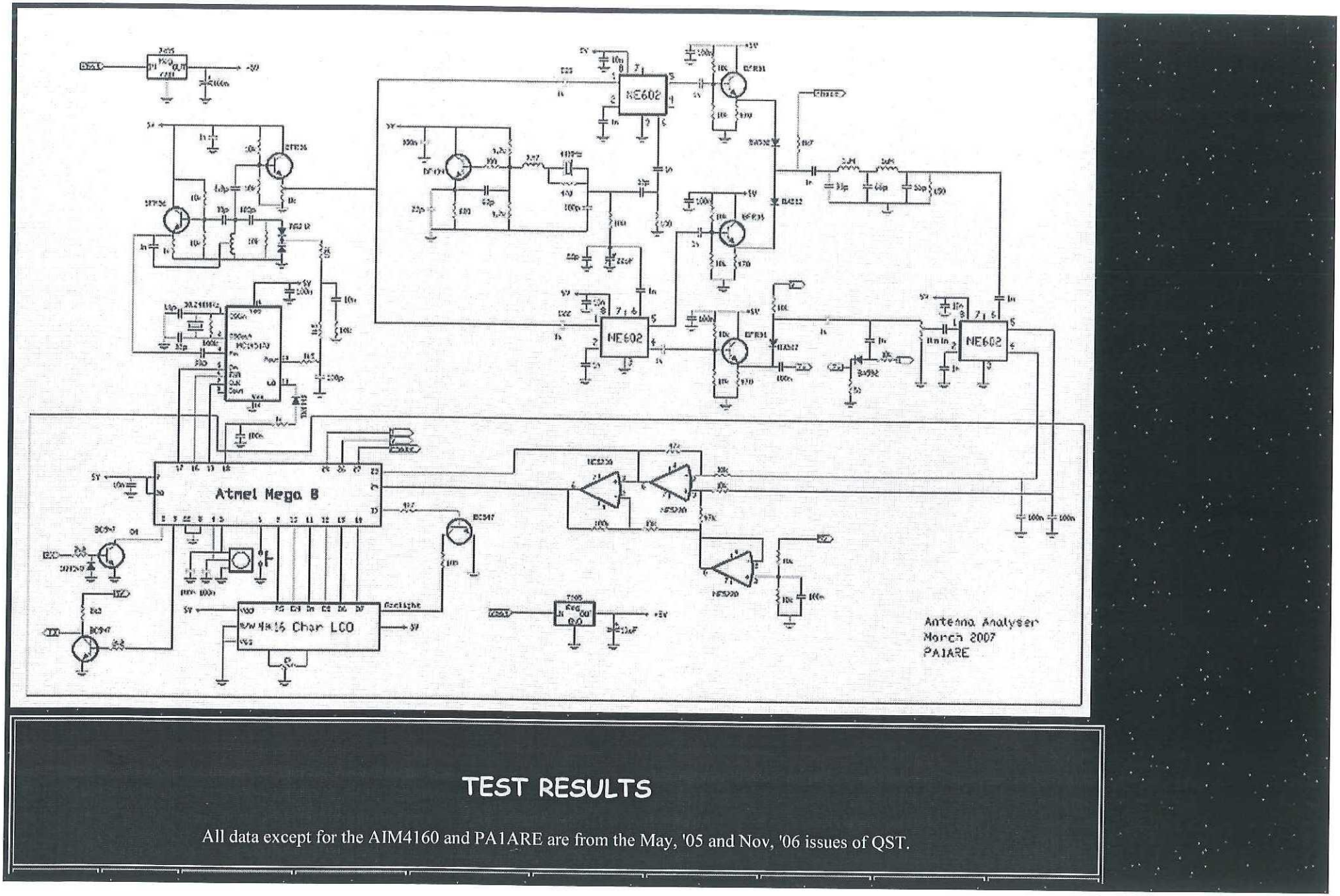


TEST RESULTS

All data except for the AIM4160 and PA1ARE are from the May, '05 and Nov, '06 issues of QST.

Load (Ohms)	Freq (MHz)	PA1ARE	AIM4160	Autek VA1	Kuranishi BR-210	MFJ-269	Palstar ZM-30	AEA Via Analyzer	Timewave TZ-900
									
50	3.5 14 28 50 144 432	50 + j0 50 + j1 50 + j3 -- -- --	50 + j0 49 + j0 50 + j0 49 + j0 49 - j0 --	52 - j1 51 - j1 58 - j3 -- -- --	51 51 50 50 50 --	48 ± j0 48 ± j0 48 ± j0 48 ± j0 48 ± j1 1.1:1 swr	53 + j0 52 + j0 53 + j0 -- -- --	50 + j0 50 + j0 50 + j0 50 + j0	48 + j0 48 + j0 48 + j0 48 + j0
5.0	3.5 14 28 50	4 + j0 4 + j1 4 + j4 --	5 + j0 5 + j0 5 + j0 5 + j0	5 - j1 6 + j0 5 - j2 --	<12.5 <12.5 <12.5 <12.5	4 ± j2 5 ± j0 4 ± j3 4 ± j5	3 + j2 3 + j2 3 - j4 --	3.2 - j0 4.1 - j0 5.5 + j2.1 5.6 + j7.9	2.4 + j0 2.5 + j0 2.3 + j2.6 2.6 + j3.0
25	3.5 14 28 50	24 + j0 24 + j1 24 + j3 --	25 + j0 25 + j0 25 + j0 25 + j1	25 - j1 25 - j0 23 + j0 --	26 27 27 27	23 ± j5 24 ± j2 23 ± j5 24 ± j6	24 + j0 24 + j0 25 + j0 --	25 + j0 25 + j0 25 + j0 25 - j6.7	23 + j0 24 + j0 24 + j0 24 + j0
100	3.5 14 28 50	102 + j1 100 + j4 101 + j8 --	100 + j0 100 + j0 100 + j1 100 - j0	100 - j0 97 + j5 84 + j0 --	100 100 100 100	99 ± j17 97 ± j10 95 ± j23 87 ± j32	108 + j0 106 + j0 102 + j0 --	102 +j0 101 + j0 99 + j0 94 - j11	100 + j0 101 + j0 99 + j0 97 + j0
Load (Ohms)	**Freq (MHz)**	**PA1ARE**	**AIM4160**	**Autek VA1**	**Kuranishi BR-210**	**MFJ-269**	**Palstar ZM-30**	**AEA Via Analyzer**	**Timewave TZ-900**
200	3.5 14 28	207 + j3 204 + j6 203 + j9	200 + j0 200 + j0 200 + j0	195 - j16 170 - j1 147 - j3	200 200 190	185 ± j68 183 ± j0 156 ± j86	210 + j0 205 + j0 173 + j56	199 - j0 193 - j0 176 - j44	200 + j0 193 - j26 175 - j63

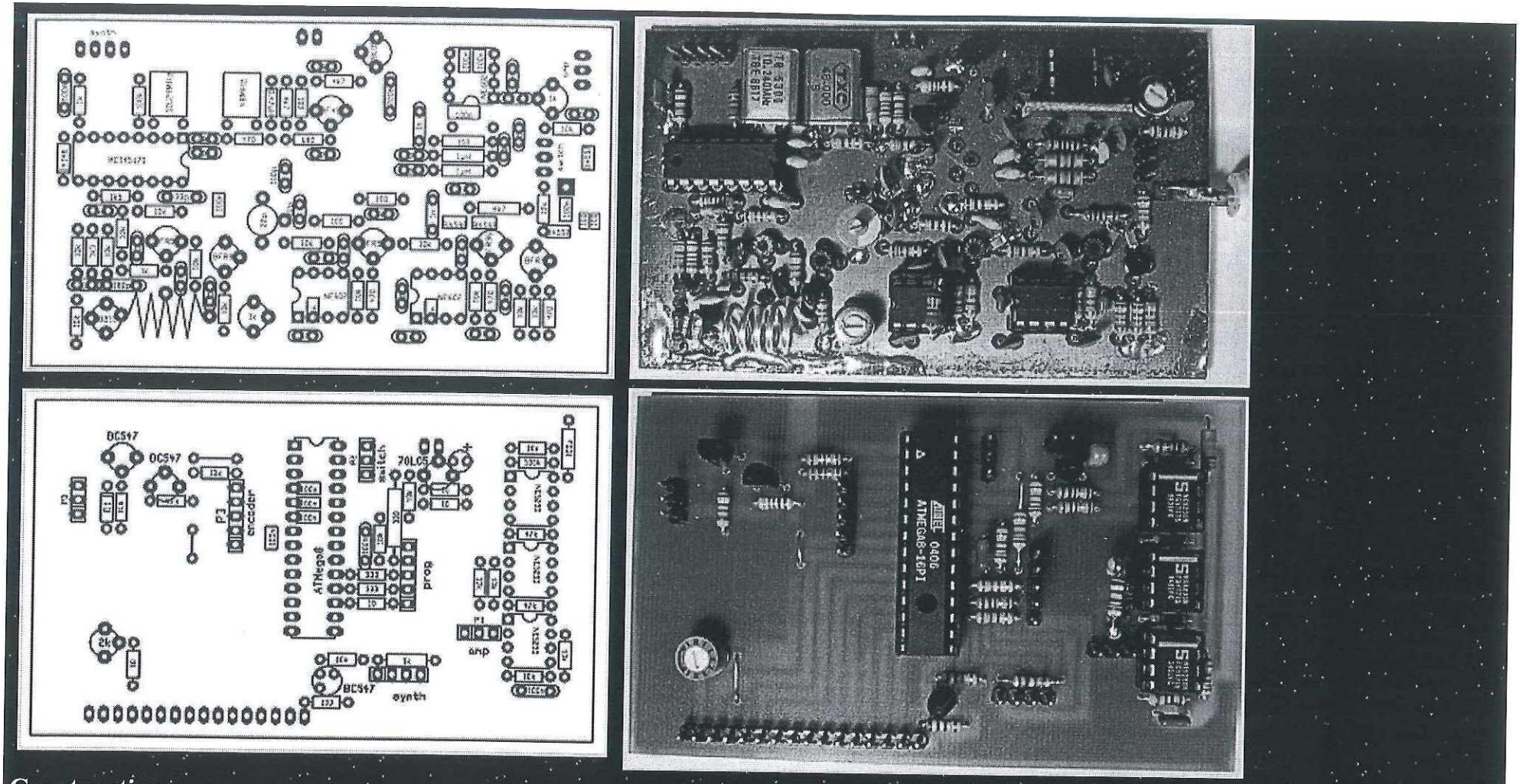
	50	--	200 - j0	--	190	115 ± j98	--	141 - j69	130 - j144
1000	3.5	1018 + j27	992 + j1	900 - j46	>400	661 ± j743	>600	940 + j0	979 + j0
	14	1000 + j30	989 - j12	590 - j380	>400	555 ± j368	>600	419 - j510	813 - j506
	28	982 - j29	990 - j28	420 - j11	>400	130 ± j409	104 - j449	259 - j429	607 - j534
	50	--	998 - j61	--	>400	56 ± j258	--	131 - j238	171 - j633

Test Results

This table shows test results from ARRL , Bob W5BIG and myself. Notice that most commercially available analyzers perform rather poorly at high impedances. This is partly due to the limitations of the measurement method and partly because of a more general problem with this type of measurement : stray capacitance. Every connector or test fixture has a certain amount of capacitance between its terminals. Not taking this parallel capacitance into account will result in large measurement errors. The reason why my design and Bob's AIM perform so well is that we both do calibrate for stray capacitance and correct the measurement results.

Calibration

Since stray capacitance is the most prominent source of error it is measured during the calibration procedure. The measured capacitance is than used to correct each reading. In version 1 calibration was automatically done at start-up.
In practice this was a bit annoying because every time the load had to be disconnected. In version 2 calibration values are stored in EEPROM. A new calibration is performed when the function key is held down during start-up.
Appart from the zero reference of the ADC / Amplifier nothing else has to be calibrated because all measurements are essentially relative.



Construction

The analyzer is built on two separate PCB's. The HF PCB contains the PLL, VCO, Mixers, Switches, LPF, 48MH oscillator and synchronous detector. The Controller PCB carries the Controller, Differential amplifier, Display and RS232 level converters. The HF board is a double layer board of which the component side is used as a ground plane.
The connections between the two boards carry only DC signals, so wiring is not at all critical.