

OPERATOR ADJUSTMENTS

Earlier methods of gain control have imposed time-consuming tasks on the operator. Most AGC circuits utilize a bridge arrangement which must be balanced frequently if amplifier instability, d-c shift, and distortion are to be held to acceptable values. Programmed gain control requires one or more test shots to establish the program times and gain values.

The digital gain control technique requires no attention at all from the operator. Gain change, both up and down, is entirely automatic, dependent solely on signal amplitude.

Other automatic features include a file counter, which automatically records a file number with each file, and a time code, which is automatically recorded with each scan. Gain code, of course, is also recorded in digital form with the sample values to which it is relevant.

TEST CAPABILITY

A test unit is provided by means of which the gain, frequency response, phase delay, and step response of the AGR amplifier may be determined. Test equipment includes an oscillator, attenuator, phase shifter, null detector, and a self-contained ohmmeter.

A two-position switching device permits the geophone inputs to be disconnected and the amplifier inputs placed in parallel and connected to the attenuator. The oscillator provides excitation to the attenuator, both sine wave and step. The phase shifter provides an adjustable phase shift to offset the phase shift through the amplifier.

To determine gain accuracy and phase shift, the sinusoidal output of the oscillator is applied to the attenuator and phase shifter. The attenuator has four positions of gain--all less than one. Thus, when the reciprocal of the attenuator gain equals the amplifier gain, a null is possible; providing the phase shift through the amplifier is equal to that through the phase shifter. Ordinarily, gain will be approximately correct, and the operator will adjust the phase shifter to obtain a null.

Since the phase shifter is calibrated, the operator may then observe the phase shift at that frequency. To adjust the gain correctly, the operator must then adjust the fixed gain control in the pre-amplifier of the AGR amplifier for minimum null. If a minimum reading cannot be obtained, it is possible by logical analysis to determine the particular amplifier unit which is at fault.

To observe step response, the step output of the oscillator is applied to the amplifier input.

Shunt resistance of the lines (indicating an open geophone) and leakage resistance to ground (indicating leakage or short which could cause a-c noise) may be checked with the self-contained ohmmeter which has two ranges.

DISTINCTIVE FEATURES

The outstanding merits of the field recording system can be brought to a conclusion by a simple listing of the major features:

- a. Dynamic range covers 168 db.
- b. Gain selection and recording is entirely automatic.
- c. Early gain and trip sensitivity are set by operator.
- d. Fast, automatic attack and release rates enable gain to follow signal.
- e. Ability to sample burst-outs without overscales ranges from an average of 12 db at 200 cps to 32 db at 10 cps (with 1-ms sampling rate).
- f. Precisely recovered amplitude permits new kinds of analysis.
- g. Time is correlated with signals to nearest millisecond, or better.
- h. Advanced design reduces harmonic distortion below 0.1%.