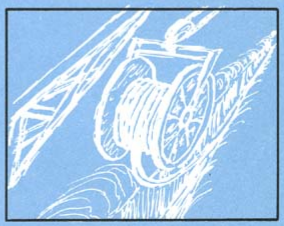
KEEP
Items 2.10.1 & 4.02

T.B. Redding
r 1708

T&R NOTES

Transmission and Radio Notes

Volume 3, No. 4 December 1968



American Telephone & Telegraph Company
Engineering Department

Page(s) Missing In The Original.

The second packaged unit, F-9024ED G-2, contains three 24V4B repeater mountings, three E-type SF signaling unit connectors, and a distribution network assembled in a 16C apparatus mounting. The G-2 unit cannot be used independently as it has no power supply or oscillator. In conjunction with the basic G-1 unit, up to five circuits can be served.

Orders for the packaged units may be placed at local W.E. Co. Distributing Houses. They have been alerted to the ordering procedure.

Additional information on packaged units may be found in the Marketing Handbook of Shop Services, or by contacting Mr. W. H. Lyons (904 353-4213) of the Southern Bell Telephone Company.

It is expected that standard consolidated equipment arrangements using SF signaling units similar in function to those described above will be developed in the future as part of the special services development project. In the meantime, the G-1 and G-2 custom packages may serve your needs.

W. C. Roesel

1.03.4 Special Services Performance

The Special Services Performance Plan Study is progressing but not at the projected rate estimated in earlier articles. The study is being coordinated with a Plant Task Force working on the Plant administration of Special Services. This task is monumental because many of the methods used by the Associated Companies are so varied. By 2Q 69, this Task Force will be in a position to start making recommendations. Because of our close coordination with them, most of the transmission items will be incorporated in their plans. Until that time, we are proceeding with outlining the parameters to be rated and, more specifically, ways and means to measure and rate these parameters.

E. M. Hammeke

1.04 Electrical Coordination

1.04.3 Proposed Practice Covering Buried Cable Systems in Joint Random Separation

You may remember that the National Electrical Safety Code was revised to permit random separation between buried power and communication facilities (this was announced in E.L. 182, dated January 24, 1968). This code revision was based upon work done by a "Joint Subcommittee to Study Buried Distribution Systems – Edison Electric Institute and Bell Telephone System." It is planned to make this report available to the Operating Companies, in practice form, namely AG56.101, during the first quarter of 1969. We anticipate a preliminary distribution of the report only being made prior to issuance of the practice.

Considering the coordination and protection aspects of this type of construction, we would like to make a few points clear:

1. Random separation is only one method of installing buried distribution plant, and its selection should be made on the basis of sound engineering and economic principles.
2. The provisions of the report and AG56.101 must be strictly adhered to and any modifications of the provisions of "The Report" and appropriate Bell System Practices could imperil acceptable safety and transmission requirements.
3. A result of random separation joint buried construction is greater mutual coupling between telephone and power cables than previously encountered. Exposures must be limited so as to meet Bell System loop noise objectives. Reference E.L. 82, dated April 27, 1967.

J. F. Katzmaier

1.05 Radio Frequency Coordination

1.05.1 (1) Proposed Changes to the Maritime Rules

(a) Maritime Service Conversion to SSB

The FCC has given notice of proposed rule making under Docket 18307 which would establish a schedule for converting to SSB the DSB maritime channels operating in the 1605-4000 kHz frequency band in all geographic areas other than Alaska and the Great Lakes. It is proposed that SSB capability at coast stations be provided by January 1, 1970 and that conversion of the service be completed by January 1, 1977, with the exception of the distress channel at 2182 kHz. The conversion to SSB operation will result in additional channel frequencies becoming available and some new channel assignments are proposed.

There are a number of problems indicated in the proposed SSB conversion with respect to technical requirements for the SSB channels and dates by which necessary equipment will become available. A number of suggestions have been received from Bell Companies regarding the proposals. Comments on the Docket 18307 proposals, reflecting the above problems and comments, will be filed with the FCC to meet the due date of December 2, 1968.

(b) High Seas Radiotelephone Service

The FCC has proposed to modify its Rules (Parts 2, 81, 83 and 85) applicable to use of radiotelephony by ship and coast stations in the exclusive HF maritime mobile service bands between 4 and 23 MHz. The proposed rule changes are to be in accord with the Final Acts of the World Administrative Radio Conference (WARC) which was concluded at Geneva on November 3, 1967 (see T. & R. NOTES, September 1967, 2.11.4).

Changes to the International Radio Regulations that were adopted by the WARC relating to radiotelephony, included:

- Changes in frequency allotments to expand by 170 kHz the spectrum available for radiotelephony, and reduction by 170 kHz of the spectrum available for radiotelegraphy;
- A schedule of dates for the changes in channel spacing and types of emission to be used in various bands;
- A schedule of dates for the orderly shifts, on a world-wide basis, of ship and coast stations from present DSB channels to the new DSB channels;
- A schedule for shifts from current SSB channels to new SSB channels;
- A schedule of dates for the orderly conversion, on a world-wide basis, from DSB to SSB radiotelephony; and
- Technical characteristics applicable to single sideband telephony transmitters used in the Maritime Mobile Service in the bands between 4 and 23 MHz.

Under Docket No. 18271, the FCC proposed a detailed plan for implementing the conversion of coast and ship stations from DSB to SSB operation, including also a reduction in the authorized bandwidth from 3.5 kHz to 3.0 kHz for SSB operation. A.T.& T.'s comments recognized the need for an orderly conversion time-table and generally supported the FCC's plan. Exception was taken, however, in the A.T.& T. comments to the FCC's proposal to reduce the authorized bandwidth to 3.0 kHz. In our view the reduction bandwidth would:

1. Preclude the recently developed Lincompex terminal for high seas service as it is presently designed, and
2. Require the reduction of transmitter spurious emissions to levels that are beyond "state-of-the-art" design capabilities of multikilowatt transmitters operated in the 4-23 MHz band.

Reaction to these and other comments filed by interested parties must await the FCC review and the Order which will finalize the new rules.

B.C. Jamison
J.B. Keane

(2) Status of BELLBOY Service

The situation with respect to obtaining radio channel authorizations for use in BELLBOY 150 MHz systems is not markedly improved. As you know, assignments of 152.84 and 158.10 MHz have been made for wire line common carrier usage in providing 1-way signaling services but no FCC authorizations for construction applications have been granted. The FCC issued an order under Docket 16778 which made the two channels available but miscellaneous common carriers have filed requests to the FCC and the U.S. Court of Appeals for a stay in the effective date of the FCC Order. In both cases the requests for a stay have been denied. The U.S. Court has, however, accepted a petition for a legal review of the FCC action but has not as yet scheduled any dates for its consideration. It appears that the legal review will not be completed before early 1969.

E.M. 913, dated June 12, 1968, forwarded information regarding considerations and requirements for the preparation of applications to the FCC for construction permits for BELLBOY stations. A number of BELLBOY applications have been forwarded to the FCC and others are now under preparation and are expected to be filed shortly. It appears that no FCC authorizations will be granted until the court review is completed. Furthermore, most of the applications are being protested by miscellaneous common carriers, with the result that additional delays in obtaining authorizations are likely to result.

B.C. Jamison

(3) Three-Channel MK Application Approved by the FCC

The FCC has authorized a construction permit to the New Jersey Bell for three 450 MHz channels to be used in an MK radio system. This is a first of its kind since the maximum number of DPLM channels previously obtained under one permit has been two. We are hopeful that the FCC in the near future will authorize a number of 450 MHz multi-channel applications now on file with the Commission. Considerable groundwork has been laid with the FCC by means of meetings at which Bell System objectives and requirements for DPLM service, particularly in the 450 MHz band for MK channels, were outlined.

In order to obtain FCC approval of multi-channel applications for construction permits it is imperative that convincing showings of need be made. E.M. 904 was forwarded on September 23, 1968, which covered in considerable detail the considerations and suggestions for preparing the showing of need. It is suggested that the Companies carefully review E.M. 904 prior to forwarding to the FCC any multi-channel DPLM applications.

B.C. Jamison

(4) Preparation for the Next World Administrative Radio Conference

The Administrative Council of the International Telecommunications Union (ITU) has adopted a Resolution calling for a Space World Administrative Radio Conference (WARC) in late 1970 or early 1971. The Resolution sets forth a tentative agenda for the proposed conference and requests comments by member administrations. Final action on the detailed agenda, timing of the meeting, etc., will be adopted by the Administrative Council in May 1969.

In line with the above the FCC has initiated, under Docket No. 18294, an inquiry requesting public comments regarding the development of United States proposals to the forthcoming Space WARC.

In the First Notice of Inquiry (adopted August 14, 1968), the FCC indicated that future exclusive allocations for communication-satellite services could not be accommodated below 17.7 GHz. They proposed, in connection with joint Director of Telecommunications Management (DTM)-FCC studies of existing and future frequency usage between 10 and 40 GHz, that the band between 17.7 and 31.3 GHz could be reallocated to accommodate future needs for satellite services.

The A.T.& T. comments filed in this matter included the following:

1. General concurrence with FCC's view that there is need for 5 GHz (2.5 GHz in each direction) above 17.7 GHz for future satellite systems.
2. Need for future terrestrial communication requirements, including fixed and mobile services, should also be considered.
3. Our studies indicate a need for 2 GHz for point-to-point terrestrial service and 0.5 GHz for future mobile services.
4. A revised frequency allocation table (17.7-33.0 GHz) to indicate the changes proposed.

The FCC, on October 9, 1968, adopted a Second Notice of Inquiry in the same proceeding in order to solicit further views regarding the proposed agenda for WARC. These proposals were mainly of an administrative nature and A.T.& T. generally supported them.

J.B. Keane

(5) Expansion of Air-Ground Developmental Service

On September 4, 1968 the FCC released a Memorandum Opinion and Order which extends the operation of the existing developmental air-ground radio service indefinitely and allows the expansion of the service. Concurrently the FCC issued a Third Notice of Proposed Rule Making (Docket 16073) in order to help resolve the immediate questions and allow the establishment of air-ground service on a regular basis. Comments on the proposed rules are being prepared by "195".

The Commission has proposed in rule making, to make available 12 two-way air-ground channels instead of the six channels presently available. The present 50 kHz channel separation is being reduced to 25 kHz in the present frequency allocations of 454.6625-455.000 MHz and 459.6625-460.000 MHz. Pending the resolution of this rule making, applications for air-ground facilities to expand the existing system will be accepted for filing on a developmental basis subject to a showing required by Part 21, Subpart F, of the FCC Rules and Regulations. Channel spacing must be in accordance with the allocation plan and standards set forth in the proposed rule making.

The Commission for the first time is proposing the sharing of frequencies between the land mobile and the air-ground systems. It has also rescinded the five-year termination period on existing air-ground service as imposed by the Report and Order issued under Docket 14615. The existing service was to have terminated in 1970.

R.M. Reid

(6) Proposed Allocations for Land Mobile Services at 900 MHz

As indicated in the September issue of T.& R. NOTES, the FCC has proposed to allocate 75 MHz for high capacity common carrier mobile systems at 900 MHz. As you might expect, we have been actively

engaged in the preparation of a detailed set of comments. This activity involves the assistance of Bell Laboratories as well as other Departments of A.T.& T. Our filing will contain a detailed proposal including studies and exploratory development work provided that suitable frequency bands are allocated.

On November 20, the FCC granted an extension of time from December 2 to February 3, 1969, in order that all parties have adequate time for preparing comments.

J.B. Keane

1.05.3 Mechanization of Microwave System Engineering

The joint A.T.& T.-Operating Company Task Force to study computer techniques applicable to Bell System microwave system engineering, has concluded its work (T.& R. NOTES, June and September 1967 and March 1968). This effort, spread over approximately 15 months including five two-day meetings of the Task Force, has produced a comprehensive study of current Bell System computer usage and expected future usage.

The report clearly indicates that extensive use is currently being made of computers for microwave system coordination and interference studies. With the exception of Long Lines, computer usage for microwave system engineering is on a decentralized basis with considerable duplication of effort and expense within and between Operating Companies. It goes on to conclude that far greater computer usage and efficiencies are possible for many more microwave system engineering functions provided that future computer systems are properly organized and directed.

The final report of the Task Force is expected to be completed early in December. The report contains four study reports that provided the bases for the main report which includes a description of a central organized and managed computer system configuration and associated system cost analyses. The four study reports are summarized as follows:

Study Report No. 1 – Bell System Microwave System Engineering

This study was essentially a survey of present computer usage and future computer requirements for the entire Bell System. The study includes discussion and analysis of (1) computer techniques for all phases of microwave system engineering, (2) microwave system engineering manpower trends, and (3) microwave station data files (microwave station catalog). Input data for this report was obtained from a series of meetings with telephone company radio engineers.

Study Report No. 2 – Mechanization of Microwave System Engineering Functions

Early in the work of the Task Force it became apparent that the application of computers to microwave system engineering work could go well beyond present day usage. This study discusses each of the microwave system engineering functions that might be considered candidates for mechanization. These functions are classified in three phases: Initial, Growth and Future, and they are related to present and future data base and programming requirements.

Study Report No. 3 – Computer System Characteristics

This study encompasses the general characteristics that would be required for any type of computer system used for microwave system engineering. Specific computer systems or configurations are avoided in this study since this was one of the initial studies made by the Task Force that provided background and support for the system configurations that are discussed in the following Section of the Main Report.

Study Report No. 4 – Potential Advantage of Computer Operations

During the work of the Task Force it became increasingly apparent that some method of analysis was needed that related microwave engineering functions that could be mechanized to the economic and/or productivity

advantages that might be realized. The analysis presented in this study is intended to be used as an engineering tool to aid in decision-making relating to the mechanization of specific microwave engineering functions. Examples are given, based upon actual experience, to illustrate the method as used.

The report is currently being reviewed in the Engineering B Division and we will keep you advised of further action that may be forthcoming as a result of this work.

J.B. Keane

1.06 Transmission Performance

1.06.1 Transmission Performance Index

Computer programs are an essential part of development of the Transmission Performance Index Plan. Several programs are planned, and some of them are discussed elsewhere in these NOTES. The Treasury Department at "195" has been asked to undertake major efforts, and the resulting programs will be made available to Company EDP centers through the Comptroller's Department. These programs should result in a substantial reduction in clerical work and produce far more useful results.

Centralized program preparation has a lot of advantages. It ensures programs that can be uniformly applied throughout the System to get uniformly accurate results. It eliminates duplication and the need for many engineers to get deeply into programming problems. In short, it's much more efficient and economical to get the programming done in one place. We recommend that all Transmission Engineers take advantage of "their" programs as soon as they become available.

1.06.2 Connection Appraisal Index

Progress continues on preparation of computer programs to summarize and analyze connection appraisal data. The package of programs is scheduled for field testing in December. If all goes well, it will be made available to all EDP centers in February, 1969. We hope everyone will be able to put first quarter data into the programs, using manual summaries as a check. After the first run is complete, there should be no more manual summaries.

A planning letter was published on September 20, 1968. In addition, a memorandum dated November 8, 1968, was mailed to Connection Appraisal Coordinators. This had to be done because some of the preliminary work for 1969 has to be done now. Some of the BSP's cannot be rewritten until the field trial of the programs is complete.

The computer selections of toll call samples for 1969 surveys are due now, and they are on the way. The print-outs will look somewhat different this year. We are processing the sample selections further with a computer at Western Electric Company. This additional step will add the test line telephone numbers and arrange the data so it can be copied directly onto a worksheet. This should cut down substantially on year-end clerical work.

Page(s) Missing In The Original.

2.10 Maintenance Test Equipment for All Systems

2.10.1 Switched Maintenance Access System (SMAS)

A trial of the economic desirability of a switched maintenance access system (SMAS) for the DDD networks, similar to SMAS #2 utilized in the AUTOVON network, is presently proposed.

Switched maintenance access provides access to the standard level points (+7, -16 dB) at the VF patch jacks and the E & M leads of the circuit. Access is obtained via zero loss trunks from control points located on the appropriate test board.

J.N. Rice

2.10.1 New Milliwatt Supply Outlet at Reduced Level

E.M. 855 was recently released which announced a new milliwatt outlet for VF patching bays. This outlet provides -26 dBm at 1000 Hz (-10 dBm at 0 TLP) for use in long term tests of carrier channels.

For some time, it has been suspected that the practice of using test tones of 0 dBm at 0 TLP might cause interference in other channels of carrier and radio systems. Several years ago a study was made which concluded that this interference was not serious, considering the short times that test tones are usually applied. No known cases of trouble which could be traced to such applications could be found. Also, as can readily be understood, a Bell Systemwide reduction in standard test tone levels would be a massive undertaking and would involve a long period of conversion during which considerable confusion would exist. Furthermore, it would involve the redesign of several items of transmission measuring gear to retain the same accuracy at the reduced levels. In addition, several hundred sections of the Bell System Practices would have to be revised.

In many cases, however, for trouble shooting and analysis purposes, it is necessary or convenient to apply test tone to one or more channels of a carrier system for extended periods. This increases the probability of causing interference and it was therefore decided to initiate a program of providing low level test tone sources for long term testing. The arrangement announced in E.M. 855 is the first step. This will be extended to the N2 and N3 packaged bays in the near future. Later, it will be provided in other test positions.

These arrangements constitute additions to the present testing facilities. It is still planned, however, that in the foreseeable future, routine and circuit order tests, as well as the usual trouble sectionalizing procedures, will continue to be made using test tones of 0 dBm at 0 TLP.

D.T. Osgood

2.10.1 International Crystal Manufacturing Company, R.F. Attenuator

In the September 1968 issue of T.& R. NOTES, we discussed availability of the DuMont Model 21-1CBA Attenuator which is described in BSP 104-201-000 and used in the Mobile Radiotelephone Service. Due to insufficient demand, this unit will no longer be available. However, we have determined that a similar unit is available from International Crystal Manufacturing Company, Inc., 10 North Lee, Oklahoma City, Oklahoma, 73102. The price of the unit is $19.50 f.o.b. Oklahoma City. Orders should specify "part No. 150-288."

P.B. Redding

2.11 Mobile Radio Systems

2.11.3 Discussion of G.E. IMTS Control Terminal

As many people are aware, Secode introduced an IMTS type mobile radio control terminal about the time the Bell System MJ equipment was available. Subsequently, approximately two years ago, General Electric purchased all manufacturing rights to this equipment and currently sells to various Bell and Independent Companies. During this time, A.T.& T. has received many calls from Associated Companies regarding the use of this terminal.

The Alabama Area of the South Central Company has installed seven Secode or G.E. terminals of various sizes throughout the state. Their experience to date, as reported to A.T.& T., has been good, and they feel this terminal offers some advantages over the MJ KS large terminal for installations of 3 or 4 maximum channels. These reported advantages include lower equipment costs, more compact equipment requiring less floor space, and easier, faster installation. The most obvious problem associated with using this equipment is the lack of standard Bell System documentation.

The G.E. terminal is available for 1 to 4-channel operation. Two basic models are available – a single channel nonexpandable terminal and a 1 to 4-channel terminal (MDA1103). The MDA1103 terminal utilizes one bay for the common control equipment including up to 120-line circuits, and one bay for up to 4-channel units. An option is available to expand the terminal to 240 lines with the addition of a third bay. The channel units (4038G2) are usable alone as manual type terminals similar to the G2 control terminal. The terminal is compatible with MJ KS base station radio equipment and, by addition of a receiver selector panel (MJ1RS), multiple receiver operation with automatic receiver selection is available.

If any of the Companies have questions concerning the Alabama Area's experience with these terminals, you may wish to call Dick Hudson of the South Central Company's staff on 205 321-8224.

R.G. Buck

2.11.6 BELLBOY BSP's

Several recent developments involving BELLBOY Personal Signaling Systems will be reflected in changes and additions to the 407 Division of the Plant Series of Bell System Practices.

35 MHz Systems – A new Timing Assembly for the Bogen control terminal will affect three sections in the 407-1 layer and the new Bogen receiver will be covered in new sections in the 407-104 group.

150 MHz Systems – The newly designed system will result in the complete rearrangement of the 407-2 layer and will include revised sections on the J1 Control Terminal together with new sections on the Motorola KS-20429 base station transmitter and the KS-20432 pocket-carried receiver.

An EM detailing the specific changes in the 407 Division was released during the 4th quarter of 1968.

P.D. Bodman

Page(s) Missing In The Original.

3. PLANNING ENGINEERING

3.01 Results of "Lineless" Extension Trials

In association with Bell Telephone Laboratories, Mountain States Telephone and Telegraph Company, and New England Telephone and Telegraph Company, two trials of the "lineless" extension, described in the September 1967 edition of T.& R. NOTES, were successfully conducted at Phoenix, Arizona and Boston, Massachusetts. The Boston trial was started in late November 1967 and was concluded in April 1968. The Phoenix trial ran from January to June of 1968. There were 19 trial users in Boston and 21 in Phoenix.

Much useful data was obtained which will play an important role in determining the operating range, co-channel separation requirements and other design parameters for possible future systems. The concept of the "lineless" extension was well received, although the majority of the users felt that the portable unit should be smaller and lighter. Even with the favorable results, the Bell System is still a long way from making the "lineless" extension a standard offering, since at the present time there are no frequencies on which to operate this radio system.

J.C. Salazar

3.06 Digits on L4 Mastergroup

In the last issue of T.& R. NOTES we discussed the M2R Terminal developed primarily to transmit digital PICTUREPHONE signals over TD-2A Radio channels. A more detailed description is now included in E.M. 1025. In this issue of T.& R. NOTES we are introducing the Digits on L4 Mastergroup Terminal (DMG) for digitally multiplexing two 6.312 megabit per second digital channels into an L4 analog mastergroup band. The primary purpose of the development is to accommodate digital PICTUREPHONE transmission over basically analog carrier facilities.

Digits on L4 Mastergroup is a time division digital transmission system designed to multiplex two 6.312 Mb/s binary inputs at the T2 line rate into a 15 level, 13.29 Mb/s, 4.43 megabaud per second partial response format. The partial response band extends from d.c. to 1/2T, where T is the sampling interval (i.e., the reciprocal of the baud rate). Thus, for a 4.43 megabaud sampling rate, the upper limit of the partial response band equates to 2.215 MHz. The energy spectrum of the partial response band is zero at 0 and 2.215 MHz, with a maximum at mid-band.

The d.c. to 2.215 MHz partial response band is modulated in a suppressed carrier balanced modulator whose frequency is chosen to place the lower sideband output approximately in the center of the standard 2.52 MHz L4 mastergroup band. As an example, a carrier frequency of 8.38 MHz is employed to translate the partial response band into L4 mastergroup 3. Modulation of the 0 to 2.215 MHz partial response band with an 8.380 MHz carrier, followed by LSB filtering, results in a mastergroup 3 energy spectrum extending from 6.165 MHz to 8.380 MHz. A 2.215 MHz timing pilot is inserted at the baseband input to the modulator. This signal together with a reinserted carrier is used to recover timing in the receive DMG Terminal.

Trials of a brassboard model of the DMG have been conducted over a loaded L4 facility between Dranesville, Virginia and Moseley, Virginia. Results have been encouraging. In these trials an automatic time domain 15-tap transversal equalizer and a.g.c. circuit have been satisfactorily tested.

It is expected that the final design will permit operation of the DMG over L4 mastergroups 2 through 6 in any combination with message mastergroups. Mastergroup 1 is precluded due to poor low frequency response. Digital regenerators will be required at approximately 300 mile intervals (every other main station).

More detailed information will be included in an introductory E.M. being prepared for release during the fourth quarter of 1968.

T.F. Benewicz

3.06 PICTUREPHONE Loops – Urban Loop Study

An A.T.& T. study of potential PICTUREPHONE loops in a New York City business environment is being conducted. New York City was selected for study because PICTUREPHONE service will most likely be initially offered in Manhattan. This effort is to determine by a search of plant engineering records the suitability of the loop plant to meet the PICTUREPHONE transmission restrictions. A sample of loops from a selected central office is being searched for the extent of bridge tap, stubs, gauge changes, unshielded cable, and other potential limitations.

The conclusions of this study will be combined with results from other related AT&T-BTL studies to provide planning information to the Operating Companies for the initial years of PICTUREPHONE service.

R.H. Murphy
M.E. Harris

4. GENERAL AND MISCELLANEOUS

4.02 Organization Changes

Transmission Section

Effective October 28, 1968, Mr. Anthony Fiscarelli, Engineer in the Transmission Performance Group, transferred to the Short Haul Transmission Systems Group. He will be responsible for maintenance, equipment and transmission matters associated with N Carrier systems.

Effective November 4, 1968, Mr. J.A. Mines of Bell Telephone Laboratories joined the Special Services Group as Engineer. He will be concerned with the interconnection program.

Effective December 1, 1968, Mr. E.M. Hammeke, Engineer in the Special Services Group transferred to the Transmission Studies Group. He will continue to be responsible for Special Service Performance Planning.

Effective December 9, 1968, Mr. C.L. Thompson of the South Central Bell Telephone Company has accepted a position in the Transmission Performance Group. He will have the responsibility for the Subscriber Loop Design Index and associated subjects.

Radio and Guided Waves Section

Effective September 16, 1968, Mr. Charles L. Ostrofe of the Microwave Systems Group, joined the Pacific Telephone and Telegraph Company in San Francisco.

Effective November 1, 1968, Mr. Milton S. Hall, Jr. of Bell Telephone Laboratories joined the Microwave and Guided Wave Planning Group as Engineer.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
TRANSMISSION SECTION
ORGANIZATION

December, 1968

F.J. Skinner – Engineering Director – Transmission (393-3915)

Mrs. C. Vitale – Secretary (393-3916)

N.A. Adams – Engineering Manager – Short Haul Transmission Systems

Current system coordination associated with introducing, maintaining and improving exchange intra-urban and toll transmission systems (including signaling, carrier and transmission testing systems).

P.W. Austin – Engineering Manager – Transmission Performance

Planning and current matters related to transmission design, maintenance and performance of the public message network, including the Transmission Performance Index plan.

L.A. Hohmann – Engineering Manager – Transmission Studies

Planning and development of Engineering Method Systems. Studies on technical operational reviews. Specific studies for establishment of service requirements for transmission systems.

H.T. Uthlaut – Engineering Manager – Special Services

Planning and current matters relating to transmission design, maintenance and performance of voice frequency special services including interconnection with customer owned and maintained equipment and systems. Also, current system coordination of voice frequency systems.

F. Woodland – Engineering Manager – Coordination and Protection

Planning and current matters relating to electrical coordination and protection. Administration of program for preparation of transmission Bell System Practices. Studies to determine the economic relationships of different transmission systems and components.

SHORT HAUL TRANSMISSION SYSTEMS GROUP

N.A. Adams (Norm) – Engineering Manager – Short Haul Transmission Systems (393-3575)

P.A. Roach (Pat) 393-3576

Special Dictation and Typing, Assistant in Engineering Studies Maintenance of Group Records

C.D. Donohoe (Dick) 393-2891

Maintenance, equipment and transmission responsibility for D1 Channel Banks, T1 Lines
Independent Manufacturers Systems
Subscriber Loop Carrier Systems
Short Haul Carrier Cost Analysis
Alarm Systems

A. Fiscarelli (Tony) 393-3160

Short Haul Analog Trunk Carrier Systems N1, 0, ON2, ON/K, N2, N3
N Carrier Program Channels
Maintenance, equipment and transmission responsibility for all N and ON Carrier Systems
Impulse Noise Measurements
Engineering Carrier Systems for Data Transmission

D.T. Osgood (Ozzie) 393-2436

Transmission Testing Methods
Voice Frequency Testing Arrangements
General Purpose V. F. Test Equipment
Echo Suppressors
"Red Ball" Program
Automatic Transmission Measuring Systems
Echo Suppressor Measuring Systems

C.M. Pomeroy (Collie) 393-2910

PICTUREPHONE Loop Repeater, Trunk Repeater
PICTUREPHONE – Coordination of Transmission System Introductory Planning

J.N. Rice (Jim) 393-3555

Maintenance, equipment and transmission responsibility for D2 Channel Banks, M12 Multiplexer, T2 Lines; PICTUREPHONE Codec
A-Type Channel Banks
Consolidated Bays
V. F. Patch Bays
SMAS

J.T. Stephens (Jack) 393-4437

Signaling Systems – Single Frequency, CX, DX and SX, Touch-Tone, Other
Miscellaneous Common Carrier Interconnections

G.W. Kornemann (Gus) 393-3822

Bell System Practices – Short Haul Carrier Systems

O.L. Norman (Norm) 393-3280

Bell System Practices
Testboards
Trunk Testing
ATMS

A. Salzberg (Art) 393-3927

Bell System Practices – Signaling

T.A. Saunders (Tom) 393-2431

ATMS Planning

L.M. Lee, Mrs. (Louise) 393-3495

Preparation of Short Haul Carrier System Information
Assistant in Engineering Studies and Field Testing
Short Haul Carrier Cost Analysis

TRANSMISSION PERFORMANCE INDEXING

A.C. Johnson (Arden) 393-4202

Development and Application of the Transmission Performance Index Plan
Trunk Transmission Maintenance
Toll Connection Appraisal
Loop Noise
Trunk Transmission Design
Related Computer Programs
Study and development of "Transmission Performance Measurement Techniques" as related to indexing problems and procedures.

C.C. Stretton, Miss (Catherine) 393-2463

Programming and Analysis

H.W. Vickroy (Harry) 393-3231

Engineering Practices – Index

C.L. Thompson (Bo) 393-2030

Development and Application of Transmission Index Components for:
Subscriber Loop Design
Local Connection Appraisal
Station Equipment
Exchange Plant Transmission Testing Instrumentalities and Techniques
Central Office
Outside Plant – Loops
Station Equipment

D.L. Whitney (Don) 393-4746

Engineering Testing Procedures in Subscriber Plant Indexing

TRANSMISSION PERFORMANCE STUDIES AND RESULTS

J.A. Harmon (Joe) 393-2671

Transmission Performance Studies
Index Analysis
SAM – '195' Working Committee
Customer Complaints – Code 3's
Transmission and Noise Improvement Programs
DDD Performance
Transmission Performance Film
Transmission Performance Results
Quarterly Results Book
Annual Improvement Questionnaire

L. Pappas, Miss (Lilly) 393-2889

Programming and Analysis Results Publication

TRANSMISSION STUDIES GROUP

L.A. Hohmann (Larry) – Engineering Manager – Transmission Studies 393-3701

L.V. Jones, Miss (Lillian) 393-3702

Maintenance of Group Records
Special Dication and Typing
Assistance to Engineering Group

E.M. Hammeke (Eldon) 393 4759

Performance Evaluation Plans
Switched Services Networks
Private Line Networks
Special Services Questionnaire
BIS Special Services Liaison

R.H. Rule (Ray) 393-3948

DX Channel Bank Feature and Cost Studies
Special Transmission Engineering Studies

SPECIAL SERVICES GROUP

H.T. Uthlaut, Jr. (Herb) – Engineering Manager – Special Services (393-3073)

E. Albanese, Miss (Eleanor) 393-3074

- Maintenance of Group Records
- Special Dictation and Typing
- Assistance to Engineers in Group

J.A. Mines (Jim) – 393-3411

- System Interconnection
- Preparation of Technical References for Interconnection of Systems

J.F. Mullin (Jim) – 393-2912

- Nonswitched Private Lines and Networks
  - Transmission Design and Maintenance (Objectives, Requirements, Methods & Equipment)
    - Audio Program Service and Facilities
    - Wired Music Systems 300-Type Switching Systems
    - Announcement Systems
    - Conferencing
- Government Communications

W.C. Roesel (Bill) – 393-4919

- Special Service Equipment Project
  - Redesign
  - Repackaging
  - Application and Methods
- Special Service Maintenance Studies

W.D. Parfitt (Bill) – 393-3320

- Switched Special Services and Networks
  - Transmission Design and Maintenance (Objectives, and Requirements, Methods and Equipment)
    - PBX Services
    - FX, Tie Lines, Station Off-Premise Lines, etc.
    - PBX Conferencing
    - CENTREX
    - Secretarial Service

T.J. Talley (Tom) – 393-2313

- Short Haul Voice Frequency Trunk Transmission
  - Trunk Design
  - Loading Systems
  - E and V Repeater Applications
  - Cable Characteristics
  - Cable Completion Tests
- Artificial Lines
- Impedance Compensators
- Statistical Methods

J.M. Benedict, Miss (Jeannette) – 393-4380

Special Services Questionnaire – Computations and Summaries
Assistance to Engineers in Group

R.L. Huxtable, Miss (Ruth) – 393-2836

Transmission Design Studies
Transmission Data Computations
Insertion Loss, Return Loss, and Impedance Calculations
Assistance in Studies

COORDINATION AND PROTECTION GROUP

F. Woodland, Jr. (Woody) – Engineering Manager – Coordination and Protection (393-3742)

L.V. Jones, Miss (Lillian) 393-3743

Maintenance of Group Records
Special Dication and Typing
Assistance to Engineering Group

H.C. Jessen (Herb) 393-2821

Inductive Coordination – Low Frequency Induction, Special Problems
Corrosion and Electrolysis
Noise Influence from Power Lines
Extra High Voltage Power Line Coordination (AC & DC)
Coordination with Electrified Railroads
Central Office Noise Problems
Radio Frequency Interference

J.F. Katzmaier (John) 393-2604

Electrical Protection – Lightning and Contact Problems, Higher Voltage Joint Use, Buried Cable Systems
National Electric Code
National Electrical Safety Code
Electromagnetic Pulse Problems
Acoustic Noise Problems
Click Measurements

E.J. Lott (Ed) 393-3369

Bell System Practices – Corrosion, Inductive Coordination, Protection

L.K. Winkelman (Lou) 393-4048

Economic Analysis of Transmission Projects

R.H. Foreman, Mrs. (Ruth) 393-3340

Maintenance of Bell System Practice Files
Assistance on Studies and Practice Preparation

C. Majchrzak, Miss (Chris) 393-3275

Maintenance of Bell System Practice Files
Special Dictation and Typing
Assistance on Studies and Practice Preparation