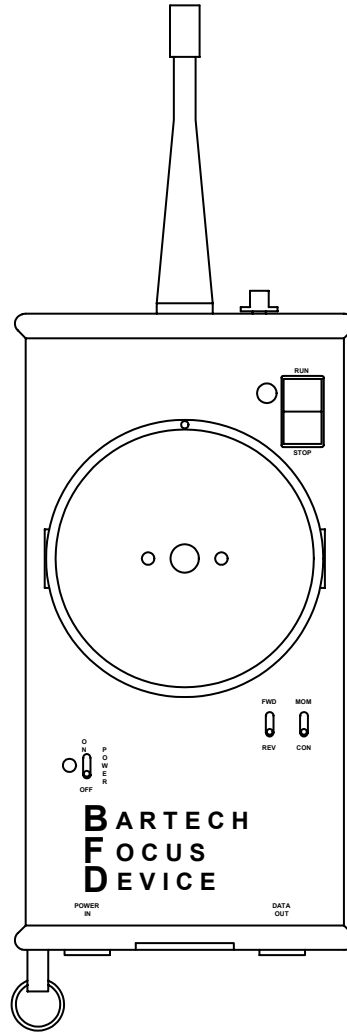


B. F. D.



BarTech Focus Device Owners Manual

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Introduction

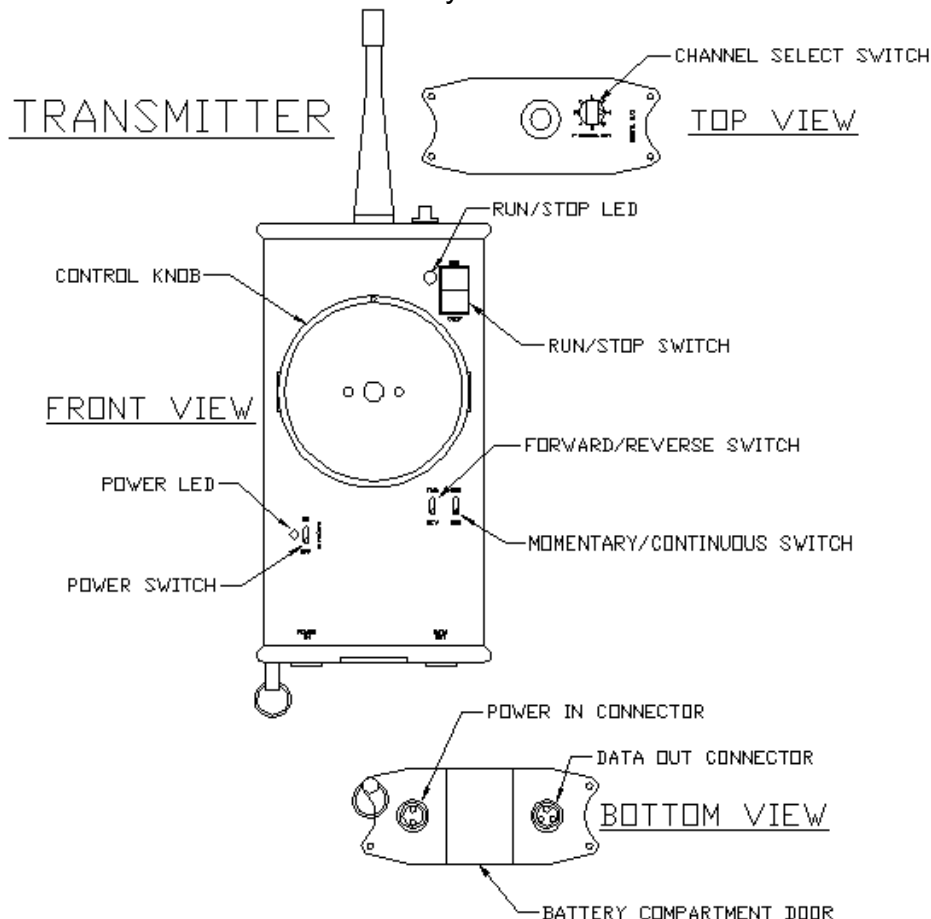
Congratulations! You are now in possession of one of the most popular wireless follow focus systems in the world. Since its introduction in 1999 the BarTech Focus Device, or BFD , has been sold by the hundreds all over the world. We hope you will enjoy using it as much as we enjoyed developing it. Please feel free to contact us if you have any questions or comments.

The BFD Unit

A BFD unit consists of a hand-held Transmitter control, a Receiver/Amplifier motor driver unit, and a power cable. To control a lens, a lens drive motor and motor cable are required. To start and stop a camera a remote control, or "run/stop" cable is required.

The Transmitter

The transmitter control unit, called just the "Transmitter", is a small, lightweight, hand-held unit that enables the operator to remotely control one lens function, such as focus or iris, and start or stop the camera. The Transmitter has one main lens control knob (either a rotary knob or a slider) three toggle switches for power and setup, one rocker switch for camera on/off, one rotary selector switch for channel selection, two LED's, two connectors and one 9V battery.



Transmitter Controls

Control Knob: Each Transmitter has one main control knob, either a rotary knob or a linear slider. Once the lens drive motor has been calibrated to the lens at the Receiver/Amplifier, end-to-end travel of the knob moves the lens through the range set during calibration. The travel can be set to be the entire range of lens movement or between two intermediate points, as desired by the operator. An important point to note is that **the smaller the range of travel of the motor, the more accurate the system becomes.** (This is the opposite of all other systems currently in use, which have either a fixed accuracy or get less accurate as the range is reduced)

POWER Switch: The power switch turns power on and off to the Transmitter.

FWD/REV Switch: This switch reverses the direction of travel of the lens drive motor in response to a movement of the control knob. The forward/reverse designations are completely arbitrary, so simply choose whichever matches the operator's needs. **The motor calibration does not need to be redone when the direction is changed.**

MOM/CONT Switch: This switch is used to select the desired operation of the camera run/stop relay in the Receiver/Amplifier. Some cameras, such as an ARRI 16SR or 35-III require the external contact closure to be maintained continuously for as long as the camera is running. Other cameras, such as the Moviacam Compact, require a momentary contact closure to start the camera and another momentary closure to stop the camera. This switch is set to CONT for continuous operation cameras and MOM for momentary operation cameras.

RUN/STOP Switch: This switch is used to activate the relay in the Receiver/Amplifier that is used to put a film or video camera in the run or stop mode.

CHANNEL Select Switch: This switch is used to select one of the eight frequencies in the 900 MHz range for operation. The selector switch must be set to the same channel on both the Transmitter and Receiver/Amplifier. As a general rule, use the highest number that works in order to minimize interference from video transmitters. **If two BFD units are being used at once, leave at least one unused channel between the two channels being used, i.e. do not set the units on adjacent channels, such as 5 & 6! Also, do not use channels 3 & 7 simultaneously, as you may get interference.**

Transmitter Indicators

POWER LED: The red/green power LED has four modes of operation:

Green: Unit on and transmitting, battery voltage OK.

Flashing Green: The unit has not been used for more than 15 minutes, so the RF transmitter has been turned off to save power. Changing any control or moving the knob turns the transmitter back on within 15 /1000 of a second.

Red: The LED will turn red approximately 1 hour before the 9V battery needs replacement.

Flashing Red: The LED will begin flashing red when the battery voltage has gotten so low the transmitter can no longer function accurately. The RF transmitter will be shutdown to prevent inaccurate operation.

RUN/STOP LED: The blue run/stop LED flashes when the camera run/stop switch is in the run position.

Transmitter Connectors

POWER IN Connector: This 2-pin connector is provided to allow the BFD Transmitter to be powered by an external battery. The Transmitter will operate on any voltage from 7 to 15 VDC. It draws 30 milliamps of current. Pin 1 is positive, pin 2 is negative.

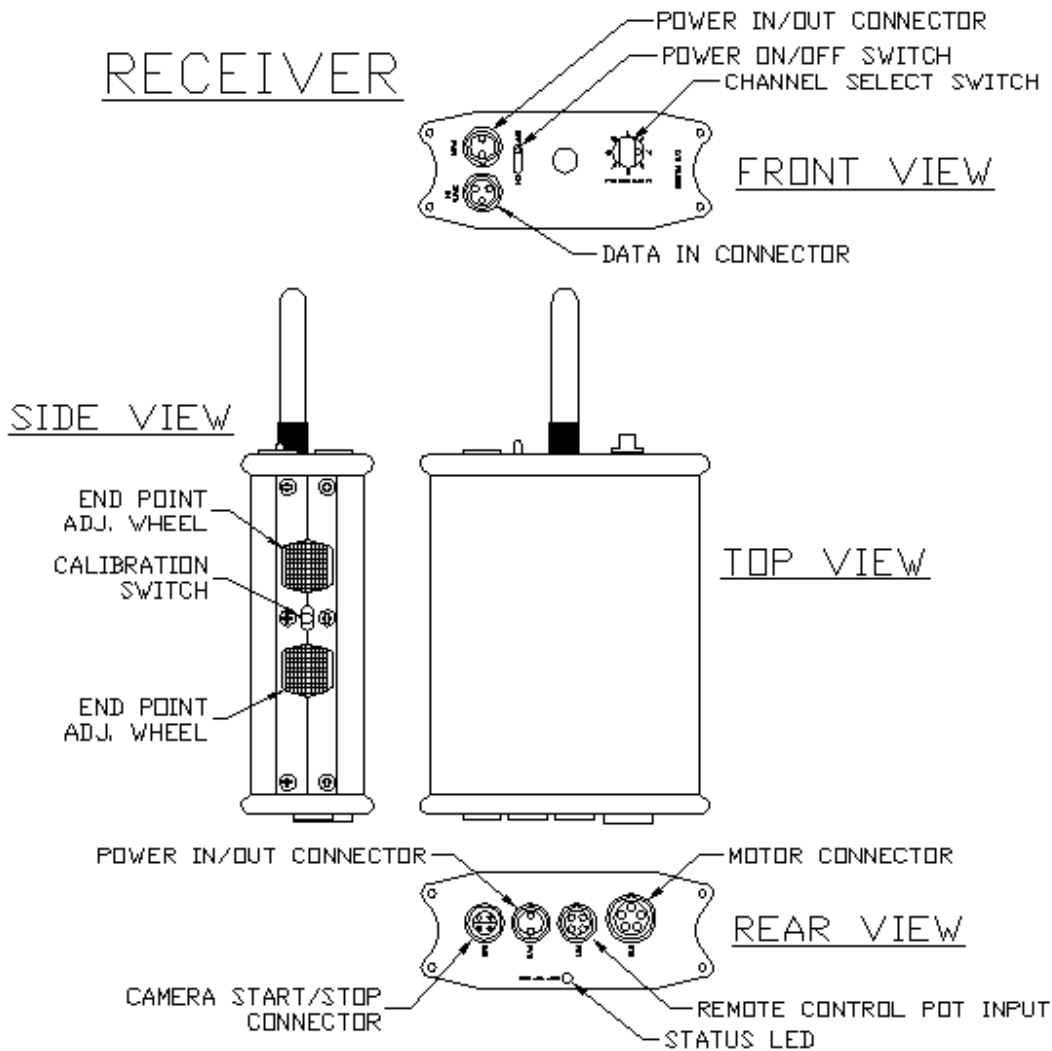
DATA OUT Connector: This 3-pin connector is provided to allow direct connection of the Transmitter and the Receiver/Amplifier unit. When connected, the RF sections in both the transmitter and receiver are switched off and the serial data is sent via a cable. Pin 1 is ground, pin 2 is the RF shutdown line that must be connected to pin 1 in the cable, and pin 3 is the serial data output line.

Transmitter Battery

The Transmitter is powered by a standard 9V battery that is inserted through the bottom plate. An alkaline 9V battery will provide 18 hours of operation. The battery is inserted with the negative contact near the power connector. **Inserting the battery backwards will have no effect, the unit simply will not operate.**

The Receiver/Amplifier

The Receiver/Amplifier unit is a small, lightweight unit that is placed near the lens being controlled. It receives the signal from the Transmitter and drives the lens drive motor proportionally to the movement of the Control Knob. It also has a relay that can be used to control the run/stop function of film & video cameras. The unit has a toggle switch for power, a rotary switch for channel selection, a 3-position toggle switch and two barrel-shaped thumb wheels for calibrating the lens drive motor's range of travel to the desired range of lens travel, one LED and six connectors.



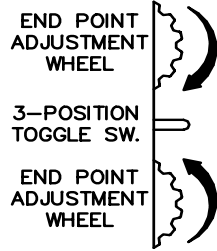
Receiver/Amplifier Controls

ON/OFF Switch: This switch controls power to the Receiver/Amplifier

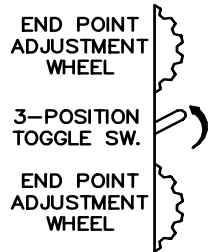
CHANNEL Select Switch: This switch is used to select one of the eight frequencies in the 900 MHz range for operation. The selector switch must be set to the same channel on both the Transmitter and Receiver/Amplifier. As a general rule, use the highest number that works in order to minimize interference from video transmitters. **If two BFD units are being used at once, leave at least one unused channel between the two channels being used, i.e. do not set the units on adjacent channels, such as 5 & 6! Also, do not use channels 3 & 7 simultaneously, as you may get interference.**

Calibration Switch and Thumbwheels: These controls, located on the side or the Receiver/Amplifier, are used to set the end points of travel of the lens drive motor that correspond to the range of travel of the Control Knob on the Transmitter. See following page for the calibration procedure.

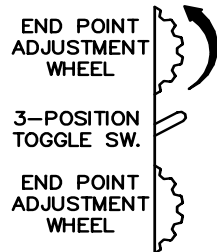
BFD CALIBRATION PROCEDURE



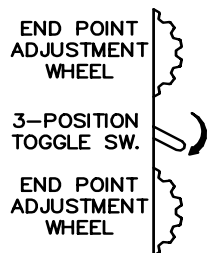
1. WITH THE TRANSMITTER OFF, THE LENS DRIVE MOTOR NOT INTERLOCKED WITH THE LENS, AND THE TOGGLE SWITCH IN CENTER POSITION, ROLL BOTH WHEELS TOWARD THE TOGGLE SWITCH AS FAR AS THEY WILL GO.



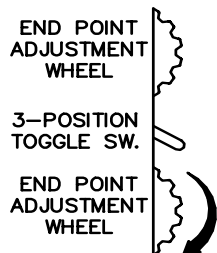
2. PRESS THE TOGGLE SWITCH TOWARDS ONE OF THE WHEELS. THE LENS DRIVE MOTOR WILL MOVE TO THE CENTER OF ITS RANGE OF TRAVEL. ROTATE THE LENS TO THE CENTER OF THE DESIRED RANGE OF TRAVEL AND INTERLOCK THE MOTOR TO THE LENS.



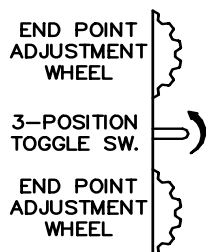
3. BEGIN ROTATING THE WHEEL THAT THE SWITCH WAS PRESSED TOWARDS. THE MOTOR WILL BEGIN TURNING THE LENS. CONTINUE TURNING THE WHEEL UNTIL THE LENS JUST REACHES THE DESIRED STOPPING POINT (EITHER THE END OF LENS TRAVEL OR A DESIRED MARK).



4. PRESS THE TOGGLE SWITCH ALL THE WAY TOWARDS THE OTHER WHEEL, PAST THE CENTER POSITION. THE MOTOR WILL RETURN THE LENS TO THE ORIGINAL STARTING POINT.



5. REPEAT STEP THREE FOR THE OTHER WHEEL, SETTING THE OTHER END OF TRAVEL POINT.



6. RETURN THE TOGGLE SWITCH TO THE CENTER POSITION. TURN THE TRANSMITTER ON. ROTATING THE KNOB (OR MOVING THE SLIDER) END TO END ON THE TRANSMITTER SHOULD CAUSE THE LENS TO MOVE FROM ONE END POINT TO THE OTHER END POINT. IF THE DIRECTION OF LENS ROTATION IS THE OPPOSITE OF WHAT IS DESIRED, SET THE FORWARD/REVERSE TOGGLE SWITCH ON THE TRANSMITTER TO ITS OTHER POSITION.

Receiver/Amplifier LED

STATUS LED: This red/green has three modes of operation:

Red: The unit is on but not receiving a signal from the Transmitter

Green: The unit is on and receiving a signal from the Transmitter

Flashing Red/Green: In calibration mode (the toggle switch is not in the center “operate” position).

Note: When the signal is being interfered with and reception is intermittent, the LED may appear a yellow-orange color as it switches back and forth rapidly between red and green.

Receiver/Amplifier Connectors

PWR Connectors: There is a 2-pin power input/output connector at each end of the Receiver/Amplifier unit. Either one may be used for connection to an external 11 to 17VDC power source. If two BFD's are being used and only one power source exists, plug the second Receiver/Amplifier's cable into the unused power connector on the first one. Pin 1 is positive, pin 2 is negative.

DATA IN Connector: This 3-pin connector is provided to allow direct connection of the Transmitter and the Receiver/Amplifier unit. When connected, the RF sections in both the transmitter and receiver are switched off and the serial data is sent via a cable. Pin 1 is ground, pin 2 is the RF shutdown line that must be connected to pin 1 in the cable, and pin 3 is the serial data input line.

MTR Connector: The 5-pin motor connector is used to connect the Receiver/Amplifier to a lens drive motor. The pin assignments are 1-for-1 compatible with Seitz and WRC-4 systems and Heden and Cinema Products motors.

POT Connector: This 4-pin connector is provided to allow direct connection of a 10K control potentiometer to be used instead of the transmitter. This way, a very small control knob may be placed anywhere convenient for the operator. When used this way, the Receiver/Amplifier becomes a direct analog servo control system (like a Preston “Micro Force”). The calibration knobs still set the ends of lens travel, but the calibration is slightly different. The calibration toggle switch has no effect and should be set in the middle position. Simply move the remote pot control all the way to one end of its travel. At this point, one of the calibration wheels will have a large effect on its operation, and one will have little effect. Use the one which has a large effect to set the end of motor travel point. Move the remote pot to the other end of its travel and repeat with the other wheel. Pins 2 & 4 are connected to the pot's end points, and pin 3 to the pot wiper.

CAM Connector: This 4-pin camera run/stop connector is used to put film or video cameras in the “run” mode and stop them. Special cables are required for each camera. This connector is compatible with the Seitz system. Pin 2 is the normally open relay contact and pins 3 & 4 are the relay common. Note: As a special order, this connector can be replaced by a 2-pin connector for compatibility with WRC-4 and modified Seitz units. If the 2-pin connector is used, Pin 1 is the normally open relay contact and pin 2 is the relay common.

Other Things to Know

Interference from Video Transmitters: UHF video transmitters, such as the Modulus 2000 or 3000, tend to broadcast on other frequencies than the intended frequency. This can block the signal from reaching the Receiver/Amplifier. There are several things you can do to prevent this from being a problem:

1. Never use any channel above 50 UHF for transmission. The lower the channel the lesser the chance of interference. Channels below 40 generally do not interfere at all unless the video transmitter is inches away from the antenna on Receiver/Amplifier.
2. Use the highest channel on the BFD that is interference free.
3. Keep as much metal (such as the camera body) between the Video transmitter and the BFD Receiver/Amplifier.
4. Keep the video transmitter antenna and cables as far away from the BFD antenna and cables as possible.

Motor Driver Shutdown: In order to save power, reduce heat generation and prevent motor “jumping” due to stray RF interference, the Receiver/Amplifier turns off the motor driver circuitry 1.5 seconds after the motor reaches its desired position. After 7 seconds of trying unsuccessfully to reach the desired position, the motor will be turned off to prevent damage to the motor or BFD unit. Changing the position of the control knob on the transmitter reactivates the motor driver circuitry and resets the timer.

Battery Saver: When the Transmitter has not been used for more than 15 minutes the RF transmitter is turned off to save power and the power LED blinks green. Changing any control or moving the knob turns the transmitter back on within 15 /1000 of a second. When in the lower power mode, a fully charged 9V battery will last over 60 hours.

Warranty

BarTech Engineering warranties the BFD for manufacturing defects or component failure under normal operation for 1 year from the date of purchase. BarTech Engineering will pay shipping UPS ground within the United States to return the unit after repairs.

Troubleshooting

I cannot get the receiver/amplifier to receive the signal from the transmitter (receiver/amp LED stays red or flickers between red and green).

There are several possible causes for this:

- The calibration switch on the receiver is not in the operate (center) position. The LED blinks red/green to indicate you are in calibration mode.
- Check that the transmitter and receiver/amplifier are set to the same channel.
- If you are using a video transmitter, turn it off and see if you get a good signal. If so, try using a different channel on the video transmitter. If it is a Modulus, be sure to set the lowest channel you can use.
- Check around for other sources of RF interference. Cell phones in use in the immediate vicinity can also be a problem.

When I switch the calibrate switch towards one of the knobs or when I try to make a fast move the motor moves in short jerks until it reaches position.

This is due to insufficient power being supplied to the BFD. When the BFD tries to move the motor to position at full speed it can draw up to 3 amps of current. 12V accessory outputs from cameras, such as an ARRI 435, are limited to less current. When the BFD tries to move the motor the power shuts down to prevent burnout, which causes the BFD to shut down. This in turn causes the power draw to drop off, which allows the accessory power to rise back up and the cycle repeats itself.

When I switch the transmitter on the light on the receiver turns green but moving the knob on the transmitter doesn't make the motor move.

The most likely cause of this is that both calibration knobs are in the start position (rolled all the way towards each other). This makes the range of motor travel nothing. Follow the calibration procedure on page 6 first try moving the knob on the transmitter.

When I switch the camera to "RUN", it moves a little and stops.

Set the "CON/MOM" switch to "CON". See page 3 for a description of this switch's operation.

When I switch the camera to "RUN" it stops, and when I set it to "STOP" it runs.

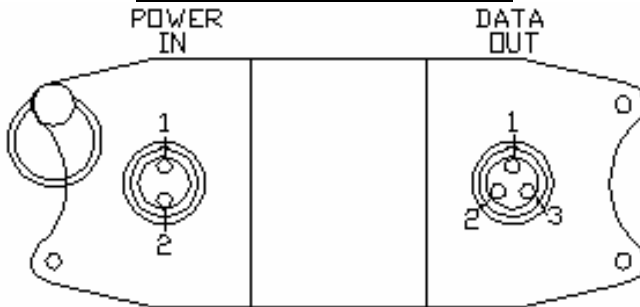
This can occur when using a camera that has one pushbutton for both starting and stopping the camera. When the switch on the BFD is set to "RUN" it momentarily closes a relay to simulate the camera button being pushed. It does the same thing when set back to "STOP". If the camera was already running when the switch was set to "RUN" it will cause the camera to stop and vice-versa. To get the camera and BFD back into synchronization start (or stop) the camera one time by using the pushbutton on the camera instead of the BFD.

When the signal is just barely getting through (LED flickering between red and green) the motors will occasionally twitch or jump.

This can be fixed by upgrading your software. Contact us for more details.

Connector Pinout

TRANSMITTER BOTTOM



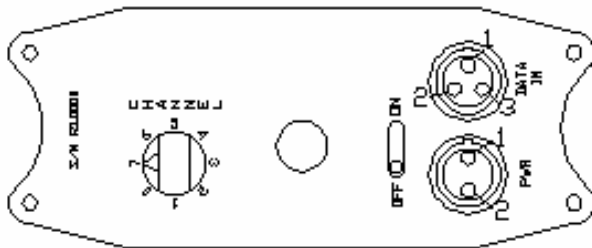
POWER IN (p. 4)

- 1: +7 TO 15 VDC
- 2: GROUND

DATA OUT (p. 4)

- 1: GROUND
- 2: RF SHUTDOWN (SHORT TO GROUND)
- 3: DATA OUT

RECEIVER FRONT



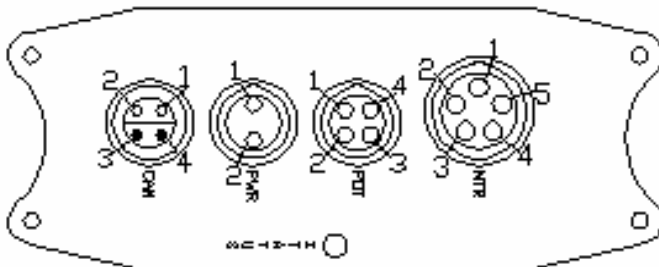
PWR (p. 7)

- 1: +11 TO 17 VDC
- 2: GROUND

DATA IN (p. 7)

- 1: GROUND
- 2: RF SHUTDOWN (SHORT TO GROUND)
- 3: DATA IN

RECEIVER BACK



CAM(p. 8)

- 1: N/C
- 2: N.O.
- 3: COM
- 4: COM

PWR(p. 7)

- 1: +11 TO 17 VDC
- 2: GROUND

POT(p. 7)

- 1: N/C
- 2: POT CCW (-) END
- 3: POT WIPER
- 4: POT CW (+) END

MTR(p. 7)

- 1: MOTOR -
- 2: POT CCW (-) END
- 3: POT WIPER
- 4: POT CW (+) END
- 5: MOTOR +

Transmitter Specifications

Dimensions/Weight: approx. 7" by 3½" by 3" / approx. 1½ lbs.

Power Consumption: 30 Milliamps @ 7 to 15 VDC (9 milliamps in low power mode)

RF Transmission: 902-928 MHZ Single frequency, part 15 FCC compliant:

<u>Channel</u>	<u>Freq.. (MHZ).</u>
0	903.37
1	906.37
2	907.87
3	909.37
4	912.37
5	915.37
6	919.87
7	921.37

Resolution: 10-bits (1024 steps), **all steps always used.**

Data Update Rate: 300 transmissions/second

Transmission Delay: 2.7 milliseconds

Receiver/Amplifier Specifications

Dimensions/Weight: approx. 4½" by 3½" by 1½" / approx. 11 oz.

Power Consumption: 50 milliamps @ 11-17VDC (Motor off) up to 3 amps max when driving a motor

Power Output to Motor: 2 amps maximum @ 18 VDC (36 watts)

Lemo Connector Part Numbers

<u>Connector</u>	<u>Receptacle</u>	<u>Plug</u>
Power (Trans. & Rcvr/Amp)	ECG.0B.302.CLL	FGG.0B.302.CLAD42
Data In/Out (Trans. & Rcvr/Amp)	ECG.0B.303.CLL	FGG.0B.303.CLAD42
Pot Input (Rcvr/Amp)	ECG.0B.304.CLL	FGG.0B.304.CLAD42
Motor Output (Rcvr/Amp)	ECG.1B.305.CLL	FGG.1B.305.CLAD62
Camera Run/Stop (Rcvr/Amp)	ERD.0S.304.CLL	FFA.0S.304.CLAC42

An excellent source for Lemo compatible connectors is Custom Interface Technology in Los Angeles, CA. Call 323-222-6401.

Technical Support

Address any technical question to:

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e-mail: jim@bartechengineering.com