TABLE 1. Comparison of Different Measurements of Elastic Moduli and Their Pressure Derivatives (Denoted by a Prime) for Several Materials[a]

Material	Elastic Moduli, Mbar				Pressure Derivatives				Reference
	C_{11}	C_{12}	C_{44}	K_S	C'_{11}	C'_{12}	C'_{44}	K'_S	
MgO	2.974	0.958	1.562	1.628	8.70	1.42	1.09	3.85	*Spetzler* [1970]
	2.966	0.951	1.558	1.623	9.16	1.82	1.12	4.27	*Chang and Barsch* [1969]
	2.967	0.951	1.560	1.623	9.48	1.99	1.16	4.49	*Anderson and Andreatch* [1969]
Range (%)	0.2	0.5	0.3	0.3	8	30	7	10	
NaCl	.4956	.1303	.1280	.251	11.65	2.06	0.37	5.26	*Spetzler et al.* [1972]
	.4942	.1269	.1281	.249	11.62	1.58	0.10	4.93	*Drabble and Strathen* [1967]
	.4958	.1306	.1279	.252	11.89	2.13	0.37	5.38	*Swartz* [1967]
	.4899	.1257	.1272	.247	11.66	2.08	0.37	5.27	*Bartels and Schuele* [1965]
Range (%)	1	3	0.7	2	2.5	25	25	6	
TiO_2	2.701	1.766	1.239	2.10	6.29	9.02	1.08	6.9	*Fritz* [1974]
	2.714	1.780	1.244	2.15	6.47	9.10	1.10	6.8	*Manghnani* [1969]
Range (%)	0.5	0.2	0.4	2	3	1	2	1.5	
Mg_2SiO_4	3.284	0.639	0.652	1.28	8.47	4.67	2.12	5.36	*Kumazawa and Anderson* [1969]
	3.291	0.663	0.672	1.29	8.32	4.30	2.12	4.83	*Graham and Barsch* [1969]
Range (%)	0.2	4	3	1	2	9	0	10	

a. Not all of the single-crystal moduli are shown for TiO_2 (tetragonal) and Mg_2SiO_4 (orthorhombic).

II. EXPERIMENTAL METHODS

The ultrasonic system, illustrated schematically in Figure 1, is described in detail elsewhere [*O'Connell et al.*, in preparation] and is based on the phase comparison technique [*McSkimin*, 1950].

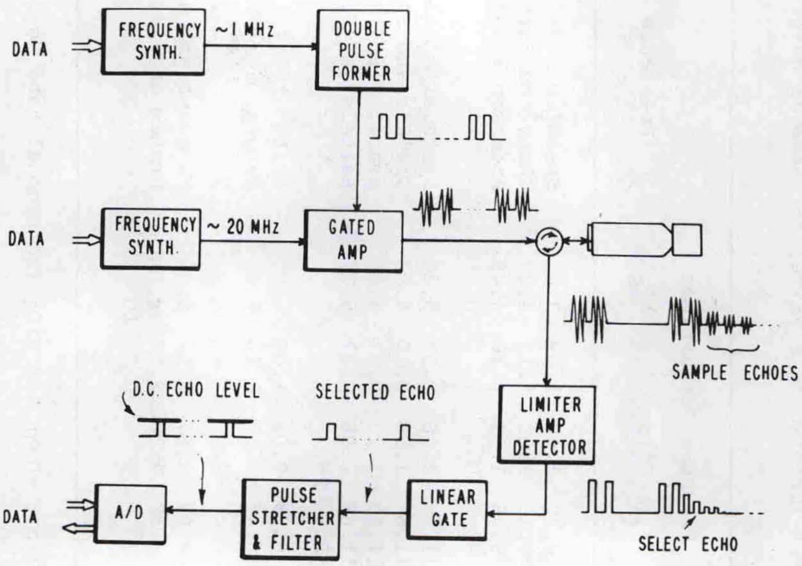

Fig. 1. Schematic diagram of the ultrasonic interferometer. Lines marked DATA indicate connection to minicomputer.

The instrumentation is similar to that described by *Spetzler* [1970]. An RF (carrier) wavetrain is gated to produce two RF pulses, which are phase coherent--i.e., the phase relationship of the pulses is the same as in the original wavetrain, independent of the spacing of the pulses. The electrical pulses are converted to acoustic pulses in the sample via a quartz transducer and the spacing of the pulses is adjusted so that the second pulse is superimposed on an echo of the first pulse in the sample. Alternate constructive and destructive interference of the pulses can be obtained by varying the carrier frequency. One echo from the train of echoes is selected with a linear gate, and its peak amplitude is converted to a DC output. The carrier frequency and pulse spacing are digitally controlled by an on-line minicomputer,