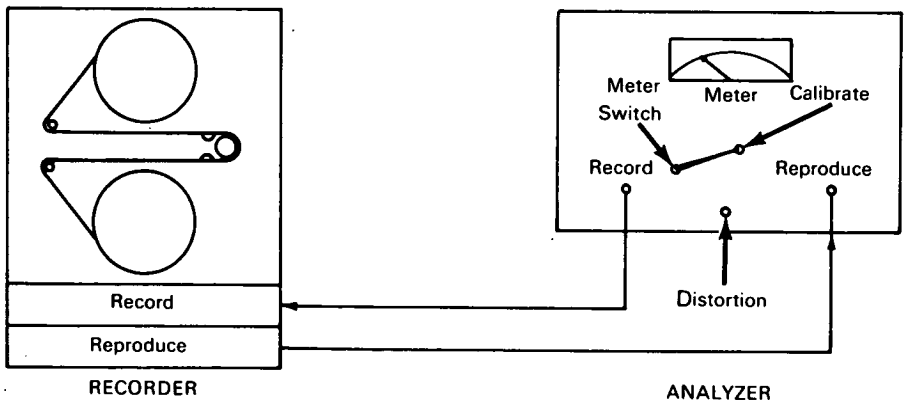
NASA TECH BRIEF

Harmonic Distortion Analyzer Speeds Setup of Magnetic Tape Recorders



A harmonic distortion analyzer has been developed to effect rapid and accurate setup and calibration of magnetic tape instrumentation recorders. When setting up and calibrating such recorders, it is necessary to establish a proper recording-head current to obtain an acceptable signal-to-noise ratio and minimize distortion products in the recorded data signal. This analyzer conforms to the generally accepted criterion that the proper recording level has been achieved when a signal at a selected frequency is recorded on a properly functioning recorder at such a record level as to cause the reproduced signal to have 1% third-harmonic content. It would be particularly useful in facilities where a large number of instrumentation recorders are in operation and it becomes necessary to make frequent checks for proper recording level and performance.

The analyzer is portable (weighs less than 5 pounds). It requires no warmup period and need not be calibrated for normal usage. No power is consumed by its selective filter components, so that failures that would require component replacement and instrument recalibration are precluded. The analyzer has its own precision signal source and indicating meter, eliminating the need for accessory test equipment which must be used with much more complicated-to-operate and costly commercially available wave analyzers. In contrast to the commercial instruments also, the new analyzer has only one functional front panel control and requires no special skill to operate. Average setup time with this analyzer is approximately 30 seconds per track. When necessary, the analyzer can be completely recalibrated in several minutes by any technician familiar with a standard rms meter and signal generators.

The harmonic distortion analyzer is connected to the magnetic tape recorder as shown in the sketch. The recorder is placed in a "record" mode at the

(continued overleaf)

selected tape speed, and the precision signal from the analyzer is simultaneously recorded and reproduced. The meter switch on the analyzer panel is placed in the "calibrate" position, and the reproduce level of the recorder is adjusted for 100 percent indication on the meter. The switch is then placed in the "distortion" position, and the record level control on the recorder is adjusted to obtain an indication of 1 percent on the meter. This procedure is repeated (usually two or three times) until the meter consistently reads 100 percent in the "calibrate" position and 1 percent in the "distortion" position. This procedure is performed for each data track on the recorder.

Note:

Complete technical details may be obtained from:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland 20771
Reference: B68-10254

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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