TVC15 Installation Instructions

Introduction

The TVC15 Radio-Camera Interface will allow you to record the communications between the driver, pit crew and spotters with your in-car video camera. The ambient sounds in the car are also captured with a remote microphone. It works with all brands of race radios utilizing a standard 5-pin connector harness (or 4-conductor IMSA connectors with our optional adapters).

Imagine hearing all of the spotters' information, the pit crew's comments, and all of the driver's intended (and unintended) comments. The ambient sounds in the car will be clean, without all the wind noise common with many cameras' built-in microphones. Use your in-car video for sharing and for driver and crew improvement. Your in-car videos will sound so much better!

Equipment Requirements

Driver's helmet must have standard microphone and earphone wiring harness.

Car radio harness must have the standard 5-pin connectors (recommended) or 4-conductor IMSA connectors (with our optional adapters).

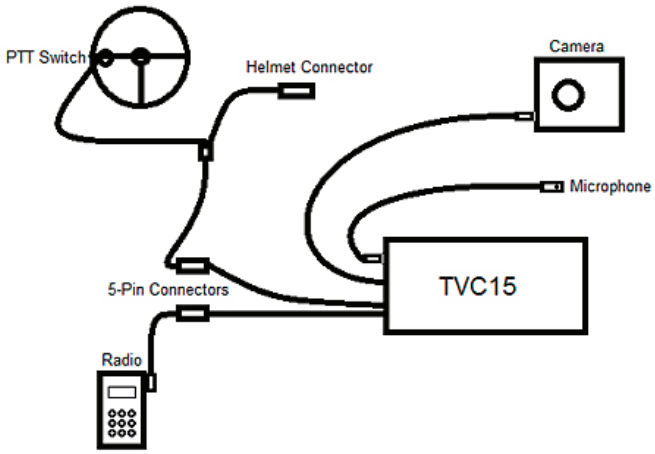
Video camera must have an 1/8" 3-conductor microphone input (or 1/8" 2-conductor microphone input with our optional adapter). GoPro Hero2, ChaseCam, and many others have this feature. GoPro Hero3 audio adaptor available separately from GoPro dealers.

External Microphone (not included): Electret condenser (recommended) or dynamic microphone, with 1/8" mono plug.

Power: Standard 9-volt battery (not included)–will last for several events.

Installation

Read this entire document before starting. The TVC15 box must not be located within 3 feet of the radio's transmitting antenna. It should be located in a place that will allow a crew member to turn the unit on and off, and to change the battery when needed. The TVC15 box may be attached to any secure part of the car, such as the roll cage, with a clamp or zip ties. It may also be attached to the floor of the car (behind the seat recommended) with Velcro. The external microphone should be mounted in an area of the car that is not subject to a lot of wind or air movement. We recommend placing the external microphone under the dashboard. Mount with Velcro or strong double-sided foam tape. If possible, wiring for the TVC15 should not be run parallel to other wiring in the car. Specifically avoid running TVC15 wiring next to main battery wires. All wiring should be secured with zip ties, Velcro wraps, or appropriate wire clamps. Connections from the TVC15 to the radio wiring harness and camera are shown on the drawing at right.



Note: If you need to power both your in-car camera and your in-car radio from the car's battery, such as for 24- or 25-hour events, you may need to use an isolated DC to DC converter to power the camera when using the TVC15. This may be needed because if you power both the camera and radio from the same supply (car battery), you will be connecting the radio ground to the camera ground via the TVC15 and unless you use an isolated power supply for the camera, you will be creating a "ground loop" which acts as an antenna and can cause problems with both the radio and the camera. Sources for isolated DC to DC converters are available from I/O Port Racing Supplies.

Setup and Testing

Open the front cover of the TVC15 by unscrewing the four phillips head screws. See figure 1.

Put a fresh 9-volt battery into the TVC15. See figure 2.

The level controls for the external microphone and the driver's earphone are factory preset at mid-position. Adjust these levels up or down as needed. See figures 3 and 4.

Replace cover onto unit. The foam under the battery is designed to keep the battery secure in the case and will make the battery stand proud of the case. Push down on the case cover to secure with the four screws. See figure 5.

Connect the TVC15 to the car's radio harness by disconnecting the 5-pin plug between the radio and the car harness and inserting the connectors from the TVC15. Figure 6 shows the radio and wiring harness before connecting the TVC15. The TVC15 goes in-line with the radio harness as shown in figure 7.

Connect the audio output from the TVC15 to the in-car video camera's microphone input. See figure 8.

Connect the external microphone to the TVC15. External microphone sold separately. See figure 9.

Turn the TVC15 unit on.

Turn on the race radios.

Turn on the in-car video camera and start recording.

Have the driver transmit some comments to the crew.

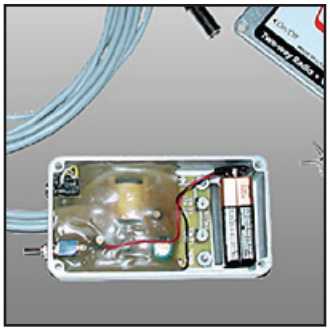
Have the crew transmit some comments to the driver.

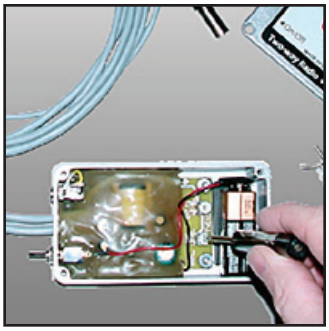
Start the car's engine and rev it up a few times. Transmit back and forth while the engine is revving.

Turn off the engine, the in-car camera, the radios, and the TVC15.

Play back the video from the in-car camera. The radio communication and some ambient car sounds will be heard on the left channel and the sound picked up by the external microphone will be heard on the right channel. If the crew comments to the driver or the sound from the external microphone are too loud or too quiet, adjust the level controls on the TVC15 up or down as needed and repeat the test as needed. (Return to step 3.) Remember that ambient sound at the track is often quite loud–the level from the external microphone should initially be adjusted so that it is quieter than the sound from the driver's microphone. These sound levels may require additional adjustment after reviewing a video recorded during a practice session or race.

Figures 1, 2, 3





Figures 4, 5, 6

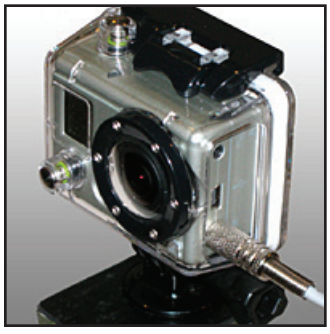
Figures 7,8

Select Camera Connection Information:

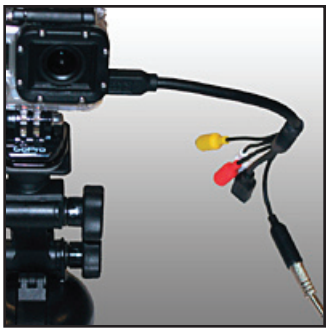
GoPro HERO2 The GoPro HERO2 camera will hook right up. You will need the “Skeleton Case” or rout out the standard case to connect the microphone wire. See figure 10.

GoPro HERO3 The GoPro HERO3 camera will need either a 3.5mm Microphone Adapter Cable or the Combo Cable, both available from your GoPro dealer. The GoPro does not offer a “Skeleton Case” for the HERO3, so you will need to rout out the standard case. See figures 11 and 12.

Figure 10, GoPro HERO2 Skeleton Case



Figures 11 and 12, HERO 3 Combo Cable; Case Routing



Troubleshooting

No sound from driver's microphone or received radio transmissions, ambient sound can be heard. Check to see that audio connector from TVC15 is plugged into the microphone input connector of the camera.

Check to see that the camera is set to record from the external microphone connector (automatically done on GoPro HERO2, HERO3 and ChaseCam, but may need to be set up on other cameras).

Some sounds are much louder than others; sounds from all sources can be heard. Repeat setup procedures (from step 6) to adjust levels for external microphone and received radio signals.

No sound from the external microphone or the driver's microphone, sound OK from received radio transmissions. The TVC15 is switched off. Turn the on-off switch to the on position.

The battery in the TVC15 is dead. Replace it with a fresh 9-volt battery (and remember to turn the unit off when you're not using it).

No sound from the driver's microphone, sound OK from the external microphone and the received radio transmissions. The battery in the TVC15 is nearly dead. Replace it with a fresh one.

Problem in the car's radio harness or helmet wiring. Check that all connections are tight and clean and wires are not pulled out of connectors.

No sound or squawking sound from the driver's microphone when driver is transmitting, sound OK from the external microphone and the received radio transmissions. TVC15 unit is too close to radio transmitting antenna. Relocate the TVC15 farther away from the radio antenna or use an external radio antenna with good quality shielded cables.

No sound from external microphone, sound OK from driver's microphone and received radio transmissions. External microphone level turned down too far. Readjust external microphone level.

Problem with external microphone wiring or external microphone. Make sure the external microphone is plugged in to TVC15 and that wiring to the microphone is not cut or damaged. Try another external microphone (a pair of cheap headphones plugged into the external microphone connector will work in a pinch to test, but the level will be much lower than with a good microphone).

Sound from external microphone is distorted, sound from driver's microphone is clear. External microphone located in a windy area or too close to car's electronics. Try relocating external microphone.

External microphone level is turned up too high. Turn external mic level control down. No sound from received radio transmissions; sound OK from driver's microphone and external microphone. Driver's earphone level turned down too far. Readjust driver's earphone level.

Problem in the car's radio harness or helmet wiring. Check that all connections are clean and tight and wires are not pulled out of connectors.
Sound volume OK from driver, ambient and one spotter/crew chief, but 2nd spotter/crew chief volume too low or too high. Mismatched spotter radios and/or headsets. All spotter radio microphones should be of the same type.

Radio configuration mismatch. Make sure all radios are set to narrow band (FCC req'd 1/1/2013).

High-pitched whine when engine is revved. Electrical noise from alternator. Relocate wiring from TVC15 and its associated wiring away from other car wiring and/or install noise suppressor on alternator wire.

Whining, buzzing, or other unexplained noises on radio transmission and/or reception. See note in installation instructions about use of an isolated DC to DC converter for powering the camera when both radio and camera are powered from car battery.