



**RCA MANUFACTURING COMPANY, INC.**

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D I V I S I O N

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APPLICATION NOTE  
GIVING

A TELEVISION BIBLIOGRAPHY AND RMA TELEVISION STANDARDS

This Note presents a bibliography of recent papers and books on television engineering, a list of the frequencies assigned by the FCC for telecasting, and the RMA television transmission standards. It is intended to be helpful to the engineer designing television equipment.

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I. General

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## II. Receiver Design and Construction

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## III. Scanning and Synchronization

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FREQUENCIES ASSIGNED BY FCC FOR TELEVISION TRANSMISSION

Megacycles

44	-	50	186	-	192
50	-	56	204	-	210
66	-	72	210	-	216
78	-	84	234	-	240
84	-	90	240	-	246
96	-	102	258	-	264
102	-	108	264	-	270
156	-	162	282	-	288
162	-	168	288	-	294
180	-	186			

The FCC order in which these assignments are made is contained in FCC Mimeo. No. 32779. Regulations applicable to miscellaneous broadcast services (other than standard broadcast stations), dated April 19, 1939, are in FCC Mimeo. No. 33365. Copies of these, and other regulations on the use of ultra-high frequencies, can be obtained from the Secretary of the Federal Communications Commission, Washington, D. C.

## TELEVISION TRANSMISSION STANDARDS

Adopted by the Radio Manufacturers Association  
(Reprinted by courtesy of RMA)

### TELEVISION CHANNEL WIDTH

- M9-201 The standard television channel shall not be less than 6 megacycles in width.

### TELEVISION AND SOUND CARRIER SPACING

- M9-202 It shall be standard to separate the sound and picture carriers by 4.5 Mc.

### SOUND CARRIER AND TELEVISION CARRIER RELATION

- M9-203 It shall be standard in a television channel to place the sound carrier at a higher frequency than the television carrier.

### POSITION OF SOUND CARRIER

- M9-204 It shall be standard to locate the sound carrier for a television channel 0.25 Mc. lower than the upper frequency limit of the channel.

### POLARITY OF TRANSMISSION

- M9-205 It shall be standard for a decrease in initial light intensity to cause an increase in the radiated power. (See Standard M9-121).

### FRAME FREQUENCY

- M9-206 It shall be standard to use a frame frequency of 30 per second and a field frequency of 60 per second, interlaced.

### NUMBER OF LINES PER FRAME

- M9-207 It shall be standard to use 441 lines per frame.

### ASPECT RATIO

- M9-208 The standard picture aspect ratio shall be 4:3.

### PERCENTAGE OF TELEVISION SIGNAL DEVOTED TO SYNCHRONIZATION

- M9-209 If the peak amplitude of the radio frequency television signal is taken as 100%, it shall be standard to use not less than 20% nor more than 25% of the total amplitude for synchronizing pulses.

### METHOD OF TRANSMISSION OF BLACK LEVEL

- M9-210 It shall be standard in television transmission that black shall be represented by a definite carrier level independent of light and shade in the picture.

### SYNCHRONIZING

- M9-211 The standard synchronizing signals be as shown in Fig.1.

### TRANSMITTER MODULATION CAPABILITY

- M9-212 If the peak amplitude of the radio frequency television signal is taken as 100%, it shall be standard for the signal amplitude to drop to 25% or less of peak amplitude for maximum white.

### TRANSMITTER OUTPUT RATING

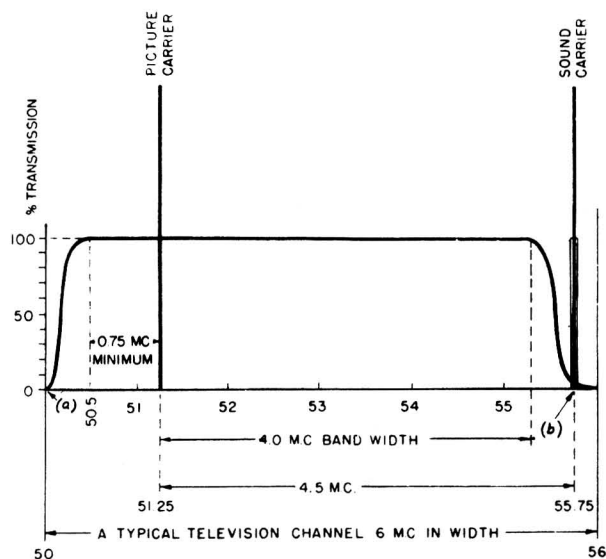
- M9-213 It shall be standard, in order to correspond as nearly as possible to equivalent rating of sound transmitters, that the power of television picture transmitters be nominally rated at the output terminals in peak power divided by four.

### RELATIVE RADIATED POWER FOR PICTURE AND FOR SOUND

- M9-214 It shall be standard to have the radiated power for the picture approximately the same as for sound.

### TRANSMITTER AMPLITUDE CHARACTERISTIC

- M9-215 The standard transmitter amplitude characteristic shall be as shown on next page.



- Notes: (a) Transmission at lower edge of channel not greater than 0.1%.  
 (b) Transmission of picture side band at sound carrier not greater than 0.1%.

SCANNING

- M9-216 It shall be standard to scan at uniform velocity in horizontal lines from left to right, progressing from top to bottom when viewing the subject from the camera position.

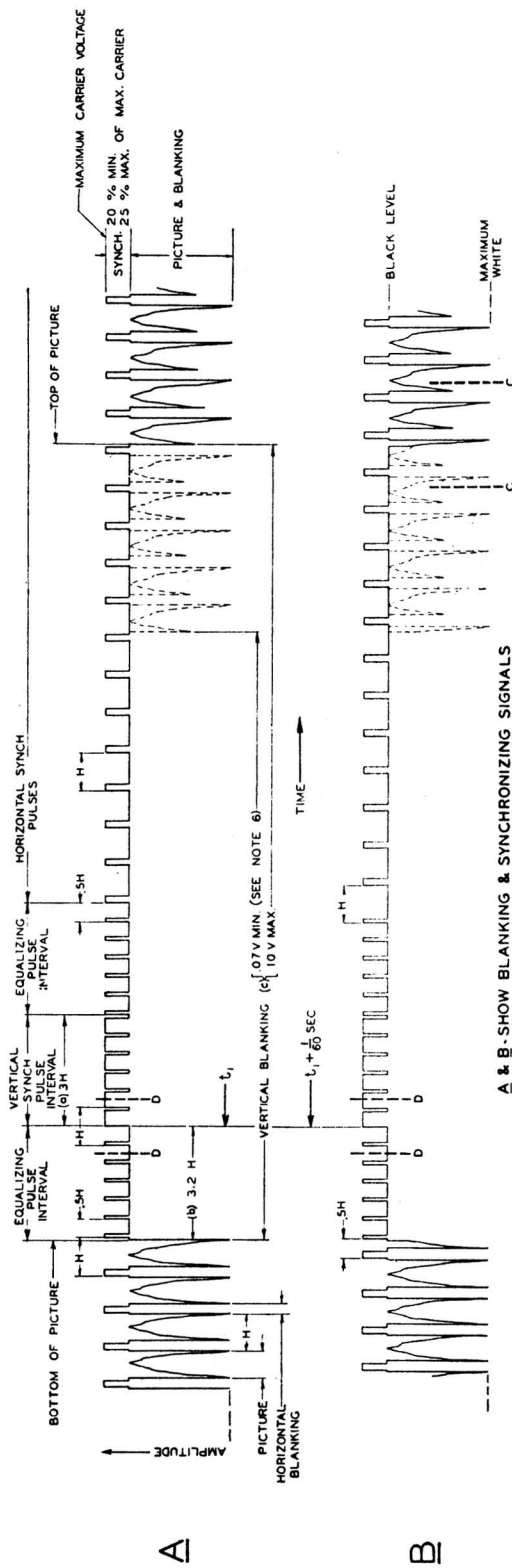
POLARIZATION OF RADIATED WAVE

- M9-217 It shall be recommended practice in television transmission that the radiated wave shall be horizontally polarized.

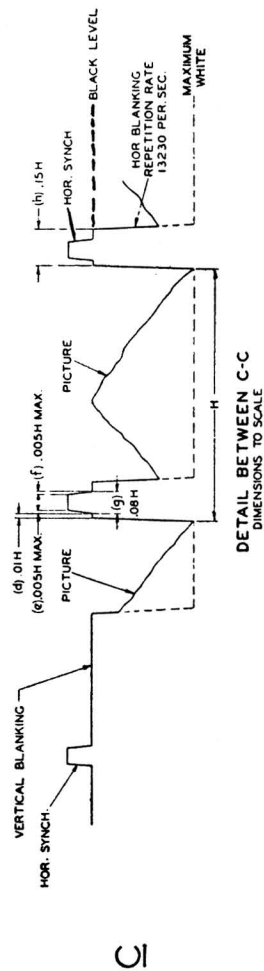
SOUND TRANSMITTER AMPLITUDE CHARACTERISTIC

- M9-218 It shall be standard in television sound transmission to pre-emphasize the modulation at the higher frequencies according to the impedance-frequency characteristic of a series inductance-resistance network having a time constant of 100 micro-seconds.

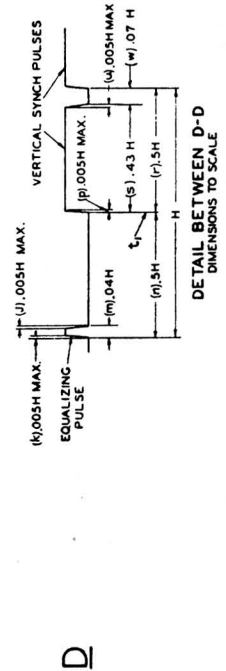
441 LINES. 30 FRAMES PER SEC., 60 FIELDS PER SEC., INTERLACED



A & B SHOW BLANKING & SYNCHRONIZING SIGNALS IN REGIONS OF SUCCESSIVE VERTICAL BLANKING PULSES. (HORIZONTAL DIMENSIONS NOT TO SCALE. ALL DIMENSIONS ARE FROM BLACK LEVEL UNLESS OTHERWISE SPECIFICALLY INDICATED)



DETAIL BETWEEN C-C  
DIMENSIONS TO SCALE



DETAIL BETWEEN D-D  
DIMENSIONS TO SCALE

- 1- DIAGRAM C SHOWS ENLARGED DETAIL VIEW OF SIGNAL IN VIEW B BETWEEN LINES C-C
- 2- DIAGRAM D SHOWS ENLARGED DETAIL VIEW OF SYNC. SIGNAL IN VIEW A BETWEEN LINES D-D
- 3- H-TIME FROM START OF ONE LINE TO START OF NEXT LINE =  $1/13230$  SEC.
- 4- V-TIME FROM START OF ONE FIELD TO START OF NEXT FIELD =  $1/60$  SEC. =  $220\frac{1}{2}$  H
- 5- LEADING AND TRAILING EDGES OF BOTH HOR. AND VERT. BLANKING PULSES HAVE SLOPES (NOT INDICATED IN A & B) WHICH SHOULD BE KEPT AS STEEP AS POSSIBLE
- 6- RECEIVER VERTICAL RETRACE SHALL BE COMPLETE AT END OF .07 V

FIG. 1