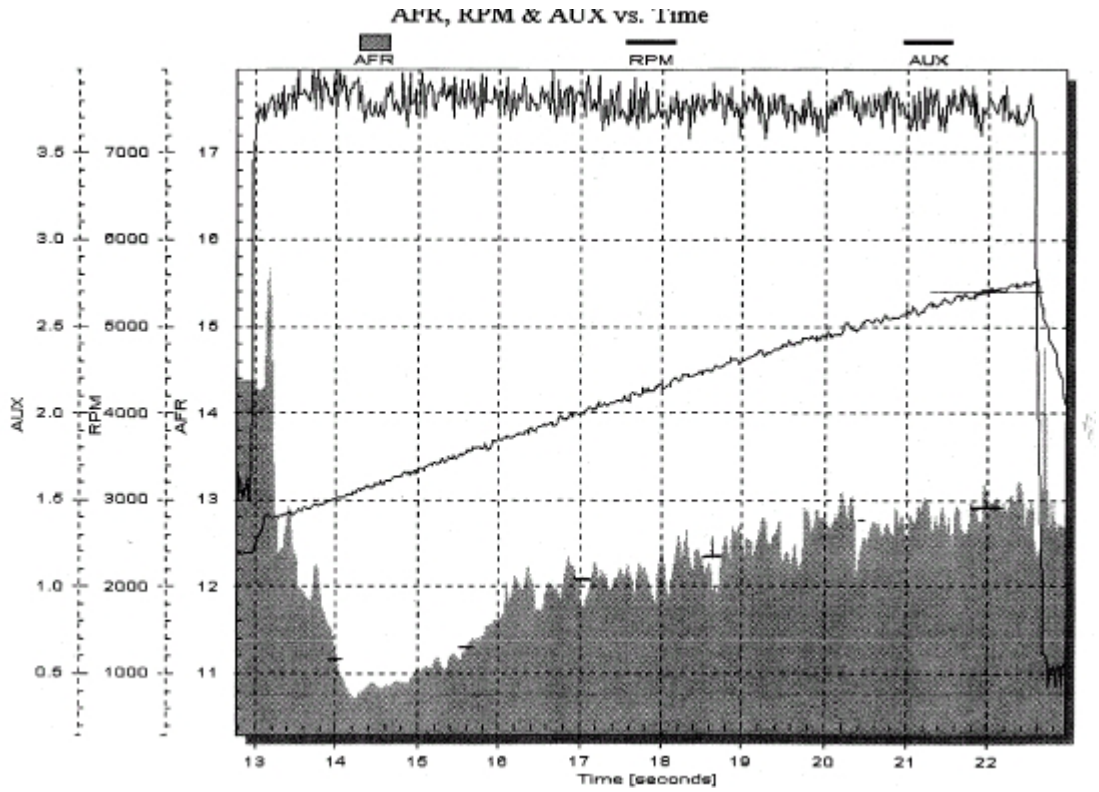
This graph illustrates a Full Throttle Test from 2500 rpm in 2nd gear. Note the top line is vacuum confirming that the throttle stayed WOT. The diagonal line is rpm while the top of the shaded area is the air fuel ratio.



Pontiac 400 with Quadrajet carb. (Air Valve has cutouts unlike the Chevy style which does not)

- I spent copious amounts of time tuning this carb. The drivability is excellent, enrichment circuit comes in smoothly, and idle is consistent. No WOT bog and this jetting delivers the fastest acceleration of any jetting combination.
- The concern is the WOT Air Fuel Mixture does not remain constant as the RPM's change.
  - At about 3100RPM the air valve is fully open. I can open it slower but acceleration suffers.
  - From 3100 to 3700RPM the carb is ridiculously fat but runs well. Again I can adjust the Air valve to open slower but acceleration suffers slightly.
  - **MY main concern is at 3700 RPM the Air Fuel ratio is about 12/1, but by 5500 RPM the Air fuel ratio is a more desirable 13/1. Another Q-Jet carb I tested showed the same traits.**
- This is in contrast to the consistent Air Fuel ratio delivered by the Holley carb on my 383 SBC 240Z. Click here and link to **Performance Data** to view the relatively flat Air Fuel ratio curve.
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- In Taylor's (from M.I.T.) 2-book novel on the Engine, he makes it clear that the optimal Air Fuel ratio for power is about 13/1 at all RPM's.

Questions for HybridZ or anyone else:

- Has anyone optimized there EFI systems at each RPM point and found that the max power Air Fuel ratio varied with RPM changes, or does it remain constant as stated in Taylor's bible?
- Has anyone taken the exact same engine and optimized both a Holley and Q-Jet to determine which makes more power?

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I USED THE FOLLOWING SETTINGS ON MY "DIALED IN" Q-JET

PARAMETER	SETTING	NOTES
Idle Feed holes	.096	1 ¾ turns out, .089 too small, .103 not a problem
Idle feed	.033	required air bleed increase to .049" (stock was .031 feed & .041 air bleed)
Primary jets	.071	.072 air/fuel richer than 12.5/1 at enrichment
Primary needles	.037	Cruise about 14.5/1, Tip in up to 15/1 before enrichment
Primary enrichment spring	12-6"hg	Probably could start enrichment about 14" and use .038 needles
Secondary power tip	.052	.048 gave similar results, .056 dropped off in some tests Best timed performance with air/fuel 13/1 max
Secondary opening angle	76deg	Do not adjust to 90deg full opening, high RPM becomes too lean
Secondary air valve spring	½ turn	1/8 turn opens instantly – prob too much too soon ½ turn probably snappier performance for 1st second of WOT 1 turn definitely too slow, could notice the shape of the sec rod on A/F ratio, more testing required
Secondary enrichment	(4).031	also shortened tube length – try more holes higher in future A/F is too rich at initial opening – more sec enrich test needed
Secondary hanger	.535	.565 caused lean A/F at small sec openings
Secondary dashpot	.018	Article said above .025 yields no damping (stk about .012")
Float height	.250	To the top, height affect idle and off idle mixture
Inlet valve	.120	This short fulcrum carb seemed to need a smaller seat No WOT air fuel ratio difference noted between .120 and .130
Base plate	7deg	90deg Primary plates, Secondary plates adjusted 7deg past 90deg This is written in books and noted on stock carbs

Timing Settings

Note cranking compression of 170 PSI

Best guess for actual at 9.5 to 10/1 1=172, 2=168, 3=150, 4=165

Initial	10deg	
Total	30deg by 2600	Minor pinging noted between 2500 to 4000 RPM sporadic / inconsistent Change from 12 to 10 deg helped but not completely eliminated
Vacuum 12 deg total		Starts at 8" all in by 13", run full intake vacuum at idle Crane #99601-1 is adjustable for pull in pressure and total amount

Notes:

- Primary throttle plates must be adjusted perfectly for equal throttle opening 'side to side'. Failure to do this can cause spill over into the primary venturi circuit at idle.
- The WOT A/F ratio will not hold steady with this carb as RPM's increase (nor another Q-Jet I tested). At least 1 point of A/F ratio lean change is noted from 3500RPM to 5500RPM after optimizing the air valve opening. (So at 3500 it is 12/1 and at 5500 it is 13/1 A/F ratio)
- One noted Carb tuner said that Q-Jet's could make more power than Holley's. If this is true, the A/F ratio change with RPM may account for this.
  Note: My Holley on the Z maintains a consistent A/F ratio throughout the RPM range.
- Adjusting the air valve opening reduced the amount the A/F ratio would go leaner with increased RPM. When I set the air valve opening to 90 degrees, the carb would lean out from 12/1 @ 3500

to 13.8/1 @ 5500. At 81deg opening diminishing returns set in. Changing to 78deg and 76 degrees produced tiny increases in power and improvements to A/F ratio linearity. Stock Air valve opening one the Pontiac carb was 76deg so I think I spent a bunch of time proving they did this right in the first place.

- When choosing secondary power tip remember:
  The .135 orifice is exactly .175" below gasket surface.
  -Power tip transition to large rod should be at least .010 - .015 above the jet
  -Rod hanger dimension and air valve opening determine how long power tip must be
- Limit inlet pressure to 5PSI when using large inlet & needle combinations (.130" and up)
- Total timing beyond 25deg at idle causes cylinder missing and high HC in my Pontiac

FUTURE TESTS:
I need a better understanding of how the secondary enrichment circuit can be tuned. It seems real fat when the air valve plops open at low (about 3000) RPM. The carb does not seem to meter well until about 3500 RPM.

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