RECORDED ANNOUNCEMENT FRAME VARIABLE MESSAGE LENGTH, MODULAR MESSAGE, PHASED MESSAGE ANNOUNCEMENT SERVICE AND MESSAGE SYNTHESIS SERVICE EQUIPMENT DESIGN REQUIREMENTS COMMON SYSTEMS

CONTENTS PAGE

Printed in U.S.A.

1. GENERAL

SCOPE

1.01 This specification, together with the supplementary information listed herein, covers the framework, equipment, and circuits to be used in the engineering, manufacturing, and installation of the central office Common Systems Recorded Announcement Frame (CSRAF).

1.02 Whenever this section is reissued, the reason for reissue will be specified in this paragraph.

1.03 The improved design offered by the CSRAF makes the system adaptable for common systems use. The announcement services are designed to work in central offices as follows:

MESSAGE SERVICE	CENTRAL OFFICE SWITCHING EQUIPMENT
Phased Message Service (PMS)	No. 4 Electronic Switching System (ESS)
Modular Message (MM)	No. 5 XBAR Phase II Automatic Call Distributor (ACD)
Variable Message Length (VML)	No. 5 XBAR Phase II Automatic Call Distributor (ACD)
Message Synthesis Service (MSS)	Automatic Intercept System (AIS)

CAPACITY

1.04 The maximum capacity of the recorded announcement frame is 800 seconds of total recorded time divided among all channels, which may be available and accessible in any number of ways, as defined in Paragraph 1.05 and in the Description sections.

1.05 With the use of a drum storage unit, channel module, channel electronics, and control units (when provided), a frame can be arranged to provide a specific announcement service or a desired combination of announcement services. The principal physical differences in frame arrangement would be the type and quantity of channel modules and control units (when provided) used. The CSRAF may be equipped for four basic types of recorded announcements:

(a) Variable Message Length (VML) announcement

(b) Modular Message (MM) announcement

(c) Phased Message (PM) announcement

(d) Message Synthesis Service (MSS) announcement.

Typical frames equipped for each of the four services appear in Fig. 1 through 4. Three basic types of announcements (VML, MM, and PM) or any combination thereof may be contained on any one frame to meet the service objectives for recorded announcements (See Fig. 5). The MSS cannot be combined with the other services because it has "reproduce only" capabilities, differences in timing signals, drum rotational speed, and frame layout (See Fig. 6).

OVERALL DESCRIPTION

1.06 A 2-foot 2-inch wide single bay frame can accommodate 9 channel modules. A channel module consists of a mounting plate and three 36A-type apparatus mountings which are wired and connectorized to accept A-type circuit packs. The frame height may be either 7 feet or 11 feet 6 inches for Modular Message, Variable Message Length, and Phased Message announcement services. The frame height is limited to 7 feet for Message Synthesis Service announcement because the central offices utilizing MSS have this frame height limitation.

1.07 When the equipment is mounted on a No. 1 ESS framework, the frame is coded J1C012A. When the equipment is mounted on an 11-foot 6-inch bulb-angle framework, the frame is coded J1C012B. Neither of these two codes can be arranged for MSS. When the equipment is mounted on the same framework as the J1C012A and arranged for MSS, the frame is coded J1C012C. The number of channels available on the CSRAF is limited by the physical mounting capacity of the frame and the storage capacity of the KS-20951 Drum Storage Unit.

Channel Modules

1.08 The channels on the CSRAF are arranged in channel modules, one for each of the basic types of recorded announcements. When provided with VML, MM, or PM service a maximum of nine channel modules can be mounted on the frame. (When provided with MSS, the need for additional

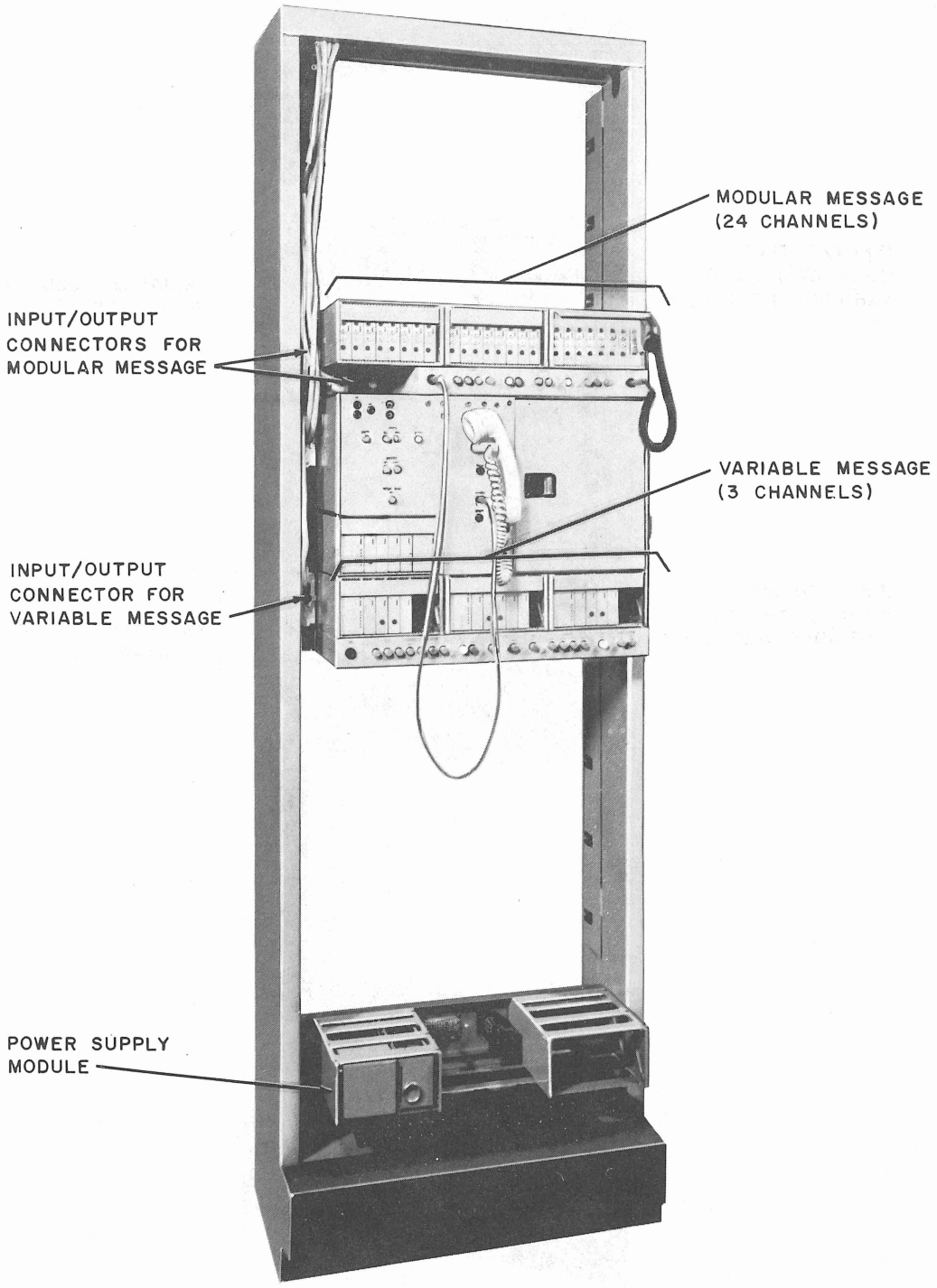


Fig. 1—Typical Frame Arrangement for the Modular Message Announcement and Variable Message Length Announcement

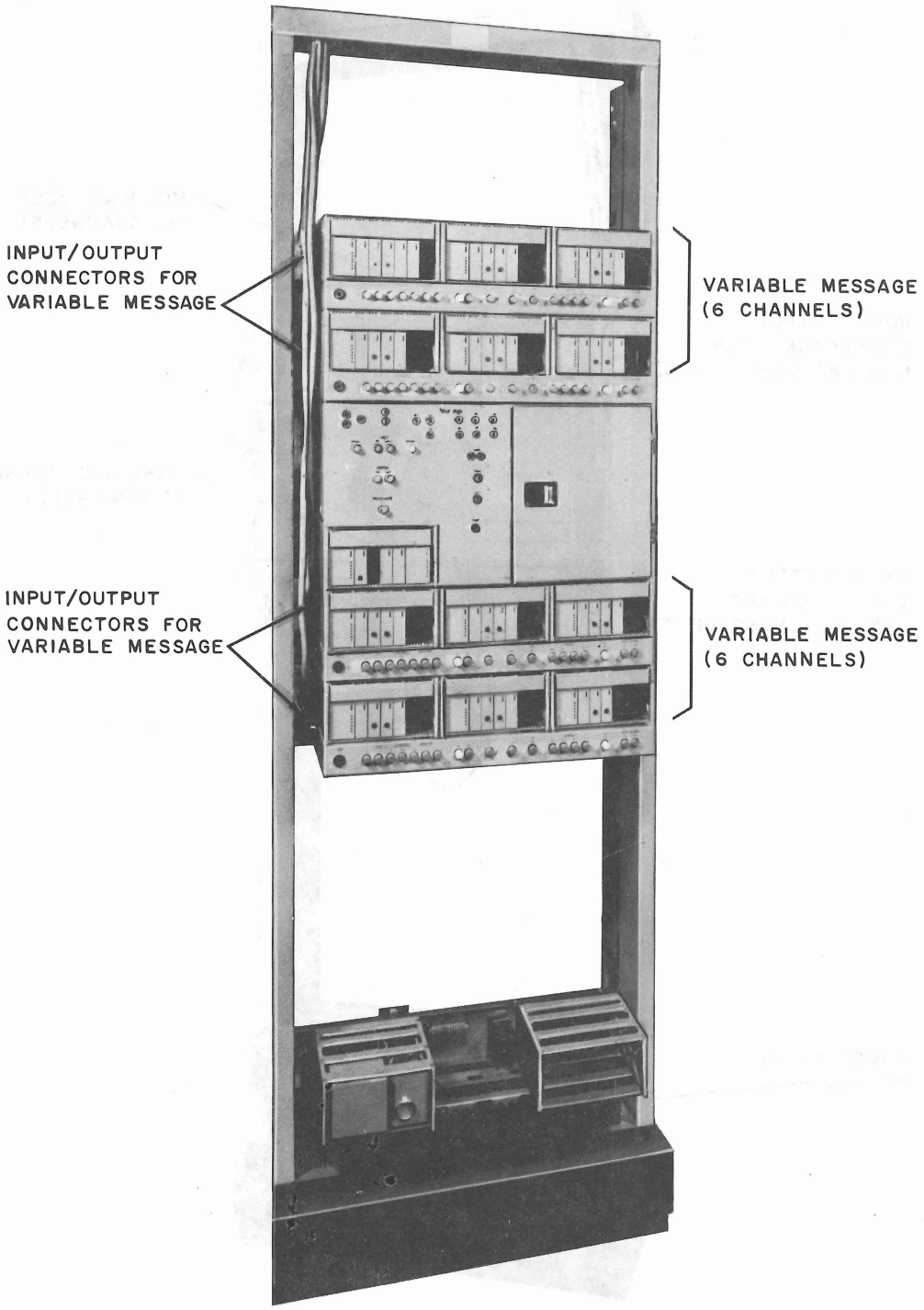


Fig. 2—Typical Frame Arrangement for the Variable Message Length Announcement (12 Channels shown)

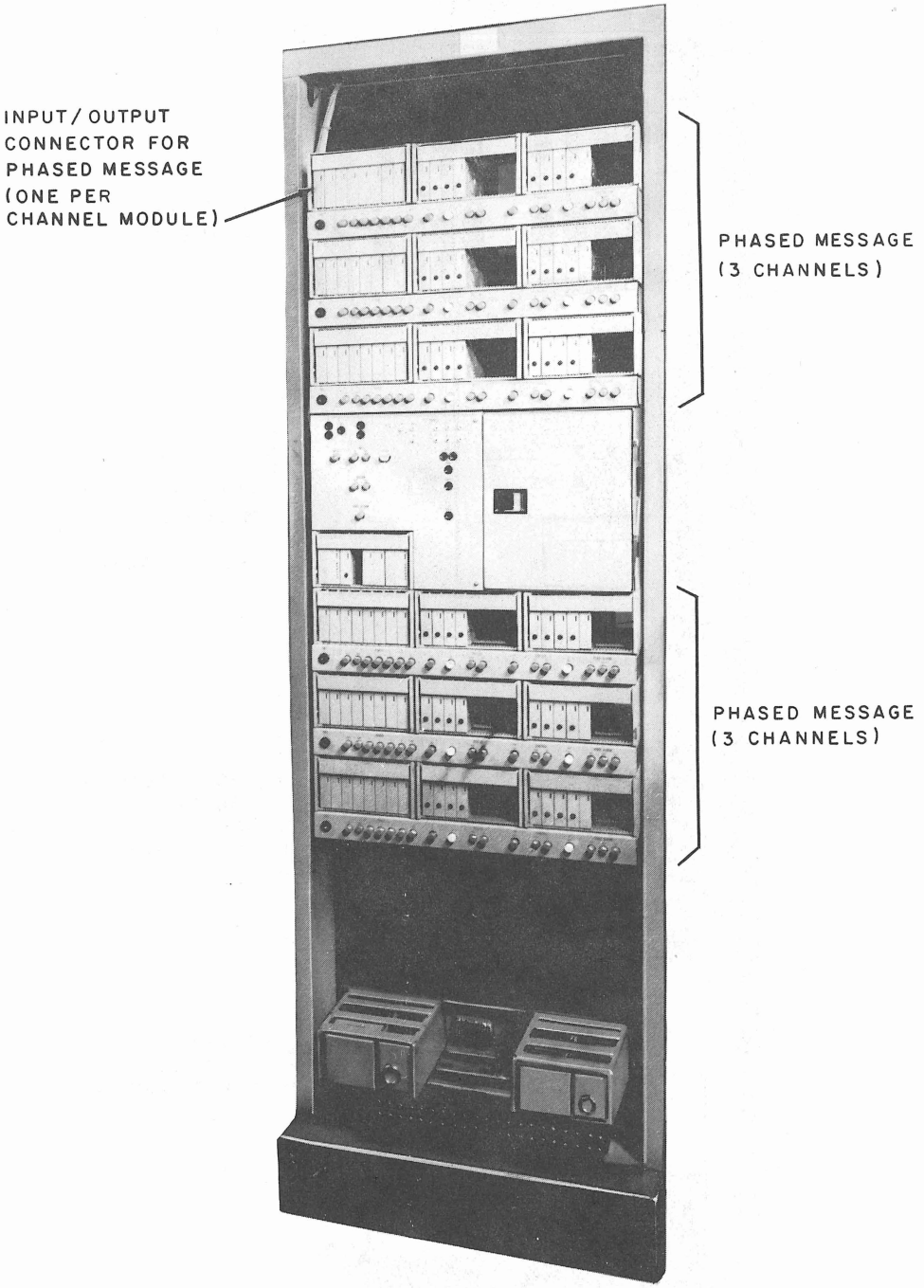


Fig. 3—Typical Frame Arrangement for the Phased Message Announcement (6 Channels Shown)

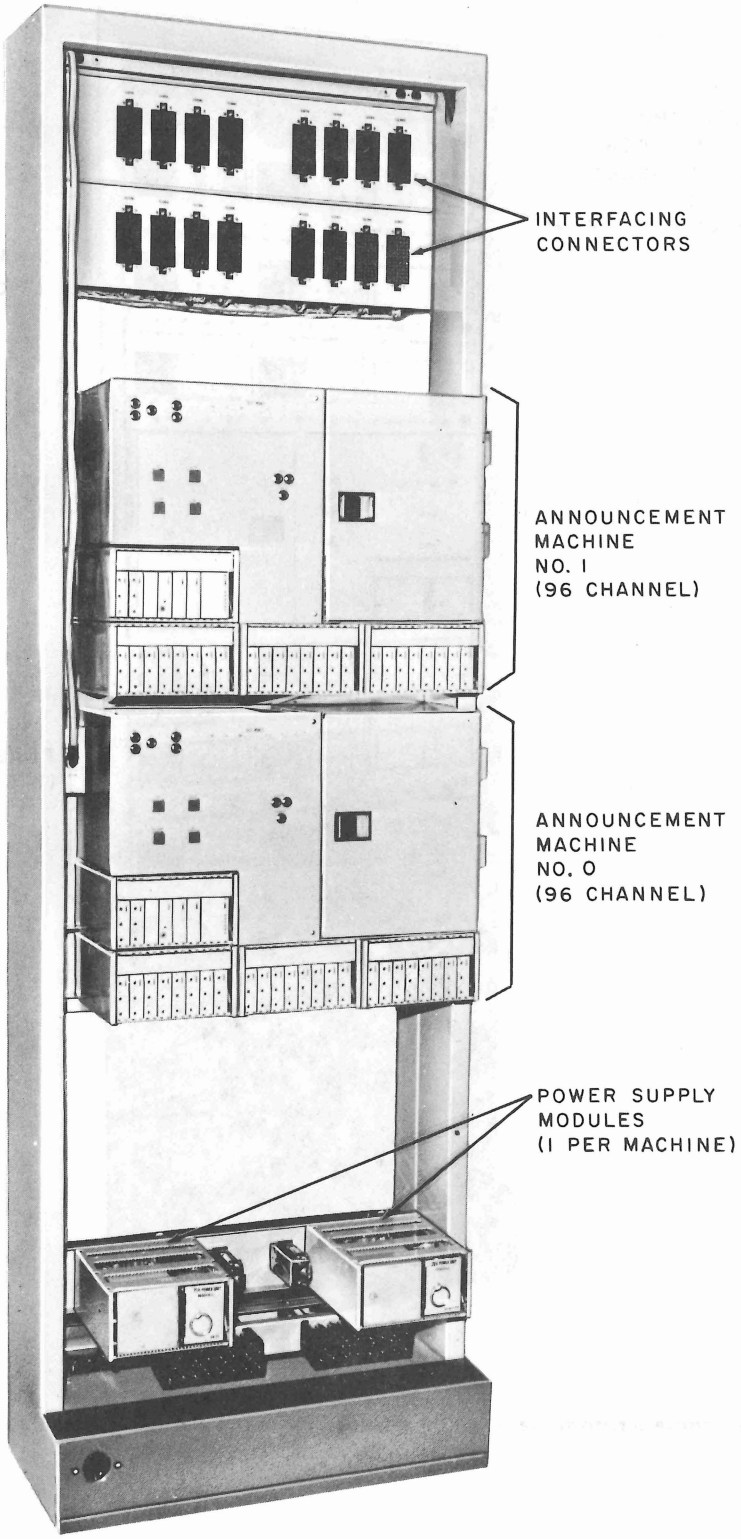
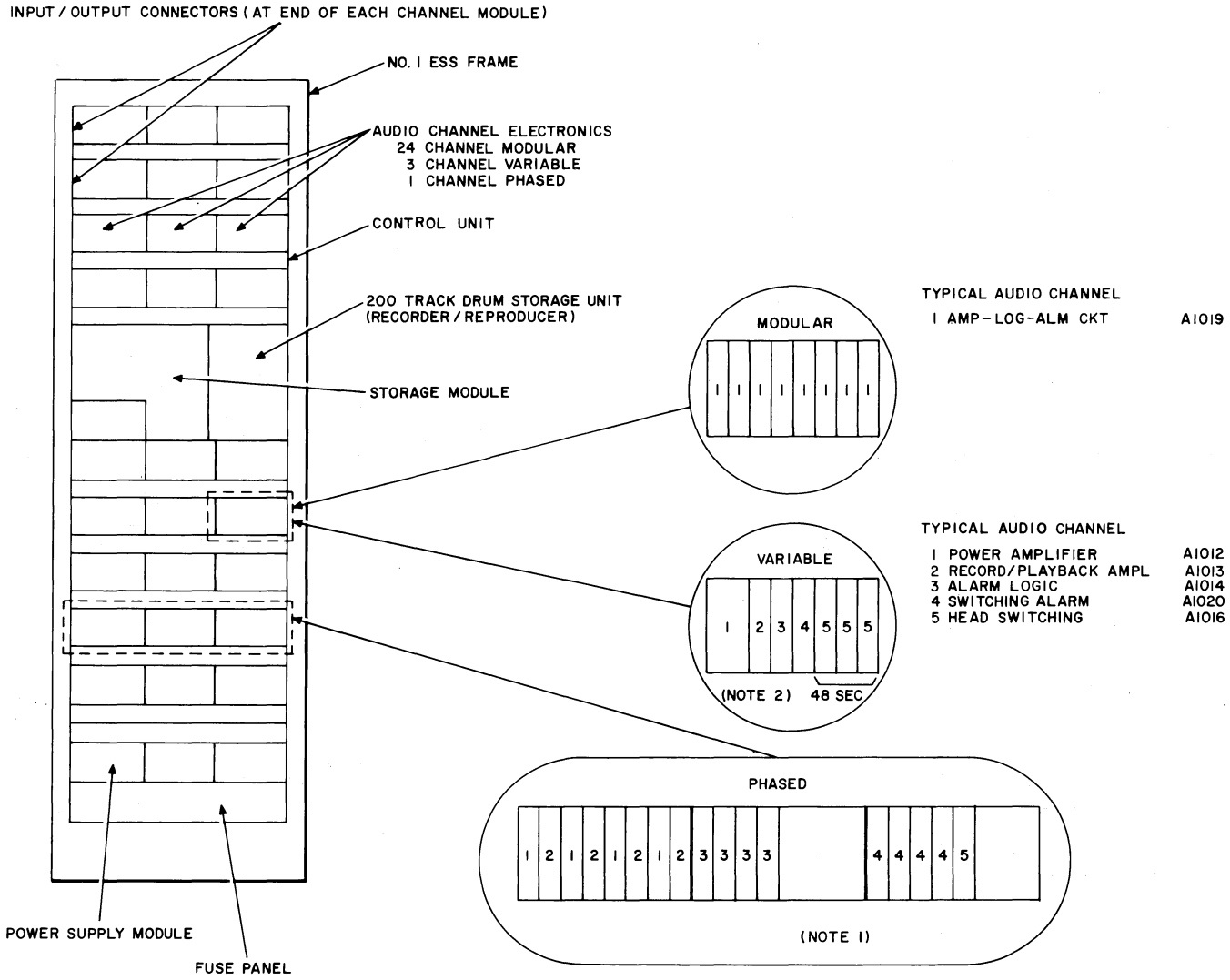


Fig. 4—Typical Frame Arrangement for the Message Synthesis Service Announcement (Duplicated Machines Per Frame)



NOTE:
1 FOR PHASED MESSAGE ANNOUNCEMENT AN ENTIRE CHANNEL MODULE MUST BE USED. THIS PROVIDES 4 PHASES OF THE ANNOUNCEMENT.
2 VARIABLE MESSAGE ANNOUNCEMENTS CAN BE INCREMENTALLY INCREASED IN 16-SECOND UNITS WITH THE ADDITION OF A HEAD SWITCHING CARD A1016 CONNECTING TO 4 AVAILABLE MAGNETIC HEADS.

Fig. 5—Common Systems Recorded Announcement Frame—Diagrammatic Representation (VML, MM, and PM Only)

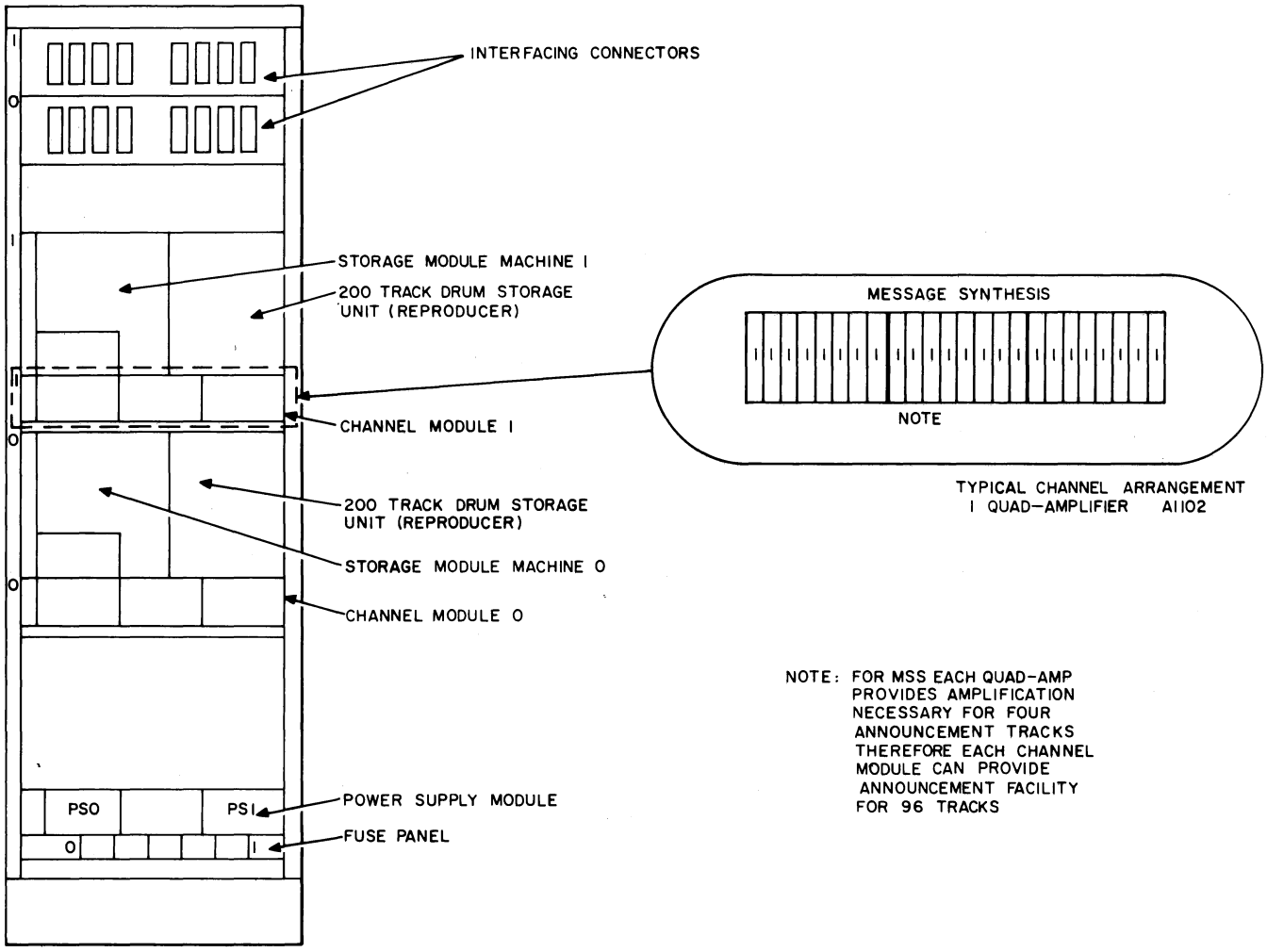


Fig. 6—Common Systems Recorded Announcement Frame—Diagrammatic Representation (MSS Only)

channel modules is unnecessary.) The VML channel module contains a maximum of 3 channels; the MM channel module contains a maximum of 24 channels; the PM channel contains 4 phases of 1 channel; and the MSS channel module contains 96 channels. Table A illustrates the channel capacity of a frame when it is equipped with only one type of channel. However, a mixture of channels (VML, MM, and PM) will alter the channel capacity of the frame.

Modes

1.09 The modes of operation for the CSRAF are as follows:

(a) Recorder-Reproducer (VML, MM, PM only)

1. Record live
2. Dub from tape
3. Reproduce

(b) Reproducer Only (MSS only)

1. Reproduce from prerecorded drum.

Modules

1.10 The CSRAF design is based on a modular building block concept to provide the different types of announcement services. The CSRAF is almost completely electronic and all circuits are mounted on plug-in circuit packs. The units on a frame are limited to those required for a particular announcement service or services. These units may vary depending on the service provided, but in general the units required are for recording, playback, controlling, maintaining, and testing the audio signal. A typical CSRAF design would contain the following units:

(a) Drum storage unit

(b) R/P electronics

(c) Control and maintenance circuits

(d) Alarm circuits

(e) Power and fuse circuits.

All frames are completely connectorized, and all interfacing, general distribution and trunk circuits are located on separate interfacing frames, which are part of the switching system providing the recorded announcement service. For frames other than MSS, the interfacing connectors are at each channel module position and at the storage module. The MSS frame provides interfacing connectors at the upper portion of the frame and at the storage modules for both machines.

1.11 Since the recorded announcement frame consists of a number of separate modules mounted and interconnected on a single bay frame, the different modules can be assembled to satisfy various announcement system requirements. Because of the flexibility and modular design, the equipment can also be rearranged to satisfy new sets of requirements. Interfaces to the announcement frame and the units within the frame are via connectors.

Drum Storage Unit

1.12 The KS-20951 Drum Storage Unit (the magnetic storage medium for audio announcements) has a capacity for 200 separate tracks of recorded information. When the frame is equipped with VML and/or MM or PM-type announcement service, each of the tracks provides 4 seconds of recorded information. The tracks can be electronically pieced together to provide longer announcements in 4-second increments. When the frame is equipped for MSS, each track provides 3 seconds of recorded information. This 3-second track is electronically divided into 2 alike announcements of 1.5 seconds duration, or into 6 alike announcements of 0.5 seconds duration. Refer to Table B, Relation of Head Bar Assemblies to Storage Capacity of the Drum Storage Unit.

1.13 Each of the ten different headbar assemblies that can be mounted in a drum storage unit contains twenty heads as indicated in Table B. The flexible design of the head bar assemblies, channel modules, and control units permits the addition of 80-second increments of storage capacity for VML, MM, or PM service, or 20 channel increments of storage capacity for MSS. Various configurations of channel modules and control units for VML, MM, or PM service can be added to meet new requirements.

> ***Note:*** Because of limitations by specification for present requirements of 96 channels for MSS, no provisions have been made for providing additional channel modules to meet new requirements.

TABLE A

MAXIMUM NO. CHANNELS VS CHANNEL VERSION

CHANNEL VERSION	MAXIMUM MESSAGE LENGTH FOR EACH CHANNEL	NUMBER OF CHANNELS	DRUM STORAGE UNIT LIMITED	FRAME LIMITED
Modular Message	1-1/3 seconds (4 seconds of drum time)	200	X	
	16 seconds	27		X
Variable Message Length	32 seconds	25	X	
	48 seconds	16	X	
Phased Message	12 seconds	9		X
Message Synthesis Service	0.5 seconds and 1.5 seconds	96	Limited only by specification for for present requirements of 96 channels	

TABLE B

RELATION OF HEAD BAR ASSEMBLIES TO STORAGE CAPACITY OF THE DRUM STORAGE UNIT

NUMBER OF HEAD BAR ASSEMBLIES	NUMBER OF HEADS	FOR VML, MM OR PM SERVICE STORAGE CAPACITY (SECONDS)	FOR MSS SERVICE ACCESS CHANNEL CAPACITY (CHANNELS)
1	20	80	20
2	40	160	40
3	60	240	60
4	80	320	80
5	100	400	100*
6	120	480	
7	140	560	
8	160	640	
9	180	720	
10	200	800	

The drum storage unit appears in Fig. 7 and 8. The number of heads supplied (i.e. ordered) for the use in the KS-20951 Drum Storage Unit will vary according to the CSRAF application.

*Only 96 are used

By switching from track-to-track on a continuous basis it is possible to provide messages of up to 48-second durations per channel. The 4-second tracks can also be subdivided into three parts of 1-1/3 seconds each. The list 3 drum storage unit used for MSS is only capable of playback from a prerecorded drum. The drum is furnished with a vocabulary of 96 words, phrases, and numbers.

1.14 When the KS-20951 Drum Storage unit is associated with VML, MM, or PM the drum has a storage capacity of 800 seconds of recorded infor-

mation. When associated with MSS, the drum uses 96 tracks of recorded information. For VML, MM, or PM services, or combinations of these services, the mounting arrangements for a maximum of 200 heads, arranged in 10 groups of 20 each, can be utilized (see Table B). The MSS utilizes 96 of a total of 100 heads arranged in 5 groups of 20 each. The differences in the MSS as compared to the VML, MM, and PM services require that different drum storage units be available. There are three available KS-20951 Drum Storage Units designated list 1 through list 3. See Table C, KS-20951 L1, L2, and L3 differences.

Storage Module

1.15 The part of the storage module shown on the left side of Fig. 7 and 8, provides the mounting for some functions common to the frame. The control panel provides for frame maintenance and a 36A-type apparatus mounting frame holds circuit packs. The KS-20951 Drum Storage Unit is housed on the right side of the Storage Module.

1.16 For VML, MM, and PM services, the frame circuit packs in the storage module provide for:

(a) Control of the dc servo motor located in the drum storage unit

(b) Bias and erase signals

(c) Frame timing signals

(d) Additional frame timing signals for Modular Message service.

Fig. 9 depicts circuit pack mounting in a 36A-type mounting frame.

TABLE C

KS-20951 L1, L2, L3 DIFFERENCES

SERVICE	DRUM KS-20951 LIST NO.	PRERECORDED	TIMING SIGNALS	NUMBER OPTIONAL TRACKS	PER TRACK ANNOUNCEMENT TIMES
VML	L1*	No	1 Pulse/Rev	20 (and increments of 20) to 800	4 seconds
PM	L1*	No	1 pulse/Rev	√	4 seconds
MM	L2*	No	1 pulse/Rev and 3 pulses/Rev	√	1-1/3 seconds
MM and Other	L2*	No	1 pulse/Rev and 3 pulses/Rev	√	1-1/3 seconds and 4 seconds
MSS	L3†	Yes	1 second period square wave 3 second period square wave	No option 96 Tracks Supplied	1-1/2 seconds and 1/2 second

* KS-20951 L1 and L2 Drum Storage Units can be ordered equipped with one to ten head bar assemblies.

† A KS-20952 L3 Magnetic Drum Storage Unit is furnished equipped with five L504320 Head Bar Assemblies and without a Magnetic Drum. A KS-20952 L3 Magnetic Drum must be ordered separately with locality information specified for each installation.

1.17 For MSS service — and only for that service — the 36A-type mounting frame circuit packs on the storage module provide for

(a) Control of the dc servo motor located in the drum storage unit

(b) Ferrod driver

(c) Two spare quad amplifiers

(d) Storage for test cables.

Refer to Fig. 10, for circuit pack mounting.

Circuit Pack Groups

1.18 Circuit pack groups are selected to provide the electronics for a specific arrangement of service or services, and for specified traffic demand (i.e., number of channels). Appropriate channel modules must be ordered to house and interconnect the circuit pack groups.

1.19 For VML, MM, and PM only, the circuit packs in each channel provide the facilities required to:

(a) Record and reproduce a message on a channel

(b) Adjust and monitor the transmission level on a channel

(c) Initiate an office alarm signal if deterioration of the reproduced message occurs.

1.20 For MSS only, the circuit packs in each channel provide the facilities required to:

(a) Reproduce a message on a channel

(b) Adjust and monitor the transmission level of a channel.

The channel electronics are designed so that each channel operates independently of all other channels.

1.21 An MM channel (1-1/3 second) using a 4-second single track consists of only one circuit pack. A VML channel consists of a minimum of five to a maximum of seven circuit packs depending upon the maximum message length. The number of circuit packs varies in the Variable Message Length channel because these circuit packs, in addition to their normal record-reproduce function, also provide for the electronic switching from track-to-track.

1.22 Each circuit pack of the Message Synthesis announcement contains four amplifiers capable of handling four drum channels. Therefore, with a channel module containing 24 circuit packs, a maximum of 96 (24 X 4) channels can be handled.

1.23 All electronic circuits are mounted on printed circuit boards having the envelope size and connector end configuration of the present type A-coded circuit packs used in the No. 1 ESS. A family of 14 circuit packs is provided for use with the CSRAF. Eight of the circuit pack designs are for use in various channel modules to provide the electronics needed to operate the audio channels, and the remaining six designs are for use in the storage module, partially for providing servo motor controls, record bias and erase signals, and timing signals.

Channel Module Description

1.24 For VML, MM, and PM only, the channel module consists of a 291A-type 4-inch mounting plate, three 36A-type apparatus mounting frames, and a plurality of 905B-type circuit pack connectors, which are interconnected with three FPW back planes, channel input/output connectors, and a channel module input/output connector. There are three channel module designs: one for the Variable Message Length announcement service, one for the Modular Message announcement service, and one for the Phased Message announcement service. However, all channel modules are assembled from the same basic apparatus. The differences between the channel modules lie in the type and number of circuit pack connectors they contain and the manner in which the circuit pack connectors are interconnected. Since the interconnection is accomplished by the FPW back plane, each of the different channel modules contains different FPW back planes. All connections to the channels are made through the channel connectors located on the FPW back plane. All central office connections to the channel modules are made via the channel module input/output connectors, one of which is located at the left end of each channel module for the Variable and Phased Message announcements. For Modular Message announcement, two input/output connectors are provided, one is at the left end of the channel module, and one is at the left end of the control unit. A total of nine channel modules can be mounted on one frame. The part or all

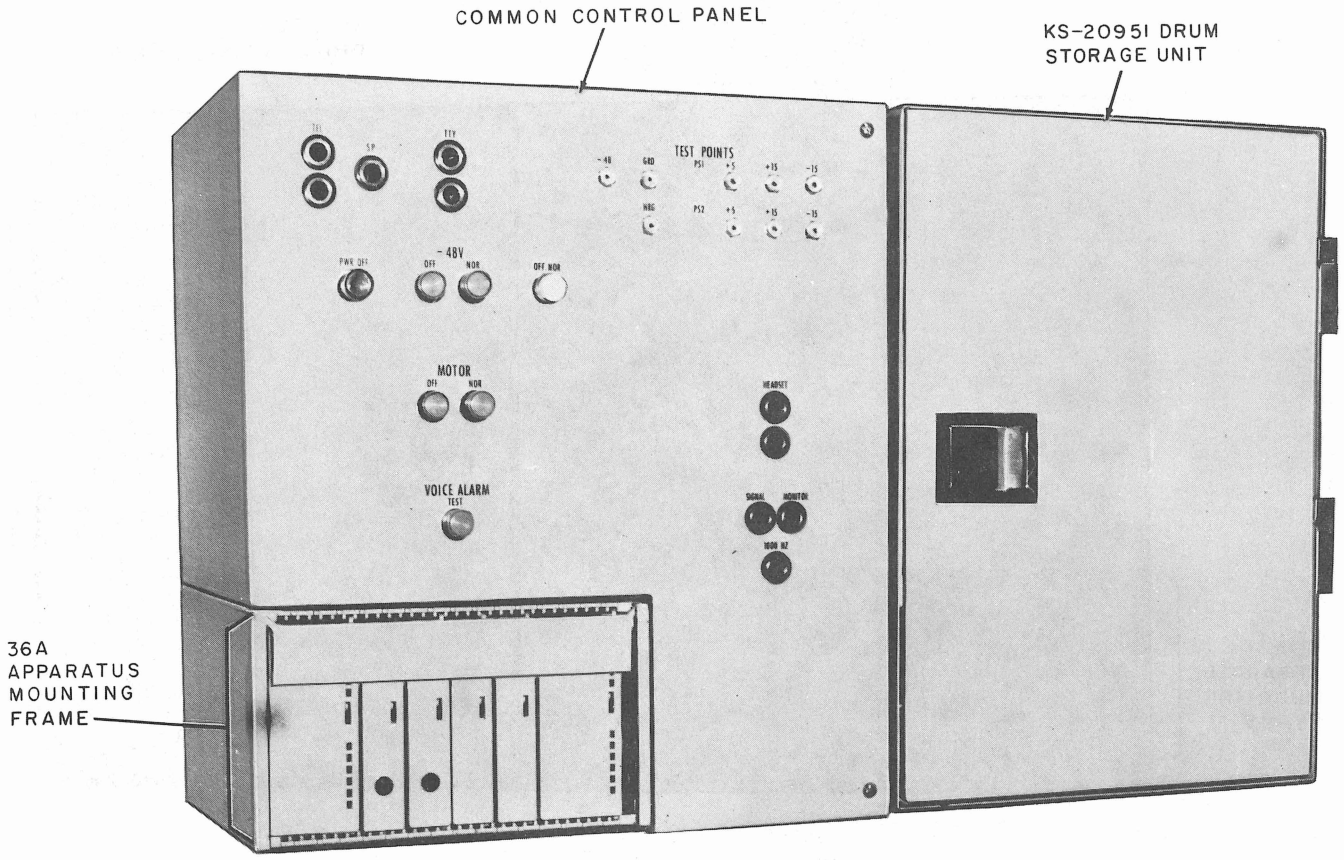


Fig. 7—Storage Module and Drum Storage Unit (VML, MM, and PM Only)

of the channel modules can consist of any combination of the VML, MM or PM channel module designs. These modules can in no way be combined with the module used with Message Synthesis Service.

1.25 For MSS only, the channel module consists of a 291A-type 4-inch mounting plate, three 36A-type apparatus mounting frames, and a plurality of 905B-type circuit pack connectors interconnected by point-to-point wiring. Connections to the channels are made by point-to-point wiring, and via connectors to the magnetic heads at the rear of the module. One channel module is used with each announcement machine. There are two announcement machines in each frame; therefore, only two channel modules are needed per frame. This channel module can in no way be combined with the modules used for VML, MM, and PM versions of the CSRAF.

Control Unit

1.26 For VML, MM, and PM only, a control unit is associated with each channel module on a one-to-one basis. There are three control unit designs — a specific control unit design provided for each of the three channel module designs. The control unit is mounted on the frame immediately below the channel module it serves. Each of the control units contains the frame mounted jacks, keys, and lamps required to provide for local control, test, and maintenance of the channel module. Each time a channel module is added to a frame an associated control unit is also added. Each control unit is connectorized in the rear, and its associated channel module is via a connectorized harness provided for each channel module-control unit combination. The harness plugs into the channel module connectors and the control unit connectors,

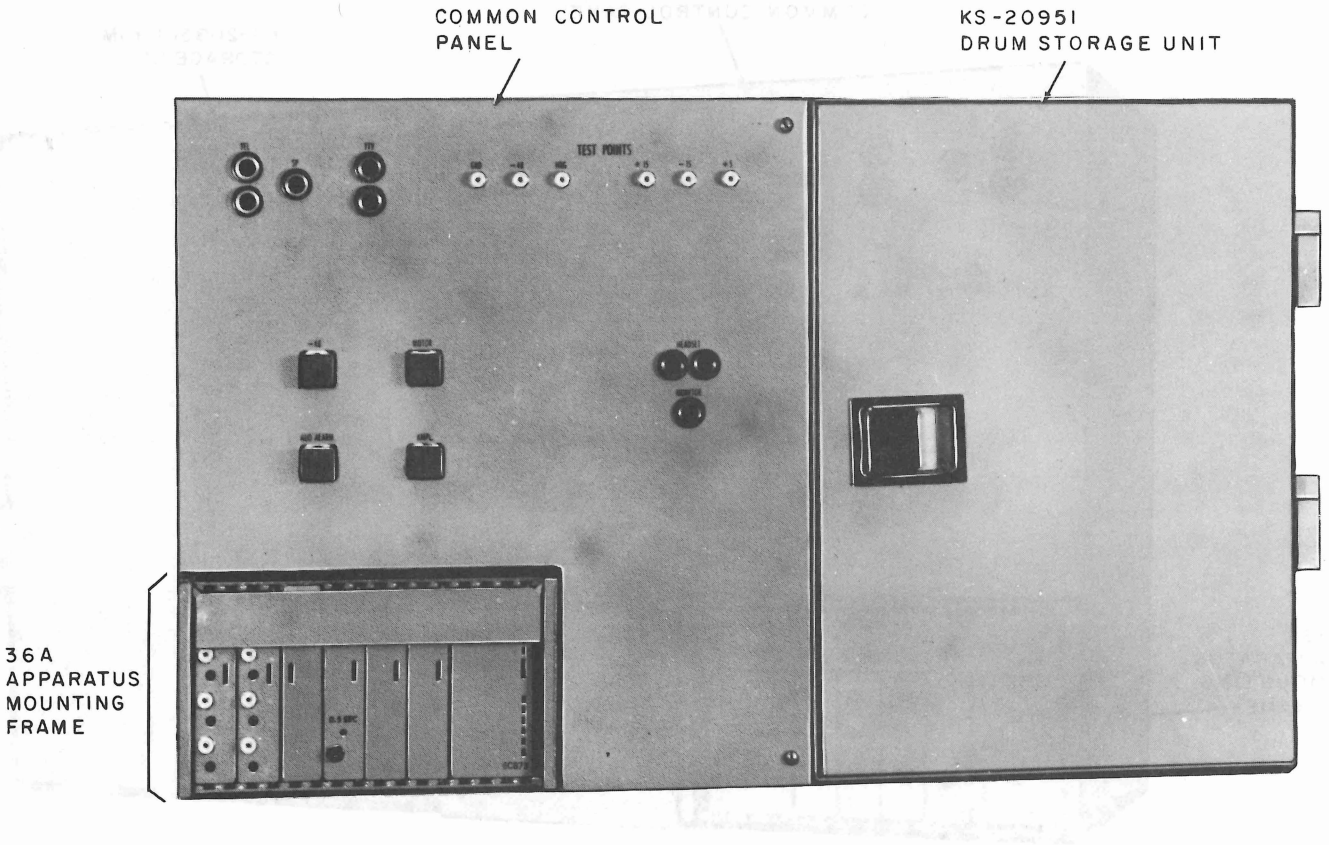


Fig. 8—Storage Module and Drum Storage Unit (MSS Only)

and has additional leads wire wrapped to the fuses and common control functions on the frame terminal blocks.

1.27 The front panel of the control unit contains the keys, jacks, and lamps. In general, the keys, jacks, and lamps provide for the following functions to be performed at the front of the frame:

(a) Monitoring channel message with headset

(b) Recording message with headset or 1000-Hz tone

(c) Dubbing message from tape recorder

(d) Turning channel power on and off

(e) Adjusting the voice alarm

(f) Measuring audio output level of a channel.

1.28 For MSS only, no control units are necessary since no recording facilities are required for the prerecorded drum. Facilities have been provided on the storage module for turning power on and off.

Power

1.29 The base of the frame contains a power supply module for providing the proper dc voltages and a fuse panel so that each channel can be separately fused.

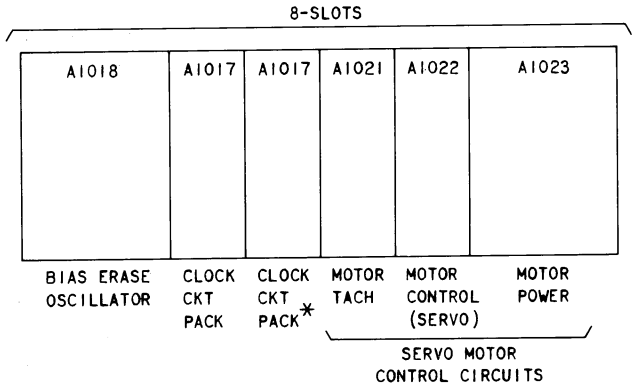
Note: For Modular Message announcement, the entire channel module (24 channels) is fused to one common fuse.

Two 36B-type apparatus mountings are mounted on one 291A-type 4-inch mounting plate located at the base of the main frame immediately above the fuse panel. Normally only one power supply is provided with the frame, however, if additional power is required, or if the frame is arranged for MSS, the mounting space is available for the second power supply. The power supply is designed to be self-protecting under short circuit conditions and is composed of two units: a 70B power unit and a 71H

power unit. The combined power output capacity from all three voltages in one power supply is 100 watts, which is sufficient to power the storage module and 4 channel modules. If five or more channel modules are used in the same frame, an additional 70B and 71H power unit is plugged into the power supply module. Refer to Fig. 3.

Note 1: For VML, MM, and PM only, one power supply is used to supply channel modules and control units 0 through 3 and the storage module. The second power supply is needed when any or all of channel modules and control units 4 through 8 are used.

Note 2: For MSS only, two power supplies are required. The MSS frame is equipped with duplicated announcement systems and therefore two power supplies (one per machine) are necessary.



*NOTE:
THE ADDITIONAL CLOCK CIRCUIT PACK IS ONLY USED FOR MODULAR MESSAGE ANNOUNCEMENT.

Fig. 9—Storage Module Circuit Pack Location (VML, MM, and PM Only)

1.30 All the circuit packs in the CSRAF operate from either +15, -15, or +5 Vdc. To provide for obtaining these voltages in any central office in which a CSRAF may be installed, the power supply converts a -48 Vdc battery/ground supply feeder, which is run to the top of the frame; then down through upright hollow sections to a filter; and then to a fuse panel.

Fuse Panel

1.31 A fuse panel, shown in Fig. 1 through 4, is mounted at the base of the frame to protect channels on an individual or group basis. A separate fuse panel is used with each power supply.

AC Power

1.32 Since the drum is driven directly from a low-speed dc servo motor, the use of this motor eliminates the need for 110 volts of ac power; therefore no ac is required on the frame.

Frame Connections

1.33 Frame connections are made through KS-19162 connectors mounted on the units in the frame. Both male and female connectors are provided.

GENERAL DESCRIPTION

Circuit Packs

1.34 There are 14 circuit pack types used in the CSRAF. Eight of the 14 types are used in the audio channels. These eight are:

(a) Power Amplifier — A1012

(b) Record/Playback Amplifier - A1013

(c) Alarm Logic Circuit Pack - A1014

(d) DMUX Audio Amplifier — A1015

(e) Head Switching Circuit — A1016

(f) Amp-Log-Alarm Circuit — A1019

(g) Switching Alarm Circuit — A1020

(h) Quad Amplifier — A1102.

1.35 The remaining six types are common to the entire frame and are located in the storage module (See Fig. 9, and 10). The following three of the remaining six types are common to all frame versions:

(a) Motor Tach — A1021

(b) Motor Control — A1022

(c) Motor Power — A1023.

TABLE D

CIRCUIT PACK DESIGNATION AND USE

CIRCUIT PACK DESIGNATION	SERVICE OR UNIT USED IN				
	MODULAR MESSAGE	VARIABLE MESSAGE	PHASED MESSAGE	MESSAGE SYNTHESIS	STORAGE MODULE
Power Amplifier A1012		*			
Record/Playback Amplifier A1013		*	*		
Alarm Logic Circuit A1014		*	*		
DMUX Audio Amplifier A1015			*		
Head Switching Circuit A1016		*	*		
Clock Circuit A1017					*
Bias Erase Oscillator A1018					*
Amp-Log-Alarm Circuit A1019	*				
Switching Alarm Circuit A1020		*	*		
Motor Tach A1021					*
Motor Control A1022					*
Motor Power A1023					*
Quad Amplifier A1102				*	
Ferrod Driver A1103				*	*

Two of the remaining three types are common to VML, MM, and PM version frames. These two are:

(a) Clock Circuit — A1017

(b) Bias Erase Oscillator — A1018.

The remaining type, the Ferrod Driver — A1103, is common to MSS version of the frame. The designation of the circuit packs and the units in which they are used is shown in Table D.

For VML, MM, and PM Only

1.36 A diagrammatic representation of the CSRAF is shown in Fig. 6. The 200-track drum storage unit (record-reproducer) is located approximately 5 feet above floor level on the right side of the frame in the storage module. The left portion of the storage module contains controls and maintenance elements common to the entire frame. The audio channel electronics consist of various types of printed circuit boards as shown in the inserts in Fig. 6.

1.37 The Modular and Variable Message channels are arranged in horizontal rows within the channel module; 24 channels for Modular or 3 channels for Variable per channel module. The Phased Message channel requires an entire channel module for each announcement. Each channel contains the circuit packs required for independent operation of the channel. The channel modules are stacked vertically on the frame in numerical order above and below the storage module with a maximum of nine modules per frame, regardless of the type of announcement.

1.38 The Modular Message announcement requires a repetitive 1.33-second announcement, achieved by dividing a 4-second recording track into three equal parts. Only one circuit pack is required for this announcement. It consists of a record/playback (R/P) amplifier, the logic required to record the name of a city, area or other short messages three times on a 4-second track, and voice alarm circuitry to indicate loss of audio signal at the output.

1.39 With Variable Message announcement, each channel can be provided with maximum message lengths of 16, 32, or 48 seconds by equipping the channel with either 1-, 2-, or 3-head switching circuit packs and accessing the channel to either 4, 8, or 12 tracks on the drum storage unit.

1.40 With Phased Message announcement, four phases of a 12-second message and a 4 second silent period are provided so that the beginning of the message is available every 4 seconds. Four sets of amplifiers are used.

1.41 Immediately below each channel module is a control unit serving the channel(s) immediately above it. This is an arrangement which adds versatility to the CSRAF in that control units are added as channel modules are added. Control units are available in three configurations to provide for some differences in control that are required for the three channel modules.

For MSS Only

1.42 A diagrammatic representation of the CSRAF is shown in Fig. 5. The basic prerecorded messages for the MSS version of the CSRAF are provided by fully duplicated systems. The announcement equipment and the prerecorded messages they provide are both duplicated. The 200-track drum storage units are located on the right side of the frame in the storage module. The left portion of the storage module contains controls and maintenance elements common to the associated machine. The audio channel electronics consists of A1102-type printed circuit boards, as shown in the insert in Fig. 5.

1.43 The MSS channels are arranged vertically on the quad amplifier circuit pack, four amplifiers per circuit pack, with each amplifier serving one announcement track. The circuit packs are arranged in a horizontal row within the channel module, 24 circuit packs per module, or a total of 96 channels.

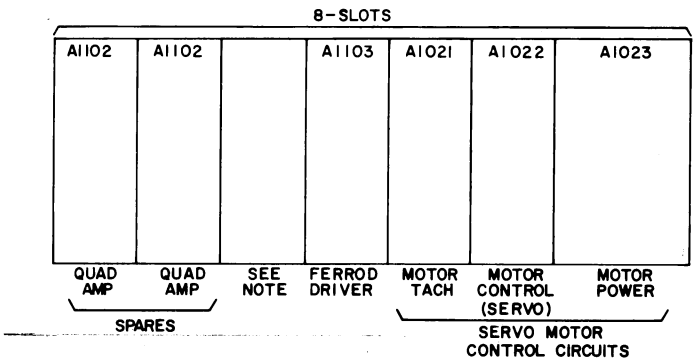


Fig. 10—Storage Module Circuit Pack Location (MSS Only)

1.44 After being reproduced from the drum storage unit, the arrnouncement tracks are amplified by the associated amplifier on this frame. The announcements are then seized and pieced together electronically by the user system. Switching or connecting together or channels is not performed on the MSS version of the CSRAF.

1.45 The MSS announcement provides message lengths of 0.5 second and 1.5 seconds. Only one circuit pack is required per four channells. It consists of four amplifiers capable of amplifying each of the four channels that the circuit pack serves on a one-to-one basis.

1.46 The user system, through stored program control and time division switching, is capable of

extracting 1.5-second and 0.5-second phases, and piecing them together in the proper sequence forming an uninterrupted announcement.

1.47 Control units are not provided for the channel modules because all controlling and accessing of the channels is performed by the user system.

1.48 The power supply module, mounted near the base of the frame, contains two power supplies. Each power supply is associated with one of the duplicated systems contained on the frame and provides the proper dc voltages. A fuse panel provides the proper fusing for each machine.

DETAILED DESCRIPTION

Phased Message Announcement

1.49 The Phased Message announcement provides a 12-second message that is ***phased*** so that the beginning of the message is available every 4 seconds. This feature results in an average waiting time of 2 seconds to hear a complete 12-second announcement.

Note: The Phased Message announcement is primarily intended for those services where the rate of connection for recorded announcement is high, barge-in is not desirable, and a 12-second message is satisfactory.

1.50 The Phased Message announcement is 16 seconds long with 12 seconds of recorded announcement and a 4-second silent period. During the recording procedure, the 12-second recorded message is automatically separated into three 4-second tracks, each track being recorded by a separate stationary magnetic recording head. Refer to Fig. 13.

1.51 The ability to provide this type of service is due to the versatility of the drum storage unit. After the first track is used in the initial announcement, it is available to restart the announcement from the beginning, while tracks two and three continue to complete the initial announcement when the proper phased switching technique results in the prescribed Phased Message announcement. The channel circuit packs in this channel module are similar to those used in the VML channel module.

1.52 Each Phased Message channel module (Fig. 11) provides for a single channel with the channel divided into four phases. The maximum message length of each phase is 12 seconds. The message on all four phases is the same, but each phase is displaced 4 seconds from the preceding one. Each phase requires four circuit packs: three for record, reproduce, and alarm functions, and one for switching. A DMUX audio amplifier circuit pack is also associated with each Phased Message channel module to amplify the announcement coming back from the user system to a level sufficient to operate the alarm circuitry. All the circuit packs are arranged in three 36A-type apparatus mountings. Refer to Fig. 12 for location and identification of Phased Message channel module circuit packs.

Modular Message Announcement

1.53 The Modular Message announcement provides for modular messages, a repetitive 1.33-second announcement, with the announcement being recorded three times within the 4-second drum rotation period. The partition of the announcement is accomplished by dividing a 4-second track into three equal parts by means of an optical switch assembly. Since there is no switching of heads and the maximum load is relatively small, the circuits are simple. For Modular Message application, the amp-log-alarm circuit contains an R/P amplifier, the logic required to record the audio information (normally the identification of a city or area) three times on a 4-second track, and voice alarm circuitry to indicate loss of audio signal at the output.

1.54 The Modular Message channel module (Fig. 14), provides for a maximum of 24 channels of Modular Message announcement service. Each channel is associated with a single 4-second track, and the module is intended for service where the 4-second message would normally be divided into three repetitive 1.33-second messages. (ie, area or city-of-origin announcements). All the electronics for one channel are contained on only one circuit pack. Each 36A-type apparatus mounting frame can house eight of these circuit packs. The three 36A-type apparatus mounting frames thus provide for a total channel module capacity of 24 channels.

1.55 For local maintenance, a control unit (Fig. 14) is located under each channel module. This con-

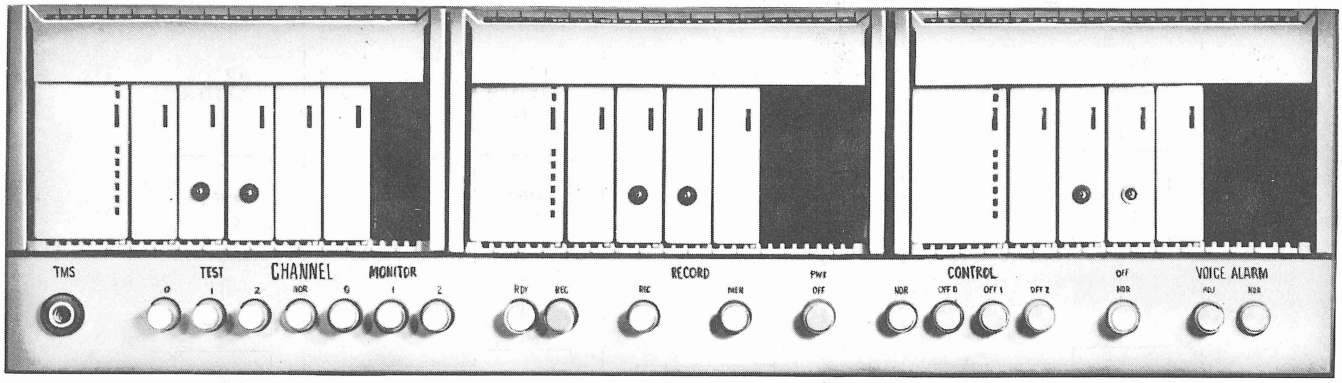
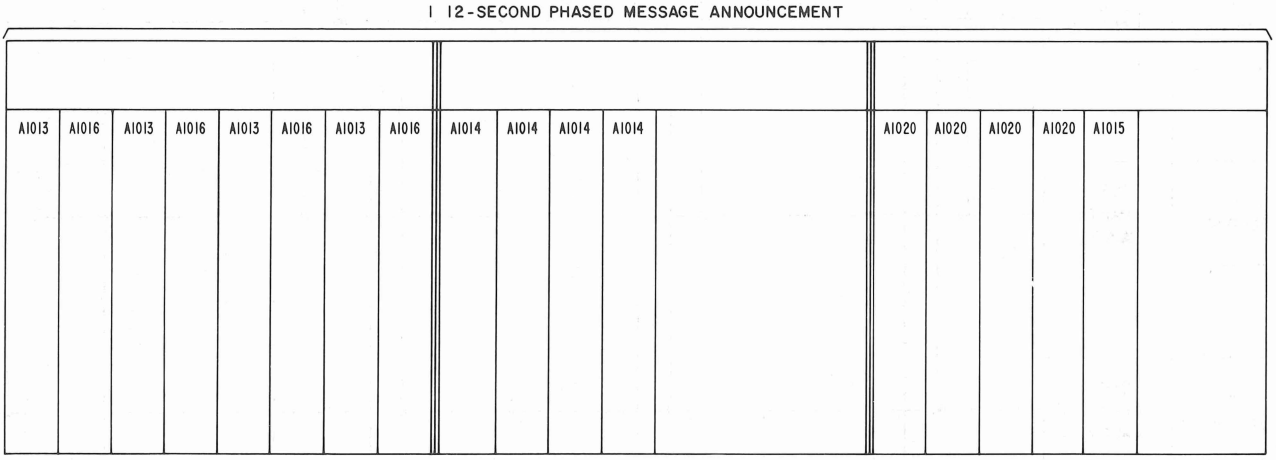


Fig. 11—Phased Message Channel Module and Control Unit



A1013 - RECORD PLAYBACK AMPLIFIER
A1016 - HEAD SWITCHING CIRCUIT PACK
A1014 - ALARM LOGIC CIRCUIT PACK
A1020 - SWITCHING ALARM CIRCUIT PACK
A1015 - DEMUX AUDIO AMPLIFIER

Fig. 12—Location and Identification of Phased Message Module Circuit Packs

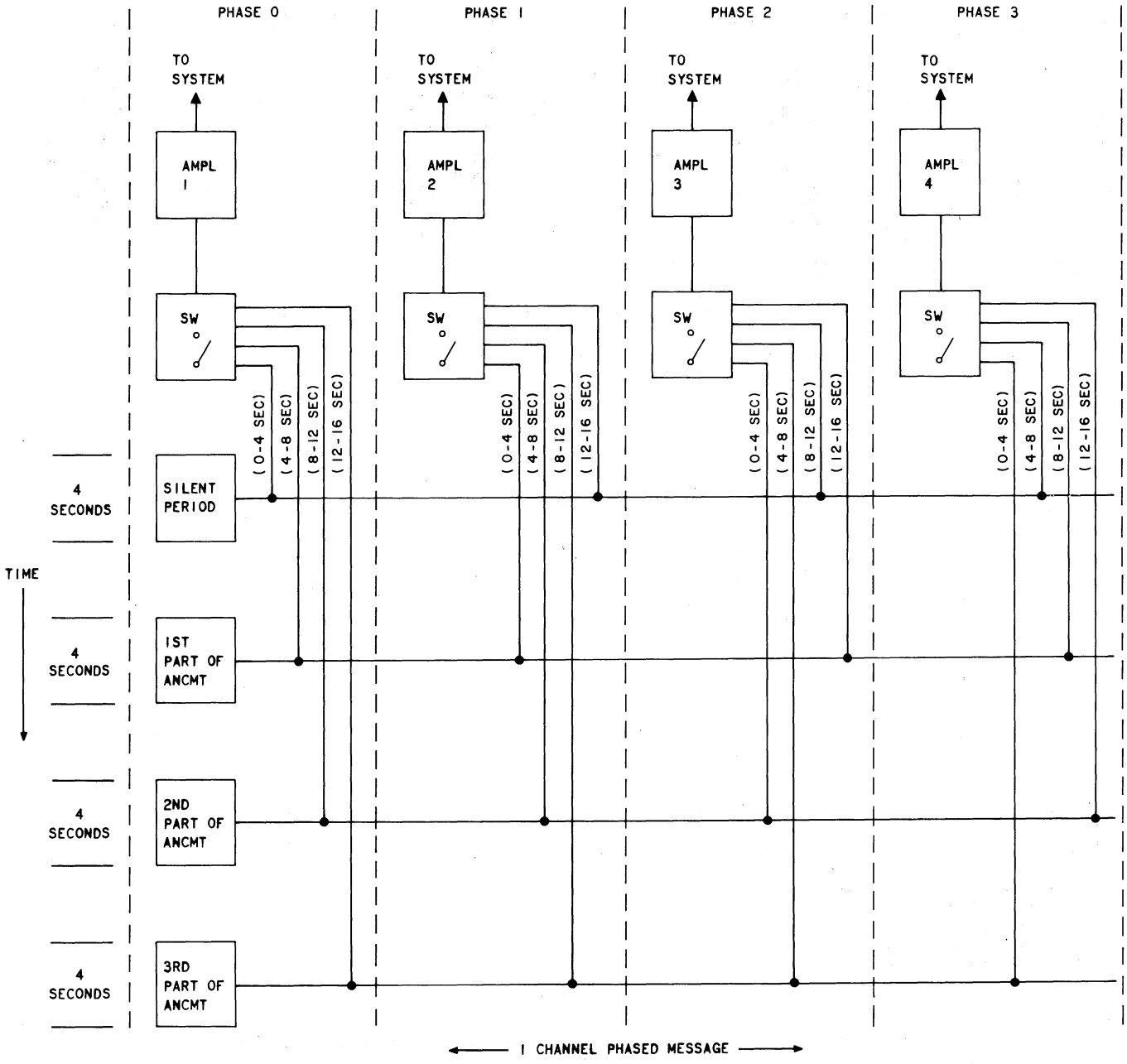


Fig. 13—Phased Message Announcement—Block Diagram

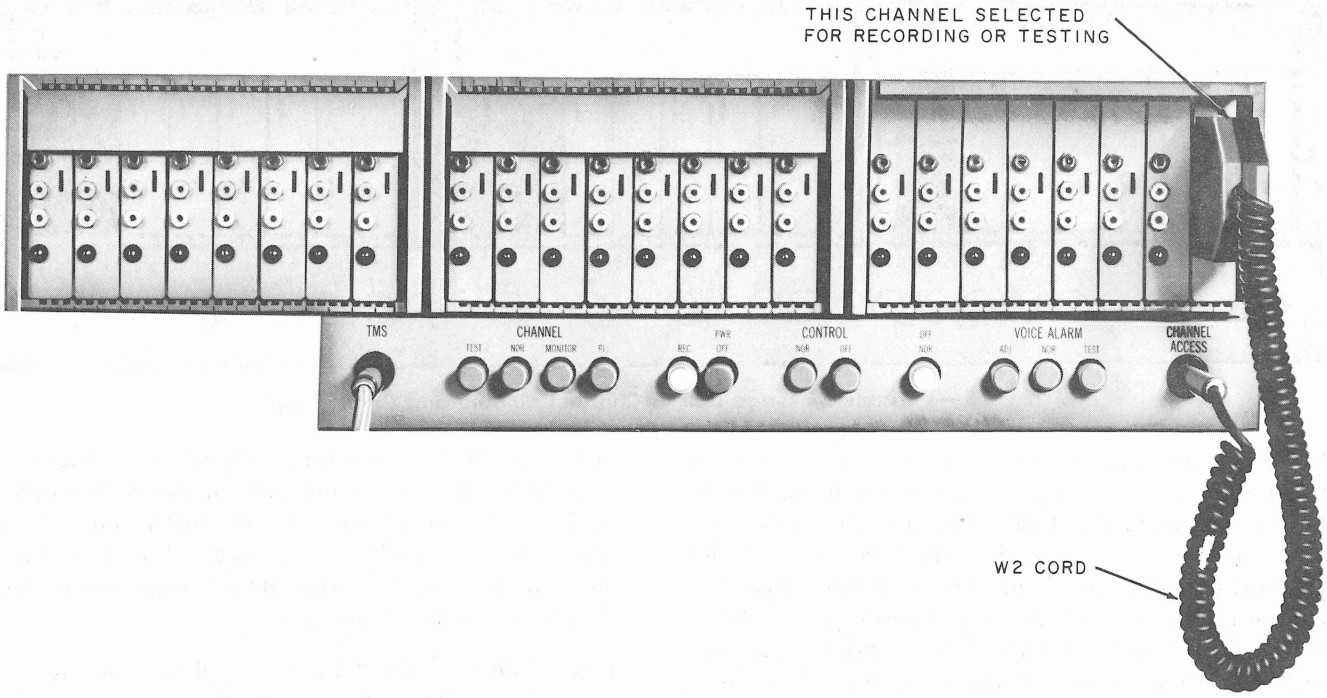


Fig. 14—Modular Message Channel Module and Control Unit W2 Patch Cord Used for Local recording and Testing

trol unit is used to turn power on and off, record test signals on the tracks, adjust voice alarm levels, and indicate off-normal and power-off conditions. The method of channel selection for recording and testing is performed by using a patch cord, as shown in Fig. 14.

VML Announcement

1.56 The maximum capacity of the VML announcement is 48 seconds, variable in 4-second increments at the time of recording. The channel operation is synchronous with the drum's 4-second rotation period. A clock pulse is produced by an optical switch assembly mounted on top of the drum unit.

1.57 If a message exceeds 4 seconds in length, it must be recorded on two or more tracks which are electronically pieced together in the R/P process. The number of messages or channels that can be handled by the drum storage unit is dependent upon the lengths of the individual message; the longer a message, the more tracks are required.

1.58 To handle this situation, the drum storage unit is organized to arrange the tracks in groups of four. Since each track provides 4 seconds, the 4-track group provides a basic message length of 16 seconds. The 16-second modules may then be added together to provide for the maximum length of the message expected. The established standard message lengths are 16, 32, and 48 seconds. The maximum message length selected for a channel is dictated by the maximum anticipated length of the message to be recorded on a channel. The actual message length can be from zero to maximum since the message is built up in 4-second increments until maximum is reached.

1.59 In the playback mode, the message is announced on a repeating cycle which is determined by the actual message length, not the maximum length. This feature of the drum storage unit, in conjunction with the associated electronics on the frame, provides a VML announcement service. When a particular maximum message length is chosen for a given channel, an associated number of tracks (maximum message length is seconds divided by four) are dedicated to that channel and cannot be used elsewhere. Therefore to realize the greatest number of channels, the maximum message length of each channel must be realistically chosen.

1.60 The VML channel module (Fig. 15) provides for a 3-channel operation with each channel

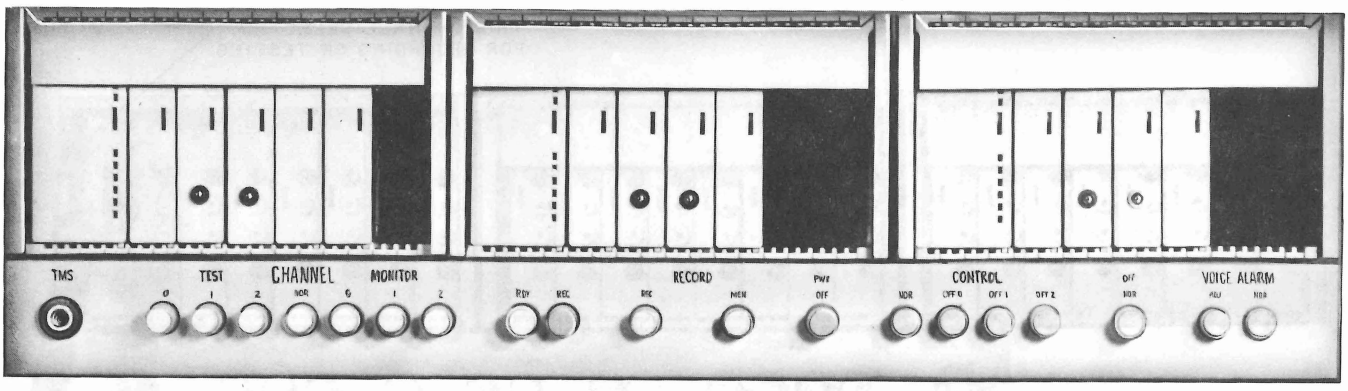


Fig. 15—Variable Message Length Channel Module and Control Unit

having a maximum message length of 48 seconds. In this design each 36A-type apparatus mounting frames together provide for three separate channels. The 48-second limitation on each channel results from the physical limitation of the number of circuit packs that can be placed in one 36A-type mounting frame. Each VML channel requires four circuit packs for the normal record-reproduce and alarm functions. The channel also requires switching circuit packs. If the channel is equipped for only 16-second long messages, one switching circuit pack is required in addition to the previously described normal circuit packs. If the channel is equipped for 32-second messages, two switching circuit packs are required; for 48-second messages, three switching circuit packs. The third switching circuit pack fills the 36A-type apparatus mounting frame. Refer to Fig. 16 for location and identification of VML channel module circuit cards.

1.61 For local maintenance, a control unit (Fig. 15) is located under each channel module. This control unit is used to turn power on and off, record test signals on the tracks, monitor recorded announcements, adjust voice alarm levels, and indicate off-normal and power-off conditions.

Message Synthesis Service

1.62 Each announcement machine of the CSRAF arranged for MSS has the capability of simultaneously reproducing a total of 96 tracks of prerecorded voice information. Each prerecorded track contains number, phrase, or locality messages. The maximum message interval for number is 0.5 seconds; for phrases and localities, 1.5 seconds. With the magnetic drum rotation period of 3 seconds, the 1.5-second phrase is provided twice and the 0.5-second phrase is provided six times within the same rotation period. The partition of the announcement is accomplished by dividing a 3-second track into either two or six equal parts by means of an optical switch assembly. Under program control, a number of prerecorded phrase, locality, and number information tracks of 1.5-second duration, 0.5-second duration or both are electronically "pieced" together (synthesized) in a logical programmed sequence by time division switching techniques.

1.63 Time division switching of phrase and number information onto and off of a common talking bus in a programmed sequential order will form complete announcements.

1.64 Each electronically synthesized announcement is arranged for responding to a specific type of calling condition that enters a user system for service.

1.65 The circuits for the MSS version of the CSRAF are relatively simple. A quad amplifier circuit used to make up the MSS channel module contains four independent amplifiers for playing back audio signals from magnetic heads. Each independent amplifier of the quad amp is associated to a magnetic head on a one-to-one basis. When the user system requires a particular announcement, it will connect to the proper amplifiers in the proper sequence. With the prerecorded drum constantly rotating and the timing pulses being sent to the system, the system can connect to the beginning of a phrase of either 1.5- or 0.5-second duration and disconnect at the next timing pulse at the end of the phrase.

> ***Note:*** Timing information defining the beginning and end of prerecorded message intervals is provided by a coded disk located atop the magnetic drum.

Complete announcements are then immediately transmitted to calling subscribers who have reached nonworking numbers. The arrangement of the various announcements and the head and amplifier associated with each is shown in Table E. This table is physically located at the CSRAF on the back side of

Note: Timing information defining the beginning and end of prerecorded message intervals is provided by a coded disk located atop the magnetic drum.

Complete announcements are then immediately transmitted to calling subscribers who have reached nonworking numbers. The arrangement of the various announcements and the head and amplifier associated with each is shown in Table E. This table is physically located at the CSRAF on the back side of the drum storage unit door.

1.66 The Message Syntheses Service channel module (Fig. 17) provides for a maximum of 96 channels. The channel module is made up of 24 individual quad amplifiers with each quad amplifier providing 4 individual amplifier circuits. Thus, each channel module contains 24 (quad amps) × 4 (amps each) = a total of 96 amplifiers per channel module. All the electronics for one channel are contained on one-fourth of a circuit pack. Each circuit pack therefore can handle four individual channels. Each 36A-type apparatus mounting frame can house eight of these circuit packs. The three 36A-type apparatus mounting frames thus provide for housing 24 circuit packs, for a total channel module capacity of 96 channels. Refer to Fig. 18.

1.67 For MSS no record procedures are necessary due to the use of the prerecorded drum. All announcements are recorded on a KS-20952 L3 drum for actual operation. Also, no provision is made for recording new information on blank announcement tracks or for rerecording existing information in the field. Announcement information can be changed, added, or renewed in the field only by replacement with new or refurbished drums on which the required information has been prerecorded by the manufacturer.

1.68 Table E provides an organization breakdown and assignment for standard messages (announcement tracks 1 through 48) as they relate to magentic head, amplifier, output, connector leads, and announcement track number.

1.69 Forty-eight of the 96 available announcement tracks (tracks 1 through 48) are assigned specific standardized prerecorded messages consisting of numbers and phrases. The time duration allowed for phrases is 1.5 seconds maximum and the time duration allowed for numbers is 0.5 seconds. Phrases therefore are prerecorded two times around the circumference of each drum track, while numbers are prerecorded six times around the circumference of each drum track to be compatible with the 3-second period of drum revolution.

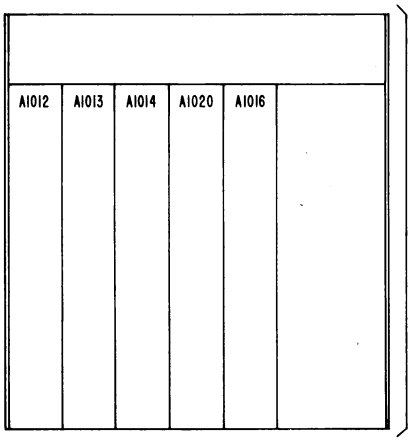
1.70 Prerecorded tracks 49 through 72 are reserved for letters for 2 L plus announcements or locality names; tracks 73 through 89 are reserved for locality names only, and tracks 90 through 96 are reserved for NPA codes or localities. The time duration allowed for locality names and area codes are specified for local area announcements to satisfy specific job requirements. Table E shows examples for tracks 49 through 96. tracks 49 through 96.

1.71 The only mode of operation for the CSRAF arranged for MSS is the playback mode in which messages prerecorded on the drum are extracted by the user system and distributed to the subscribers. The messages recorded on the drum are stored in 1.5-second or 0.5-second segments contained in a normal 3-second track on the drum. The two timing signals that are provided to the interface circuit change state every 0.5 or 1.5 seconds to indicate the beginning of a letter, word, number, or phrase. A large inventory of announcements are generated from the 96 prerecorded phrase, number, and locality messages. These are automatically assembled together, in a multitude of combinations, by user system computer programs as required for the total inventory.

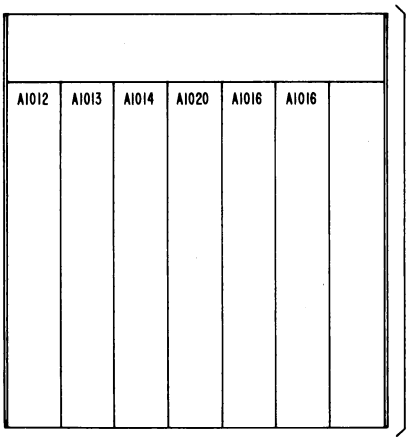
1.72 Figure 19 is an example of how a complete announcement is synthesized from a selected series of prerecorded messages as reproduced during the drum rotational period. The full announcement and time sequence is typical of the type of machine-produced announcements provided for nonworking number calls attached to the CSRAF arranged for MSS.

Interconnections

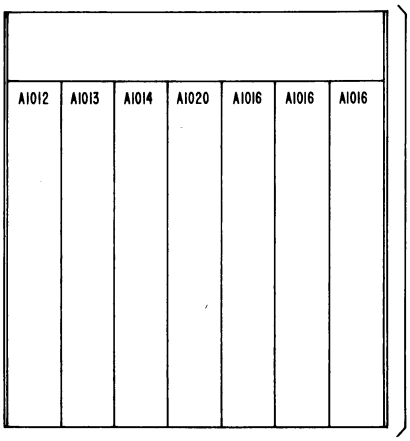
1.73 Each L504320 head bar assembly is assigned a dash number from 1 through 10. Only one of each dash number will fit the drum storage unit. The dash number is used to define the position of the head bar assembly on the drum storage unit. The head bar assemblies have identical head bars containing twenty heads, arranged in five groups of four heads. The dash numbers 1 through 10 denote different cable forms and lengths between the head bar assembly and



ARRANGED FOR
16-SECOND
ANNOUNCEMENT (MAX)



ARRANGED FOR
32-SECOND
ANNOUNCEMENT (MAX)



ARRANGED FOR
48-SECOND
ANNOUNCEMENT (MAX)

A1012- POWER AMPLIFIER
A1013- RECORD PLAYBACK AMPLIFIER
A1014- ALARM LOGIC CIRCUIT PACK
A1020- SWITCHING ALARM CIRCUIT PACK
A1016 - HEAD SWITCHING CIRCUIT PACK

Fig. 16—Location and Identification of Variable Message Length Channel Module Circuit Cards

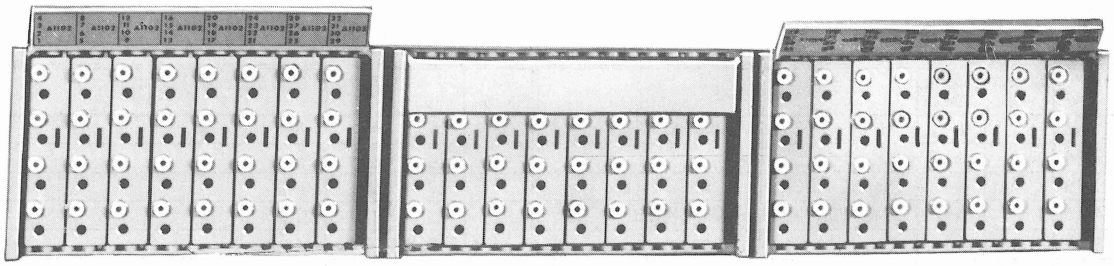
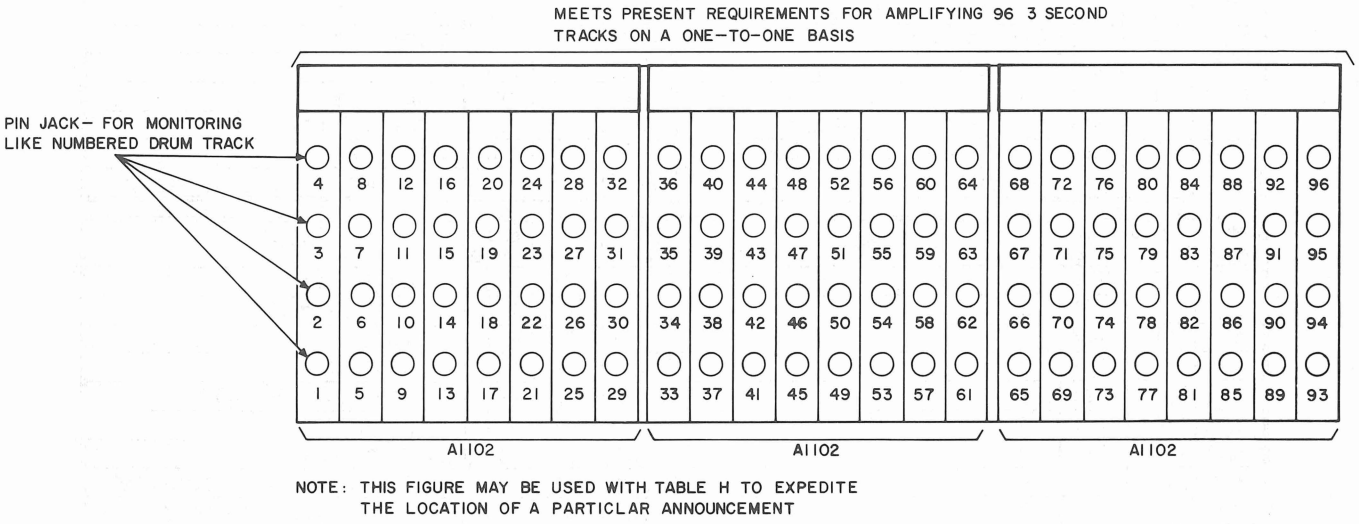


Fig. 17—Message Synthesis Service Channel Module



NOTE: THIS FIGURE MAY BE USED WITH TABLE H TO EXPEDITE THE LOCATION OF A PARTICLAR ANNOUNCEMENT

Fig. 18—Location and Identification of Message Synthesis Service Channel Module Circuit Cards and Channel (Track) Assignment

TABLE E

REPRODUCER ANNOUNCEMENT TRACK, HEAD AMPLIFIER, PLUG CONNECTIONS, TRUNK AND MESSAGE ASSIGNMENT

J27 PIN NO.	AMP AND HEAD	OCTAL NUMBER	MESSAGE
1,13	1	640	THE NUMBER YOU HAVE REACHED
2,14	2	641	HAS BEEN CHANGED
3,15	3	642	THE NEW NUMBER (PAUSE) IS
4,16	4	643	TO A NONPUBLISHED NUMBER
5,17	5	644	FOR INCOMING CALLS
6,18	6	645	IN AREA CODE
7,19	7	646	HAS BEEN DISCONNECTED
8,20	8	647	TO A NON-LISTED NUMBER
9,21	9	650	TEMPORARILY
10,22	10	651	AT THE CUSTOMER'S REQUEST
11,23	11	652	IS BEING CHANGED
12,24	12	653	THE NEW NUMBER
49,61	13	654	IS NOT YET CONNECTED
50,62	14	655	
51,63	15	656	CALLS ARE BEING TAKEN BY
52,64	16	657	IS NOT IN SERVICE
53,65	17	660	IS A WORKING NUMBER
54,66	18	661	PLEASE CHECK THE NUMBER
55,67	19	662	AND DIAL AGAIN
56,68	20	663	IF YOU NEED ASSISTANCE
57,69	21	664	PLEASE MAKE A NOTE OF IT
58,70	22	665	YOU MAY STAY ON THE LINE
59,71	23	666	AND AN OPERATOR WILL ANSWER
60,72	24	667	THOUSAND ↓

J28 PIN NO.	AMP AND HEAD	OCTAL NUMBER	MESSAGE
1,13	25	670	HUNDRED ↓
2,14	26	671	OH –
3,15	27	672	ONE –
4,16	28	673	TWO –
5,17	29	674	THREE –
6,18	30	675	FOUR –
7,19	31	676	FIVE –
8,20	32	677	SIX –
9,21	33	700	SEVEN –
10,22	34	701	EIGHT –
11,23	35	702	NINE –
12,24	36	703	OH ↓
49,61	37	704	ONE ↓
50,62	38	705	TWO ↓
51,63	39	706	THREE ↓
52,64	40	707	FOUR ↓
53,65	41	710	FIVE ↓
54,66	42	711	SIX ↓
55,67	43	712	SEVEN ↓
56,68	44	713	EIGHT ↓
57,69	45	714	NINE ↓
58,70	46	715	(REORDER TONE)
59,71	47	716	AREA CODE
60,72	48	717	WILL YOU DIAL IT AGAIN PLEASE

J29 PIN NO.	AMP AND HEAD	OCTAL NUMBER	MESSAGE
1,13	49	720	A
2,14	50	721	B
3,15	51	722	C
4,16	52	723	D
5,17	53	724	E
6,18	54	725	F
7,19	55	726	G
8,20	56	727	H
9,21	57	730	I
10,22	58	731	J
11,23	59	732	K
12,24	60	733	L
49,61	61	734	M
50,62	62	735	N
51,63	63	736	O
52,64	64	737	P
53,65	65	740	R
54,66	66	741	S
55,67	67	742	T
56,68	68	743	U
57,69	69	744	V
58,70	70	745	W
59,71	71	746	X
60,72	72	747	Y

J30 PIN NO.	AMP AND HEAD	OCTAL NUMBER	MESSAGE
1,13	73	750	IN MANHATTAN
2,14	74	751	IN THE BRONX
3,15	75	752	IN BROOKLYN
4,16	76	753	IN QUEENS
5,17	77	754	IN STATEN ISLAND
6,18	78	755	IN NASSAU
7,19	79	756	IN SUFFOLK
8,20	80	757	IN WESTCHESTER COUNTY
9,21	81	760	IN ROCKLAND COUNTY
10,22	82	761	IN NEW JERSEY
11,23	83	762	IN CONNECTICUT
12,24	84	763	IN NEWARK
49,61	85	764	IN PHILADELPHIA
50,62	86	765	IN PENNSYLVANIA
51,63	87	766	IN MASSACHUSETTS
52,64	88	767	
53,65	89	770	
54,66	90	771	516
55,67	91	772	914
56,68	92	773	201
57,69	93	774	609
58,70	94	775	203
59,71	95	776	215
60,72	96	777	617

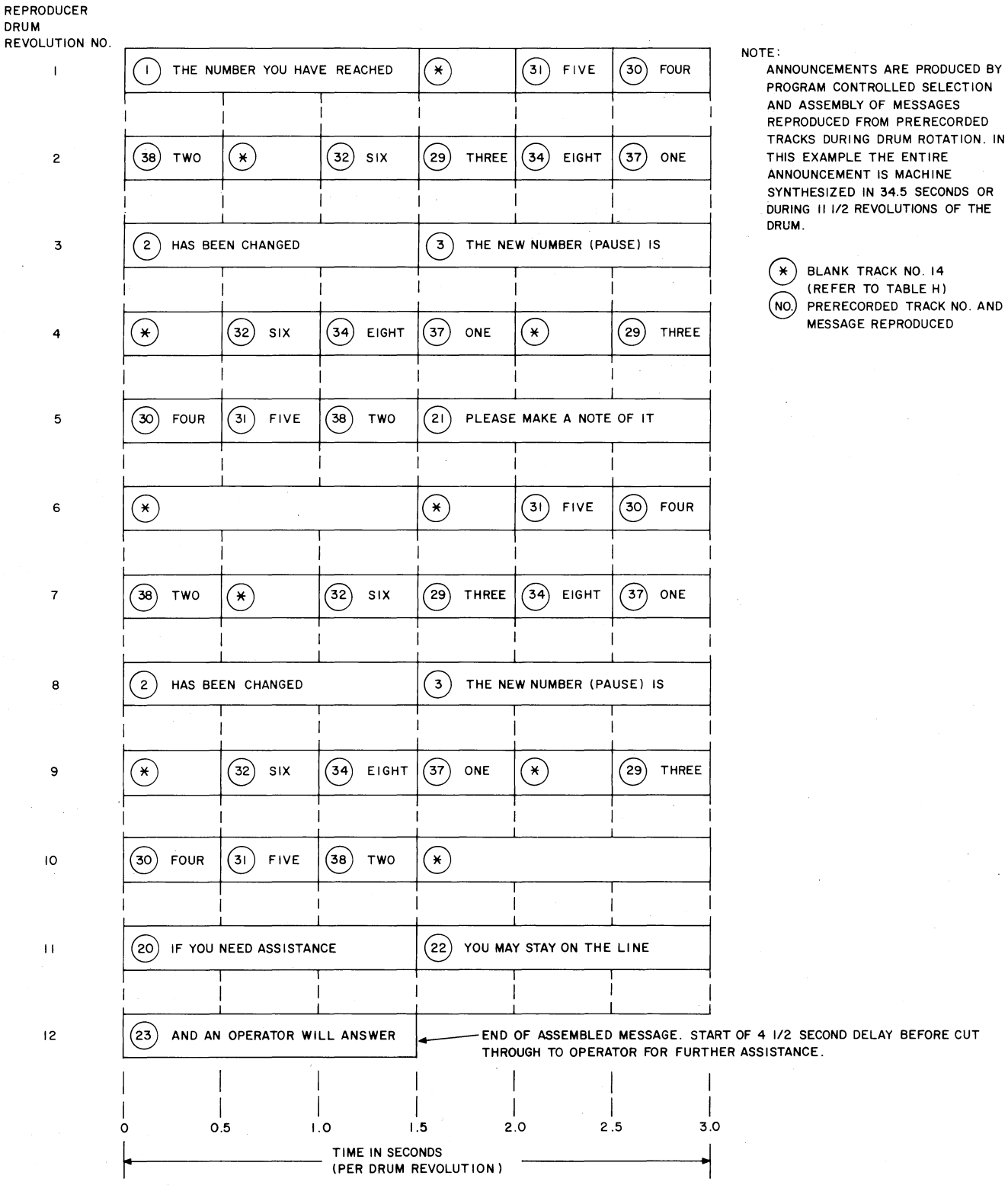


Fig. 19—Typical Message Assembly for Message Synthesis Service During Reproducer Drum Rotation

a connector at the rear of the drum storage unit. Due to the differing forms and cable lengths, the head bar assemblies are not interchangeable (see Fig. 20). The L504320 head bar assembly consists of the KS-20953 head assembly and a KS-20954 interconnecting cable. The cable numbers are KS-20954 L1 through L10 for the L504320-1 through -10 respectively.

1.74 From the rear of the drum storage unit the head bar assembly head signals are connected to the channels by KS-20956 cable assemblies. These cable assemblies are available in two lengths, KS-20956 L1 and L2 as required. See Fig. 21 and 22.

1.75 Switching pulses derived from drum optical switches and a feedback signal from a code wheel amplifier are delivered to the rear of the drum assembly by a KS-20955 L1 cable assembly. The switching pulses are brought from the rear of the drum assembly by a KS-20955 L2 cable assembly to the circuit cards in the storage module. Refer to Fig. 23.

1.76 The KS-20954 interconnecting unit consists of two flat cables, each of which is 1-inch wide, and contains 40 conductors. One end of the unit is terminated in 20 connectors that mate with the magnetic heads and the other end terminates on a printed circuit board. The printed circuit board provides 5 plug ends of 16 contacts each. The plug ends have a polarizing slot to accept a key, ensuring proper mating with their corresponding connectors on the KS-20956 interconnecting units.

1.77 Ten list numbers have been assigned to the KS-20954 interconnecting unit. Each number defines a different folding pattern and flat cable length used in this interconnecting unit. The list numbers are coordinated with the installation position on the KS-20951 Drum Storage Unit.

1.78 The KS-20955 interconnecting units exist in two distinct configurations, list 1 and 2. The list 1 unit connects the circuitry of an optical switch assembly (located atop the drum storage unit) and a code wheel and motor (mounted on the bottom of drum storage unit) to a connector on the rear of the drum storage unit. The list 2 unit connects the control functions and circuit cards of the storage module to the drum storage unit.

1.79 The list 1 unit has two flat cables both terminated in the same male connector on one end and a female connector on each of the other ends. The list 2 unit has two flat cables both terminated in one female connector on each end.

1.80 The KS-20956 interconnecting unit consists of a flat cable (with 16 conductors) terminated in a female connector on each end. The connectors are keyed for polarization to mate with an edge of a printed circuit card. List numbers have been assigned to the KS-20956 interconnecting unit to identify the length.

(a) List 1 is 4 feet 4 inches in length. (VML, MM, and PM only — Used to connect to channel modules in frame positions 0 through 3.) (MSS only — Used to connect to All channel module amplifiers of each machine.)

(b) List 2 is 7 feet 0 inches in length. (VML, MM, and PM only — Used to connect to channel modules in frame positions 4 through 8.) (MSS only — Not used for MSS).

1.81 For VML, MM and PM-type announcements, flexible printed wiring (FPW) is used on the back plane of the frame (channel modules) to interconnect circuit packs. The use of FPW eliminates conventional point-to-point wiring from unit-to-unit.

Note: For MSS-type announcements, FPW is not used because of the small amount of point-to-point wiring that is required.

Handset

1.82 A handset, type G3AB, is ordered for local monitoring and recording at the frame as shown in Fig. 1.

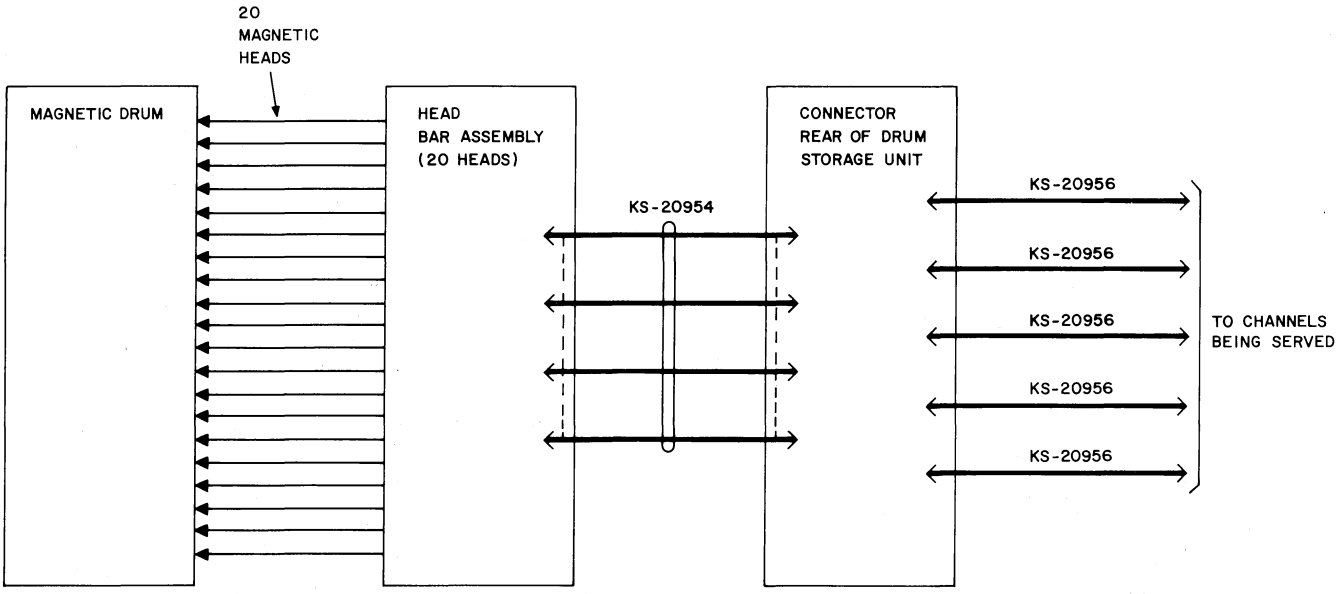


Fig. 20—Interconnecting Unit Arrangement

CALL DIRECTOR®

1.83 A CALL DIRECTOR® (VML, MM, and PM only) is used as a dedicated phone for recording audio information on the CSRAF from a quiet location. The CALL DIRECTOR is a standard 637 EA13-type, equipped with 18 key positions; 2 positions for the record function and 16 positions for selecting channels on the CSRAF (1 position per channel). If the CSRAF is equipped with more than 16 channels, 2 additional 635 GC keys can be added to provide 12 additional channels or a maximum of 28 channels. A jack arrangement is provided on the side of the CALL DIRECTOR so that professionally prerecorded messages can be dubbed onto the recorded announcement frame. One CALL DIRECTOR may be ordered per frame. Two frames located in the same frame lineup require two CALL DIRECTOR's for access.

1.84 For MSS only, the use of a dedicated phone is not necessary. No recording facilities of any type are required because of the use of the prerecorded magnetic drum.

ALARMS

1.85 The announcement frame is alarmed for the predominant modes of failure. To simplify the diagnosis of a machine fault, the alarm features are classified into three areas:

(a) Voice alarms

(b) Memory loss alarms

(c) Fuse alarms.

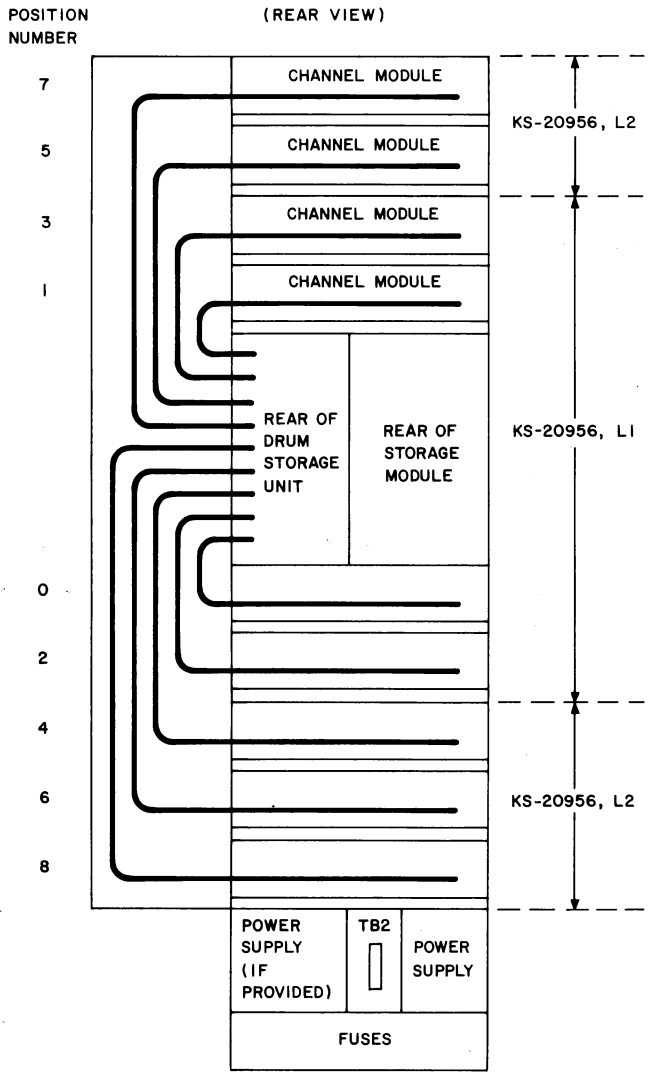


Fig. 21—Typical Arrangement of the KS-20956 Interconnecting Unit on Rear of CSRAF — (Intended for use with VML, MM and PM only)

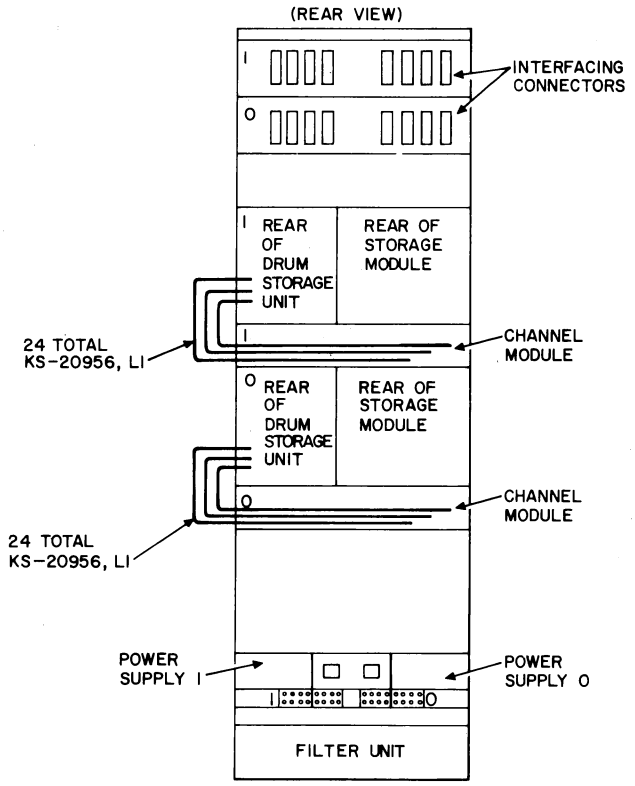


Fig. 22—Typical Arrangement of the KS-20956 Interconnecting Unit on Rear of CSRAF — (Intended for use with MSS only)

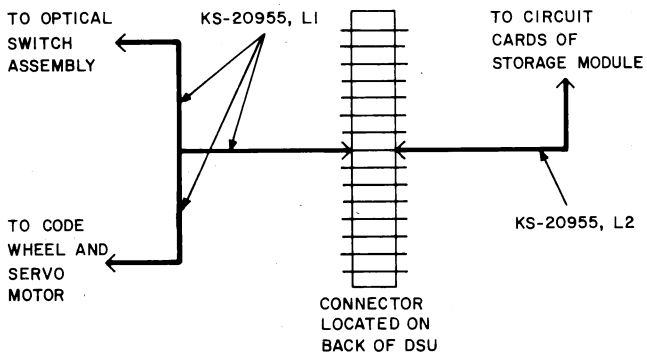


Fig. 23—Location of KS-20955 L1 and KS-20955 L2 Interconnecting Units

Alarms are given on the frame itself in the form of lights, and to the interfacing circuit in the form of relay contacts for loop closures.

1.86 To maintain a satisfactory audio level at the output of the announcement frame, a voice alarm circuit samples the audio at the output. Provision for adjusting the sensitivity of the voice alarm level is available on the A1014 ALARM LOGIC circuit pack. The audio level at which the voice alarm operates is adjustable to accomodate different system output requirements. The voice alarm not only detects a decrease in the audio level, but also any fault which would deteriorate or eliminate the signal, such as power loss, drum stoppage, malfunctioning magnetic head, faulty amplifier, etc.

FLOOR PLAN ARRANGEMENTS

1.87 Only three restrictions apply in the use of the CSRAF. Two are associated with the input/output connecting cables and one with channel capacity.

1.88 The resistance of the cable connecting a playback amplifier output to the distributing networks, which connect to the trunks, adds to the output impedance of the amplifier. Therefore, this cable resistance should, be kept as low as possible. The service to be provided and the transmission objectives dictate the cable resistance tolerance. If the loop resistance of the cable can be kept to approximately 0.5 ohms, transmission performance should be excellent in all cases. The resistance of the cable connecting a CALL DIRECTOR to the CSRAF must be kept within bounds. In this case, considerably more resistance is tolerable; if the cable loop resistance does not exceed 150 ohms, satisfactory recordings should result. The 150-ohm limitation applies to remote recording from a CALL DIRECTORlocated in the same building which contains the CSRAF.

Note: Although not a requirement, it is suggested, in order to cause minimum interference to the audio signals, that the CSRAF should not be located adjacent to frames which produce extraordinary electrical activity. (ie ringing and tone frame).

2. SUPPLEMENTARY INFORMATION

801-000-000—Numerical Index—Division 801, Equipment Design and General Equipment Requirements and Engineering Information, Common Systems.

201-520-301—Common Systems Recorded Announcement Frame (CSRAF) SD-97725-01 and SD-97725-02 Operating procedures.

201-520-501—Common Systems Recorded Announcement Frame (CSRAF) SD-97725-01 and SD-97725-02 Tests and Trouble Analysis

201-520-701—Common Systems Recorded Announcement Frame (CSRAF) SD-97725-01 and SD-97725-02 Requirements and Adjusting Procedures.

201-520-801—Common Systems Recorded Announcement Frame (CSRAF) SD-97725-01 and SD-97725-02 Piece-Part Data and Replacement Procedures.

205-430-501—Common Systems Recorded Announcement Frame Electrical Transmission Test and Adjustment Automatic Intercept Center No. 1A Automatic Intercept System.

J1A053—820-053-150—Filter Unit
KS-20951—Drum Storage Unit
KS-20952—Magnetic Drum
KS-20953—Magnetic Head
KS-20954—Interconnecting Unit
KS-20955—Interconnecting Unit
KS-20956—Interconnecting Unit

3. DRAWINGS

For additional drawings forming a part of this specification, see listings under Subdivisions of Equipment and Detailed Index.

Circuit

SD-97723-01—Common Systems Drum Storage Unit Circuit KS-20951 for Recorded Announcement Frame

SD-97724-01—Common Systems Circuit Pack Schematics, Recorded Announcement Frame.

SD-97725-01—Common Systems Recorded Announcement Frame

Wiring and Cabling

ED-1B000-01—TSPS No. 1 Table of Wire Gauges and Types of Insulation

ED-1B006-( )—Method of Running and Connecting +24 Volt and -48 Volt Power Feeders and Grounding Methods.

ED-97763—Switchboard Cabling (J1C012A)
ED-97764—Switchboard Cabling (J1C012B)

TABLE F

SAMPLE FRAME 1

VARIABLE LENGTH MESSAGES — 12 CHANNELS
6 16-SECOND CHANNELS
4 32-SECOND CHANNELS
2 48-SECOND CHANNELS
(See Fig. 24)

QUAN.	UNIT	TITLE
1	J1C012A,L2	Frame
1	J1C012AA,L1	Storage Module
1	J1C012B-1A,AA	Local Cable
4	J1C012AB,L1	Channel Module—Variable Message Length
12	J1C012AB,L2	Common Circuit Packs
20	J1C012AB,L3	Switching Circuit Packs
4	J1C012AF,L1	Control Unit
1	J1C012AJ,L1	Power Supply Module
1	J1C012AJ,L2	Power Supply—Circuit Packs
1	J1C012AK,L1	Fuse Module
1	KS-20955 L2	Interconnecting Unit
20	KS-20956 L1	Interconnecting Unit
1	J1A053,E-1	Filter Unit
1	J1C012B-1B,BA	Local Cable (Pos 0)
1	J1C012B-1B,BB	Local Cable (Pos 1)
1	J1C012B-1B,BC	Local Cable (Pos 2)
1	J1C012B-1B,BD	Local Cable (Pos 3)
1	J1C012AC,L1	Drum Storage Unit
1	J1C012AC,L4	Head Bar Assembly
1	J1C012AC,L5	Head Bar Assembly
1	J1C012AC,L6	Head Bar Assembly
1	J1C012AC,L7	Head Bar Assmbly

Equipment

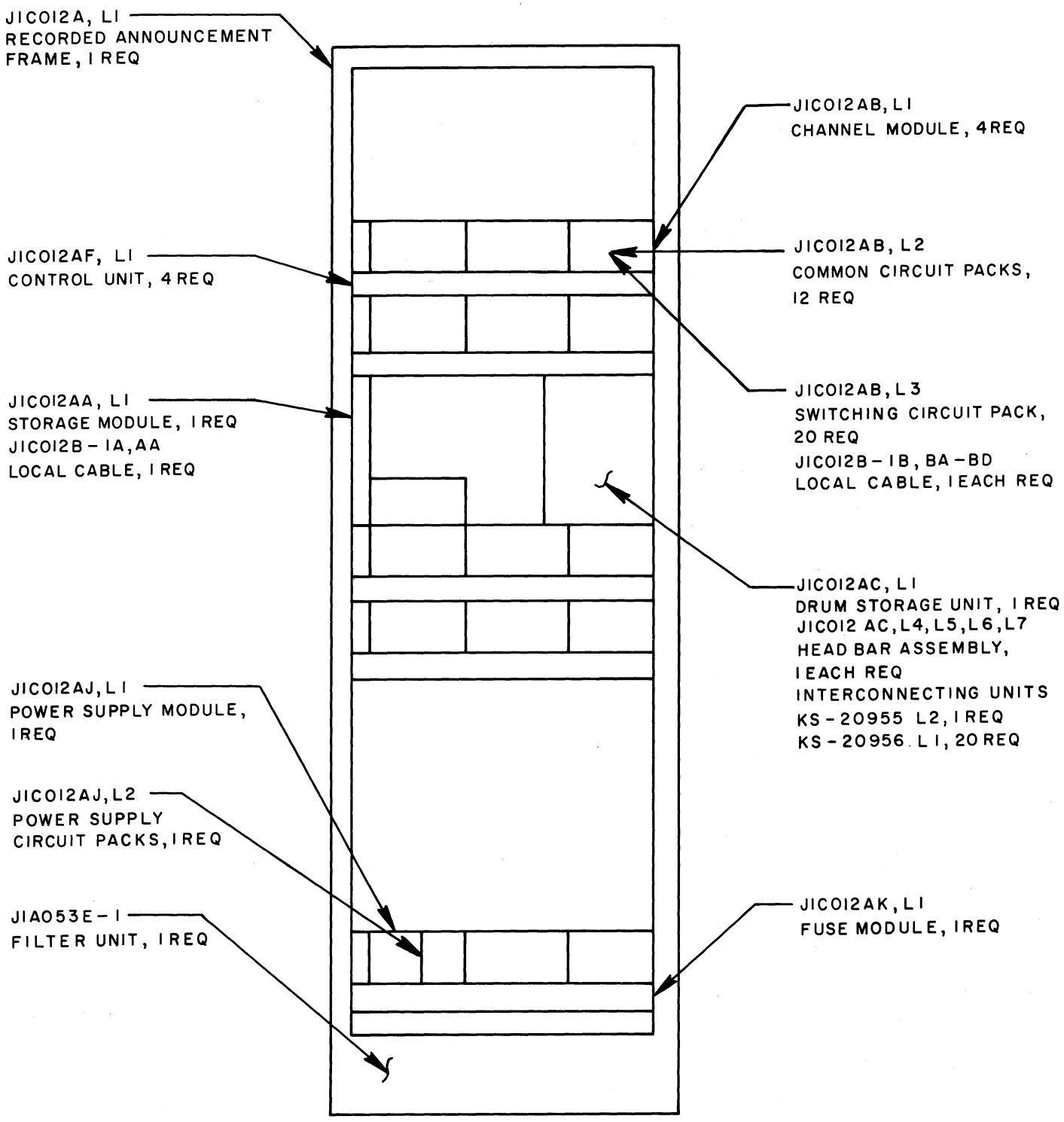
ED-1A150-70G1—Common Systems Electronic — Switching Type Single Bay Frame Assembly and Stock List, 7'=0" High, 1'-0" Deep.
ED-1A157-72—Appliance Outlets
ED-1A192-50—Adapter Details
ED-1B004-( )—Typical Existing Distributing Frame Equipment
ED-1B005-( )—Typical ESS Distributing Frame Equipment
ED-4C013-10—Capacitor Replacement Assembly
ED-91710-70G6—Common Systems Frame — Assembly Angle Type with 10" Sheet Metal Base.

4. EQUIPMENT

4.01 Either the J1C012A or the J1C012B frames may be equipped for the VML, MM, or PML requirements. Sample frames equipped for these services appear as Fig. 24 through 27 and associated tables F through I. The J1C012C frame for MSS service is shown on Fig. 4.

J1C012A—AT&TCo Std—Recorded Announcement Frame

List 1—Framework, assembly, wiring, and common equipment for a Common Systems Recorded Announcement Frame using a 7 foot single bay ESS frame ED-1A150-70,G1. (See notes



SAMPLE FRAME #1

Fig. 24—Variable Length Messages—12 Channels
6 16-Second Channels
4 32-Second Channels
2 48-Second Channels
(See TABLE F)

TABLE G

SAMPLE FRAME 2
PHASED MESSAGES — 6 CHANNELS
(See Fig. 25)

QUAN.	UNIT	TITLE
1	J1C012A,L1	Frame
1	J1C012AA,L1	Storage Module
1	J1C012B-1A,AA	Local Cable
6	J1C012AE,L1	Channel Module — Phased Message
6	J1C012AH,L1	Control Unit — Phased Message
1	J1C012AJ,L1	Power Supply Module
1	J1C012AJ,L2	Power Supply Circuit Packs
1	J1C012AK,L1	Fuse Module
1	KS-20951 L1	Drum Storage Unit (E/W L504320-1, -2)
1	KS-20955 L2	Interconnecting Unit
4	KS-20956 L1	Interconnecting Unit
2	KS-20956 L2	Interconnecting Unit
1	J1A053,E-1	Filter Unit
1	J1C012B-1E,EA	Local Cable (Pos 0)
1	J1C012B-1E,EB	Local Cable (Pos 1)
1	J1C012B-1E,EC	Local Cable (Pos 2)
1	J1C012B-1E,ED	Local Cable (Pos 3)
1	J1C012B-1E,EE	Local Cable (Pos 4)
1	J1C012B-1E,EF	Local Cable (Pos 5)
1	J1C012AC,L1	Drum Storage Unit
1	J1C012AC,L4	Head Bar Assembly
1	J1C012AC,L5	Head Bar Assembly

A and B.) Recorded Announcement Frame Circuit SD-97725-01.

J1C012B—AT&TCo Std—Recorded Announcement Frame

List 1—Framework, assembly, wiring and common equipment for a Common Systems Recorded Announcement Frame using an 11-foot 6-inch single bay bulb angle-type frame similar to ED-91710-70,G6, except with a 12-inch base. Two 7-foot adapters mount on the frame and provide a mounting surface for the equipment that results in a flush front surface with the base of the frame. (See Notes A and B.) Recorded Announcement Frame Circuit SD-97725-01.

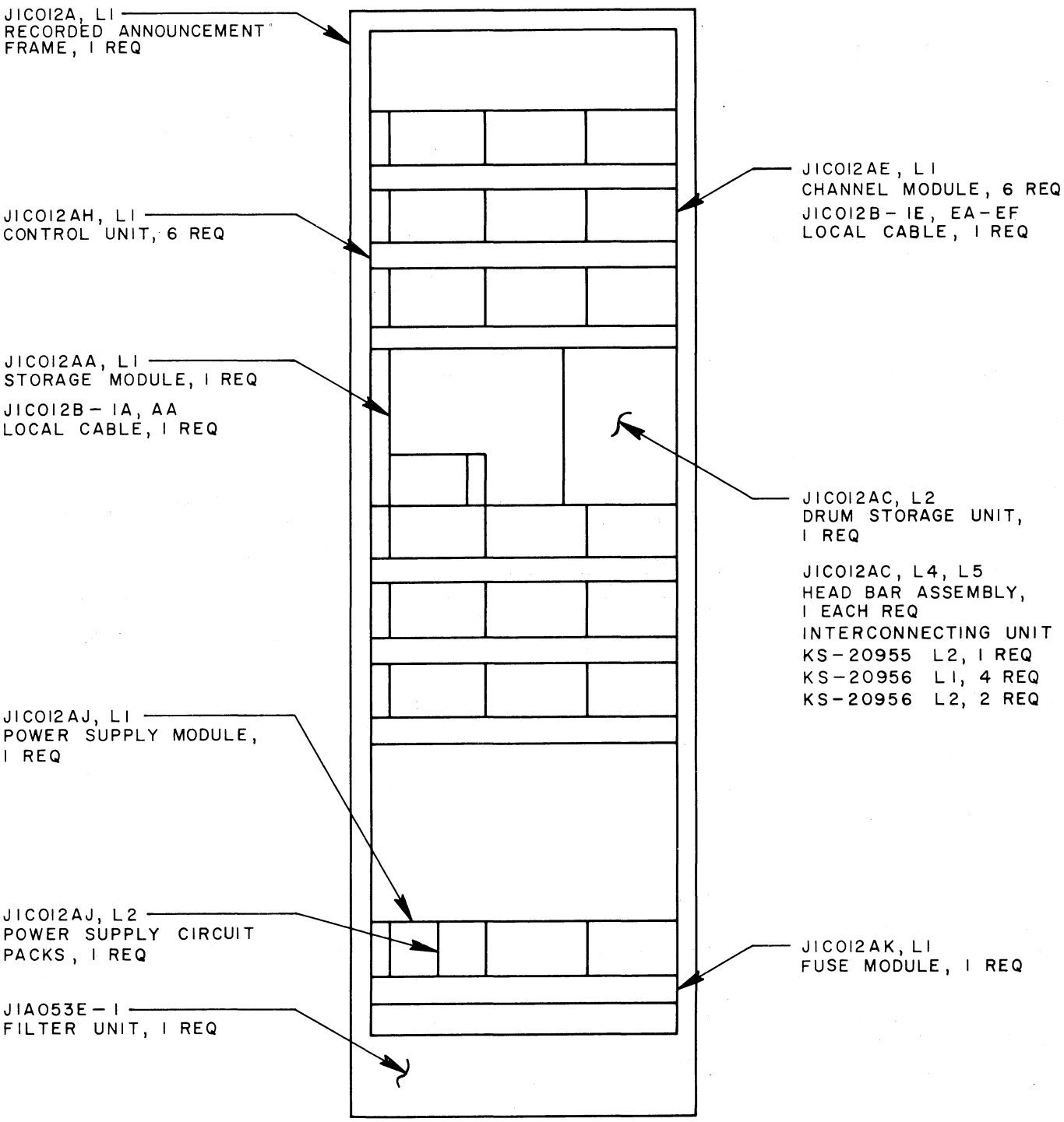
Notes for J1C012A and J1C012B

A. Component units shall be furnished in accordance with Subdivision of Equipment and Detailed Index.

B. One 637-EA13 telephone set must be specified for each recorded announcement frame.

J1C012C—AT&TCo Std—Recorded Announcement Frame for Message Synthesis

List 1—Framework, assembly, wiring and common equipment for a Common Systems Recorded Announcement Frame equipped for Message Synthesis Service including machine 0 and 1.



SAMPLE FRAME #2

Fig. 25—Phased Messages — 6 Channels
(See Table G)

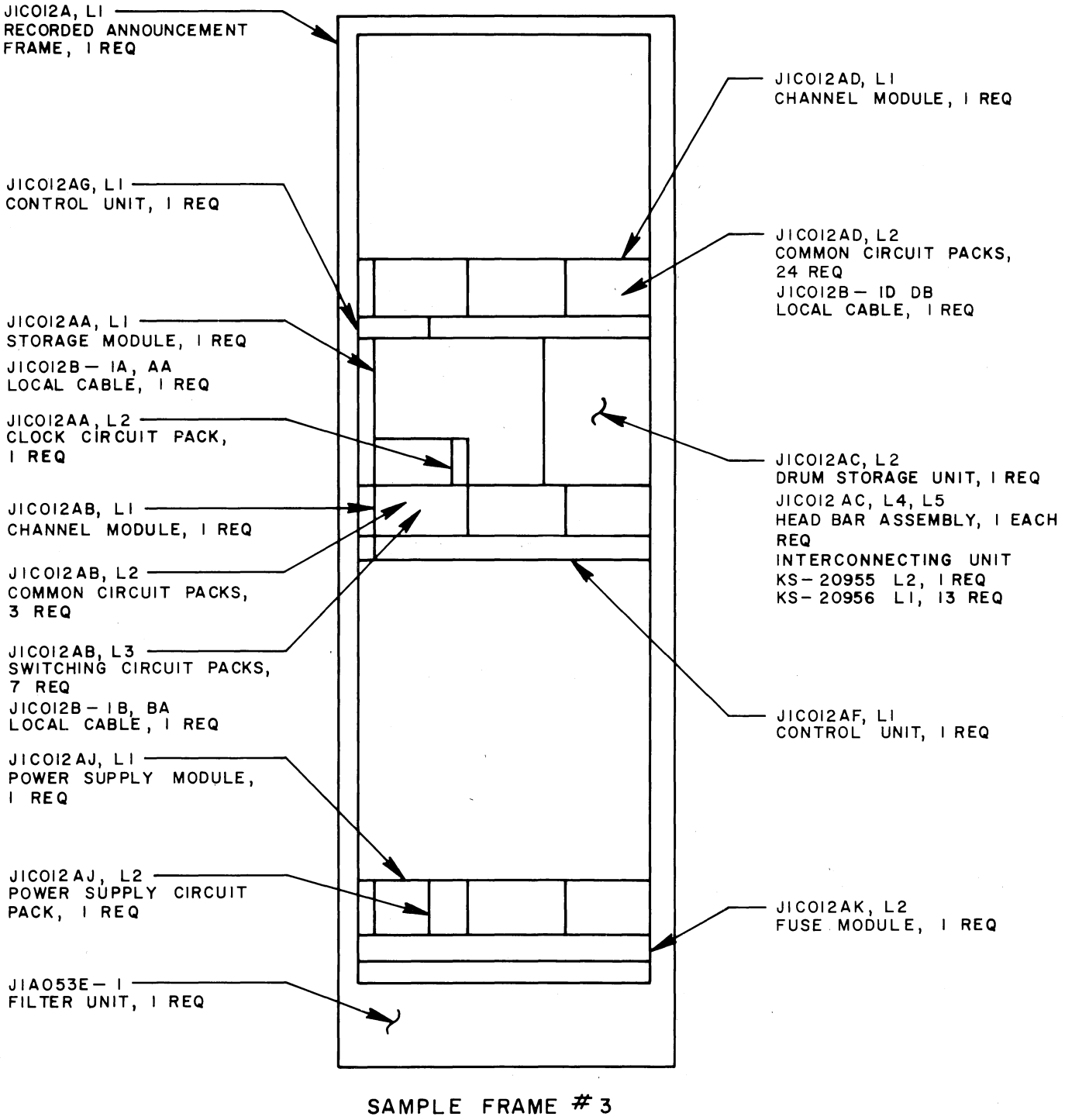


Fig. 26—Variable Length Messages — 3 Channels
2 32-Second Channels
1 48-Second Channel
Modular Messages - 24 Channels
(See Table H)

TABLE H

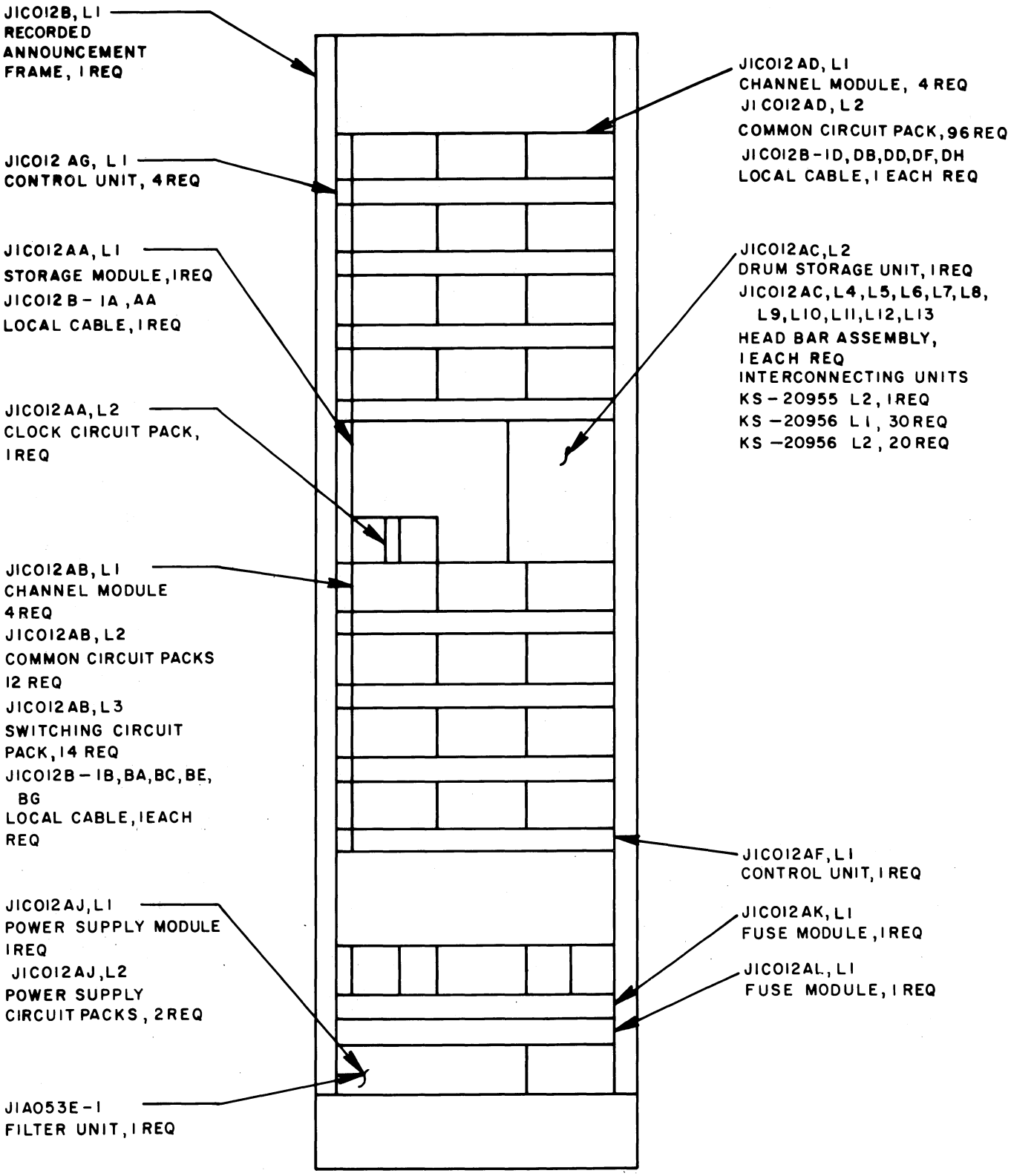
SAMPLE FRAME 3
VARIABLE LENGTH MESSAGES—3 CHANNELS
2 32-SECOND CHANNELS
1 48-SECOND CHANNEL
MODULAR MESSAGES — 24 CHANNELS
(See Fig.26)

QUAN.	UNIT	TITLE
1	J1C012A,L1	Frame
1	J1C012AA,L1	Storage Module
1	J1C012AA,L2	Clock Circuit Pack
1	J1C012B-1A,AA	Local Cable
1	J1C012AB,L1	Channel Module (Variable Message Length)
3	J1C012AB,L2	Common Circuit Packs (Variable Message Length)
7	J1C012AB,L3	Switching Circuit Packs
1	J1C012AD,L1	Channel Module (Modular Message)
24	J1C012AD,L2	Common Circuit Pack (Modular Message)
1	J1C012AF,L1	Control Unit (Variable Message Length)
1	J1C012AG,L1	Control Unit (Modular Message)
1	J1C012AJ,L1	Power Supply Module
1	J1C012AJ,L2	Power Supply Circuit Packs
1	J1C012AK,L1	Fuse Module
1	KS-20955 L2	Interconnecting Unit
13	KS-20956 L1	Interconnecting Unit
1	J1A053,E-1	Filter Unit
1	J1C012B-1B,BA	Local Cable (Position 0)
1	J1C012B-1D,DB	Local Cable (Position 1)
1	J1C012AC,L2	Drum Storage Unit
1	J1C012AC,L4	Head Bar Assembly
1	J1C022AC,L5	Head Bar Assembly

TABLE I

SAMPLE FRAME 4
VARIABLE LENGTH MESSAGES — 12 CHANNELS
6 48-SECOND CHANNELS
2 32-SECOND CHANNELS
4 16-SECOND CHANNELS
MODULAR MESSAGES — 96 CHANNELS
(See Fig. 27)

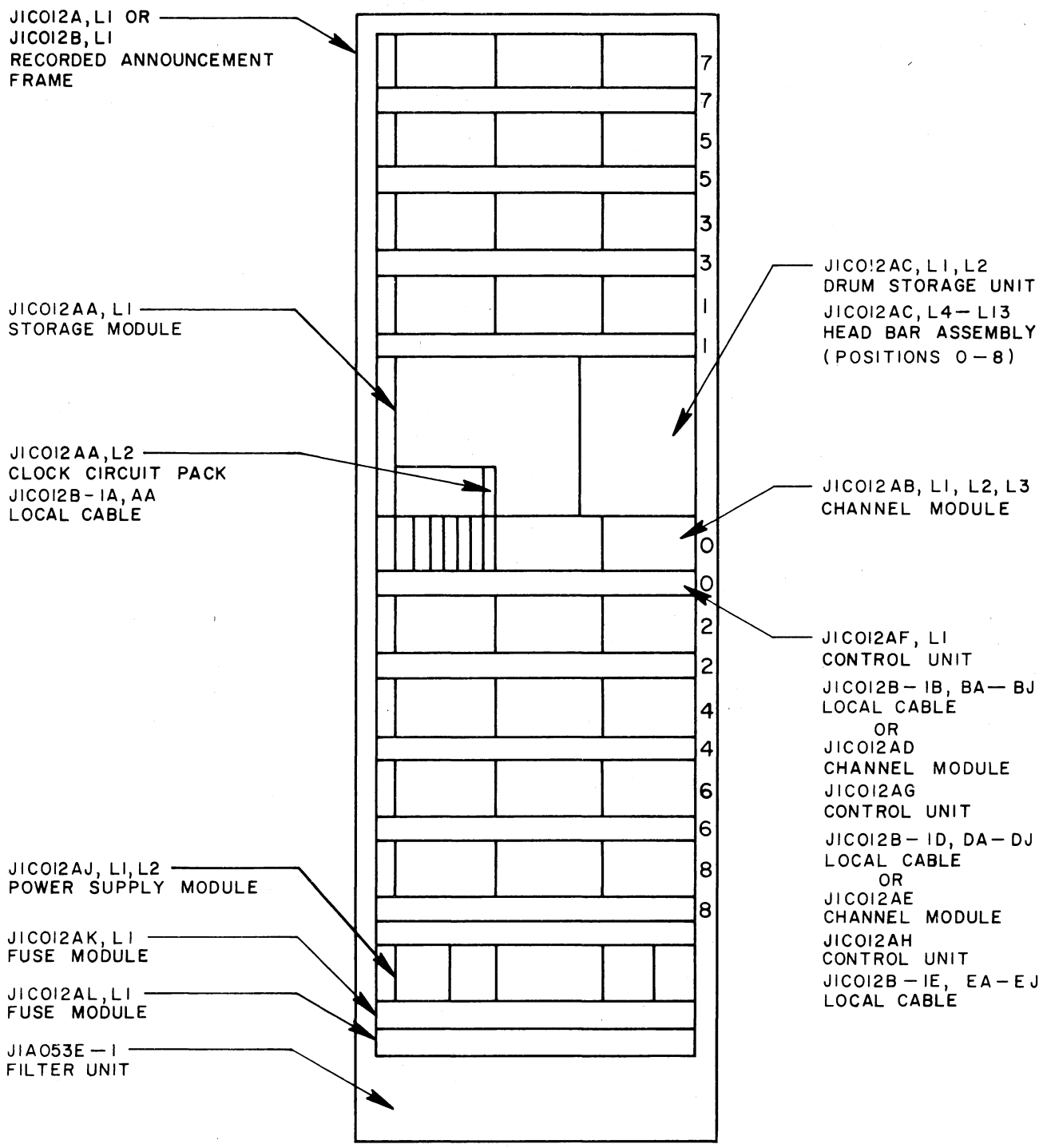
QUAN.	UNIT	TITLE
1	J1C012B,L1	Frame
1	J1C012AA,L1	Storage Module
1	J1C012AA,L2	Clock Circuit Pack
1	J1C012B-1A,AA	Local Cable
4	J1C012AB,L1	Channel Module (Variable Length message)
12	J1C012AB,L2	Common Circuit Packs (Variable Length Message)
14	J1C012AB,L3	Switching Circuit Packs
4	J1C012AD,L1	Channel Module (Modular Message)
96	J1C012AD,L2	Common Circuit Packs (Modular Message)
4	J1C012AF,L1	Control Unit (Variable Length Message)
4	J1C012AG,L1	Control Unit (Modular Message)
1	J1C012AJ,L1	Power Supply Module
2	J1C012AJ,L2	Power Supply Circuit Packs
1	J1C012AK,L1	Fuse Module
1	J1C012AL,L1	Fuse Module
1	KS-20955 L2	Interconnecting Unit
30	KS-20956 L1	Interconnecting Unit
20	KS-20956 L2	Interconnecting Unit
1	J1A053,E-1	Filter Unit
1	J1C012B-1B,BA	Local Cable (Pos 0)
1	J1C012B-1B,BC	Local Cable (Pos 2)
1	J1C012B-1B,BE	Local Cable (Pos 4)
1	J1C012B-1B,BG	Local Cable (Pos 6)
1	J1C012B-1D,DB	Local Cable (Pos 1)
1	J1C012B-1D,DD	Local Cable (Pos 3)
1	J1C012B-1D,DF	Local Cable (Pos 5)
1	J1C012B-1D,DH	Local Cable (Pos 7)
1	J1C012AC,L2	Drum Storage Unit
1	J1C012AC,L4	Head Bar Assembly
1	J1C012AC,L5	Head Bar Assembly
1	J1C012AC,L6	Head Bar Assembly
1	J1C012AC,L7	Head Bar Assembly
1	J1C012AC,L8	Head Bar Assembly
1	J1C012AC,L9	Head Bar Assembly
1	J1C012AC,L10	Head Bar Assembly
1	J1C012AC,L11	Head Bar Assembly
1	J1C012AC,L12	Head Bar Assembly
1	J1C012AC,L13	Head Bar Assembly



SAMPLE FRAME #4

6 48-Second Channels
2 32-Second Channels
4 16-Second Channels
Modular Messages —96 Channels
(See Table I)

Fig. 27—Variable Length Messages—12 Channels



SEE SUBDIVISION OF EQUIPMENT AND DETAILED INDEX

Fig. 28—Recorded Announcement Common Systems (See Table F)

J1C012AA—AT&TCo Std—Storage Module

List 1—Assembly, wiring, and equipment for one storage module providing a mounting location for the J1C012AC Drum Storage Unit, common controls and voltage test points for the frame, circuit packs for the motor servo, and circuit packs for the oscillator, and one clock. Recorded Announcement Frame Circuit SD-97725-01.

List 2—Equipment required in addition to list 1 to provide an additional clock circuit pack for Modular Message operation.

Note:

A. Storage Module excludes the J1C012AC (KS-20951) Drum Storage Unit and CP6 (SD-97724-01) clock circuit.

J1C012AB—AT&TCo Std—Channel Module (Variable Message Length)

List 1—Assembly, wiring, and equipment for one Variable Message Length Channel module. There are a maximum of 3 channels per module (0-2) and a maximum of 9 modules per frame in positions (0-8). Recorded Announcement Frame Circuit SD-97725-01.

List 2—Equipment (circuit packs) required in addition to list 1 to provide the four common circuit packs required per channel. One list 2 is required per channel with a maximum of 3 per channel module. Recorded Announcement Frame Circuit SD-97725-01.

List 3—Required in addition to list 2 to provide control of 4 magnetic heads or 16 seconds of recorded information per card in channel 0. At least one required per channel with a maximum of 3 in each channel in the list 1 Channel Module. (See Equipment Summary Notes A and B.)

Local Cable for Variable Length Message Channel Modules.

The list number defines the cable shape for the frame position of the channel module.

Associated Local Cable J1C012B-1B

LIST	FRAME POSITION
BA	0
BB	1
BC	2
BD	3
BE	4
BF	5
BG	6
BH	7
BJ	8

Note

A. Channel Module excludes all circuit packs.

J1C012AC—AT&TCo Std—Drum Storage Unit

Assembly, wiring, and equipment arranged for a maximum of 800 seconds of recorded information. The capacity of the DSU is increased in increments of 80 seconds by the addition of a head bar assembly. The heads are accessed in groups of 4 each, to provide 16 seconds of recorded information.

List 1—Provides a Drum Storage Unit equipped to provide a clock pulse once per revolution of the drum or one every 4 seconds. The list 1 DSU can be used with Phased and Variable Message Length channel modules, but not with Modular Message channel modules.

List 2—Provides Drum Storage Unit equipped to provide 3 clock pulses for each revolution of the drum, or a pulse every 1.33 seconds in addition to the single clock pulse per revolution furnished in list 1. The list 2 DSU is required when a Modular Message channel module is used in the frame, but it can also be used for Phased and Variable Message Length channel modules.

List 3—Provides a drum storage unit used as a reproducer of prerecorded announcements capable of using 96 tracks from the KS-20952 prerecorded magnetic drum. The list 3 DSU has a period of revolution of 3 seconds with 2 timing pulses one at 0.5 seconds and another at 1.5 seconds. The list 3 DSU is used in Message synthesis only in the J1C012C frame which comes fully equipped except for prerecorded drum, KS-20952 which must be ordered separately with the locality information to be recorded on 48 tracks specified for each installation.

List 4 through List 13—Head Bar Assemblies arranged for mounting 20 magnetic heads on either the list 1 or list 2 DSU. Only one of each of the list 4 through list 13 can be

mounted on a DSU with a maximum of 10 head bars. The list number fixes the location of the head bar assembly on the DSU.

TIME (Sec)	NO. OF HEADS	HEAD BAR ASSEMBLIES
80	20	L4
160	40	L4,L5
240	60	L4,L5,L6
320	80	L4,L5,L6,L7
400	100	L4,L5,L6,L7,L8
480	120	L4,L5,L6,L7,L8,L9
560	140	L4,L5,L6,L7,L8,L9,L10
640	160	L4,L5,L6,L7,L8,L9,L10,L11
720	180	L4,L5,L6,L7,L8,L9,L10,L11,L12
800	200	L4,L5,L6,L7,L8,L9,L10,L11,L12,L13

J1C012AD—AT&TCo Std—Channel Module

List 1—Modular Message Assembly, wiring, and equipment for one channel module unit arranged for Modular Messages (24 maximum).

List 2—Equipment required in addition to L1 to provide common circuit packs. One required per channel with a maximum of 24 per channel module. (See Equipment Summary Note C)

Local cable for Modular Message Channel Module.

The list number defines the cable shape for the frame position of the channel module.

Associated Local Cable J1C012B-1D

LIST	FRAME POSITION
DA	0
DB	1
DC	2
DD	3
DE	4
DF	5
DG	6
DH	7
DJ	8

Note

A. List is similar to J1C012AB,L1 in construction and contains no circuit packs.

J1C012AE—AT&TCo Std—Channel Module

List 1—Phased Message Assembly, wiring equipment, and circuit packs for one channel module arranged for one 12-second message. Phased on 4-second intervals. (See Equipment Summary Note D.)

Local cable for Phased Message Channel Module.

The list number defines the cable shape for the frame position of the channel module.

Associated Local Cable J1C012B-1E

LIST	FRAME POSITION
EA	0
EB	1
EC	2
ED	3
EE	4
EF	5
EG	6
EH	7
EJ	8

A complete unit contains the mounting and the following circuit packs for one channel of four phases (See Fig. 12).

AMT	CODE	SCHEMATIC DESIGNATION
1	A1015	(CPS4)
4	A1013	(CPS2)
4	A1014	(CPS3)
4	A1016	(CPS5)
4	A1020	(CPS9)

J1C012AF—AT&TCo Std—Control Unit

List 1—Variable Message Length Assembly, wiring, and equipment for one control unit arranged for control of maximum of three channels of Variable Message Length.

J1C012AG—AT&TCo Std—Control Unit

List 1—Modular Message Assembly, wiring, and equipment for one control unit arranged for control of a maximum of 24 channels of Modular Messages.

J1C012AH—AT&TCo Std—Control Unit

List 1—Phased Message Assembly, wiring, and equipment for one control unit arranged for control of one channel of a 4-Phased Message.

J1C012AJ—AT&TCo Std—Power Supply Module

List 1—Assembly, wiring, and equipment for one power supply module to accept circuit packs to provide either a 100-watt supply or a 200-watt supply.

List 2—Power Supply circuit packs each list 2 to contain one 70B-Power unit (inverter) and one 71H-power unit (rectifier filter). One list 2 is required for a frame with a maximum of 4 channel modules and two L2 are required for a frame with more than 4 channel modules.

J1C012AK—AT&TCo Std—Fuse Module

List 1—Assembly, wiring, and equipment arranged for fusing channel modules 0 through 3: 1 to 12 channels of Variable Message Length or 4 Phased Message, or 1 to 96 channels of Modular Message.

List 2—Similar to list 1 with a different bus bar arrangement, used in addition to list 1 when frame is equipped with more then 4 channel modules.

J1C012AL—AT&TCo std—Fuse Module

List 1—Assembly, wiring, and equipment arranged for fusing additional channels beyond the capacity of J1C012AK,L1 and should be used in addition to J1C012AK,L1.

4.02 A multiple conductor flat cable terminated in a female connector on each end is used to interconnect the storage module with the drum storage unit for power and control. — ***KS-20955 L2 Interconnecting Unit***

4.03 A multiple conductor flat cable terminated in a female connector on each end is used to interconnect the magnetic heads in the drum storage unit with the switching circuit packs in the channel modules.

— KS-20956 L1 Interconnecting Unit, positions 0-3

— KS-20956 L2 Interconnecting Unit, positions 4-8

Equipment Summary Notes

A. The engineer shall order local cable associated with the position of the channel module in the frame.

B. For VML the engineer shall order one KS-20956 Interconnecting Unit for each L3 circuit pack. KS-20956 L1 is ordered for channel modules in frame positions 0 through 3; and KS-20956 L2 is ordered for channel modules in frame positions 4 through 8.

C. For MM the engineer shall order one KS-20956 Interconnecting Unit for each four L2 common circuit packs (A1019). List number of KS-20956 depends on the position of the channel module in the frame.

D. For PM the engineer shall order one KS-20956 Interconnecting Unit for each J1C012AE channel module. List number of KS-20956 depends on the position of the channel module in the frame.

5. GENERAL NOTES AND INDEXES

5.01 SD drawings and associated CDs are to be shipped in bound form with the product. The issues of the SDs and CDs shall reflect all changes in the product as shipped.

5.02 Codes J1C012D through J1C012Y and codes J1C012AM through J1C012AY are unassigned.

5.03 The gauge and type of wire furnished for the recorded announcement frame shall conform to the requirements of ED-1B000-01.

5.04 A 637 EA13-type standard CALL DIRECTOR® is required for each announcement frame except the MSS type frame. When the CSRAF is equipped for more than 16 channels, two additional 635G5C keys can be added to provide for 12 additional channels, or a maximum of 28 channels.

5.05 A volume indicator and a KS-19725 L2 Audio Monitor are needed to set the levels of the amplifiers in J1C012C for MSS. For J1C012A and B a 23D Transmission Measurement Set is used.

SUBDIVISION OF EQUIPMENT AND DETAILED INDEX

EQUIPMENT CODE	AT&T RATING OF UNIT	TITLE	EQUIPMENT DRAWING	CIRCUIT DRAWING	CODE LIST	MINIMUM QUANTITY REQUIRED	QUANTITY FOR OPTION	POSITION
J1C012A	Std	Recorded Announcement Frame (7 ft. High)	J1C012A-( )	SD-97725-01		Frame		
J1C012B	Std	Recorded Announcement Frame (11 Ft High)	J1C012B-( )	SD-97725-01		Frame		
J1C012C	Std	Recorded Announcement Frame for Message Synthesis	J1C012C-( )	SD-97725-02		Frame		
J1C012AA	Std	Clock CKT Pack	J1C012AA-( )	SD-97725-01	2	1		
		Storage Module			1			
J1C012AB	Std	Switching CKT Pack	J1C012AB-( )	SD-97725-01	3,4,5	*	*	0-8
		Common CKT Pads			2			0-8
		Chan Mod—Var Length MSG (48 Sec Max)			1			0-8
J1C012AC	Std	Head Bar Ass'y	J1C012AC-( )	SD-97723-01	4-13			
		Drum Storage Unit (KS-20952)			3	†		
		Drum Storage Unit (KS-20951)			2	*		
		Drum Storage Unit (KS-20951)			1			
J1C012AD	Std	Chan Mod— Common Ckt Pack	J1C012AD-( )	SD-97725-01	2	*	*	0-8
		Chan Mod— Modular Ckt Pack			1			0-8
J1C012AE	Std	Chan Mod— Phased Message	J1C012AE-( )	SD-97725-01	1	*	*	0-8
J1C012AF	Std	Control Unit— Var Length Message	J1C012AF-( )	SD-97725-01	1	*	*	0-8
J1C012AG	Std	Control Unit— Modular Message	J1C012AG-( )	SD-97725-01	1			0-8

EQUIPMENT CODE	AT&T RATING OF UNIT	TITLE	EQUIPMENT DRAWING	CIRCUIT DRAWING	CODE LIST	MINIMUM QUANTITY REQUIRED	QUANTITY FOR OPTION	POSITION
J1C012AH	Std	Control Unit—Phased Message	J1C012AH-( )	SD-97725-01	1			0-8
J1C012AJ	Std	Power Supply Module Ckt Packs	J1C012AJ-( )	SD-97725-01	2	1	*	
		Power Supply Module			1	1		
J1C012AK	Std	Fuse Module Chan Mods D-3	J1C012AK-( )	SD-97725-01	1	1		
J1C012AL	Std	Fuse Module Chan Mods 4-8	J1C012AL-( )	SD-97725-01	1			
J1C012B-1A	Std	Local Cable	J1C012B-1A-( )			*	*	
J1C012B-1B	Std	Local Cable	J1C012B-1B-( )			*	*	
J1C012B-1D	Std	Local Cable	J1C012B-1D-( )			*	*	
J1C012B-1E	Std	Local Cable	J1C012B-1E-( )			*	*	

* At least one channel module and control unit is required. A maximum of nine (0-8) may be intermixed.

† At least one drum storage unit is required and one head bar assembly except for L3 which comes equipped.

Circuit Schematic Index

CIRCUIT DRAWING	J1C012 EQPT CODE
SD-97723-01	AC
SD-97724-01	A
SD-97725-01	A,B
SD-97725-02	C

Bell Telephone Laboratories, Incorporated

Dept 2452