

**FORCE ADMINISTRATION DATA SYSTEM (FADS)
USED WITH NO. 5 CROSSBAR OFFICE
ARRANGED FOR AUTOMATIC CALL DISTRIBUTION (ACD)**

DESCRIPTION

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1. INTRODUCTION

A. General

1.01 This section describes the Force Administration Data System (FADS), Phases I and II, when used with the No. 5 crossbar (XBAR) office arranged for automatic call distribution (ACD). Traffic data recorded by the FADS equipment consists of calls-waiting usage, total count of calls by class of service, position occupied usage, position work-time usage, and position peg count by traffic office.

1.02 This section is reissued to include the remote accessible (READ) data terminal, Phase II FADS.

1.03 The FADS equipment is capable of recording traffic data from a No. 5 XBAR ACD office having as many as 2400 incoming trunks arranged to handle a maximum of 5 classes of service for a maximum of 10 traffic offices, each office being equipped with a maximum of 60 operator positions. The traffic offices may be in the same building as the No. 5 XBAR ACD office or may be at a remote location.

1.04 The traffic data recorded by the FADS is used by a traffic coordinator whose responsibility is proper distribution of traffic and the overall force adjustment of the operator positions of the system. Traffic distribution is varied in predetermined patterns by means of keys provided on the traffic coordinator console. These keys will be discussed in more detail along with the traffic coordinator console later in this section.

1.05 The basic units of the FADS common to both Phases I and II are as follows:

- Coordinator control equipment which provides traffic administrative personnel with control features in connection with the FADS of the No. 5 XBAR ACD office.
- A traffic usage recorder (TUR) is required in the No. 5 XBAR ACD office for recording traffic usage in hundred call seconds (CCS).
- Totalizers are required in the No. 5 XBAR ACD offices for summing peg count data on incoming trunks and position trunks and marker class-of-service peg counts.
- Teletypewriters (TTYs) for displaying the basic FADS data obtained by the traffic information gathering (TIG) circuit located at the traffic coordinator office and optionally at each traffic office associated with the ACD.

1.06 The basic unit for Phase I FADS is the TIG circuit which provides the traffic department with information necessary for force administration of the No. 5 XBAR ACD office.

The basic units for Phase II FADS are as follows:

- The READ terminal replaces the TIG frame and provides the necessary information to the traffic department.
- Remote start signal generator permits TURs associated with a READ terminal to be started in synchronization with the READ terminal.
- Remote registration signal receiver provides for connecting Phase I position trunk and control units to Phase II ACD FADS.

1.07 The traffic data obtained by the FADS equipment is transmitted normally at half-hour intervals to a traffic coordinator and optionally to all traffic office locations over a private line TTY network. This data is preceded by a preamble composed of system and schedule identities, date and time identification, block length, and TUR cycle count. A TTY at the traffic coordinator location prints all of the preceding information at all times. An optional typing reperforator at the same location

may also be furnished to punch the data on a perforated tape. When provided, at each traffic office, a TTY prints the preamble and, selectively, the traffic data for the individual office. The traffic office which is designated as the night coordinator location is also equipped with a traffic administrator console and receives complete system traffic data. The coordinator may request the traffic data at quarter-hour intervals which is helpful during periods of heavy traffic.

Note 1: See Part 4 for information concerning the printout format for No. 5 XBAR ACD FADS.

Note 2: A flow chart diagram of the FADS is shown in Fig. 1.

B. Field of Use

1.08 The FADS may be used with the No. 5 XBAR ACD office serving up to five classes or routes of service; for example, local directory assistance, shorthaul toll directory assistance, NPA (numbering plan area) directory assistance for customers and operators, and intercepting.

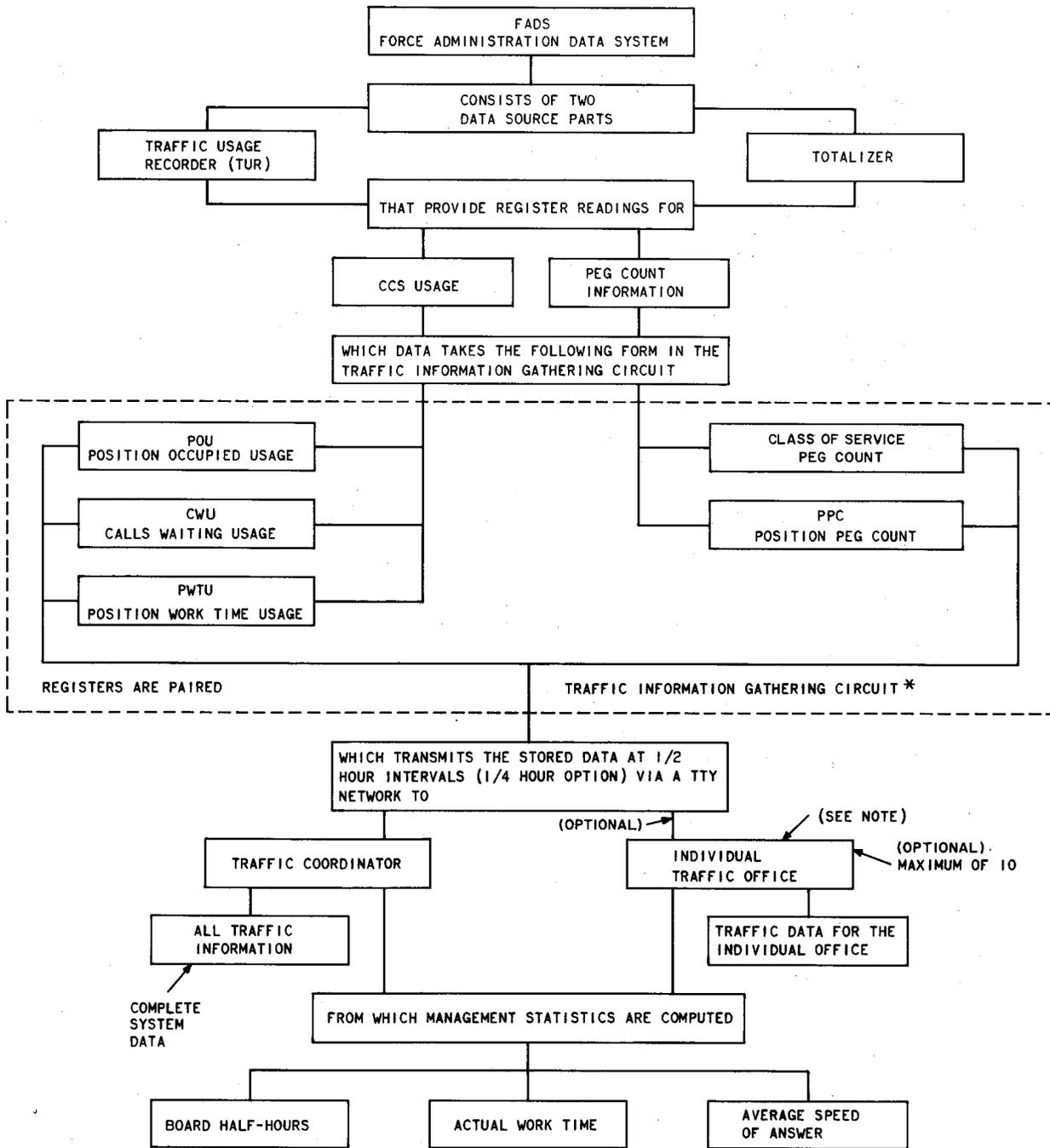
C. Capacity

1.09 The size of the FADS is determined by the ACD to which it is connected. When the number of FADS usage leads exceeds the capacity of one 3B TUR (600 leads), additional 3B TURs or a 4A TUR is provided as required.

2. EQUIPMENT ELEMENTS FOR PHASES I AND II

2.01 The traffic measuring equipment described in this section is designed to function with a No. 5 XBAR office arranged for ACD. The traffic measuring equipment consists of two phases: Phase I which consists of TIG equipment and Phase II which consists of the READ terminal, remote start signal generator, and remote registration signal receiver. Common to Phases I and II is the coordinator control circuit, some of which is located in the No. 5 XBAR ACD office and some of which may be located remotely, depending upon the location of the traffic coordinator relative to the ACD office.

2.02 A list of the equipment required for a FADS TIG equipment frame is shown in Table A.



NOTE:
TRAFFIC OFFICE DESIGNATED AS NIGHT
COORDINATOR WILL RECEIVE COMPLETE
SYSTEM DATA.

* IN PHASE II THE TIG CIRCUIT
WILL BE REPLACED BY THE
READ TERMINAL.

Fig. 1—Force Administration Data System (Flow Diagram)

A typical equipment arrangement of this frame is shown in Fig. 2.

▶PHASE 1◀ —TRAFFIC INFORMATION GATHERING EQUIPMENT

A. General

2.03 The TIG equipment shown in Fig. 2 consists of a duplicated register field labeled A and B. This duplicated register field is comprised of electrically readable and resettable registers; an electronic character generator and translator; a 400-point electronic matrix; and associated control, test, and timing equipment. At 100-second intervals, start scan signals are transmitted to the associated 3B or 4A TURs which have been optionally wired to operate from remote control. Traffic data from traffic usage registers and traffic totalizers is fed into one register group for a normal period of one-half hour. At the end of this time period, a transfer occurs and the incoming traffic data is shifted to the second register group. The first set of registers is scanned by the electronic circuitry, and the data is transmitted over the TTY network to the traffic coordinator and optionally to the individual traffic offices.

B. Operation

2.04 Traffic information is stored in the first group of registers for the duration of the scheduled interval, at the end of which time the registers are cleared and the transfer of counting from the second group of registers to the first group of registers takes place. The second group of registers is then scanned, and this information is transferred onto the system TTY. Readout of quarter-hour intervals by the traffic coordinator is possible. A visual readout of the data stored in the registers can be requested by the traffic coordinator in the event of a failure in the readout circuitry.

2.05 Data sources for the registers in the TIG equipment are TURs in both the No. 5 XBAR ACD office and each traffic office and KS-15947 L1 totalizers in the No. 5 XBAR ACD office. Peg counts for incoming trunks for class of service are obtained from totalizers, one for each class of service per marker. Peg counts for position trunk usage are obtained from totalizers, one for each traffic office, associated with the outgoing trunks in the No. 5 XBAR ACD office.

Calls-waiting data on incoming calls is obtained from a TUR scanning the incoming trunks in the No. 5 XBAR ACD office; position usage data is obtained from a TUR at each traffic office location scanning the position trunks. When the traffic offices are local, the TUR for position usage data may be in the No. 5 XBAR ACD switchroom. When the traffic offices are remote from the No. 5 XBAR ACD office, signaling facilities must be provided for transmitting the start scan signal to the remote 3B TUR. The TURs used for FADS must be equipped for remote start, so all TURs will be synchronized under the control of a start signal generated by the TIG circuit. A TUR start scan signal is transmitted every 100 seconds by this equipment.

2.06 Due to the input grouping limitations of the TURs, usage measurements for only 600 trunks of one class of service can be accommodated on one FADS register. In cases of systems that require more than 600 trunks per class of service, an auxiliary summing circuit is used which will accept usage data up to 1800 trunks (through one 4A TUR or two or three 3B TURs) and provide a totaled output to a single register.

2.07 For remote traffic offices which are beyond the 1000-ohm loop resistance range, the TIG equipment provides a means for interconnecting to E&M signaling facilities or 43-type data channels. The start scan signal to activate the TUR must be transmitted to each remote office, and two position usage signals must be transmitted from the TUR at the remote office to the TIG equipment. The signaling facilities required for transmission of these signals are handled by the telephone company.

C. Matrix and Shift Register Unit and Character Translator and Generator Unit

2.08 The matrix and shift register unit and character translator and generator unit are electronic units which employ circuit packs. A cross-connection field provided on these units enables each of the 400 points in the matrix to be connected to a specific character in the character generator or to a particular digit in each register. Typical cross-connections provide, when readout takes place, for a character generator to generate a 3-digit start code. The matrix scans the preamble generator, time and data generator, and registration circuits in a predetermined sequence and provides for

TABLE A

NO. 5 CROSSBAR ACD FADS EQUIPMENT FRAME

COMPONENT EQUIPMENT UNITS SHALL BE EQUIPPED AS FOLLOWS:				
UNIT		QUANTITY TO BE PROVIDED		TITLE OF UNIT AND DESCRIPTION OF FEATURE OR OPTION
CODE	LIST NO.	ALWAYS	FOR OPTION INDICATED	
J3B008AA	1	1		Matrix and Shift Register Unit (Common Eqpt)
J3B008AB	1	1		Character Translator and Generator Unit (Common Eqpt)
J3B008AC	1	2		Position Register Unit for two traffic offices in each register group A and B
	1		2	Position Register Unit for two additional traffic offices in each register group A and B
	2	2		Registers for one traffic office in each register group A and B
	2		2	To provide registers for an additional traffic office in each register group A and B
J3B008AD	1	4		Class of Service Register Unit arranged for five classes of service in each register group A and B
	2		4	Registers for one class of service in each register group A and B
	2		4	To provide registers for one additional class of service in each register group A and B
J3B008AE	1	1		Time of Day Register Unit (Common Eqpt)
J3B008AF	1	1		Control Unit (Common Eqpt)
J3B008AG	1	1		Register Reset Unit (Common Eqpt)
J3B008AH	1	1		Control Panel (Common Eqpt)
J3B008AJ	1	1		Power Supply and Timer Unit (Common Eqpt)
J3B008AM	1	1		Auxiliary Relay Unit (Common Eqpt)

TABLE A (Cont)

UNIT		QUANTITY TO BE PROVIDED		TITLE OF UNIT AND DESCRIPTION OF FEATURE OR OPTION
CODE	LIST NO.	ALWAYS	FOR OPTION INDICATED	
J3B008AN	1	1		Signal Converter Unit
	2		1	When M lead signal is required for TUR start lead to remote traffic office (maximum 10)
J3B008AV	1		1	When 600 to 1200 trunks in the same class of service are to be scored on one class of service register, in an office with either -26V or +24V battery supply
	2		1	When office battery supply is -48V
	3		1	When No. of trunks in same class to be scored on same class of service register is between 1200 and 1800

Note 1: The position register units J3B008AC are duplicated in register groups A and B. A maximum of five List 1 position register units may be equipped in each register group. List 2 position register units may be equipped on an individual traffic office basis with a maximum of ten List 2 traffic register units in each register group A and B.

Note 2: Class of service register units J3B008AD are duplicated in register groups A and B. Two J3B008AD List 1 register units are required in each register group. A maximum of five class-of-service registers J3B008AD List 2 may be equipped on each register unit J3B008AD List 1.

controlling and driving the appropriate TTYs in the system. At the completion of scanning, a stop code is generated.

D. Position Usage Register Unit

2.09 The position usage register unit records position occupied usage, position work usage, and position peg count data for traffic offices and has a capacity of two traffic offices. The registers are plug-in units and are provided on an individual office basis. A maximum of five position usage register units may be provided in each register group, and each register group must be equipped in the same manner.

E. Class-of-Service Register Unit and Auxiliary Summing Unit

2.10 The class-of-service register unit records peg counts on incoming trunks per class of service and calls-waiting data on incoming trunks per class of service, requiring one register unit to perform each function. The unit has a capacity of serving up to five classes of service. The registers are of the plug-in type and are equipped on an individual class basis up to a maximum of five classes. Two of these units, identically equipped, are required in each register group. Since both the 3B and 4A TURs are limited to 600 scanned inputs connected to a single recording register, no more than 600 incoming trunks may be associated with one class of service register for calls-waiting data. Two methods of deriving the total calls-waiting data are

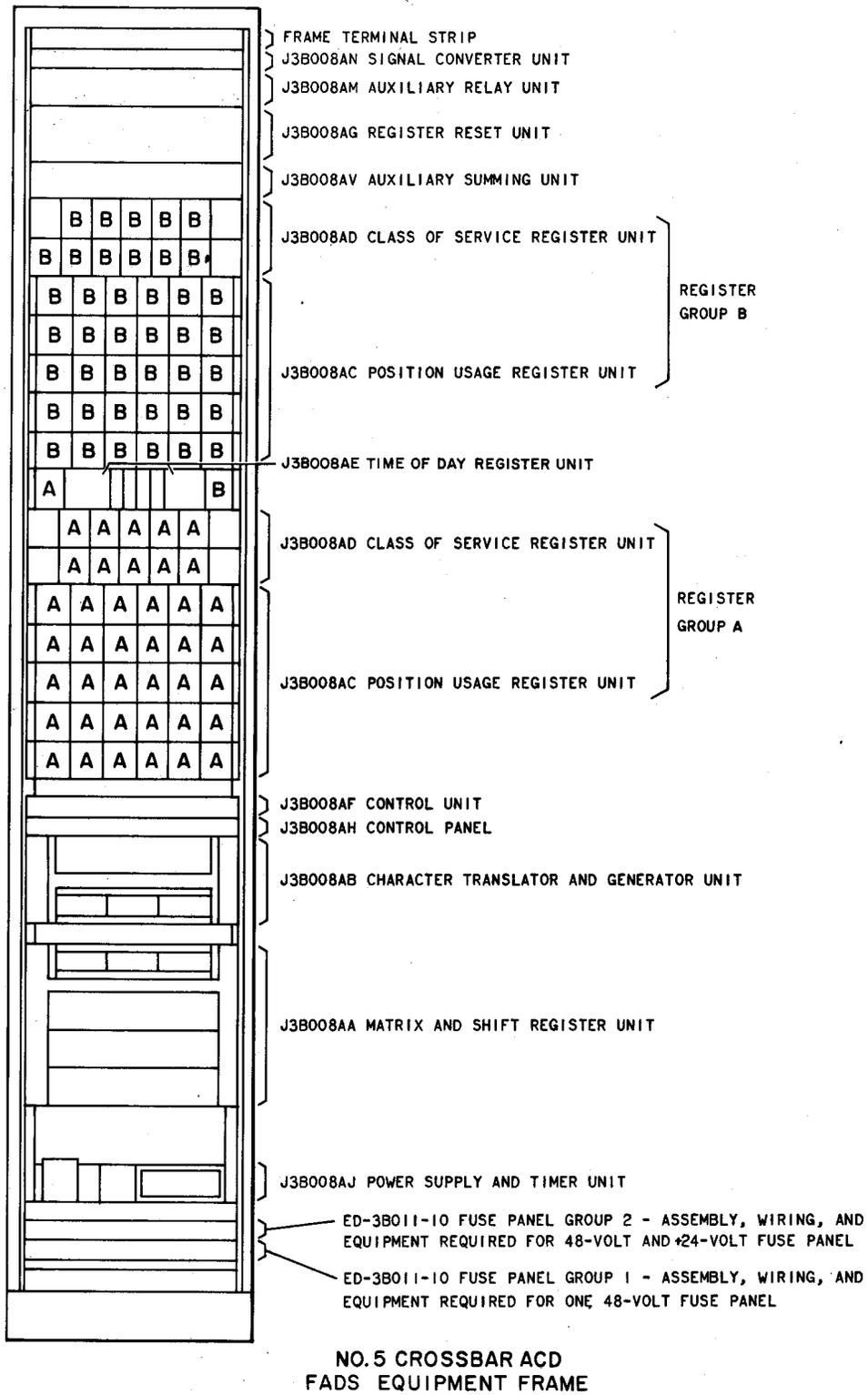


Fig. 2—FADS Equipment for Use in No. 5 XBAR Office Arranged for ACD

available when more than 600 trunks are assigned to a class of service. The first method requires a separate register for each group of 600 trunks in the class and a manual summation of the scoring of the registers. The other method provides the use of an auxiliary summing unit, capable of obtaining the outputs of two or three 3B TURs or one 4A TUR and generating an overall total output to a single calls-waiting register for that class of service.

F. Time-of-Day Register Unit

2.11 The time-of-day register unit is common to both register groups A and B. In addition to registers for recording time data (month, day, hour, and minutes), a TUR cycle count register for each register group is provided on this unit.

G. Control Unit

2.12 The control unit is a single unit of relay equipment which provides controls for the TIG equipment.

H. Register Reset Unit

2.13 Between 7 seconds prior to transfer and 3 seconds prior to transfer, the register reset unit generates a 4-second burst of 49V RMS 60 Hz superimposed on -48 VDC. This burst resets the registers in the register group.

I. Control Panel

2.14 The control panel provides means for manually testing the shift registers in the electronic units, access for monitoring on the TTY loop, and alarm controls.

J. Power Supply and Timer Unit

2.15 The power supply and timer unit provides the +24V unit supply for the electronic units. A dc-to-dc converter, which is a part of this unit, provides the +24V output. A timer, also part of this unit, generates pulses at 60 seconds, 100 seconds, and 900 seconds to control the clock, the TUR start signal, and register reset and readout.

K. Auxiliary Relay Unit

2.16 The auxiliary relay unit is provided to extend the signal range of the registers. The relays repeat the pulse from the data source to insure proper operation of the registers.

PHASE II—READ TERMINAL

EQUIPMENT ELEMENTS FOR PHASE II

A. General

2.17 In Phase II ACD, the READ terminal replaces the TIG circuit (Fig. 3). The READ terminal consists essentially of circuit packs. The terminal contains two memories, an active memory for accumulated data and a passive memory for storing the data until a printout is requested. At the end of a collection interval, the active memory data is transferred to the passive memory where it is read out.

B. Operation

2.18 The READ terminal receives data from totalizers and TURs. This data is accumulated in its active memory for a predetermined interval (half-hours or hour interval). At the end of this predetermined interval, a memory transfer takes place which transfers the data accumulated in the active memory to the passive memory and clears the active memory to collect data for the next collection interval. The data stored in the passive memory becomes available for a printout on a local or remote TTY. The data readout of the passive memory is read out on a nondestructive basis which makes repeated printout of the data available. This process is repeated for the succeeding collection intervals.

C. Traffic Data for Phase II

2.19 The READ terminal will generate start and stop characters, a terminal identity code, 11 status indicators, and a time-of-day indication. The status indicators are connected to external circuits in the ACD to identify the position of routing switches. Phase II ACD FADS can provide a maximum of 51 traffic data registrations. These registrations are as follows.

- (a) Position occupied usage, position work-time usage, and position peg count are provided

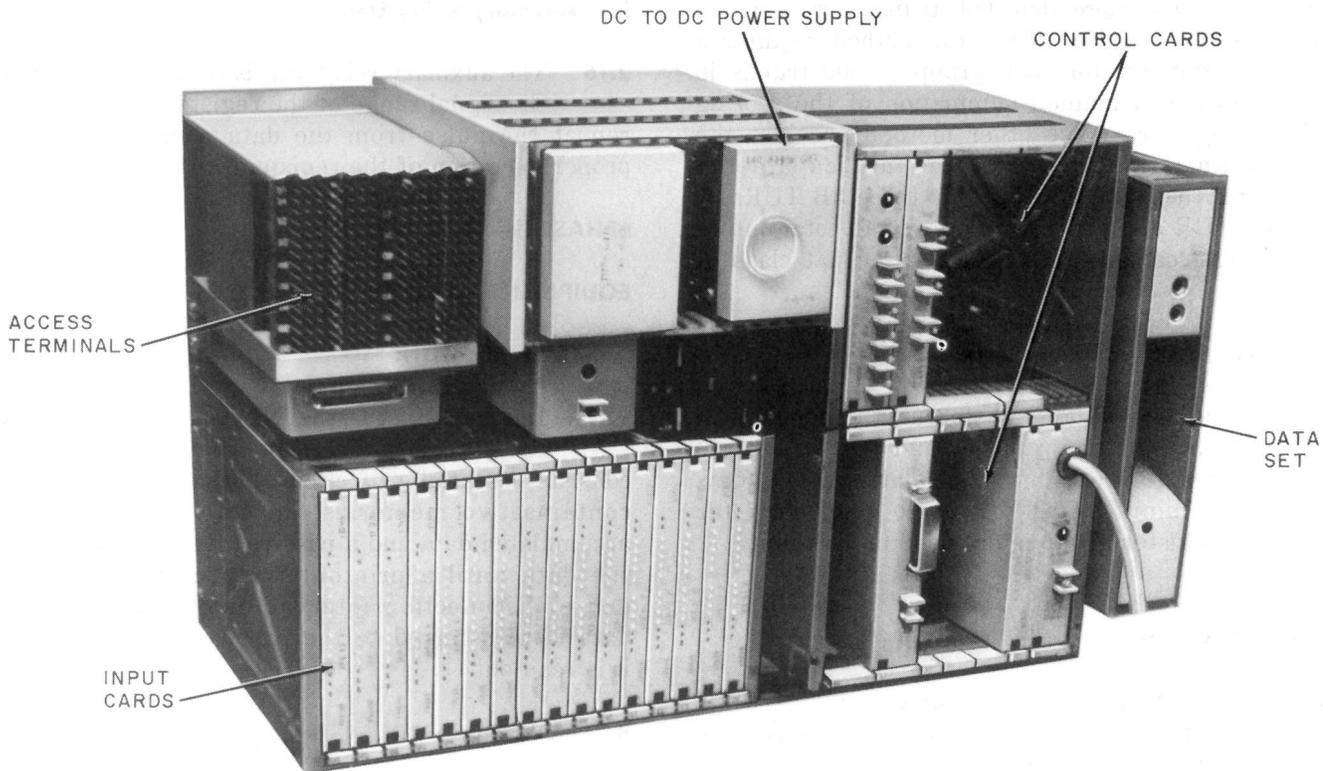


Fig. 3—READ Terminal

for each traffic office. The position usage data is received from the output of a 3B or a 4A TUR located in the ACD switchroom. Peg count measurement is received from KS-15947 L1 totalizers associated with the position trunks.

(b) Peg count and calls-waiting usage are provided for each of five possible routes. A route consists of one or more traffic offices and is used for the purpose of handling the offices as a group. The peg count data is obtained from totalizers associated with the ACD marker. Calls-waiting usage is received from the output of a 3B or a 4A TUR associated with the ACD line circuits.

(c) A peg count of total ACD traffic is taken of calls intraflowed from each route and calls intraflowed to each route. The intraflow feature permits calls for a route which has no idle position trunks to be completed to one or more different routes, which are in turn capable of reciprocating with their own excess traffic.

D. Sum Card

2.20 If it is desirable to total the outputs of several TUR detectors on one register, the sum card is used. The sum card permits the assignment of up to 1800 ACD line circuits on the same route for which a single calls-waiting usage measurement can be recorded by the READ terminal and then printed on the TTY. The sum circuits provide a replacement for the auxiliary summing circuit used with the TIG circuit.

E. Remote Control

2.21 When under remote control-type operation, the timer on the READ terminal controls the memory transfer. No printout will occur until the READ terminal is remotely polled. Under remote FADS control of the READ terminal, a memory transfer will be prevented from occurring at the end of the one-half hour interval until the terminal has been polled at least once during the preceding one-half hour. This precautionary procedure will prevent the READ terminal from

resetting its memory and losing data if it is not polled due to a trouble condition. If the trouble condition persists, the READ terminal can be manually switched to local FADS timing control.

F. Remote Start Signal Generator Circuit

2.22 This circuit generates a remote start signal which is used to synchronize the starting times of one or more traffic usage recorders with the READ terminal. A direct connection is provided to the TURs located in the No. 5 XBAR ACD office. Simplex, loop, and M lead signaling is provided for starting the 3B TURs remotely located in the traffic offices.

G. Remote Registration Signal Receiver Circuit

2.23 This circuit provides for connecting remote Phase I position, trunk, and control circuits to a Phase II No. 5 XBAR ACD office. The remote registration signal receiver receives one pulse from the signaling facilities for each CCS usage count transmitted from the 3B TUR. These signals are then repeated to the READ terminal for registration.♦

COORDINATOR CONTROL EQUIPMENT

A. General

2.24 The second group of equipment units forming a part of the No. 5 ACD FADS equipment is the coordinator control equipment, consisting of two consoles, one for the chief traffic coordinator and one for the night traffic coordinator; relay rack control units, which are mounted adjacent to the FADS equipment frame in the No. 5 XBAR ACD office, used for control and night transfer functions; and signal converter units which may be in the No. 5 XBAR ACD office or remotely used for access to signaling facilities for consoles and traffic offices located remote from the ACD.

B. Operation

2.25 Upon receipt of an "all positions busy" signal from the No. 5 ACD equipment for a class of service, the coordinator control equipment begins to time the length of the signal. Time intervals for individual classes of service are preset in a range bracket of 2 to 20 seconds which is adjustable in 2-second increments. When the length of the "all positions busy" signal exceeds the time interval

established for the particular class, a "heavy traffic signal" is generated which initiates the following operations:

- Lighting of the appropriate class-of-service lamp at both coordinator console locations
- Lighting of the administrative heavy traffic lamp in each traffic office serving the particular class of service
- Lighting of the position calls-waiting lamps in the traffic office locations serving that class.

Note: At the discretion of the traffic coordinator, the administrative heavy traffic lamp and the position calls-waiting lamps may be extinguished by operation of the appropriate lamp inhibit key on the coordinator console.

2.26 Operation of the route transfer keys on the coordinator consoles causes traffic to be transferred to other predetermined routes. The route transfer keys will be used during periods of light traffic and at closing times of the offices. A repeat key is provided which permits the coordinator to request a repeat printout of the passive register bank. A half-hour quarter-hour key allows the traffic coordinator to cause readout of the TIG circuit at quarter-hour intervals rather than at normal half-hour intervals.

C. Chief Traffic and Night Traffic Coordinator Consoles

2.27 The chief traffic coordinator console and the night traffic coordinator console are identical except that the chief traffic coordinator console is equipped with a lock-type switch for night transfer, which allows the chief traffic coordinator to transfer or regain control of the system to the night traffic coordinator location. To safeguard against accidental or unauthorized night transfer, the key actuating this lockswitch is removable in either the locked or unlocked position. Each console is equipped with the following lamps and keys.

- (a) Five lamps, one for each class of service to indicate heavy traffic conditions.
- (b) A lamp inhibit key associated with each heavy traffic lamp; operation of the keys inhibits the lighting of the heavy traffic lamp

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for a class of service in every traffic office serving that class.

- (c) Four route transfer keys, operation of which will change the traffic-handling pattern in a predetermined manner.
- (d) A pilot lamp associated with each route transfer key indicates that the route transfer key signal has been received at the No. 5 ACD location.
- (e) A readout time key which permits the coordinator to request a data printout at 15-minute intervals instead of the normal half-hour intervals.
- (f) A nonlocking repeat key, operation of which permits either coordinator to obtain a repeat printout of the latest data received.
- (g) A test lamp is provided to indicate that a test condition or alarm condition exists at the TIG equipment in the No. 5 XBAR ACD office.

Lighting of the test lamp at the time a printout is scheduled indicates to the coordinator that tests are being made at the No. 5 XBAR ACD switchroom, in which case the printout will not be sent. When the test lamp is flashing, an alarm condition exists at the No. 5 XBAR ACD switchroom, in which case the printout may not be received at the proper time. An LT key is provided on each console to allow for a check of the lamp conditions prior to night transfer. Lamp signals in the consoles are not transferable, corresponding lamps being lighted in both consoles at the same time. Operation of lamp test key will cause all lamps at the respective consoles to light, thus insuring the state of the console at the time of night transfer. Any lamps not operating will be detected by this test, and the console to which control is being turned over can be placed into the same state as the control console prior to transferring.

D. Coordinator Control Unit

2.28 The coordinator control unit is a relay rack mounted in the No. 5 XBAR ACD switchroom adjacent to the FADS equipment frame. This equipment causes route transfers to be made in the No. 5 ACD equipment, operating under control of the keys in the coordinator console. Heavy

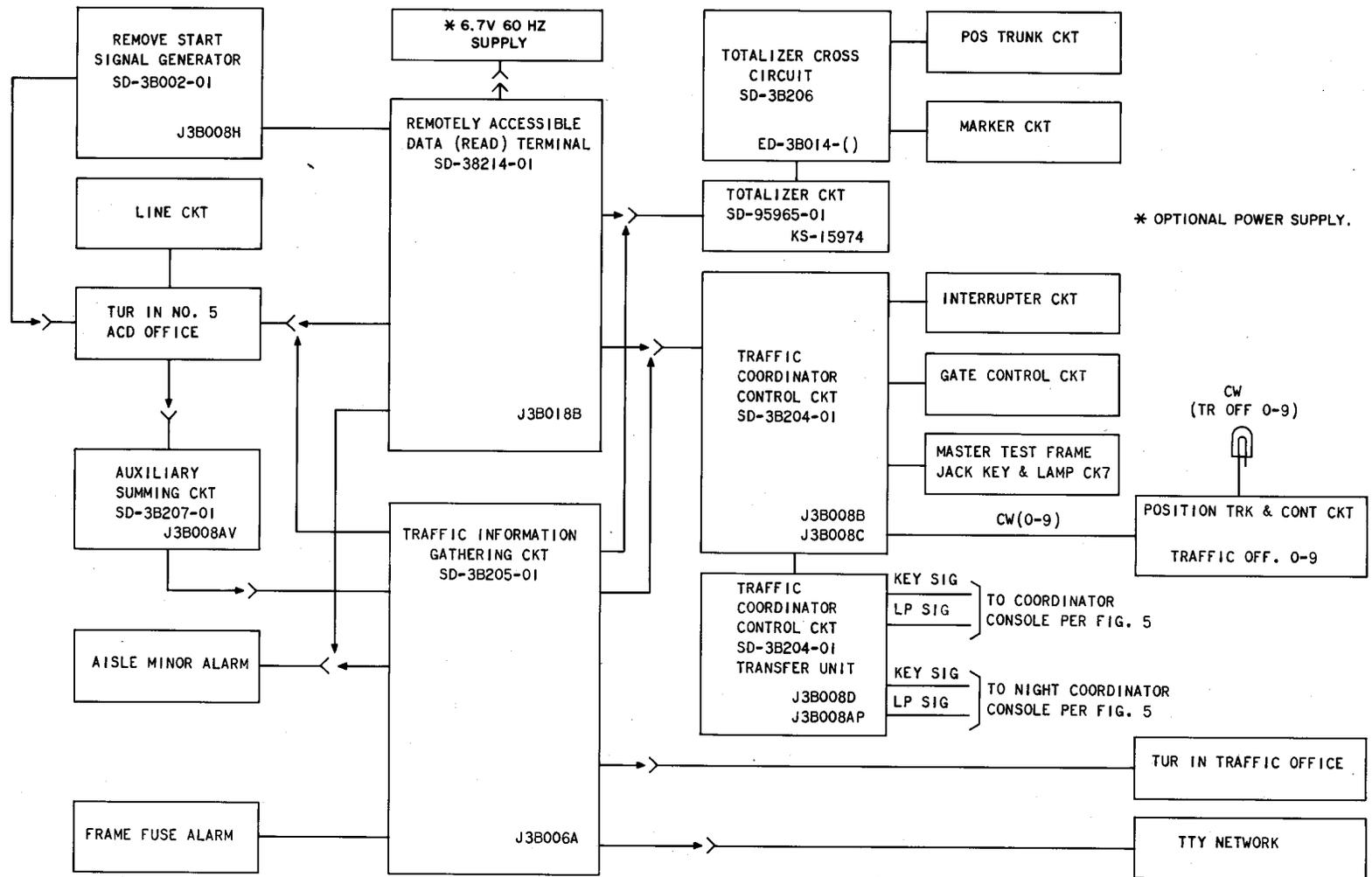
traffic lamps are lighted in the traffic offices and on the consoles for classes of service during "all positions busy" conditions. If the coordinator prefers, keys on the coordinator console may inhibit the heavy traffic lamps of the traffic offices without inhibiting corresponding lamps on the coordinator console.

E. Night Transfer Unit

2.29 The night transfer unit is a relay rack unit which, under control of the night transfer key in the coordinator console, transfers control of the equipment to the night coordinator console and also restores it to the traffic coordinator. When both coordinator consoles are located in the same building as the No. 5 XBAR ACD office, the night transfer unit is located with the coordinator control unit in the No. 5 XBAR ACD office. When both coordinators are located remote from the No. 5 XBAR ACD office, the night transfer unit may be located remote from the No. 5 XBAR ACD office, depending upon the location of the coordinator consoles in respect to one another and the No. 5 XBAR ACD office. Typical block diagrams of these arrangements are shown in Fig. 4, 5, and 6.

F. Signaling Facilities

2.30 Twelve signals must be transmitted between the chief coordinator console and the transfer unit and between the transfer unit and the No. 5 XBAR ACD switchroom. Eleven signals must be transmitted between the night coordinator console and the transfer unit. An additional signal is required from the No. 5 XBAR ACD switchroom to each traffic office for transmission of the calls-waiting lamp signals. Universal signal converter units are available which permit interfacing with either E&M-type signaling facilities or 43-type data channels by means of wiring options. Converter units J3B008AR and J3B008AT for calls-waiting lamp signals to traffic offices and console lamp signals to a remote transfer unit are located in the No. 5 XBAR ACD switchroom when required. Converter units J3B008AS and J3B008AU, when required, are provided at the No. 5 XBAR ACD switchroom, at remote transfer unit location, at remote offices serving remote consoles, or at remote traffic offices. (See Fig. 6.)



* OPTIONAL POWER SUPPLY.

Fig. 4 → Loop or Simplex Signaling to Transfer Unit and Traffic Offices ←

G. Signal Conversion Units

2.31 The signal conversion unit provides signal conversion facilities when traffic offices, transfer unit, or traffic coordinator consoles are located remote from the No. 5 XBAR ACD office.

- J3B008AR—This signal conversion unit is used for transmission of calls-waiting lamp signals to traffic offices when conductor resistance is greater than 25 ohms or when E&M-type signaling facilities are being used for transmission of these signals. This unit, when used, will be located in the No. 5 XBAR ACD office.
- J3B008AS—This signal conversion unit is used when the coordinator console is located remotely from the No. 5 XBAR ACD office. This unit is located in a serving office for a coordinator console when the key functions of the console are being transmitted to a transfer location over E&M signal circuit or at the location of the transfer unit when the key functions of the coordinator console are being transmitted to the transfer unit location by means of 43-type or equivalent data channels.
- J3B008AT—This signal conversion unit is used at the location of the No. 5 XBAR ACD office when the transfer unit is located remotely from the No. 5 XBAR ACD office and when the lamp signals are being transmitted to the transfer unit location by means of E&M-type signaling facilities.
- J3B008AU—This signal conversion unit is used at a serving office for a coordinator console when lamp signals to the console from the transfer unit are being transmitted by means of E&M-type signaling facilities or by means of 43-type or equivalent data channels.

Typical block diagrams of signaling arrangements are shown in Fig. 5 and 6.

H. Totalizer Cross-Connection Field

2.32 In order to facilitate the assignment of the outgoing trunks to the totalizers for obtaining position peg count information and the assignment of the marker peg count leads to totalizers for peg

count information on incoming trunks, by class of service, a cross-connection field for totalizers must be provided in the No. 5 XBAR ACD office. The cross-connection field is mounted with the totalizers being used for the FADS measurements. This field is used to permit convenient grouping of the outgoing trunks by trunk link and traffic office and to permit cross-connection to the inputs of the appropriate traffic totalizers that appear on this field. Also, leads from the markers may be cross-connected to the proper totalizers for each class of service.

3. MISCELLANEOUS EQUIPMENT

A. Traffic Usage Recorders

3.01 4A or 3B traffic usage recorders (Fig. 7 and 8, respectively) are used as data sources for usage measurements. In the No. 5 XBAR ACD office, a 4A TUR or as many 3B TURs as necessary to meet the capacity requirements may be used for calls-waiting usage measurements for the maximum 2400 incoming trunks to the No. 5 XBAR ACD office, as well as being used for position usage data for traffic offices that may be located in the same building as the No. 5 XBAR ACD office. A 3B TUR is used for position usage measurements at a traffic office remote from the No. 5 XBAR ACD office. The 3B TUR may serve several traffic offices in the same building within its capacity. All TURs used with FADS equipment must be provided with a remote start feature to allow proper synchronization with the timing of the TIG circuit.

3.02 Remote 3B TURs are provided in the traffic offices only when Phase I operator trunks are used at the traffic office. When the traffic office is connected to an ACD using Phase II trunks, no remote TURs are necessary.

B. Program Timer (Fig. 7)

3.03 Operation of the 3B or 4A TUR is controlled by the program timer (Fig. 7), which is equipped with a 24-hour dial and 7-day calendar wheel. The 24-hour dial is equipped with 96 tabs, each representing a 15-minute interval. The 70-day calendar wheel has a spoke for each day of the week. For remote starting of the TUR, four tabs must be set for each hour of operation.

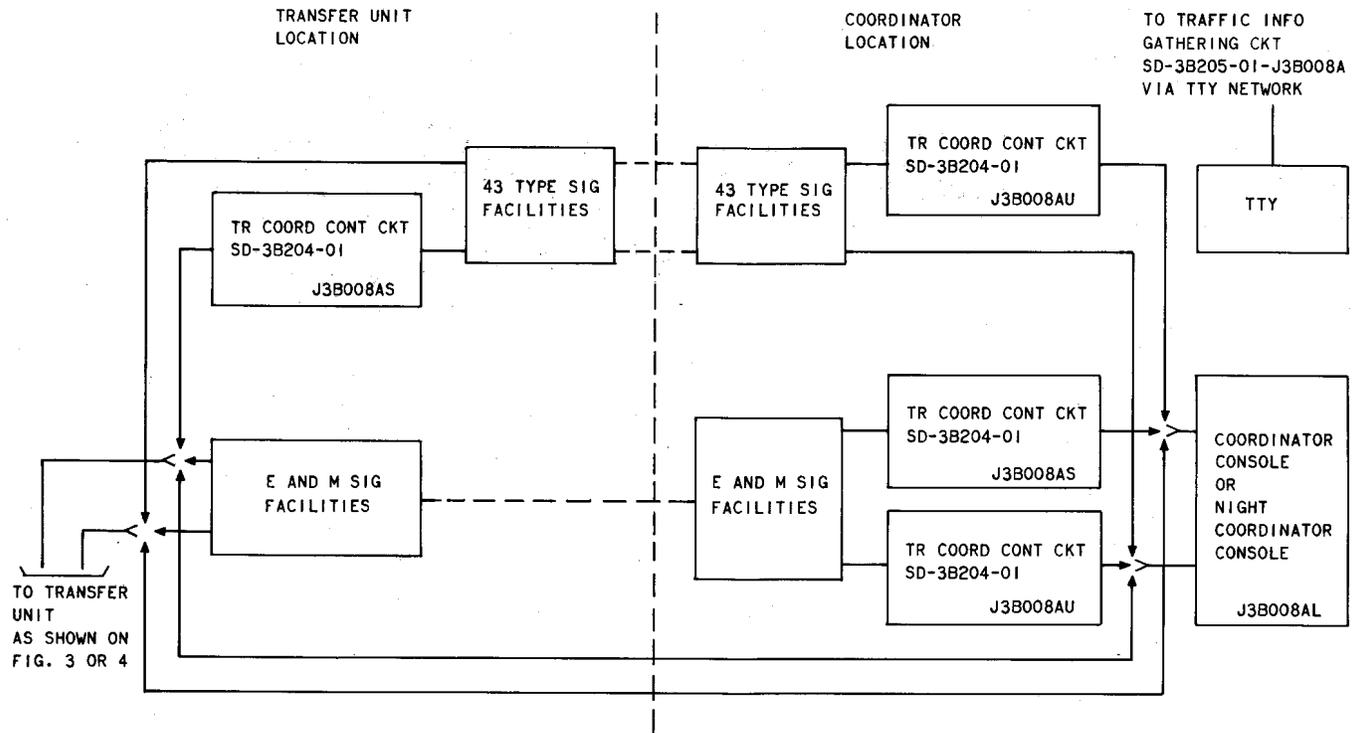


Fig. 6—Signaling Arrangement Between Transfer Unit and Traffic Coordinator Console or Night Coordinator Console

C. KS-15947 L1 Totalizer

3.04 The KS-15947 L1 totalizer (Fig. 9) is an electronic counting device which is used in the No. 5 XBAR ACD office for peg count data on incoming trunks and position trunks. Totalizers for peg count for incoming trunks are provided on a class-of-service basis. One KS-15947 L1 totalizer equipped with six (A) packages shall be provided for each class of service so the inputs from the six markers in the No. 5 XBAR ACD office can be terminated on individual (A) packages on the totalizer. One KS-15947 L1 totalizer equipped with four KS-15947 L4 networks shall be provided for each traffic office so the input leads from trunk link frames may be terminated on an individual network on the totalizer. The totalizer requires a 23-inch relay rack mounting space of two 2-inch mounting plates. The totalizer may be ordered initially equipped with 1 to 12 A packages (10 to 120 inputs).

3.05 Each input A package has a maximum of ten inputs which are wire-wrapped to peg

count leads on the wiring side of the totalizer mounting plate. There is a maximum of 60 positions per ACD traffic office; therefore, the maximum (A) packages necessary per totalizer is six. To facilitate grouping and assignment of totalizer leads, the totalizer cross-connection circuit SD-3B206-01 provides for a cross-connection field which is located in the same area as the totalizers. Also, a decade scaler package per KS-15947 L10 is provided with each totalizer for a scaled output to the registration equipment.

D. Teletypewriter

PHASE I

3.06 The TTY used at the traffic coordinator location is a 35-type receive only (RO) machine with sprocket feed to accept form feed, with local carriage return and line feed controls, mounted in a floor cabinet, and equipped with a paper accumulating shelf. It is capable of operating on a 20-MA loop and is equipped with paper jam and low paper alarms. Also present at the coordinator location

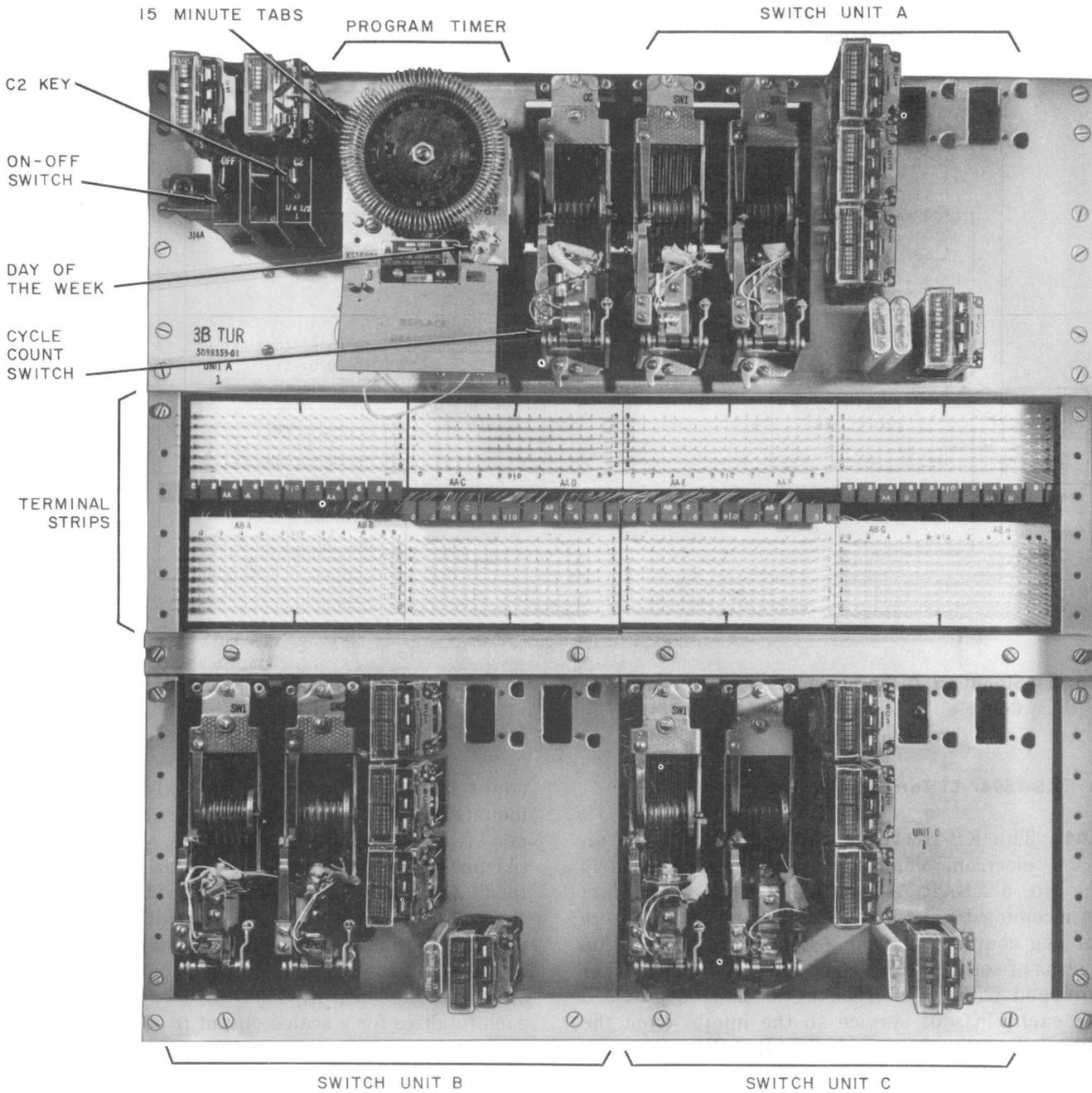


Fig. 7—3B Traffic Usage Recorder (Arranged for 600 Inputs)

is a typing reperforator which is located in a separate cabinet. It is capable of recording all the data received and printed on the TTY. It is also equipped with a low tape alarm. The TTYs at the individual traffic office locations may be 35-type RO with friction feed for 8-1/2 inch paper

and local carriage return and line feed controls. The TTY machines are mounted in floor standing cabinets, are equipped with low paper alarms, and operate on a 20-MA loop. The machines are capable of selectively accepting calls addressed to specific machines and rejecting all others.

▶PHASE II

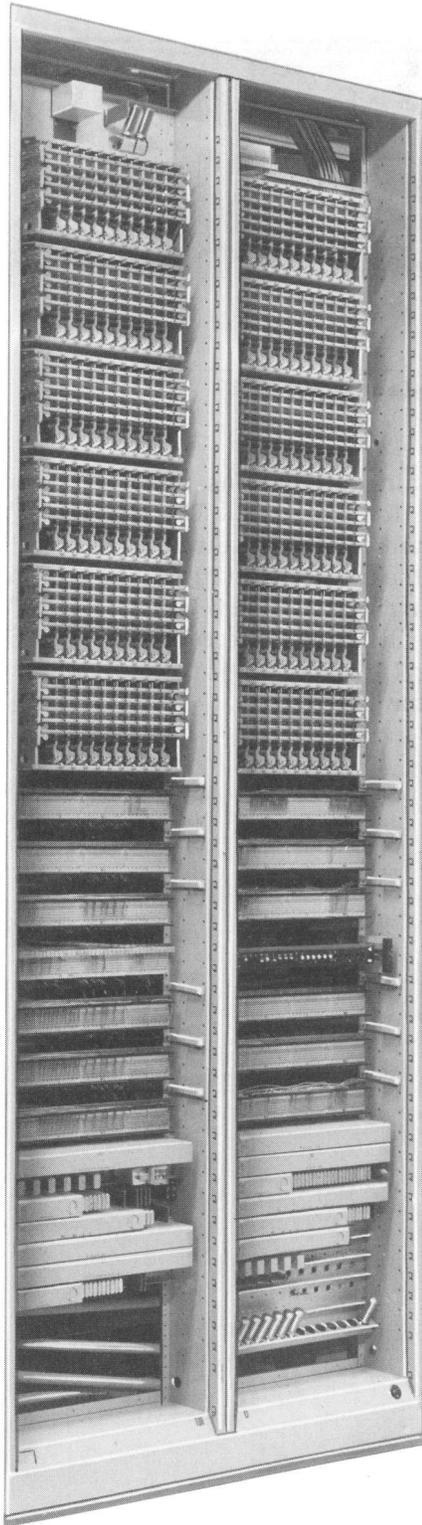


Fig. 8—4A Traffic Usage Recorder

3.07 TTYs for printing FADS information may be located locally or remotely from the ACD. At least one local TTY would ordinarily be provided to guard against a loss of data in the event of a trouble condition occurring on the data link. The local TTY may be of the 33- or 35-type, but it must be arranged for Electronic Industries Association (EIA) compatibility for connection to the READ terminal.

3.08 Remote TTYs are connected to the ACD using data sets. The operating companies may use data sets of their choice which are EIA compatible and capable of transmitting American Standard Code for Information Interchange (ASCII) information at a rate of 100 words per minute (110 band). When the READ terminal operates under local timing control, dedicated data links are required to remote TTYs to receive the half-hourly FADS printout. In this case a one-way data line for transmitting information from the READ terminal to the remote TTYs should be provided.

3.09 When the method for remotely polling the READ terminal is employed, a 113B data set should be ordered as part of the READ terminal. Other EIA compatible answer-only data sets may also be used, but additional cross-connections will be required at the READ terminal.◀

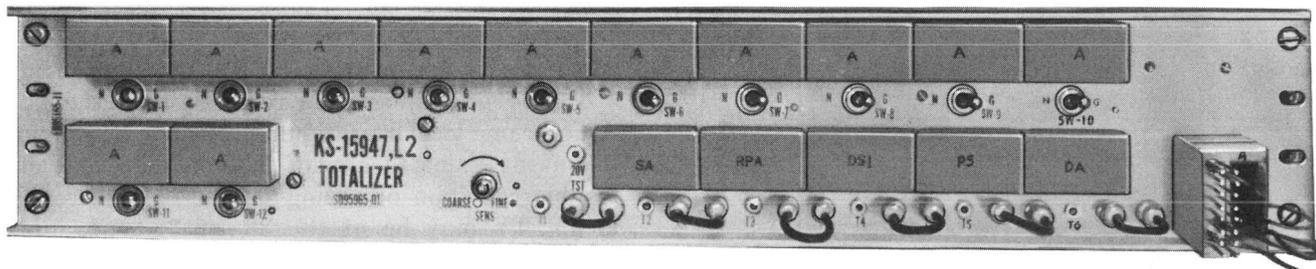


Fig. 9—KS-15947 L2 Totalizer—120-Lead Input

4. DESCRIPTION OF TTY PRINTOUT

4.01 Shown in Fig. 10 is a typical printout for five classes of service and ten traffic offices. Each of the characters, spaces, or functions represents one point in time or one of 400 (maximum) matrix points. For this printout, 399 matrix points were required. The characters "greater than" (>), "less than" (<), and parentheses are required

for certain applications when a paper tape is produced for later use. The character "asterisk" (*) and the letters are used to unblind (printing allowed) the traffic office TTYs. Each line terminates with "carriage return," "line feed," "carriage return" (CRLF). The combination LFCR causes blinding (printing suppressed) of all but the coordinator TTY.

Preprintout

* Unblinds all traffic office TTYs

CR, LF Insures that all TTYs are on margin at a new line

Line 1

<<< Start of message

48Ø Office identity (fixed by cross-connection)

Ø5Ø Schedule identity (first digit variable)

12 Month

Ø7 Day

14 Hour

3Ø Minute

41 Number of data blocks to follow

18 TUR cycle count

CR, LF, CR Blinds all traffic office TTYs

Line 2

(Part of standard format

SP/N The N is inserted during night transfer to unblind the night coordinator TTY

V Unblinds TTYs of all traffic offices which serve 411 traffic

411 Class of service for data on this line

) Part of standard format

ØØØØ Calls waiting CCS for 411 traffic

ØØØØ Peg count for 411 traffic

CR, LF, CR Blinds all traffic office TTYs

Lines 3 through 6

Same as line 2 for classes of service 555, 131, 141, and 222.

Line 7

(Part of standard format

SP/N N inserted after night transfer to unblind one traffic office TTY

A Unblinds TTY of first traffic office

) Part of standard format

ØØØØ Position occupied usage CCS for traffic office A

ØØØØ Position work time CCS for traffic office A

ØØØ Position peg count for traffic office A

CR, LF, CR Blinds all traffic office TTYs

Lines 8 through 16

Same as line 7 for traffic offices B through J.

>>> End of message

Note: Figure 10 shows two printouts. The top printout is a typical example of that received by the chief traffic coordinator. The lower portion of Fig. 10 shows a typical example of the printout received by the individual traffic offices.

5. DERIVED DATA AND FORMULAS

5.01 The derived data which may be obtained from the FADS data and formulas is shown in Table B.

A. Average Speed of Answer

5.02 Average speed of answer is the average speed with which incoming calls are being answered. It does not represent the time that each individual call waited to be answered. Normally

FOR CHIEF TRAFFIC COORDINATOR

“Unblinding”	*	Office Identity	0 = 1/2 Hr, 2 = 1/4 Hr, 3 = Repeat FADS	Month	Day	Hour	Min	#of totals following	TUR cycle count	
	<<<	480050	12	07	14	30	41	18		Calls served peg count X10 Calls waiting usage CCS
Unblinding for class	(	V411)	0001	0000						
	(	W555)	0002	0000						
	(	X131)	0003	0000						
	(	Y141)	0004	0000						
	(	Z222)	0005	0000						
	(	A)	0000	0000	000					See Note Below
	(	B)	0001	0000	000					
	(	C)	0002	0000	000					
	(	D)	0003	0000	000					
	(	E)	0004	0000	000					
	(	F)	0005	0000	000					
	(	G)	0006	0000	000					
	(	H)	0007	0000	000					
	(	I)	0008	0000	000					
Unblinding for Traffic Office	(	J)	0009	0000	000	>>>				Peg Count Calls served Pos work time usage Pos occupied usage

FOR TRAFFIC OFFICE “C”
(Handling “W” and “X” Classes)

<<<	480050	12	07	14	30	41	18	See Note Below
	555)	0002	0000					
	131)	0003	0000					
	)	0002	0000	000				

Note 1: CRLF following the character asterisk (*) at start of message. CRLF at end all other lines, except LFCRFF (FF = Form Feed) at end of message if desired.

Note 2: <<< >>> () are used so that data will be in a format suitable for future interfacing with Traffic Data Recording System No. 1A.

Fig. 10—Printout Formats for No. 5 XBAR ACD FADS

TABLE B

FADS DERIVED DATA AND FORMULAS

Average Speed of Answer = $\frac{\text{Calls Waiting Usage X 100}}{\text{Position Peg Count}}$
Actual Call Value = $\frac{\text{Position Work Time Usage X 100}}{\text{Position Peg Count}}$
Average Work Time = $\frac{\text{Position Work Time X 100}}{\text{Position Peg Count}}$
Position Occupied Usage = $\frac{\text{Position Occupied Usage}}{18 \text{ (Number of Scans Per Half-Hour Period)}}$

a satisfactory average speed of answer is about 5 seconds. It should be realized that at this speed of answer it is possible for some calls to wait as long as 30 seconds or more before being answered. The primary purpose of force administration is to ensure a uniformly reliable answer in the most economical manner.

B. Actual Call Value

5.03 Actual call value is the average amount of operator work time required to handle a single average call.

C. Average Work Time

5.04 Average work time is the average time that the attendant is talking or is connected to the incoming trunk circuit.

D. Position Occupied Usage

5.05 Position occupied usage is the total time that the positions are busy handling calls.

6. MAINTENANCE FEATURES

6.01 The registers used for recording class-of-service data and position usage data in the TIG equipment are operated on a round-the-clock basis, except when in the memory mode. In an effort to equalize the operating life of these registers, it is recommended that the individual

counters in each register be interchanged at regular intervals or approximately a semiannual basis. Typically, the counter with the highest operating rate (units digit of the register) should be transposed to the position of the lowest operating rate counter (thousands in the case of 4-digit registers). The individual counters would thus progress through operating rate changes in such a manner that in a number of transpositions equal to the number of counters comprising the register, all counters would have the same number of operations. This process of transposition would be continuous for the life of the registers. To expedite transposition, it is desirable to have additional spare registers available at the local office. This maintenance feature is best performed at nonbusy hours and during the interval when the registers are in the memory mode.

6.02 A lamp monitoring assembly ED-3B020-30 is available for use in testing the electronic circuitry. This is a special circuit pack with a front panel housing 24 lamps. A test connector is provided in the character generator unit J3B008AB into which the lamp monitor unit may be inserted. Two tests connectors are provided in matrix unit J3B008AA, one for the vertical shift register and one for the horizontal shift register. The selector switch on the control panel J3B008AH is set to the shift register to be tested, and the test card is inserted into the associated test connector. Operation of the step key progressively steps a signal through the shift register causing the lamps

SECTION 252-176-101

to light in sequence. Failure of a lamp to light indicates an absence of signal at that stage of the shift register.

6.03 The following listing provides information and/or test requirements for No. 5 XBAR ACD FADS.

S.D.	TITLE
SD-3B204-01	Traffic Coordinator Control Circuit
SD-3B205-01	Traffic Information Gathering Circuit
SD-3B206-01	Cross-Connection Circuit for Connection to Traffic Totalizer
SD-3B501-01	READ Terminal
SD-3B502-01	Remote Start Signal Generator
SD-3B503-01	Remote Registration Signal Receiver

7. GLOSSARY

ACD: Term used to describe the automatic call distributor, a system with full access which automatically distributes incoming calls to a team of service attendants substantially in the order of arrival.

Actual Work Time: The average time that the operator is talking or is connected to the incoming trunk circuit.

Auxiliary Summing Unit: A unit which provides means for summing random ground pulses received from two or three TURs and records the overall total on one high-speed electromechanical register.

Average Speed Of Answer: A number derived from FADS data which represents the average length of time all calls waited to be answered.

Average Talk Time: The average time that the attendant is talking or is connected to the incoming trunk circuit.

Calls Waiting CCS: A FADS register which records in CCS the waiting time of calls waiting to be served by the ACD. One per class of service.

CCS: Term used to describe a basic traffic measurement known as hundred call seconds.

Class-Of-Service Peg Count Register: A FADS register which records the number of calls served by the ACD. One per class of service.

Coordinator Control Equipment: The equipment which provides traffic administrative personnel with control features for the No. 5 XBAR ACD FADS.

Cycle Count: Term used to designate the number of scan cycles started by the traffic usage recorder during the half-hour measurement period (should be 18 scan cycles).

FADS: Term used to represent Force Administration Data System or Systems.

Force Team: See "Team."

Night Coordinator: The person who assumes the duties of the traffic coordinator for night operation. The night coordinator is usually located in one of the traffic offices in the system at which complete system data is received when night transfer is made.

Position Occupied Usage Register: A FADS register which records the total time that positions are occupied within a measurement period. Measured in CCS. One per traffic office.

Position Peg Count Register: A FADS register which records the number of calls served by a traffic office. One per traffic office.

Position Work Time Usage Register: A FADS register which records the total time that positions are busy serving calls. Measured in CCS. One per traffic office.

Preamble: The beginning of the TTY printout. Composed of system and schedule identities, day and time identification, block length, and TUR cycle count.

Program Timer: A timer used to start and stop the traffic usage recorder.

◆READ Terminal: Replaces TIG equipment in Phase II ACD FADS. Contains a dual memory, active and passive, in which 4-digit totals are accumulated up to 128 inputs.

Remote Registration Signal Receiver: Provides for connecting Phase I position trunk and control units to Phase II ACD FADS.

Remote Start Signal Generator: Permits TURs associated with the READ terminal to be started in synchronization with the terminal.

Sum Card: Optional plug-in card designed to total the outputs of several TURs on one register.

Team: The group of operators whose activities are designated to be measured by the FADS.

Teletypewriter: The equipment unit used for displaying the basic FADS data obtained by the TIG equipment.

Totalizer: An electronic counting device which collects peg count information and scores PC (peg)

registers in the FADS equipment frame once for each ten counts received.

Traffic Coordinator: Person responsible for the proper assignment of traffic and the overall force adjustment of operator positions of the system. All system data is made available at the traffic coordinator location.

TIG Circuit: Circuit which provides the traffic department with the necessary information for force administration of the No. 5 XBAR ACD office.

Traffic Usage Recorder: An electromechanical device which records the usage data from the incoming trunk circuits.

TUR: Traffic usage recorder.

Typing Reperator: A unit which obtains and punches FADS data on a perforated tape.