and remove the RED Lens Drive Gear.

CHAPTER 6:
SYSTEM MAINTENANCE

All RED® products are designed for rugged durability, but precision instruments demand proper care. Take note of the special care guidelines in this section.

WARNING: DO NOT attempt to modify, dismantle or open the RED Lens Control Motor, Tactical Hand Controller (T.H.C.), Wireless Motor Driver (W.M.D.), or other accessory as doing so may expose you to electric shock and serious injury. There are no user-serviceable parts inside. Alterations or repairs made to the W.M.D., T.H.C., RED Lens Control Motor, or other accessory, except by a RED authorized service facility, void the Limited Warranty.

CLEAN 3-AXIS SYSTEM COMPONENTS

Clean ONLY using a dry cloth. When cleaning your RED Lens Control Motor, T.H.C., W.M.D., or other accessory, remember that the components are not waterproof and moisture can damage electronic circuitry.

WARNING: DO NOT rinse or immerse any part of the RED Lens Control Motor, T.H.C., W.M.D., or other accessory. Keep components dry at all times.

WARNING: DO NOT use soaps, detergents, ammonia, acetone, alkaline cleaners, abrasive cleaning compounds, or solvents. These substances may damage electronic circuitry.

NOTE: Using any fastener or adhesive material may leave residue on equipment. If residue is left behind, use an appropriate isopropyl alcohol cleaner and a lint-free cloth to clean. Apply a small amount of cleaning solution to the lint-free cloth and wipe.

STORE THE 3-AXIS SYSTEM

It is important to properly store and protect your equipment when it is not in use. Use the following tips when storing components of the RED 3-Axis Lens Control System:

- Remove the detachable antenna from the T.H.C. and W.M.D. to prevent accidental damage to the antenna and antenna connector.
- Remove the battery from the T.H.C. When the battery is removed, ensure that dirt, dust, or other debris does not get into the battery bay or the microSD® slot.

CHAPTER 7:
UPGRADE FIRMWARE

The Tactical Hand Controller (T.H.C.) and Wireless Motor Driver (W.M.D.) are designed to support firmware upgrades for improved functionality and additional features in the future.

The T.H.C. and W.M.D. are updated independently of each other. You can load both the T.H.C. and W.M.D. firmware to the microSD® card at the same time.

Visit RED Downloads at www.red.com/downloads for the latest firmware and resources.

NOTE: User-selected settings on the T.H.C. and W.M.D. are not affected by firmware upgrades.

MICROSD CARD PREPARATION

- Format the microSD card as MS-DOS FAT (for Mac®) or FAT32 (for Windows®). The microSD card must be formatted properly before saving firmware upgrade file.
- Use the provided microSD card and SD card adaptor for best results when upgrading firmware. Other brands or models of microSD cards and SD card adaptors may not be compatible with the RED 3-Axis Lens Control System.

VERIFY CURRENT W.M.D. FIRMWARE

The current firmware version can be found in the W.M.D. main menu.

1. Select the **About** menu in the W.M.D. main menu.
2. Press **Select**.

   The firmware version displays in green. A higher number reflects a later release version.

UPGRADE W.M.D.

IMPORTANT: If operating on battery power, ensure that the battery is fully charged before upgrading.

NOTE: User-selected settings on the T.H.C. and W.M.D. are not affected by firmware upgrades.

1. Insert the microSD card into the SD card adaptor.
2. Insert the SD card adaptor into the SD card slot on your computer or SD card reader.
3. Format the microSD card as MS-DOS FAT (for Mac) or FAT32 (for Windows).
4. Download the most recent W.M.D. firmware from RED Downloads at www.red.com/downloads.

   NOTE: You can load both the T.H.C. and W.M.D. firmware to the microSD card at the same time.
5. Save the firmware file to the root directory of the microSD card. Do not copy the file to a folder.
6. Turn off the W.M.D.
7. Insert the microSD card in the microSD slot on the bottom of the W.M.D.
8. Turn on the W.M.D.

   The upgrade process starts when the W.M.D. is turned on. The upgrade status displays on the LCD display and the Power LED flashes green. When the upgrade is complete, the LCD display shows “Done” and the Power LED turns solid green.
9. Turn off the W.M.D.

10. Remove the microSD card.

VERIFY CURRENT T.H.C. FIRMWARE

There is currently no way to verify current firmware version. If you are experiencing problems, upgrade to the latest firmware version available at www.red.com/downloads.

UPGRADE T.H.C.

IMPORTANT: Ensure that the battery is connected and fully charged, or connect the T.H.C. to a power source using the RED CAN Command Cable.

NOTE: User-selected settings on the T.H.C. and W.M.D. are not affected by firmware upgrades.

1. Insert the microSD card into the SD card adaptor.
2. Insert the SD card adaptor into the SD card slot on your computer or SD card reader.
3. The microSD card must be formatted each time before using it to upgrade. Format the microSD card as MS-DOS FAT (for Mac) or FAT32 (for Windows).
4. Download the most recent T.H.C. firmware from RED Downloads at www.red.com/downloads.

   NOTE: You can load both the T.H.C. and W.M.D. firmware to the microSD card at the same time.
5. Save the firmware file to the root directory of the microSD card. Do not copy the file to a folder.
6. Turn off the T.H.C.
7. Remove the battery to reveal the microSD slot in the battery bay.
8. Using your fingernail or other non-conductive material, move the microSD compartment to the open position and pull the hinged compartment open.
9. Insert the microSD card so that the contacts mate with the card reader connections on the T.H.C.
10. Close the microSD compartment.
11. Power the T.H.C. using the CAN cable or battery.

    The upgrade process starts as soon as the T.H.C. is powered. The Battery LED flashes green rapidly for 15 seconds. When the upgrade is complete, the Battery LED turns solid green.
12. Turn off the T.H.C.
13. Remove the microSD card.

CHAPTER 8:
TROUBLESHOOT THE SYSTEM

GENERAL TOPICS

W.M.D. SHUTDOWN

SYMPTOM

The Wireless Motor Driver (W.M.D.) shuts off while driving multiple motors on a stiff lens.

EXPLANATION

The 12 V auxiliary (AUX) port(s) on many camera power modules, including the REDVOLT® XL Module, provide a maximum of 3.8 A of current and is sufficient for most operating conditions. In certain instances, when driving multiple motors simultaneously on a stiffer than normal lens, the W.M.D. may draw more than 3.8 A. The event may cause an interruption of power supplied to the W.M.D. and result in a shutdown.

POTENTIAL RESOLUTIONS

- Connect the W.M.D. to a 12 VDC power source with sufficient amperage.
- Unplug a motor that is not being used for a particular shooting sequence.
- Select **Low Power** mode.

  NOTE: Low Power mode may affect performance when maximum power is required.

POWER FAILURE

SYMPTOM

The camera monitor displays an error message stating that a Rear Battery Power and Fault has occurred and too much current has been drawn from the camera, resulting in the port ceasing to provide power.

EXPLANATION

The camera notifies the you and removes power from that port. Power failure occurs when the W.M.D. attempts to use more power than the camera module can provide. For example, driving multiple motors on very stiff lenses can cause power failure.

POTENTIAL RESOLUTIONS

- Connect the W.M.D. to a 12 VDC power source with sufficient amperage.
- Select **Low Power** mode.

  NOTE: Low Power mode may affect performance when maximum power is required.

TROUBLESHOOT THE W.M.D.

W.M.D. DOES NOT RECOGNIZE MOTOR

SYMPTOM

The W.M.D. does not recognize a motor.

POTENTIAL RESOLUTIONS

- Ensure that the W.M.D. is connected to the motor.
- Ensure that the problem is not related to a faulty or damaged cable. Try connecting the W.M.D. and motor with another cable.
- Ensure that you are using a supported motor (for a list of supported motors, go to "3-Axis System Compatibility" on page 61.

TROUBLESHOOT RED LENS CONTROL MOTORS

RED LENS CONTROL MOTOR GEAR SKIPS DURING OPERATION

SYMPTOM

A RED Lens Control Motor gear skips on the lens gear during operation.

EXPLANATION

Gear skips may occur due to support rod flexing when using carbon fiber support rods with lenses that are stiff and require high torque levels. RED recommends using the black rod, steel rod, or other stiff support rods.

POTENTIAL RESOLUTION

- Ensure that the gear is properly installed.
- Ensure that the proper gear pitch is correct for the installed lens.
- Ensure that support rods are firmly and properly installed.
- Ensure that the RED Lens Control Motor and RED Lens Control Motor Mounting Bracket are properly installed and tightened on the support rod.
- The motor torque setting may be set too high. For more information, go to "Adjust Torque" on page 27.

RED LENS CONTROL MOTOR ERROR CODE

SYMPTOM

The motor is not functioning and the motor LED indicator is red.

POTENTIAL RESOLUTION

- Go to **Select** > **Status** in the W.M.D. main menu to check if there is an error code.
- Initialize the motor.

  NOTE: For more information and resolutions regarding errors, go to "View Motor Status" on page 29.

MOTOR DOES NOT MOVE WHEN IT SHOULD BE HOMING

SYMPTOM

The motor status light indicates that the motor is homing, but the motor does not move. After 60 seconds, a motor error occurs.

POTENTIAL RESOLUTIONS

Ensure that the motor gear is fully engaged with the motor.

LENS FUNCTION DOES NOT RESPOND

SYMPTOM

A lens function (Focus, Iris, Zoom) is not responding.

POTENTIAL RESOLUTIONS

- The lens function may be locked. To resolve the issue, use the instructions described in "Remove a Lens Lock" on page 45.
- Ensure that the torque setting on the motor is set appropriately. The torque value may be too low.
- Ensure that you are using the appropriate motor cable.
- If you are experiencing issues with the W.M.D., ensure that sufficient power is available for the operations. Try connecting the W.M.D. to a 12 VDC power source that is not the camera, and attempt the operation again.

TROUBLESHOOT WIRELESS OPERATIONS

T.H.C. DOES NOT CONNECT WITH W.M.D.

SYMPTOM

The Tactical Hand Controller (T.H.C.) does not connect with the W.M.D.

EXPLANATION

The T.H.C. retains the MAC address for the W.M.D. (or other controller) that it is paired to.

POTENTIAL RESOLUTION

Connect the T.H.C. to the W.M.D. using the RED CAN Command Cable:

1. Connect one end of the 4-pin 0B LEMO® CAN connector cable to the CAN port on the W.M.D.
2. Connect the opposite end of the 4-pin 0B LEMO CAN connector cable to the CAN port on the T.H.C.
3. Ensure that the wireless blue light stops flashing and turns off. The communication is established and the wireless information has been exchanged.
4. Disconnect the 4-pin 0B LEMO CAN connector cable.
5. Connect the T.H.C. wirelessly.

INTERMITTENT WIRELESS SIGNAL

SYMPTOM

The wireless signal transmitting between the T.H.C. and W.M.D. is intermittent, resulting in intermittent or unreliable functionality.

POTENTIAL RESOLUTIONS

- The W.M.D. wireless setting (**Select** > **Wireless** > **Power**) may need to change. When the T.H.C. is close (less than 25 feet) to the W.M.D., select **Low**. When the T.H.C. is farther away (more than 25 feet) from the W.M.D., select **High**.
- Ensure that the RED T.H.C. and W.M.D. Antenna is securely connected to the T.H.C. and W.M.D.
- Ensure that the T.H.C. is fully charged.

T.H.C. CAUSES MOTOR TO WHIPBACK

SYMPTOM

One (1) or more motors whip around when you are controlling a function on the T.H.C.

POTENTIAL RESOLUTION

Reset the T.H.C. parameters.

1. Ensure that the T.H.C. is receiving power from a charged RED Li Battery 7.2V.
2. Ensure that the T.H.C. power switch is set to **Battery** mode.
3. Remove the RED CAN Command Cable.
4. Toggle the T.H.C. power switch to **Cable** mode.
5. Adjust the Focus/Iris/Zoom controls until each control is at an end stop.
6. Press and hold the **Initialize** button on the T.H.C. for two (2) seconds. At the same time, toggle the T.H.C. power switch to **Battery** mode.

   All lights on the T.H.C. flash green five (5) times.
7. Connect the T.H.C. to the W.M.D. using the RED CAN Command Cable.
8. Toggle the T.H.C. power switch to **Cable** mode.
9. Adjust the **Limit** buttons for Focus/Iris/Zoom individually.
   A. Hold down the Focus, Iris, or Zoom Limit button.
   B. Move the adjustment knob until it reaches its start or end point.
   C. Release the button.
   D. Repeat for the Focus, Iris, and Zoom Limit buttons.
10. Remove the RED CAN Command Cable.
11. Toggle the T.H.C. power switch to **Battery** mode.
12. Press and hold the **Initialize** button on the T.H.C. for two (2) seconds.

    All three (3) motors initialize automatically.
13. Test your Focus, Iris, and Zoom functions.

    If you are still experiencing a problem, submit a Support ticket at https://support.red.com.

TROUBLESHOOT FIRMWARE UPGRADE

SYMPTOM

The W.M.D. or T.H.C. does not recognize the firmware upgrade file or is not upgrading properly.

POTENTIAL RESOLUTIONS

- Start with a freshly formatted microSD card.
- Verify that the microSD card is formatted as MS-DOS FAT (for Mac®) or FAT32 (for Windows®).
- Ensure that there is no other data on the microSD card besides the upgrade file.
- Use the microSD card provided by RED.
- If you are unable to use the microSD card provided by RED, you may need to experiment with different brands or models of microSD cards or SD card adaptors.
- Verify that the correct firmware file is downloaded to the root directory of the microSD card.

APPENDIX A:
TECHNICAL SPECIFICATIONS

TACTICAL HAND CONTROLLER (T.H.C.)

Dimensions	Height (with antenna): 9.00" (228.6 mm) Height (without antenna): 8.08" (205.2 mm) Width: 3.50" (88.9 mm) Depth: 4.32" (109.7 mm)
Weight	32.1 oz (885 g)
Material	Aluminum
Construction	Machined
Coating	Black and red anodized coating
Operating Temperature Range	0°C to 40°C (32°F to 104°F)
Storage Temperature Range	–20°C to 50°C (–4°F to 122°F)
Wireless Operating Frequency	2.4GHz FHSS
Input Supply Voltage	12 V to 18 V
Supported Battery Type	RED® Li Battery 7.2V
Battery Capacity	2200 mAh at 7.2V

WIRELESS MOTOR DRIVER (W.M.D.)

Dimensions	Height (with antenna): 4.95" (125.7 mm) Height (without antenna): 4.05" (102.9 mm) Width: 4.48" (113.8 mm) Depth: 1.83" (46.5 mm)
Weight	19.2 oz (544 g)
Material	Aluminum
Construction	Machined
Coating	Black anodized coating
Operating Temperature Range	0°C to 40°C (32°F to 104°F)
Storage Temperature Range	–20°C to 50°C (–4°F to 122°F)
Frequency	2.4GHz FHSS
DC Power Supply Requirements	12 to 18 VDC

RED LENS CONTROL MOTOR

Maximum Peak Torque	0.85 Nm
Maximum Speed	4.5 rev/second
Dimensions	Height: 1.75" (44.5 mm) Width: 1.00" (25.4 mm) Depth: 4.50" (11.4 mm)
Weight	5.4 oz (155 g)
Material	Aluminum
Construction	Machined
Coating	Black anodized coating
Operating Temperature[1]	0°C to 40°C (32°F to 104°F)
Storage Temperature	–20°C to 50°C (–4°F to 122°F)
Typical Operating Power Consumption	< 10 W
Peak Operating Power Consumption	25 W

1. The operating temperature range represents the low and high ambient temperature that the RED Lens Control Motor operates in without user-intervention and is consistent with most other professional electronic imaging equipment. Extreme conditions require adequate preparation and on-set handling. Any damage caused to the RED Lens Control Motor or your camera system caused by operating outside of the specified temperature range is not covered under any RED warranty.

RED LI BATTERY 7.2V

Dimensions	Height: 1.50" (38.1 mm) Width: 0.80" (20.3 mm) Depth: 2.20" (55.8 mm)
Weight	2.8 oz (78 g)
Battery Capacity	2200 mAh at 7.2 V
Nominal Energy	15 Wh
Run Time[1]	5 hours
Rechargeable	Yes
Operating Temperature Range	0°C to 40°C (32°F to 104°F)
Storage Temperature Range	–20°C to 50°C (–4°F to 122°F)

1. Approximate battery run time is based on a wireless connection to W.M.D.

APPENDIX B:

3-AXIS SYSTEM COMPATIBILITY

COMPATIBLE MOTORS

The following motors are currently supported by the RED® Wireless Motor Driver (W.M.D.) and RED Tactical Hand Controller (T.H.C.):

- RED Lens Control Motor (DLM1)
- Element DLM1
- Hedén M21VE
- Hedén M26VE
- Preston DM1
- Preston DM1x
- Preston DM2

COMPATIBLE MOTOR DRIVERS

RED Lens Control Motors are compatible with the following motor drivers, which require a 3.3KΩ resistance, using the RED Lens Motor Cable (3.3KΩ version):

- Bartech® Focus Device, single-axis system
- Preston MDR1
- Preston MDR2
- Preston MDR3
- cmotion® camin motor drivers

WARNING: ALWAYS use the RED motor cable with the appropriate internal identification resistor when using RED Lens Control Motors with third-party motor drivers. Any damage caused to motors or motor drivers resulting from the use of third-party cables is not covered under warranty.

NOTE: RED is in the process of testing and developing additional cables with the appropriate internal identification resistor to support seamless communication with other third-party motor systems.

COMPATIBLE LENSES

RED Lens Control Motors can be equipped with accessory drive gears to interface with lenses using any of the following gear modules:

- 0.8 M
- 0.4 M
- 0.5 M
- 0.6 M

As with most lens control motors, there are some lenses that are too large, too heavy, or too stiff for the RED DLM1 motor. Additionally, cold ambient temperatures may also make it more difficult for the motor to rotate the lens.

NOTE: For information about lenses with default profiles, refer to "W.M.D. Lens Profiles" on page 31.

APPENDIX C:

CONNECTOR AND CABLE PINOUTS

This appendix provides RED® 3-Axis Lens Control System pinout information for the RED Wireless Motor Driver (W.M.D.), RED Tactical Hand Controller (T.H.C.), RED Lens Control Motor, and RED connector cables that are used with the system components.

NOTE: When connecting a cable to a connector, align the key and red marker on the cable connector with the corresponding key and marker on the device connection.

NOTE: Connector diagram images are for reference only. Diagrams are not to scale.

W.M.D. CONNECTORS

Figure: W.M.D. Connections

#	CONNECTOR	CONNECTOR TYPE	CONNECTOR FUNCTION
1	FOCUS	7-pin 1B LEMO®	Lens motor drive support; Focus control knob on T.H.C.
2	IRIS	7-pin 1B LEMO	Lens motor drive support; Iris control knob on T.H.C.
3	ZOOM	7-pin 1B LEMO	Lens motor drive support; Zoom control slider on T.H.C.
4	CAN	4-pin 0B LEMO	CAN communication and power for the T.H.C.
5	EXP	14-pin 1B LEMO	Start/Stop, Tally, RS-232, GPIOs
6	232/422	10-pin 1B LEMO	RS-232/422 communication
7	PWR	2-pin 1B LEMO	12 to 18 VDC power

W.M.D. LENS MOTOR CONNECTOR

The W.M.D. Lens Motor connector is an industry-standard 7-pin 1B LEMO connector.

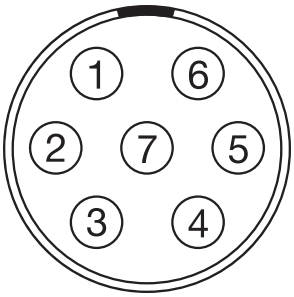


Figure: W.M.D. 7-Pin 1B Lens Drive Connector

7-PIN 1B LEMO LENS DRIVE CONNECTOR	
PIN	**SIGNAL**
1	Motor (+)
2	Motor (–)
3	Encoder A
4	+5 VDC
5	GND
6	Encoder B
7	Motor ID

W.M.D. CAN CONNECTOR

The W.M.D. CAN connector is a 4-pin 0B LEMO connector that provides power and CAN communications between the W.M.D. and T.H.C., or other auxiliary devices.

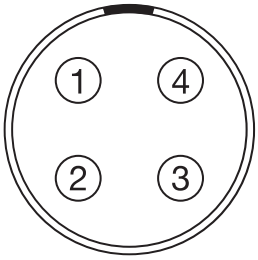


Figure: W.M.D. 4-Pin 0B CAN Connector

4-PIN 0B LEMO CAN CONNECTOR	
PIN	**SIGNAL**
1	GND
2	CANL
3	CANH
4	VCC

W.M.D. START/STOP/TALLY EXPANSION CONNECTOR

The W.M.D. Start/Stop/Tally expansion connector is a 14-pin 1B connector that provides expansion (EXP) support for the RED 3-Axis Lens Control System. The W.M.D. Start/Stop/Tally expansion connector has a maximum power out of 500mA.

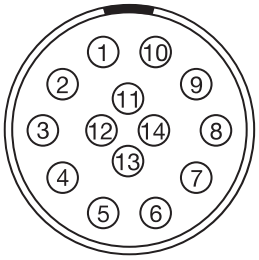


Figure: W.M.D. 14-Pin Start/Stop and Tally Connector

14-PIN 1B LEMO START/STOP EXPANSION CONNECTOR	
PIN	**SIGNAL**
1	GND
2	232_Rx
3	+12 VDC
4	232_TX
5	Momentary Start/Stop
6	DSMC Tally
7	DSMC Start/Stop Contact
8	AUX GPIO 1_3.3
9	+3.3 VDC
10	Cable ID
11	N/A
12	AUX GPIO 2_3.3
13	N/A
14	N/A

W.M.D. AUX CONNECTOR

The W.M.D. AUX connector is a 10-pin 1B connector used for RS-232 communication and power with other third-party systems and accessories.

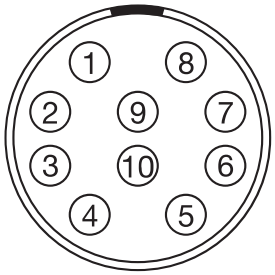


Figure: W.M.D. 10-pin 0B RS232 Connector

6-PIN 0B LEMO AUX CONNECTOR	
PIN	**SIGNAL**
1	+12 VDC
2	232 Tx
3	232 Rx
4	422 Tx+
5	422 Rx+
6	422 Rx-
7	422 Tx-
8	232 Select Jumper
9	232 Select Jumper
10	GND

W.M.D. POWER CONNECTOR

The W.M.D. PWR connector is a 2-pin 1B LEMO power connector to supply power to the W.M.D. from your camera or other power modules.

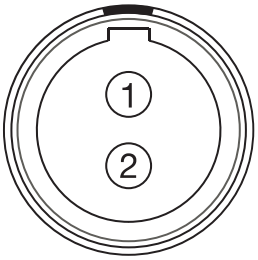


Figure: W.M.D. 2-Pin 1B Power Connector

2-PIN 1B LEMO POWER CONNECTOR	
PIN	**SIGNAL**
1	GND
2	+12 VDC

T.H.C. CONNECTORS

Figure: T.H.C. Connections

#	CONNECTOR	CONNECTOR TYPE	CONNECTOR FUNCTION
1	AUX	6-pin 0B LEMO	RS-232 communication to auxiliary devices
2	CAN	4-pin 1B LEMO	CAN communication and power from the W.M.D.

T.H.C. AUX CONNECTOR

The T.H.C. AUX connector is a 6-pin 0B LEMO connector on the T.H.C. used for RS-232 communications and power with third-party systems and accessories.

NOTE: The T.H.C. Auxiliary (AUX) connector is for future development and is not currently needed for operation.

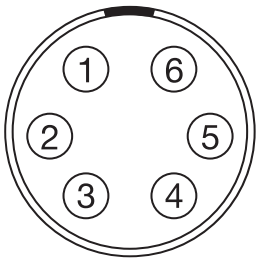


Figure: T.H.C. 6-Pin 0B AUX Connector

6-PIN 0B LEMO AUX CONNECTOR	
PIN	**SIGNAL**
1	GND
2	Rx
3	Tx
4	Pwr Out
5	Pwr In
6	N/A

T.H.C. CAN CONNECTOR

The T.H.C. CAN connector is a 4-pin 0B LEMO connector that provides power and CAN communications between the W.M.D. and T.H.C., or other auxiliary devices.

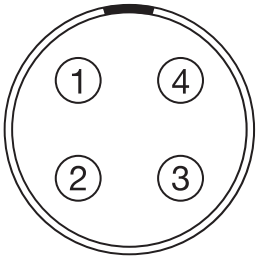


Figure: T.H.C. 4-Pin 0B CAN Connector

4-PIN 0B LEMO CAN CONNECTOR	
PIN	**SIGNAL**
1	GND
2	CANL
3	CANH
4	VCC

RED LENS CONTROL MOTOR CONNECTORS

Figure: RED Lens Control Motor Connection

#	CONNECTOR TYPE	CONNECTOR FUNCTION
1	7-pin 1B LEMO	Lens motor drive support

RED LENS CONTROL MOTOR CONNECTOR

The RED Lens Control Motor connector is an industry-standard 7-pin 1B LEMO connector.

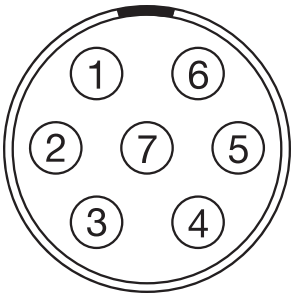


Figure: RED Lens Control Motor 7-Pin 1B Connector

7-PIN 1B LEMO LENS DRIVE CONNECTOR	
PING	**SIGNAL**
1	Motor (+)
2	Motor (–)
3	Encoder A
4	+5 VDC
5	GND
6	Encoder B
7	Motor ID

3-AXIS SYSTEM CABLES

This section provides the pinout information for each side of each cable.

RED W.M.D. MOTOR CABLE (FOCUS, IRIS, ZOOM)

The RED W.M.D. Motor Cable is a 7-pin 1B to 7-pin 1B LEMO cable used to connect your RED Lens Control Motor to your RED W.M.D. RED offers the following cables:

- **790-0434**: RED W.M.D. Motor Cable 12"
- **790-0406**: RED W.M.D. Motor Cable 18"
- **790-0412**: RED W.M.D. Motor Cable 24"

NOTE: The RED Lens Control Motor is also compatible with third-party systems using an appropriate RED motor cable with the proper internal identification resistor. For more information, visit the RED Store at http://www.red.com/store or submit a Support ticket at https://support.red.com.

Figure: RED W.M.D. Motor Cable (12")

#	CONNECTOR	PART NUMBER
1	J1	LEMO FHG.1B.307.CLAD62Z
2	J2	LEMO FGG.1B.307.CLAD62Z

RED W.M.D. MOTOR CABLE (FOCUS, IRIS, ZOOM) PINOUT

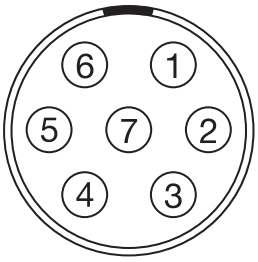


Figure: Front Face View J1 (Left)

RED W.M.D. MOTOR CABLE (FOCUS, IRIS, ZOOM)			
J1	**J2**	**SIGNAL**	**WIRE COLOR**
J1-1	J2-1	Motor (+)	Red
J1-2	J2-2	Motor (–)	Black
J1-3	J2-3	Encoder A	Orange
J1-4	J2-4	+5 VDC	Brown
J1-5	J2-5	GND	Blue
J1-6	J2-6	Encoder B	Violet
J1-7	J2-7	Motor ID	Yellow
J1-SHELL	J2-SHELL	GND (Shield)	Braid Shield

RED LENS CONTROL MOTOR CABLE (3.3KΩ 0VERSION)

The RED Lens Control Motor Cable (3.3KΩ Version) provides a 7-pin 1B to 7-pin 1B LEMO cable used to connect RED Lens Control Motors to compatible third-party motor drivers. This cable provides a 3.3k ohms (Ω) resistance identification to the motor driver. RED offers the following cables:

- **790-0439**: RED Lens Motor Cable 18"
- **790-0438**: RED Lens Motor Cable 24"

NOTE: The RED Lens Control Motor is also compatible with third-party systems using the appropriate RED motor cable with the proper internal identification resistor. For more information, go to "RED Start/Stop Cable (1B to Sync, Ctrl, BNC)" on page 86, or visit the RED Store at www.red.com/store.

Figure: RED Lens Control Motor Cable (3.3KΩ Version)

#	CONNECTOR	PART NUMBER
1	J1	LEMO FHG.1B.307.CLAD62Z
2	J2	LEMO FGG.1B.307.CLAD62Z

RED LENS CONTROL MOTOR CABLE (3.3KΩ VERSION) PINOUT

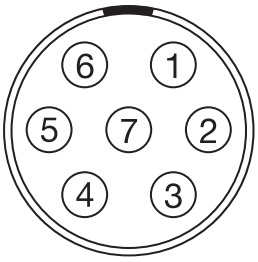


Figure: Front Face View J1 (Left)

RED W.M.D. MOTOR CABLE (FOCUS, IRIS, ZOOM)			
J1	**J2**	**SIGNAL**	**WIRE COLOR**
J1-1	J2-1	Motor (+)	Red
J1-2	J2-2	Motor (–)	Black
J1-3	J2-3	Encoder A	Orange
J1-4	J2-4	+5 VDC	Brown
J1-5	J2-5	GND	Blue
J1-6	J2-6	Encoder B	Violet
J1-7	J2-7	Motor ID with 3.3K in series	Yellow
J1-SHELL	J2-SHELL	GND (Shield)	Braid Shield

RED CAN COMMAND CABLE

The RED CAN Command Cable is a 4-pin 0B to 4-pin 0B LEMO cable that provides CAN communications and power from the W.M.D. to the T.H.C. It is used for wired operation and wireless pairing of T.H.C. units. RED offers the following cables:

- **790-0407**: RED CAN Command Cable 5'
- **790-0408**: RED CAN Command Cable 50'
- **790-0409**: RED CAN Command Cable 100'

Figure: RED CAN Command Cable (5')

#	CONNECTOR	PART NUMBER
1	J1	LEMO FGG.0B.304.CLAD56Z
2	J2	LEMO FGG.0B.304.CLAD56Z

RED CAN COMMAND CABLE PINOUT

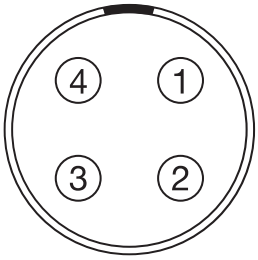


Figure: Front Face View J1 (Left)

RED CAN COMMAND CABLE			
J1	**J2**	**SIGNAL**	**WIRE COLOR**
J1-1	J2-1	GND	Black
J1-2	J2-2	CANL	Yellow
J1-3	J2-3	CANH	Green
J1-4	J2-4	VCC	Red
J1-SHELL	J2-SHELL	GND (Shield)	Braid Shield

R.C.P. DEVELOPER KIT-TO-T.H.C. CONNECTOR CABLE

The R.C.P.™-to-T.H.C. Connector Cable (3') is a 6-pin 0B to 6-pin 0B LEMO cable that enables you to pair the T.H.C. to the R.C.P. Bridge to control the iris and focus of motorized Canon® and Nikon® lenses. RED offers the following cable:

- **790-0444**: R.C.P.-to-T.H.C. Connector Cable 3'

Figure: R.C.P.-to-T.H.C. Connector Cable (3')

#	CONNECTOR	PART NUMBER
1	J1	LEMO FGG.0B.306.CLAD56Z
2	J2	LEMO FGG.0B.306.CLAD56Z

R.C.P.-TO-T.H.C. CONNECTOR CABLE PINOUT

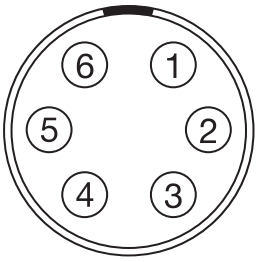


Figure: Front Face View J1 (Left)

R.C.P.-TO-T.H.C. CONNECTOR CABLE			
J1	**J2**	**SIGNAL**	**WIRE COLOR**
J1-1	J2-1	GND	Black
J1-2	J2-3	RX	Green
J1-3	J2-2	TX	Yellow
J1-4	-	-	-
J1-5	-	-	-
J1-6	-	-	-
J1-SHELL	J2-SHELL	GND (Shield)	Braid Shield

W.M.D. POWER CABLE 2-PIN 1B TO 2-PIN 0B

The W.M.D. Power Cable 2-Pin 1B to 2-Pin 0B (18") connects your RED W.M.D. to a standard 12 V 2-pin 0B LEMO accessory port (found on the QUICKPLATE Module and REDVOLT XL Module) to power the RED 3-Axis Lens Control System. RED offers the following cable:

- **790-0410**: W.M.D. Power Cable 2-Pin 1B to 2-Pin 0B 18"

Figure: W.M.D. Power Cable 2-Pin 1B to 2-Pin 0B (18")

#	CONNECTOR	PART NUMBER
1	J1	LEMO FGG.0B.302.CLAD56Z
2	J2	LEMO FHG.1B.302.CLAD56Z

W.M.D. POWER CABLE 2-PIN 1B TO 2-PIN 0B PINOUT

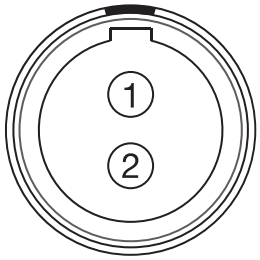


Figure: Front Face View of J1 (Left)

W.M.D. POWER CABLE 2-PIN 1B TO 2-PIN 0B			
J1	**J2**	**SIGNAL**	**WIRE COLOR**
J1-1	J2-1	GND	Black
J1-2	J2-2	+12 VDC	Red
J1-SHELL	J2-SHELL	GND (SHIELD)	Braid Shield

W.M.D. POWER CABLE 2-PIN 1B TO 4-PIN XLR

The RED W.M.D. Power Cable 2-Pin 1B to 4-Pin XLR (8') connects your RED W.M.D. to a 12v 4-pin XLR standard accessory port to power the RED 3-AXIS Lens Control System. RED offers the following cable:

- **790-0411**: W.M.D. Power Cable 2-Pin 1B to 4-Pin XLR 8'

Figure: W.M.D. Power Cable 2-Pin 1B to 4-Pin XLR (8')

#	CONNECTOR	PART NUMBER
1	J1	Neutrik® XLR NC4MXX-B
2	J2	LEMO FGG.1B.302.CLAD62Z

W.M.D. POWER CABLE 2-PIN 1B TO 4-PIN XLR PINOUT

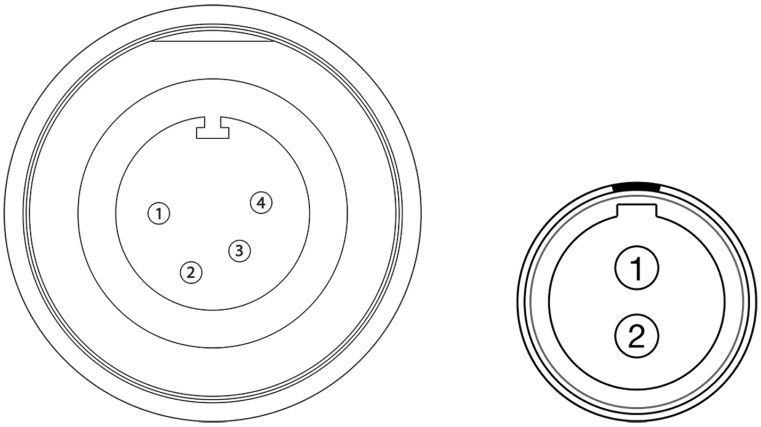


Figure: Front Face View of J1 (Left) and J2 (Right)

W.M.D. POWER CABLE 2-PIN 1B TO 4-PIN XLR			
J1	**J2**	**SIGNAL**	**WIRE COLOR**
J1-1	J2-1	GND	Black
J1-2	-	-	-
J1-3	-	-	-
J1-4	J2-2	+12 VDC	Red
J1-SHELL	J2-SHELL	GND (SHIELD)	Braid Shield

RED START/STOP CABLE (1B TO SYNC, CTRL, BNC)

The RED Start/Stop Cable (1B-to-Sync/Ctrl/BNC) provides start/stop and tally support through the RED W.M.D. The 14-pin 1B LEMO connects to the EXP port on the W.M.D, and transfers the tally signal from the camera to the W.M.D. The 4-pin LEMO connects to the CTRL port on the camera. The BNC connector connects to the SYNC port on the camera via a 3BNC-to-00 LEMO Sync Cable and a BNC-to-BNC Adaptor, and transfers the start/stop signal to the camera. RED offers the following cable:

- 790-0415: RED Start/Stop Cable (1B to Sync, CTRL, BNC)

NOTE: Full support for start/stop requires the 3BNC-to-00 LEMO Sync Cable and a BNC-to-BNC Adaptor (both are included with the RED 3-Axis Lens Control System). The 3BNC-to-00 LEMO Sync Cable has two (2) additional BNC connectors that offer support for timecode and genlock.

NOTE: When using the RED Start/Stop Cable (1B to Sync, CTRL, BNC), you must configure the W.M.D. for DSMC start/stop operation only. On the W.M.D., go to **Select** > **Start/Stop** > **DSMC**.

Figure: RED Start/Stop Cable (1B to Sync, Ctrl, BNC)

RED START/STOP CABLE (1B TO SYNC, CTRL, BNC)		
#	**CONNECTOR**	**PART NUMBER**
1	J1	LEMO FGG.1B.314.CLAD42Z
2	J2	Amphenol® 31-710013
3	J3	LEMO FGG.00.304.CLAD30Z

RED START/STOP CABLE (1B TO SYNC, CTRL, BNC) PINOUT

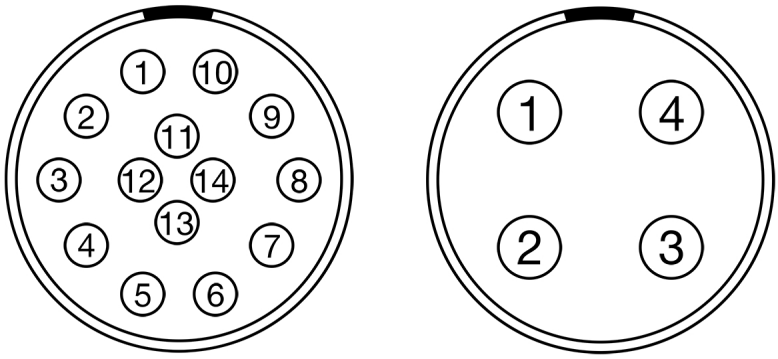


Figure: Front Face View J1 (Left) and J3 (Right)

RED START/STOP CABLE (1B TO SYNC, CTRL, BNC)				
J1	**J2**	**J3**	**SIGNAL**	**WIRE COLOR**
J1-1	J2-1	J3-1	GND	Yellow
J1-2	-	J3-4	232_Rx	White
J1-3	-	-	+12 VDC	-
J1-4	-	J3-2	232_Tx	Green
J1-5	-	-	Momentary Start/Stop	-
J1-6	-	J3-3	DSMC Tally	Blue
J1-7	J2-2	-	DSMC Start/Stop	Red
J1-8	-	-	AUX GPIO 1_3.3	-
J1-9	-	-	+3.3 VDC	-
J1-10	-	-	Cable ID	-
J1-11	-	-	-	-
J1-12	-	-	AUX GPIO 2_3.3	-
J1-13	-	-	-	-
J1-14	-	-	-	-
J1-SHELL	-	J3-SHELL	GND (SHIELD)	Braid Shield

RED START/STOP CABLE (1B TO BNC)

The RED Start/Stop Cable (1B to BNC) is used with the Sync Cable to provide start/stop support and allow external timecode and genlock to be connected to the camera. This cable connects to the EXP port on the W.M.D. and an auxiliary device for start/stop, genlock, and timecode. RED offers the following cable:

- **790-0416**: RED Start/Stop Cable (1B to BNC)

NOTE: Requires the 3BNC-to-00 LEMO Sync Cable and a BNC-to–BNC Adaptor (both are included with the RED 3-Axis Lens Control System).

NOTE: When using the RED Start/Stop Cable (1B to BNC), you must configure the W.M.D. for DSMC start/stop operation only. On the W.M.D., go to **Select** > **Start/Stop** > **DSMC**.

Figure: RED Start/Stop Cable (1B to BNC)

#	CONNECTOR	PART NUMBER
1	J1	LEMO FGG.1B.314.CLAD42Z
2	J2	Amphenol 31-70013

RED START/STOP CABLE (1B TO BNC) PINOUT

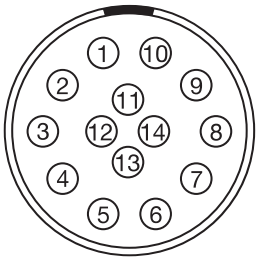


Figure: Front Face View of J1 (Left)

RED START/STOP CABLE (1B TO BNC)			
J1	**J2**	**SIGNAL**	**WIRE COLOR**
J1-1	J2-1 (SHELL)	GND	Yellow
J1-2	-	232 Rx	-
J1-3	-	+12 VDC	-
J1-4	-	232 Tx	-
J1-5	-	Start/Stop Contact Pin	-
J1-6	-	Start/Stop Status in 3V3	-
J1-7	J2-2	DSMC Start/Stop 3.3 Con Pin	Red
J1-8	-	AUX GPIO 1_3.3	-
J1-9	-	+3.3 VDC	-
J1-10	-	Cable ID	-
J1-11	-	-	-
J1-12	-	AUX GPIO 2_3.3	-
J1-13	-	-	-
J1-14	-	-	-
J1-SHELL	J2-1 (SHELL)	GND (SHIELD)	Braid Shield

RED START/STOP CABLE (1B TO 00B SYNC)

The RED Start/Stop Cable (1B to 00B Sync) supports Start/Stop functionality through the RED W.M.D. This cable connects to the EXP port on the W.M.D. and to the SYNC port of your camera and is ideal for run-and-gun shooters who want convenient Start/Stop capability only and do not need to connect external timecode and genlock. RED offers the following cable:

- **790-0428**: RED Start/Stop Cable (1B to 00B Sync)

NOTE: When using the RED Start/Stop Cable (1B to 00B Sync), you must configure the W.M.D. for DSMC start/stop operation only. On the W.M.D., go to **Select** > **Start/Stop** > **DSMC**.

Figure: RED Start/Stop Cable (1B to 00B Sync)

#	CONNECTOR	PART NUMBER
1	J1	FGG.1B.314.CLAD42Z
2	J2	FGG.00.304.CLAD30Z

RED START/STOP CABLE (1B TO 00B SYNC) PINOUT

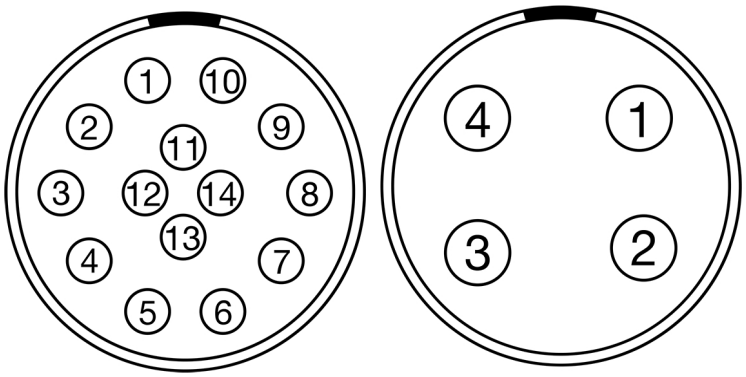


Figure: Front Face View of J1 (Left) and J2 (Right)

RED START/STOP CABLE (1B TO 00B SYNC)			
J1	**J2**	**SIGNAL**	**WIRE COLOR**
J1-1	J2-1	GND	Yellow
J1-2	-	232 Rx	-
J1-3	-	+12 VDC	-
J1-4	-	232 Tx	-
J1-5	-	Start/Stop Contact Pin	-
J1-6	-	Start/Stop Status in 3V3	-
J1-7	J2-2	DSMC Start/Stop 3.3 Con Pin	Red
J1-8	-	AUX GPIO 1_3.3	-
J1-9	-	+3.3 VDC	-
J1-10	-	Cable ID	-
J1-11	-	-	-
J1-12	-	AUX GPIO 2_3.3	-
J1-13	-	-	-
J1-14	-	-	-
J1-SHELL	J2 (SHELL)	GND (SHIELD)	Braid Shield

NOTE: No connection for J2-3 and J2-4.

APPENDIX D:

W.M.D. MAIN MENU MAP