PHASED ANNOUNCEMENT SYSTEM

THEORY

4 *ESS*™ SWITCH

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1. GENERAL

INTRODUCTION

1.01 This practice describes how the PAS (Phased Announcement System) operates in the 4 ESS switch. Part 7 provides a list of abbreviations and acronyms used in this practice.

1.02 Whenever this practice is reissued, the reason(s) for reissue will be provided in this paragraph.

1.03 This issue of the practice is based on the following drawings:

NE-00291-10, Issue 1

NJ-00291A-1, Issue 1

NS-00291-01, Issue 1

NT-00291-31, Issue 1.

If this practice is to be used with equipment or apparatus reflecting later issue(s)of the drawings, reference should be made to the drawings to determine the extent of the changes and the manner in which the practice may be affected.

PURPOSE OF THE PHASED ANNOUNCEMENT SYSTEM

1.04 The PAS is a solid-state recorded announcement frame which provides phased message service. It has a maximum capability of 20 nonbarge-in messages. These messages inform the calling party of why the call was not completed and of the action to be taken. The PAS communicates through connectorized cable sets with the 4 ESS switch. Some of these cables connect to the SP (Signal Processor) 1 or 2. Others connect through the MF (Multifrequency) Signaling Frame to the VIU (Voiceband Interface Unit) or D4 Channel Bank.

1.05 The PAS in the 4 ESS switch provides solid-state, analog-to-digital conversion, recording and storage of audio announcements, and digital-to-analog playback of audio announcements for heavy duty continual operation. The PAS frame provides:

- Unique announcement messages which tell the calling party why a call was not completed and what further action(s) should be taken
- Up to 20 nonbarge-in type messages, each with a maximum waiting time of 4 seconds before an announcement starts.

1.06 The PAS frame is composed of the following major items of equipment:

- Record Module - One per PAS frame
- Playback Module - One per announcement
- Monitor Module - One per PAS card cage
- Control Unit - One per PAS frame
- Interface Panel - One per PAS application.

The PAS frame in the 4 ESS switch environment is equipped with up to 20 playback modules divided between two card cages.

1.07 For a single announcement to be provided by the 4 ESS switch via the PAS, a playback module, control unit, and record module are required. The record module, containing its own solid-state mem-

ory and analog-to-digital components, provides interim announcement storage and timing prior to loading the digitized message into memory on a playback module.

1.08 Besides providing message digitization and memory storage, a playback module also provides additional control, such as mode of operation, voice alarm, and phase playback.

PRACTICE REFERENCES

1.09 The following information should be read before proceeding with Parts 2 through 4 of this practice: This practice provides only the necessary details to enable the reader to understand the use of the PAS in the 4 ESS switch environment. Additional practice references are listed in Part 6.

2. PHASED ANNOUNCEMENT SYSTEM INTERFACES

GENERAL

2.01 Figure 1 shows a block diagram of the interfaces between the PAS and the:

- VIU (Voiceband Interface Unit)
- D4 channel bank
- SP (Signal Processor) 1 or 2
- Power distribution system
- Office alarm system.

2.02 Transmission and monitoring of the recorded announcement is accomplished by connection to a VIU or D4 channel bank via 4-wire voice frequency lines (Fig. 2).

2.03 Communication between the PAS and the SP 1 or 2 (detailed in Part 3) is accomplished via SP 1 or 2 scan points and SD (Signal Distributor) points (Fig. 3).

2.04 The −48 volts for the PAS is furnished by the power distribution system. Connection to the 4 ESS switch alarm system for major PAS malfunction is provided.

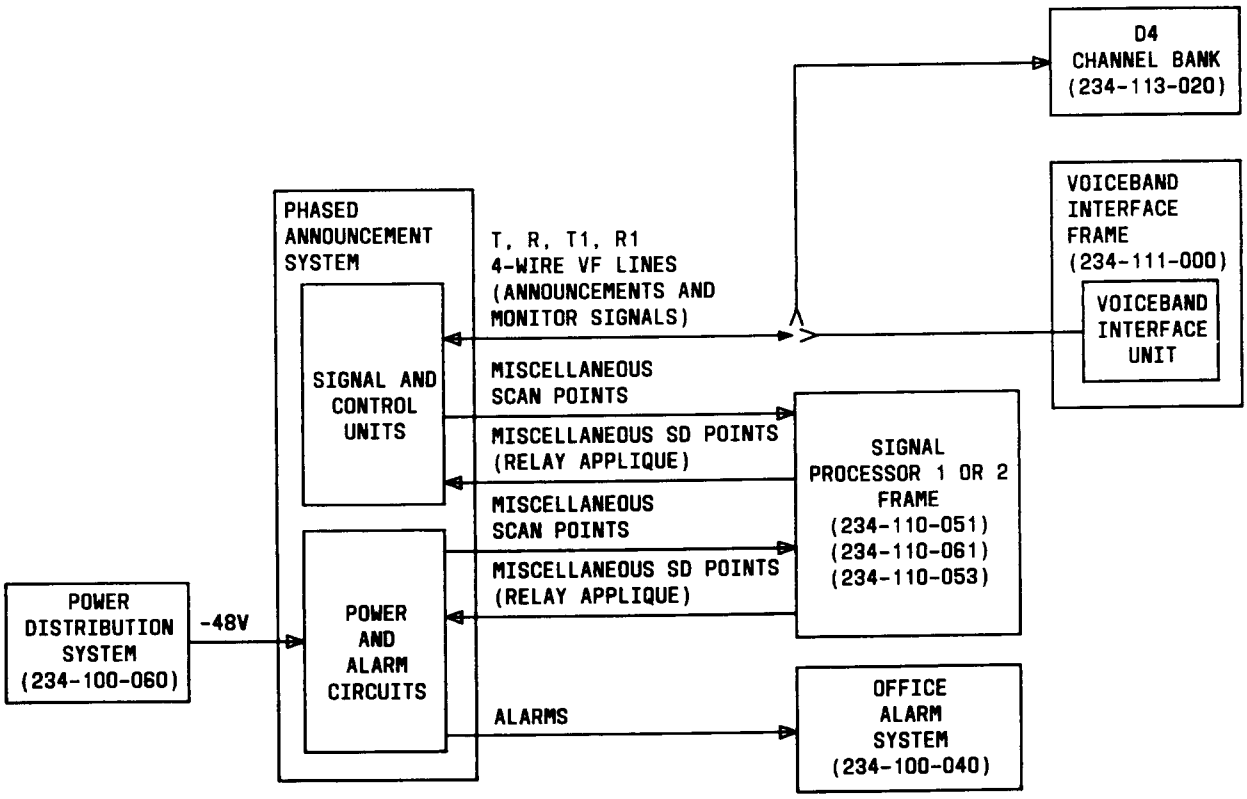

Fig. 1—Phased Announcement Frame—Functional Interface Diagram

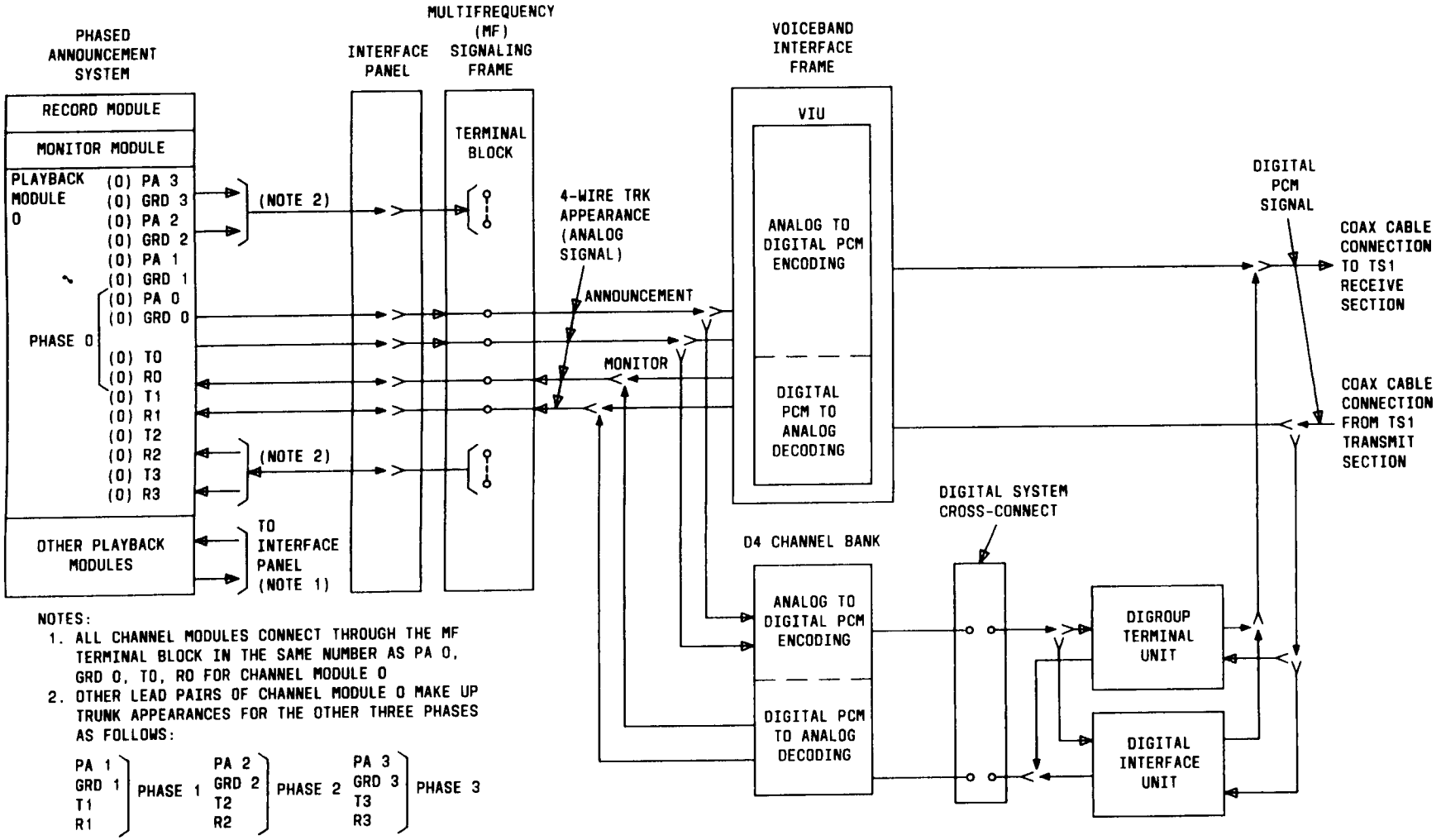

Fig. 2—Phased Announcement System—Phased Message Connections to TDNET (Time Division Switching Network)

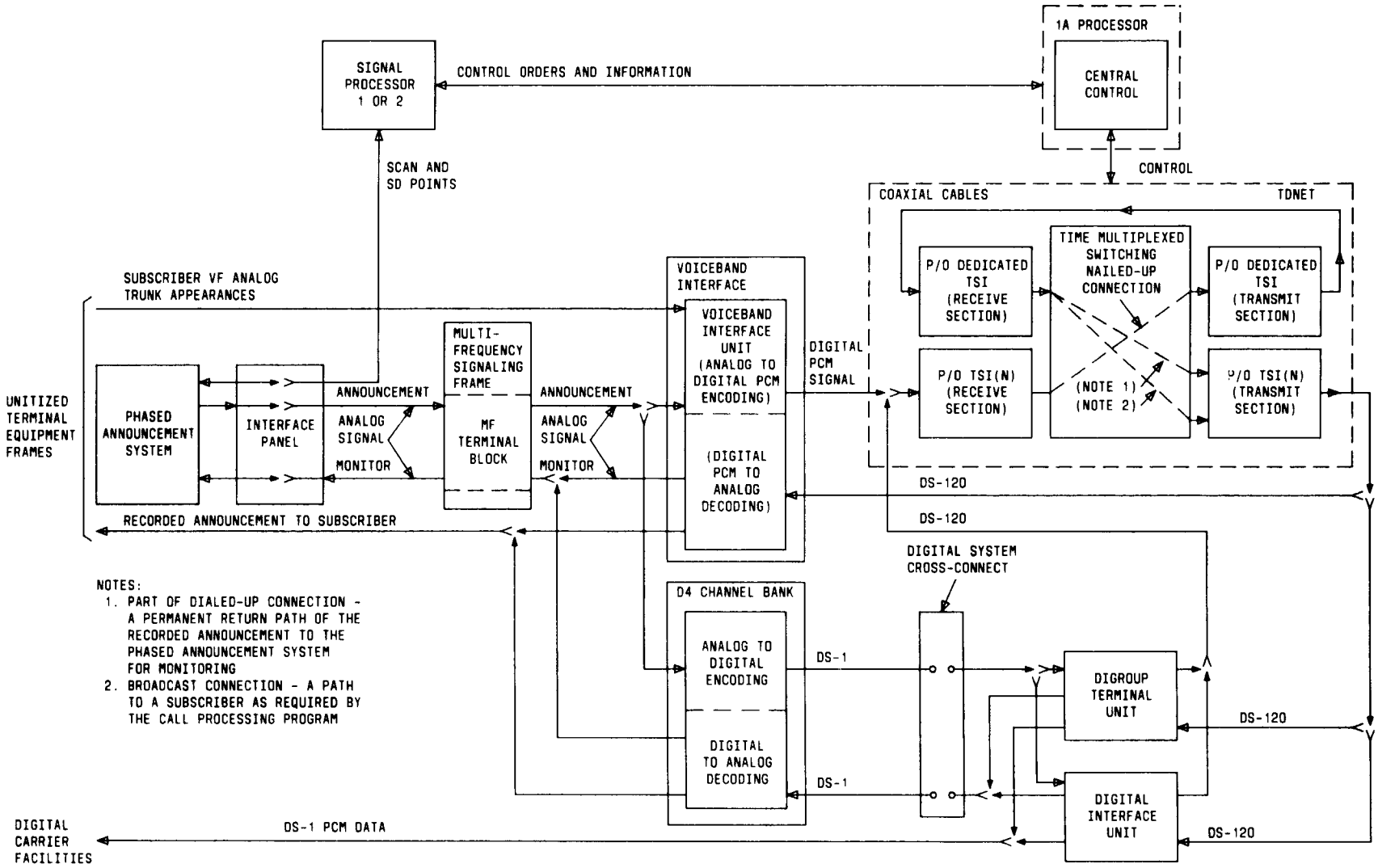

Fig. 3—Phased Announcement System—Distribution System (Simplified)

2.05 A digitized 1000-Hz reference tone, located in the playback module, serves as a test signal in support of routine maintenance and troubleshooting.

3. THEORY—SIGNAL AND CONTROL UNITS

3.01 Figure 4 illustrates the three major components which make up the PAS. The frame contains a message record module that is shared by all playback modules and the control unit. The record module interfaces similarly to each of the playback modules.

3.02 The major functions of the PAS are to:

- Provide the announcement signal output from the playback module(s) for distribution to subscribers via the VIU (Voiceband Interface Unit) or D4 channel banks and TDNET (Time Division Network)
- Check the DMUX (Demultiplexed) audio monitor signal input to the playback module to insure that it is within prescribed limits.

3.03 Record and playback features are available at the frame and/or remotely at the dedicated CALL DIRECTOR telephone.

SCAN AND SD POINTS

3.04 Software control of the 4 ESS switch PAS is accomplished by SP (Signal Processor) 1 or 2 scan and SD (Signal Distributor) points. The SP 1 or 2, in turn, is controlled by the central control in the 1A Processor.

3.05 Scan points communicate information when the external path of a current loop connected to the SP 1 or 2 is either open or closed. The opening or closing of the external path can be initiated manually by operating a switch or autonomously by optoisolator operation. The SD points in the SP 1 or 2 produce relay operations which control and initiate frame and channel functions.

A. Scan Points

3.06 The SP 1 or 2 scan points provide the following types of information:

(a) A request has been made for the RAMP (Recorded Announcement Machine Program) to test all alarm logic circuits within the PAS frame.

(b) A change in the power state of the PAS frame has occurred.

(c) The audio level of an announcement phase has fallen below a predetermined limit.

(d) The request-to-record function has been activated on an announcement channel or a channel select pushbutton on the dedicated CALL DIRECTOR telephone which has been depressed.

(e) The ROS (Request Out-of-Service) switch has been operated on the control unit for the associated playback module.

(f) A 4-second closure has occurred indicating which phase of each announcement is in the silent interval.

3.07 The three basic types of scan points connected to the PAS relate to:

- An entire PAS
- Each playback module
- One phase of the announcement.

Scan Points—Frame

3.08 The following information is provided by SP 1 or 2 scan points relative to the entire PAS frame:

(a) A clock pulse scan point provides a 100-ms closure every 4 seconds. This clock pulse is used by the RAMP to increment the phases of all active announcements.

(b) An alarm test scan point indicates the state of the manually operated VOICE ALARM TEST switch located on the control panel. A closure of the switch requests the RAMP to test all alarm logic circuits on the PAS (all channels).

(c) Two additional scan points, in conjunction with the FA (Fuse Alarm) relay and

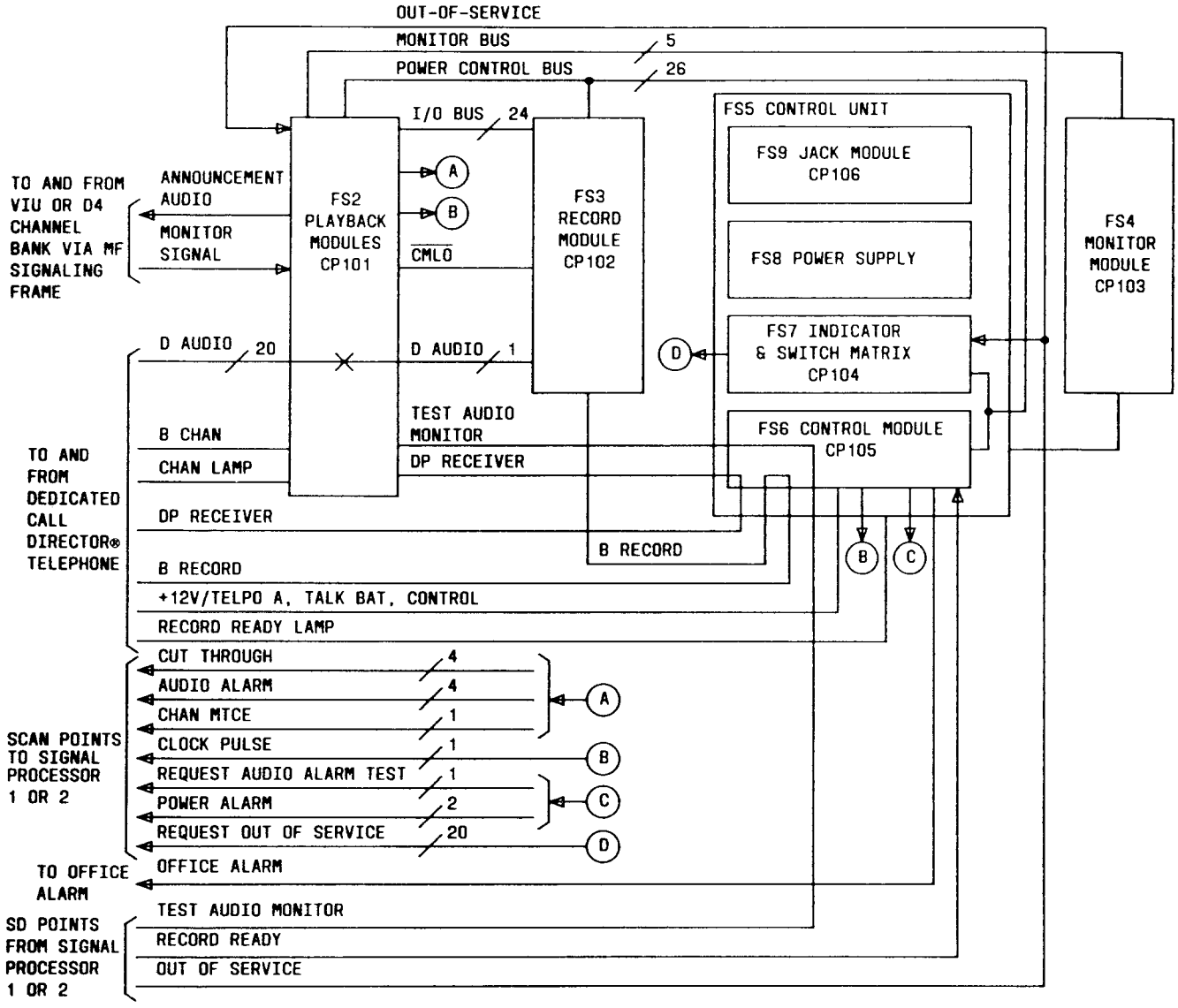

Fig. 4—Phased Announcement System (NS-00291-01)—Functional Diagram

control unit power switches [i.e., master POWER, playback module POWER, and REC (Record) switches] indicate the power status of the frame.

Scan Points—Playback Module

3.09 The following are SP 1 or 2 scan points that relate to each of the playback modules:

(a) One channel maintenance scan point is available for each playback module. A closure signal to the scan point indicates a request to record on the record module, either from the PAS frame or from the dedicated CALL DIRECTOR telephone. The closure can be activated manually by operating the channel select pushbutton on the dedicated telephone. This also causes the REMOTE ACCESS LED (Light-Emitting Diode) indicator on the record module to light. This indicates to operating personnel at the frame that someone at the dedicated CALL DIRECTOR telephone is recording or monitoring an announcement. The lighted LED indicator warns operating personnel to proceed with caution.

(b) Each playback module has an ROS scan point. The scan point receives a closure signal when the ROS switch is manually operated on the control unit. The closure is a request to the RAMP to remove the playback module from service.

Scan Points—Single Phase

3.10 The following are SP 1 or 2 scan points which relate to a single phase:

(a) Four cut-through scan points are available, for each announcement, one for each announcement phase 0 through 3. (Cut-through operation means that the associated phase is in the silent interval.) Only one of the four scan points should be operated at a time. This scan point indicates the phase of the announcement to which a subscriber should be connected to insure a nonbarge-in announcement.

(b) Four audio alarm scan points are also assigned to each channel, one for each announcement phase 0 through 3. These normally closed scan points notify the central control, via the SP 1 or 2, when a loss of audio has been detected by the monitor circuits. The scan points open to indicate a failure.

B. SD Points

3.11 The central control, via the SP 1 or 2 SD points, controls and changes the state of the PAS frame. The SD points perform the following functions:

- Operate the playback module OS LED indicator on the control unit to indicate the channel has been removed from service
- Operate the record lamp on the dedicated telephone.

3.12 The two basic types of SD points connected to a PAS either relate to the entire frame or to a single channel.

SD Points—Frame

3.13 The following SD points relate to the frame:

(a) The record ready SD point, via the control unit, operates the lamp under the record pushbutton on the dedicated CALL DIRECTOR telephone. The lighted lamp indicates that the channel selected, either at the frame or dedicated telephone, has been removed from service by the RAMP and may now be used for recording.

(b) The test audio monitor SD point is operated as a result of manual operation of the VOICE ALARM TEST switch on the control unit. Operation of this SD point tests the level detecting portion of the audio alarm logic circuits on the playback modules.

SD Points—Single Channel

3.14 Each channel has an OS SD point. When operated at the SP 1 or 2, the SD point lights the OS LED indicator on the control unit. The lighted LED indicator is an indication that the RAMP has removed the channel from service.

4. FUNCTIONS OF PHASED ANNOUNCEMENT SYSTEM—SIGNAL AND CONTROL CIRCUITS

RECORD MODULE

4.01 The three functions of the record module are to:

- Perform a record session
- Supervise a record session
- Monitor a record session.

4.02 The record module consists of audio filtering, A-to-D conversion and digital storage circuitry. The record module also contains an 8-bit CPU (Central Processing Unit), with associated I/O (Input/Output) data pathways and CPU memory for control code storage.

4.03 The record module processes and supervises record session messages, either from the dedicated CALL DIRECTOR telephone or from a tape recorder, by digitizing and processing them for eventual storage in one of the playback modules.

4.04 The record module communicates with the playback modules via the I/O channel which links together all playback modules with the record module.

4.05 Each playback module contains a 1000-Hz tone source for maintenance and/or calibration. A TMS (Transmission Measuring Set) or equivalent test instrument can be used to set the output level of the four phases.

4.06 The 8-bit microprocessor is supported by a PROM (Programmable Read Only Memory) for running the operating system and a separate scratch-pad memory for temporary command storage. Messages are temporarily stored in 48k bytes of RAM (Random Access Memory) on the record module before being transferred to the selected playback module.

4.07 Message transfer is accomplished via the I/O channel. The I/O channel consists of:

- A common data path
- A command path
- A common address path.

4.08 The rate for voice (or tone) to be digitized is 8 kHz. At this rate, an 8-bit sample is produced. The sample is further compressed to 4 bits and a weighting bit applied by an integrated circuit which applies ADPCM (Adaptive Delta Pulse Code Modulation) techniques to the message to synthesize and prepare it for RAM storage.

4.09 The ADPCM integrated circuit samples at a 4-kb/s rate to support the 12-second message for conversion to 48 k.

4.10 The record session can be performed two ways:

- By using the dedicated telephone
- Locally via a tape recorder.

The session synchronizes the starting and stopping of messages so that the proper 12-second record interval can capture the message. When the dedicated telephone is used, this interval is created by lighting the record lamp on the dedicated telephone and by lighting the RECORD LED indicator on the record module. This action signifies to the craftsperson that he or she may begin speaking. To record from a tape recorder, the craftsperson must also wait for the record lamp to light before playing the prerecorded message.

4.11 Once the message has been transferred to the record module, it can be passed to one of the playback modules via a unique user-selected address. The record module will monitor the status of the playback module before passing the digitized message to it.

PLAYBACK MODULE

4.12 Each of the playback modules located in the PAS has three states of operation as follows:

(a) ***Active:*** In the playback mode, provides the announcement for customer connection.

(b) ***Out-of-Service:*** Not available for customer use. For maintenance, recording in progress, or faulty unit.

(c) ***Growth:*** Not available for customer use. State used when adding a new playback module to a PAS. For testing and verifying that the new playback module works before turning it up for system use.

4.13 Each playback module contains the following circuits which are required in the record or playback mode as follows:

- Playback amplifier
- Alarm logic
- DMUX audio amplifier.

4.14 Each playback module contains the circuitry necessary to play back a single unique announcement. During playback, four phases of the announcement are transmitted to the VIU or D4 channel bank via the MF signaling frame (Fig. 5). Each phase contains the same message shifted (displaced) 4 seconds in time with respect to the preceding announcement message.

4.15 Like the record module, each playback module incorporates an 8-bit CPU and control PROM for the operating system. Each playback module is equipped with 48 k bytes of message storage that can be RAM or, optionally, PROM for storage of fixed messages.

4.16 The playback module connects to the I/O channel for the purposes of passing a recorded message into its memory or for reporting its status to the record module.

4.17 The playback module receives a feedback signal from the 4 ESS switch for level comparison purposes. If the echoed signal falls below a preset level for more than 20 seconds, the playback module will issue an alarm to the 4 ESS switch which will, in turn, activate a local alarm.

4.18 Each playback module is individually fused. If a playback module becomes defective and draws excessive current, only the defective module need be removed. The playback module POWER switch on the control unit front panel allows individual power control of all playback modules.

A. Playback Amplifier

4.19 When in the playback mode, the following occurs:

(a) The playback amplifier downloads the 48 k message-storage RAM via I/O into four ADPCM voice synthesis ICs (Integrated Circuits) having D-to-A converters. An 8-bit CPU manages the downloading process, which includes providing the 4-second quiet time at the beginning of each phase.

(b) From the ADPCM circuits, the unprocessed analog messages are input to low-pass filters, then to an impedance-matching circuit.

(c) The announcement signal (four phases) is transmitted to the VIU or D4 channel bank via the Interface Panel to the MF signaling frame.

(d) The playback signal (four phases) may be monitored with a headset or TMS at the monitor module by manually operating a monitor switch on the playback module.

(e) The phase 0 playback signal is also transmitted to the dedicated telephone, enabling the craftsperson to hear the message.

B. Alarm Logic Circuit

4.20 The monitor signal (announcement—four phases) is transmitted to the alarm logic circuit via the DMUX audio amplifier. If the audio level falls below a predetermined limit, a normally operated scan point will open. Also, the V ALM (PHASE 0—PHASE 3) LED indicator(s) on the playback module will light. The test audio monitor signal from the control unit causes the alarm scan point to open and the LED indicator(s) to light.

4.21 The DP receive and B channel signals from the dedicated telephone will cause the channel maintenance scan point to operate. The operated channel maintenance scan point indicates a request to record has been initiated at the dedicated telephone. The channel maintenance scan point to the SP 1 or 2 and the lamp control signal to the dedicated telephone is enabled when the channel maintenance scan point operates.

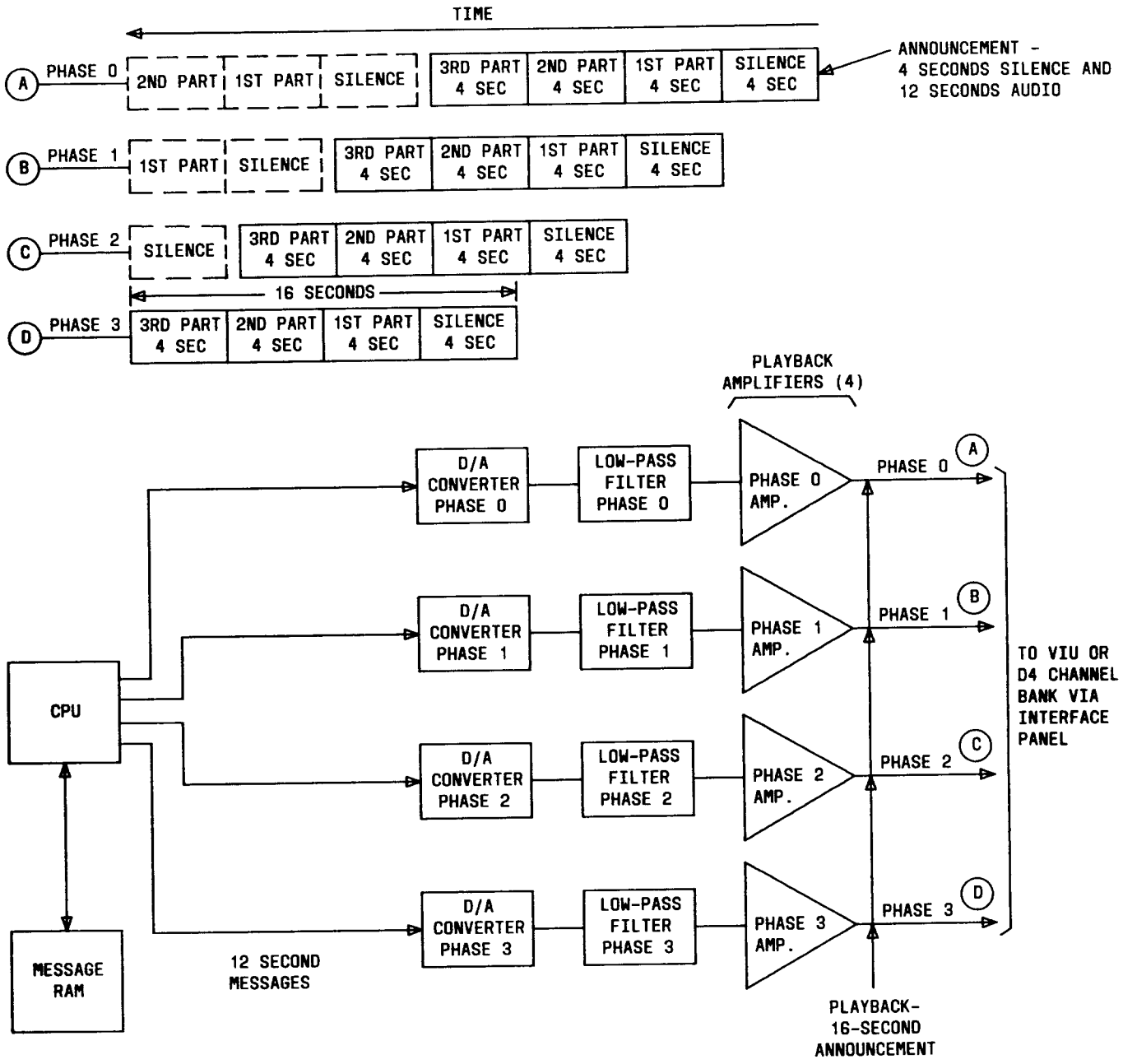

Fig. 5—Phased Message Announcement—Playback Block Diagram

4.22 The silent period indicator (cut-through scan point) is enabled to the SP 1 or 2 when an associated cut-through relay on the playback module operates. This indicates the announcement phase that is in the 4-second silent period.

C. DMUX Audio Amplifier

4.23 The monitor signal (four phases) is amplified by the DMUX audio amplifier. This amplifier is used in the playback mode only and drives the phases 0 through 3 alarm logic.

LOCAL RECORDING

4.24 New announcements may be recorded locally at the frame, either through a headset/handset or via a prerecorded message from a tape recorder. Local recording feature enables a maintenance function for diagnosing recording problems, as well as a means for dubbing professionally prerecorded messages to the record module. Refer to Task Oriented Practice AT&T 234-151-060 for detailed instructions on local recording.

4.25 The procedure for local recording is as follows:

(1) Insert a handset/headset into the RECORD jack at the record module. If dubbing a prerecorded message, connect the tape recorder through the KS-22566 interface kit to the RECORD jack.

(2) Operate the CAL/NORMAL/RECORD switch on the record module to the RECORD position.

(3) When the RECORD LED indicator lights, turn on the tape recorder (if used) or dictate the message into the headset/handset mouthpiece. The RECORD LED indicator will remain lighted for exactly 12 seconds.

(4) Immediately following the 12-second interval, the RECORD LED indicator will extinguish.

(5) After recording, the complete message will be heard through the RECORD jacks. This cycle will repeat until the CAL/NORMAL/RECORD switch is moved to the NORMAL position.

(6) If satisfied with the audio quality, the CAL/NORMAL/RECORD switch is moved to the NORMAL position.

PLAYBACK

4.26 Transfer the recorded message to a selected playback module as follows:

(1) Depress the ROS switch on the control unit for the designated playback module.

(2) After a delay of up to 32 seconds, the OS LED indicator on the control panel for the associated playback module will light.

(3) Select the playback module to receive the new recording by dialing the corresponding module number via the CHANNEL SELECT thumbwheel switches on the record module front panel.

(4) Depress the TRNSF (Transfer) switch on the record module.

(5) The TRNSF LED indicator on the record module will light green if the transfer was successful, red if not successful.

(6) Depress the RESET switch on the record module to extinguish the TRNSF LED indicator.

4.27 The audio level and quality of playback is monitored as follows:

(1) Push the MONITOR switch up on the playback module.

(2) The MONITOR LED indicator on the playback module and the BUSY LED indicator on the monitor module will light.

(3) Monitor the four phases at the MON (Monitor) jacks on the monitor panel.

(4) Push the MONITOR switch down on the playback module.

(5) The MONITOR and BUSY LED indicators will extinguish.

(6) Depress the ROS switch on the selected channel to return the channel to service.

DEDICATED *CALL DIRECTOR* TELEPHONE

4.28 Recording or monitoring with a dedicated telephone is initiated by lifting the receiver from the line switch. When the contacts on the line switch close, the dedicated telephone receives filtered talking current and control power from the PAS frame. By depressing a channel selection locking pushbutton on the dedicated telephone, the phase 0 announcement of the associated playback module, if recorded, can be heard. After a delay of up to 32 seconds, the record lamp on the dedicated telephone lights to indicate a record session may commence.

4.29 The B channel signal to the playback module is enabled when the channel selection pushbutton on the dedicated telephone is depressed. This signal operates a channel maintenance scan point in the playback module and lights the REMOTE ACCESS LED indicator on the record module. The lighted LED indicator indicates a channel on the PAS is being accessed. The channel maintenance scan point is enabled to the SP 1 or 2, indicating that the channel is being accessed either for recording or testing. The RAMP will remove the channel form service, if active, and light the OS LED indicator on the control panel for the associated playback module. The record ready SD point, via the control unit, will also light the record lamp on the dedicated telephone. The lamp, when lighted, indicates the channel has been removed from service and may now be used for recording. A delay of 32 seconds may occur if the channel is active, since it is required that the subscriber hears at least two repetitions of an announcement before being disconnected.

4.30 To record a new message, the record pushbutton is depressed and released.

4.31 The lamp control signal from the playback module will light the channel lamp under the depressed channel selection pushbutton. This lamp will light 2 seconds after depressing and releasing the record pushbutton. The lighted channel lamp indicates that an announcement may now be recorded within an allotted 12-second time period. After 12 seconds, the channel lamp will extinguish.

4.32 After completing the recording, personnel can listen to the announcement to determine if a satisfactory announcement has been recorded. If not, the announcement can be rerecorded.

4.33 The channel is released to the system by selecting another channel or by depressing the release pushbutton on the dedicated telephone and placing the receiver on-hook.

5. THEORY—POWER AND ALARM CIRCUITS

5.01 The following as they relate to the PAS are described:

- Power input to the PAS
- Power distribution within the PAS frame
- Power control
- Alarm circuits.

5.02 Figure 6 is a functional diagram of the PAS power and alarm circuits. The basic input, conversion and levels of voltage distribution to the different major functional schematic units, is shown.

POWER INPUT TO PHASED ANNOUNCEMENT SYSTEM

A. Control Unit

5.03 One control unit is associated with each system. The control unit contains the switches, jacks, and visual indicators required to:

- Control associated playback module power
- Perform maintenance on a playback or record module.

5.04 The control unit contains one dc-to-dc converter-type power supply which outputs +5 V dc, +12 V dc, −12 V dc, and −5 V dc. Input to the power supply is −48 V dc.

5.05 The control unit front panel has switches for the three types of functions under the control of this unit. The functions are:

- Main power on/off
- Module(s) power on/off
- Request out of service.

5.06 The power requirements of the PAS in the 4 ESS switch are −48 V dc from the office distri-

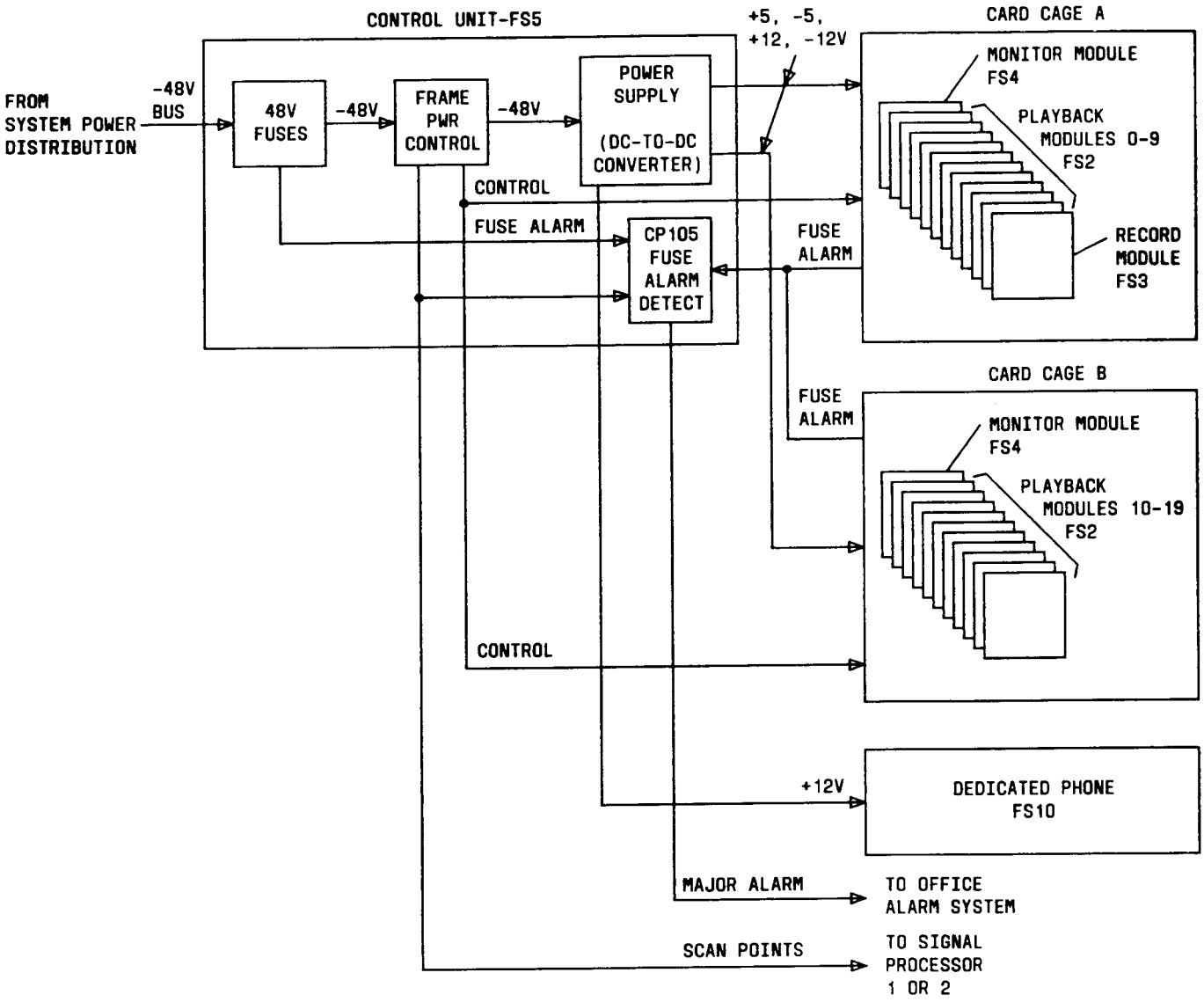

Fig. 6—Phased Announcement System (NS-00291-01)—Power and Alarm Circuits

bution system and −48 V dc from the office alarm power distribution system.

POWER DISTRIBUTION WITHIN THE PHASED ANNOUNCEMENT SYSTEM

5.07 The dc-to-dc converter used, by virtue of its design, isolates frame noise from the office power distribution system.

5.08 The −48 V feed is distributed to the dc-to-dc converter via the front panel master POWER switch.

5.09 The voltages are distributed to each card cage via the card cage backplanes. Playback module POWER switches located on the control unit direct the voltage distribution to the playback modules. The control unit itself requires +5 and −48 volts to operate indicators and drive a relay circuit located within it.

5.10 The PAS dedicated CALL DIRECTOR telephone receives +12 volts from the control unit to energize the record lamp and for filtered talking current. For circuits controlled by the dedicated telephone, this voltage is supplied by the control unit.

5.11 Additional +12 volt power is supplied by the playback module for the channel lamp indicators on the dedicated telephone.

POWER CONTROL

5.12 This part discusses the PAS circuits that control, apply, or remove power from the frame and from playback modules.

A. Frame Power Control

5.13 The master POWER switch located on the control unit distributes −48 volts to the dc-to-dc converter as follows:

(a) The master POWER switch, when depressed to ON, applies −48 volts to the converter. The POWER LED indicator will light.

(b) The master POWER switch, when depressed to OFF, removes −48 volts from the converter. The POWER LED indicator will extinguish.

5.14 Power is removed from the PAS as follows:

(1) The ROS switches are depressed for all playback modules to remove them from service. The ROS LED indicator will light. After a delay of up to 32 seconds, the OS LED indicator will light.

(2) The POWER switches are released for all playback modules to remove their power. The ON LED indicators will extinguish.

(3) The master POWER switch is depressed to OFF to remove power from the PAS. The ROS, OS, and master POWER LED indicators extinguish.

5.15 Power is restored to the PAS frame as follows:

(1) Make sure that all playback module ROS switches are down.

(2) The master POWER switch on the control panel is depressed to ON. The ROS, OS, and master POWER LED indicators light.

(3) The playback module POWER switches are depressed. The ON LED indicators light.

(4) The playback module ROS switches are released. The ROS and OS LED indicators extinguish.

B. Playback Module Power Control

5.16 The playback module power control, located on the control unit, directs the application of power to all circuits located within the playback modules. The power is controlled by a manually operated switch as follows:

(a) The playback module POWER switch, when depressed, applies +5, +12 and −5 volts to the playback module circuits.

(b) The playback module POWER switch, when released, removes power from the playback module circuits.

Removing Power From a Playback Module

5.17 Power is removed from a playback module via switches on the control unit as follows:

(1) The ROS switch is depressed. The ROS LED indicator will light. After a delay of up to 32 seconds, the OS LED indicator lights.

(2) The playback module POWER switch is released. The ON LED indicator will extinguish.

Restoring Power to a Playback Module

5.18 Power is restored to a playback module as follows:

(1) Make sure the playback module ROS switch is depressed.

(2) Power is restored to the PAS frame if required.

(3) On the control unit, the playback module POWER switch is depressed. The ON LED indicator will light.

(4) The ROS switch is released. The ROS and OS LED indicators extinguish.

ALARM CIRCUITS

5.19 The power and alarm circuits within the PAS consist of the following:

- Alarm-type fuses
- Fuse alarm detection circuits
- Fuse alarm relay.

5.20 All +5, +12, −12 and −5 volt distribution within the PAS is through individual alarm-type fuses. If a fuse fails, a contact closure connects the respective voltage to an associated fuse alarm detect circuit. A −48 volt fuse failure results in the operation of the FA (Fuse Alarm) relay in the control unit.

5.21 Fuse alarm detection circuits are located in the control unit and in each playback module. Detection of a +5, −5, or +12 volt fuse alarm lights a FUSE LED indicator and operates the FA relay in the control unit.

5.22 Failure of any fuse results in the operation of the FA relay. With the FA relay operated and all POWER switches on the control unit operated, a major alarm is sent to the office alarm system. The major alarm indicates a condition which can adversely affect call processing.

5.23 The FA relay, in conjunction with control unit power switches, controls two scan points: one series and one parallel. These scan points are monitored by the signal processor and indicate the power status of the PAS frame as follows:

(a) ***Normal:*** Both scan points are open (i.e., all control unit power switches operated and the FA relay not operated).

(b) ***Manual Power Off:*** Series scan point is open, parallel scan point is closed (i.e., any power switch not operated).

(c) ***Fuse Alarm:*** Both scan points are operated (i.e., all power switches operated and the FA relay operated).

6. REFERENCES

6.01 The following listing provides further information concerning the PAS:

PRACTICE	TITLE
AT&T 234-110-160	PAS Description
AT&T 234-151-060	PAS Operating and Trouble Clearing Procedures
NE-00291-10	PAS Manufacturing Details
NJ-00291A-1	PAS Equipment Drawings
NS-00291-01	PAS Schematic Diagrams
NT-00291-31	PAS Connection Drawings.

7. ABBREVIATIONS AND ACRONYMS

7.01 The following are defined abbreviations and acronyms used in this practice:

ABBREVIATION	TERM
ADPCM	Adaptive Delta Pulse Code Modulation
CPU	Central Processing Unit
DMUX	Demultiplexed
FA	Fuse Alarm
I/O	Input and Output
IC	Intergrated Circuit
LED	Light-Emitting Diode
MF	Multifrequency
MON	Monitor
OS	Out of Service
PAS	Phased Announcement System
PROM	Programmable Read Only Memory

ABBREVIATION	TERM
RAM	Random Access Memory
RAMP	Recorded Announcement Machine Program
REC	Record
ROS	Request Out of Service
SD	Signal Distributor
SP 1	Signal Processor 1
SP 2	Signal Processor 2
TDNET	Time Division Switching Network
TMS	Transmission Measuring Set
TRNSF	Transfer
VIU	Voiceband Interface Unit

8. ISSUING ORGANIZATION

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