tors and for preparation of service messages.) The tape factory is found near the service desk. Near the bulkhead next to monitors are switchboards and relay frames. Patchboards and test panels are appropriately positioned for patching and testing purposes.

ORGANIZATION

Each primary relay station has an OIC (sometimes called relay officer) who is directly responsible to the communication officer of the NAVCOMMSTA for the proper organization, administration, and supervision of the relay center. The OIC is usually a lieutenant commander. His two principal assistants are the chief in charge of the relay center and a civilian administrative assistant.

In addition to supervision of the operation of tape relay circuits and relay station terminating facilities, the OIC administers a training program for relay personnel, provides adequate control of message accountability, and works with other components of the NAVCOMMSTA and with communication offices of other activities to ensure satisfactory service and operation of the center.

The chief in charge of the relay center is the principal military assistant to the OIC. He prepares the relay station watch bill for approval of the OIC, maintains files, records, and required reports, and supervises the handling of all tracers referred to the relay center. In addition, the chief in charge sees that the station's training program results in constant improvement of personnel operating efficiency. This billet is comparable to that of leading Radioman aboard ship.

At most primary stations a civilian is designated as administrative assistant to the OIC. His civil service title is relay section chief. Under the general supervision of the OIC, the administrative assistant is responsible for operation of the semiautomatic tape relay system, handling of messages, and installation of equipment. He supervises civilian personnel in the relay room, assigns them to watches, and ensures that they are adequately trained and instructed in the latest NTX procedures.

He recommends them for advancement, and assigns their performance ratings. In any supervisory capacity, you will work closely with the man in this billet. The administrative assistant is usually a retired officer with many years of experience in tape relay.

A rated Radioman normally is assigned the full-time job of tracer clerk, for expeditious action must be taken on any message claimed undelivered by the originator. The tracer clerk breaks out monitor rolls of applicable circuits and searches for the message. Results of the search are compiled and a tracer reply is initiated in strict accordance with ACP 127. The outgoing tracer message must be released by the CO of the NAVCOMMSTA.

A supply clerk maintains an up-to-date inventory of supplies and printed forms, makes out stub requisitions, and files boxes for monitor rolls. He is the general utility man in the relay office, assisting the civilian administrative assistant and chief in charge whenever necessary.

WATCH STANDERS

All military watch standers in tape relay centers are Radiomen, TE(RM's), or RM strikers. The relay center in NAVCOMMSTA, Washington, D. C., for example, has 16 men (including strikers) on each watch. Three or 4 are assigned to each peak load watch, assisting regular watch standers during hours of heavy traffic.

Civilian personnel with previous military experience in tape relay stand watches at relay centers in the continental United States and at most overseas stations. In addition to military personnel, 5 or 6 civilians are employed on each regular watch and 3 or 4 on each peak load.

Once you are assigned to a watch in the tape relay center you will work closely with civilian watch standers as well as with lower rated petty officers and strikers. The section which follows describes each supervisory position at a typical primary relay station. Some of these billets may be filled either by military or civilian personnel. Make sure, however, that you know the important duties of each position. Bear in mind that

shortages of trained personnel frequently occur. When this happens, your billet may be combined with another, giving you added responsibilities.

Relay Chief of the Watch (RCOW)

The RCOW is an experienced Chief Radioman or Chief Teleman (RM) who is in charge of each watch. He maintains liaison with the CWO of the COMMCEN and keeps him informed of any unusual events of the watch such as excessive outages and delays. When part-time stations are closed, the RCOW screens all traffic and takes appropriate action to deliver all high priority traffic. At some primary stations he is required to refer all ACTION PRIORITY (or higher) messages to the CWO. The RCOW also screens all ROUTINE ACTION and PRIORITY INFO messages, informing the CWO of those pertaining to deaths or injury of personnel, etc. He notes on the hard copy disposition made of each message referred to the CWO and returns it to the relay file.

When final numbers for the day are completed, the RCOW checks each received record card for the previous day to ensure that all encircled and open numbers have been serviced, and initials each card when necessary action has been taken on all messages. He then staples together all the received record cards for the previous day and files them in the received record holders. At some relay centers the RCOW has secondary duties as receiving supervisor.

Receiving Supervisor (ARCOW)

The receiving supervisor is the assistant relay chief of the watch (ARCOW). He ensures that all tapes are promptly removed from receiving consoles and expeditiously distributed. The ARCOW makes half-hourly time endorsements on the received message cards with a colored pencil. Whenever the ARCOW finds that no traffic has been received on a normally busy circuit since the previous endorsement, he immediately investigates conditions on that circuit.

The ARCOW uses a colored pencil to encircle all open numbers on the received record cards, keeping the service desk

informed of such numbers so the service desk can request reruns. He supervises the handling of STOP and GO messages, making sure the sending operator inserts or removes holdup tabs in the transmitter of the circuit involved. (A STOP and GO message is a procedure message directing a distant station to either stop transmission or go ahead with transmission on channels as indicated.) The ARCOW also checks handling of number comparisons and is assisted by the sending supervisor as necessary. He must maintain a vigilant watch on all receiving equipment, being particularly alert for reperfs running out of tape and tapes hanging up or jamming in the punch block of the typing reperf.

The ARCOW's duties include ensuring that all information required at the top of each received message card is filled in on both sides, such as the circuit designation and date. He also places all received message cards for temporarily secured circuits upside down in card holders until the circuit is reopened.

He instructs his receiving operators in the following:

1. Separating incoming tapes properly.
2. Checking off channel numbers on received message cards.
3. Routing all multiple address message tapes to tape factory.
4. Routing all outgoing tapes to correct sending position.
5. Inserting tapes in correct order in sending position grids.
6. Giving special handling to OPERATIONAL IMMEDIATE or higher precedence tapes.
7. Routing and identification of TWX tapes.
8. Placing the TOR on the front end of FLASH or EMERGENCY messages and passing these to the supervisor for swift handling.
9. Carrying a maximum of 10 tapes for distribution.

Relay Station Supervisor

At most primary relay stations in the United States an experienced civilian is normally designated relay station supervisor. He works in close coordination with the RCOW, for

the relay station supervisor is charged with proper operation of all circuits and equipments, and expeditious movement of message traffic. He cooperates with the RCOW in assigning operating personnel to positions so that the traffic load is handled effectively. He first sees that incoming message tapes are separated and distributed to sending grids in proper order of precedence. Normally, he rotates qualified operators between sending and receiving positions approximately every 2 hours. During heavy peak loads he rotates operators every hour.

The relay station supervisor ensures that used tapes are carefully removed from used-tape bins so that live tapes (those awaiting transmission) are not mixed in. He checks to see that used tapes are placed in burn bags and that full burn bags are ready for disposal at the end of each watch.

When page copy is run off for certain offices at night, the supervisor sees that no garbles, mutilations, or overlines appear in the message copy and that the copy is complete in every respect. For general messages, the supervisor makes sure a checkoff sheet is prepared and attached to a page copy of all general messages. (The checkoff sheet lists all stations for which the relay center has relay responsibility.) The outgoing circuit channel number and sign of person making the checkoff must be recorded in the appropriate place on the checkoff sheet for each transmission. The relay station supervisor supervises the closing out of channel numbers and preparation of the traffic load study report at 2359 GMT daily.

If no tape factory supervisor is assigned to the watch, the relay station supervisor details a well-qualified person to that position.

Relay Station Sending Supervisor

The relay station sending supervisor is responsible for the proper operation of all sending equipment. He ensures that tapes are transmitted in order of precedence and in order of insertion in the grids. Particular attention must be paid to transmission of reruns to Navy activities, making sure they are sent without picking up a new number.

NOTE.—Air Force and Army sometimes require numbers on reruns.

The sending supervisor sees that all STOP and GO messages are promptly complied with, and that number comparisons are transmitted promptly at designated times. In addition to these responsibilities he assists the relay station supervisor when necessary and is in training for that position.

Relay Station Service Supervisor

The service supervisor (sometimes called service and monitor supervisor) is responsible for all service operations in the relay center. He makes proper disposition of all service messages, initiates service investigations, and operates monitor and automatic numbering equipment. Under careful direction of the service supervisor, service personnel locate and transmit correctly all missent, misrouted, and lost messages, retransmit messages which failed to reach the addressee due to equipment failures, and prepare new message tapes when existing tapes result in faulty transmission.

The service supervisor also sees that service desk personnel clear up garbled or overlined message tapes, make and check numbering tapes, and record and identify all monitor records, including tape file boxes.

Other important duties of the service supervisor are investigation of claims of delay or nondelivery, and correction of automatic numbering equipment failures.

Tape Factory Supervisor

The tape factory supervisor is normally a First Class Radioman with thorough knowledge of NTX routing doctrine and procedure, especially as they apply to transfer of multiple call messages to joint circuits. He must keep fully informed of all local and trunk circuits, both overseas and domestic, which comprise the NTX and joint relay systems, and keep posted on all changes to these systems as they occur.

The tape factory supervisor checks the multiple log frequently for proper checkoff of routing indicators in every multiple call tape. His sign after each routing line indicates the message was routed correctly. He works closely with the service desk correcting and routing properly all tapes with garbled,

doubtful, or duplicated routing indicators, retrieving these tapes and passing them to service desk as necessary.

When traffic is light the tape factory supervisor should instruct tape factory operators in the proper method of marking, transmitting, routing, and checking off all multiple call tapes on the multiple log.

Radio Supervisor (Overseas TTY)

The radio supervisor (overseas TTY) is responsible for proper operation of all radio channels. He logs all outages, stating the reasons, and supervises sending and receiving operators in radio section. If high precedence traffic is held up due to circuit outage, he must keep the RCOW and relay station supervisor informed. In close coordination with the control center supervisor in the COMMCEN, the overseas supervisor runs tests on all radio circuits. He also ensures that page copy monitors are changed at 0001Z daily and that a new log is started on all radio channels.

MAINTENANCEMEN

Maintenancemen are needed to repair and maintain relay equipment but generally are not included in the relay station watch bill. Electronics Technicians, Radiomen, and TE (RM's) qualified in teletypewriter repair are designated as maintenancemen. At small relay stations only one man may be required to maintain the equipment. He is available on a round-the-clock basis.

At most relay centers civilians in addition to Radiomen are employed to maintain and repair Navy-owned relay equipment. Equipment leased from commercial telecommunication companies is repaired only by a civilian technician employed by the company.

BREAKING IN NEW MEN

Tape relay stations frequently experience a rapid loss of trained watch standers and consequent influx of new personnel who are, in most cases, completely unfamiliar with tape relay operations. To combat shortages of trained personnel, most

relay centers conduct intensive indoctrination courses to qualify a man as a watch stander. The orientation period for a Radioman or TE(RM) petty officer depends, of course, on his background in tape relay and general supervisory qualifications. An experienced petty officer may need only 4 to 6 weeks' instruction. Normally, to train a nonrated man takes from 4 to 6 months. The following procedures, although not standard, will enable you to train a man thoroughly in the shortest possible time.

The first week or two a new man is aboard he should pick up and distribute tapes throughout the relay room to familiarize himself with the physical layout of the relay center. He must, of course, be under strict surveillance to prevent inadvertent misplacement or loss of tapes.

The following week your new man should read all orders, memoranda, and instructions regarding operation of the relay station. Be sure ACP 127, ACP/JANAP 117 series, and other procedural publications are available to him. Get him into the habit of breaking out ACP 127 whenever a question on procedure arises.

During the next few months the new man should break in gradually at each nonsupervisory position. His progress depends on how quickly he picks up duties of each job. A new man should normally spend 3 weeks to a month at each position. The following cycle is recommended:

1. Receive operator (slow bank).
2. Receive operator (fast bank).
3. Send operator (slow bank).
4. Send operator (fast bank).
5. Radio send and receive operator.
6. Tape factory operator.
7. Service desk operator.
8. Comparison operator.

As soon as the new man is checked out at all positions, he is placed on a watch and assigned to the billet for which he is

best qualified. The RCOW continues to instruct him, especially during light traffic hours. The relay chief may rotate the new watch stander to make sure he keeps checked out in other positions of the watch.

LOGS AND RECORDS

Relay center logs and records are vitally important to the mission of the station. Their purpose is twofold: to provide traffic analysis data and to ensure up-to-the-minute accountability of every message in process. Remember, properly kept records will enable you, as supervisor, to run a taut watch.

Relay Station Log

All important occurrences of the watch are recorded in the relay station log. It is kept at the relay station supervisor's desk. Typical entries are information on abnormal traffic delays, circuit failures, setting up special circuits, alternate routing of traffic, traffic backlogs, and the opening and closing of all circuits. For convenience, at some stations a separate OUTAGE SHEET (kept by the RCOW) also records the opening and closing of circuits.

Relay Status Report

The RCOW submits a RELAY STATUS REPORT at the end of each watch. In the operational section of the report, he indicates circuit conditions and backlogs, and certifies that all received message records and number comparison sheets (number comps) have been checked. The RCOW also indicates that publications such as ACP 121, ACP 127, and ACP/JANAP 117 series are properly accounted for by a check mark after the appropriate short title.

Listed in the general section of the report are names of watch standers on the binnacle list, those on leave, total number in the crew, and total present.

In the administrative section the RCOW indicates he has submitted the muster report, made routine inspections, and prepared the meals missed list.

Message Accountability Logs

Number comps are sent and received between stations every hour on radio circuits and every other hour on landline circuits to ensure continuity of numbers. These numbers are recorded on the NUMBER COMP SHEET. A number lower than that of the number comp which is still open (not crossed off on the RECEIVED MESSAGE RECORD) must be requested from the sending station through a RERUN REQUEST. The RECEIVED MESSAGE RECORD is a checkoff list of incoming message numbers and contains the operator's sign and time each message was received. This record is kept in a card slot at each receiving console. The RERUN REQUESTS form contains the circuit number of the requested message, reason requested, time rerun was sent, operator's sign, and time the rerun was answered.

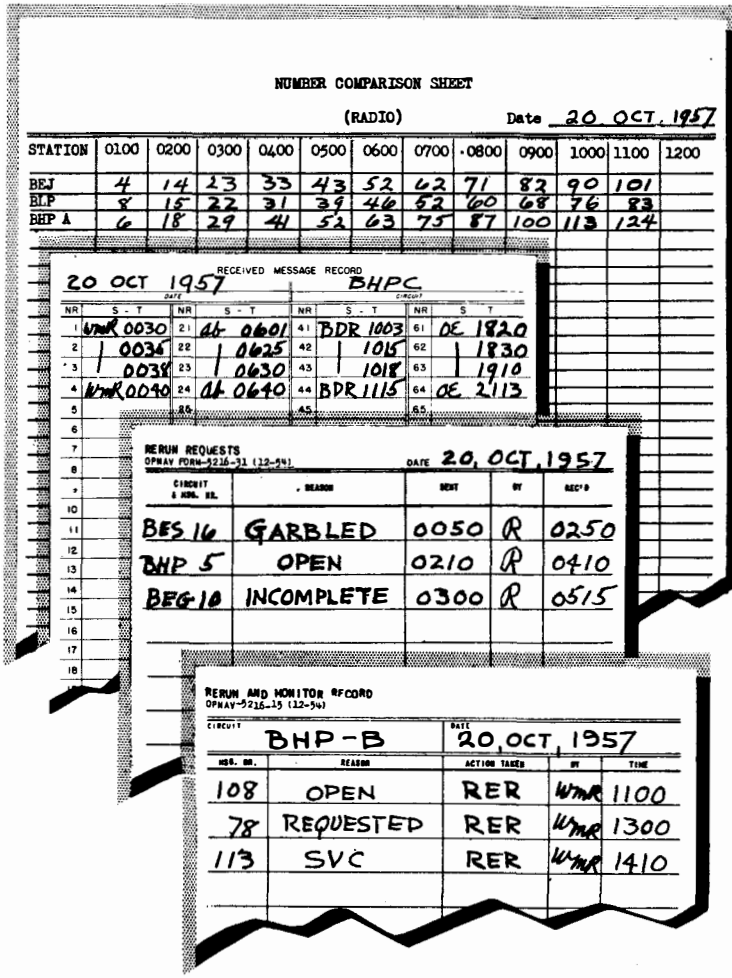
A RERUN AND MONITOR RECORD is kept at the service desk. It is a record of all messages rerun to other relay stations at their request. This record contains the following information: message number, reason for rerun, action taken, by whom, and time sent. Reel changes and final numbers (entered in red) are also recorded on the rerun and monitor record.

Figure 5–2 shows the message accountability logs. They are intended for use at all relay stations. If these forms are not available at your station, they may be ordered direct from CNO (DNC). Procedures for ordering are contained in DNC Instruction 5213.1.

Traffic Analysis Records

The relay station supervisor prepares the daily TRAFFIC LOAD STUDY REPORT. This report is signed by the OIC and submitted to the commanding officer of the NAVCOMMSTA with a copy to the duty officer. The report lists each circuit and circuit number and the number of messages sent and received on each circuit that day. The number of service messages is recorded separately at the bottom of the page. Total number of messages sent and received is added to give the grand total.

There are four parts to the TELECOMMUNICATIONS ENGINEERING REPORT (DD Form 280). Each primary relay station sub-



NUMBER COMPARISON SHEET

(RADIO) Date 20 OCT. 1957

STATION	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200
BEJ	4	14	23	33	43	52	62	71	82	90	101	
BLP	8	15	22	31	39	46	52	60	68	76	83	
BHP A	6	18	29	41	52	63	75	87	100	113	124	

RECEIVED MESSAGE RECORD

20 OCT 1957 (DATE) BHPC (CIRCUIT)

NR	S-T	NR	S-T	NR	S-T	NR	S-T
1	WMR 0030	21	ab 0601	41	BDR 1003	61	OE 1820
2	0036	22	0625	42	1015	62	1830
3	0038	23	0630	43	1018	63	1910
4	WMR 0040	24	ab 0640	44	BDR 1115	64	OE 2113
5		86		45		65	

RERUN REQUESTS

OPNAV FORM-5216-31 (12-54) DATE 20, OCT, 1957

CIRCUIT & NOM. NR.	REASON	SENT	BY	REC'D
BES 16	GARBLED	0050	R	0250
BHP 5	OPEN	0210	R	0410
BEG 10	INCOMPLETE	0300	R	0515

RERUN AND MONITOR RECORD

OPNAV-5216-15 (12-54)

CIRCUIT BHP-B DATE 20, OCT, 1957

MSG. NR.	REASON	ACTION TAKEN	BY	TIME
108	OPEN	RER	WMR	1100
78	REQUESTED	RER	WMR	1300
113	SVC	RER	WMR	1410

Figure 5-2.—Message accountability logs.

mits part II, the monthly transmitted message load. The smooth report is signed by the commanding officer of each NAVCOMMSTA and submitted to CNO (DNC) quarterly. It is a record of the total of daily incoming and outgoing messages by circuits. A separate columnar entry is made for each channel of every available primary and standby circuit. Each

circuit's designation and channel letter (if applicable) are recorded, as well as the type of circuit (RATT, CW, etc.). In addition to the entry of total traffic sent and received, total outages, operating hours of channels and circuits, and model numbers of equipment employed are included on the report. The telecommunications engineering report also includes the average group count, computed once a year in October. It is obtained by measuring a representative number of tapes transmitted and received on each channel during the month.

Permanent Message File

Tape relay stations are not required to keep a permanent file of messages. Each station is required, however, to keep monitor tape or page copy for 24 hours on all INCOMING messages. It is mandatory for relay stations to keep monitor tape or page copy on OUTGOING messages for 60 days.

EQUIPMENT

Most relay stations employ, as major equipment, Navy-owned tape relay equipment formerly used by the Postal Telegraph Company, package units (four-in-one: send, receive, automatic number, and monitor), and A. T. & T. leased equipment. The ex-postal telegraph equipment comprises receiving, sending, automatic numbering, and monitoring units, and is used on both radio and landline circuits. It operates at speeds of 60 wpm on radio circuits and either 65 or 75 wpm on landline circuits. Tape relay equipment is leased from A. T. & T. to terminate heavy traffic load trunk circuits. It also consists of receiving, sending, and automatic numbering and monitoring units, and operates at 75 wpm. Navy-owned package units are normally employed on light traffic load circuits, both radio and landline. Each unit operates at 60 wpm on radio and 65 wpm on landline.

In addition, model 15 teletypewriters are used in relay centers for page copy monitoring. Model 19 and 28 sets are employed by service clerks and supervisory personnel to prepare procedure and service messages.

Following is a description of major tape relay equipment.