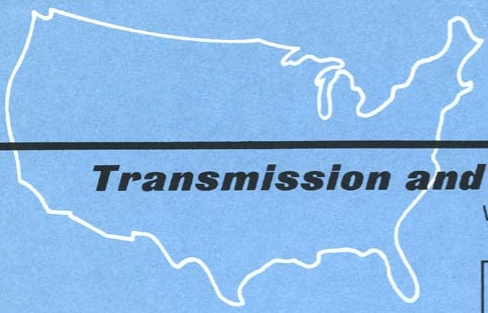
KEEP - ~~Page~~ Item 4.02

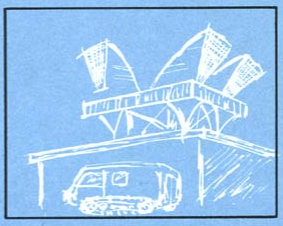
P.B. Redding
r 1708

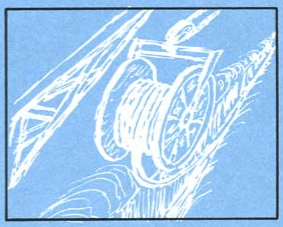


T&R NOTES

Transmission and Radio Notes

Volume 3, No. 2 June 1968





American Telephone & Telegraph Company
Engineering Department

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2.09 Video Systems

2.09.1 CATV – Field Modifications

E.M. 768 and E.M. 858 have been issued recommending certain field modifications to CATV equipment.

E.M. 768 describes a modification to Jerrold Channel Commanders when they are used in adjacent channel operation in the high band (channels 7 – 13). This modification reduces the possibility of a Channel Commander's AFC locking on a strong adjacent channel in the absence of the proper channel carrier.

E.M. 858 recommends several field modifications to Jerrold Starline Amplifiers. Two of these modifications will result in major improvements in system stability with temperature and amplifier reliability. A third modification will improve system hum performance.

W.F. Spencer

2.09.3 KS-19763 Oscilloscope

The high-frequency roll-off that has been a problem with the KS-19763, L1 Oscilloscope (television waveform monitor) appears to have at last been solved. E.M. 811, dated March 13, 1968, gives the details of the solution. All of these oscilloscopes should be returned to the manufacturer for elimination of the problem. Western Electric is coordinating the return of the oscilloscopes, and Associated Companies should make arrangements through their local Distributing Houses.

E.M. 811 also gives additional details of the optional new features that can be added to these oscilloscopes to make them more versatile.

The proper operation and accurate response of television waveform monitors is made even more critical by an understanding between the major network broadcasters and the Bell System on interim tolerances for Vertical Interval Test Signals. This understanding, known as N.T.C. Engineering Report #5, is discussed in another article in this issue of T & R Notes.

C.L. Ostrofe

2.09.3 Television Test Signals – Pulse Rise and Fall Times

There have been recurring instances, particularly on local video circuits, in which certain video test signals have shown excessive overshoot, or spiking, when transmitted through an otherwise satisfactory circuit and then displayed on an oscilloscope. On some occasions, circuits have been unnecessarily withheld from service , and extra time and effort has been spent in realignment.

Video transmission systems such as the A2A and A2AT have a relatively flat amplitude-frequency response to approximately 4.5 MHz, and roll off gradually beyond. This response is completely adequate for high quality U.S. standard video transmission. Any signal with significant frequency components above approximately 4.5 MHz will be distorted by such a system. For example, the "1T" sine-squared pulse, whose half-amplitude duration is 0.125 microseconds, has a frequency spectrum extending to 8 MHz, and therefore shows overshoots and ringing when transmitted through a system with 4.5 MHz flat response.

Overshoots on the rise and fall transitions of video test signals can easily be the result of excessively fast or incorrectly shaped rise and fall transitions produced by the test signal generator. Test signal generators have been found to vary considerably in this respect, and it is advisable to check them occasionally, in accordance with the manufacturer's recommendations. There is no generally accepted industry standard for the transient time of the test signals. NTC Engineering Report No. 5 specifies a minimum of 0.100 microseconds for all transitions, while FCC Rules and Regulations specify, for a radiated signal, a maximum of 0.254 microseconds for synchronizing and equalizing pulses.

Our purpose here is to offer a conservative guideline until a standard is established. The rise and fall transitions of video test signals at the output of the test signal generator should ideally have a sine-squared shape. It is possible to visually check, on an oscilloscope set to maximum horizontal magnification, that transitions are smooth curves, and free of sharp variations, ringing, and overshoots. The transition time, between 10% and 90% of full amplitude, should be approximately 0.150 microseconds. This does not apply to the T or T/2 pulses, which are specified to be faster.

C.L. Ostrofe

2.09.3 A New Test Instrument for Local Video Transmission Systems

The current practice for alignment of A2A and A2AT video transmission systems requires, at the transmitting end, the use of a 61C Signal Generator, a 70B Power Meter or a 38A T.M.S., a 1AP Transmission Comparing Set, and a 200CD Hewlett-Packard Oscillator. The purpose of this combination of equipment is to send alternately a test frequency sinewave and a reference frequency sinewave at an accurately controlled sending level.

The functions of all of these individual equipments as used for video circuit alignment have been combined into a single new test set, the Hewlett-Packard 653A Oscillator, which is smaller, lighter, less expensive, and easier to set up and use than the combination it replaces.

The 653A has a 10 Hz to 10 MHz adjustable oscillator, a 300 kHz reference oscillator, a switch to select between the two, a meter to check output level, and appropriate W.E.-type jacks.

E.M. 879 gives more details, and ordering and pricing information.

C.L. Ostrofe

2.09.3 VITS Performance Objectives

The Network Transmission Committee (NTC), composed of engineering representatives of the three major broadcast networks and of the Bell System, has been meeting monthly for over ten years to work on aspects of video and audio transmission of mutual interest. Cooperation between the Bell System and its broadcast customers in this committee has led to the solution of many problems, and the development of a number of innovations.

A major project of the NTC in recent years has been the adoption and use of Vertical Interval Test Signals for checking certain transmission characteristics of video facilities. For the last five years, the three major television networks have inserted test signals into the vertical interval of the video signal, specifically on lines 18 and 19 of both fields 1 and 2. These test signals are added by the broadcaster at the point of origination just before the connection to the Bell System's facilities, and

are generally left on the video signal throughout the transmission, delivery to the receiving television station, and broadcast over the air. They must be displayed on an oscilloscope for analysis. Their presence can be seen on an ordinary television receiver by adjusting the vertical hold control so that the black area between the bottom of one frame and the top of the next frame is visible. VITS will be present just above the top of the picture

VITS proved to be quite useful to the Bell System for in-service checking of transmission quality, and as a better basis for coordination with the broadcasters, in that measurable test signals are much less sensitive to the perceptivity and interpretation of the observer than are television pictures.

A logical extension of the use of VITS was the establishment of performance objectives for the individual signals. The NTC has recently developed numerical performance objectives and methods of measurement, to go into effect May 1, 1968, for a trial period of six months. The specification of the test signals, their performance objectives, and their application is discussed in NTC Engineering Report #5, which we expect to have distributed as a general letter before publication of these notes.

We wish to emphasize the importance of understanding the purpose and scope of VITS as explained in Report #5. Among other qualifications, VITS objectives are not to be interpreted as go; no-go tolerances, or on the basis of a single observation. Rather, they are intended as a statement of expected normal performance over a relatively long period of time.

VITS are expected to undergo improvements in the future. A signal for checking color is a likely future addition. Also, because of the long history and general industry acceptance of the 1T sine-squared pulse, objectives for it are included in Report #5. However, there is considerable evidence that it is not the most suitable test signal for its intended application. It has a significant amount of energy and therefore sensitivity at frequencies above the nominal video bandwidth, and does not provide good correlation between its distortion and subjective picture degradation. Work is in progress towards superior test signals.

C.L. Ostrofe

2.10 Maintenance Test Equipment for All Systems

2.10.4 A New Balance Test Set

A test set is being developed which will replace the 201A Noise Generator, 3A Noise Measuring Set, 2D Singing Point Test Set, 207G Filter and 21A Transmission Measuring Set in the adjustment and measurement of balance. Some of the attributes of the new set will be:

- Compact size (about the size of the 3A NMS).
- Reduces the tangle of cords now required to three – one power and two measuring.
- Measures ERL and SP with the flip of a switch.
- Capable of measuring at 2-wire and 4-wire points.
- Readout to the nearest dB.
- Corrections of readings not required.

A breadboard model of the proposed set has been tried out at a variety of toll offices throughout the Bell System. BTL is now in the process of evaluating the data obtained in the field environment and considering the many worthwhile suggestions received during the field visits prior to formulating the final design.

At present we have no concrete knowledge of when the set can be made available. As soon as schedule dates are available we will pass them along to you.

R.V. Hayes

2.11 Mobile Radio Systems

2.11.4 Coast Station Maps

Public Class IIB and IIIB Coast Station maps have been reissued to bring them up to date. Copies of these revised maps are attached to this issue of TRANSMISSION AND RADIO NOTES.

A. Boyne

3. PLANNING ENGINEERING

3.06 PICTUREPHONE – Suburban Loop Study

A joint A. T. & T. – BTL experimental probe of actual field conditions for PICTUREPHONE transmission in a residential suburban area is being conducted in Short Hills, N.J. Approximately 15 locations in Short Hills have been selected based on distance from the central office, variations in feeder routes, and market potential for an initial service offering. Two additional loops per customer have been assigned and made available to each location on a standard POTS basis. The loops are terminated in the nearest access terminal on poles at each location. This will simulate conditions of trying to provide PICTUREPHONE service with today's methods and plant.

Field measurements will be made to determine the amount of PICTUREPHONE transmission degradations caused by gauge changes, bridge taps, and single frequency interferences such as AM radio frequencies. The results of these tests will be compared to known laboratory calculations of transmission degradation. In the cases where loops assigned do not meet the transmission requirements, a study will be made to determine the correction procedures that have to be applied and the costs involved to provide corrected loops. The results are expected by the Fourth Quarter of 1968. We shall keep you advised.

R.H. Murphy

3.07 Remote Message Repeater for Long Loops

96-volt dial long line equipment will provide satisfactory signal and supervisory performance and adequate transmitter current over an external loop resistance of about 3900 ohms. With this range, and allowing for telephone set resistance and the resistance of an E-6 repeater, it will be possible, for example, to build a loop 100 kf long wholly of 22-gauge cable (H-88 loaded). The insertion loss of such a loop will be too great to permit the use of an E-6 repeater in the central office, as sufficient gain cannot be realized due to crosstalk limitations.

We are proceeding with the development of a remote message repeater (voice gain only) to care for such situations. As currently contemplated, the remote package will consist of units of six E-6 repeaters, each unit to be powered over a separate pair from the central office. One of our available boxes will be adapted for mounting the units and it is expected that up to three of the six-repeater units will mount in the box. A relay will be provided with each unit to bypass the repeaters in the event of power failure and a power alarm will be provided at the central office.

Preliminary cost estimates indicate that we will realize a substantial saving by utilizing a 96-volt dial long line equipment in the central office and remote repeater package over the use of the J98619 Message and Signal Repeater.

Availability of the remote repeater package will be as soon as possible after availability of the 96-volt dial long line equipment. Concerning the latter, Mr. Goldstein contacted the Equipment Engineers by TWX on January 31, 1968, requesting company estimates of requirements. Company replies will be of great importance in stimulating the activity necessary to meet an early 1969 availability date for the 96-volt dial long line equipment.

C.D. Howe

4. GENERAL AND MISCELIANEOUS

4.02 Organization

Transmission Section

Effective May 16, Mr. Herbert C. Jessen of the Pacific Telephone and Telegraph Company in Sacramento accepted a postition as engineer in the Coordination and Protection Group. Mr. Jessen will be responsible for work dealing primarily with inductive interference problems. He will be located in Room 1122 B and may be reached on Area Code 212 393-2821.

Radio and Guided Wave Section

Effective May 15, Mr. Paul B. Redding of Southwestern Bell Telephone Company in Oklahoma City accepted a position as engineer in the Mobile and Special Radio System Group. He will be responsible for work dealing primarily with the marine mobile telephone services. He will be located in Room 1708 and may be reached on Area Code 212 393-2415.

5. TRANSMISSION AND RADIO INFORMATION

The following information has been forwarded since the last issue of TRANSMISSION AND RADIO NOTES.

E.M.'s

E.M. 718 – LMX-2 Multiplex – New Supergroup Adjustable Amplitude Equalizer (921A) (1S3.16-3)

E.M. 760 – N2 Repeatered Line – N2 Repeater-to-N1 Adapter

E.M. 766 – Short Haul Radio – TL/TM Vapor Phase Cooling System (1S3.90-29)

E.M. 776 – Point-to-Point Microwave Radio – FCC Procedures for Transfers of Station Authorizations (1S4.1-31)

E.M. 791 – LMX-2 Multiplex – Reduction of Incidental Phase Deviation in Intermediate Frequency Carrier Supplies (1S3.16F-15)

E.M. 801 – T1 Carrier – 113B Test Set Trouble Condition and Modification

E.M. 810 – 1A Echo Suppressor – Modification

E.M. 811 – Television – KS-19763 Oscilloscope – Revised Arrangements for Modification and Additional Features (1S3.17B-4)

E.M. 815 – T1 Carrier – Line Design

E.M. 826 – T1 Carrier – Foreign Exchange Channel Units

E.M. 827 – N3-L Junction – Price and Miscellaneous Information

E.M. 829 – 227D, E and F Amplifiers

E.M. 832 – TD-2 Microwave Radio – Replacement of 423 Type Gas Tubes with 426 AM Diodes in J68336 Type FM Terminal Equipment

E.M. 833 – TD-2 Microwave Radio – Metal Whisker Growth on 100A Switching Plug-In Units Employing Tin Plated Terminals

E.M. 846 – Renewal of Domestic Public Land Mobile Licenses

E.M. 855 – Transmission Maintenance – New Outlet Providing – 26 dBm

E.M. 858 – CATV – Field Modification to Jerrold Starline – One Series Amplifiers

E.M. 872 – Revised Color Choices for MJ Mobile Telephone Control Heads (1S3.9R1-4)

E.M. 903 – Public Mobile Telephone Service – Narrowbanding DPLM Channels in 450-470 MHz Frequency Band (1S4.1-316)

E.M. 908 – T1 Carrier – New Channel Units

E.M. 910 – N3 Carrier – AC Change for J99300AS Frequency Correction Units

E.M. 913 – Bellboy – One-Way Signaling Service – Radio Channel Assignments in 150 MHz Frequency Band (1S4.1-308)

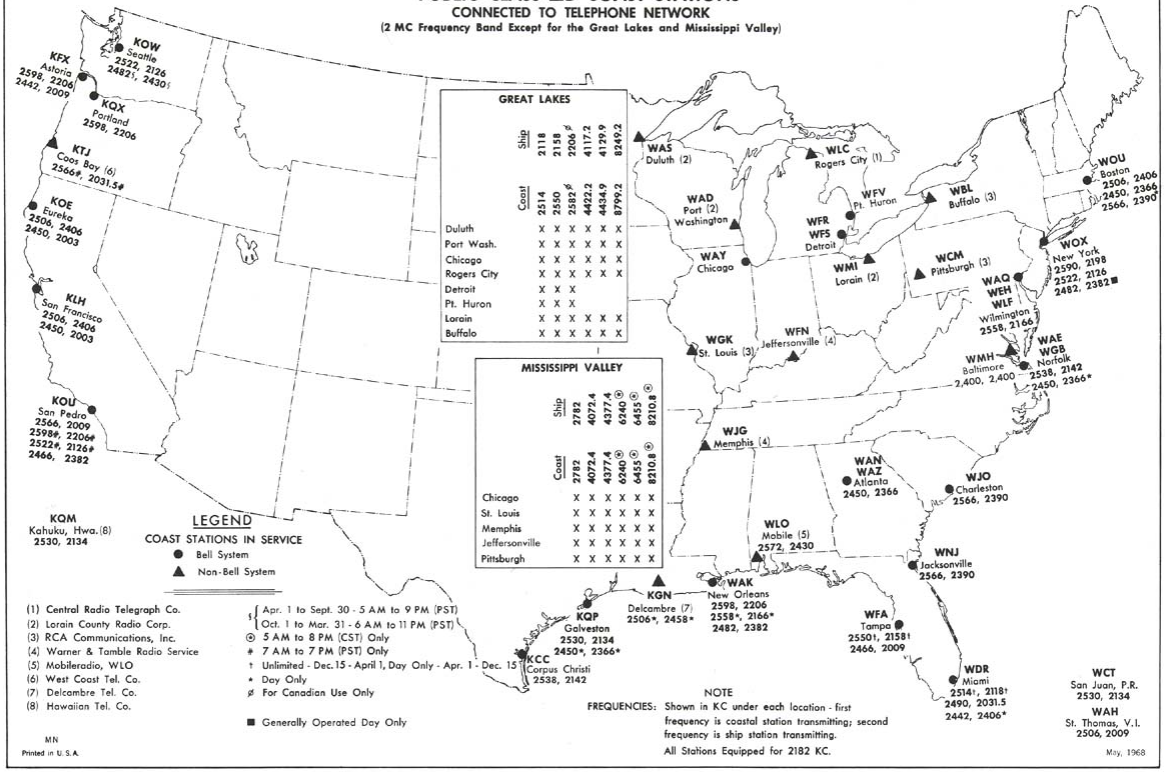
E.M. 915 – CATV – Modification of Jerrold Starline – One Series AGC Amplifiers (1S3.17D-21)

E.M. 916 – Tandem Operation of Program Amplifiers

PUBLIC CLASS IIB COAST STATIONS

CONNECTED TO TELEPHONE NETWORK

(2 MC Frequency Band Except for the Great Lakes and Mississippi Valley)



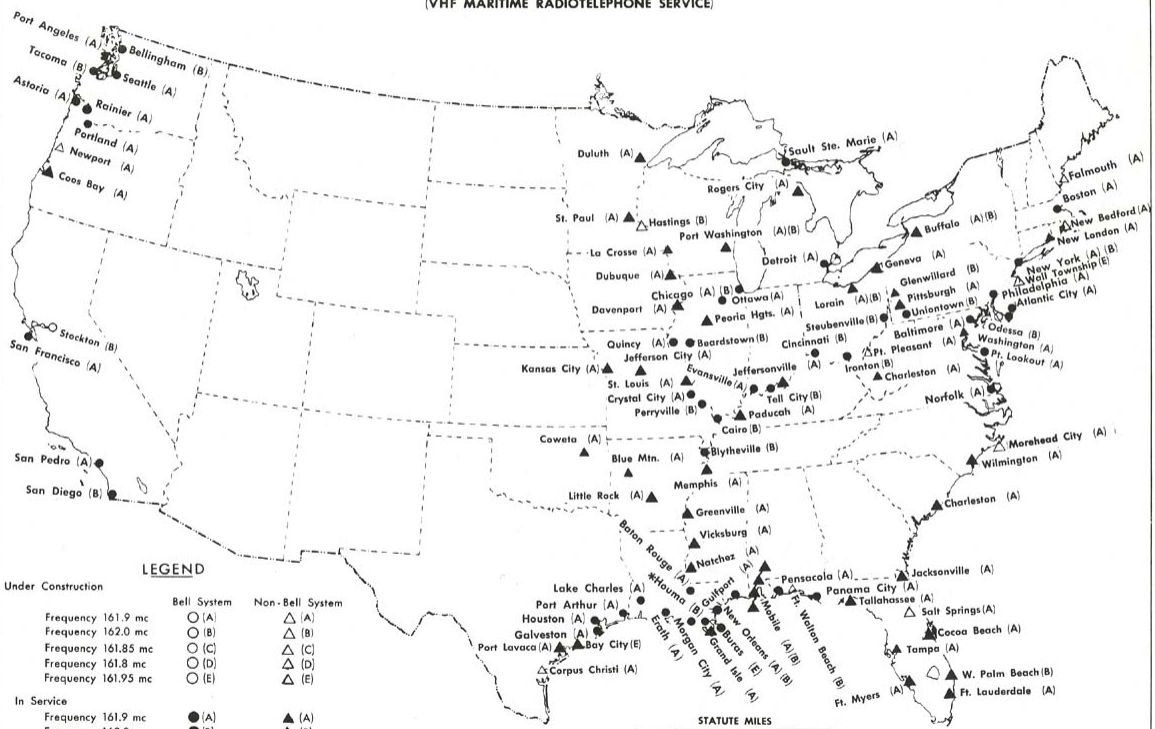
MN

Printed in U.S.A.

May, 1968

PUBLIC CLASS IIIB COAST STATIONS

(VHF MARITIME RADIOTELEPHONE SERVICE)



LEGEND

	Bell System	Non-Bell System
Under Construction		
Frequency 161.9 mc	○ (A)	△ (A)
Frequency 162.0 mc	○ (B)	△ (B)
Frequency 161.85 mc	○ (C)	△ (C)
Frequency 161.8 mc	○ (D)	△ (D)
Frequency 161.95 mc	○ (E)	△ (E)
In Service		
Frequency 161.9 mc	● (A)	▲ (A)
Frequency 162.0 mc	● (B)	▲ (B)
Frequency 161.85 mc	● (C)	▲ (C)
Frequency 161.8 mc	● (D)	▲ (D)
Frequency 161.95 mc	● (E)	▲ (E)

MN NOTE: All stations equipped to use 156.8 mc except those marked with *

May, 1968
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