



## Ford Coyote Ti-VCT Controller PN 554-145

Please call Holley tech service (270-781-9741) for software (which includes a base cal for a stock 2011-2014 Coyote engine) and firmware to use with the Holley Ti-VCT controller. These will be available on the Holley website in the future.

**Use With:** 558-124 or 558-125 Ti-VCT harness and 558-110 or 558-122 main engine harness.

**Operation:** The Ford Coyote Ti-VCT controller is currently designed to work with a gen one (2011-2014) coyote engine. It has a pre-programmed cam position table internal to the controller that have been developed by Holley for best drivability and power under most circumstances and is not currently user adjustable.

**Inputs/Outputs:** The Ti-VCT controller sends and receives information over the CAN bus with the Holley EFI and inputs 47-70 are setup in the base cal to record the data. If you are not using the supplied base cal you will at minimum be required to add the CAN\_VVT\_VEtrim\_1 and CAN\_VVT\_VEtrim\_2 for proper operation. Their definitions along with the other Inputs are covered in more detail under the diagnostics section later in these instructions.

**Advanced Table Features:** The base calibration included with the Holley EFI software has several advanced tables (in the Advanced ICF) enabled in the calibration. Below is a listing of them and their purpose.

- **Start\_Idle\_Offset:** 2D Table – This is used to allow a time versus coolant temp (CTS) idle speed adjustment. This table is used in lieu of the normal coolant rpm offset table. This raises the RPM to approximately the same level that those tables would, but also allows for a high RPM/quick drop off when warm. This allows the cam activators to fill with oil quickly and remove any chain slop immediately after start up. When the engine is cold, it actually allows the RPM to come down to a much more manageable level quicker than the normal coolant decay table. This table can be adjusted if necessary, but the user should probably just play with the base idle versus coolant temp to get his warm idle where he wants it. The normal table will be a flat number instead of having the ramp that you may be used to.
- **Fuel\_Press\_Comp:** 2D Table – Fuel pressure versus MAP. This table should not be adjusted by the end user unless he knows exactly what he is doing. It will most likely be close enough to work with any injector, but is set up for the stock Coyote injectors. It is setup to turn off if the fuel pressure falls too low or goes too high. This should protect against a bad sensor going out of range high or low. It should also automatically turn off the table if they do not have a pressure sensor plugged in (should fall below the 5psi set point).

**NOTE: This table should not be used on boosted engine without modification.**

- **Cyl\_VE\_Trims:** 2D Per Gear Tables – These tables are a polynomial model based fuel correction for cam movement. What that means is that the Ti-VCT controller calculates a transient fuel value when the cams move and sends that value to the Holley EFI to be used as a fuel correction. These tables should not be adjusted for any reason.

**Diagnostics:** There are two different areas of diagnostics with the Ti-VCT controller. The first are CAN inputs from the controller that are read by the Holley EFI. These are pre-setup in the base cal. The second area of diagnostics is the 4 LEDs on the controller itself. Both are explained below

- **INPUTS:** For the inputs to work you must make sure the calibration you are using has CAN Bus 1 type set to “Holley Standard” under the basic I/O in system parameters. Failure to do so will result in the Ti-VCT controller not working.
- **Input 47 and 48:** CAN\_VVT\_Exh1&2\_DC – These are the commanded duty cycle of the cam phaser solenoids for each of the two exhaust cams.
- **Input 49-56:** CAN\_VVT\_Status1-8: - These are diagnostic outputs from the Ti-VCT controller. See table for a brief description of what they report.

VARIABLE	DESCRIPTION
VVT_Status_1	Displays active errors
VVT_Status_2	Displays all stored errors from current key cycle
VVT_Status_3	Intake cam Error Counter
VVT_Status_4	Exhaust cam Error Counter
VVT_Status_5	Error index – intake cam 1 (commanded vs actual)
VVT_Status_6	Error index – intake cam 2 (commanded vs actual)
VVT_Status_7	Error index – exhaust cam 1 (commanded vs actual)
VVT_Status_8	Error index – exhaust cam 2 (commanded vs actual)

- **Input 57 and 58:** CAN\_VVT\_VETrim1&2 – These are used as inputs for the advanced table features explained earlier in the instructions
  - **Input 59 and 60:** CAN\_VVT\_Var1&2 – These are reserved for future use.
  - **Input 61-64:** CAN\_Int/exh\_SP – These are the commanded cam positions for the individual cams.
  - **Input 65-68:** CAN\_Int/exh\_FB – These are the actual cam positions for each cam.
  - **Input 69 and 70:** CAN\_VVT\_Int1&2\_DC - These are the commanded duty cycle of the cam phaser solenoids for each of the two intake cams.
- **LEDS**

LED	Status
LED 1	OFF = NO ERROR RED = CAM POSITION ERROR
LED 2	SOLID GREEN = GOOD CRANK/CAM SYNC BLINKING GREEN = N CAM/CRANK SYNC OR ERROR WITH SYNC
LED 3	OFF = NO ERROR RED = NO CAN COMMUNICATION FROM HOLLEY EFI
LED 4	NOT USED

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