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 televising, and the RMA television transmission standards. It is intended to be helpful to the engineer designing television equipment.

BIBLIOGRAPHY

I. General


Copyright, 1939 by
RCA Manufacturing Co., Inc.

AN-104-6-7-39
Printed in U.S.A.
II. Receiver Design and Construction

1. A series of articles by E. W. Engstrom and R. S. Holmes in Electronics

"Television Receivers," April, 1938.
"Power for Television Receivers," April, 1939.

2. A series of articles by C. C. Shumard and J. B. Sherman in QST:


III. Scanning and Synchronization

13. Instruction booklets on RCA Kinescopes, Iconoscopes, and Monoscope.

IV. Standards


V. Transmission Lines and Antennas


VI. Transmitters


VII. Tubes

7. Instruction booklets on RCA Kinescopes, Iconoscopes, Monoscope, television amplifier tubes, and related types.

VIII. Video Amplifiers

FREQUENCIES ASSIGNED BY FCC FOR TELEVISION TRANSMISSION

**Megacycles**

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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.

C - DIAGRAM C SHOWS ENLARGED DETAIL VIEW OF SIGNAL IN VIEW B BETWEEN LINES C-C
D - DIAGRAM D SHOWS ENLARGED DETAIL VIEW OF SYNCH SIGNAL IN VIEW A BETWEEN LINES D-D

1. H - TIME FROM START OF ONE LINE TO START OF NEXT LINE = 1/13230 SEC.
2. V - TIME FROM START OF ONE FIELD TO START OF NEXT FIELD = 1/60 SEC. = 220\(\frac{1}{2}\) M
3. H - TIME FROM START OF ONE FIELD TO START OF NEXT FIELD = 1/60 SEC. = 220\(\frac{1}{2}\) M
4. V - TIME FROM START OF ONE FIELD TO START OF NEXT FIELD = 1/60 SEC. = 220\(\frac{1}{2}\) M
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