

# • Multifunction Steering Wheel Retrofit

Model & year: **91-97 8-Series, U.S.**

Expertise level: **Beginner > Intermediate > Advanced**

Date: **May 12, 2011** (Updated: February, 2012)

Estimated time to complete: **2-3 days**

## Tools Required

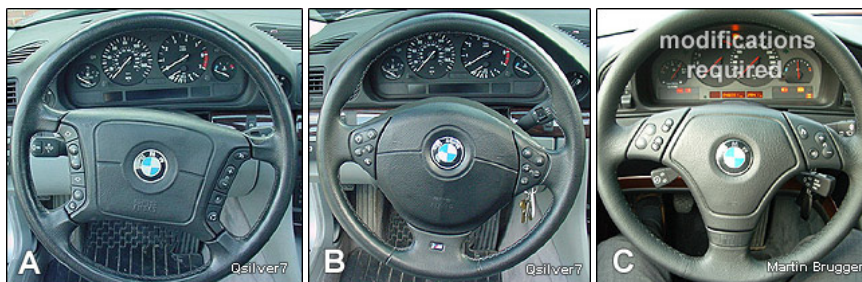
- Wiring supplies
- Other basic hand tools

## Facilities Needed

- Garage (dry, secure work area)

## Parts Required

- (1) BMW Multifunction Wheel w/Airbag (options below), \$250-\$450 used
- (1) Slip Ring, p/n 32 34 1 094 261, \$175 list
- *Pre-'95 + all CSI:* (1) Column Switch Bracket, p/n 32 31 1 162 088, \$3.79 list
- (1) BMW Wiring Connector, p/n 61 13 6 913 635, \$2.98 list
- (5) BMW Wiring Leads/Pins, p/n 61 13 0 005 198, \$1.82 list each



### Standard 4-Spoke

E38/39; 9/96 thru 3/99  
Wheel: 32 34 1 094 259  
Airbag: 32 34 1 097 125

### M 3-Spoke

E38/39; 9/97 thru 3/99  
Wheel: 32 34 2 228 671  
Airbag: 32 34 2 229 130

### Sport 3-Spoke

E46 thru 6/00  
Wheel: 32 34 6 753 943  
Airbag: 32 34 1 092 762

- (1) BMW I-Bus Radio (options below), \$150-\$350 used



### C33

standard '96-on I-bus radio  
(about \$150 used)

### C43

deletes weather band, adds  
PTY/RDS  
(about \$200 used)

### CD43

deletes tape, adds CD (no mp3)  
(about \$350 used)

## OPTIONAL:

Phone:

- Parrot CK3000 "Evolution" Bluetooth System, price: \$120 + shipping
- Connects2 CTPPAR007 Wiring Kit, price: \$80 + shipping

Cruise:

- (1) Cruise Adaptor Module (see below) or, for 840Ci only:

- \* (1) E38/39 Cruise Control Module, p/n 65 71 8 375 497, \$651.79 list
- \* (1) E38/39 Cruise Control Actuator, p/n 65 71 8 369 027, \$320.12 list

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## Getting Started

Update your 8-series with something that should've been standard from '95-on: a multifunction wheel. The information compiled here is applicable to *all* airbag-equipped BMW's since 7/90 (earlier models may have used different airbags and steering columns). Credit is due to E36 BimmerForum members *vlacki* and *bluebook*, E38 BimmerBoard members David Cecil, *Qsilver7*, and *O4sshd*; and especially *8er.org* founder Martin Brügger - all of whom performed pioneering work from which I have drawn.

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### WHEELS

There are two smaller diameter, single-stage airbag multifunction wheels used in '97-'99 E38/39's (with slip ring '261) optimally suited for adaptation. (See below for more on the Sport 3-spoke. Wheels from '95-'96 [with slip ring '912] require a separate control module and are therefore less suitable.) This retrofit is easier for most BMW's from '95-on which use updated column switch brackets and airbag connectors, however earlier models are easily adaptable.

Sport 3-Spoke: This popular wheel is made for the column-mounted slip rings on the E46 and therefore is not directly compatible. However, machining the base and other changes will allow use of the '261 slip ring.

- [BMW Sport 3-Spoke Supplement](#) - PDF document by Frankie



Note these two wheels offer customizable button block options. For instance, telephone buttons are optional, while wheel A may include either wheel heater or HVAC recirculation button (unusable with 8-series). Wheel B has no heat option but offers button covers. (Wheel C has no options.) Therefore, for example, wheel B could be configured with radio buttons only. For button block details, see RealOEM [wheel A](#), [wheel B\(1\)](#), [wheel B\(2\)](#), and [wheel B\(3\)](#).

Heated Steering Wheel: To use the wheel A heater, you must use slip ring '262 with contact switch and matching wheel/airbag. See [heated wheel](#) for details.



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### RADIO

Functionality is achieved by using I-bus capable factory radios (C33, C43, or CD43) and extending the white I-bus output wire from the '261 slip ring to terminal 7 of the radio wiring harness. For those using aftermarket radios, check with the radio's manufacturer for adaptors.

For those wishing to use only radio buttons with wheel B, install a [right button cover](#) after removing the cruise button face. The wheel's radio button wiring still needs to connect thru the unused cruise button block, however.

For those using factory CD changers, they will need to be replaced with newer I-bus CD/MP3 changers and data cables. See procedure section below

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### PHONE

Integrating a hands-free "bluetooth" phone system allows more complete utilization of your MF wheel while providing real practicality. An

affordable approach uses the *Parrot CK3000* bluetooth kit along with the *Connects2* steering wheel adaptor. See procedure section below.

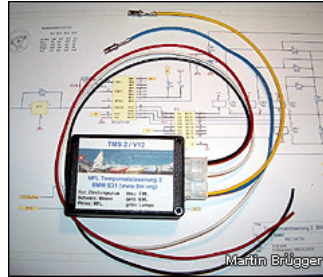
## CRUISE

While adapting radio functions is simple, cruise functions are more involved. There are two possible approaches: 1) install an electronic adaptor which mimics cruise stalk output using wheel button input, or 2) swap cruise control components for those which understand the wheel buttons.

Use of an electronic adaptor can be elegant and efficient. Fortunately such a device has already been developed. As of this writing, an adaptor module is available for purchase from Swiss electronics whiz and 8-series enthusiast Martin Brügger.

Called the "TMS 2" module (Tempomatsteuerung 2), Martin's black box (developed around 2009, shown below left) is professionally made and easy to install. Available for both V8 and V12, it can be used with other BMW's such as the E32 and E34, and even includes provisions for a cluster annunciator light. Martin's instructions are in German, so I created supplemental wiring diagrams:

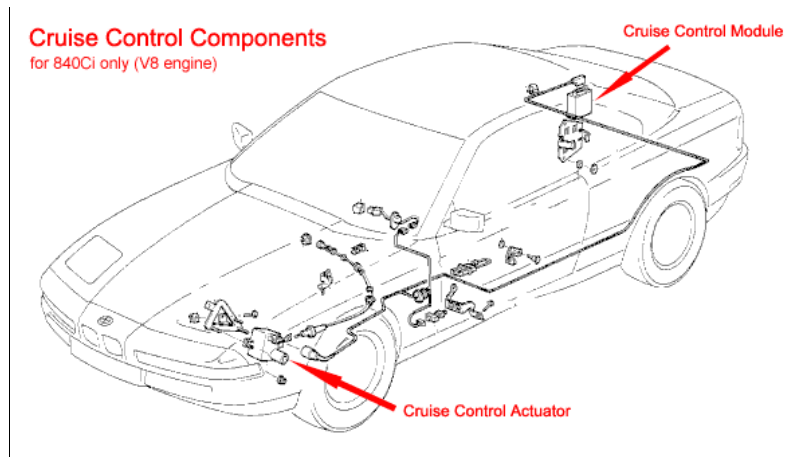
TMS 2 Module (Cruise Control Adaptor)



- **Contact:** [Martin Brügger](#) from [8er.org](#) (Switzerland)
- **Price:** 215 CHF (about \$238), price subject to change, exchange rate varies.
- **Details:** [Installation Instructions](#) - German PDF file by Martin Brügger
- **Supplements:** [V8 Wiring Diagram](#), [V12 Wiring Diagram](#) - by Frankie

Without a cruise adaptor module, swapping cruise components is your only option. But this works *only for the 840Ci* and its V8 engine. (All V12 models utilize circuitry integrated with the engine control unit.) Incidentally, 6-cylinder BMW's may also use this approach.

Compatibility is achieved by swapping in E38/39 cruise components, specifically the cruise module (GR11) and its related actuator with cable. Re-pinning the connector is required. See diagram below:



BMW used three different variations of cruise functions on the E38/39 with the most desirable being from 9/97-on. *Therefore cruise modules should be sourced from 740/540's built from 9/97.* New cruise modules require coding from the dealer, which is why used modules from V8 powered cars are needed. (6-cylinder cars may pull from the 528.) Unlike the cruise module, cruise actuators do not require coding and are the same from 9/96-on.

A wiring diagram including part numbers is available below. Note that since I used the TMS adaptor instead, this diagram is labeled "untested". But it is based on the successful work accomplished in the [E36 Bimmerforums](#).

[E38/39 Cruise Control Retrofit for E31 \(840Ci\)](#) - by Frankie.

Note with either option (component swap or TMS module), cruise system diagnostics (fault readouts) will no longer be available, or limited at best.

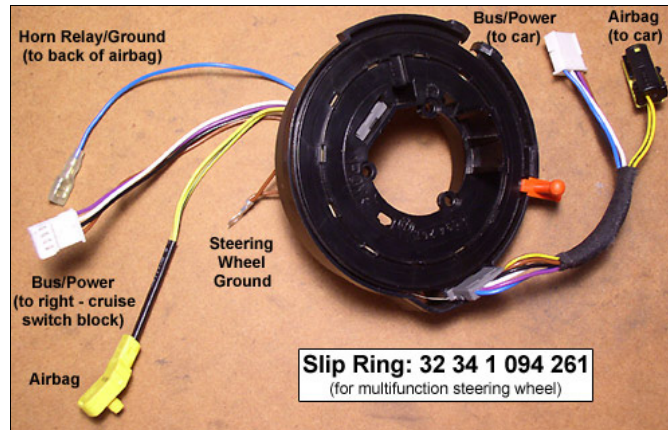
Sourcing cruise parts from either a salvage yard or eBay will be the most cost effective. Procedures below.

## Procedure

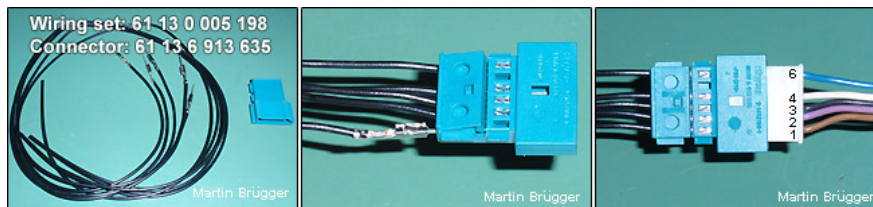
### Wheel

Follow my previously written [Steering Wheel Retrofit](#) but use slip ring '261 instead, and note the following:

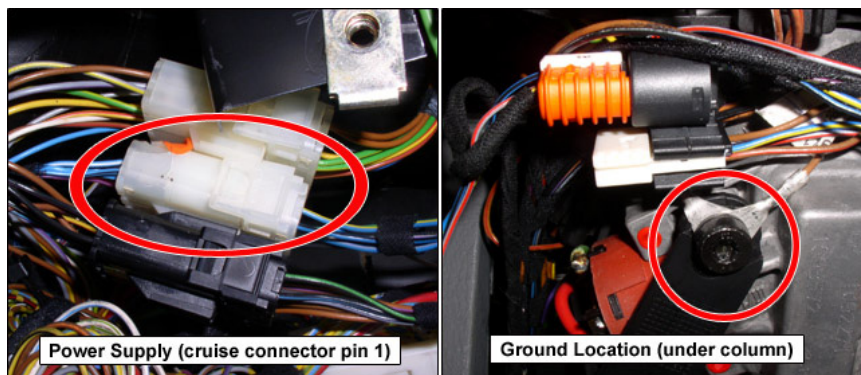
- Fully lower and extend the motorized steering column before disconnecting battery!
- Leave the bus/power car connector of the new slip ring in place. Only alter the slip ring's car airbag connector if your car originally used the '901 slip ring (thru '93), as specified in the above procedure.



- Use wiring and connector specified to receive the bus/power connector from new slip ring:



- Pin 1 (brown) - *Ground*: to TMS module (if used) or other ground location under column.
  - Pin 2 (purple) - *Power*: from TMS module (if used) or other 12v source (ex: cruise switch, radio).
  - Pin 3 (black) - *Cruise Bus Signal*: to TMS module (if used) or retrofitted GR11 cruise module.
  - Pin 4 (white) - *Radio Bus Signal*: to terminal 7 of radio wiring harness. See *Radio* below.
  - Pin 6 (blue) - *Horn*: to horn relay (existing brown/red wire under column).
- Tap fused power sources which are hot in accessory/run/start. For 840's, the cruise switch wire from connector pin 1 (violet/white) is ideal (see image below left). 850's may use radio pin 5 or others. Tap-in squeeze connectors are convenient.



- For a ground terminal use under-column location, under ignition switch (see image above right). '95-on cars are pre-wired from original '111 slip ring. Simply open the car's connector and transfer the pin 1 brown wire into pin 1 of your new connector.

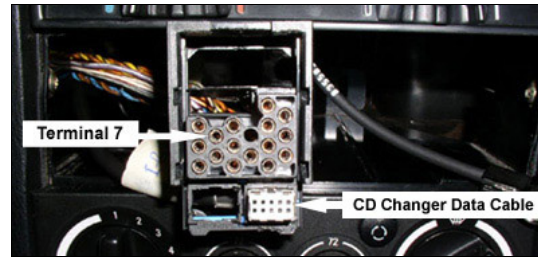


- The light control module (LKM) has no input and therefore wheel buttons are lit at all times.

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## Radio

- Extend slip ring's pin 4 (white wire) to radio wiring harness terminal 7. See image below. Run the radio bus wire down right side of column along the ignition switch interlock cable to radio. Secure wire with tie wraps.



- To use a CD/MP3 changer, see [Factory-Look Audio Upgrades](#). Use tap-in squeeze connector to create a Y branch for changer.
- Again, source proper wiring supplies. For example, use terminal [61 13 0 007 449](#) in the radio harness.

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## Phone

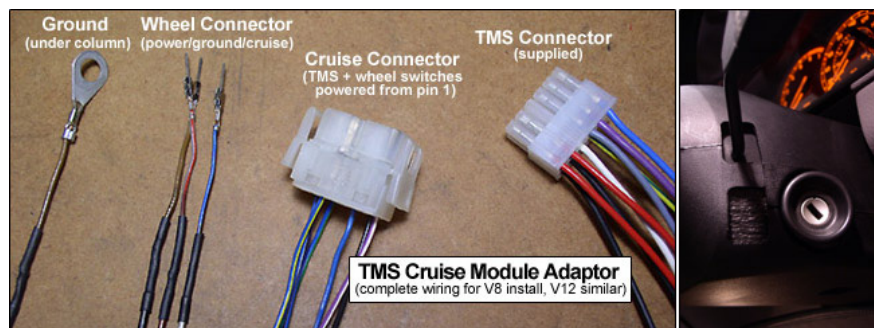
See: [Bluetooth Integration](#)

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## Cruise

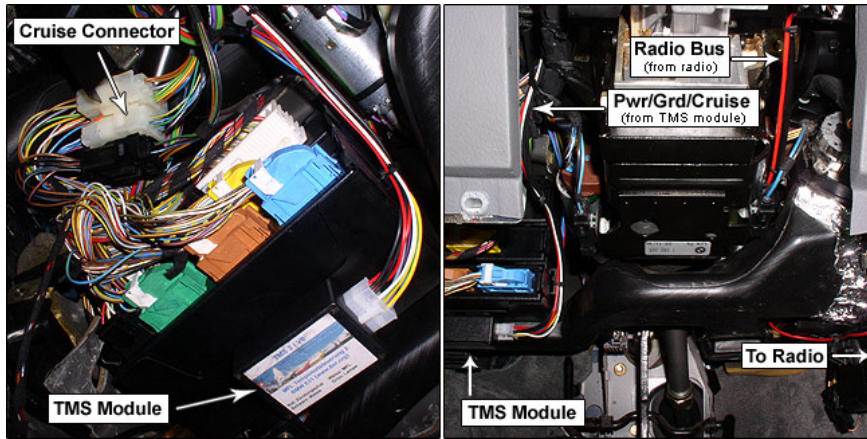
### TMS Module Installation

- 1) Refer to supplemental wiring diagrams and installation instructions referenced in *TMS* section above.
- 2) Remove all lower trim from driver side.
- 3) Prepare supplied TMS wiring harness by splicing in cruise stalk connector (image below left) or source new unpinned connector from BMW (61 13 8 352 322). Of course once the TMS module is in place, you no longer need the cruise stalk! (See image below right.) Use suggested BMW wiring pins (61 13 0 005 198) for a factory fit into wheel bus/power connector:



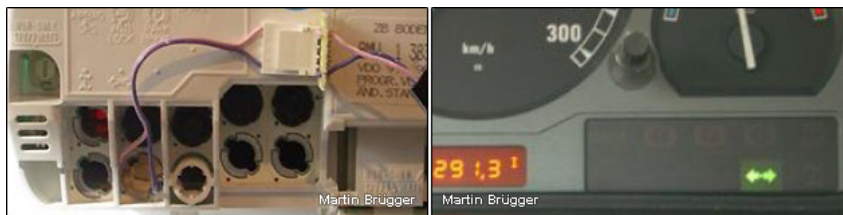
Use heat shrink tubing after a dab of solder on your wire splices to ensure good contact and durable insulation.

- 4) Mounting location is important: it determines needed wire lengths. I mounted the TMS with Velcro to the underside of ZKE bracket. See image below left. From here, wires can be conveniently run up to both cruise connector and left side of steering column. Note radio bus wire (red) along ignition switch interlock cable. See image below right:



Secure all wiring with tie wraps.

5) *Optional:* To use the module's panel annunciator light, use a factory panel bulb with separate 12v power. The module's pin 3 is a ground circuit. It operates by sending a ground signal to the bulb, lighting it only upon button press. See images below:



5) You're done! Take it for a test drive!

*First Impressions (840): The TMS module holds speed smoothly, like a factory system, but responds a bit crudely to accelerate or resume, commanding aggressive accelerator movement with corresponding RPM surges to attain desired speeds. For those who infrequently use cruise functions, this is acceptable. But frequent cruise users who prefer smoother operation may prefer the original cruise stalk, or the component swap outlined below. - Frankie.*

*Note: I have been informed by Mr. Brügger that his TMS module is optimized for the V12. This explains the less-than-smooth operation in my V8.*

#### Cruise Component Swap

This option provides factory-smooth cruise control operation versus Martin's TMS adaptor on V8 powered cars.

1) Source all parts and review wiring diagram referenced below. Cruise actuators require the matching cable and electrical connector. Mounting hardware may be needed too. If possible, open and re-pin connectors as needed, instead of cutting & splicing.

[E38/39 Cruise Control Retrofit for E31 \(840Ci\) - by Frankie.](#)

*Note: This method is untested in the 8-series, but has been successfully performed in the E36 3-series. The GR11 cruise module offers even smoother operation than earlier factory systems, along with a cluster annunciator light. Since I abandoned this approach in favor of the TMS adaptor, additional installation details are not possible and the wiring diagram is only theoretical. However, this should provide a foundation for those proceeding down this path - Frankie.*

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