



[Table Of Contents](#)

Acknowledgments

About the Author

Chapter 1: Introduction

Chapter 2: The Basics

4 Cycles of an Engine

Air and Fuel

Chapter 3: The Good Ol' Days

Carburetion

Timing

Cam Timing

Chapter 4: Taking Measure

Throttle Position

Coolant Temperature

Air-Inlet Temperature

Manifold-Surface Temperature

Mass Air Flow

Manifold Pressure

Barometric Pressure

Crank/Cam Position

Rail Pressure

System Voltage

Oxygen Sensors

Knock Sensors

Chapter 5: Outputs

Fuel Injectors

Ignition

Fuel Pump

Throttle/ETC/Fly by Wire

Idle Air Control

Runner Controls

Cam Controls

Boost Control

Chapter 6: "The Recipe"

Modeling Airflow

Mass Air Flow

Speed Density

Fuel Delivery

Picking a Ratio
Transients and Modifiers
Correction Factors

Chapter 7: Ignition

Burn Rate
“Blancing the Players”

Chapter 8: Data Logging

Know Your Load

Chapter 9: Getting into the Zip Code

Mass Air Flow Modeling
MAF Scaling
Speed Density Airflow Modeling
Spark Advance

Chapter 10: Settling Down

Dashpot

Chapter 11: More Power

Chapter 12: Polising a Sculpture

Integrating Fuel Maps
Integrating Spark maps
Tip-In Ignition
Deceleration
Closing the Loop (or not?)
Choosing Cam/Runner Timing
Choosing a Shift Point
Almost Done

Chapter 13: Forced Induction

Centrifugal Superchargers
Positive Displacement Superchargers
Turbochargers
Nitrous Oxide

Chapter 14: Conclusion

Appendix A: Ford Tuning

Examples

Appendix B: GM Tuning

Examples

Appendix C: Standalone EFI Systems

Accel DFI

F.A.S.T.

AEM

MegaSquirt

Electromotive TEC3r

Appendix D: INCA OEM Calibration Tool

Appendix E: External Controllers

Electronic Ignition Boxes

VAFC/MAF Adjusters

Piggyback Controllers

Auxiliary Injector Control

Hobbs Switches

Mechanical Adjustable Fuel Pressure Regulators

The FMU

Manual Boost Controllers and Wastegates

Exhaust Cutouts