# CANTCU – AEM Infinity 5 Series (506/508) Integration

- AEMNET CAN: 29 bit, 500 kb/s, 8 data bytes per message
- AEM Infinity DBW must be configured and functional prior to setting up CANTCU Integration

Wiring between CANTCU and AEM Infinity



- AEM CANL A (C1-34) to CANTCU C3L (A7)
- AEM CANH A (C1-35) to CANTCU C3H (A6)
- CANTCU DOUTs (B1/B8/C1/C8) to AEM Digital 5/7



### Software Configuration

File Logging Options

The AEMNet allows only one way communication. Data streams such as Engine RPM/MAP/PPS/VE/coolant Temp/Oil temp are broadcasted from the AEM Infinity to CANTCU CAN3. Triggers for **Blip** and **Shiftcut** must use <u>Digital Outputs from CANTCU</u> to <u>AEM Infinity Digital Inputs</u>.

In CANTCU Configurator, enable **Blip** and **Cut** trigger functions on chosen <u>Digital</u> <u>Outputs</u>. Confirm settings by clicking the **Update**-button.

-	Configuration		-Outputs	
Connected	[General	I inputs	Phillip Internation	
5N: 08C7	Transmission Photocol BMW BHP F-Series 1st Gen	Anolog Input 1 Rotary Switch C Setup	Digital Output I	Reverse Gear Active 🗸
BL: 1.2	AEM Infinity Setup	Analog Input 2 Disobled V		10026 (2016) (21)
5W: 1.0.155	LIN/Serial Protocol Disabled	Analog Input 4 Disabled	Digital Output 2	Disabled 🗸 🗸
•	Instrument Cluster Disabled	Digital Input 1 Paddle Up ~ Active LOW ~	and the second second second	
Configuration	Shilter OEM (CANI+2)	Digital Input 2 Paddle Down V Active LOW V	Digital Output 3	Blip Active 🗸
+11	Default Drive Mode Sport+ 🗸 🗐 Use Shifter	Digital Input 3 Disabled		Contraction in the local division of the
IHT	WheelSze (mm) 2040	Digital Input 4 Brake Switch V Active LOW V	Digital Output 4	Disabled
runing	Car Dif Ratio 3.26	Outputs		Enabled (always on)
	Speed Corection 1000 \$	Digital Output 1 Reverse Gear Active V	2 <u>-</u>	WILP Output (HW <1.5)
15	Dyno Model Display	Diptel Output 3 Bis Active		
Realtime		Digital Output 4 Cut Active		Reverse Gear Active
Δ			DOUT3 0	Variable Controlled
Diagnostics	Supply Voltage 12.96 V Wheel Speed VI 0 km/h	DOIIT3 0 PT DEBUG 5 192 Shift Time	DOUTA 0	Cut Active
Chagnoshos	Ignition On 1 Wheel Speed VR 0 km/h Engine RPM 0 RPM Poddle Up 0	DOUT4 0 Shifter Status 0 TCU Drive Mode CAN1 Load 15 % TCU Gear Neutral TCU DL Mode	CANILLord 1	E DE A A A A
	TPS Value 0 % Paddle Down 0 Brake Switch 0 AINI 2.34 V	CAN2 Load 21 % Shift In Progress 0 TCU Oil Temp CAN3 Load 4 % TCU Intervention - DS Calc RPM	CANTLODA	Blip Active
	Engine Torque 0 Nm DINI 0 Wheel Speed 0 km/h DIN2 0	RT_DEBUG_1 94 TCU RPM Target 0 RPM TCU Input RPM RT_DEBUG_2 0 Target Torque 1024 Nm TCU Output RPM	CAN2 Load 2	E46 Shifter Adapter D1
CANOTEL	Wheel Speed HL 0 km/h DIN4 0 Wheel Speed HR 0 km/h DOUT1 0	RT_DEBUG_3 0 Shiftout 0 % TCU Gear Ratio RT_DEBUG_4 0 Throttle Blip 0 % TC Status	CAN3 Load 4	DCT Park Lock
Transmission Controller	STREET, STREET		DT DEBUC 1 0	
The local data				
. He Logging Options	Conformation			
<b>.</b>	Contiguration	n nouts	- Debug	
Connected	Transmission Protocol BMW 8HP F-Series 1st Gen 💛	Analog Input 1 Rotary Switch - Setup	Debug Value 1	
HW: 1.5	Car/ECU Protocol AEM Infinity V Setup	Analog Input 2 Disabled 🗸	0	
SW: 1.0.133		Analog Input 3 Disabled v	Debug Value 2	
<b>A</b>	LIN/Serial Protocol Disabled	Analog Input 4 Disabled ~	0	
Configuration	Instrument Cluster Disabled v	Digital Input 1 Paddie Up · Active LOW ·	Debug Value 3	
Conligoration	Default Dive Mode South Ule Shifter	Digital Input 3 Disabled	Debug Value 4	
t4t	WheelSize (mm) 2040	Digital Input 4 Brake Switch  V Active LOW V	0	
Tuning	Car Diff Ratio 3.26	= Outputs	Debug Value S	
	Speed Correction 100.0	Digital Output ) Reverse Gear Active	0	
ıl.ı	Simulate Speed Enabled V	Digital Output 2 Disabled V		
Realtime	Dyno Mode Disabled ~	Digital Output 3 Blip Active v		
		Digital Output 4 Cut Active ~	Update	
A	Realtime Values 25Hz	Enabled (always on)	altime Record	
Diagnostics	Supply Voltage 12.96 V Wheel Speed VL 0 km/h	DOUT3 0 Reverse Gear Active us 0 Tou Drive Mode	16 ms C ECO Pro Corre	
	Engine RPM 0 RPM Poddle Up 0 TPS Value 0 % Paddle Down 0	CANT Load 15 Variable Controlled or Neutral TCU DL Mode CAN2 Load 21 Cut Active at 0 TCU DL Mode	0 34 *C	
	Brake Switch 0 AN1 2.35 V Engine Torque 0 Nm DIN1 0	CAN3 Load 4 (Bip Active on - DS Calc RPM RT DEBUG 1 95546 Shifter Adapter D1 et 0 RPM TCU load RPM	O RPM O RPM	
	Wheel Speed         0 km/h         DIN2         0           Wheel Speed HL         0 km/h         DIN4         0	RT_DEBUG_2 0 DCT Park Lock ve 1024 Nm TCU Output RPM RT_DEBUG_3 0 ShiftCut 0 % TCU Gear Ratio	0 RPM 0	
	Minard Freedow R A Los R	PT DEBUG 4 A	Contra	

In the diagnostics tab of the AEM configuration wizard, turn on CAN A Terminating resistor.

Diagnostics			
The following list is for setup and debug purposes only. Contact AEM for info	rmation		
Battery Filter	50	* *	<u>%</u>
CAN A Terminating Resistor			
CAN B Terminating Resistor			
Crank Maximum RPM	400	•	<u>rpm</u>
Crank Minimum RPM	25	<b>*</b>	<u>rpm</u>



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## Shift Cut / Shift Switch Configuration

Shift switch trigger must be defined in the Input Function Assignment Menu by double clicking Shift Switch Setup under the Switch Tab.

Infinity-506 v96.5						)
— Basic Setup — 🔺	Input Function Assignments					
Engine	Use the selections below to configure hard	ware inputs.				
Tuning Preferences						
Lam/Crank						
njector Setup	Analog 0-5V & Modes Switches Speed	& Frequency Temps Axis				
Dasic Sensors	Function	Channel	Pin	Raw	Scaled	
	3-Step Switch Setup	Disabled		0.00	0.00	
et I nrottie Range	AC Request Switch Setup	Disabled		0.00	0.00	
Inition Sync	Clutch Switch Sotup	Disabled		0.00	0.00	
Advanced Setup	Shift Switch Setup	Disabled		0.00	0.00	
ccel and Decel Fuel	Brake Switch Setup	Disabled		0.00	0.00	
dvanced Trims	MIL Manual Trigger Switch Setup	Disabled		0.00	0.00	
oost Control	Nitrous Arm Switch Setup	Disabled		0.00	0.00	
BW Throttle Blip	RollingLaunchSwitch Setup	Disabled		0.00	0.00	
ngine Protection	StagedFuel Switch Setup	ModeSwitch		0.00	0.00	
lle						
nition Coil Dwell						
nput Function Assign						
nock Setup						
ambda Control						
aunch Antilag						
aunch Timer	Pin Out					
ain Rev Limiter						
litrous N2O						
av Limit 2 Stan						
ev Limit 2 Step						
hift Cut						
1 for Tuning Guide					Cl	ose
2.96 Build 03/14/2019						

#### Select the Digital Input designated for the Shift Cut Switch.





Configure the Shift Switch Table Data as shown below. Right click to delete extra rows.

Shift Switch Setup	Live Data	- C ×
Warning: Analog input pins can only accept a switched ground signal. Do not connect switched 12V	Raw	Scaled
signals to analog input pins.	0.00	0.00
Shift Switch Setup Digital7	Digital7 Shift Sv Table I 0.00 0 1.00 1 3.01 Delete	vitch Jata ] Selected Row(s) Shift+Del

The Shift Switch Table Data should appear as follow:





In the Shift Cut tab of the wizard, configure the settings as follows for a starting point.

Infinity-506 v96.5				×
Basic Setup 🔺	Shift Cut			
Engine	The FCU and deserves and		en shift an anti a shi shi shi sa bala fullaharada. Davaa	
Tuning Preferences	reduction can be achieved by	a combination of ignition retard, fue	el cut, and spark cut in response to a switch, a clutch pressure	е
Cam/Crank	sensor, or a switch/strain gau	uge mounted to the shift lever. Use t	he 'Input Function Assignment' page of the wizard to configure	э
Injector Setup	the TD table ShintSwitch.			
Basic Sensors				
DBW Tuning	Shift Cut Activation			
Set Throttle Range				
Ignition Sync	Shift Cut Minimum RPM	1500	rpm	
— Advanced Setup — 🔺	Shift Cut Minimum Throttle	5	<b>↓</b> <u>%</u>	
Accel and Decel Fuel	Shift Cut Re-Arm Delay Time	200	 I▲I ms	
Advanced Trims	Shine Gat No Ann Doldy Think	200		
Boost Control				
DBW Throttle Blip	Shift Cut Method	Ign Retard Only	~	
Engine Protection				
ldle	Shift cut time can be adjusted	for each gear using the 1D table 'S	ShiftCutTime'. After the cut time has been completed, ignition	
Ignition Coil Dwell	L D . LA	out over a certain amount of time to	decrease driver ain shock when power is reapplied.	
Input Function Assignments	Ign Retard Amount	30	degrees BIDC	
Knock Setup	Ign Retard Ramp-Out Time	20	单 <u>ms</u>	
Lambda Control				
Launch Antilag				
Launch Timer				
Main Rev Limiter				
Nitrous N2O				
Rev Limit 2 Step				
Rev Limit 3 Sten				
Shift Cut				
Throttle High Timer				

Note: The following Shift Cut Method can be implemented, however using "**Ign Retard Only**" will offer the fastest and smoothest shifts. Users may tune these settings accordingly to their desired comfort level.

Ign Retard Only	$\sim$
Ign Retard Only	
Ign Retard + Fuel Cut	-
Ign Retard + Spark Cut	Į.
Ign Retard + Fuel and Spark Cut	

In the **ShiftCut** tuning tab, configure the **ShiftCutTime[ms]** table as follows for a starting point:

ShiftCutTime [ms]								
40	40	40	40	40	40	40	40	
1	2	3	4	5	6	7	8	
Gear								



Test drive and log to verify Shift Cut is occurring at over 1500 RPM. Adjust the **ShiftCutTime[ms]** table accordingly.



AEM Log showing Shift Cut activating on upshifts

Note: If AEM Shift Cut is not triggering during upshifts, test and verify your input assignment by setting the corresponding CANTCU Digital Output to "**Enabled** (always on)".



If ShiftSwitch in AEM shows a value of 1.0, it is assigned correctly. If not, verify your wiring and Input Function Assignment settings.



## DBW Throttle Blip configuration

In order to use the DBW Throttle blip, DBW Blip Arm Switch Setup and Clutch must be assigned to the same <u>Digital Input</u>.

In the wizard, open the **Clutch Switch Setup** in the Input Function Assignment / Switch Tab.

Infinity-506 v96.5						×
Infinity-506 v96.5						>
Basic Setup     A     Engine     Tuning Preferences     Cam/Crank     Injector Setup	Input Function Assignments Use the selections below to configure hardw Analog 0-5V & Modes Switches Speed &	rare inputs. Frequency Temps Axis				
Basic Sensors	Function	Channel	Pin	Raw	Scaled	
DBW luning	3-Step Switch Setup	Disabled		0.00	0.00	
Set I nrottle Range	AC Request Switch Setup	Disabled		0.00	0.00	
Ignition Sync	Clutch Switch Setup	Digital5	C1-30	0.00	0.00	
— Advanced Setup —	Shint Switch Setup	Disabled		0.00	0.00	
Accel and Decel Fuel	Brake Switch Setup	Disabled		0.00	0.00	
Advanced Trims	MIL Manual Trigger Switch Setup	Disabled		0.00	0.00	
Boost Control	Nitrous Arm Switch Setup	Disabled		0.00	0.00	
DBW Throttle Blip	RollingLaunchSwitch Setup	Disabled		0.00	0.00	
Engine Protection	StagedFuel Switch Setup	ModeSwitch		0.00	0.00	
ldle						
Ignition Coil Dwell						
Input Function Assignments						
Knock Setup						
Lambda Control						
Launch Antilag	Pin Out					

Assign the Clutch Switch to the same Digital Input used for DBW Blip. Configure the Clutch Switch Table Data as shown below.





In the DBW Throttle Blip tab of the wizard, configure the DBW Blip Arm Switch Setup as the same Clutch Switch input.



Note: Activation settings provided here are just a starting point example. These parameters should be tuned to your preference.

The DBW Blip Table is hidden by default. In the DBW Layout Tab, right click and add a 2D Table. Select DBW Blip as the channel and a new 2D Table will appear.

	Select a channel	×								
1D Table 2D Graph 2D Table 3D Graph Bar Gauge Plot Scatter Plot	Search: Name 3StepTarget_Spark [RPM] AltControlTret [Vills] BoostTargetTable2 [ps] BoostTargetTable2 [ps] BoostTargetTable2 [ps] BoostTargetTable2 [ps] BoostTargetTable2 [ps]		DBW_Blip 6000 4000 3000 3000	20 13 9	25 17 12 8	30 20 15	35 24 18	40 28 22	45 32 25	50 35 28 20
Slider Text Text Grid	CollowelMap (ms) CrankPrimePulae (ul.) CrankVE_Table (%) DBW1_DutyMax DBW_HontellCurve1		1500	0	1	2	3	4	4	5
	DBW_ThrottleCurve2 FI_TmingX [degBTDC] Flex(?rankinnAdder fms]	OK Cancel		2	3	4	5 Gear_Prev	6	1	8



## General Notes on Blip tuning

- The **Gear\_Prev** should be assigned as 2-8. RPM should be assigned according to your engine's limits. The throttle blip values should be tuned to your vehicle's throttle rate.
- DBW Blip will only occur when all conditions are met. Blip will continue for as long as CANTCU Digital output trigger is active. Although the timer will continue to run for 1000ms, the throttle blip will stop as soon as CANTCU Digital Output is inactive.
- Multiple blips may occur if the TCU determines the RPM is too low to rev match and complete the shift. Adjust the throttle rate accordingly if you experience multiple blip triggers.
- Setting the throttle rate too high may overshoot the blip target and cause the vehicle to lunge forward.



