



PagePac® Voice Paging System

PagePac® VS

Installation, Operation and Maintenance

(STANDARD VERSION)

PAGEPAC® VS TELEPHONE PAGING SYSTEM

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1. GENERAL

1.01 This section provides identification, description of apparatus, installation, operation, maintenance and connection information for the PagePac® VS Telephone Paging System manufactured by the Dracon Division of the Harris Corporation, Chatsworth, California 91311.

1.02 This section is reissued to:

- (a) Incorporate a built-in 48-volt power supply
- (b) Delete terminal block TB1 (48-volt input)
- (c) Delete the requirement for an external source of -48 volts.

Since this reissue covers a general revision, arrows normally used to indicate changes have been omitted.

1.03 The Dracon PagePac® VS (Very Small) is a self-contained 50-watt zone paging unit. It provides a PABX or key telephone system with all the controls and features necessary for zone paging. Intended for small business customers, it is the smallest and most economical version of the standard PagePac® Paging System.

1.04 The PagePac® VS (Fig. 1) provides three separate paging zones plus all-call paging into all three zones at once. Talk-back is optional as is an FM tuner for background music and music-on-hold. Also optional is an interface card for trunk or station access from a PABX. The complete system comes mounted in a wall cabinet and the only additional materials required are the loudspeakers and the speaker wire.

®PagePac is a registered trademark of the Harris Corporation.

2. IDENTIFICATION

PURPOSE

- To provide a small telephone system with a compact and economical paging system.
- To provide a unique paging system offering a variety of sophisticated features.

APPLICATION

- 1A2 and 10A2 Key Telephone Systems.
- Private Automatic Branch Exchanges.

DESIGN FEATURES

- Compact and flexible single-unit design.
- Three paging zones plus all-call paging.
- Access from key or non-key telephone sets.
- Access via a dial or manual key system intercom or direct from station sets.
- 25 or 70.7V switch-selectable speaker outputs.
- 600-ohm output for off-premise amplifier.
- Self-contained in wall-mounted cabinet.
- Compression circuit for uniform paging output level over wide range of inputs.
- Paging preamplifier provides improved frequency response of voice signals.
- Separate preamplifier channel for background music.
- Music gain can be independently adjusted.

OPTIONAL FEATURES

- Talk-back; handsfree reply from speaker locations.
- FM music source for background music and key system music-on-hold.
- Access from PABX trunk or station outlet.

ELECTRICAL CHARACTERISTICS

- Refer to Table A for the PagePac® VS electrical and performance specifications.
- Refer to Table B for the Talk-Back Control Card performance specifications.
- Refer to Table C for the Universal Interface Card (UIC) electrical specifications.

PagePac® VS Voice Paging System

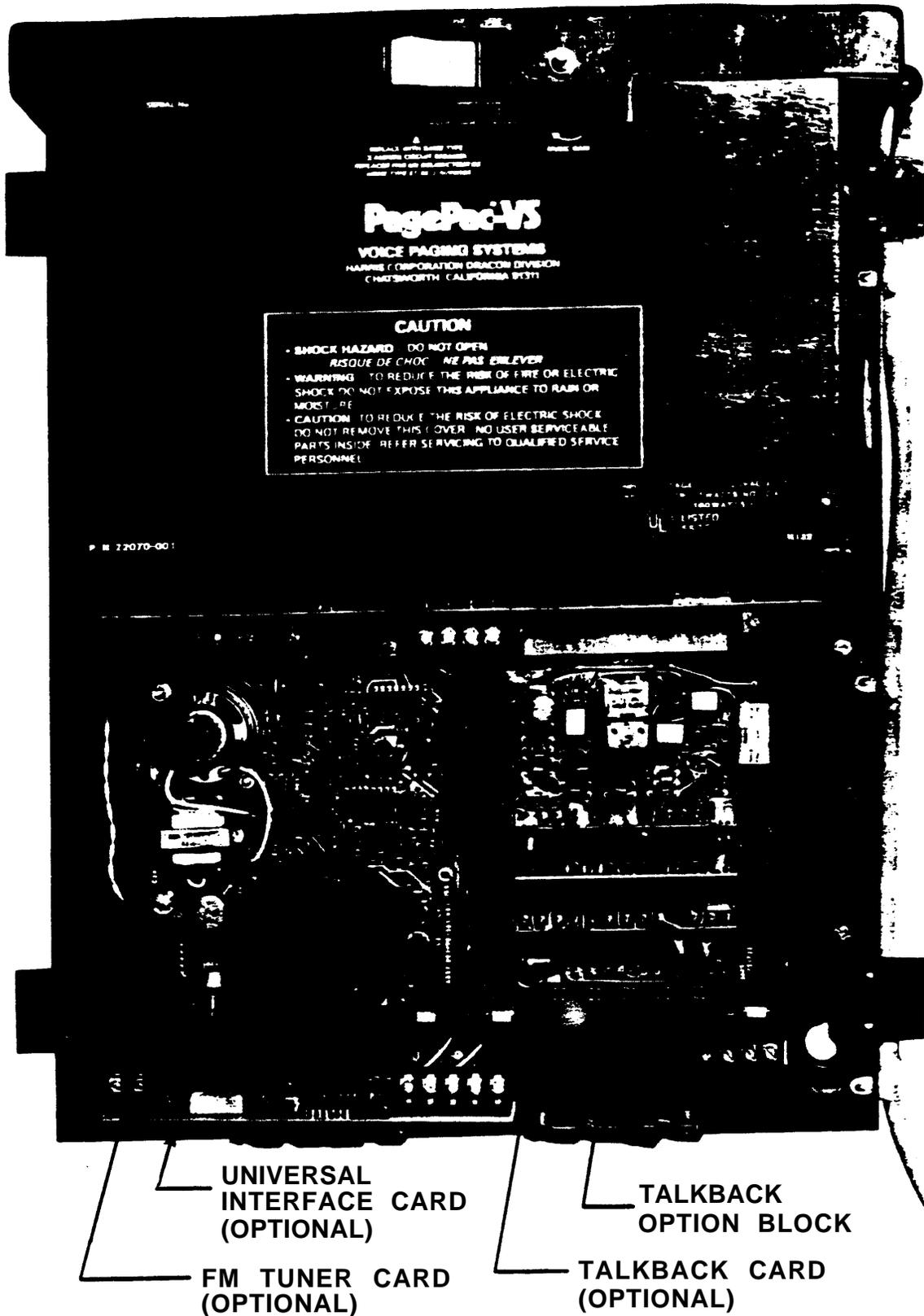


Fig. 1—Fully-Equipped PagePac® VS with Cover Removed

General Information

TABLE A
PAGEPAC® VS ELECTRICAL SPECIFICATIONS

PARAMETER	WORKING LIMITS
LOOP RESISTANCE 24V Battery Feed 48V Battery Feed	600 ohms max. 1500 ohms max.
LOOP CURRENT	20 mA min.
ZONE SELECTION Zones Enable Leads Enable Signals	3 + All Call 4 (3 Zones + All Call) ±10V, ±18V, ±105V, -24V or Ground (selectable)
MAX. SPEAKER LOAD Per Zone All Zones Combined	50 watts rms 50 watts rms
MUSIC AMPLIFICATION Frequency Response Distortion Input Impedance Hum and Noise	±2 dB 200 Hz to 12 kHz Less than 2% 600 ohms balanced Min. 60 dB below rated output
PAGE AMPLIFICATION Frequency Response Input Impedance Hum and Noise	-3 dB at 330 Hz and 5.7 kHz 600 ohms balanced Min. 60 dB below rated output
PAGE COMPRESSOR Compression Ratio Attack Time	15:1 Less than 3 ms
SPEAKER LINE	25 V or 70.7 V (selectable)

TABLE B
TALK-BACK CONTROL CARD SPECIFICATIONS

PARAMETER	WORKING LIMITS
VOICE ACTIVATED SWITCH Switching Level at Telephone Line: high sensitivity low sensitivity Attack Time (Listen to Page) Release Time (Page to Listen) Insertion Loss in Page Mode (Tel. Line to PA Amp Output)	-21 dBm nominal -18 dBm nominal 20 ms nominal 500 ms nominal 0.5 dB
STANDARD TALK-BACK PRE-AMPLIFIER Sensitivity Average Output to Tel. Line Available Compression	-50 dBm -10 dBm 50 dB
ADJUSTABLE-GAIN TALK-BACK PRE-AMPLIFIER Sensitivity Limited Output to Tel. Line Available Compression	-50 dBm -5 dBm None
TALK-BACK ALERTING TONES Frequency Output Level Burst Length Repetitive Tone Silent Interval	440 Hz -10 dBm Approx. 1 second Approx. 15 or 30 sec. (selectable)
MAX. SPEAKER LOAD Into 70.7V Line	200 watts rms relay contact rating

PagePac® VS Voice Paging System

TABLE C

UNIVERSAL INTERFACE CARD SPECIFICATIONS

PARAMETER	WORKING LIMITS
TELEPHONE LINE IMPEDANCE	600 ohms
RINGTRIP VOLTAGE	75 to 110V ac, 16 to 60 Hz
TONE DIAL SIGNALS	
Digit 2 – All Call	697 Hz + 1336 Hz
Digit 4 – Zone 1	770 Hz + 1209 Hz
Digit 5 – Zone 2	770 Hz + 1336 Hz
Digit 6 – Zone 3	770 Hz + 1477 Hz
Frequency Bandwidth	±2.5% About Center Frequency
Amplitude Difference	10 dB Max.
Signal Duration	40 ms Min.

POWER REQUIREMENTS

- 110-120V, 60 Hz ac power, 100 watts maximum.
- Unit comes equipped with 6-foot, heavy-duty power cord with 3-prong plug.

DIMENSIONS AND WEIGHT

- The unit with cover is 14½" (36.8 cm) wide, 18" (45.7 cm) high and 5¼" (13.3 cm) deep.
- The system weighs 25 lbs. (11.34 kg).

ORDERING GUIDE

- Refer to Table D to determine the model numbers of the PagePac®-VS and the desired option cards.
- If the talk-back feature is not desired, the Talk-Back Continuity Card provided with the unit must remain in connector J102.
- If talk-back is desired, specify the adjustable-gain talk-back card if high ambient noise is encountered at the speaker locations. Otherwise the standard card may be specified.

TABLE D

ORDERING GUIDE

DESCRIPTION	MODEL NO.
PagePac®-VS	22070-001
Talk-Back Control Card Standard	22080-000
Adjustable Gain Continuity Card*	22080-002
FM Tuner Card	22083-001
Universal Interface Card	22086-002

*Continuity Card is provided with each unit.

3. DESCRIPTION OF APPARATUS

PAGEPAC®-VS ASSEMBLY

3.01 Most internal components of the PagePac®-VS are located on a single PC board supported by an aluminum backplate. Access to the power section on the upper portion of the printed circuit board is restricted by a metal cover. The -24V dc power supply powers the telephone interface circuitry and the plug-in option cards. Connections for the optional Talk-Back Control and FM Tuner Cards are provided by a 12" x 6" metal chassis equipped with plug-in connectors and a terminal strip. This chassis sits atop the lower portion of the main PC board. The Universal Interface Card mounts on the aluminum backplate below the PC board. The whole assembly is enclosed by a decorative plastic cover. The cover is attached to the chassis by magnetic fasteners. See Fig. 2.

MOUNTING

3.02 The PagePac®-VS is designed to be backboard mounted only. The chassis backplate has four keyholes that are used for mounting the unit. (See Fig. 2). A cardboard template is provided with each unit to assist in placing the mounting screws.

3.03 All incoming wire terminations are made on screw-type terminal strips, TB1, TB2 and TB3, located at the bottom of the PC board and TB101 on the card mounting chassis. If a UIC card is provided, terminations are also made on its two screw-type terminal strips, TB1 and TB2.

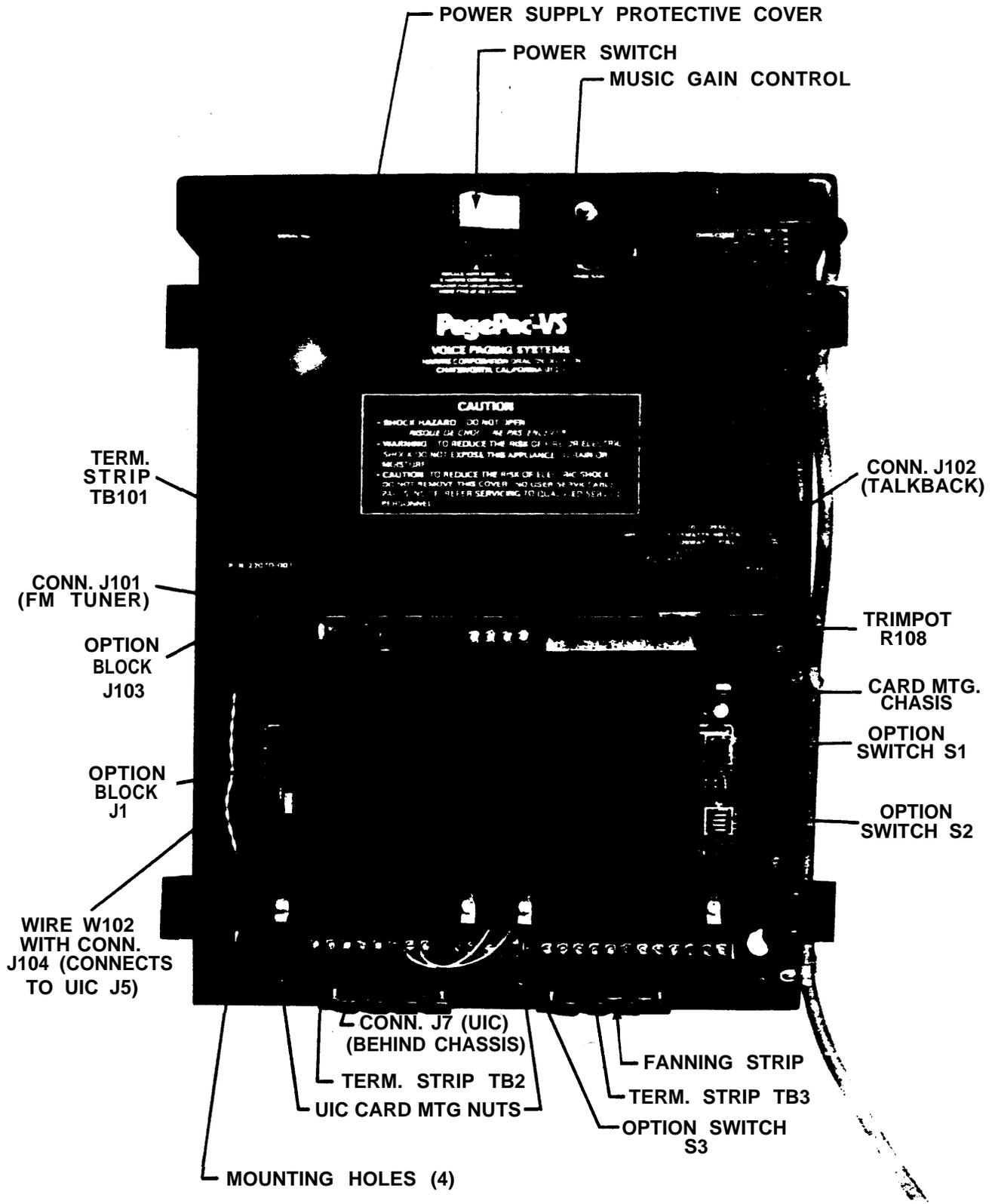


Fig. 2—PagePac® VS Without Optional Cards and With Cover Removed

PagePac® VS Voice Paging System

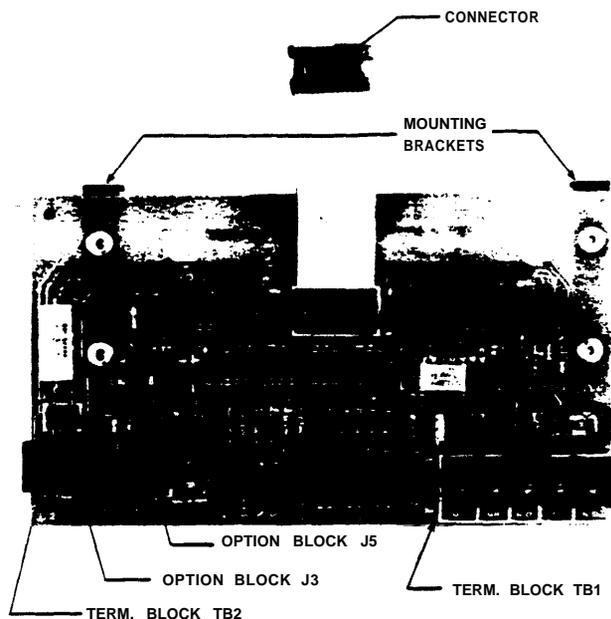


Fig. 3—Universal Interface Card (UIC)

UNIVERSAL INTERFACE CARD

3.04 The basic PagePac® VS unit may be accessed from a key system dial intercom which provides full zone selection. It may also be accessed via a manual intercom card or directly from single-line instruments or from a spare pickup key on key telephone sets. However, in the latter case, a separate set of 4 non-locking signaling keys must be used to effect zone selection. In lieu of the non-locking signaling keys, the optional UIC card (Fig. 3) can be provided in tone-dial systems. Also, access from a PABX station circuit requires the UIC card and access from a PABX trunk outlet requires the UIC card if zone selection is desired.

Caution: *In the station-access mode, the PagePac® VS is not compatible with PABXs which return a non-precise dial tone to the paging telephone within 15 seconds after going on hook.*

3.05 The UIC card contains a tone-dial receiver and DTMF signaling must be employed for zone selection. To access all-call or zones 1, 2 or 3, the caller keys the digit “2”, “4”, “5” or “6”, respectively.

3.06 The UIC also contains a ring detector and ringtrip circuit. When the UIC is accessed from a PABX station circuit, the connection is maintained by a voice activated switch (VOX). In non-talk-back zones, a VOX on the UIC disconnects the page originator if he does not speak for 4 or 8 seconds. Option strap J103 determines this timeout interval. When the optional talk-back control card is installed and the zone is optioned for talk-back, a VOX on the talk-back card overrides the UIC VOX. If the originator’s voice is not present for 4 to 20 seconds, the unit will disconnect. Trimpot R108 (Fig. 2) selects the timeout interval. It comes factory preset at approximately 12 seconds.

3.07 The UIC is mounted on the PagePac® VS backplate below the PC board and plugs into connector J7. See Fig. 2. It has two screw-type terminal strips, TB1 and TB2. TB1 has five screw terminals, **MT** and **MR** are for connecting an external music source, if provided, **n.o.c** and **n.c.**, a form C relay contact, may be used to light a busy lamp. The relay will operate when either a loop is closed across tip and ring or when any zone is selected. TB2 is for connecting the tip and ring leads from the telephone system.

TALK-BACK CARD

3.08 The optional talk-back feature is provided by either the Standard Talk-Back Control Card or the Adjustable-Gain Talk-Back Control Card. Either card provides two-way communications between the telephone and the paging loudspeakers. The Adjustable-Gain Talk-Back Control Card allows adjustment of the talk-back signal level to the paging telephone to compensate for high ambient noise levels in the paging zone. With talk-back, the installer can select which zones, including all-call, are to have the talk-back feature or one-way paging. Both cards provide a single one-second tone burst when the zone is first seized, as well as a repetitive alerting tone, to prevent the talk-back feature from being used as a covert monitoring device. The repetitive tone is available at either a 15- or 30-second interval. A Talk-Back Continuity Card must be plugged into talk-back connector J102 whenever a talk-back control card is not provided. See Fig. 2.

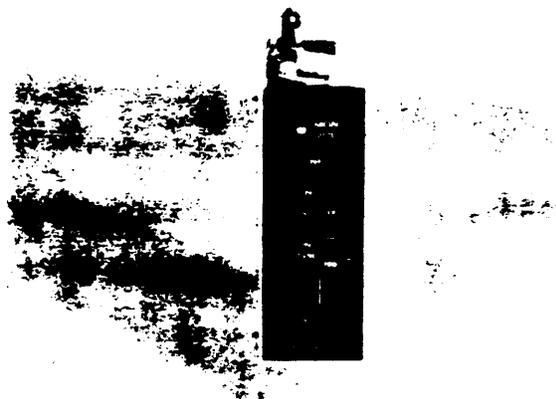


Fig. 4—FM Tuner Card

FM TUNER CARD

3.09 The optional FM Tuner Card (Fig. 4) provides a source of background music for the paging system and may also be used to provide the music for the music-on-hold feature of the associated telephone system. The FM Tuner Card plugs into connector J101 on the PagePac® VS card chassis. The tuner incorporates a built-in speaker for monitoring, automatic frequency control and a visual tuning indicator.

Note: Under the U.S. copyright laws, use of the FM tuner may require the user to obtain a copyright license.

SWITCHES AND CONTROLS

Basic PagePac® VS Unit (Fig. 2)

3.10 **Power Switch:** The PagePac® VS POWER switch is a white rocker switch that is a combination power switch, power on/off indicator and circuit breaker. When the switch is set to ON, it is illuminated by an internal lamp. Should a power overload develop, the switch will automatically trip to the OFF position.

3.11 **Music Gain Control:** Background music level is adjusted with the MUSIC GAIN control.

3.12 **Trimpot R108:** This control permits the adjusting of the timeout period from 4 to 20 seconds in those zones offering the talkback feature. It is only used with the optional UIC card, and when access to the system is via a PABX station circuit.

3.13 **Switch S1:** The amplifier output to the speakers may be set at either 25 volts or 70.7 volts by switch S1. S1 comes factory set for 70.7V.

Note: The 25-volt output may be required in locations where building codes do not permit 70-volt speaker systems.

3.14 **Switch S2:** When talk-back is provided, switch S2 selects the zone(s) which will have talk-back. Closing S2-1 through S2-4 provides talk-back to zones 1 to 3, and all call, respectively.

3.15 **Switch S3:** The setting of switch S3 is dependent on the polarity of the signaling voltage used for zone selection. If the signaling voltage is ground such as from non-locking signaling keys or from the UIC card, the switch is set to the G position. If the selection voltage is $\pm 10v$, $\pm 18v$ or $\pm 105v$ as may be encountered in a dial intercom or if it is -24 volts dc, the switch is set to BATT.

FM Tuner Card (Fig. 4)

3.16 **Tuning Dial:** Tunes commercial FM broadcasts from 88 to 108 MHz.

3.17 **Tune LED:** This LED will light when a station is exactly tuned to its central frequency.

3.18 **AFC Switch:** In the ON position, automatic frequency control is enabled. In the OFF position, AFC is switched out.

3.19 **Speaker Switch:** With the SPK switch in the ON position, the music outputs from the tuner card are disconnected and the built-in monitor speaker is enabled. In this mode, the card is supplying a signal only to the monitor speaker. In the OFF position, the built-in monitor speaker is disconnected and the music outputs are enabled. The OFF position is the normal operating mode.

3.20 **Monitor Volume Control:** The MON VOL control adjusts the sound level of both the monitor speaker and the music outputs and should be set at mid-range, unless adjustment is required for music-on-hold.

3.21 **Antenna Switch:** With the ANT switch in the EXT position, the FM tuner's input is connected to the external antenna terminals. When the tuner is used with the PagePac® VS, the ANT switch should always be set to EXT. A suggested external antenna is shown in Fig. 13.

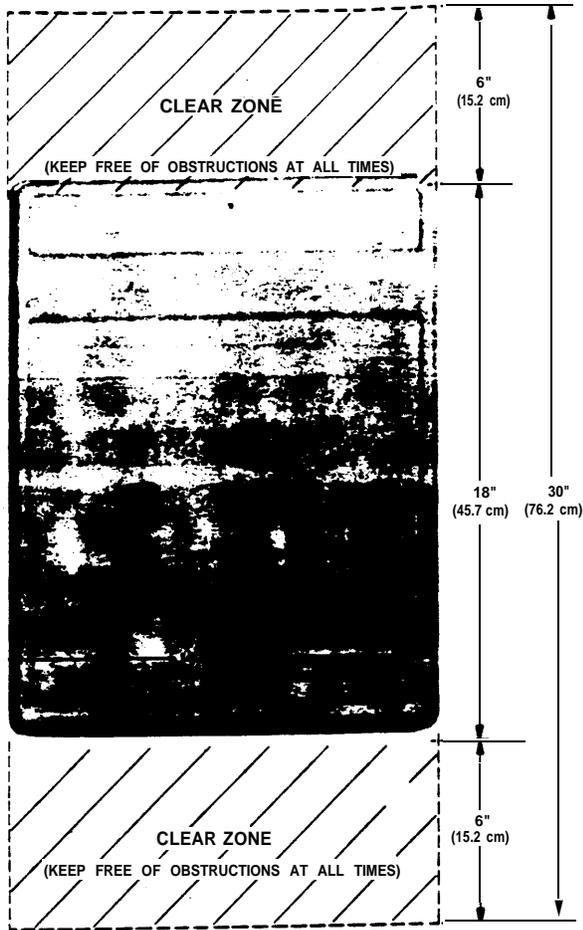


Fig. 5—Mounting Clearances

OPTION BLOCK

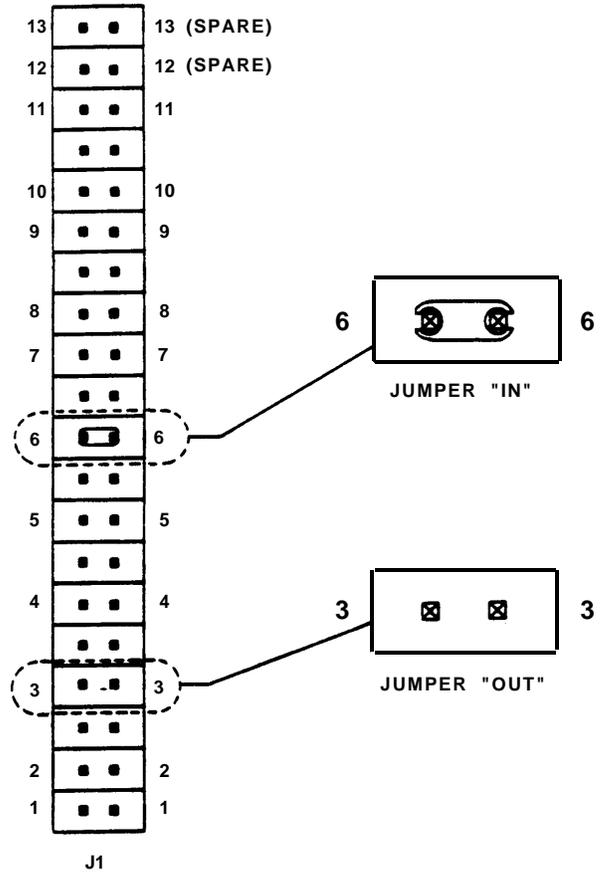


Fig. 6—Layout of Option Block J1

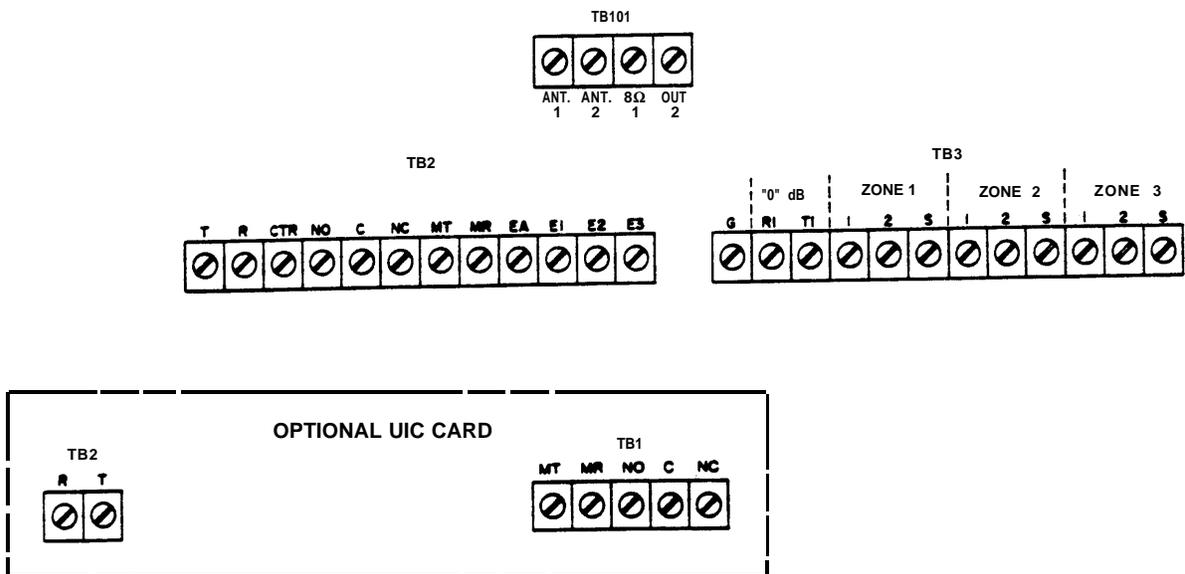


Fig. 7—Terminal Strip Layouts

4. INSTALLATION

PAGEPAC® VS UNIT

4.01 **Mounting:** Mount the basic PagePac® VS unit, excluding optional cards, as follows:

- (1) Select a wall location which allows at least 6 inches (15.2 cm) of wall space at the top and bottom of the cabinet (Fig. 5) to allow adequate air flow through the unit and prevent possible amplifier overheating and failure.
- (2) Make sure that a 117V ac power outlet is located within 6 feet of the selected location. The outlet should not be controlled by a switch.
- (3) Mount a plywood backboard, if required, on the wall in the selected location.
- (4) Carefully unpack the unit from the carton and inspect for damage. Find the hole-locating template which is included as part of the packing material. **Do not** discard any packing material until you have located the template.
- (5) Mark the location of the 4 mounting screws using the template.
- (6) Fasten the appropriate mounting screws to the backboard in the marked locations.
- (7) Remove the cover from the unit, and mount the unit on the wall by passing the screws through the keyhole cutouts.
- (8) Tighten the screws down on the backplate.

4.02 **Connections:** Before mounting any optional cards, perform the wiring and select the options for the basic assembly as follows:

- (1) Set the **POWER** switch to **OFF** and do not plug in the ac power cord at this time.
- (2) Determine the location of the option pins and switches by referring to Fig. 2 and 6 and strap the desired options on the option block in accordance with Table E.
- (3) Refer to Table F and set option switches S1 and S3 to the desired positions.
- (4) Refer to Fig. 7 to determine the location of the various terminal strips and the designations of the terminals.

(5) Select the appropriate connection diagram from among Fig. 8 to 11.

(6) If a UIC card is not provided, perform all the wiring shown on the connection diagram. If the UIC card is provided, at this time only perform the connections to terminal strip TB3.

(7) Perform the connections to the speakers in accordance with Fig. 12. Shielded wire must be used if talk-back is provided. Otherwise it is optional.

(8) If an off-premise amplifier is provided, perform the necessary connections per Fig. 12 using twisted-pair wire.

(9) If the FM Tuner Card and the UIC are not provided and an external source is available for background music, connect the music source output across terminals **MT** and **MR** of TB2. The connection of an external music source when the UIC card is provided is covered in paragraph 4.05.

(10) Make sure the Talk-Back Continuity Card is plugged into connector J102.

4.03 **Connecting Power:**

(1) Turn the music gain down by turning the **MUSIC GAIN** control at the top of the unit (Fig. 2) fully counterclockwise.

(2) Plug the power cord into the 117v ac outlet.

Caution: In no case should this unit be connected to any sources of direct current (dc) or any ac voltage exceeding 120 volts rms, 60 Hz.

(3) Set the **POWER** switch (Fig. 2) to **ON**. The switch should illuminate.

(4) If an external music source is provided, adjust the **MUSIC GAIN** for an acceptable music level in the paging zones.

4.04 **Testing:** If the UIC card is not provided, proceed to test the basic system before installing any option cards, as follows:

(1) From any station instrument that has access to the system, initiate a paging call to each zone and to all zones at once (all-call).

PagePac® VS Voice Paging System

TABLE E
PAGEPAC® VS OPTION BLOCK STRAPPING

FEATURE				J1 OPTION BLOCK TERMINALS	
PAGING ACCESS	ZONE SELECTION	UIC CARD PROVIDED	TALK BATTERY	JUMPERS IN	JUMPERS OUT
Via Key System Dial Intercom	Dial Up	No	From Intercom	1-1 6-6 7-7 9-9	2-2 3-3 4-4 8-8 10-10 11-11
Via Key System Manual Intercom	Non-Locking Signal Keys	No	From Intercom	1-1 6-6 7-7 9-9	2-2 3-3 4-4 5-5 8-8 10-10 11-11
	All-Call Only	No	From Intercom	1-1 6-6 7-7 9-9 11-11	2-2 3-3 4-4 5-5 8-8 10-10
Direct From Pickup Keys Of Key Sets And/Or Single Line Sets	Non-Locking Signal Keys	No	-24V	3-3 4-4 6-6 8-8 10-10	1-1 2-2 5-5 7-7 9-9 11-11
	Dial Up	Yes			
	Non-Locking Signal Keys	No	-48V	2-2 4-4 6-6 8-8 10-10	1-1 3-3 5-5 7-7 9-9 11-11
	Dial Up	Yes			
	All-Call Only	No	-24V	3-3 4-4 6-6 8-8 10-10 11-11	1-1 2-2 5-5 7-7 9-9
				-48V	2-2 4-4 6-6 8-8 10-10 11-11
PABX Station Circuit	Dial Up	Yes	From PABX	4-4 5-5 8-8 10-10	1-1 2-2 3-3 6-6 7-7 9-9 11-11

TABLE E (Contd)
PAGEPAC® VS OPTION BLOCK STRAPPING

FEATURE				J1 OPTION BLOCK TERMINALS	
PAGING ACCESS	ZONE SELECTION	UIC CARD PROVIDED	TALK BATTERY	JUMPERS IN	JUMPERS OUT
PABX Trunk Circuit (DTMF Only)	Dial Up	Yes	-24V	3-3 4-4 6-6 8-8 10-10	1-1 2-2 5-5 7-7 9-9 11-11
			-48V	2-2 4-4 6-6 8-8 10-10	1-1 3-3 5-5 7-7 9-9 11-11
	All-Call Only	No	-24V	3-3 4-4 6-6 8-8 10-10 11-11	1-1 2-2 5-5 7-7 9-9
			-48V	2-2 4-4 6-6 8-8 10-10 11-11	1-1 3-3 5-5 7-7 9-9

TABLE F
PAGEPAC® VS OPTION SWITCH SETTINGS

FEATURE		DESIG	POSITION
Speaker Line	25-Volt	S1	25
	70.7-Volt		70
Zone 1 Arranged for	One-Way Page	S2-1	Open or Off
	Talk-Back		Closed or On
Zone 2 Arranged for	One-Way Page	S2-2	Open or Off
	Talk-Back		Closed or On
Zone 3 Arranged for	One-Way Page	S2-3	Open or Off
	Talk-Back		Closed or On
All-Call Arranged for	One-Way Page	S2-4(A)	Open or Off
	Talk-Back		Closed or On
Voltage of Zone Selection Leads	Ground or UIC	S3	G
	±10V, ±18V, ±105V or -24V dc		BATT

TABLE G
OPTION SELECTION ON TALK-BACK CARD

FEATURE		OPTION TERMINALS	OPTION STRAP
Initial Alerting Tone	Required	1-2	In
	Not Required		Out
Repetitive Alerting Tone	Required	3-4	Out
	Not Required		In
Silent Interval of Repetitive Alerting Tone	15 seconds*	5-6	In
	30 seconds		Out
Sound Level from Telephone Necessary to Switch Direction of Talk-Back Circuit	High	7-8	Out
	Low		In

*Do not use the 15-second option if the UIC is provided and access is via a PABX station line.

TABLE H
UIC TIMEOUT SETTINGS*

FEATURE	DESIRED TIMEOUT	DESIG	POSITION OR STRAP
PABX Station Access Without Talk-Back	4 seconds	Option Block J103‡	Strap In
	8 seconds		Strap Out
PABX Station Access With Talk-Back	4 to 20 seconds	Trimpot R108‡	Adjust as Required†

*The UIC does not provide a timeout when accessed from a PABX trunk or from the pickup key of a key set.

†R108 is factory set for a timeout period of approximately 12 seconds.

‡Option block J103 and trimpot R108 are located at the top of the card mounting chassis of the PagePac® VS.

- (2) When a zone or all-call is accessed, background music should be muted in all the zones.
- (3) Speak into the handset. The message should be heard in all the speakers connected to the selected zone or zones.
- (4) Replace the handset. The paging connection should be terminated and background music should again be heard from all the speakers.

UNIVERSAL INTERFACE CARD

4.05 **Installation:** If the UIC card is provided, it should be mounted at this time. The procedure is as follows:

- (1) Turn the **POWER** switch off.
 - (2) Set option switch S3 on the basic unit to **a**.
 - (3) Refer to Table E and strap the option block for either PABX Trunk Access, PABX Station Access, or direct telephone set access, and for either 24V or 48V operation.
- Caution: Never connect a unit optioned for TRUNK access to a STATION LINE. Doing so will damage the PagePac VS.**
- (4) On option block J3 of the UIC card, jumper pins 1-1 and 2-2 if trunk access is utilized; remove these jumpers if station access is provided.
 - (5) If station access is provided, set the disconnect time in non-talk-back zones for 4 seconds by strapping the two terminals on option block J103 on the card mounting chassis; for an 8-second timeout, omit this strap.
 - (6) When station access is provided, the disconnect time for talk-back zones is factory preset at approximately 12 seconds, but may be varied from 4 to 20 seconds by rotating trimpot R108 on the card mounting chasis. See Table H.

(7) Plug the ribbon cable from the Universal Interface Card into connector J7 on the PC board of the PagePac® VS unit. See Fig. 2.

Caution: Care must be taken to prevent bending the connector pins.

- (8) On the PagePac® VS backplate below the PC board, locate the two captive nuts, one under TB1, the other under switch S3.
- (9) Use the two #6-32 screws provided with the UIC to secure the card to the PagePac® VS backplate.
- (10) Connect wire W102 with attached connector J104 to option block J5 on the UIC card.
- (11) Connect the tip and ring wires from the PABX to terminals **r** and **n**, respectively, on TB2 of the UIC card.
- (12) If the FM Tuner Card will not be provided and an external source is available for background music, connect the music source output to terminals **MT** and **MR** of terminal strip TB1 on the UIC. Do not use terminals **MT** and **MR** on TB2 of the basic unit.
- (13) If a busy lamp or other **IN USE** indication is desired, it can be connected to terminals **n.o.** and **c** on TB1 of the UIC card. With a UIC card plugged in, similarly designated terminals on TB2 of the main assembly may not be used. Power for busy lamps must be supplied externally.

4.06 **Testing:** If the UIC card is provided, the PagePac® VS system is tested in the following manner before any additional option cards are plugged in:

- (1) Turn the **POWER** switch on.
- (2) Lift the handset of any tone-dial PABX station, listen for the dial tone, and key the access code for paging.

PagePac® VS Voice Paging System

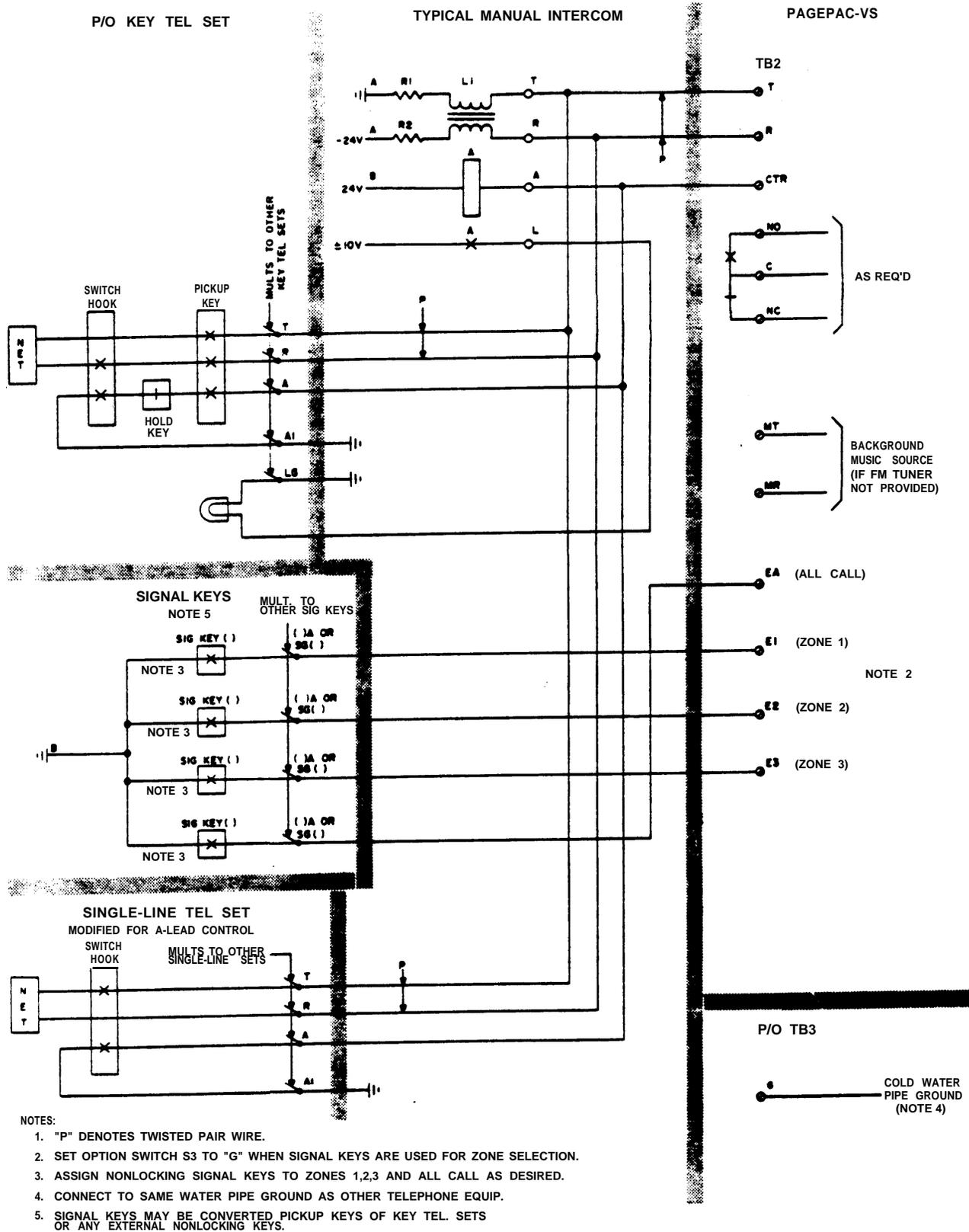
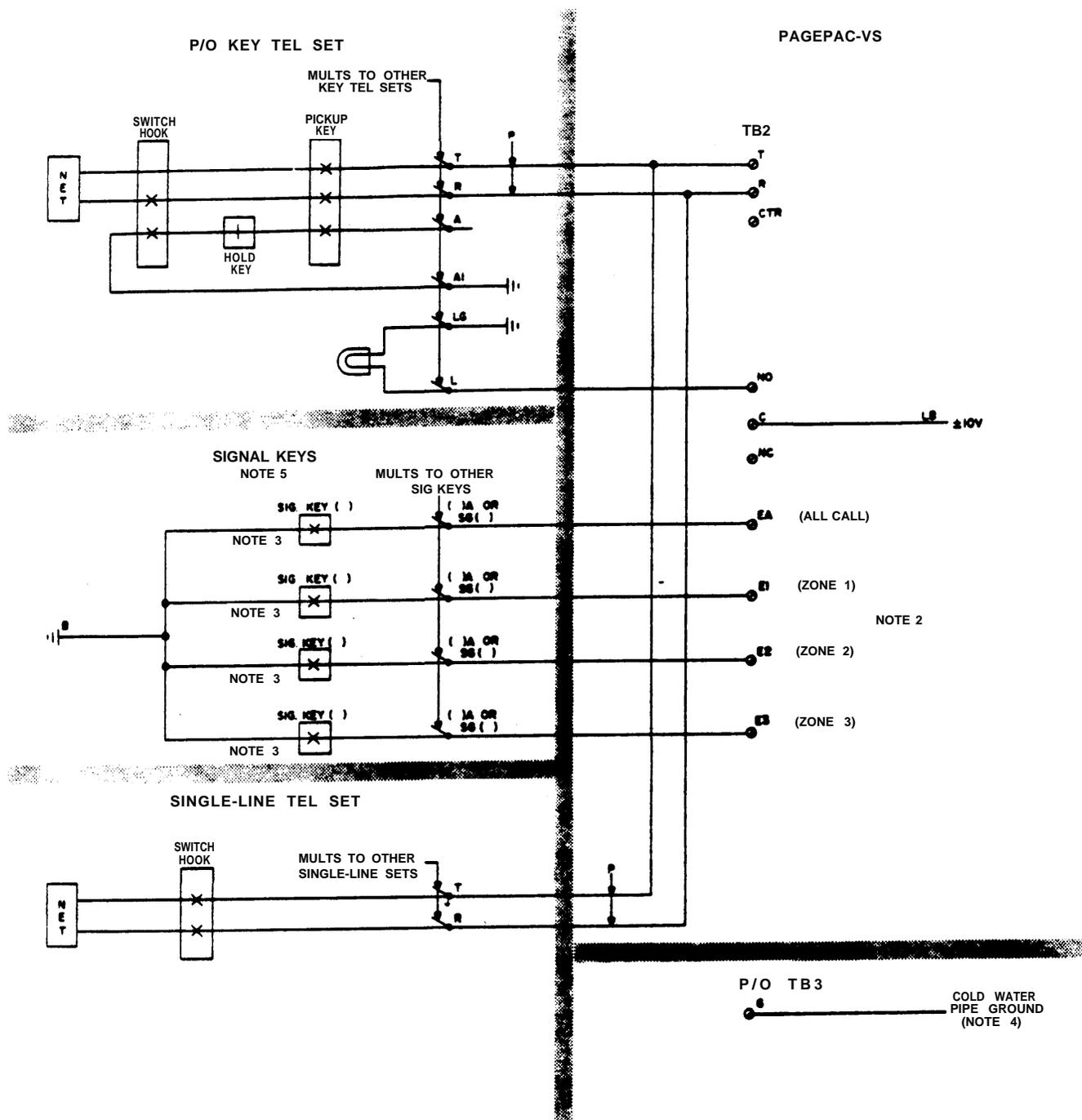


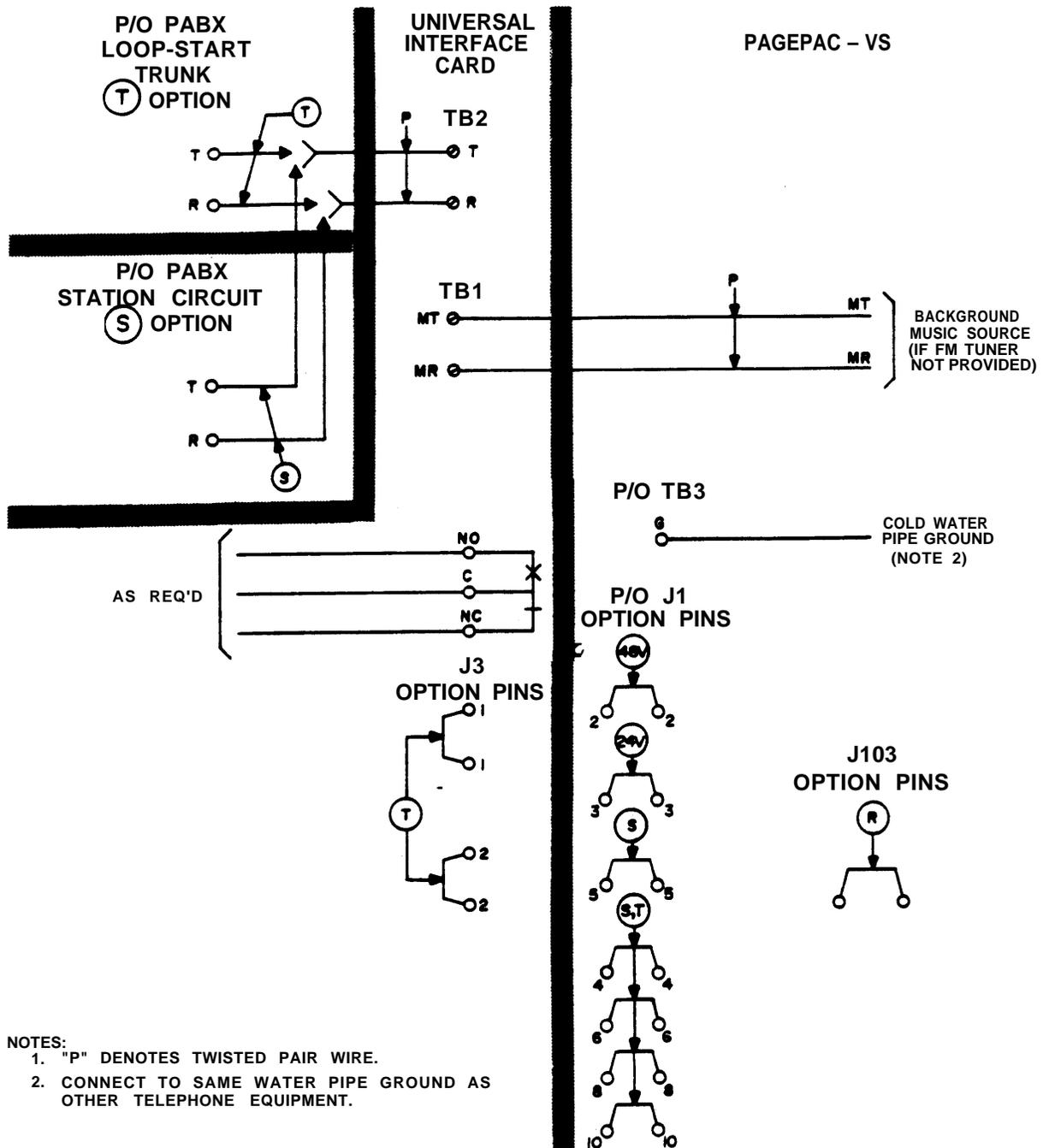
Fig. 8—Connections for Manual Intercom

PagePac® VS Voice Paging System



- NOTES:
1. "P" DENOTES TWISTED PAIR WIRE.
 2. SET OPTION SWITCH S3 TO "G".
 3. ASSIGN NONLOCKING SIGNAL KEYS TO ZONES 1, 2, 3 AND ALL CALL AS DESIRED.
 4. CONNECT TO SAME WATER PIPE GROUND AS OTHER TELEPHONE EQUIP.
 5. SIGNAL KEYS MAY BE CONVERTED PICKUP KEYS OF KEY TEL. SETS OR ANY EXTERNAL NONLOCKING KEYS.

Fig 10—Direct Connection to Station Instruments



- NOTES:
1. "P" DENOTES TWISTED PAIR WIRE.
 2. CONNECT TO SAME WATER PIPE GROUND AS OTHER TELEPHONE EQUIPMENT.

OPTION STRAPPING

FEATURE		OPTION	OMIT
PBX TRUNK ACCESS	28V OPERATION	24V, T	48V, S
	48V OPERATION	48V, T	24V, S
PBX STATION ACCESS	24V OPERATION	24V, S	48V, T
	48V OPERATION	48V, S	24V, T
RELEASE TIME (APPLICABLE TO STATION ACCESS ONLY)		4 SEC DISCONNECT	R
		8 SEC DISCONNECT	R

Fig. 11—Connections for PABX Access

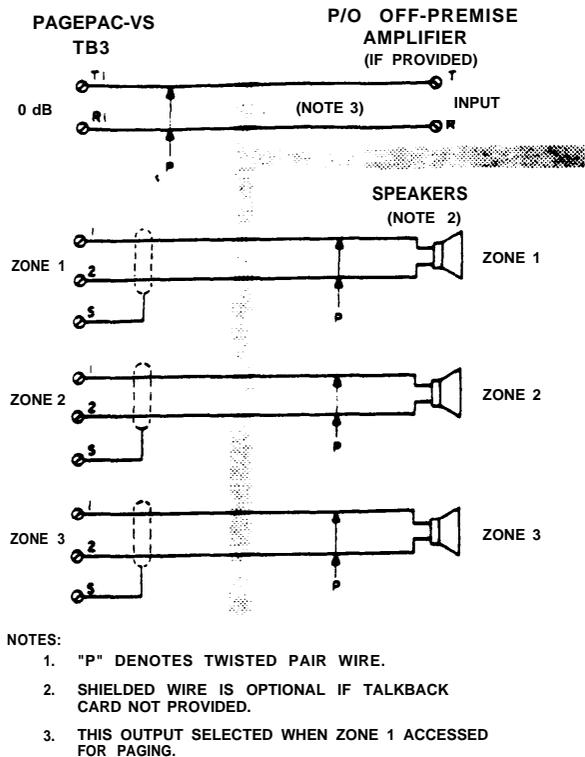


Fig. 12—Output Connections

- (3) If the paging system is in use, the PABX will return a busy tone to the calling party. If it is free, there will be no second dial tone.
- (4) Key the digit "4" to access zone 1. Background music should be disconnected from all the speakers.
- (5) Speak into the handset. The message should be heard from all zone 1 speakers.
- (6) Replace the handset. The PagePac® VS should disconnect and background music should again be heard in all the loudspeakers.
- (7) With station access, in non-talk-back zones, the system disconnects and background music is restored 4 to 8 seconds after either the caller ceases to page into the handset or the handset is replaced, whichever occurs first. In talk-back zones, the disconnect time is 4 to 20 seconds.
- (8) Repeat steps (2) to (7) for zone 2 by dialing the digit "5", for zone 3 by dialing "6" and for all-call by dialing "2".

TALKBACK CARD

4.07 **Installation:** If the talkback feature is provided, perform the following steps. If not, a factory-provided Talk-Back Continuity Card *must be* mounted in connector J102 of the basic unit.

- (1) Turn the POWER switch off.
- (2) Refer to Table G and perform the necessary option strapping on the Talk-Back Card.
- (3) Refer to Table F and set option switch S2 on the basic unit for the zones which will have talkback.
- (4) Remove the Talk-Back Continuity Card and install the Talk-Back Control Card in its place. See Fig. 1.
- (5) Save the continuity card for use to restore one-way paging in the event of a talk-back failure or if talk-back is removed in the future.

4.08 **Testing:** If the Talk-Back Control Card is provided, the feature is tested in the following manner:

- (1) Perform the test procedure of paragraph 4.04 if a UIC card is not provided or 4.06 if a UIC card is installed.
- (2) When those zones are called that have option switch S2 set for talk-back, either a single-burst or a repetitive alerting tone should be heard, depending on the options selected from Table G.
- (3) When the caller pages into a talk-back zone, instead of a one-way page, a two-way conversation should take place with the party at the speaker location.

Caution: *The Talk-Back card should be used with speakers and speaker wiring that is comparable in quality with that of Dracon products. Use of poor quality components or unshielded wiring may result in inferior talk-back performance.*

FM TUNER CARD

4.09 **Installation:** If the FM Tuner Card is provided, perform the following steps:

- (1) Turn the **POWER** switch to **OFF**.
- (2) If an outdoor antenna is available, connect it across terminals **ANT1** and **ANT2** of terminal block TB101 (Fig. 7). Otherwise provide the indoor antenna arrangement shown in Fig. 13. Some locations may require a more extensive antenna system.

Caution: *If an outside antenna is connected to the antenna terminals, the antenna system must be grounded in accordance with Articles 810 and 820 of the National Electrical Code ANSI/NFPA No. 60-1968.*

- (3) If the associated key system features music-on-hold and requires a music source, connect terminals **8 Ω out** on TB101 to the key system's music-on-hold line cards.
- (4) Mount the FM Tuner Card in connector J101 (Fig. 1).

4.10 **Tuning and Testing:** To align and test the FM Tuner Card, proceed as follows:

- (1) Turn the **POWER** switch to **ON**.
- (2) Set the FM Tuner Card's **ANT** switch to **EXT**.
- (3) Set the **SPK** switch to **ON** to disconnect the output and listen to the monitor speaker.
- (4) Set the **AFC** switch to **OFF**.
- (5) Set the FM Tuner Card's **MON VOL** control to mid-range.
- (6) Tune to the desired station. The red **TUNE** LED should light when the station is precisely tuned.

Note: If a station cannot be adequately tuned, as indicated by the lamp not illuminating properly, an external antenna may be required.

- (7) Set the **AFC** switch to **ON**.
- (8) Set the **SPK** switch to **OFF** to reconnect the audio output and disconnect the monitor speaker.
- (9) If music-on-hold is provided, adjust the music level by rotating the **MON VOL** control on the FM Tuner Card.
- (10) Adjust the background music level with the **MUSIC GAIN** control at the top of the main assembly.
- (11) Check for background music in each paging zone.

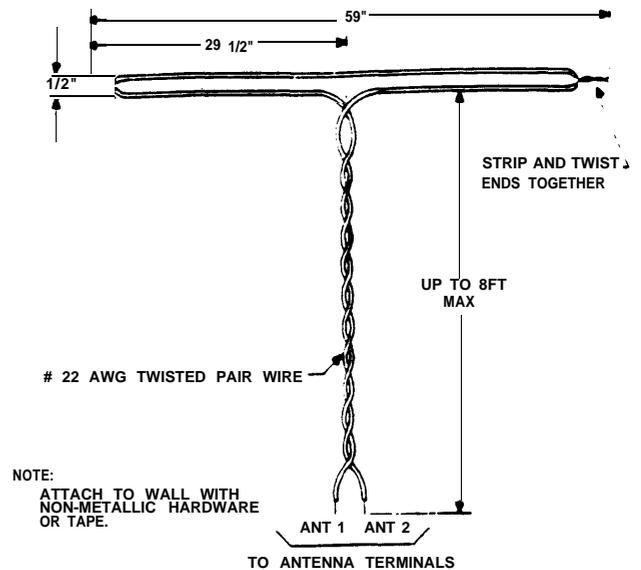


Fig. 13—Suggested Indoor FM Antenna

COMPLETING THE INSTALLATION

4.11 After all the desired option cards have been installed and all the foregoing tests have been performed, complete the installation as follows:

- (1) Check that each speaker is working and is connected to the proper zone.
- (2) Set the paging sound level of each individual speaker in the system by adjusting the speaker's power tap. Refer to Dracon practices DRCN-46-310, Cone Type Loudspeakers and Baffles, and DRCN-46-300, Horn Type Loudspeakers and Attenuators.
- (3) Check the operation of the off-premise amplifier, if provided. A page should only be heard when zone 1 or all-call is selected. At all other times, background music should be heard, the same as at the main location.
- (4) Check that each station that is not restricted can access the paging system.
- (5) Check that restricted phones, if any, cannot reach the paging system.
- (6) Check that all the desired options have been provided.
- (7) Dress the wiring neatly through the rings of the fanning strips.
- (8) Replace the cover of the PagePac® VS unit.

PagePac® VS Voice Paging System

5. OPERATION

IDLE CONDITION

5.01 In the idle state, background music from either the FM Tuner Card, if provided, or from an external source is applied to terminals **MT** and **MR** on TB2. From there it passes via the music preamplifier and music page switch to the input of the power amplifier. The music is amplified and applied to the speakers of all the zones. See Fig. 14.

DIRECT ACCESS

5.02 Repeat coil T3, Capacitor C25 and relay K4 comprise a transmission bridge which provides a 24- or a 48-volt battery feed to the calling telephone. When a telephone station goes off-hook, a loop is closed across tip and ring energizing relay K4. See Fig. 14.

5.03 Relay K4 operates and its contacts perform the following functions:

- Provide a closure to light an external busy lamp, if provided.
- Prepare a locking path for whichever zone relay will operate.

5.04 The caller selects the desired zone by momentarily pressing a non-locking key corresponding to the area he wishes to call, either zone 1, zone 2, zone 3 or all-call. A momentary ground is applied to terminal E1, E2, E3 or EA, respectively. If zone 1 is called, relays K2 and K3 operate to disconnect the speakers from zones 2 and 3 and prevent the page from reaching those areas. In the case of all-call, none of the relays operate. The operated relays latch via a contact of relay K4. At the same time that a zone or all-call is selected, an inhibit signal is transmitted to the music/page switch to mute background music.

5.05 The caller may now broadcast his page by speaking into his handset. The page is terminated when the caller replaces his handset. Relay K4 de-energizes and releases any operated zone relays. Background music is again heard in all zones and the system is ready for a new page.

INTERCOM ACCESS

5.06 In this mode the transmission bridge does not provide a battery feed to the station sets, as the intercom fulfills this function. The transmission path from the telephone system to repeat coil T3 (Fig. 14) is incomplete to prevent the latter from mutilating dial pulses in a rotary-dial intercom and to prevent an internal intercom call from being broadcast over the paging system. When the calling party goes off hook, he seizes the key system intercom in the normal manner.

5.07 To select the desired zone, the caller presses a non-locking key if he is connected to a manual intercom. If he is connected to a dial intercom, he dials the code assigned to the desired zone or all-call. In the former case, ground is applied to the corresponding terminal, E1, E2, E3 or EA. In the latter case, either $\pm 10V$, $\pm 18V$ or $\pm 105V$, depending on the intercom signaling voltage, is applied to these leads. If zone 2 is selected, for example, relays K1 and K3 operate to prevent the page from reaching zones 1 and 3.

5.08 The zone selection logic applies a ground to operate relay K4. Contacts of relay K4 perform the following functions:

- Provide a holding path for relay K4 via the dial intercom's holding lead or via the A lead of the calling station.
- Light an external busy lamp, if provided.
- Provide a holding path for the operated zone relays.
- Close the tip wire from the station to repeat coil T3 to complete the transmission path to the paging system.

5.09 The caller pages into his handset and background music is disconnected. Upon termination of the page, the caller replaces his handset. The A lead or the intercom holding lead is opened and relay K4 releases. K4 de-energizes any operated zone relays. The system is now back to idle.

PABX TRUNK ACCESS

5.10 When the caller in a PABX lifts his handset and dials the paging code, he is connected to a spare trunk assigned for paging. The trunk closes a loop across tip and ring to the paging system, and relay K4 operates in exactly the same manner as described in paragraphs 5.02 and 5.03.

5.11 To select a zone, the caller must have a tone-dial instrument and dials either "2", "4", "5" or "6", depending on whether he wishes all-call or zones 1, 2 or 3, respectively. The dual frequencies are received in the UIC card, decoded, and converted to a ground on lead EA, E1, E2 or E3 respectively. See Fig. 15.

5.12 Once the UIC card has been accessed and a zone or all-call selected, the user may dial other zones in succession without going on-hook. Each time he selects a new zone, the previous zone is disconnected.

5.13 The caller pages and disconnects in the same manner as with direct access, as described in paragraph 5.05. When he replaces his handset, the PABX releases the connection to the trunk and the trunk opens the loop to the paging system.

PABX STATION ACCESS

5.14 When the caller in a PABX dials the station code assigned for paging, ringing current is applied across tip and ring to the UIC card. See Fig. 15. The ring detector circuit in the UIC card is enabled and energizes UIC relay K1. K1 remains energized via a 4- or 8-second timer. Contacts of K1 disconnect the ring detector from the line and switch the calling party through to repeat coil T3. A loop is closed to the PABX via repeat coil T3 and the windings of relay K4 in series, tripping the ring signal and holding the connection through the PABX. Relay K4 is energized by the current flowing in the loop, and in turn energizes UIC relay K2. Contacts of relay K2 are used to light an external busy lamp, if provided.

5.15 The caller must now key the zone code as described in paragraph 5.11 to energize the appropriate zone relays.

5.16 The caller may now page. As he talks, a voice-operated switch resets the timer. 4 to 8 seconds after the caller finishes his page, the timer releases, de-energizing UIC relay K1. K1 opens the loop from the paging system to the PABX. The PABX disconnects the calling party from the called station circuit. Relay K4 is de-energized and releases the zone relays and UIC relay K2. The equipment is now fully restored.

TALK-BACK

5.17 If the Talk-Back Control Card is provided, during a page a two-way conversation may take place with the called speaker acting as both a loudspeaker and a microphone. The Talk-Back Control Card is activated for handsfree reply only if option switch S2 is closed for the called zone. When a zone selection is made, the zone logic transmits an enable signal to the talk-back circuit via S2. If S2 is open for that zone, the circuit only works in one direction.

ALL-CALL ONLY

5.18 If the all-call only strap is provided, when a station goes off hook, it is immediately connected to all zones without the need for making a zone selection.

OFF-PREMISE AMPLIFIER

5.19 The PagePac® VS provides a separate paging output for connection of an off-premise or auxiliary amplifier. Resistors R77 and R78 drop the output level to 0 dB and resistor R79 provides a 600-ohm output impedance for connection to a telephone line to the off-premise location. The amplifier output is connected to the zone 1 output, and the amplifier is in the page mode only when zone 1 or all-call is selected. At other times, background music is heard at the remote location, in the same manner as the main location.

PagePac® VS Voice Paging System

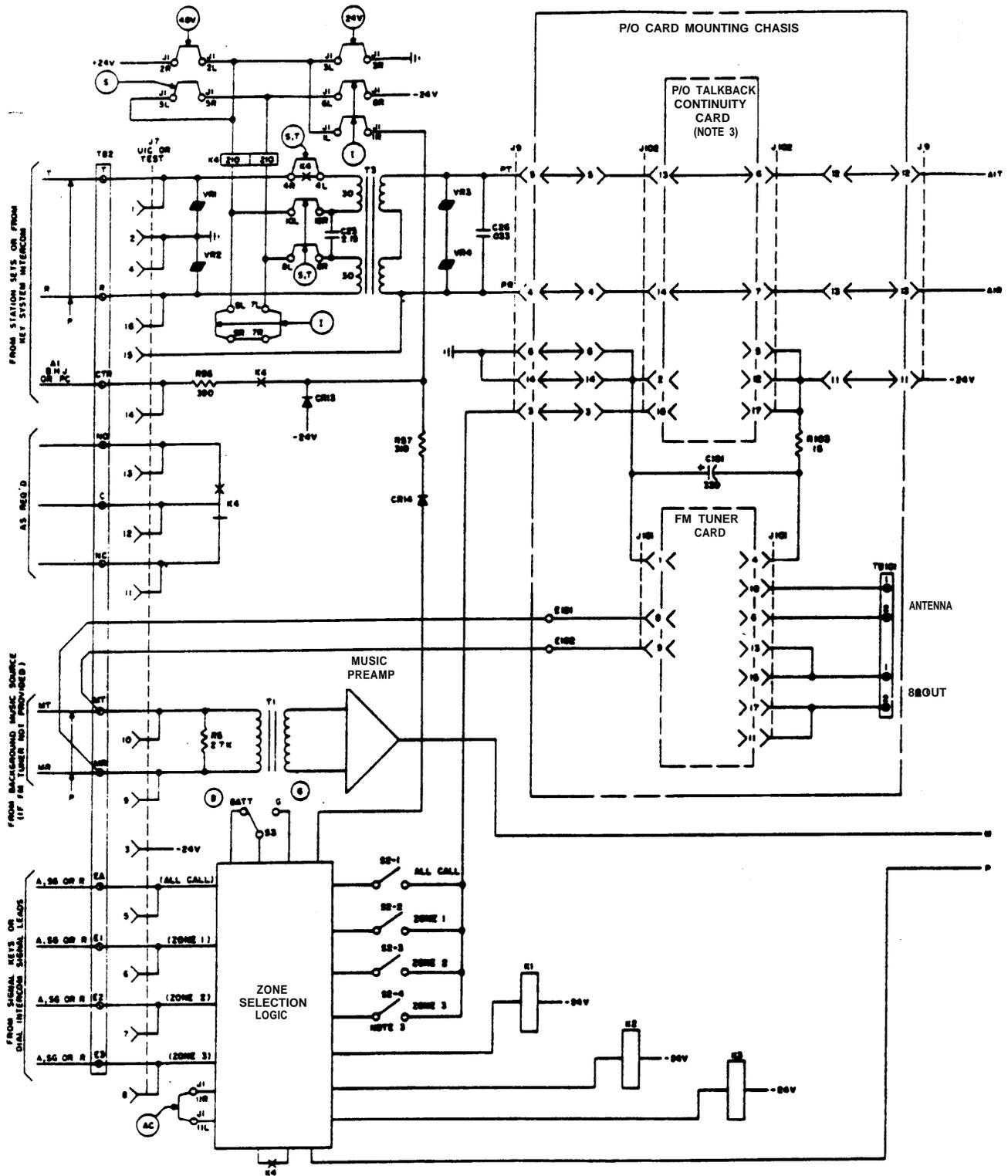
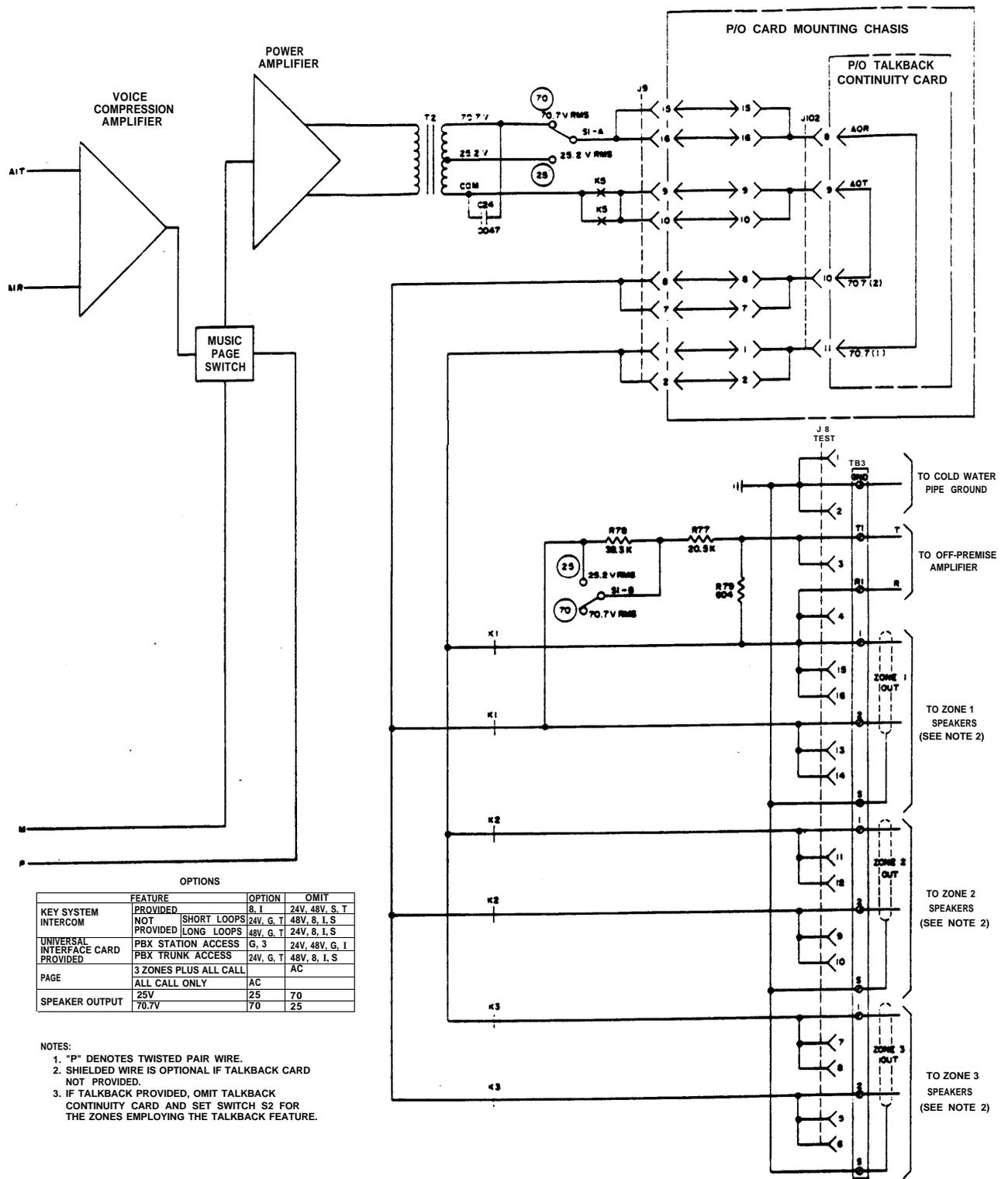


Fig. 14—PagePac® VS Simplified Schematic (Sheet 1 of 2)



OPTIONS

FEATURE	OPTION	OMIT
KEY SYSTEM INTERCOM PROVIDED	8, 1	24V, 48V, S, T
NOT PROVIDED	SHORT LOOPS	24V, G, T
LONG LOOPS	48V, G, T	24V, 8, I, S
UNIVERSAL INTERFACE CARD PROVIDED	PBX STATION ACCESS	G, 3
PBX TRUNK ACCESS	24V, G, T	24V, 48V, G, I
3 ZONES PLUS ALL CALL	AC	48V, 8, I, S
PAGE ALL CALL ONLY	AC	
SPEAKER OUTPUT 25V	25	70
70.7V	70	25

- NOTES:
1. "P" DENOTES TWISTED PAIR WIRE.
 2. SHIELDED WIRE IS OPTIONAL IF TALKBACK CARD NOT PROVIDED.
 3. IF TALKBACK PROVIDED, OMIT TALKBACK CONTINUITY CARD AND SET SWITCH S2 FOR THE ZONES EMPLOYING THE TALKBACK FEATURE.

Fig. 14—PagePac® VS Simplified Schematic (Sheet 2 of 2)

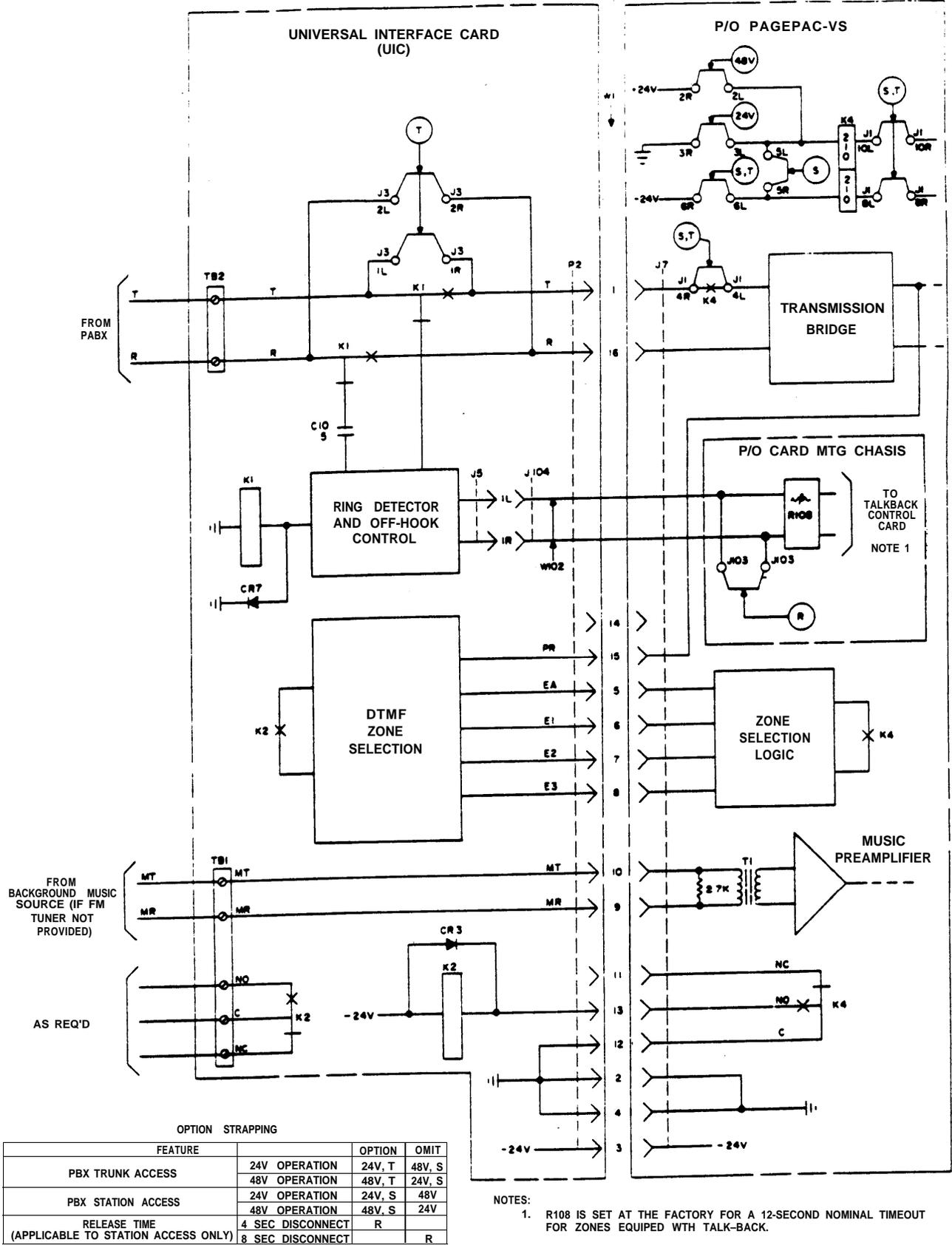


Fig.15—Universal Interface Card (UIC) Simplified Schematic

6. MAINTENANCE

6.01 **General:** When trouble is reported, verify that:

- Power is being supplied to the PagePac® VS.
- There are no broken connections at the terminal strips.
- The overload circuit breaker has not tripped.
- The paging system and the telephone system are both properly grounded.

6.02 **Test Apparatus Required:** If trouble still exists, the test equipment listed below shall be provided. Test lamps must not be used to check voltages. They can damage electronic circuits. A hand testset shall not be used to check voltages as the results will be misleading.

- Volt-ohm-milliammeter,
- Dracon TS21 Hand Test Telephone or equivalent, and
- Test leads with alligator clips.

6.03 **Voltage Check:** Before proceeding further, check that the voltage at the input to the PagePac® VS is not less than 105 volts nor more than 120 volts ac. Then check that the voltage across righthand pins 3R and 6R of option block J1 are not less than 22 volts nor more than 26 volts dc. Also check the voltages of the associated key system. An undetected blown fuse or low voltage will cause improper operation. DC voltage measurements are made with respect to (+) ground.

6.04 **Troubleshooting:** Trouble conditions originating outside of the paging system, such as shorted wires or ac power failure, should be located and cleared using normal telephone repair procedures. A Dracon TS21 Lineman's Test Set or equivalent, in the **MONITOR** mode, is an ideal tool to use for checking continuity of input and speaker wiring.

6.05 **Repairs:** The PagePac® VS, or any of its optional equipment, does not require periodic maintenance and is not field repairable. If a unit fails to function properly, it should be returned to Dracon for repair.

Note: A return authorization number must be received before returning any equipment. This number may be obtained by calling the Dracon Customer Service Department at (805) 487-5307.

6.06 **Talk-Back Malfunction:** Should a Talk-Back Control Card malfunction, the card may be removed and a Talk-Back Continuity Card placed in the connector to restore one-way paging. The Talk-Back Control Card should then be returned to Dracon for repair.

6.07 **Test Procedure:** The PagePac® VS system may be tested in accordance with the applicable procedures of part 4, or it may be disconnected from the telephone system and tested independently, as follows:

- (1) Set the **POWER** switch to **OFF**.
- (2) Unplug the UIC card, or disconnect the tip and ring wires from TB2.
- (3) On the option block, convert the system for direct station access.
- (4) Connect a speaker near the equipment, if necessary.
- (5) Set switch S3 to **G**.
- (6) Connect a Dracon TS21 Lineman's Test Set to the **τ** and **κ** terminals on terminal strip TB2.
- (7) Set the **POWER** switch to **ON**.
- (8) Place the test set in the **TALK** mode.
- (9) Momentarily jumper terminal **ε** on terminal strip TB3 and zone enable terminal EA, or E1 thru E3 on TB2, depending on the zone to be tested.
- (10) Test the system by making a paging call.
- (11) Disconnect by operating the test set **TALK/MON** switch to the **MON** position. The equipment should release properly.
- (12) Repeat the foregoing for each zone and for all-call.
- (13) After all testing is completed, reconnect the telephone system wiring, restore the original options and replace the cover.

6.08 **Unit Substitution:** If spare PagePac® VS units are available, continue to troubleshoot by substituting a spare unit for the one that is not working.

PagePac® VS Voice Paging System

7. FCC COMPLIANCE

FCC REGISTRATION

7.01 In compliance with Part 68 of the FCC Rules and Regulations, the customer is advised as follows:

7.02 **Standard Plugs and Jacks:** Direct connection to the network must be through a USOC type jack to be supplied by the telephone company. Registered terminal equipment or protective circuitry may not be used with party lines or coin telephone lines.

7.03 **Notification to Telephone Company:** Customers connecting terminal equipment to the telephone network shall, before such connection is made, give notice to the telephone company of the particular line(s) to which such connection is to be made and shall provide to the telephone company the FCC registration number and the ringer equivalence of the registered protective circuitry. Notice of final disconnect shall also be given.

7.04 **Separate Wiring:** Compliance with FCC Registration requires that wiring between PagePac® VS and the loudspeakers be in a cable harness separate from all other leads. It is also a requirement that the PagePac® VS be installed by a trained and authorized agent of the manufacturer or under the supervision of a licensed professional engineer, as provided for in section 68.215 of the FCC Rules and Regulations.

7.05 **Separate Housing:** The PagePac® VS has its own housing and mounts externally to the associated telephone system.

7.06 **Incident of Harm:** Should terminal equipment cause harm to the telephone network, the telephone company shall, where practicable, notify the customer that temporary discontinuance of service may be required. However, where prior notice is not practicable, the telephone company may temporarily disconnect service forthwith, if such action is reasonable in the circumstances. In case of temporary discontinuance, the telephone company shall (1) promptly notify the customer of such temporary discontinuance, (2) afford the customer the opportunity to correct the situation which gave rise to the temporary discontinuance, and (3) inform the customer of his right to bring a complaint to the Commission pursuant to the procedure set out in Subpart E of Part 68.

7.07 **Changes in Telephone Company Facilities, Equipment, Operations or Procedures:**

The telephone company may make changes in its communications facilities, equipment, operations or procedures, when such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of Part 68. If such changes can be reasonably expected to render any customer's terminal equipment incompatible with the telephone company communications facilities, or require modification or alteration of such terminal equipment, or otherwise materially affect its use or performance, the customer shall be given adequate notice in writing, to allow the customer an opportunity to maintain uninterrupted service.

7.08 **Repairs:** Repair of registered terminal equipment and registered protective circuitry shall be accomplished only by the manufacturer or by its authorized agent. ***This applies at any time during and after the warranty period.***

7.09 **Equipment Malfunction:** When trouble is experienced, the customer shall disconnect the registered equipment from the telephone line to determine if the registered equipment is malfunctioning, and that, if the registered equipment is malfunctioning, the use of such equipment shall be discontinued until the problem has been corrected.

7.10 **Restrictive Conditions:** The customer will be advised by written instructions of any restrictive conditions under which the apparatus must be used. Such restrictions to include information such as only with registered apparatus, or only with specific model numbers.

7.11 **Registration Number:** The type of connecting arrangement (jack) to be ordered from the telephone company is indicated below as typical. Other standard jacks may be used for specific applications.

USOC RJ-11C

COMPLIES WITH PART 68, FCC RULES	
FCC REGISTRATION NUMBER	<u>APF9Q9-70328-OT-N</u>
RINGER EQUIVALENCE	<u>0.88</u>

RADIO FREQUENCY INTERFERENCE

7.12 The UIC and FM Tuner Card generate and use radio frequency energy and if not installed and used in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. Both have been type tested and found to comply with the limits for a Class B device in accordance with the specifications in Subpart J of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the PagePac® VS off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- (a) Reorient the radio or TV receiving antenna.

- (b) Relocate the PagePac® VS with respect to the radio or TV receiver.
- (c) Move the PagePac® VS away from the radio or TV receiver.
- (d) Plug the PagePac® VS into a different outlet so that it and the radio or TV receiver are on different branch circuits.

7.13 If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402. Stock No. 004-000-00345-4.