1. Pre-start: sensors, breakpoints, trims
2. Starting
3. Idling
4. Fuel
5. Ignition
6. Boost Control
7. Datalogging
8. Knock measurement & feedback
9. FD-specific stuff: OMP, sequential twin turbo control
10. Advanced gizmos that nobody really needs: 2-step rev limit, drag-style anti-lag, full-throttle shift cut, high/low boost switch, nitrous trims

Outline:
1. Basic pre-start setup:
1a. Sensor setup (MAP sensor setup is critical: Load Breakpoints depend on it) CLT, AIT, TPS
Setup>>Sensors>>(sensor type)>>Wizard to select MAP, CLT, AIT sensors. No Wizard for TPS sensor, manually open TPS parameters, adjust Min/Max options so that 'Throttle' parameter is never less than 0.5% or greater than 99.5% (double-check this again when engine is running)

1b. Breakpoints (Load, RPM, TPS, TPS-to-Load).
Setup>>Breakpoints>>Breakpoints [template].
The RPM and Load Breakpoints are used for fuel map, ignition map, boost control, O2 Target and others. Load breakpoints: probably want good resolution near idle (30, 40, 50, 60kPa), and at desired boost level, and at 'overboost' if you want to dump fuel and pull timing. RPM Breakpoints: try to have at least one breakpoint below idle RPM, one exactly at idle RPM, one above idle RPM (might be wise to put this exactly at cold idle RPM). Nice to have most RPM breakpoints at 'easy' numbers... increments of 500 RPM tend to work well. Note the breakpoints can at any interval you want... you can add resolution if there's a certain spot where the setup comes 'on the pipe' and suddenly wants drastic changes in the maps.

1c. Fuel map 'strategy' (MAF, Speed Density, Alpha-N, TPS-based fuel map)
Most people use Speed Density (MAP sensor used for y-axis on fuel map and ignition map). When Speed Density option ON and TPS-Based Fuel Map option is ON, TPS sensor used for y-axis on fuel map (Boost Fuel Corrtable can be used for turbo engines), MAP sensor used for y-axis on ignition map.

1d. Fuel trims (Battery Offset, AIT, CLT, Boost Fuel Correct)
Fuel>>Advanced Fuel>>Fuel Trims>>Fuel Trims [template]

Use Wizard for Battery Offset:
Setup>>Injectors>>(Primary or Staged)>>Battery Offset Wizard The Battery Offset table adds a certain pulsewidth to the value in the fuel map in order to ensure that the amount of fuel delivered to the engine does not change when the battery voltage gets higher or lower. Battery Offset values will be different for each injector, and are very different for low-impedence injectors if you wire a resistor pack inline instead of using a Peak & Hold driver. If there is not a wizard for your specific injectors you can send them to AEM for testing or contact the injector manufacturer to request the response time/ battery offset/dead time info (there are a few common names used to describe the same thing).
Info for AEM response testing here:
http://forum.aempower.com/forum/index.php/topic,4619.0.html

Air Temp Fuel Trim:
In general, cold air is more dense than warm air (more molecules of oxygen for the exact same volume). More fuel will be required to acheive the same AFR at colder temperatures.

Warm Up Enrichment (Coolant Temp Fuel Trim)

Similar phenomenon to Air Temp Fuel Trim... colder engine temps require more fuel to acheive same AFR.

Boost Fuel Correct table:
Fuel trim based on manifold pressure. Some people use it, others prefer to leave it at zero. Physics theory is that fuel requirements will be linear with manifold pressure increase or decrease, assuming the VE of the engine does not change. For instance... engine at atmospheric pressure needs a certain amount of fuel. At double the pressure (+1 bar boost), the air entering the engine is twice as dense and will require exactly twice as much fuel to acheive the same AFR. At half the pressure, (-0.5 bar of boost) the engine will require exactly half as much fuel to acheive the same AFR. The Boost Fuel Correct table can be used to account for this change in density, which will allow the main fuel map to be a closer representation to Volumetric Efficiency. There are many ways to skin a cat... this can make your life easier if set properly. Set to -100% at 0 kPa, -70% at 30kPa, +1% at 101kPa, +100% at 200kPa, etc...

====TO DO:====
1e. Staged Injection setup (doesn't really need to be done before starting)
1f. OMP setup
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2. Starting:

2a: Initial Crank Pulse table:
First fuel pulse when crank signal is detected, this has a very large influence on how quickly the engine starts on 'first crank.' x-axis is Coolant Temp... engines will generally need more fuel to start when cold than when warm.

2b: Crank Injector Time table:
this is how much fuel to use when cranking, depending on throttle position. Typically set to zero above 80-90% throttle to help clear a flooded engine. Using AEMPro software, this is 'raw' units which can be confusing. Try starting with a small number and increase while cranking the engine until it starts (be sure the battery is fully charged before first start... you might spend a long time cranking). Note: raw units in this table get multiplied by 'Microsec/bit' factor... not safe to compare these values between calibrations unless 'Microsec/bit' option is the same in both cal files.

2c: Crank Adv option:
Ignition timing used during cranking, in degrees BTDC. If engine 'kicks back' when cranking and trying to start, use less ignition advance. Values between -5 to +5 tend to work.

2d. RPM Offset vs Start table:
Used to open the idle solenoid valve while cranking and immediately after start; additional airflow can help stabilize idle and prevent car from stalling immediately after start. x-axis is time (seconds). (this may belong in Idle section)

2e. Start Extra vs Temp table:
Percentage of additional fuel added during cranking, this is also added for a few seconds after engine starts to help stabilize idle

2f. Start Extra Decay table:
Length of time (in seconds) before Start Extra percentage gradually decays to zero. Example: Start Extra = 10%, Start Extra Decay = 4 seconds. During cranking 10% fuel will be added due to Start Extra fuel; 2 seconds after starting, 5% fuel will be added, 4 seconds after starting, 0% fuel will be added due to Start Extra table.

2g. Warm Up Enrichment table:

Percentage of fuel to add because the engine is cold, most engines will require more fuel to run smoothly when cold. Unlike Start Extra, this fuel is added regardless of how long the engine has been running.

Note: secondary injectors are not used during cranking.

2h. Pre-start check:
Press the throttle, make sure the Engine Load parameter doesn't change (it should be measuring atmospheric pressure, usually ~100kPa at sea level and something lower depending on altitude). If the Engine Load changes when the throttle is pressed, this usually means the MAP sensor volts are 'out of range' and is usually caused by a wiring problem or disconnected MAP sensor.

Disable injectors (Options>>Injector, select each injector and un-check the 'Active' checkbox), crank engine and watch the "Stat Sync'd" parameter, it should turn ON within 1 second of cranking... this indicates that the EMS has detected the cam & crank sensors in the pattern it is expecting to see. If you happen to have an eccentric shaft pulley with timing marks (unfortunately most people don't), now would be a good time to crank the engine and verify the timing on the eccentric shaft matches what's displayed in the EMS.
If Stat Sync does not turn on when cranking the engine, look at the parameters Crank Tooth Period and T2PER. which indicate the time between pulses on the Crank and T2 (Cam) signals. Both of these channels should respond when the engine is cranking, if either signal is not being detected or measuring an incorrect number of pulses per engine cycle the EMS will not fire the coils or injectors. Time to double-check the engine harness wiring (get a multimeter and measure continuity between the sensor plugs and ECU pins). Check that the air gap between the sensor and the trigger wheel is not excessive; this could cause a signal that is not 'strong' enough for the EMS to measure.

Might not be a bad idea to disable all the ignition outputs, then turn them back on one at a time and check that they are each working correctly. (Coil1 is for the leading coil, Coil2 is the front trailing, Coil3 is the rear trailing).

Don't forget to turn the injectors back on before starting the engine.
Before you do that, it's not a bad idea to manually trigger each injector and listen/feel for it to turn on.
Link to AEM forum instructions:
http://forum.aempower.com/forum/index.php/topic,23912.0.html

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3. Idle:

3a. Idle Target Base table:
first step in Idle routine... this is where you define what RPM you want to idle at. Usually want to idle higher when cold for stability and to warm the engine more quickly.

3b. Idle % vs Target table:
second step in the idle routine... when the EMS is attempting to idle at a certain engine speed, it will begin by using the duty cycle found in this table. After that, the idle feedback settings are used to fine-tune the actual engine speed.

3c. Options-Idle
Hi Idle Car Speed:
above this speed, the EMS will attempt to idle at a higher RPM (see Hi Idle RPM Offset). Adjusting this setting may help avoid stalling when the clutch is suddenly depressed at high speeds. Hi Idle RPM Offset: this is the extra RPM to add when the Vehicle Speed is above the Hi Idle Car Speed. Hi Idle Wait Time: this is the amount of time to maintain the Hi Idle RPM offset after the Vehicle Speed has fallen below the Hi Idle Car Speed

Idle FB Below RPM:
Feedback will occur if the idle is below this RPM. If the engine gets "stuck" at an excessively high idle, you might want to increase this value and/or decrease the Idle % vs Target table value for that target RPM. Setting this too high may result in idle feedback trying to decrease the engine speed when decelerating in gear, which may result in stalling when the clutch is pressed. Try setting this a bit higher than the cold idle target.

3d. Advanced Idle Template:
Idle FB Minimum: set this to a very low value (-30 or -40) if you have not disabled the fast idle cam in the throttle body. In stock configuration, there is a thermowax plunger that will prevent the throttle from fully closing until the engine warms up. This can increase idle speeds by over 1000 RPM when cold, and the EMS needs to be able to compensate for this. Highly recommend removing the thermowax and disabling the fast idle cam; the stock idle solenoid can supply enough airflow to keep the engine from stalling when cold. Idle FB Rate: how often the idle feedback routine is able to adjust idle solenoid duty cycle. if the idle feedback is fluctuating wildly when attempting to idle, try a larger number for this setting. This does not affect the Ign vs Idle RPM table (details below)... it is able to make quick adjustments regardless of Idle FB Rate. RPM offset vs TPS table: used to increase Idle Target when the driver presses the throttle, otherwise the idle feedback will decrease airflow through idle solenoid and car may stall when throttle is released. Note: if the fast idle cam in the throttle body is still present, values in this table can cause the EMS to target a higher RPM when the engine is cold. You can compensate for this by decreasing the values in the Idle Target Base table for temperatures below 170F.

3e. Adjusting the Idle % vs Target table:
1. Open the Idle>>Advanced Idle template and set Idle FB Minimum to -40, Idle FB Maximum to +40. Be sure to press Enter when changing values, or the EMS will not save your changes.
2. Open the Idle template and set the entire Idle Target Base table to 3000 RPM. The EMS's idle feedback will increase or decrease the Idle Position in an attempt to bring the engine speed to 3000 RPM. Go to the 3000 RPM breakpoint and adjust it so the Idle Learned Value is between -3 and -7%.
3. Set the entire Idle Target Base table to 2900 RPM and adjust the 2900 RPM breakpoint in the Idle % vs Target table, again shooting for an Idle Learned Value between -3 and -7%. Repeat this process until you have adjusted each breakpoint in the Idle % vs Target table.

3f. Ign vs Idle RPM table;
useful for quick, small adjustments to engine speed. Advance timing if engine speed is below target,, retard timing to prevent surging.

=======INCOMPLETE==========
4. Fuel: main fuel map, staged injection, O2 feedback, fuel cut, fuel trims... battery offset
4a. Main Fuel Map;
There are RPM breakpoints going left-to-right (x-axis), and Load breakpoints going down-to-up (y-axis). Just like math class, 'zero' is on the lower-left corner of the table, max RPM and max boost is the top-right corner of the table. The Load axis is somewhat upside-down compared to the Power FC but at least the units make sense.

4b. Staged Injection
Injector Min: This is the minimum pulsewidth (before battery offset adjustments) used for the secondary injectors. Recommend using small values here for a smooth transition, because Injector Min time is subtracted from the primary injector pulsewidth as soon as secondary injectors are activated.
Injector Duty Max: Primary injector duty will not be allowed to exceed this value, secondary injectors will be staged in (even if the value in the Fuel Difference map is zero) to supply additional fuel.
Staged Flow Ratio: This value is used by the EMS to determine the relationship between primary and secondary injector flow rates. For stock 550 primary / 850 secondary injectors, use -35%. For 550 primary / 1680cc secondary injectors, use -67%. For 850 primary / 1680 secondary injectors, use

-49%. For 850 primary / 850 secondary injectors, use 0% (zero flow difference)
Fuel Difference table: Amount of fuel to be supplied by secondary injectors. If the value in the table is zero, the secondary injectors will not operate (100% fuel from primary injectors); if the table value is 100, the primary injectors will not operate. If the table value is 50, the secondary injectors will supply 50% of the fuel flow to the engine. In this example, if the table value is 50% and the secondary injectors flow twice as much fuel as the primaries, the primaries may be opened for 60% duty while the secondaries only require 30% duty to supply an equal amount of fuel. Note that most rotaries use larger secondary intake ports, so it may be wise to have the secondary injectors supplying more fuel than the primary injectors in an attempt to evenly distribute the air and fuel. For instance, the stock RX-7 ECU holds both primary and secondary fuel injectors open for the exact same duty cycle once the secondary injectors are activated, in this instance the secondary injectors would supply approximately 60% of the total fuel to the engine.

Remember, the Fuel Difference table doesn't change the total amount of fuel going into the engine, it just alters how the fuel is divided up between the primary and secondary injectors. If you need more fuel, increase the value displayed in the main fuel map.

Don't forget that the OEM throttle is not always allowing air through the secondary intake runners... without airflow you shouldn't inject fuel. The secondary throttle blade is closed between about 0-30% as measured by the TPS... most stock twins setups can see a few PSI boost below 30% throttle at cruising RPM; you still want the Fuel Difference table at 0% in these situations or the engine will not run well.

4c. O2 Feedback
O2 FB Target map: defines the closed-loop O2 target... set this to the AFR you want to see depending on RPM and Engine Load.
O2 FB Options: important ones are Rich Limit (max amount of fuel to add... for instance +10%), Lean Limit (max amount of fuel to subtract... must be a negative number for instance -5%). O2 FB Maximum Load can be used if you want to limit feedback so it only works at light loads.

When O2 Feedback is active, monitor the parameter 'O2 #1 FB Value,'   this is the amount of fuel the Feedback function is adding or subtracting in an attempt to reach the O2 Target. If the feedback is too fast or too slow in making its adjustments, try changing the O2 FB Pro Gain and O2 FB Int Gain tables. Setting them further from zero will result in faster, more aggressive changes. Note that the O2 FB Value is making live trims to the fuel output, but this will not save changes to the original map.

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5. Ignition
5a. Ignition Map
Pretty straightforward... RPM for x-axis, Load for y-axis, using same breakpoints as the fuel map. Units in map are degrees of ignition advance BTDC.

5b. Ignition Difference Map
Degrees of split. +10 in this map will fire the trailing coils 10 degrees earlier than the leading coils. Common practice is to set this map to (-10) or (-15) in boosted sections.

5c. Ignition Trims
Air Temp Trim, Coolant Temp trim, Idle trim.

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