

Factory Bluetooth Retrofit

- **Model & Year:** 95-01 7-Series, U.S.
- **Expertise:** Intermediate
- **Date:** January 29, 2017
- **Updated:** December 16, 2020
- **Time Estimate:** 4-8 hours

7 Series ^{E38}

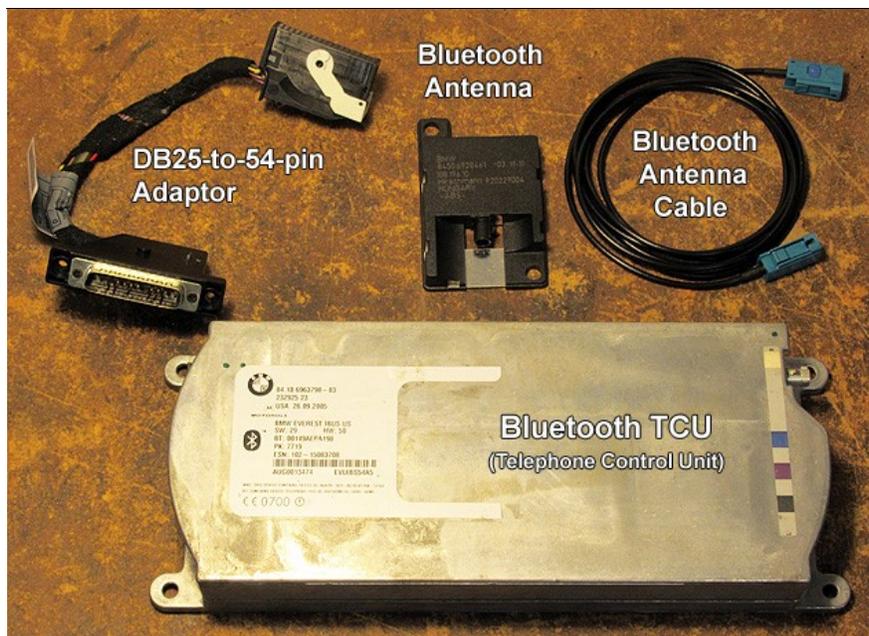
Tools Required

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

Facilities Needed

- None

Parts Required



- **BMW Bluetooth TCU:** p/n varies, price (used): \$100 - \$150.
- **DB25 to 54-pin Adaptor Harness:** p/n 84-12-0-308-375, price: \$37 (list).
- **BMW Bluetooth Antenna:** p/n 84-50-6-928-461, price: \$26 (list).
- **FAKRA B (or Z) Female-Female Cable** (BT antenna): gauge RG174, length 4ft, price: \$8-\$30.

NOTE: Although the factory adaptor has been discontinued, you can [Make a DB25-to-54-Pin Adaptor](#)

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.

Aftermarket BT devices (such as *Grom* and *MediaBridge*) require your radio to be continuously on and in CD mode in order to function. But a factory BT system operates independently, in the background and always at the ready. In addition, the CD changer line remains open (and may be used as an aux-in). Now, you can finally use all your car's electronics including the built-in microphone and steering wheel controls, plus view extensive phone information - including your address book - on your nav screen or MID display. What could be better?!

There are two different ways to achieve this:

1. **ULF (Universal Hands-Free):** Compatible with most BMW's regardless of installed electronics and model year; Requires phone pairing button, included with optional "eject box" phone cradles (in center armrest) that connect to roof antenna and charge your phone; However, ULF's are expensive and hard to find.

2. **TCU (Telephone Control Unit):** Partially compatible with E38's thru 08/00 (see limitation for nav voice control below) but fully compatible after that; No pairing button (pair within two minutes of starting your car); Phone cradles optional; Cheaper and more numerous than ULF's.

Considering cost and availability, most people choose to install a TCU. While the good folks at [BimmerNav](#) sold TCU kits for over \$900, a TCU retrofit - as described here - can cost under \$200. For phone cradle installation, see "Universal Eject Box" below.

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

There are some limitations:

- Compatible ULF's and TCU's are made for voice communications, not music streaming. Only the latest TCU's offer streaming, but they're not compatible with the E38 7-series. However, there are workarounds:
 - Install an [aux-input](#) in place of the CD changer, for phone-based music. (*This method avoids A2DP compression losses from streaming music.*)
 - Install a [Grom](#) or [BlueBus](#) exclusively for wireless streaming. (*RE: Grom: the factory Bluetooth system mutes radio audio during a call, and should thereby take priority. RE: BlueBus: although telephone functions are included, address book pairing and supporting Nav/MID screens are not yet operational.*)
 - For cars with navigation: swap in a ["New Generation" radio with audio streaming dongle](#).
- Navigation voice control will be lost for E38's built thru 08/00 unless a ULF is installed. From 09/00, voice control can be shared with navigation after simple coding with [NavCoder](#) software. See [Using NavCoder](#) for instructions. Since onboard nav is mostly obsolete, this point is likely irrelevant.
- If your BMW is *not* equipped with DSP sound, you will need a supplemental amplifier in order to obtain suitable volume from your phone. See [Factory Bluetooth Retrofit - Supplement](#). There are also similar instructions on [BimmerNav](#).

The information here should be applicable to several BMW models that were pre-wired for phone 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.

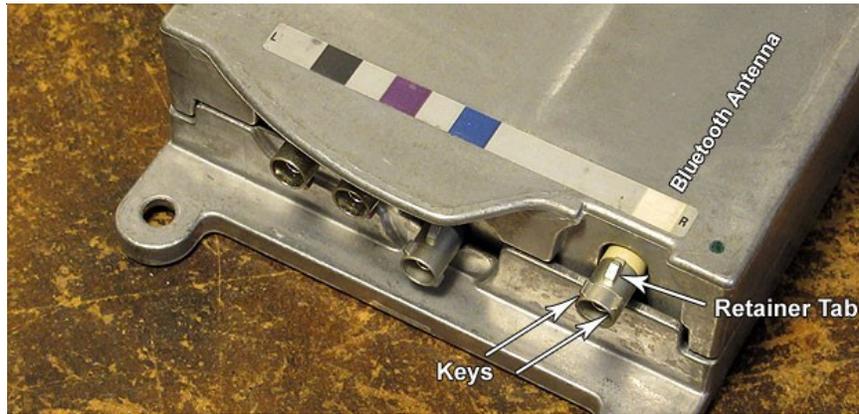
Verify "BMW...IBUS", as only i-bus units are compatible with the E38 7-series (not MOST-bus!). The production date (above: January 13, 2007) will relate to the software and hardware version ("SW" and "HW", respectively). Look for late production dates to obtain the newest technology.

Antenna Connections

Cable terminals on the TCU are color-coded [FAKRA](#) types. But factory connection cables are discontinued from BMW. Not to worry: cables are generic parts. There are several aftermarket cable vendors on [eBay](#), and custom-spec cables are sold by [vCableMart](#).

TIP: Although eBay vendors ship cheaply, your order takes weeks to arrive from China. vCableMart also ships from China but, delivers a professional grade product at a higher price within 5-7 days.

To connect the Bluetooth antenna to the TCU, use a FAKRA female-female B-type (color: white) or universal Z-type (color: aqua) with 4' minimum length, in cable size RG174. If other FAKRA types are used, they will not fit the keyed ends of the TCU terminal:



What are those other connections? The blue-coded FAKRA terminal is for GPS signals, while the violet and black terminals are for external antennas. These signals were apparently used with BMW's now-obsolete "Assist" service.

Universal Eject Box

To charge your phone while boosting its signal thru the roof antenna, BMW offers a universal "eject box" (phone cradle) that installs in the center armrest. This is the most sophisticated way to integrate a phone into your car. See [Phone Charging & Signal Boosting](#).

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 pass-thru is surprisingly easy compared to some cars.

Unfortunately, removing trim pieces for access will result in broken fasteners. The question is how many. Follow my instructions to minimize the 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 either the outer "video" bracket or in place of the CD changer (if not used). See *Bluetooth TCU Installation* below for details.

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. If mounted on the video bracket, the TCU still contacts the taillight access door. But leaving this door ajar isn't an issue, since it's not visible after closing the larger nav access door.

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).

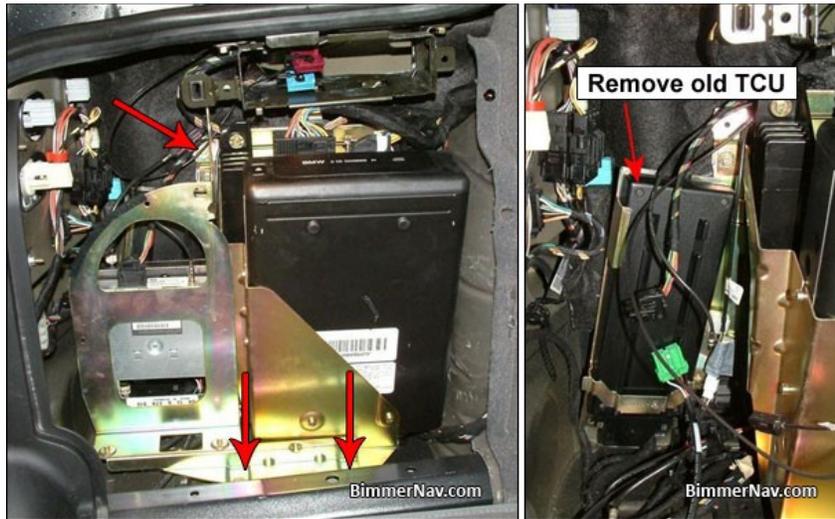
4) Moving on to C-pillar trim, lever out -- from the top -- the left passenger courtesy light and unplug. (Levering from the front will break the light's retainer clips. Ask me how I know.)

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. (It may be time to replace your headliner and pillar cover fabric.)



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 a blank center tray to replace any existing eject box, or install a universal eject box (see [Phone Charging & Signal Boosting](#)).



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 (from 9/00), note also the SES voice module in image above. This module will handle voice control of both Bluetooth TCU *and* navigation (after *NavCoder* programming of TCU). Cars without SES (thru 8/00) will lose voice control for navigation after Bluetooth TCU installation unless a ULF is installed.

7) For cars build before 9/00 (which have no SES module), it will be necessary to jumper pins 11 and 14 in the black phone plug located under the center armrest. This sends phone audio to the front speakers. See image below. Pinout numbers are stamped on the connector.



Additionally, open the DB25 plug (in trunk) and verify pin 22 is wired. If not, it will be necessary to jumper an i-bus wire into pin 22. The i-bus signal wire can be sourced/spliced from pin 3 of the CD changer power plug (also in trunk). See: [Factory Bluetooth Retrofit - Supplement](#).

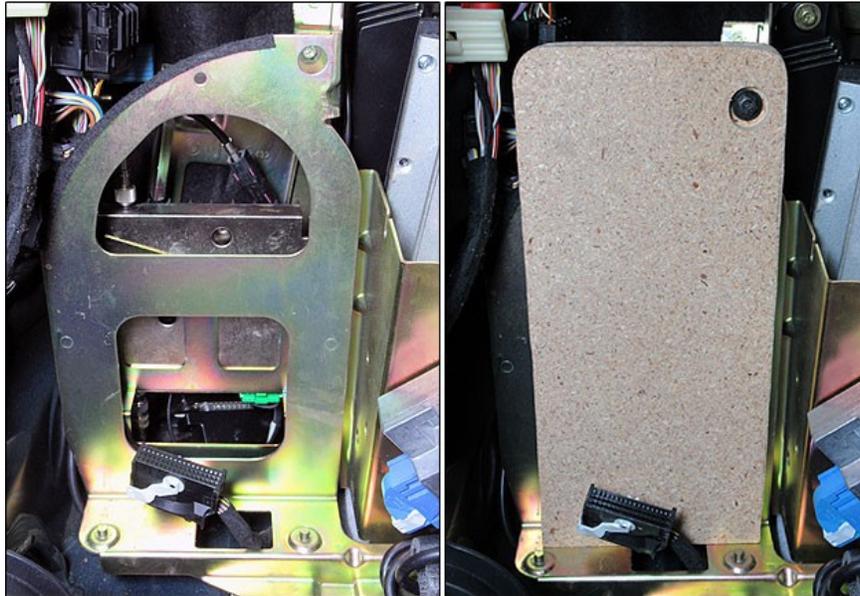
8) For cars built from 9/00 that did not have an SES module pre-installed (or had SES removed), verify the blue SES connector has a white jumper plug connected (p/n 84-11-0-018-038), as seen in image below. Also, in this case, it's necessary to jumper pins 11 and 14 as shown in step 7 above.



NOTE: Installing an SES module should enable voice control of both nav and phone (and "notepad" voice memos) all *without* jumpering pins 11/14 in the armrest plug. By now however, most existing SES modules have failed and don't seem as durable as TCU's. There is an updated SES module (84-41-6-915-049) available new for \$800. Cars that were pre-wired for SES should have a "talking head" icon instead of a telephone icon printed on the left steering wheel button pad.

Bluetooth TCU Installation

9) Plug adaptor harness into DB25 connection from old TCU. Then return video bracket and secure with screws. (Your Bluetooth TCU will not fit back there.)



For TCU video bracket installation: route 54-pin connector up through cut-out in bracket floor (see image above left). For CD bracket installation: route 54-pin connector underneath CD area.

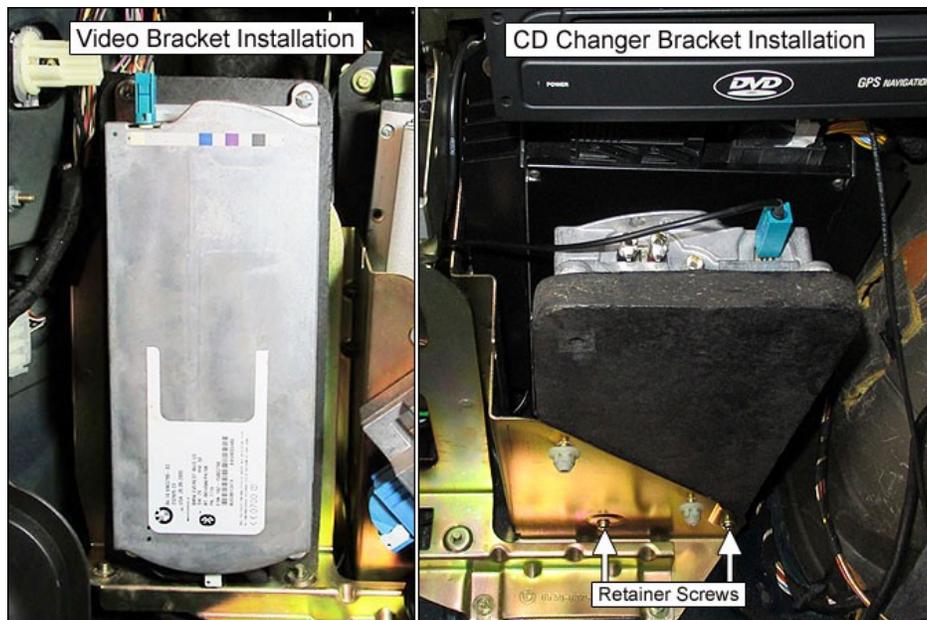
10) Mount Bluetooth TCU and connect 54-pin adaptor. One mounting option is to tie-wrap it to the video bracket. A better solution is a plywood mounting board which attaches to either the video bracket or CD changer bracket. See image above right and sidebar below.

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.

For video bracket: with 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.) For CD bracket: remove bracket, mark and drill two pilot holes in board at lower attachment points, to receive two screws (see image below right).

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.



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

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

