

A wide-angle photograph of a long, straight asphalt road with a yellow dashed center line and red-paved shoulders. The road leads towards a range of mountains, some with snow, under a clear blue sky. A car is visible in the distance on the road.

**HIGH PERFORMANCE
ENGINE TUNING SOLUTIONS**

www.splitsec.com

PHILOSOPHY

Split Second is dedicated to getting peak performance from high output engines. Many Split Second products work along with a stock ECU. These products make it possible to make a variety of performance enhancements while maintaining OEM levels of drivability. Split Second products interface to the stock ECU through various sensor inputs. This approach preserves and utilizes the OEM mapping while making real-time adjustment possible.

Split Second products are widely used to add turbos and superchargers to naturally-aspirated engines. Regardless of the type of modification, whether it be a mass air flow conversion, cold air intake, big bore throttle body, hot cams, headers or free flow exhaust, Split Second products can be used to get the most from your engine upgrade.

AIR FUEL RATIO CALIBRATORS



ARC1

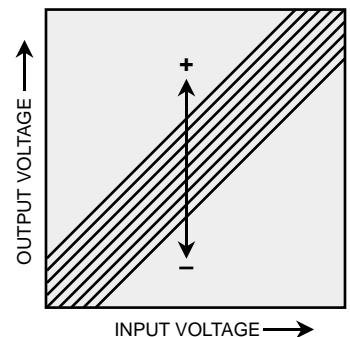
The ARC1 provides precise adjustment of air/fuel ratio. It is ideally suited to re-establish the proper fuel mixture in modified, fuel injected engines. Its two front panel controls are calibrated and detented to allow precise and repeatable settings. The ARC1 is well suited for recalibrating engines that have been supercharged. It may also be used to compensate for changes in driving conditions, elevation or fuel.

- ◆ Match larger injectors to a modified engine
- ◆ On-the-fly adjustment from the driver's seat
- ◆ Fine tune for maximum horsepower

The front panel controls of the ARC1 operate as follows:

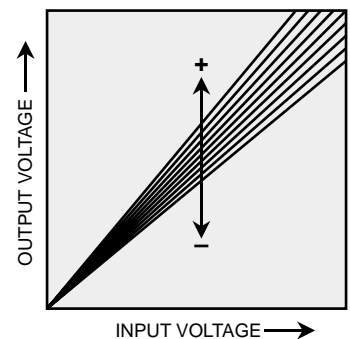
LOW

The LOW control adds a variable offset to the input signal. It therefore moves the output up or down (rich or lean) by a fixed amount over the entire operating range. It is called LOW because changes in offset cause a much greater percentage change at low engine loads. Idle and low speed cruise are low load conditions.



HIGH

The HIGH control changes the signal gain. It therefore changes the output level by a fixed percentage over the entire operating range. It is called HIGH because it is the primary way to adjust the air/fuel ratio at high loads. High loads occur during full throttle acceleration and climbing steep grades.



AIR FUEL RATIO CALIBRATORS



ARC2

The ARC2 Air/fuel Ratio Calibrator provides an effective way to calibrate fuel mixture over the entire load range of the engine. Its four front panel controls are calibrated and detented to allow precise and repeatable settings. Adjustment of the ARC2 can be made on-the-fly from the driver's seat to optimize engine performance for the current driving situation. It can also be used to re-calibrate modified engines including those converted to forced induction with a turbo or supercharger.

- ◆ **LOW, MID, HIGH and ACCEL controls**
- ◆ **Crisp throttle response**
- ◆ **Improve midrange performance**
- ◆ **Mass flow conversion**
- ◆ **Panel illumination and night dimming**

Available versions of the ARC2

ARC2-A

The ARC2-A is specifically designed to replace air flow meters with mass air flow sensors. Conversion to a MAF sensor removes a major restriction on the engine and boosts horsepower and torque. The ARC2-A performs the specific elevation compensation and signal filtering required for MAF conversion.

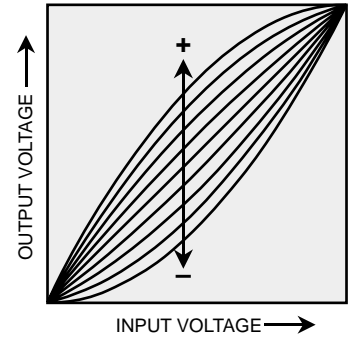
ARC2-GM

The ARC2-GM is specifically designed to calibrate the frequency output of late model GM MAF sensors.

The ARC2 picks up where the ARC1 leaves off. In addition to the LOW and HIGH controls of the ARC1, the ARC2 has controls for MID and ACCEL. They operate as follows:

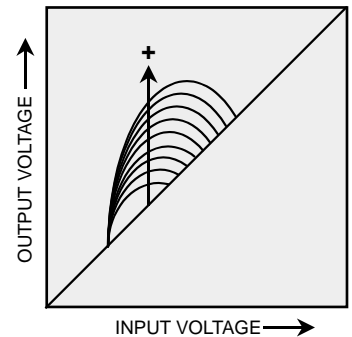
MID

The MID control alters the linearity of the input signal. Increasing the setting of the MID control bows the curve so that mid-load values are boosted more than low and high load values. The MID control is used to fine tune the air/fuel ratio at moderate acceleration levels.



ACCEL

Accel boost momentarily makes the air/fuel ratio richer. The degree of enrichment is related to the rate of change of the TPS input and the amount of boost selected by the ACCEL control. Accel boost is used to optimize throttle response.



ARC2-K

The ARC2-K is specifically designed to replace Karman Vortex type sensors with MAF sensors. It does all the signal conditioning necessary to make the MAF sensor signal output look like a Karman Vortex signal.

ARC2-NE

The ARC2-NE is used when the same type of voltage-based air flow meter is retained, but calibration of the flow signal is required. It can be used to calibrate for a larger MAF sensor or a wide variety of other engine changes.

ARC2.1

The ARC2.1 is designed to be mounted in a hidden location and features a single fuel mixture control that can be conveniently located for adjustment from the driver's seat.

AIR FUEL RATIO METER



ARM1

The ARM1 is a miniature air/fuel ratio meter that features an ultra-bright, easy to read, five color display. It may be used with the stock oxygen sensor or a dedicated sensor such as the EGO1. High precision circuitry is used to provide accurate readings and assure that the ARM1 does not interfere with the operation of the oxygen sensor. The ARM1 has automatic night dimming to reduce the display brightness at night. Available for both OBDII and non-OBDII applications.

- ◆ **Five color display**
- ◆ **Night dimming**
- ◆ **Miniature size**
- ◆ **High accuracy**
- ◆ **Signal filtering**

MAF KITS



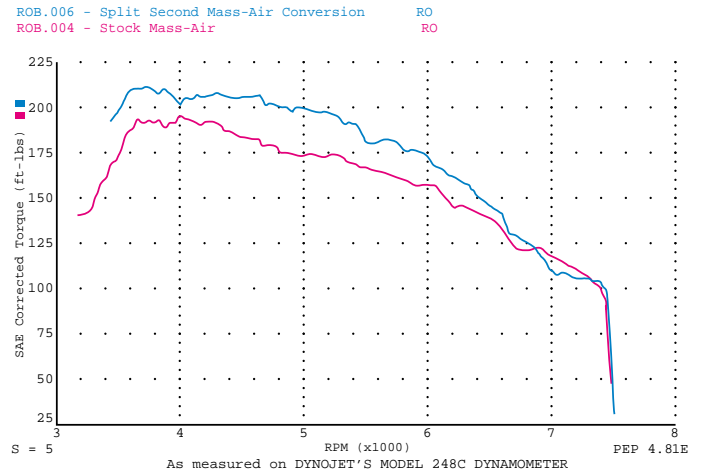
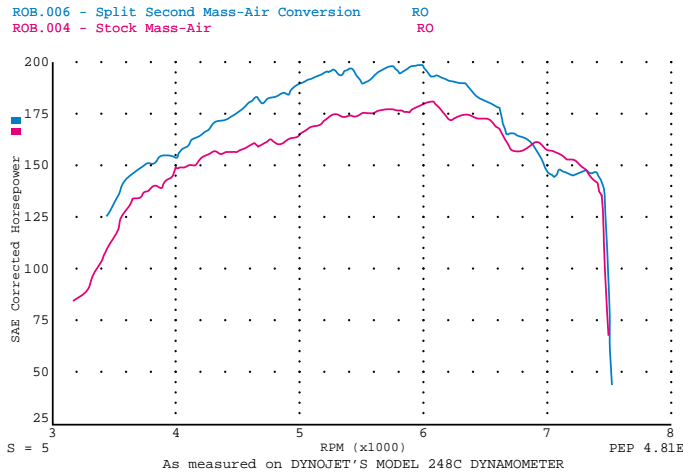
Complete mass air flow conversion kits are available for several models. The kits produce a significant horsepower upgrade for air flow meter or Karman Vortex based vehicles. Air flow meters are highly restrictive and are frequently the cause of a poor running car. The MAF kits not only improve horsepower, but also provide

a means to fine tune performance while preserving drivability. Each kit includes the ARC2, ARM1, mass air flow sensor, wiring harness and complete instructions. Available for various models from BMW, Porsche, Toyota, Mitsubishi, Chrysler and more.

MAF KITS

The following dyno curves show the improvement in horsepower and torque at the wheels for a first generation Eclipse. The only

difference between the two runs was the replacement of the stock Karman Vortex sensor with a MAF sensor calibrated with the ARC2.



ROB.006 71.1 °F 29.92-0.45 in.Hg. 50 ft. CF=0.98 RPM/MPH=71
Max POWER = 198.6

ROB.006 70.2 °F 29.92-0.45 in.Hg. 50 ft. CF=0.98 RPM/MPH=71
Max POWER = 180.8

ROB.006 71.1 °F 29.92-0.45 in.Hg. 50 ft. CF=0.98 RPM/MPH=71
Max TORQUE = 198.6

ROB.006 70.2 °F 29.92-0.45 in.Hg. 50 ft. CF=0.98 RPM/MPH=71
Max TORQUE = 180.8

RPM	Horsepower Referred to Flywheel			Torque Referred to Flywheel		
	Karman Vortex	MAF	Improvement	Karman Vortex	MAF	Improvement
3500	144	166	22	215	246	31
4000	186	191	5	244	253	9
4500	195	219	24	228	256	28
5000	205	236	31	216	249	33
5500	218	238	20	208	226	18
6000	224	246	22	196	216	20
6500	215	225	10	173	181	8



The ARM1 and ARC2 integrate well with the instrument panel. They provide immediate feedback and adjustability of the fuel mixture. The MAF sensor mounts in place of the air flow meter in the engine compartment.



TIMING CONTROL



TMC1

The TMC1 Timing Map Controller provides the ability to precisely control ignition timing retard as a function of both intake manifold pressure and RPM. It is primarily intended for engines that have been converted to forced induction through the addition of a turbo or supercharger. As boost pressure increases, ignition timing is retarded in a smooth progressive fashion. This makes it possible to boost manifold pressure without inducing harmful detonation. It is compatible with modern engines that have individual ignition coils and will not degrade performance of the ignition system. The number of teeth on the crank encoder wheel must be specified when ordering.

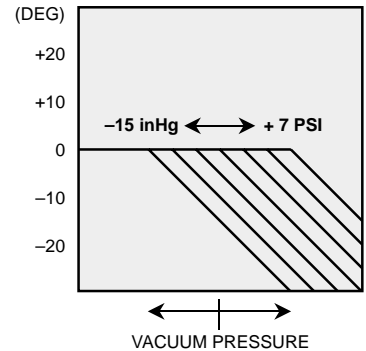
- ◆ 3D mapping of timing retard over RPM and intake pressure
- ◆ Adjustable from the driver's seat
- ◆ Compatible with modern OBDII engines with individual coils
- ◆ Panel illumination and night dimming

The TMC1 has four front panel controls. The function of the THRESHOLD and RETARD controls are as follows:

THRESHOLD

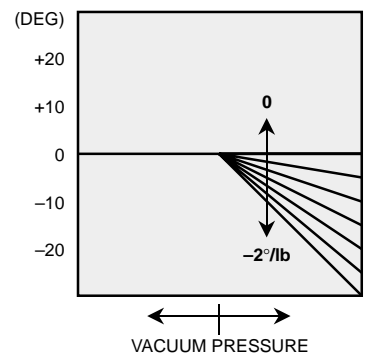
The THRESHOLD control adjusts the threshold level of intake manifold pressure at which the TMC1 will begin to retard timing. Before this threshold, no timing retard will occur.

The zero point of the THRESHOLD control is set at atmospheric pressure. The range of adjustment is from -15 inHg of vacuum to +7 PSI of manifold pressure.



RETARD

The RETARD control adjusts the sensitivity of timing retard to increase in manifold pressure. It may be set over the range of zero to -2°/lb of boost in 0.1°/lb increments. Timing retard begins at the manifold pressure set by the THRESHOLD control, while the amount of timing retard is set by the RETARD control.



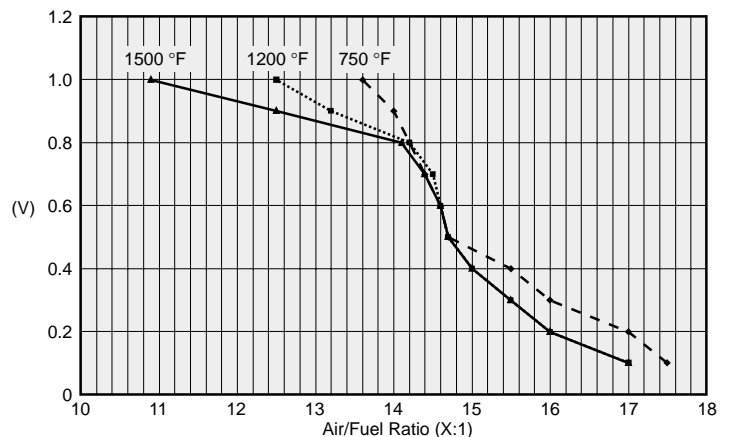
EGO SENSOR

EGO1

The EGO1 is a precision, heated 4-wire oxygen sensor. It is ideal for driving the ARM1 Air/fuel Ratio Meter or as a replacement for stock sensors. The output of the EGO1 remains calibrated over a wide temperature range. Characterization allows precise air/fuel ratio measurement when used with the ARM1.

- ◆ Heated sensor
- ◆ Predictable, stable output
- ◆ Characterized over wide temperature range

The EGO1 has the following output characteristics vs. air/fuel ratio and temperature:



SENSOR CONDITIONING PRODUCTS

ESC1

The ESC1 alters the signal from EGO sensors under boost conditions. It may be used in either single or dual EGO sensor applications. Under vacuum conditions it outputs a signal which is identical to the EGO signals that appear at the input. Under boost, it prevents lean fuel mixtures by disabling fuel trim by the ECU.

- ◆ **Dual channels for one or two EGO sensors**
- ◆ **Internal MAP sensor**
- ◆ **Compatible with OBDII systems**
- ◆ **Versions available for 1V and 5V range EGO sensors**

FC1

The FC1 is designed to condition the output of frequency-based air flow meters such as those on late model GM MAF sensors and Karman Vortex sensors. Under normal condition, the FC1 outputs a signal that is identical to the flow signal at its input. When the frequency reaches the internally set clamp level, the FC1 maintains a constant output frequency at the clamp level as the input frequency rises.

- ◆ **Avoids fault codes due to excess flow readings**
- ◆ **Compatible with OBDII systems**
- ◆ **Versions available for different clamp levels**
- ◆ **Clean, undistorted output signal**

FCC1

The FCC1 Frequency Calibrator and Clamp picks up where the FC1 leaves off. In addition to the frequency clamp feature of the FC1, it also calibrates the gain and offset of the frequency signal. The FCC1 thereby provides a way to set the air/fuel ratio over the entire RPM and load range. The calibration is set by the factory and is not adjustable by the user.

- ◆ **Ideal for supercharger kits on late model GM cars**
- ◆ **Avoids fault codes due to excess flow readings**
- ◆ **Factory set calibration and clamp levels**
- ◆ **Fast response time**

TSC1

The TSC1 is a temperature signal conditioner that modifies the output of coolant temperature sensors. Many different versions are available which can activate above or below an internal set point. The altered temp signal can be a scaled version of the input signal or a fixed level.

- ◆ **Overrides temp signal during warm-up and normal operation**
- ◆ **Allows engine to operate at optimum temperature**
- ◆ **Alters fuel and timing map in ECU**
- ◆ **Versions available for various temperature profiles**

VC1

The VC1 is designed to condition the output of voltage based MAF and MAP sensors. Under normal condition, the VC1 outputs a signal that is identical to the flow signal at its input. When the voltage reaches the internally set clamp level, the VC1 maintains a constant output voltage at the clamp level as the input voltage rises.

- ◆ **Avoids fault codes due to excess flow readings**
- ◆ **Compatible with OBDII systems**
- ◆ **Versions available for different clamp levels**
- ◆ **Clean, undistorted output signal**

VSC1

The VSC1 is designed to condition the output of variable reluctance (VR) sensors. It detects the low level sinusoidal signal output of the VR sensor, and converts it to a high level 0 to 5V logic signal.

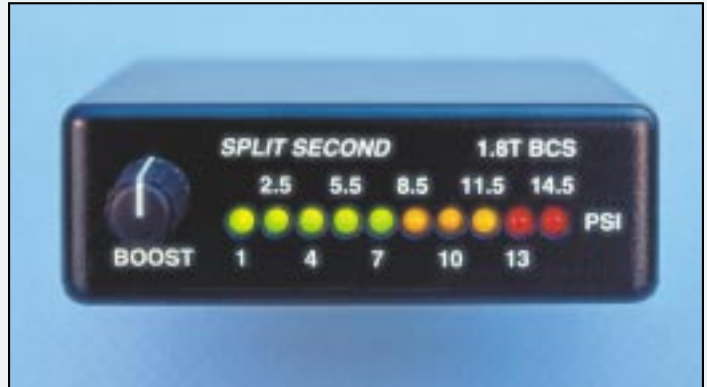
- ◆ **Configurable for differential or single ended sensors**
- ◆ **Input loading may be tailored for specific sensors**
- ◆ **Provides 5V logic level output**
- ◆ **Compatible with electronic ignition modules**

1.8T BCS – BOOST CONTROL SYSTEM

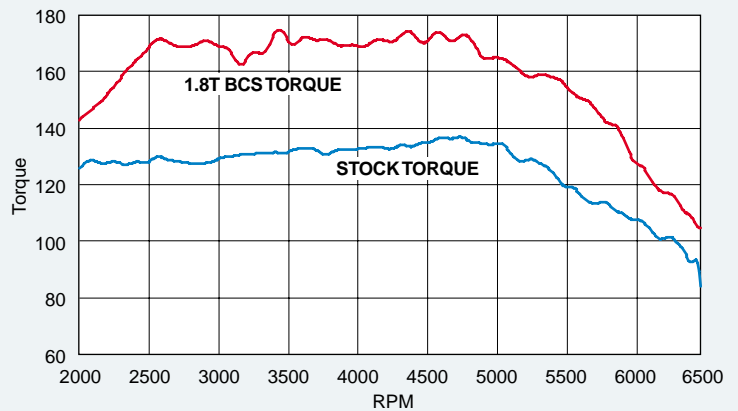
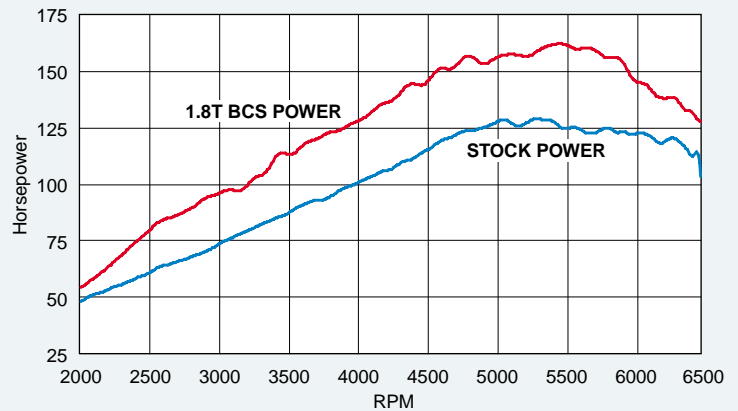
- Adjustable boost from the driver's seat
- Built-in boost gauge
- Miniature size
- Easy to install

The 1.8T BCS (Boost Control System) allows the user to increase boost without ECU re-programming. Boost can be varied from 6 to 14.5 PSI which increases horsepower at the wheels by 35 hp and low-end torque by 43 ft-lbs. It is designed to work with all throttle-by-wire Audi and Volkswagen 1.8T engines. Compatible models include the A4, Beetle, Passat, Jetta, Golf and GTI. The boost gauge has a ten segment, three color LED display that reads in 1.5 PSI increments from 1 to 14.5 PSI. It is electronically filtered to provide a smooth reading.

The dyno curves show the horsepower and torque gains over stock at the wheels on a 2000 Tiptronic Passat. The peak horsepower increase of 35 hp occurs at 5500 RPM. The peak torque gain is apparent from 2500 to 5000 RPM. These horsepower and torque improvements are made with stock ECU programming. This helps to preserve smooth and predictable drivability.



The BCS is easy to install. Its small size makes it easy to fit in the center console. Wire connections for the BCS are made at the ECU. Installation takes about one hour.



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