CANTCU – E6/7/8/9x integration

- **CAN Speed** is 500kb/s
- Possibility to use Default Datastream

CANTCU Placement

There are several options to mount CANTCU in the car. The two most popular options are the **glovebox** and **ECUbox**. Our PnP wiring harness will put CANTCU in the glovebox.

The **glovebox** is a good place for CANTCU because of easy accessibility.

The **ECUbox** has the benefit of all the power- and bus-connections being available directly inside it. When installing CANTCU into the **ECUbox**, it's recommended to route the USB-cable to inside the car for easy configuration accessibility.
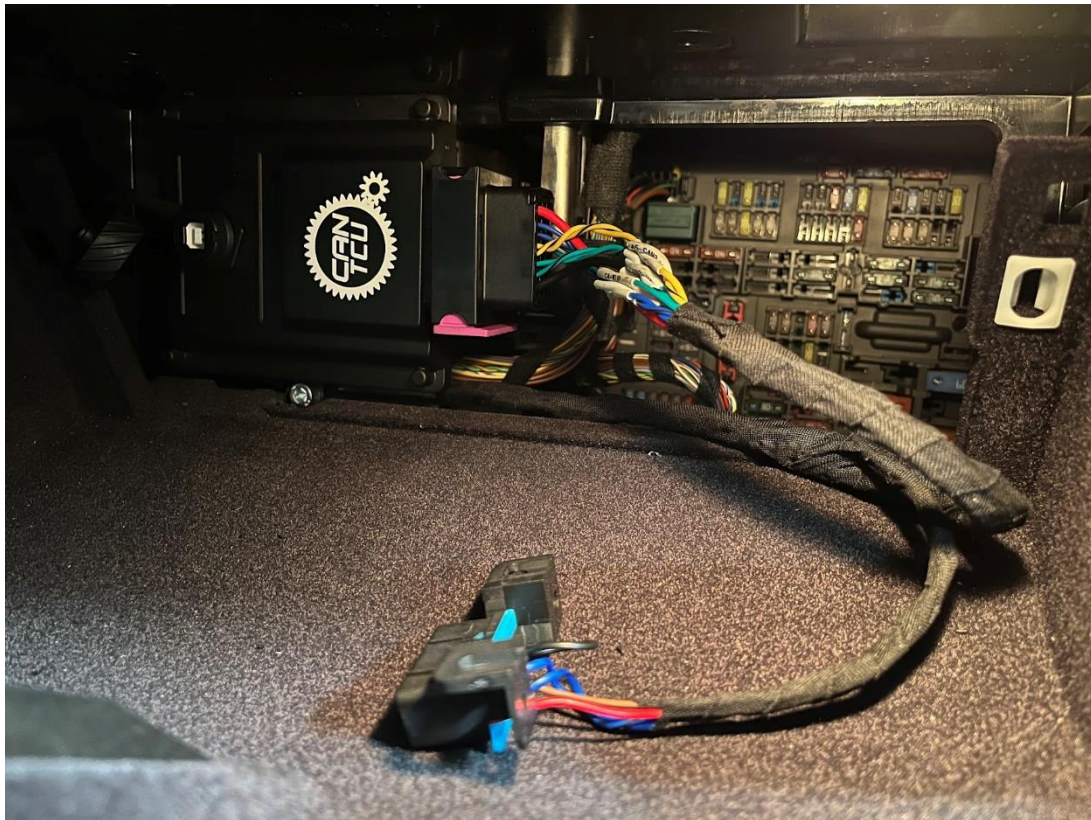

CANTCU installed in the glovebox (E9x) using the PnP wiring harness

Power Supply

A 15A combined fused power supply for transmission (8HP or DCT), shifter and CANTCU is recommended. This fused power supply is present in the **X6021/X6031** connectors inside the ECUbox of all 6HP cars, from where it is routed to the OEM 6HP connector at the transmission. When making your own wiring harness, you can use this power feed directly by repinning the power pins to the 8HP connector instead, or alternatively take advantage of the **X6021/X6031** connectors.

On manual transmission cars which don't have 6HP wiring harness, and therefore also lack the **X6021/X6031** connectors, the power feed for transmission/shifter/CANTCU can be done by using power feed from the jump start pole terminal. Using a 15A fuse, and a relay triggered by ECU power feed, it's possible to have the transmission powering logic follow OEM ECU/transmission power logic fully. This allows for a proper power-down sequence before cutting the power, which is critical for correct and continuous saving of transmission adaptations.
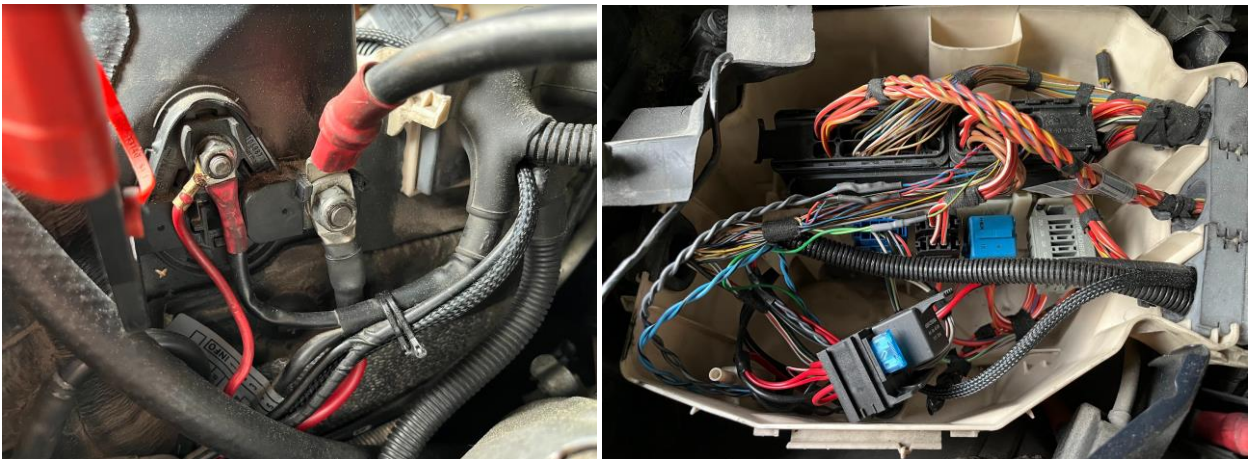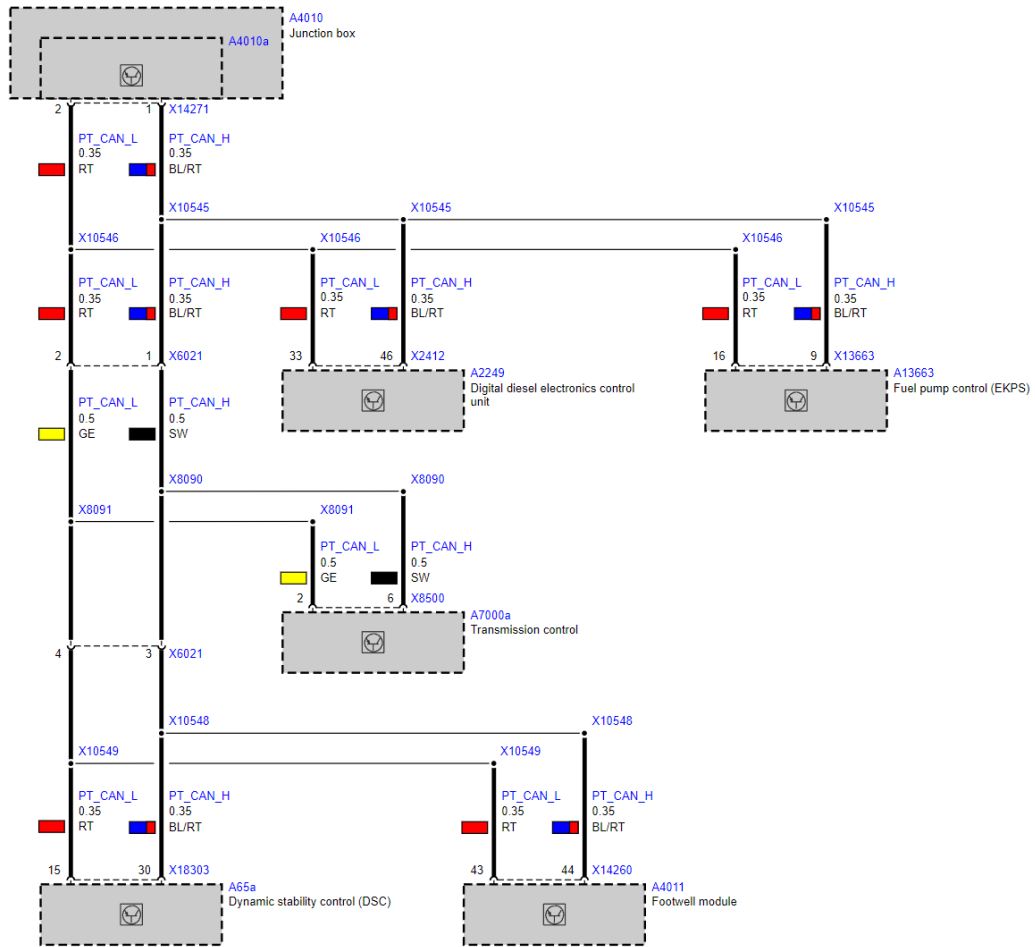

E9x manual transmission car with added power feed for 8HP using a 15A fuse & relay controlled by OEM ECU power feed

PTCAN-connection

CANTCU CAN3 needs to be connected to the car PTCAN. There are several places to tap into the car PTCAN. It is always available in the ECUbox, and in 6HP cars, it is routed to the **X6021/X6031** connectors and looped to the OEM 6HP connector as well. On manual cars, the easiest location to find PTCAN wires, is in the ECUbox at the ECU.

The PTCAN wires can be identified easily because they are arranged as a twisted pair. Wire colors are Red (PTCAN Low) and Blue/Red (PTCAN High). On the 6HP OEM harness (**X6021/X6031** connectors) the colors are Yellow (PTCAN Low) and Black (PTCAN High).

PTCAN wiring schematic (E9x)

CAN3 wiring spliced into ECU PTCAN (E9x manual transmission car)

Wiring

The wiring usually involves both the inside of the car (Shifter, CANTCU, paddles etc) and the outside (Transmission tunnel, ECUbox etc). The locations for components, and wire routes used, are fully up to the user/installer to decide.

In our experience, the easiest non-intrusive way to route wires between inside and outside the car, is to use the stock shifter cable passage, as the shifter cable will be removed anyways when installing a newer 8HP/DCT transmission.

Utilizing the OEM shifter cable passage through the bulkhead

Shifter

CANTCU supports a lot of different shifters, and the list is continuously expanding. Depending on which shifter is going to be used, a shifter adapter might be needed.

- On E6x/7x LCI 6HP cars using the electric "joystick"-shifter, no wiring or modification is needed. The shifter will work directly as it's already wired to PTCAN. Just select the correct shifter in CANTCU Configurator and you are all set.
- On all other cars, the shifter needs to be wired and connected to either CAN1&2 **or** CAN3. The connection depends fully on used shifter & transmission combination, valid combinations can be seen at the Supported Shifters page in the wiki.

For the most OEM look and bolt-on installation on E6/7x cars, a LCI model shifter can be used. OEM look and bolt-on installation on E8/9x cars is achieved by using a suitable E8/9x DCT model shifter.

For E8/9x cars, other shifters like F-series 8HP/DCT shifters, G-series shifters and A90 Supra 8HP shifter are commonly used and can easily be fitted to the car using one of our shifter adapters available in the webshop.

A90 Supra shifter adapter and shifter installed on E9x

Shift Paddles

All different versions of shift paddles are supported. Depending on shift paddle type, the connection to CANTCU is either done by using two **Digital Inputs** or a single **Analog Input** and **+5Vout**.

Pre-LCI "dual function" shift paddles are usually of grounding-type while LCI "single function" paddles are voltage-level dependent.


Pre-LCI Dual Function paddles


LCI Single Function paddles

The OEM paddle wires are normally routed through the JBBF module on the E8/9x cars. On E6/7x cars, the wires go directly from the steering wheel to the **X6031** connector in the ECUbox. In case of retrofitted paddles, they often are tapped into the stock shifter harness (steptronic switch).

NOTE! Measure the OEM paddle wiring using a multimeter to confirm paddle type before connecting/wiring them to CANTCU. Connecting digital/grounding type paddles on the +5Vout line will cause a short circuit and possible damage to components.

| Model	Model Year	Paddle Type	JBBF (X14271) Pins	X6031 Pins
E6x	2005/09 - 2007/02	Dual	-	3 & 4
E6x	2007/03 - 2007/08	Dual	-	10 & 11
E6x	2007/09+	Dual	-	10 & 11
E8x/9x	pre 2006/02	Dual	-	3 & 4
E8x/9x	2006/03 - 2007/02	Dual	22 & 38	3 & 4
E8x/9x	2007/03 - 2007/08	Dual	22 & 38	7 & 8
E8x/9x	2007/09 - 2008/02	Dual	22 & 38	7 & 8
E8x/9x	2008/03+	Single	22 & 38	-
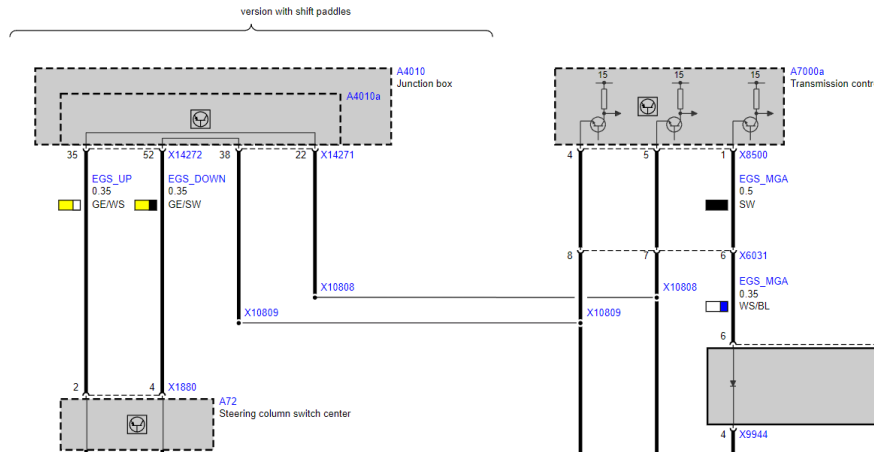
Example paddle wiring diagram of E8x/9x
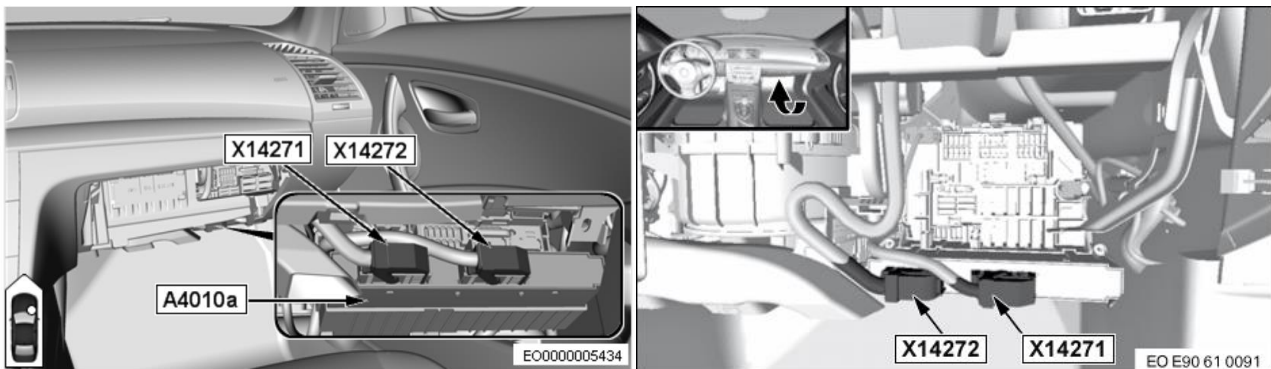
JBBF Connector for paddle connection on different types of JBBF modules (JBBF70 & JBBF87)

On E8x/9x, we recommend wiring the paddles into the JBBF output connector **X14271** if possible. Pins required are of MQS/Quadlock type, identical to the ones used on BMW shifter connectors.
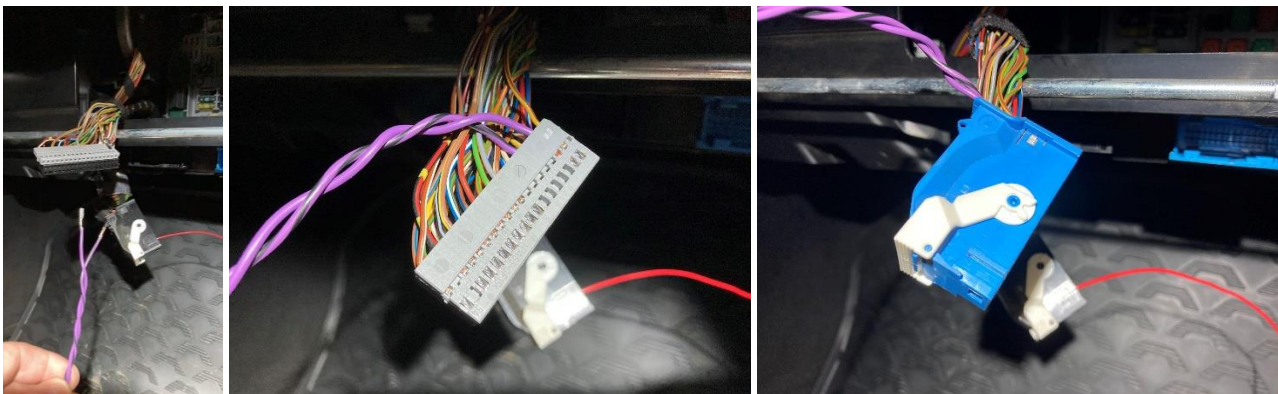
Adding pins on JBBF connector X14271 for Dual Function Pre-LCI paddles (to CANTCU Digital Inputs)

NOTE! Paddle wire colors and pin placements vary through model years. Always check and measure before making any connections.

Programming

If the car was <u>Manual</u> or <u>DCT transmission</u> before the CANTCU installation/transmission swap, programming of the ECU is needed to an <u>Automatic Transmission</u> calibration. This is a requirement because of the type of torque interventions used by CANTCU to command cuts and blips on down/upshifts.
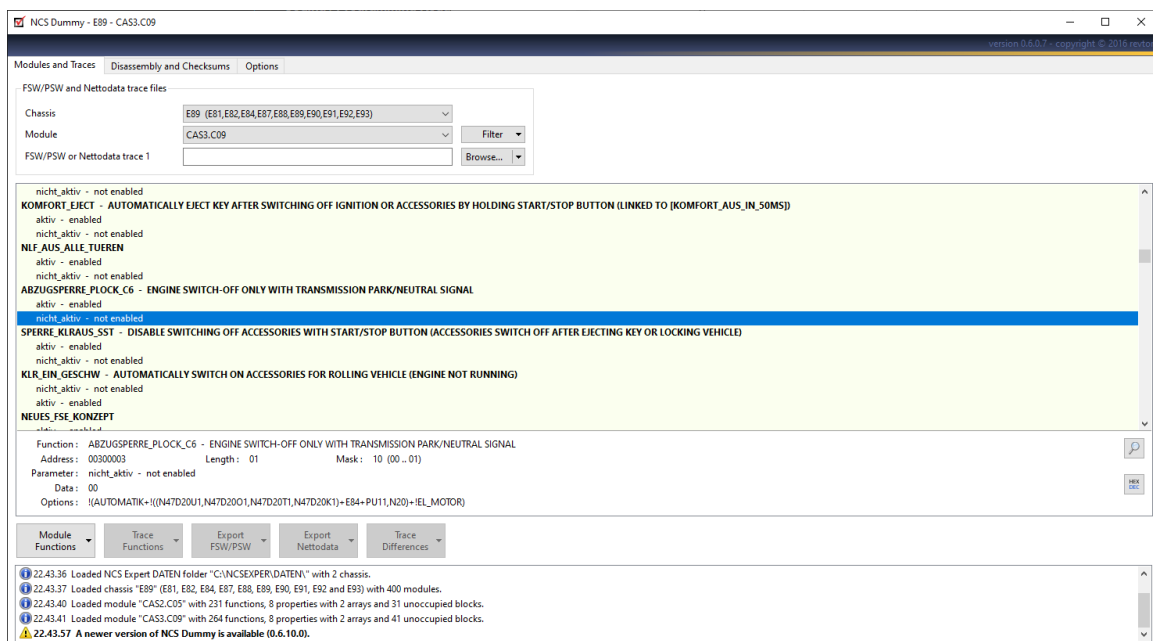
Coding

Coding is a relevant step of the installation as the car needs to be aware of type of transmission used to work properly in all situations. The coding can be done using BMW Standard Tools (NCSExpert) or by any other suitable aftermarket tools that are able to do VO/FA coding and module-specific coding.

NOTE! Coding requires BMW-specific knowledge and software/cables that are outside the scope of CANTCU delivery. If you are unfamiliar with BMW coding, we recommend finding someone experienced do the coding for you.

The coding can be divided into two steps:

1. Car needs to be fully coded to an automatic (S205A). If the car was equipped with <u>Automatic Transmission</u> or <u>SAT (Sport Automatic Transmission S2TB)</u> from the factory, this step is unnecessary. If the car was a <u>Manual or DCT Transmission</u> model before the CANTCU installation/swap, this step is mandatory.
2. Coding custom parameters in CAS module:
    a. **AUSWERTUNG_P_HW** → *nicht_aktiv*
    b. **ABZUGSPERRE_PLOCK_C6** → *nicht_aktiv*

Coding custom parameters in CAS module using NCSDummy

PLOCK fault code

After installation, most cars will throw a CAS fault code related to PLOCK. This fault is rectified by <u>grounding pin 11 on the CAS module</u>. The CAS module is located on the LHD side under the dashboard.
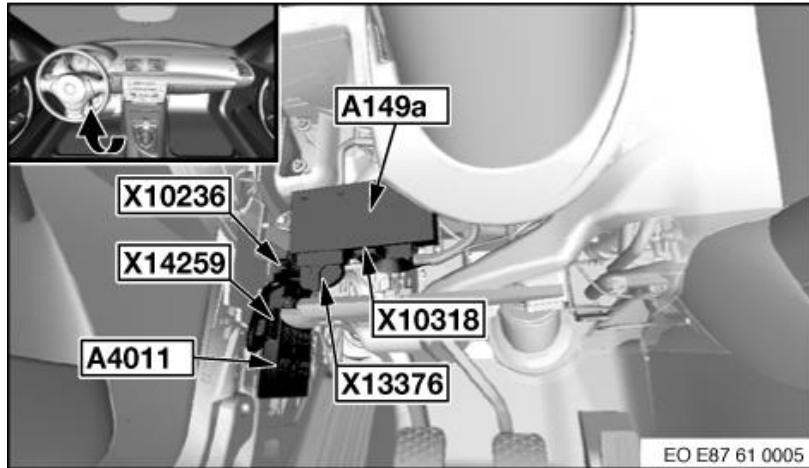
CAS module (A149a) and connector (X13376) location

On manual cars, the CAS pin 11 is unoccupied. Wiring will require a MQS/Quadlock pin and some length of wire to be wired to a grounding point nearby.

CAS Pin 11 grounding on an E9x manual transmission car

On automatic cars with a mechanical shifter, the CAS pin 11 is wired to the shifter harness to a **black 4-pin connector** (X14275). This connector has the <u>PLOCK signal connected on pin 3</u>, and a <u>ground connection is available on pin 4</u>. By making a simple loop wire, the PLOCK signal will be grounded and the fault will be rectified.

X14275 4-pin connector with PLOCK and ground signals

PLOCK fault rectified using a terminated loop 4-pin connector (included in the PnP harness)