

## • Factory Bluetooth Retrofit

Model & year: **95-01 7-Series, U.S.**

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

Date: **January, 2017** (Updated: March 21, 2017)

Estimated time to complete: **2- 4 hours**

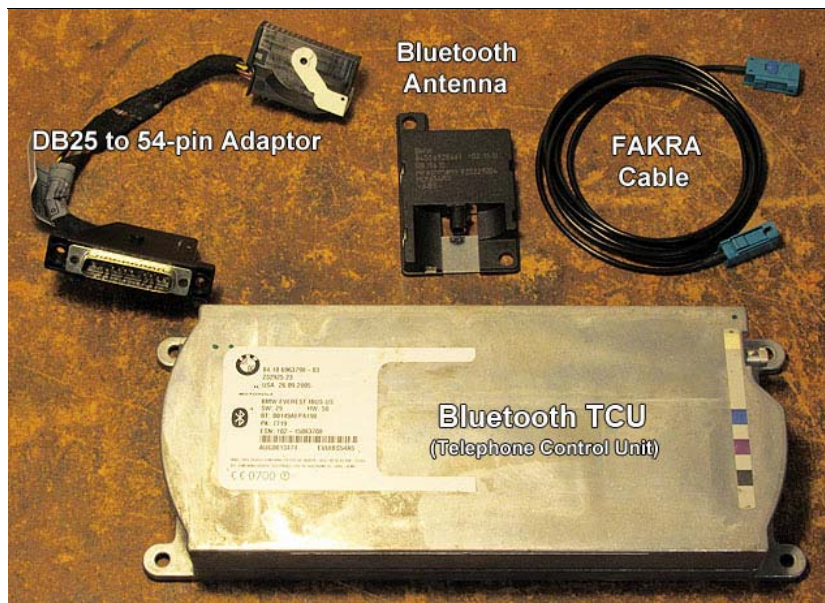
### Tools Required

- Basic hand tools
- *NavCoder* software (varies)

### Facilities Needed

- None

### Parts Required



- (1) BMW Bluetooth TCU, p/n varies, price (used): \$100 - \$150.
- (1) DB25 to 54-pin Adaptor Harness, p/n 84 12 0 308 375, price: \$37 (list).
- (1) BMW Bluetooth Antenna, p/n 84 50 6 928 461, price: \$26 (list).
- (1) FAKRA Cable (female-female), 4' minimum length, price: \$6-\$12 (on eBay).

### Getting Started

Replacing the useless stock phone system in your BMW with a factory, hands-free "Bluetooth" system is a fantastic way to modernize your car, gain practical benefits and fully utilize your onboard electronics.

To use aftermarket BT devices (such as *Grom* and *MediaBridge*) your radio must be continuously "on" and in CD mode. But a factory BT system operates independently, in the background and always at the ready. In addition, the CD changer line remains open for an MP3 changer or aux-in, for example. So, you can finally use all your car's electronics including the built-in microphone (in the headliner) and steering wheel controls, plus view extensive phone information on your nav screen or MID display. What could be better?!

There are two different ways to achieve this:

1. **ULF (Universal Phone Unit):** Compatible with most BMW's regardless of installed electronics and model year; Requires phone pairing button; Accepts phone-specific cradles (in center of armrest) which charge your phone while boosting its signal thru the roof antenna; However, ULF's are expensive and hard to find; Requires more installed parts.
2. **TCU (Telephone Control Unit):** Partially compatible with E38's thru 01/00 but fully compatible after that; No pairing button needed (pair within two minutes of starting your car); Can't use cradles; Cheaper and more numerous than ULF's; Fewer installed parts required.

Considering cost, simplicity, and my car's model year, I chose to install a TCU. The good folks at [BimmerNav](#) are now offering a TCU kit, but it costs as much as their ULF kit: \$800. As described here, a TCU retrofit can cost under \$200.

BMW made several different ULF's and TCU's over the years. Compatible TCU's were made from late 2004 thru 2008, with the last one being p/n 84 10 9 195 455 (from 3/08). For a summary, see [BMW TCU and ULF Part Numbers](#).

There are some limitations:

- Compatible ULF's and TCU's are optimized for voice communications, not music streaming. Only the latest TCU's offer BT streaming, but they're not compatible with the E38 7-series. For work-arounds, see note at the bottom of this [BimmerNav](#) page. Another option is to use an aux-input for music. (This method also avoids data loss from A2DP compression.)
- Navigation voice control will be lost for E38's built before 01/00. If this is a deal-breaker, get a ULF instead. From 01/00, voice control can be shared with navigation after simple coding with [NavCoder](#) software. See my [NavCoder](#) section for instructions.
- If your BMW is *not* equipped with DSP sound, you *may* need a supplemental amplifier if you cannot obtain suitable volume from your phone. There are three different ways to control in-call volume: 1) radio, 2) phone, 3) system. (System volume is only accessible by voice command. Speak "Volume Up" or "Volume Down".)

While there is much variation in BMW models, the information here may be applicable to several BMW models from the late '90's-on.

### TCU Specifics

Used TCU's are commonly available on [eBay](#). Beware some sellers claim "Bluetooth" when in fact the TCU is an older, non-BT unit. Confirm Bluetooth by the label:



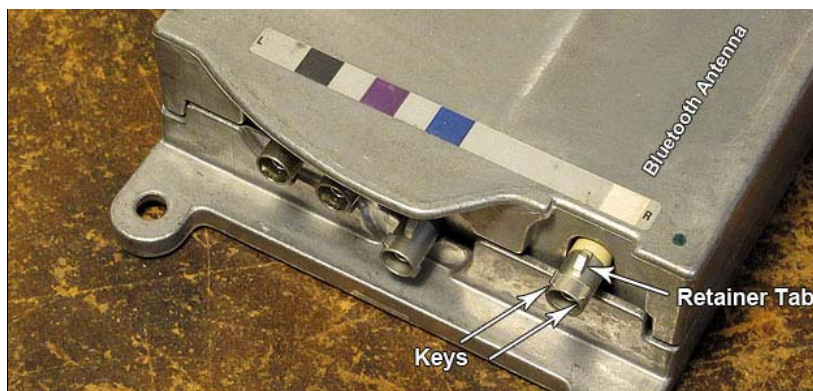
Look for the Bluetooth logo (left center) and "PK" (Pass Key) code. This code is required to pair your phone. If this label is missing or illegible, do NOT buy it! The two peel-off labels will most likely be missing. This is OK.

Verify "BMW...IBUS", as only i-bus units are compatible with the E38 7-series. The production date (above: September 26, 2005) will relate to the software and hardware version ("SW" and "HW", respectively). Look for late production dates to obtain the newest technology.

### FAKRA Cable

The BMW cable which connects the BT antenna to the TCU (p/n 61 12 0 137 616) is a FAKRA-type cable and was discontinued on 6/3/16. Not to worry. This is a generic part and may also be purchased on [eBay](#). You will need a female-to-female connection with minimum 4' length, in size RG174.

The drawback of a generic cable is that its connector may -- *may* -- not fit the keyed ends of the TCU and BT antenna. If this happens, the keys must be removed by filing them away. But do NOT remove the retainer tab. See image below:



### Mounting the BT Antenna

The perfect location for the BT antenna is inside the left (driver-side) C-pillar, just below the passenger courtesy light. Running the FAKRA cable thru the trunk wiring pass-thru is surprisingly easy compared to some cars.

Unfortunately, removing trim pieces will result in broken fasteners. The question is how many. Follow my instructions to minimize damage.

## Mounting the TCU

Unlike the ULF, a factory trunk mounting bracket is unavailable for a Bluetooth TCU in an E38 7-series. For those interested in a clean install (like me), a random tie-wrap solution is unacceptable. An adaptor board can be made from plywood, and mounted on the video bracket.

Note the Bluetooth TCU is a large device. It's too big to fit in place of the old TCU. If mounted as suggested, it must sit as low as possible on the bracket. Even so, the TCU still contacts the taillight access door. Leaving this door un-latched and slightly open isn't an issue, since it's not visible after closing the larger nav access door. See Procedure sidebar below.

## Procedure

### Trim Removal

1) Start by removing the nav computer (if applicable). Allow computer's red light to extinguish BEFORE proceeding. Insert radio removal tools (or coat hangers) into slots to release retainers. Then, grasp black nav trim and pull firmly:



Once free, disconnect the two plugs and antenna wire. Set aside. Then, remove the black plastic trim surrounding the bracket's opening.

2) Release the two black plastic trim screws just right of both the nav and CD changer. Then, release the 1/4 turn fastener securing the taillight access door (left of nav opening). Now, remove left rear side trim by pulling out and up.



3) Pull out upper rivet on forward trim. Then, pull trim down to gain access to trunk wiring pass-thru (images above).

### Sanity Check: Black Plastic Trim Screws

*Those black plastic fasteners are the dumbest thing BMW has ever invented. The plastic nut on the other end almost always turns with the screw, making it impossible to release. And the nut can't be held in place 'cause it's behind the trim...leaving your only option to break off the screw. Even if you release a screw, installation is worse. Try positioning the trim while turning the screw: the nut will either fall into oblivion or turn like a pinwheel.*

*This is why most screws have missing nuts and aren't functional anymore. I know of no good substitute parts.*

4) Moving on to C-pillar trim, lever out -- from the top -- the left passenger courtesy light and unplug. (Levering from the front will break the light's retainer clips. Ask me how I know.)

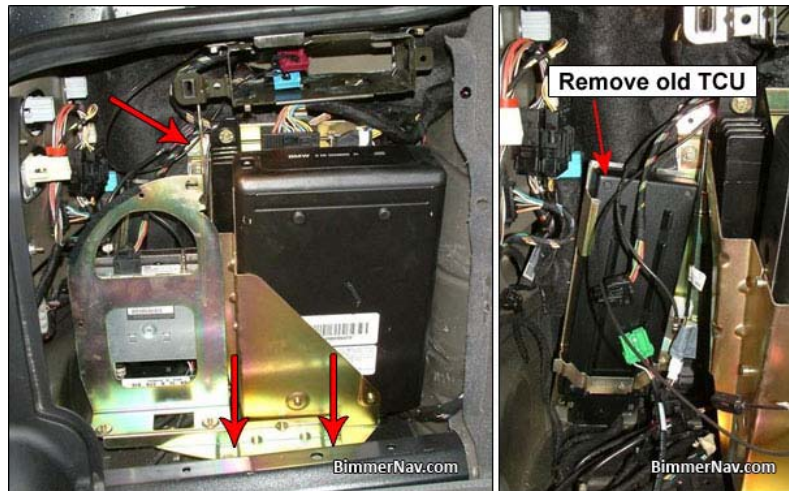


5) Release the three (3) now-visible trim retaining screws using an 8mm nut driver. See image below. Remove trim carefully by pulling out and up, in rocking motion. Afterwards, the trim will likely suffer from indentations in the (deteriorating) foam, left behind after handling. This is unavoidable.

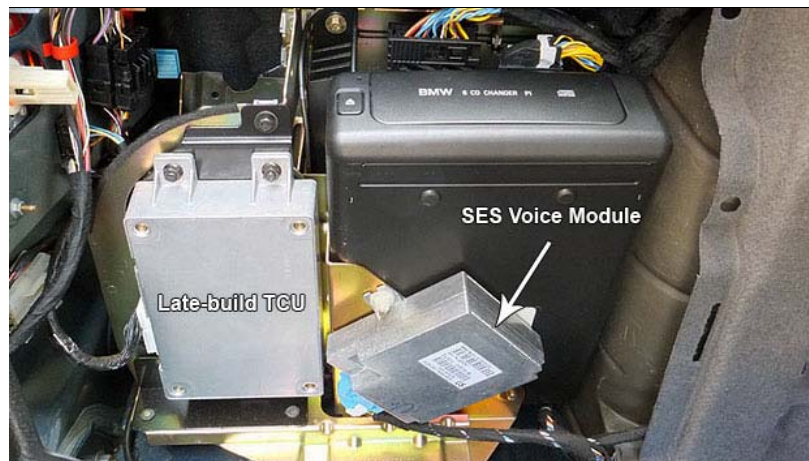


### Prep Work

6) Survey your installed equipment. Remove your old TCU and associated phone parts from both the trunk and center armrest (if any). Install blank center tray in armrest to replace any existing phone cradle.



Your old TCU is likely behind the brass-color video bracket. Remove the three 8mm screws to release bracket, as shown in image above left (red arrows). Unplug old TCU and discard. (Don't bother listing it on eBay. It's worthless.) Newer cars may have TCU mounted in front, directly on video bracket, as in image below.



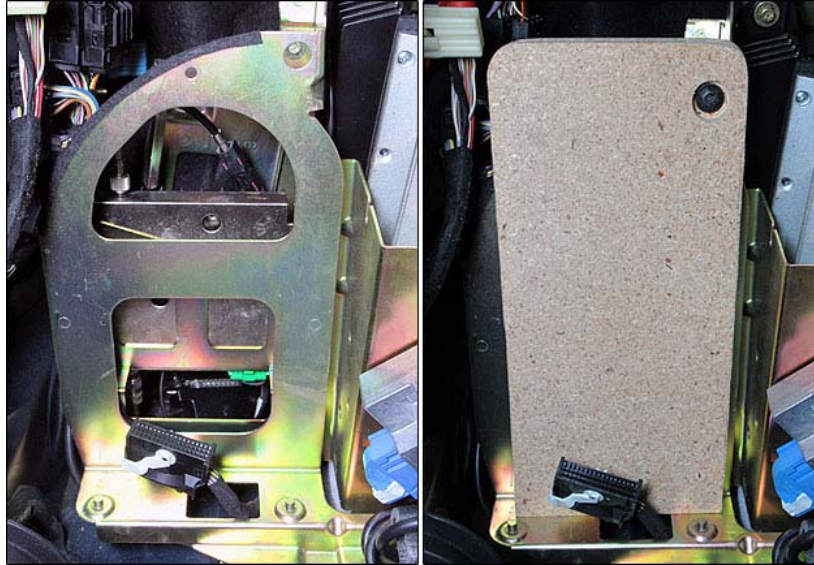
For late-build models, note also the SES voice module in image above. This module will handle voice control of both Bluetooth TCU and navigation (after NavCoder programming). Cars without SES will lose voice control for navigation after Bluetooth TCU installation.

7) OPTIONAL (if necessary): Prepare new TCU and BT antenna for the FAKRA cable by filing off keyed metal ends of white coded connector

of TCU and the black plastic keyed ends of BT antenna.

### Bluetooth TCU Installation

8) Plug adaptor harness into DB25 connection from old TCU. Return video bracket and secure with screws. (Your Bluetooth TCU will not fit back there.) Route 54-pin connector up through cut-out in bracket floor. See image below left:



9) Mount Bluetooth TCU and connect 54-pin adaptor. One mounting option is to tie-wrap it to the video bracket. A better solution is a plywood mounting board which attaches to the video bracket. See image above right and sidebar below.

#### **Building a TCU Mounting Board**

*Using thick 5/8" plywood or similar, cut a piece 5" x 11.5". Round off the upper corners to prevent cuts & bruises when reaching in to change a rear light bulb. Spray-on flat black paint for a finished look.*

*With the board resting on bottom of bracket, mark the bracket attachment point in upper right corner. Drill a hole for a screw/clip or nut/bolt combo and countersink it using a 3/4" bit. (TCU will rest over this area.) A drill press is helpful for accuracy.*

*On a workbench, place TCU at the top of board and mark the four TCU screw locations. Drill four pilot holes sized for short, thick screws.*

*Installing: attach board, plug in TCU, then secure TCU to board with screws:*



10) Insert coat hanger wire (or similar) in trunk pass-thru grommet, up into C-pillar area. Tape FAKRA cable to the wire and pull it back through into trunk.

11) Route FAKRA cable safely behind trunk electronics and connect to white coded terminal of mounted TCU.



12) Connect other end of FAKRA cable to BT antenna. Then, mount antenna just above white AM/FM amplifier by utilizing the T25 screw holding black plastic protective trim inside C-pillar. See image below:



13) Done! Before replacing trim, test your installation: Temporarily re-connect nav computer (if applicable). Switch ignition key to accessory and attempt to pair your phone (within two minutes) using the Pass Key (PK) printed on your TCU label. Once successful, take optional final steps using [NavCoder](#) software as below:

- E38's thru 01/00 (without nav or SES module): Configure emergency call number and other helpful features. Confirm voice recognition ("VR") is enabled (most TCU's come this way).
- E38's from 01/00 (with nav): Disable voice recognition (switch to SES). Configure additional features as above.

#### Voice For All

*E38s without voice recognition, built between 3/96 - 9/99, can obtain it by swapping steering wheel buttons.*

*Right: note phone icon (panel A) vs voice icon (panel B) on bottom button.*

*In fact, phone buttons have been discontinued and superseded by voice, p/n 61316903396 (\$100 new, \$50 used).*

*The significance of this is now all cars can use the voice recognition features of a factory Bluetooth TCU!*

*Why would you want this?*

*Because TCUs have an independent voice-activated phonebook, separate from your phone. Using the built-in microphone, you can record "voice tags" of commonly called numbers, allowing you to place calls by voice command instead of manually selecting them from either your phone or your phone's paired directory (displayed on nav/MID). And also because system volume (as opposed to radio & phone volume) can only be controlled by voice command.*

*What a cool way to bring your E38 into the 21st century!*



14) Once satisfied, replace trim in reverse order. Finally note:

- [BMW Bluetooth User Manual](#) - for ULF installations, but mostly applicable.
- [BMW Voice Control User Manual](#) - make use of the separate voice-activated phonebook!
- [Bluetooth Telephone Menus](#) - an original supplement for cars with navigation.
- **Microphone**, p/n 84 31 6 938 762 - new, noise canceling voice mic (*optional*). **I do not recommend this mic over stock simply because its noise-cancelling features cause audio cut-out upon low signal levels. This results in a completely silent "lost-signal" sound for the other party during conversational pauses.**

Now place a Bluetooth call to celebrate!

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