MEMORANDUM

The 82B1 teletypewriter switching system was developed for use by the U. S. Navy. Its operation is described in CD70731-01 to CD70734-01 and CD70737-01.

The 82B1 system differs from the 81 type systems in the following respects:

(1) It is designed to handle the message preamble of the "Joint Allied Procedures." This preamble may be from 1 to 3 lines in length and is preceded by a start of message code.

(2) The system recognizes and handles six degrees of precedence.

(3) The outgoing line cabinets add channel numbers to each message.

(4) The incoming line cabinet checks channel numbers on received messages.

(5) The system has an unlimited multiple address message capacity since all messages are handled on a multiple address basis.

(6) No group codes are available for this particular system.

(7) Crossoffice speed is 200 words per minute using non-printing reperforator transmitters (RT).

(8) The system is developed for 28 type machines.

(9) The cabinets plug in to one another making installation relatively simple and rapid. They weigh about 3000 pounds and draw approximately 16 amperes of AC. There are two types of cabinets - one for incoming lines and one for outgoing lines. Each type is completely self-contained, there being no common equipment such as control panels or power plants.

Features of the incoming line cabinets are as follows:

(1) Each cabinet may be connected to two incoming lines only one of which may be a multistation line with a maximum of five stations. A 28A printing RT is provided for each line. A gear shift lever changes these machines to accommodate 60, 75 or 100 speed incoming lines.

(2) One 28B 200 speed RT non-printing director is provided for each two incoming lines.

June 28, 1957

Status of 82B1 System for U. S. Navy

A general steering committee has been established on a staff basis to handle contacts between Plant, Engineering, Commercial, Laboratories, O&E and the Pacific Tel. & Tel. Co. Three plant committees have been organized to coordinate installation activities for the three switching centers in the Eastern Area. The Pacific Tel. & Tel. Co. has formed committees for the two centers in California.

All private line service orders and most engineering supplements have been issued.

The specification for the Trenton switching center is scheduled for release next week. actual 7/2/57

The installation schedules for the various switching centers are attached.

RLD:MFD

Conference Notes
Steering Committee
USN 82B1 Teletypewriter Switching System

A scheduled meeting of the Steering Committee, held in New York on September 10 and 11, 1957, was attended as follows:

BTL	Eric	E Graber	New York
*O&E	Bill	W H Deering	"
PT&T	Roy	R C Anderson	San Francisco
*WE Co.	Cliff	C Bogardus	New York
* "		R W Dineen	"
* "		J L O'Marra	"
* "		C G Veth	"
* "	Sieg	S R Strand	White Plains
LL POE		W S Black	New York
"	Dan	D W Chamberlin	"
"	Dave	O H Davidsmeyer	"
*"		J D Riley	"
"		F E Young	"
LL ADO	Bill	W Hoinkus	"
*"	John	J Thorpe	"
LL EA (Eng)		R L Dempsey	White Plains
LL EA (Plant)	Nick	N E Lowe	"
LL Plant	Henry	H Cook 3 rd	Philadelphia
"		F R Cosh	Washington
"		B C Clatterbuck	"
"		L A Morriss Jr.	Norfolk
LL Com'l		A J Green	Washington
"		S F Hogerton	"

* Part time

1. Switching Center Subcommittee Developments

All subcommittee representatives participated actively in a series of questions of which the more important appeared to be as follows:

1. Suitability of Test Tapes proposed for use with Transmitter Start Test Circuits. These are the same as those designed for 81 systems on which trouble has been experienced due to the TSTC only approximating what is sent out in a Switching Center Test pattern. Potentially, this appears to offer a problem and Mr. Thorpe agreed to investigate.

2. Requirements for special maintenance gear for station equipment. It was developed that the Labs have designed special gear including a portable ASR and a Station Director test set. POE has requested detailed descriptions which will be disseminated through normal Plant channels. Mr. Anderson (PT&T) inquired as to costs and BTL agreed to furnish levels of charges.

3. Availability of 2 or 3 speed machines for Test Room Monitoring purposes in order to reduce the number of machines and space required.

It was developed that this proposal was already under consideration for 81 systems and the investigation would be expanded to include 82 systems.

4. Plans for the modification of existing 81D model "H" Response Monitor Set for TRs. Mr. Hoinkus agreed to follow up.

5. Requirement for uniform maintenance and testing procedures and service restoration programming.
Mr. Davidsmeyer advised a BSP, probably a new E12 Section, is planned to cover maintenance and testing. POE also agreed to prepare a letter for the field suggesting standard alternate access arrangements and restoration capabilities and procedures.

6. W. E. Co. Supply Houses requirement for information on shop test equipment also testing and assembly instructions. Mr. Bogardus agreed to follow through.

7. Requirement for shielded cables to switching centers to avoid radio interference. At the moment this question has been raised in Norfolk only but may be encountered elsewhere. Agreed that sub committees should determine where local conditions warrant and should so specify.

8. Customer proposal (West Coast) to install repeaters similar to Bell System #13 type in loop leads between the MDF and switching center station equipment.
It was the consensus that the Bell System could not tolerate this proposal and that such action should be opposed with the suggestion that the Navy at San Francisco refer the subject to DNC for a ruling if necessary.

9. Requirement for a local inter-position inter-com telephone system in switching centers for use by operating and supervisory personnel.
The suggestion has merit and Commercial agreed to explore with DNC.

2. Private Line Service Orders

Both W. E. Co. and PT&T representatives questioned the status of orders for 83B1 systems. Commercial advised DNC is still evaluating the 83B1 as well as other alternatives. Navy appreciates their delay in reaching a decision may jeopordize start date but are not too much concerned. Relatively speaking the requirement is restricted and, if necessary, relay could be performed on a manual basis as a short term expedient. Based on the above it was agreed that there would be no demands made on W.E. Co. and no action required in the field pending a customer decision.

Floor plans for all centers except Cheltenham have been submitted to and accepted by DNC . In negotiating acceptance, the specific layout of equipment and the assignment of lines serving the Intercept and Send Station Positions were resolved and will be covered shortly in Sups to the original orders.

Summaries of a new traffic survey are available and reengineering of the Final System is underway. As previously indicated Navy orders will be predicated upon the results of this survey and it is still hoped to reflect any changes in Sups to original PLSO's early in January 1958.

3. Customer Field Contacts

Mr. Anderson inquired as to when it will be permitted to contact outlying stations. Actually the Navy would prefer to delay outlying station contacts until after the results of the new survey have been approved and disseminated. On the other hand if local planning on the part of either the Navy or an Operating Company is in conflict with 82B1 plans there could be no objection to making known these plans.

Numerous references during the conference indicated only a limited knowledge on the part of local Navy personnel with Switching Center planning. This suggests active subcommittee participation jointly with local Naval personnel with the thought that should there be any conflict with Telco and DNC planning such information could be made known immediately to Commercial. One area which can be expected to develop questions, if not conflict, may be found in local, and as yet unexplored, pickup and distribution systems.

4. W. E. Co. Inc. Estimates and Schedules

In his presentation Mr. Bogardus listed several problem areas, the first concerned with installation intervals.

Original rough estimates suggested a two month interval at each of the five switching centers with the understanding that firm schedules could not be established until W. E. Co. could appraise the overall picture.

Tentative estimates on the part of W. E. Co. for planning purposes only now contemplate intervals of from 19 to 24 weeks at the Trenton, Stockton and San Diego centers. Specs due in W. E. Co. hands within the week will permit an estimate of the intervals required at Cheltenham and Norfolk. A further review of the problem, with probable changes in the intervals, is scheduled for next week with official advice dependent in part on performance standards still to be provided by BTL.

Actually the new schedules propose meeting the original W. E. completion dates of August 1, 1958 for Trenton and November 1, 1958 for the remaining centers and in essence involve advancing the start dates. Earlier access dates may present a problem at some locations but will be worked out either locally on a subcommittee basis or by Commercial with DNC if necessary.

A second problem area, of several parts, concerns authorizations and requisitions.

As a first item, requisitions covered by Long Lines authorization are coming in very slowly and there is need for coordinated action to expedite their receipt. Action is also suggested to insure that requisitions for all items including not only LL authorized items but also requisitions for testing and maintenance equipment, Carrier systems and other related items show W. E. Co. Project #115.1 L and that they are related or cross referenced to the appropriate centers involved.

A second item concerns requisitions for additional items of test and maintenance equipment not included in the original Long Lines authorization.

Note: It was developed that some items being requisitioned have been specified by BTL but are unknown to Long Lines. POE, in receipt of a letter from W. E. Co. requesting authorization to manufacture, have in turn requested descriptive details from BTL.

A third item concerns orders for "Service" items and maintenance spares required at outlying stations in Connecting Company areas.

As previously reported, W. E. Co. prices to Independents are still not available. A delay can be tolerated on Service items as they are contemplated in the original Long Lines authorization. On the other hand there is need to identify requirements for maintenance spares. This problem is prevalent throughout the system but is critical in the PT&T areas. Mr. Anderson agreed to explore the possibility of estimating Connecting Company requirements and including these as part of PT&T requirements.

As regards maintenance spares Mr. Lowe advised requirements for the East Coast are being checked and should be available to Mr. Strand in about two weeks. Mr. Anderson indicated Stockton center area requirements are in and he will check on San Diego.

A fourth item concerns equipment required for training outlying station maintenance personnel. This problem is two fold. Other than on the West Coast POE plans for training contemplate use of "JOB" items or service machines, to be reconditioned after they have served training purposes and reshipped to service locations.

On the West Coast a somewhat different set of circumstances prevail and PT&T proposes a permanent training school at some central location equipped in part as follows:

2 Multistation control cabinets
1 Single station control cabinet
12 #28 ROTR's
3 #28 RO's
6 #28 TR's
12 #28 RT's
13 #28 ASR

Requisitions for the above have been placed and carry a fairly short date. Not having been authorized originally these orders present a manufacturing and scheduling problem to W. E. Co. It also suggests a possible need for some priority delivery schedule.

A fifth item concerns the status of orders for various 43A1 systems required as a part of this project. These include the Philadelphia-Trenton systems, the Washington-Cheltenham systems and one or more, as yet undetermined systems required for transcontinental trunk routes.

Mr. Dempsey advised specs are out for Trenton but not Philadelphia. Mr. Cosh will check C&P on the Washington systems and Mr. Anderson, working with Mr. Sargent (EA Eng) will check on the transcontinental systems.

Mr. Strand urgently suggested that all orders for 43A1 systems be placed by 11-1-57 but not later than 12-1-57 with appropriate reference on the correct Sequence List.

In summing up W. E. Co. position Mr. Bogardus stressed the fact that W. E. Co. is planning with a few exceptions, only those quantities and items of equipment covered in the original LL authorization and he appealed urgently to have made available, preferably from a central source, complete details on total quantities and on all items of equipment broken down to show requirements for training, cross referenced where applicable to those items required for service, testing and maintenance.

Messrs. Thorpe and Chamberlain agreed to collaborate on a study of the overall problem which they would expect to complete in a week or ten days.

Mr. Bogardus also made a strong appeal for active W. E. Co. field participation in all subcommittee activities including subcommittee representation.

5. Alternate Entrance Facilities at Switching Centers

All planning is now in the hands of Commercial. The Trenton plans have been submitted to DNC and approved. Norfolk has been submitted with Cheltenham. Stockton and San Diego to follow. All have been discussed informally with DNC who appears satisfied that their requirements will be met.

Briefly the plans contemplate serving Trenton and Cheltenham over alternate route 43A1 VF Carrier Telegraph Systems out of Philadelphia and Washington #1 respectively. The remaining centers will be served on an alternate route DC loop basis out of the serving central offices.

Only two problems appear to exist, the first involving disposition of certain construction charges at Trenton and the second the need for Navy to construct certain On-Base cable facilities at Norfolk.

The first problem resolves around an O&E ruling-which Mr. Deering agreed to try and expedite-as to whether the new channels to be constructed fall into an IXC or loop category. The second problem has been formalized with Navy and is presently under review.

6. Out side Plant Engineering

Nothing additional to report.

7. Plant Training Materials and Schedules

Messrs. Young and Black reported progress on schedule in the preparation of Training Material and in planning for Key Instructor training.

In the light of suggestions from BTL as to the need for certain items of maintenance center test equipment for key Instructor training and also on W.E. Co. plans for earlier installation start dates, it was agreed that POE (Messrs. Young and Chamberlin) would take another look at the types and quantities of all equipment required, the dates required, as well as the location of these items and would advise W. E. Co.

From a training standpoint Long Lines (POE) responsibility presumably ends with the preparation of training material and the training of key instructors. The bigger responsibility then falls on the Operating Companies who will be expected to select and train in excess of 700 men. POE agreed on the need to advise the Areas on suggested planning for the training of field forces including suggestions as to the type of personnel to be selected, the type of training required and the types and amount of equipment required for training.

8. Plant Maintenance Procedures

See comments under Item 1.

9. Plant Maintenance Equipment

See comments under Item 1.

10. Circuit Layout Engineering

See comments under Item 1 (status of transcontinental systems) and Item 4 (43A1 Carrier System requisitions).

11. Customer Training

Mr. Anderson advised that PT&T planning contemplates the start of their Traffic Department Instructor training on 3-1-58 and inquired as to the status of Long Lines planning.

Commercial advised that plans are still in the tentative stage.

The first draft of a Customer's Operating Instruction Manual is expected to become available within 30 days for joint BTL, Navy and LL Plant and Engineering review. The final product is expected to become available early in January 1958. Key Instructor classes of about two weeks, to be held in Washington, are scheduled to start February 17, 1958.

12. Miscellaneous

Throughout the two day conference items of interest affecting the Central and Western Areas arose. These were particularly concerned with Plant training and test and maintenance procedures in Test Rooms and at outlying stations and it was suggested that Area Plant Supervisors from the two Areas be invited to participate as members of the Steering Committee and to attend all future committee meetings.

Present Bell System planning contemplates LL ownership of all lines and equipment furnished as part of full automatic systems.

Most Operating Companies have concurred, with the remainder expected to fall in line following receipt of a letter from O&E now awaiting signature.

Mr. Dempsey inquired as to any change in ordering procedures resulting from new Division of Business arrangements. Mr. Deering indicated no

change and that Switching Centers would continue to be the responsibility of Enginering and Outlying Stations that of Plant.

PLSO's are written on the basis of the above and it was suggested that subcommittees check to make sure that equipment has been ordered for all points including those items that would be furnished by Operating Companies under the old Division of Business arrangement.

Conference Notes
Steering Committee
USN 82B1 Teletypewriter Switching System

A scheduled meeting of the Steering Committee, held in New York on November 12, 1957, was attended as follows:

BTL	E. R. Robinson	New York
"	E. Graber	"
"	R. MacLaughlin	"
FT&T	R. C. Anderson	San Francisco
"	K. V. Self	"
W. E. Co.	C. Bogardus	New York
"	R. W. Dineen	"
"	J. L. O'Marra	"
"	G. P. Williams	"
"	C. G. Vath	"
"	W. C. Steele	"
"	S. R. Strand	White Plains
LL POE	O. H. Davidsmeyer	New York
"	D. W. Chamberlin	"
"	J. D. Riley	"
"	F. E. Young	"
"	W. S. Black	"
"	C. A. Gartman	"
O & E	W. H. Deering	"
LL ADO	J. Thorpe	"
"	W. Hoinkus	"
"	J. A. Huke	"
LL EA (Plant)	N. E. Lowe	White Plains
"	R. W. Boyle	"
"	G. E. Martin	"
LL CA (Plant)	R. W. Brounley	Cincinnati
"	L. G. Stahl	"
LL WA (Plant)	R. E. Tuveson	Kansas City
LL Plant	H. Cook 3rd	Philadelphia
"	F. R. Cosh	Washington
"	B. C. Clatterbuck	"
"	L. A. Morriss, Jr.	Norfolk
LL Com'l	R. E. Gradle	Washington
"	A. J. Green	"
"	R. I. Dodge, Jr.	"
"	C. H. Wulfhorst	White Plains

1. Review of Developments

a. Commercial reported on current developments as they relate to the Final system. Re-engineering, based on a new traffic survey has been developed and approved by CNO. Supporting details, to be used by the customer in issuing their CSA's, now being prepared.

These details, in Chart and Summary form, are expected to be available in the Field prior to January 1, 1958 to be followed by revised PLSO's shortly thereafter. While a substantial number of line and station changes are involved, significant changes involving specific items of equipment appear as follows:

# 28 RO's	decreased from 297 to 262
# 28 ROTR's	increased from 107 to 201
# 28 KT Perf's	reduced from 88 to 0
# 14 KTR's	increased from 0 to 60
# 14 ATR's	increased from 0 to 11
# 1 MATR (TABLE)	increased from 0 to 15
# 1 MATR (CONSOLE)	increased from 0 to 8

The above changes are unofficial. Approved changes to be confirmed with POE by December 1, 1957.

The expected increase in ROTR's results from a customer decision to provide this type of terminal equipment at all outlying stations acting as their own "Crypto Guard."

The change in KT Perf's results from an indicated delay in the availability of this equipment and customer acceptance of an alternate plan involving the use of KTR's.

The requirement for ATR's and MATR's results primarily from customer acceptance of an otherwise unresolved problem for handling International and Miscellaneous Intercept and Gateway traffic in switching centers. Details of this arrangement, to be engineered by EA Engineering, are contained in a WA Commercial letter dated November 6, 1957 to EA ACM with copies to BTL, PT & T and LL ADO, COE and EA Engineering.

b. Active, direct liaison between EA sub-committee groups and Navy Project personnel has been established and considerable progress reported in identifying and planning for service needs.

c. Customer requirements for engineering details on ceiling inserts to be provided by the Navy in switching centers is critical, particularly in the EA, because of the present status of customer planning and construction. E. A. Engineering to expedite with W. E. Company.

d. Mr. Anderson inquired whether one test tape could be made suitable for all stations. It was developed that this could not be done but that there would be fewer test tapes when compared to the number employed for 81D1 systems. The Long Lines Staff Engineer is working on this item and ordering information should be available sometime in February 1958. The test tapes for the test centers only will be furnished by the POE, who will provide an 'E' Section to cover Plant Operation tests.

e. Descriptive information on the 29 ASR test set is now available. PCE advised that estimates for Parts as well as the ASR and Director Test Sets for all three Areas and the PT and T Co. will be released to ADO for authorization by 12-1-57. Mr. Bogardus pointed out that only the 28 ASR test set will be produced by Teletype Corporation. The 164 set will be manufactured by the Western Electric Company.

f. Mr. Hoinkus advised they were still working on information in connection with the "H" response monitor set. The possibility of a three speed teletypewriter monitor for testrooms is also under investigation. It was pointed out that Teletype Corporation made up two samples of a three speed receiving only monitor but nothing is being done actively on this item at the moment. The present design requires shutting off the motor in order to change speeds and the Bell Laboratories have not released this design. Mr. Thorpe advised he would follow up on this item.

g. Mr. Anderson advised that the matter of alternate routes has been settled and PT & T Co. orders for all 43A1's have been placed. The problem of a crypto application referred to in previous meetings has also been resolved with Stockton Navy representatives.

h. Final draft of the Customer's Operating Instruction Manual will be available prior to 12-1-57 for Customer and BTL review. It is expected that this review can be expedited and the finished draft ready for publication by 12-15-57.

2. Western Electric Company, Inc. Schedules

Mr. Bogardus advised that a situation has developed in the original scheduling of switching center requirements resulting from added unit of equipment required to meet training schedules.

Production schedules contemplate the availability of machines starting in March or April 1958 but in insufficient quantities to meet both Trenton Center and training needs. Attempts to expedite and to increase production schedules has not been productive and a need is apparent for some form of allocation.

3. Training

Mr. Young advised that Plant training schedules and equipment requirements have been established and must be met. Considerable discussion evolved on this subject but because of the close relationship between the training problem itself and the training equipment procurement problem, the subject could not be resolved by the committee as a whole and a sub-committee consisting of Western Electric Company, Plant Operating Engineer and Pacific Telephone and Telegraph Company representatives was excused from the main conference to review equipment schedules and training requirements. The sub-committee recommendation will be covered during the next general committee meeting.

In the preliminary discussion of this problem, Mr. Self expressed concern on the part of the PT & T Co. as to the adequacy of the schedule which contemplates the start of Plant pre-service acceptance tests and

customer training November 1, 1958 with a service date of January 15, 1959, and expressed the need for a schedule which contemplates two months for acceptance tests, and two and one-half months for customer training and dress rehearsal with an effective service date of March 15, 1959. Many circumstances mitigate against any change in present schedules. Admittedly the schedule is tight and special steps may become necessary to achieve the established objectives. Possibilities include, among others (a) shortened Western Electric Company installation dates, (b) coincidental Western Electric Company switching center and Plant Department systems tests and (c) centralized customer training schools.

Commercial advised that numerous reviews of the customer training problem with CNO have suggested alternatives that could be followed in achieving present objectives and it is expected that these will be resolved some time in the first quarter of 1958.

A need was indicated for exact locations in order to identify training needs and the committee advised that revised PLSO's will show exact locations and contacts.

4. Station Tests

The need for outlying station tests by the serving test centers was stressed. After the switching center equipment has been tested, Plant pre-service tests on an overall basis will be required. In answer as to the length of the shake-down tests, the Bell Laboratories advised they would establish some test performance requirements on outlying station equipment.

It was suggested that the Associated Companies participate in the initial station equipment tests. It was recommended that the Chairman of the local sub-committees review the subject with each Operating Company involved and work out the most satisfactory arrangement.

Mr. Anderson commented that the outlying station teletype equipment allocated for training should be completely assembled and tested by the Western Electric Company before it is sent to the field. Also in the processing of the training equipment it would again have to be readied for installation on customer premises before the initial station tests start.

5. Plant Maintenance Procedures

Bell Telephone Laboratories recommendations for clearing outlying station director circuit troubles contemplate replacement of the original with a spare and return of the original to either a Telephone Company maintenance center or Western Electric Company shop for repair. Central and Western Area Plant and the PT & T Co. appear to favor the former whereas Eastern Area propose the latter. Nothing conclusive was resolved with additional reports expected at subsequent meetings.

5. Plant Maintenance Procedures (Continued)

In the area of the PT & T Company this problem is made complex by the large number of Connecting Company stations that will be involved. According to Mr. Anderson they have been handicapped in dealing with it because of the lack of charges to Connecting Companies for regular and spare station units. It was agreed that the problem itself had first to be resolved with subsequent action on costs and compensations, and, that an approach should be made on this basis.

6. Miscellaneous

Mr. Anderson reminded the committee that the lack of Western Electric Company prices to Connecting Companies is becoming an increasingly pressing problem. Agreed that attempts would be made to expedite.

Mr. Cook indicated that questions are arising in the field as to space for storing equipment. It was agreed this problem should be handled locally, as it arises, by the sub committees.

Mr. Self advised that installation of a No. 2 hub board required at Stockton as a part of the 82 system installation has been scheduled for completion along with other items included as part of Western Electric Company Project 115.1L effective November 1, 1958. The board was expected and is required in advance of this date.

It appeared that Western Electric Company had not been informed of the circumstances and were treating the requirement in the same category as other items. An attempt will be made to improve the date.

Meeting adjourned at 4:30 PM.

Coordinating Committee
Rm 2543 32 AOTA

Nov 12, 1957 (1)
RID

WE Co. production notes

Deferred sched for 200 machines for Trenton
4/11 - 5/9 58 in order to relieve trng machine bind

San Diego Start Trng 5-1-58

Manual Installation 1/3 - Testing 2/3 time

Discussion of "#2" Board at Stockton. —
Coordinated order with 8281 switch.
"Vince" - pac, T+T

Plant acceptance tests thought of in terms of 30 days ADG

4-5 wks - overall tests

28 ASR Test sets - Labs-WECo - not in production.
are they needed for trng?

Brownlee - CA ~~Geo Tillett 417 E~~
Cliff Bogardus
Bill Hankus H response monitor sets devise.

Practice overall sys' tests Feb 1 58

Navy trng loc. Chicago?
Roy - PT+T
John Thorpe

60 speed OUT.

Gear shift RO design for Testrm monitoring discussed, 3 speed for x the board rqmnts - normal crankup of labs to be initiated - by John Thorpe.

Kmtr start test set

Eric? - Labs?

Comparison of bug tbles in BI systems with B2B1 problem. Green people, etc.

Nick

Dan Chamberlain

Shakedown tests of RTs

McGlaughlin - Labs

WECo vs Assoc Co doing this work

Independent Co. problem. 31 Connecting Co's involved. Pricing info etc. Eqpt ordered. Calif state commission hand on tariff filings. Nothing done on maint. spare ordering covering Ind. Cos Pac Tel area.

Will W. ECo test testgear + RTs for tng?

Roy from Pac. Tel.

240 locations in addn to system to be trained.

Wikstrom?

NOTES - 82B1 Systems.

Foll. from RLD letter 10-16-7

Trenton	EA 16500	sys 1	Orders placed	with	WE				
Norfolk	EA 17076		"	"	"				
Cheltenham	EA 17075		"	"	"				

Customer approval for floor space revd

6 43A1 carrier tg sys rqd derive loop fac into Trenton
Spec EA 16156 covers Trenton
Specs (10-16-7) being prpd for Phila
Thy sys in 1958 constr. pgrm + orders will be placed after approval of Est. 7E 4952.

15 143A2 regen rptrs rqd at Richmond to interconnect 43A1 channels. Specs have been prpd. Job order to cover being processed.

Spec EA 17079 covers proyn tg rptrs at Wash. D.C. + addl pwr plnt. Est 7E 6803 being prepared to cover.

The Tg channels for this sys are interspersed in 1958 constr. prgrm. Efforts being made to identify the sys's involved in order to apply W.E.Co. project 115, IL to them for coordinating purposes.

Anticipated above installations outside of the switching centers will complete in time to meet the overall service dates.

To date no requests revd fm Plant re diversion of eqpt for Training purposes nor for special eqpt in central offices for overall system tests.

10-31-7
RID

NOTES - 82B1 system (continued)

AF Sargent letter 10-5-7 to NJBTCo.

Fac rqmnts to Navy Bldg near airport in West Trenton

10 prs over 2 routes for diversion by Aug 1, 1958

6 prs from Trenton C.O.
4 prs " Yardley, Pa. C.O.

W.E. Co. letter 10-11-7 to AJG (Bogardus)
Supl. letter 9-27-6

Installation Interval Norfolk 17 wks
" " Cheltenham 17 wks

W.E.Co. Project WP-115.1L

W.E.Co Letter 10-10-57

Approx 73 R-T's ordered in Telco specs over + above quantities authorized ~~authorized~~ in cc. Duncan let. to WE Co. Creates production bind.
Pacific Co. has rqsted Stockton compl. 8-30-8 (vice prev. 11-1-8)

W.E. Co Let 10-8-57 to H.B. Flynn (Los Angeles) (Bogardus)
re eqpt for training rqts

Teletype + WE (ref. let. 4-15-7) producing based on L.L. mntfg authorizations.
Service eqpt to be used for tng.
Lab design changes binding production.
Delivery scheds not firmly established.

Trenton to be first in service. Installation compl. 8-1-8

R-Ts for SW cons - carefully integrated sched.
House producing eqpt to have time for reprocessing eqpt used for tng.
Time (date) Installn Forces require mach. for instaln.
Pacific Co has already ordered on E F + I specs.
Special arrangements rqd. with Kearny

Outlying sta. eqpt easier problem. TT machines will be avail over + above rqts. All must be coordinated with master sched - awaiting L.L. Tng plan.

Outlying sta. wired cabinets being produced by Kearny. If tng rqts small Kearny will meet quantities over & above actually authorized.

10-2-7 Mr. Waggonette (PT+T) } Team preparing
" Lippincott (NYB) } outlying sta. maintenance
" Morningstar (C+P) } rqts.
" Black (POE) }

Pilot Tapes.

10-1-7 Memo FEY to JDR 16 wks rqd for tng. Complete 7-3-8
Tng Key instructors for sw cen opn complete 2-28-8
With 2 wks operation craft tng by these instr's start 3-17-8
This sched make personnel avail for:
Start of Installation 6-1-8
" Acceptance tests 8-1-8
ref. Mr Blairs let. 3-25-7 to Admiral Bruton

Mentions 2 mo. rqd for reconditioning eqpt.
Also can't stand longer instal'n interval than originally planned ?? Only way to accomplish is if delivery of sw cen mach's used for tng is delayed until start of testing on Aug 1, 1958.

12 R-T's from the sw cen to be used for key instructor tng + later for craft tng. These cd be released for recording 3 wks in advance of tng compl. date or by about June 13, 1958, if undesirable rearrangement of tng sequence can be lived with.

If mach's are returned on 6-16-8 7 wks will be available before the 8-1-8 start-of-testing date.

Since mach's are "plug-in" and interchangeable delay shd not affect service date if WE Co will agree.
Also appears the est. of 2 mo. for rendering excessive

10-31-57
RID

9-30-7 Let POE(DWC) to APM's re
Maintenance parts
" kits
" tools
" test sets } for outlying stas.

9-27-7 W.E Co let to A/G from RHD

Installation Intervals: Trenton 18 Wks
Stockton 16 "
San Diego 15 "

9-26-7 Tng let from WS Block (POE) to APM's

Rqsts names those who will prepare mach. tng + attend
FT Corp sch Chicago start 9-30-57

Key Instr. class to be at LL bldg Morristown, N.J.

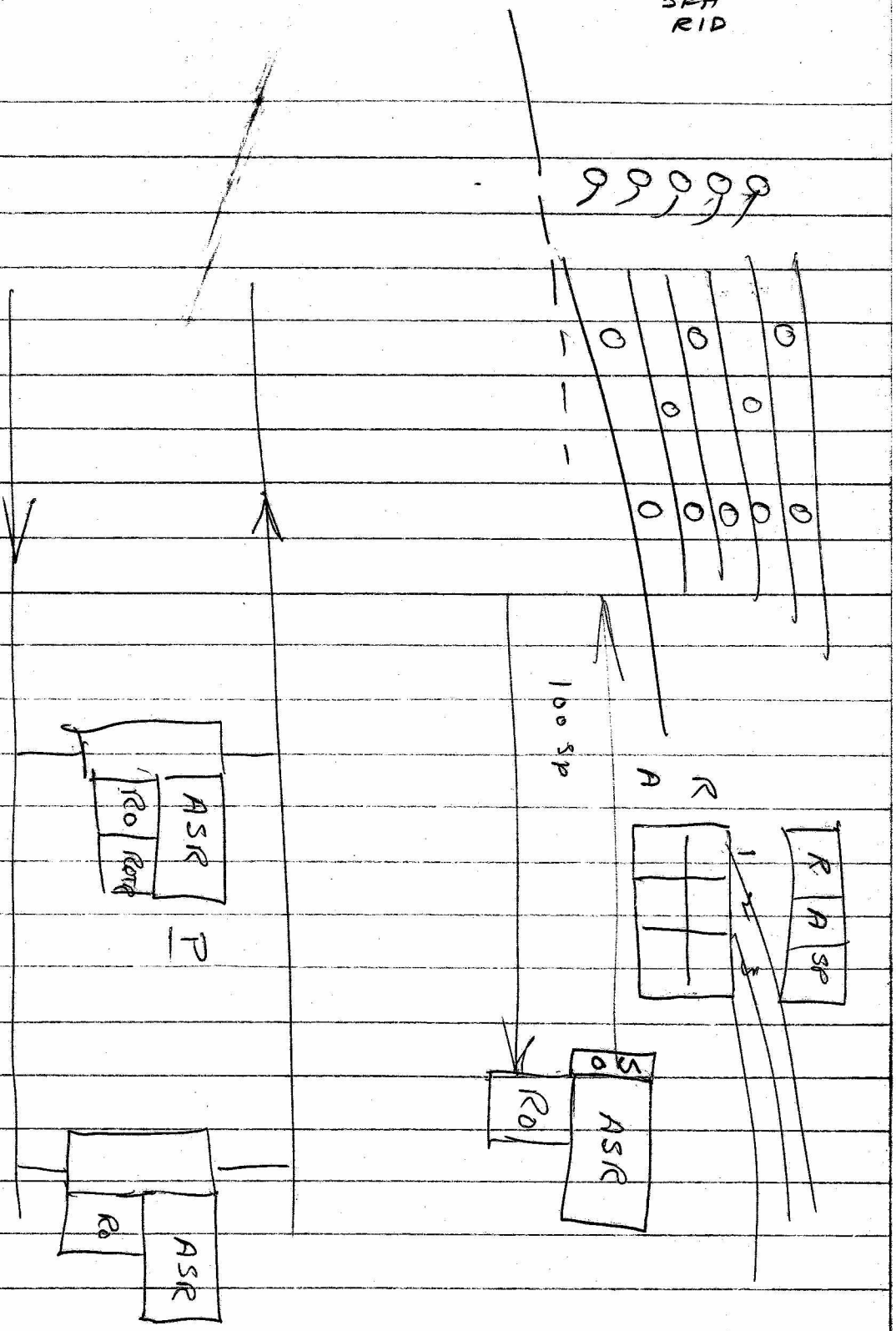
Prerequisite backgnd ramnts for Key Instr.:
Swi cen (D58B)
Outlying pt (D58C)
Mntnce pers. to have simi. backgrnds. This assumes
outlying pt maintce will be done by some men.
Requisitions for tng eqpt reqd pronto.
Recommended list of eqpt for 10 man class.

9-26-7 Tng let WSB(POE) to Desmond (ref. G.E. Martin)

Gives lists of tng eqpt for

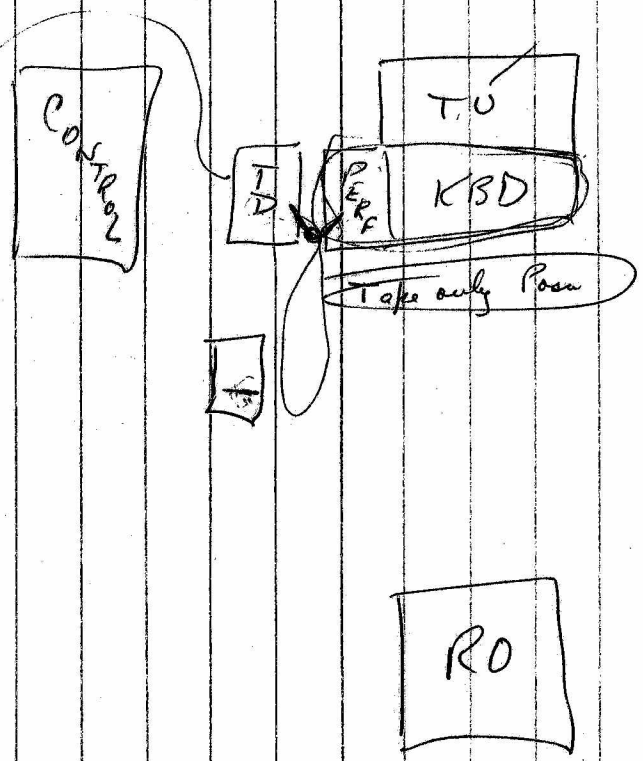
Outlying Point Course eff. Dec 30, 1957
Machine Maint. " eff. Jan 20, 1957

11-14-57
SRH
RID



ZZZCZCABCA13/NRR > RBEPAB << = D E - - - - TEXT - - - - - = NNNN

11-14-57
SFM
RID



10-22-57 1.
RID

8231

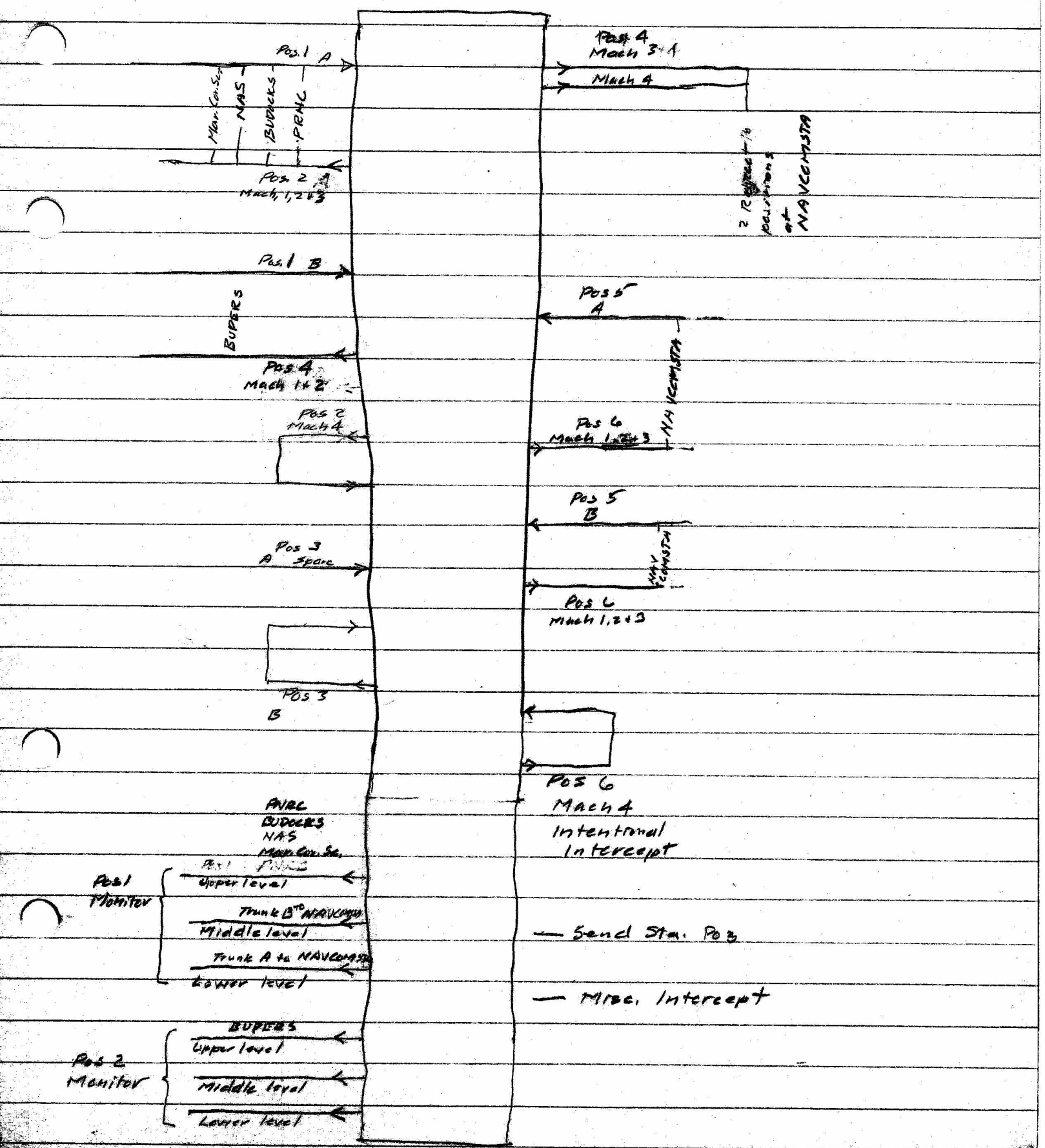
AUTOMATIC TELETYPEWRITER ~~SWITCHING~~ SYSTEM

Incoming Cab. (own DC pwr, functional equpt, control+alarm feat)
Outgoing Cab. " " " " " " "
Send Sta. Pos.
Misc. Intercept Pos.
Intentional " Pos.
Monitor Pos
Common Office Alarm

Incoming Cab { 2 incoming lines (one of which may be multi sta. max 5 lines)

Outgoing Cab { 4 machine outlets - capable wide flexibility of line assignments

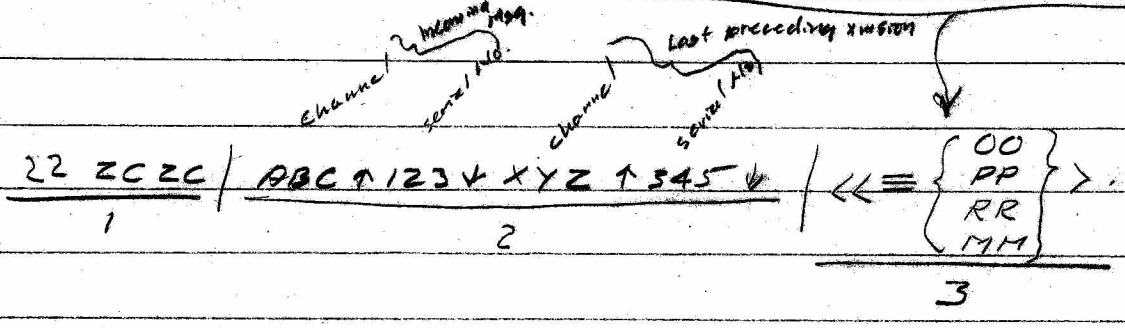
⟩⟩ Blank
↓ Letters
> Space
≡ Line Feed
< Carriage Return
↑ Figures


Pos 1 A
Mar Con Sta
NAS
BUDOCKS
PRMC
Pos 2 A
Mach 1, 2 & 3
Pos 1 B
BUPERS
Pos 4
Mach 1 & 2
Pos 2
Mach 4
Pos 3
A Spare
Pos 3
B
Pos 4
Mach 3 & 4
Mach 4
Pos 5
A
Pos 6
Mach 1, 2 & 3
Pos 5
B
Pos 6
Mach 1, 2 & 3
Pos 6
Mach 4
Intentional
Intercept
— Send Sta. Pos
— Misc. Intercept
ANRC
BUDOCKS
NAS
Pos 1
Monitor
Upper level
Middle level
Lower level
BUPERS
Pos 2
Monitor
Upper level
Middle level
Lower level

00 = Operational Immediate – switching occurs here instead of at end of Routing Indicator Info

Flash ZZ
Emergency YY
} Switching occurs here instead of at end of Routing Indicator Info.

Precedence prosign preceded by (↑ JJJJ 55555 ↓) ??



22 ZCZC / ABC ↑ 123 ↓ XYZ ↑ 345 ↓ / << ≡ { OO PP RR MM } >.
1 2 3

RBWPAB RBEPAB << ≡ ... < RUEPAB /
4

<< ≡ { D Z } / ... Heading and Text / ≡ NNNN
5 6 7

1. = Start of Message = SOM

2. = Channel Number Group – Recognition Function

3. = Precedence Prosign – Recognition + Switching Functions

4. = Routing Indicator – Switching Function

4, 5, 6 or 7 characters (only 6 used for switching, 7th carried along)

5. = End of Routing Line – Switching Function

<< ≡ DE or << ≡ Z indicates E of R and switching begins

6. Message Heading and Text

7. End of Message - EOM Signal - Recognition Function

As this signal passes thru office it progressively causes disconnection of all equipment held up for the message.

Incoming Cab

Receives TT sigs

Sigs perforated in tape in R-T (Reperforator - Transmitter)

Reads info present in tape ahead of the text of the msg (info indicating destinations of the msg and delivers msg to outgoing cabs. involved.

2 incoming lines one of which may be multi sta.

Basic elements are + 3

2 line units
1 director unit
} each equipped with an R-T

plus { visual and audible indicators and alarms
necessary rectifiers converting AC to DC

Each cab. has 6 Number Comparators
One for each of 5 sta.'s that may be connected to a multi sta. line and 1 for the single station line or trunk that may be connected to the same cab.

Incoming Cab (cont.)

Reperforator - Transmitter (R-T)

R-T consist of { Receiving Element (Reperforator)
Sending " (Transmitter)

At Incoming Cabs.

Receiving Unit transforms signal to punched tape.

Sending Unit consists of a SENSING head which reads punched tape and transmits signal on.

Note: The reading portion of the sending unit is independent of the actual transmitter which sends the signal on and each can be controlled separately from external circuits.

The reading head can climb tape as it becomes taut between reperf. & xmtr and read the last character in the tape.

The receiving and sending units, including a reel of new tape and a take-up reel for used tape are mounted in one assembly.

R-T's terminating lines in Incoming Cab. are on receiving side with gear shift for 60, 75 or 100 wpm.

Also equipped for typing the incoming sigs. on the same perforated tape with typed characters appearing 6 spaces behind the corresponding perforated code.

The sending side of an incoming line R-T sends only at 200 wpm.

The R-T in Incoming Cab. associated with the director unit arranged to receive and send only at 200 wpm.

R-T's in Outgoing Cab's. comparable to Incoming set-up except opn of send + receive units are reversed i.e. -

Receive unit operates at 200 wpm.
Send unit at 60, 75 + 100 wpm.

No typed tape function performed because of incoming line speeds.

Outgoing Cab.

Elements:

Temporary storage msgs revd fm incom. cabs.

Generates SOM codes and Channel No's as rqd.

Xmits stored msgs to outgoing lines + Loops which are part of the overall switching system as these lines become available

Msgs revd in R-Ts over x office paths at 200 wpm + xmtd to outgoing lines + Loops at 60, 75 + 100 wpm.

Outgoing Line Cab 3 basic elements:

2 Bid Receivers

7 Channel No generators

4 Line Units each equpd w/ a R-T.

Own visual + audible indicators + alarms, a rectifier and a Xmtr start circuit.

Bid Receivers

Basic Func. –

Rcv 'bid' for the connection of an incoming line R-T to an outgoing line R-T and to actually make the connection.

2/ outgoing cab.

Both arranged to handle multi-sta line outlets but only one bid-rcvr in a cab can serve a multi-sta line in the same cab.

Other functions:

Connecting a specific number generator for individual sta's on a multi-sta line.

Recognizing the 1st character in each routing indicator + xmtng a response to the director

Recognizing + acting upon the EOM code as a signal to take down x office connections.

Channel Numbering

7 Number gens in outgoing cab.
1 may be assigned to each of the 5 stas on a multi-sta line and the other 2 to addt'l single sta lines or trunks served fm the same cab.

All msgs contain a new channel no. as the msg leaves the office —
Exception — Those routed to Intentional or Misc. Intercept Positions.

On Single sta lines or trunks — Channel Nos added as msgs are sent to the outgoing line.

On Multi-sta lines —
Channel Nos always inserted in tape on the revng side of the outgoing machines and ahead of the start of x office xmsn of the msg itself.

↑

This is occasioned by the need that number gen's to each individual sta. be discreet and that separate predetermined generators must be used.

↑

In this instance the appropriate number gen. is connected to the line by

the bid-recvr in accordance with the destination outlet code recvd & office from the director.

Of interest in this connection is the fact that the first character of the three alphabetical characters of the channel identification serves as the cut-on code for the individual sta.

Thus, the first letter character will always be A, S, I, D or R.

Outlet Machines

4 line units/ Outgoing Cabs.

Each line unit terminates in an R-T which records incoming x office msgs in perf. tape while the sending unit xmts msgs using the same perf. tape to outgoing lines + loops. These R-Ts referred to as machine outlets or output machines

For outgoing cabs an outlet usually requires more than one R-T machine.

Multi-sta lines normally have 3 R-Ts

1 priority
2 regular

Machines assigned to multi-sta lines must always be in the some outgoing cab + must be the 3 machines designated for that use.

Single sta. and trunk lines served by a one channel group will normally be equpd with 3 machines also

1 priority
2 routine

Any output machine in any cab. may be assigned for these purposes

Outlet Machines (cont.)

Where outlets are used to serve multi-channel single sta. or trunk line groups the ratio of output machines will normally be in the following order:

No. Channels	Machines Assigned
2	3 or 4
3	4 or 5
4 or more	1 per channel

Other Features - Outgoing Cab

1. Xmtr Start Circuit - only on Multi-sta lines - Sends sigs over outgoing side of line to start the xmtrs on the incoming side of the line.

↑

This circuit appears only on Machines A B + C.

Polling of outlying sta's by the Xmtr Start Ckt is generated by:

a. Rcpt over the incoming line of an EOM code fm the sta finished sending.

b. An incoming msg waiting condition, generated by an outlying station, if the circuit has been idle.

Outlet Machines (cont.)

[Polling by xmtr start chat (cont)]

c. Automatically every half hour regardless of either condition a. or b. above.

2. Alternate Routing.

Ea. Output Machine has 2 jacks on the output side:

/ Regular assignment

/ Alternate Routing assignment

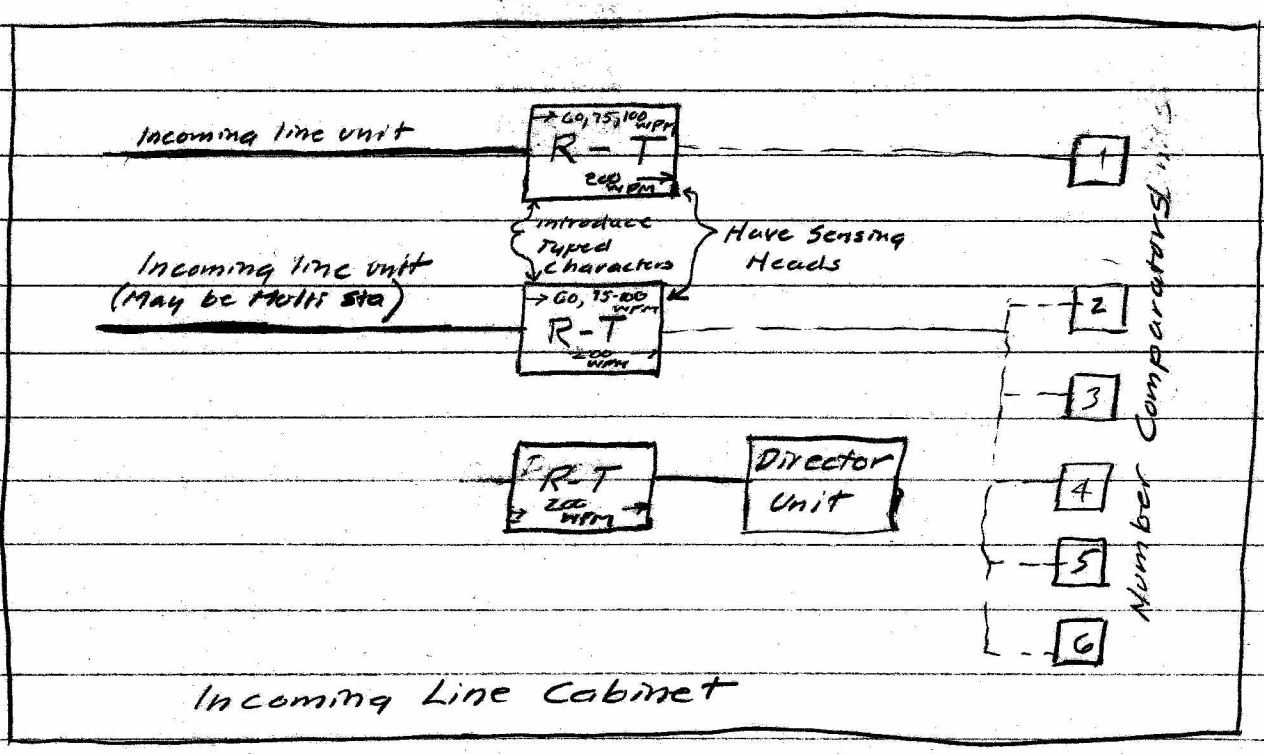
The Alt. jack on any machine may be trunked to other jacks of any particular output machines.

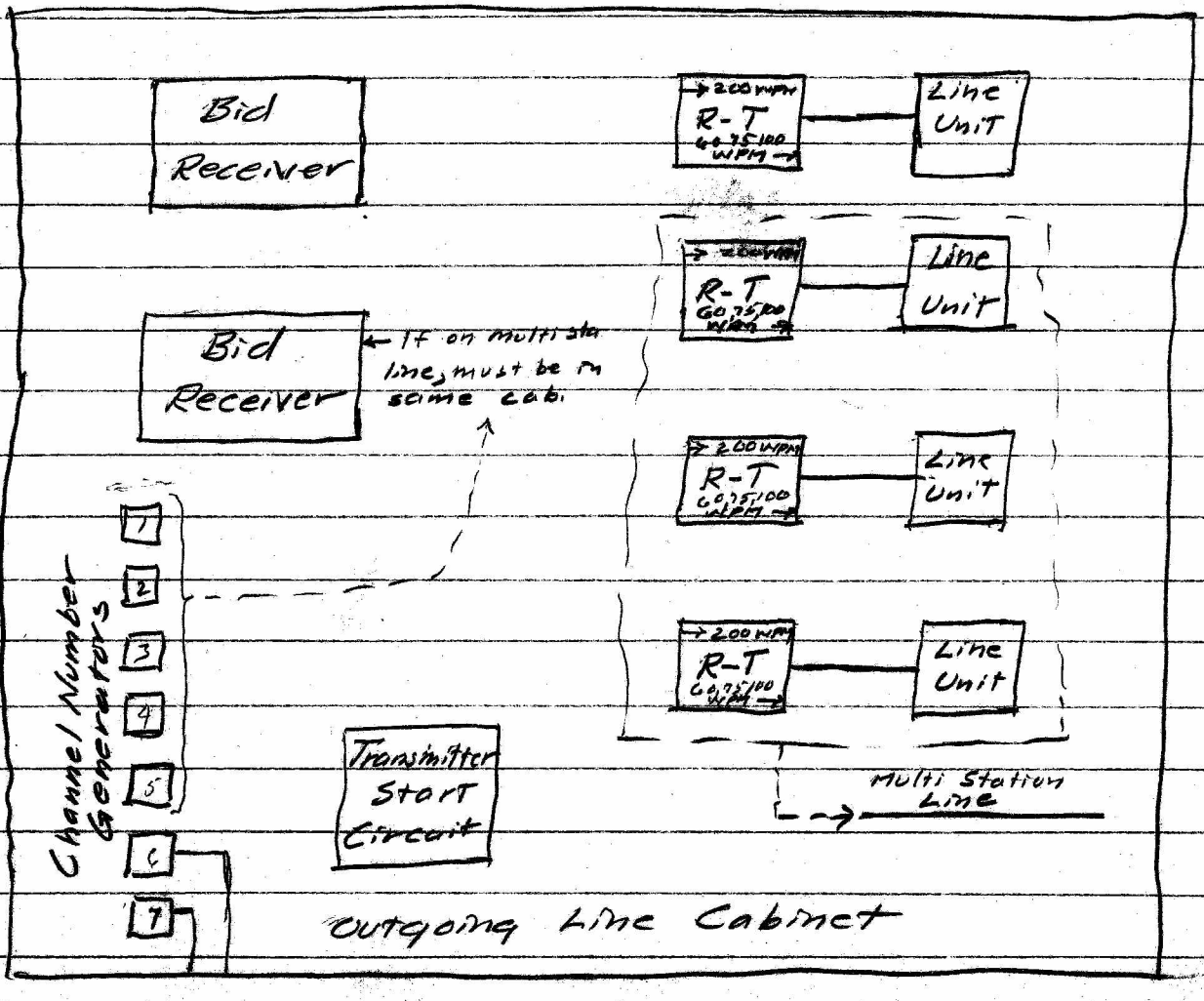
Opn'— Traffic fm the output mach. involved is routed via intercab. trunks to the alternate line route to which it has been patched.

3. Intercab. Trunking —

Inter-cab patching trunks looped thru all outgoing cabinets may be used to patch line loops or alternate route output machines.

Nov 4, 1957
RID





Method of Operation

Acting on signals from the Director Unit in the Incoming Cab the Bid Receiver:

1. Selects and connects an idle priority or routine machine outlet as indicated by the received outlet code.

2. On multi-sta. lines, generates and stores the next number for the called station in the outgoing message tape.

3. Signals the director to proceed with the message

Message tapes perforated + temporarily stored at the recvng unit of the selected machine outlet in the outgoing cab. as the result of subsequent actrn on the part of the director are transmitted to the lines as it becomes available.

Where the number of machines in a group exceed the number of outgoing line channels, the machines assigned for regular msg traffic are given access to the first idle line on a rotating non-preferential basis. Machines assigned to precedence msg traffic are given access to the lines on the same basis within the precedence

groups. but all machines in the precedence group have preference over all machines in the regular group.

Where the number of machines in the outlet group is the same as the number of channels each machine is assigned to a separate line.

10-25-57
RID

PLSO ÷ ANOO ?

B3 systems adjunct ?

How monitors work ?

~~Machines~~ A B + C ??

Are alternate routes preset or manually patched each time?

Multi channel single sta. or trunk line groups

Multi channel { single sta. / trunk line } Groups ?

Arrangement of the 2 inputs on outgoing machine?

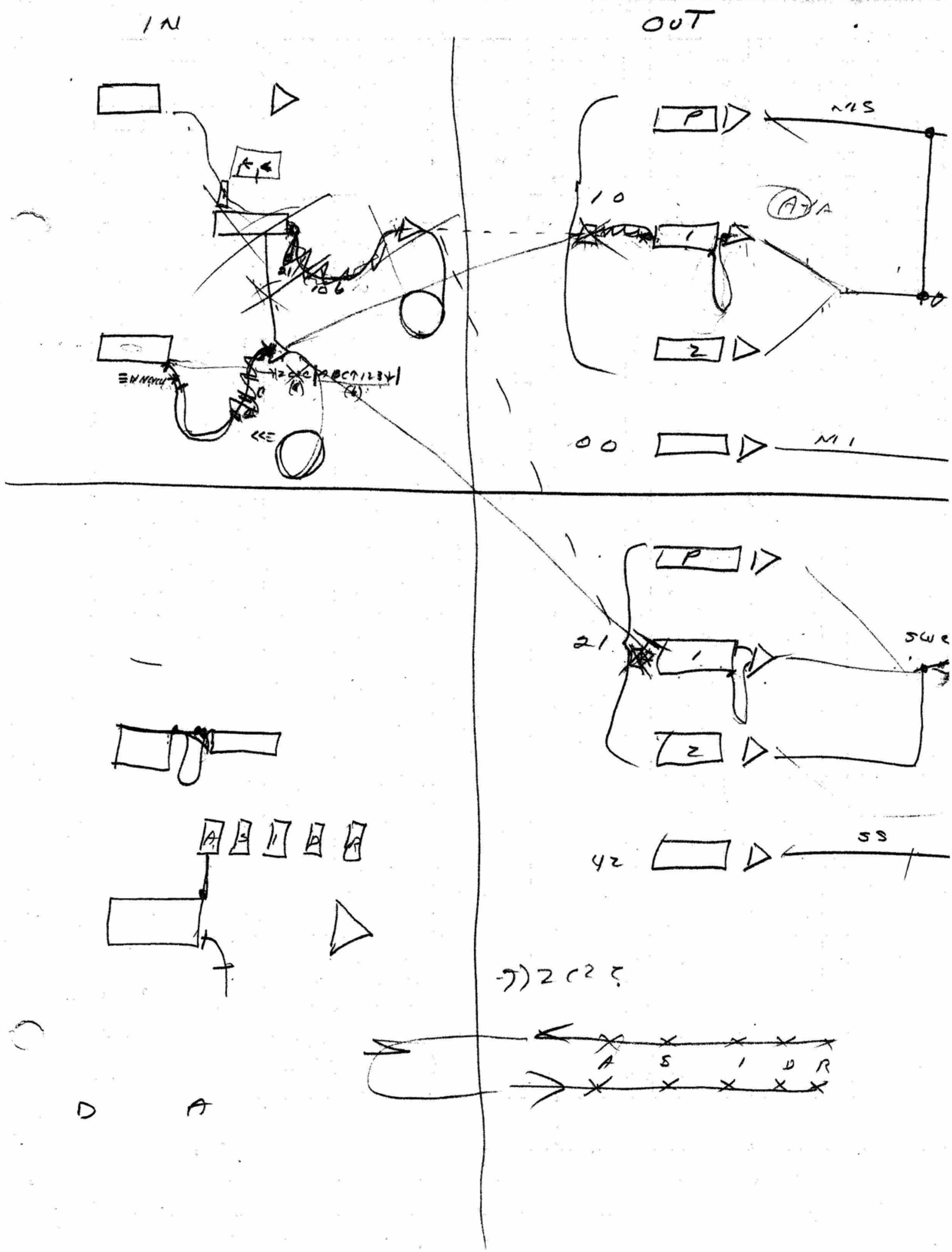
Why Prec indication output mach major alarm?

Misc Incpt - output mach. one indicator?

Line RLS + Tape Discard push button function?

SKIP Outgoing R panel?
XMSN

S+I in pilot log ??


IN
OUT
P
1
2
10
00
M1
P
21
1
2
42
SS
A S 1 D R
D
A

12-10-?
RID

What is meant by a new channel no outgoing?

Discreet??

Cut-on code?

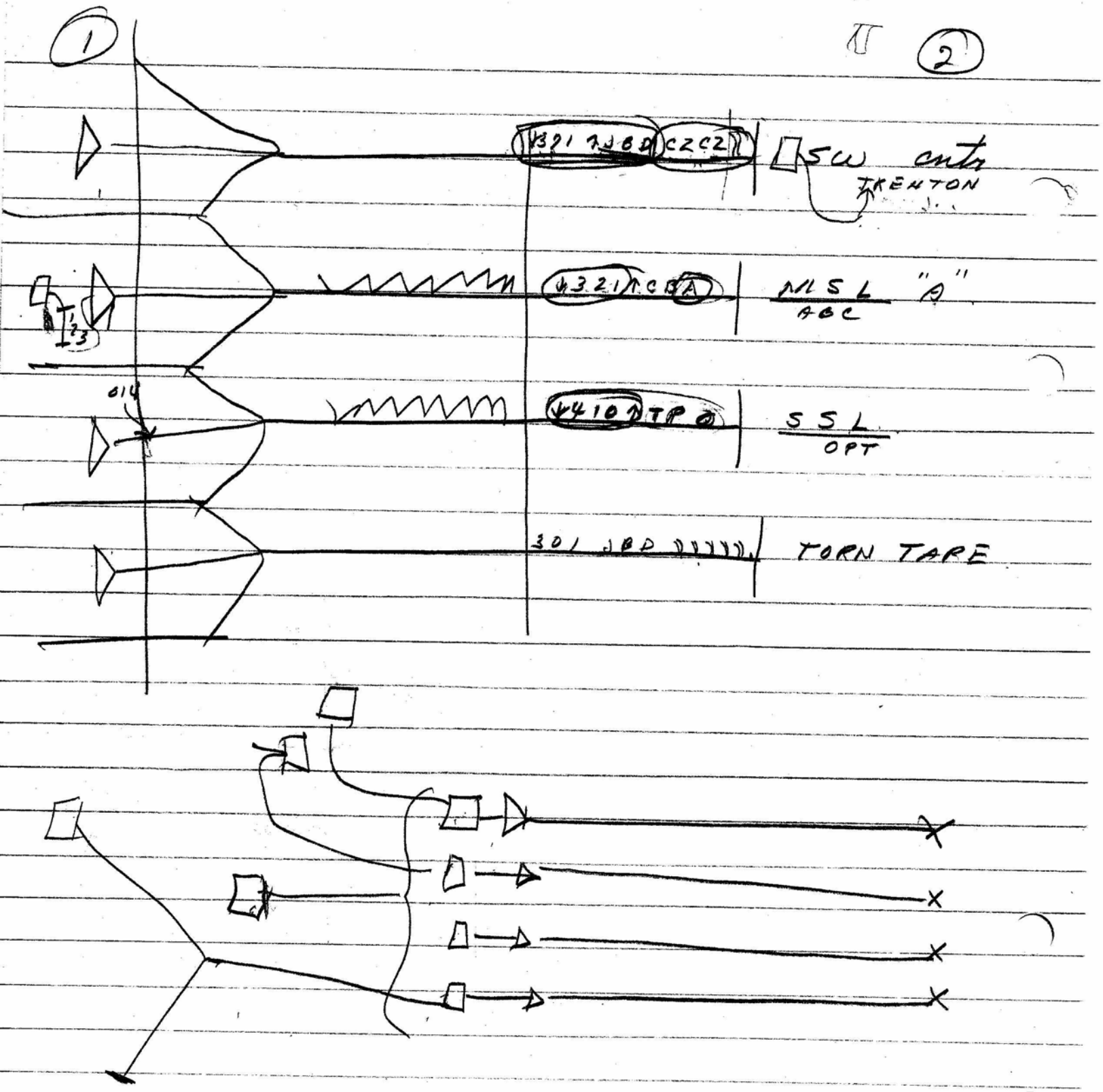
No of tapes involved in a x office conn, one incoming + one outgoing?

Opn of multi sta line, if 2 stas only getting msg others necessarily idle?

What is meant by a one channel group?

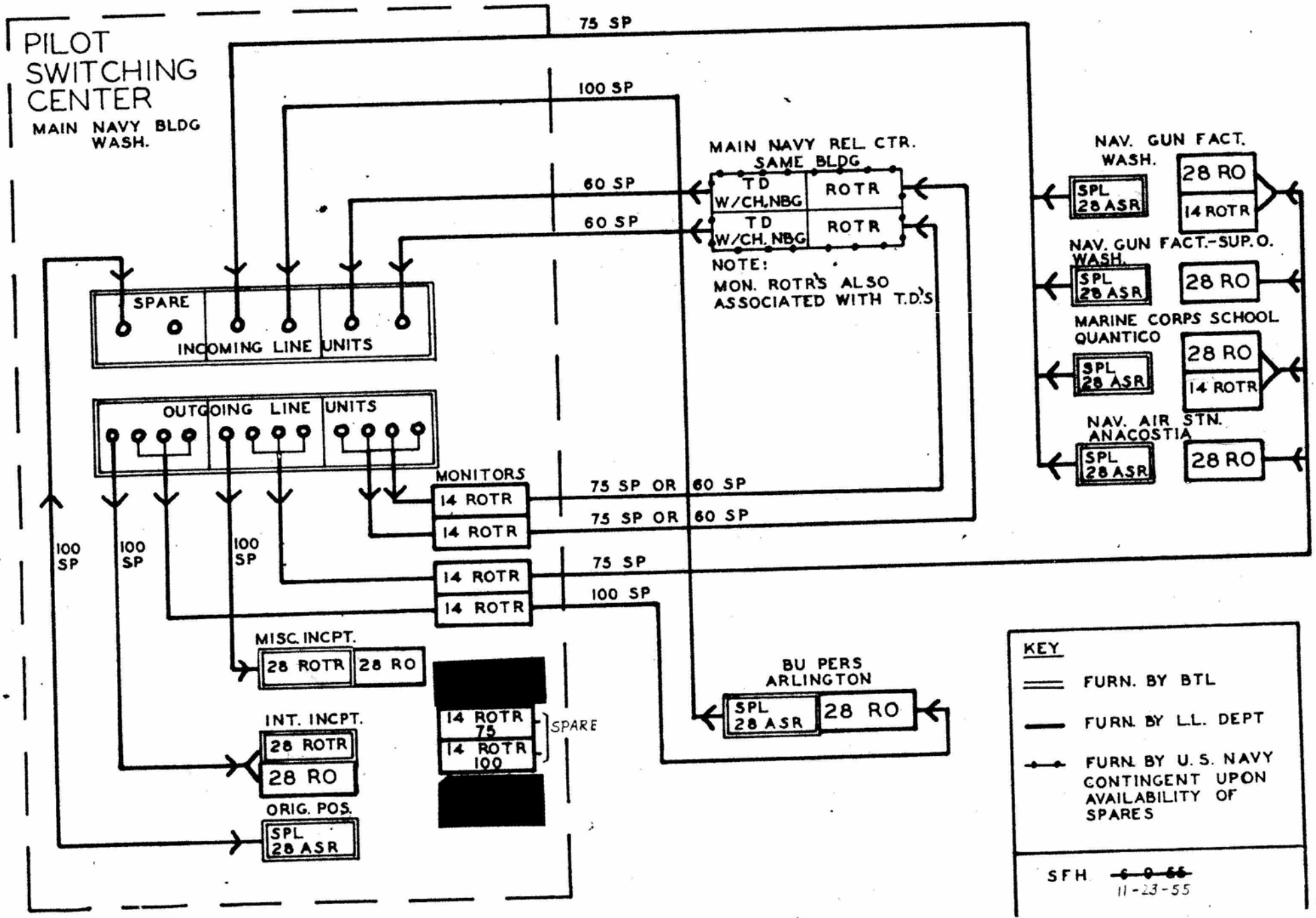
Meaning of machines A, B + C?

In opn "the Bid Recvr - on multi sta line - generates + stores the next number for the called sta in the outgoing msg tape" - what next no. channel or msg??


1
2
SW cnts
TRENTON
MSL
AGC
"A"
SSL
OPT
TORN TAPE

82[illegible] AUTOMATIC TELETYPEWRITER SWITCHING SYST[illegible]

PILOT INSTALLATION BLOCK DIAGRAM



MESSAGE FORMAT

(PRECEDENCE: DEFERRED)

(FROM STATION ON MULTISTATION LINE)

MESSAGE AS PREPARED BY OPERATOR

‹‹≡MM›RBEPRM›RBEPRR‹‹≡DE TEXT ≡NNNN

MESSAGE AS TRANSMITTED

\\ZCZCANA▲OOIW‹‹≡MM›RBEPRM›RBEPRR‹‹≡DE TEXT ≡NNNN

- \\ZCZC — START OF MSG.
- ANA — CHANNEL NUMBER
- ▲OOI — START OF ROUTING LINE
- W — PREC. SIGN
- ‹‹≡MM› — PRO-
- RBEPRM›RBEPRR — ROUTING INDICATORS
- ‹‹≡DE — END OF ROUTING LINE
- TEXT — OPERATOR PREPARED
- ≡NNNN — END OF MSG

AUTOMATICALLY GENERATED BY STATION CONTROL UNIT

OPERATOR PREPARED

LEGEND

\\	BLANK	‹	CAR. RET.
▲	FIGURES	≡	LINE FEED
W	LETTERS	›	SPACE (NOT PRINTED)

EXHIBIT 14

G4361
G4313

ASR

RO

ROTR

SO

TD

CONTROL

12-26-57
RID

SSL — WG? Western Union??

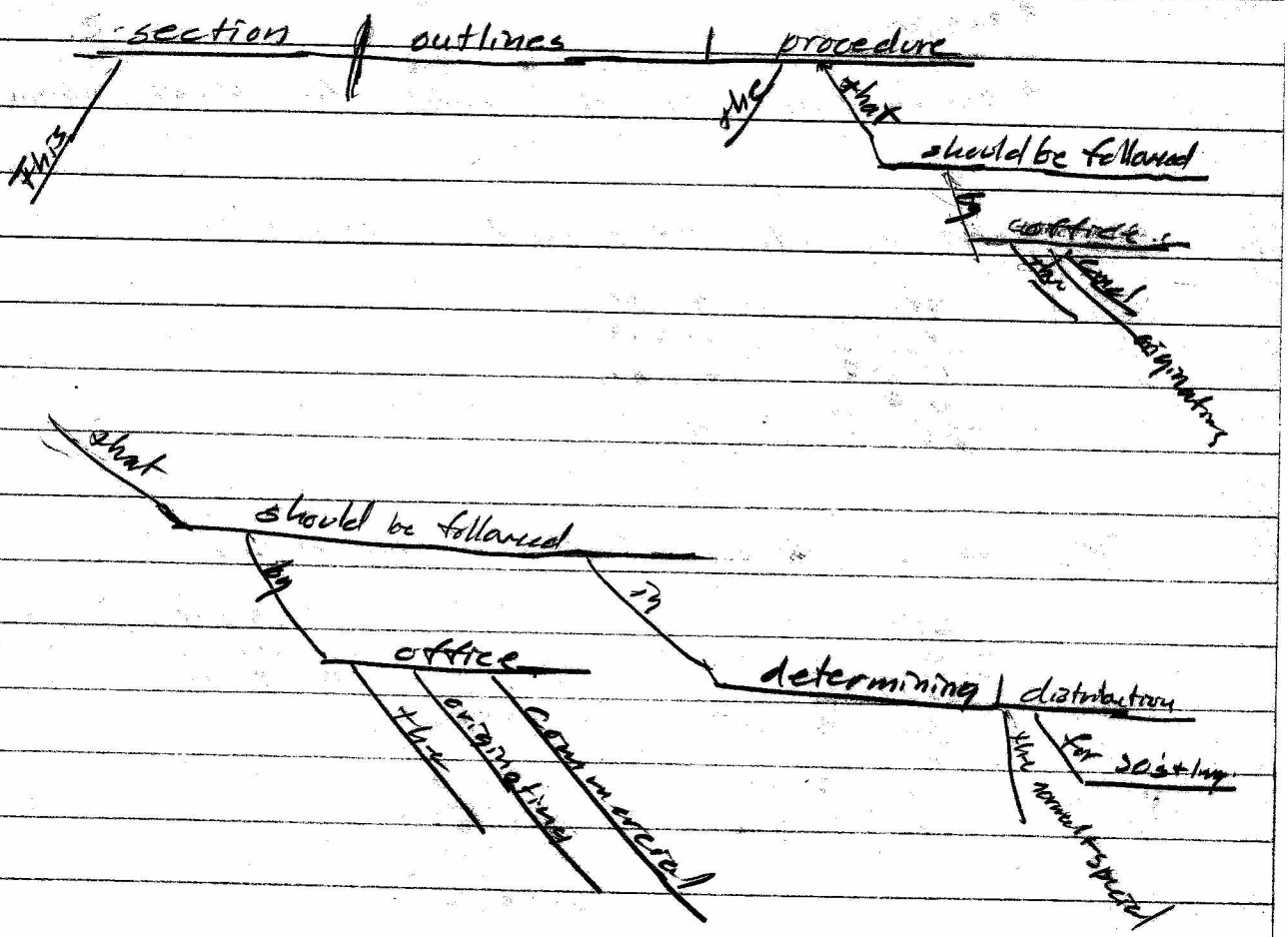
BSP AA 285, 516

Notes in CAPS?

2 Station ltrs (5+4 + 6+4) used separately or together?

The E in DE (End of Rtng line) is treated as part of the text?

Start of Message code (SOM) ZCZC is inserted automatically by the station control unit (in message as received by the Switching Center)



C-382 - 50 + Inquiry Work Sheet ?

1. Accting
2. Cmcl
3. Eng
4. Tfc
5. WEco
6. Plant

250 mi

@ 3.00/mi/mo

@ 750.00 /mo FP Tel. Channel for 250 mile channel

For 500 mile PP Channel 1312.50 /mo

250	750.00
2.25	562.50
11 250	1312.50
45 0	
562.50	

For 3000 mi channel 4312.50 /mo.

3000		1312.50
− 500		3000.00
2500		# 4312.50
500	@ 1.75	875.00
2000		
500	@ 1.25	625.00
1500	@ 1.00	1500.00
		3000.00

Perforator Tape?

TT Systems:

Manual Tape

83B1

SCATS

Bellfast

81D System BSP P70,604

2-10-58 RSD
Staff. Conf.

Feb 10 view of sales + billed revenue program for 1958.

Sales to date 1958 thru 31 Jan

	TTY	FP	PGM	PM	OTHER	Total
	5,272,680	1,961640	72,000	189,000	1,267,700	8,765,120
Sold	1,129,356	1,761,818	78,800	41,900	29,000	
	22.8%	89.8	109.4	22.2	23	3,101,474 35.4

1957 @ 22,753000 Wash Office billed revenue

21,685,000 collected

Highest mo 2.7 million Oct

A

A NYG-71001 TG Service order or Inquiry No.

Item B Type of Service + Ckt No

- BSP E14.105 + Long Lines Addendum

(BSPs for EMC's E12.620 (Tp) E12.724 (Tq)

Speed of service mentioned here.

One Way or DUX or EXTN here.

"EMC" - here.

"Dual" - here.

DDT or DDR FGD or SDV ? - Here

Other Priority Orders (when ROW or Mob Tel) here. - explanation under Item H.

SSM (Special Security Measures)

C Arrange to

D To Take effect

E Name of Custr + Address

F Custr's Control Office

FF Plant Control or Reporting Office

G Hours of Service

H Station + Service Details

2-13-38(RID)

	Bandwidth (Cycles)	Bits Per Second
TWX (60 wpm)	170	45
TT (PL) 60 wpm	170	45
Tel. Ckt. (PL)	3000	1000
Radio Program Ckt	15,000	8,000

19 ASR

1. Automatic transmitter
2. Keyboard perforator – transmitter
3. Typing unit

Keyboard

1. Send directly to the line
2. Perforate tape
3. Send to line + perforate tape simultaneously

1. Perforated tape may be prepared while the typing unit is receiving copy from another station or – while tape previously produced by the set or obtained from other sources is being transmitted to the line by the automatic transmitter.
2. Data may be transmitted manually and added to information sent automatically from stored tapes, permitting complete integration of material.

#19 always furnished with table

30" wide

23½" deep

26½" high.

19 ASR (35 RO same) Page Automatic Sndng + Revng TT

Direct keyboard sndg + Page revng

Means for kybd preparation of msgs in perf tape form and automatically xmtng to the line from the perf tape.

Automatic Xmtr (35 RO series)

Keybd perf'or - xmtr

Typing unit

Kybd can -

send directly to the line

perforate tape

send + perforate simultaneously

Spcl voice circuits for tone signal / control

300-3000 ~ - PEL 6055

TG

Delayed Idle Service Alarm

Form Out Alarm

Paper Out Alarm

Power Failure Alarm

Tape Out Alarm

Tape Stop Alarm