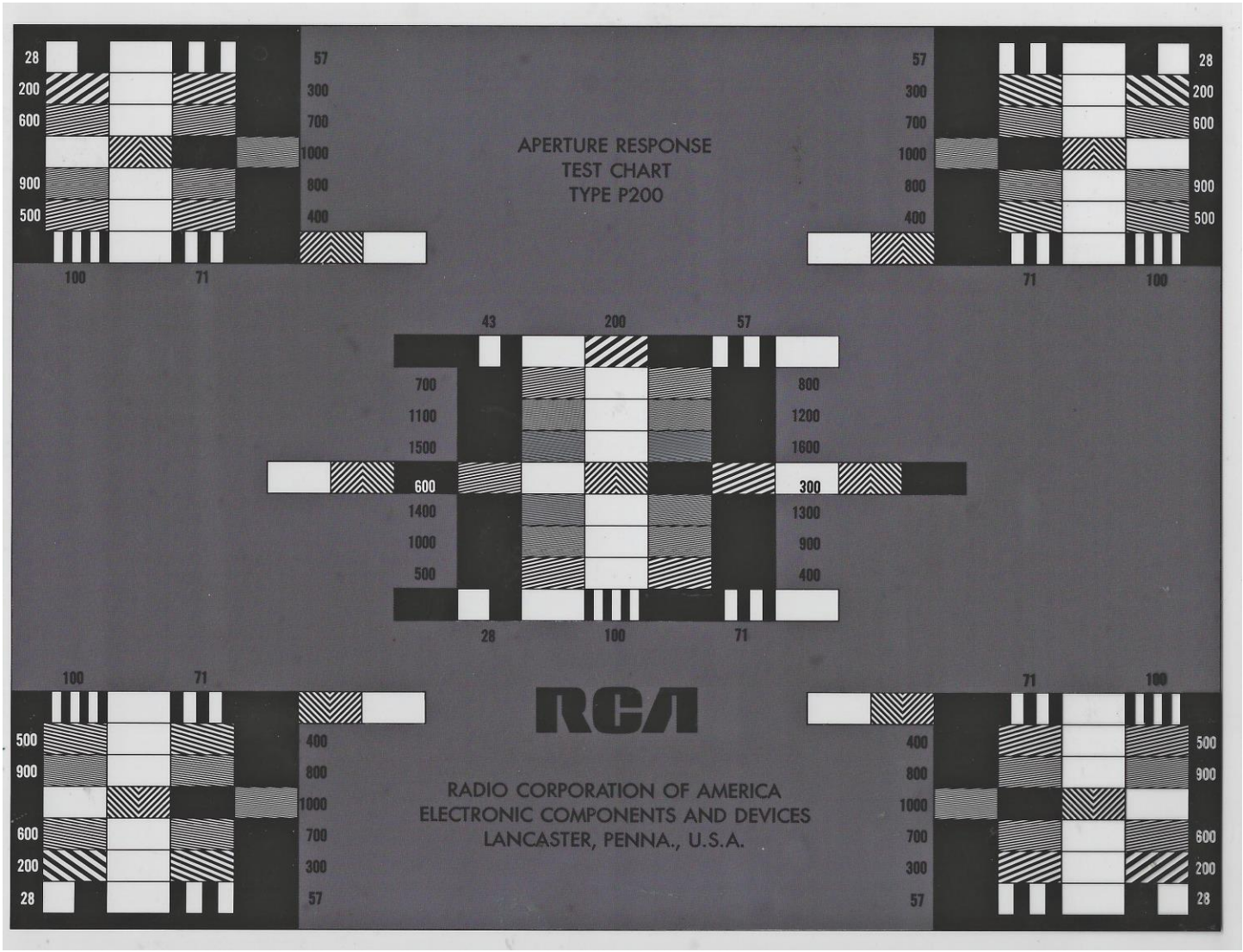

APERTURE RESPONSE
TEST CHART
TYPE P200
28
200
600
900
500
57
300
700
1000
800
400
100
71
43
1100
1500
1400
1000
1200
1600
1300
900
RCA
RADIO CORPORATION OF AMERICA
ELECTRONIC COMPONENTS AND DEVICES
LANCASTER, PENNA., U.S.A.

RCA AMPLITUDE RESPONSE TEST PATTERN, P-200

Description and Use of the New Slant Line Aperture Response and Astigmatism Pattern

A test pattern has been designed to simplify and make more accurate the measurement of aperture response of television camera tubes. It also contains information to balance horizontal and vertical resolution and to measure astigmatism. In this pattern, the information for the various line numbers is slanted so that approximately four cycles are covered during each scan. The overall transmission is very nearly 50%. It should be noted that in a linear system, the grey will not always equal 50% of white signal depending on the "gamma" of the camera tube. Some additional advantages of this pattern are:

1. Information at very high and very low T.V. line numbers
2. Information to determine the ellipticity of the spot
3. Information for complete corner aperture response curves
4. Each block of information (except the 1,000 line blocks (in the corners) is bound by white and black.

Information at low T.V. line numbers 28, 43, 57 and 71 is included so that data can be obtained from which the "spot shape" can be determined. (See Schade, O. H., A Method of Measuring the Optical Sine-Wave Spatial Spectrum of Television Image Display Devices, J.S.M.P.T.E., Sept. 1958). "Spot shape" in this instance means the shape of the composite "aperture", made up of contributions from the electron beam, the optical lens, the photoconductor, the faceplate spread, etc.

Information at high line numbers (up to 1,600) is included so that complete response curves can be taken on 1 1/2" vidicons. All the information from 100 to 1,600 lines is at such an angle that at normal T.V. scanning rates - 15,750 cps line frequency and 60 cps field frequency - the fundamental frequency is about 1.45 Mc. This means that aperture response readings accurate to within 2% can be made using a system limited to only 4.5 Mc; because, the waveform composed of only the fundamental and third harmonic is a reasonably good approximation of the original square wave. Slanting the lines to decrease the bandwidth required also has the advantage of drastically reducing noise to facilitate measurement of response. Furthermore, since all information is presented at the same frequency, the shape of aperture response curves will be the same despite differences in amplifier response characteristics. Due to the physical construction of the pattern, the low line number information 28, 43, 57 and 71 is displayed at 0.36, 0.55, 0.70 and 0.88 Mc respectively; so that video amplifiers must be flat at the low end of the frequency range.

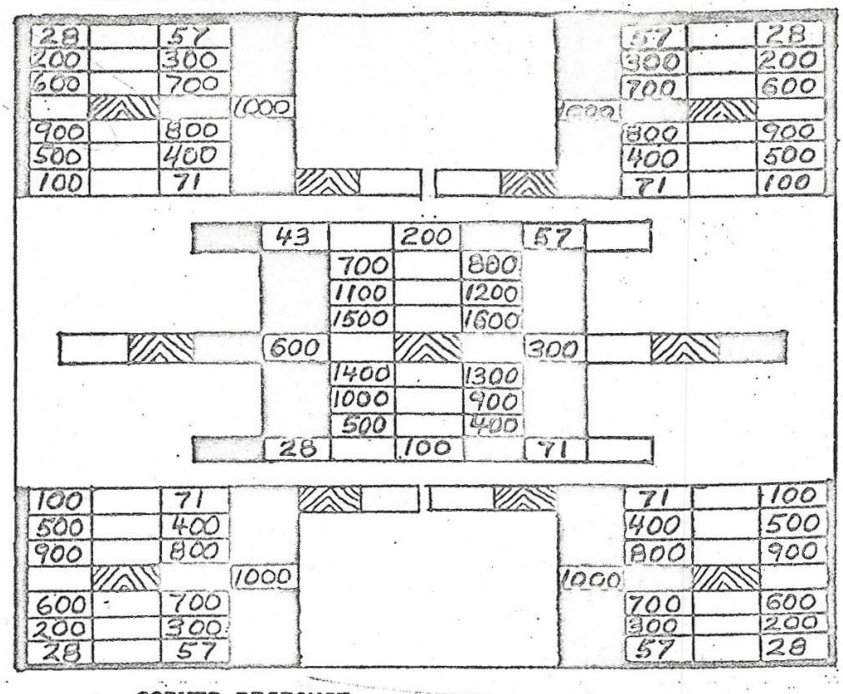
There are eleven blocks containing 400 line "set-up", or astigmatism, information placed at +45° and -45° to the horizontal to obtain data on the ellipticity of the spot. The fundamental frequency at normal T. V. scanning rates is about 3.5 Mc. Ideally, a camera tube would be set up so that the response from the information at +45° is the same as the response at -45°, and at that point the response from both would be optimum. When the responses from both sides of a block are equal, it means that the spot is round, elliptical with the major axis vertical, or elliptical with the major axis horizontal. The approximate orientation can then be determined by the response curve. High response from low line numbers (which are vertical) coupled with low response at higher line numbers (which approach the horizontal direction) indicate a vertical ellipticity; and, low response at low line number coupled with higher than normal response at high line numbers indicates a horizontal ellipticity. In an actual tube, the spot may be so elliptical that response from both sides cannot be made equal; also, the spot changes ellipticity and orientation with scanning, and defects related to the cathode, such as split beam, make it impossible to equalize response. In actual use, it has been found that the condition of balanced horizontal and vertical resolution with best center to corner focus can be achieved by making the response from the three blocks of "set-up" information in the center line as equal and great as possible. When a camera tube has been set up for equal and optimum response as above, corner response curves can be read directly with no electrical refocusing. Only the optical focus should be readjusted for corner focus.

Each block of information has been bound by black and white for accurate 100% signal reference. It is especially important to note the black to white references when measuring corner response curves, due to the signal drop-off at the edges of the picture.

The accompanying reproduction of the pattern contains the key to the aperture response pattern. The pattern is upright when the "set-up" wedges in the center line form arrows pointing upward. The black borders at the corners form the edges of the pattern, which measures 7 1/8" x 9 1/2".

Radio Corporation of America
Electronic Components
Lancaster, Pennsylvania

May 26, 1969



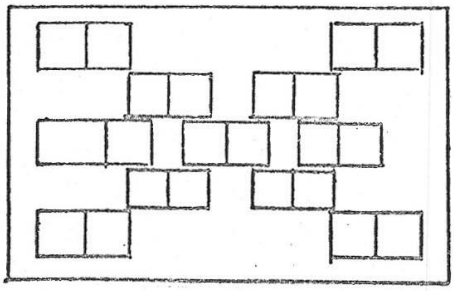
CENTER RESPONSE

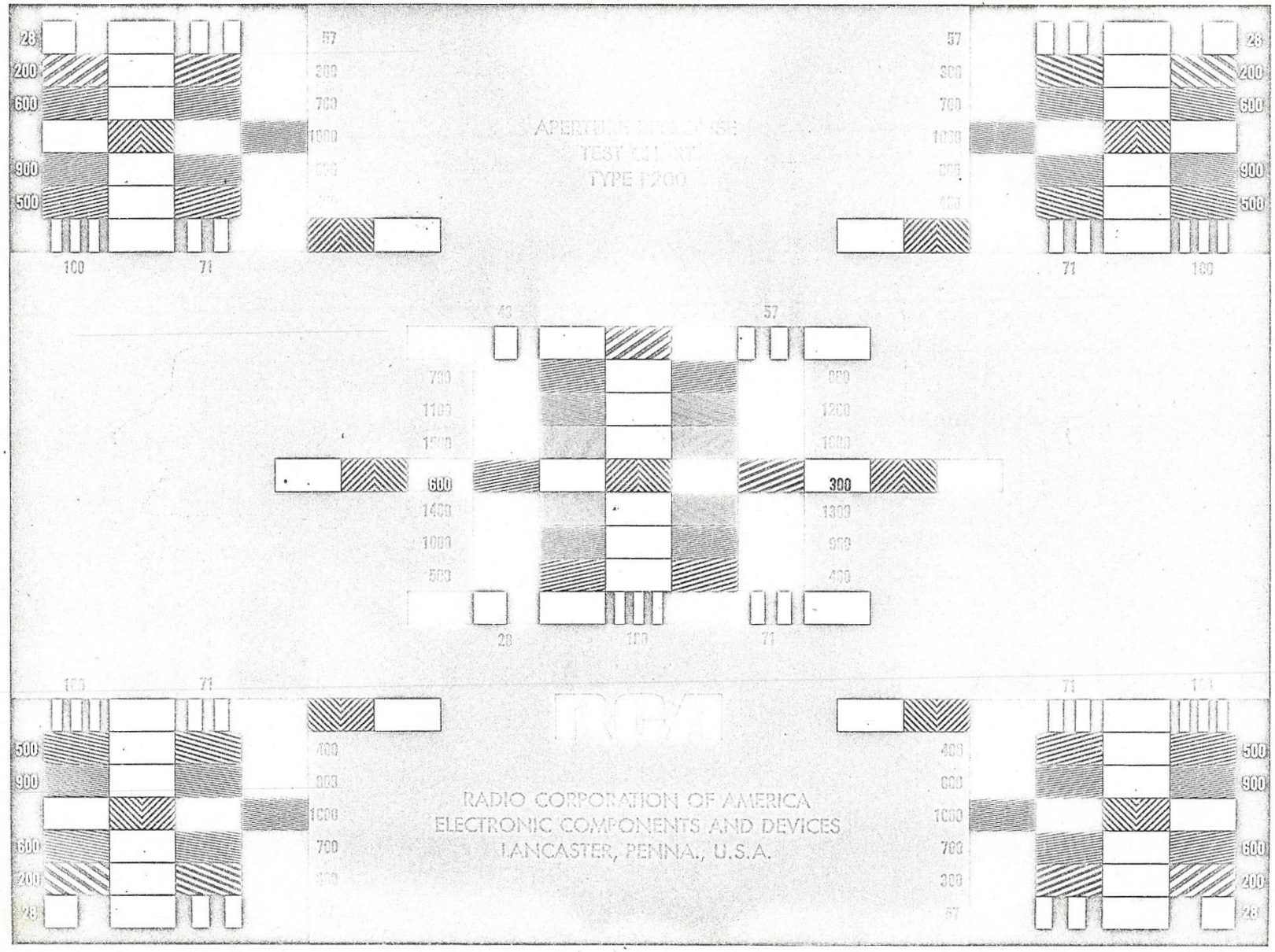
LINE NO.	RESPONSE
43	
200	
57	
700	
800	
1100	
1200	
1500	
1600	
600	
300	
1400	
1300	
1000	
900	
500	
400	
28	
100	
71	

CORNER RESPONSE

LINE NO.	UPPER LEFT RESPONSE	UPPER RIGHT RESPONSE	LOWER LEFT RESPONSE	LOWER RIGHT RESPONSE
28				
57				
200				
300				
600				
700				
1000				
900				
800				
500				
400				
100				
71				

ASTIGMATISM




APERTURE MASK
TEST PATTERN
TYPE T200
RADIO CORPORATION OF AMERICA
ELECTRONIC COMPONENTS AND DEVICES
LANCASTER, PENNA., U.S.A.