GAI-TRONICS®
A HUBBELL COMPANY

69609-002 Dual PPI
(Page/Party Interface) PCBA

TABLE OF CONTENTS

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Confidentiality Notice

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SmartSeries®   Page/Party®   ADVANCE   SmartVolume™

General Information

NOTE: Proceed with these instructions only when replacing an existing dual PPI card. Contact GAI-Tronics' Service Department to modify the ADVANCE system's configuration when installing the No.69609-002 Dual PPI (Page/Party Interface) PCBA (printed circuit board assembly) as an addition to an existing ADVANCE system.

The No.69609-002 Dual PPI PCBA interfaces Page/Party field equipment to a No. 69254 Series or No. 69440 Series MCU (Master Control Unit). A No. 10457 Series card rack houses the dual PPI PCBA with the MCU and other associated PCBAs. The dual PPI card supports one or two Page/Party zones, referred to as *zone A* and *zone B*.

How to Use the Assembly

The No. 69609-002 Dual PPI provides the following features and capabilities:

- communicates with external GAI-Tronics field devices via FSK over the 33-ohm page line,

- supports on/off hook detection for party lines one and two,

- ground fault detection on the page line and party line one,

- fail-safe path,

- self-check audio path diagnostics,

- performs audio switching to transmit the 33-ohm page line audio to either of two 1000-ohm differential backplane page resources,

- allows page line audio to drive a differential page monitor bus on the backplane,

- allows party line switching from the 33-ohm party lines to the 33-ohm backplane,

- receives one external dry contact closure input for each Page/Party zone, and

- switches one output to drive an external relay, in each Page/Party zone, for special applications.

NOTE: The No.69609-002 Dual PPI does NOT support the following legacy features of the No. 69255-001 PPI PCBA:

- *Control Area PPI* Board Type—The dual PPI only reports as a *field area PPI* or as a *dual PPI.*
- RS-485 communication line.
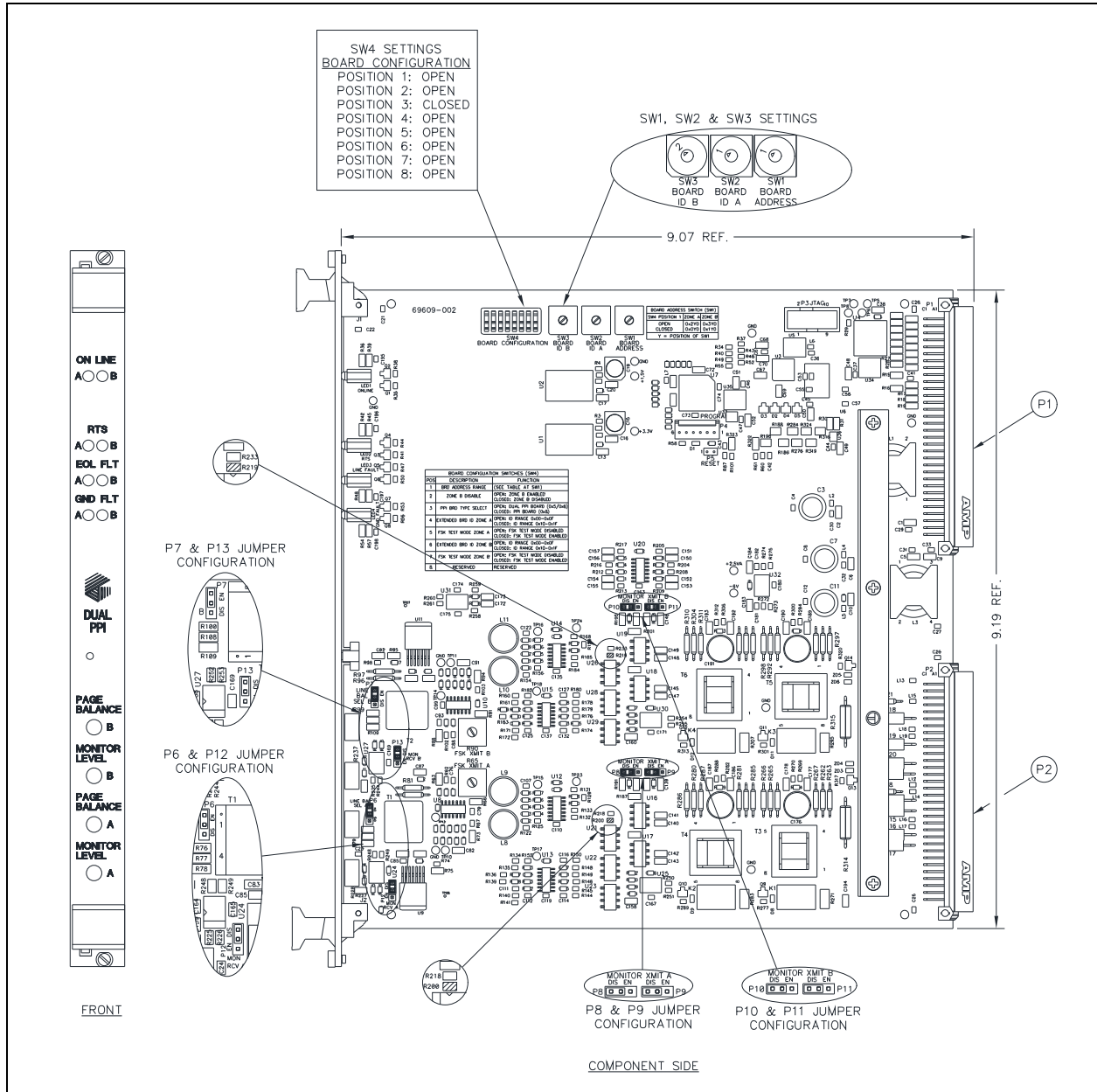- Party line one supervision via DTMF tone detection.

Figure 1. No.69609-002 Dual PPI PCBA

Configuration

Proper operation of the dual PPI card requires configuration of several switch and jumper settings prior to installation. GAI-Tronics' technicians configure the following settings during system commissioning and programming. Do NOT modify the factory configuration when replacing a dual PPI PCBA. When replacing an existing dual PPI, for maintenance purposes, replicate the switch and jumper setting of the existing dual PPI card (see Figure 1 for the switch and jumper locations).

Switch Settings

The dual PPI card contains three rotary hex switches, S1, S2, and S3, an eight-position DIP switch, S4, and multiple jumpers.

SW1—Board Address

Use the rotary hexadecimal switch SW1 in conjunction with DIP switch SW4-1 to set the hexadecimal board addresses that the MCU uses to access the dual PPI card. Since the dual PPI card provides two distinct Page/Party zones, the dual PPI occupies two separate board addresses—one for **zone A** and one for **zone B** (*assuming zone B is enabled*). The board addresses for **zone A** and **zone B** are below (see Table 1 and Table 2):

Table 1. Zone A Board Address

	Address		
Description	**0 | 2**	**0–F**	**0**
0 with SW4-1 Closed			
2 with SW4-1 Open			
Set by SW1			
Always zero			

Table 2. Zone B Board Address

	Address		
Description	**1 | 3**	**0–F**	**0**
1 with SW4-1 Closed			
3 with SW4-1 Open			
Set by SW1			
Always zero			

NOTE: Disabling **zone B** (*SW4-2 closed*) causes the dual PPI card to only occupy the **zone A** board address (the **zone B** board address is available for use by other cards, in the card rack).

SW2 and SW3—Board IDs

Use the rotary hexadecimal board ID switches, SW2 and SW3, in conjunction with DIP switch SW4 positions 4 and 6 to set the board ID values for **zone A** and **zone B**. Since the dual PPI provides access to two distinct Page/Party zones, the dual PPI has two board ID values—one for **zone A** and one for **zone B** (*if zone B is enabled*). The board ID values for **zone A** and **zone B** are defined below (expressed as hexadecimal values):

Table 3. Zone A Board ID

	Board ID	
Description	**0 | 1**	**0–F**
0 with SW4-4 Open		
1 with SW4-4 Closed		
Set by SW2		

Table 4. Zone B Board ID

	Board ID	
Description	**0 | 1**	**0–F**
0 with SW4-6 Open		
1 with SW4-6 Closed		
Set by SW3		

NOTE: DIP switches SW4-4 and SW4-6 (*Extended Board ID A/Extended Board ID B*) only function when SW4-3 (*board type select*) is in the **OPEN** position (*dual PPI board type selected*); otherwise, the upper hexadecimal digit of the board ID values for **zone A** and **zone B** are 0.

NOTE: Each Page/Party zone, associated with a given card rack, must have a unique board ID to allow the MCU to clearly identify it. For simplicity, the board ID values are typically set to match the zone numbers, in the ADVANCE system.

SW4—Board Configuration DIP Switch

The eight-position board configuration DIP switch, SW4, controls various aspects of the dual PPI PCBA in the ADVANCE system. The function for each switch position is in the table below (see Table 5) with subsections for each switch position after the table.

Table 5. DIP Switch SW4 Settings

Position	Parameter	Setting	Description
1	Board Address Range Select	Open	Sets first digit of the PCBA hardware address to 2 for zone A and 3 for zone B (*if enabled*).
		Closed	Sets first digit of the PCBA hardware address to 0 for zone A and 1 for zone B (*if enabled*).
2	Zone B Enable/Disable	Open	Enable zone B.
		Closed	Disable zone B (not visible to the MCU).
3	PCBA Board Type Select	Open	Board type is *Dual PPI*.
		Closed	Board Type is *PPI*.
4	Extended Board ID A	Open	Extended Board ID A first digit = 0.
		Closed	Extended Board ID A first digit = 1.
5	FSK Test Mode Enable A	Open	Disable FSK test mode for zone A (this position is required for normal operation).
		Closed	Enable FSK test mode for Zone A.
6	Extended Board ID B	Open	Extended Board ID B first digit = 0.
		Closed	Extended Board ID B first digit = 1.
7	FSK Test Mode Enable B	Open	Disable FSK test mode for zone B (this position is required for normal operation).
		Closed	Enable FSK test mode for zone B.
8	Reserved	Open	The dual PPI PCBA does not use this switch. Leave it in the OPEN position.

SW4-1—Board Address Range Select

The rotary hexadecimal switch, SW1, sets the PCBA addresses that the MCU uses to access the dual PPI card. When closed, SW4-1 sets the first digit of the PCBA address for **zone A** to 0 and **zone B** to 1. When open, SW4-1 sets the first digit of the PCBA address for **zone A** to 2 and **zone B** to 3 (see the SW1—Board Address section).

SW4-2—Zone B Enable/Disable

This switch disables **zone B**, which hides **zone B** from the MCU. Use this feature in systems that only require one of the two available zones, on the dual PPI.

SW4-3—PCBA Board Type Select

This switch sets the *board type* that the dual PPI reports to the MCU for both **zone A** and **zone B**. The dual PPI can report as a *PPI (Page/Party interface)*, or as a dual PPI (*dual Page/Party interface*).

NOTE: Upon initial release of the dual PPI card, always set switch position 3 to the **closed** position for PPI board type. The dual PPI board type is reserved for future use pending release of compatible MCU firmware.

SW4-4—Extended Board ID A

Use this switch with rotary switch SW2 to configure the board ID value for **zone A** (see the SW2 and SW3—Board ID section).

SW4-5—FSK Test Mode Enable A

This switch forces activation of the FSK carrier signal in **zone A**; producing a continuous alternating 1–0 data pattern at 2400 bps. This switch **must be OPEN** for normal system operation.

SW4-6—Extended Board ID B

Use this switch with rotary switch SW3 to configure the board ID value for **zone B** (see the SW2 and SW3—Board ID section).

SW4-7—FSK Test Mode Enable B

This switch forces activation of the FSK carrier signal in **zone B**; producing a continuous alternating 1–0 data pattern at 2400 bps. This switch **must be OPEN** for normal system operation.

SW4-8—Reserved

The dual PPI PCBA does not use this switch. Leave it in the OPEN position.

Jumper Settings

P6—Page Balance Select (Zone A)

This jumper enables/disables the dual PPI internal *page line balance* for **zone A**. The default/normal setting for this jumper is in the **EN** position (*internal page balance enabled*). Disable the page-line balance only when an external page-line balance is necessary.

NOTE: When using an external page balance, locate it near the card rack. Keep this jumper in the **EN** position (*internal page balance enabled*) unless using an external page balance:

Table 6. Zone A Page Balance Select Jumper P6

Setting	Description
EN	Internal Page Balance Enabled (Keep in this position for most installations.)
DIS	Internal Page Balance Disabled.

NOTE: The page balance adjustment for **zone A** has no effect when this jumper is set to the **DIS** position.

P7—Page Balance Select (Zone B)

This jumper enables/disables the dual PPI internal page line balance for **zone B**. The default/normal setting for this jumper is in the **EN** position (*internal page balance enabled*). Disable the page-line balance only when an external page-line balance is necessary.

NOTE: When using an external page balance, locate it near the card rack. Keep this jumper in the **EN** position (*internal page balance enabled*) unless using an external page balance:

Table 7. Zone B Page Balance Select Jumper J7

Setting	Description
EN	Internal Page Balance Enabled (Keep in this position for most installations.)
DIS	Internal Page Balance is Disabled.

NOTE: The page balance adjustment for **zone B** has no effect when this jumper is set to the **DIS** position.

P8, P9, and P12—Monitor Bus Transmit/Receive (Zone A)

These three jumpers control the page-line audio between **zone A** and the *monitor bus*. **Zone A's** page-line audio can drive the monitor bus, the monitor bus audio can drive **zone A's** page line, or there can be complete isolation between the monitor bus and the **zone A** page line.

Table 8. Zone A Monitor Bus Transmit/Receive

Option	P8 Setting	P9 Setting	P12 Setting
Isolation	DIS	DIS	DIS
Zone A Page Audio → Monitor Bus	EN	EN	DIS
Monitor Bus → Zone A Page line	DIS	DIS	EN

P10, P11, and P13—Monitor Bus Transmit/Receive (Zone B)

These three jumpers control the page-line audio between **zone B** and the *monitor bus*. **Zone B's** page-line audio can drive the monitor bus, the monitor bus audio can drive **zone B's** page line, or there can be complete isolation between the monitor bus and the **zone B** page line.

Table 9. Zone B Monitor Bus Transmit/Receive

| Option	P10 Setting	P11 Setting	P13 Setting
Isolation	DIS	DIS	DIS
Zone B Page Audio → Monitor Bus	EN	EN	DIS
Monitor Bus → Zone B Page line	DIS	DIS	EN

Installation/Replacement

⚠️**WARNING** ⚠️ —Failure to observe warnings may result in equipment damage.

⚠️ Warning: Observe precautions for handling electrostatic sensitive devices.

⚠️**WARNING** ⚠️ —Disconnect power to the card rack prior to installation.

1. Verify that power is disconnected from the card rack assembly prior to installation/replacement.

2. Remove the No.69609-002 Dual PPI from its carton.

3. Configure the switch and jumper settings (see the <u>Configuration</u> section) in accordance with the instructions in the system manual.

4. Remove the existing Dual PPI from card rack assembly.

5. Install the replacement Dual PPI as described below.

    1. Align the PCBA into the upper and lower tracks of the assigned slot.
    2. Slide the PCBA towards the rear of the card rack until it comes in contact with the backplane connector.
    3. Firmly press on the front bezel until the PCBA is seated. Secure the PCBA to the card rack by tightening the two screws, on the front bezel (See <u>Figure 1</u>).

6. Apply power to card rack assembly.

7. After a brief delay, observe the LEDs, on the dual PPI:

    *   the ON LINE LEDs illuminate for the configured zones.
    *   The RTS LEDs flash continuously if SmartSeries stations are configured to communicate with the dual PPI.
    *   The EOL FAULT LEDs should NOT illuminate.
        These LEDs only illuminate when an EOL (End-of-Line) device is not responding to the dual PPI.
    *   The GND FAULT LEDs should NOT illuminate.
        These LEDs only illuminate when a ground fault is present on the page line or party line one.

Table 10. Dual PPI LEDs

Zone A or Zone B LED	Condition
EOL FAULT	An end-of-line station is not responding
GROUND FAULT	A page line or *party line one* conductor is grounded.
ON LINE	The Page/Party zone is recognized by the MCU.
RTS	Data communication request to send

8. Adjust the *page line balance* for **zone A** and **zone B** after connecting all stations to the card.

    The *page balance* sets the line loading impedance on each zone's page line.

    1. From a station, connected to the dual PPI card, squeeze the handset pressbar and blow steadily into the mouth piece.

2. Listen to the sidetone in the receiver.

3. Adjust the page line balance until the receiver emits a minimal side tone.

   The page line balance does not require readjustment unless adding ten or more stations to the zone.

NOTE: If a handset station is not available for use, perform the following steps:

1. Connect a true impedance meter to the page line of the appropriate dual PPI.

2. Adjust the line balance potentiometer to a reading as close to 33 ohms as possible.

9. Adjust the *monitor level* for **zone A** and **zone B**, if used:

   Adjust the *monitor level* during system start-up. This is required <u>only</u> if the jumper configuration is set for *monitor receive*.

   1. Have an individual go to the nearest Page/Party station and talk on the page line.

   2. Adjust the *page monitor* until the desired level is achieved.

10. Verify that the dual PPI properly routes audio and communicates with the external devices as indicated in the system manual.

Replace a Single 69255-001 PPI Board

- When using a dual PPI to replace a single No. 69255-001 PPI board, use **zone A** on the dual PPI (disable Zone B, on the dual PPI).

- Use the following conversion table, as a guide when setting the board address for the dual PPI (see the <u>SW1—Board Address</u> section):

Switch on Dual PPI	Equivalent Switch on PPI	Notes
SW1	S1	Assigns middle nibble of board address

- Use the following conversion table, as a guide, when setting the board ID values for the dual PPI (see the <u>SW2 and SW3—Board ID</u> section):

Switch on Dual PPI	Equivalent Switch on PPI	Notes
SW2	S2	Assigns Board ID for Zone A
SW3	None	Assigns Board ID for Zone B

NOTE: In this case, the position of SW3 is unimportant and the system ignores it.

GAI-Tronics recommends the following settings for switch SW4 for most installations:

Switch (SW4)	Setting
Position 1	OPEN
Position 2	**CLOSED**
Position 3	CLOSED
Position 4	OPEN
Position 5	OPEN
Position 6	OPEN
Position 7	OPEN
Position 8	OPEN

NOTE: SW4-2 must be **CLOSED** to disable Zone B (see the SW4—Board Configuration DIP Switch section on page 4).

- For most installations, set the *page balance select* jumpers (P6 and P7) to the **EN** position (*internal page balance enabled*).

- use the following conversion table, as a guide, to set the *monitor bus transmit/receive* jumpers for the dual PPI:

Jumper(s) on Dual PPI	Equivalent Jumper(s) on PPI	Notes
P8/P9	J6/J8/J11/J12	Zone A Page Audio → Monitor Bus
P12	J9/J10	Monitor Bus → Zone A Page Line

NOTE: Place jumpers P10, P11, and P13 in the **DIS** position in this case.

Replace Two 69255-001 PPI Boards

When using a dual PPI to replace two 69255-001 PPI boards:

- Determine which 69255-001 PPI board will be mapped to **zone A** of the dual PPI and which will be mapped to **zone B**. Hereafter, based on this mapping, the two 69255-001 PPI boards are referred to as **zone A PPI** and **zone B PPI**.

- Use the following conversion table, as a guide, to set the board address for the dual PPI (see the SW1—Board Address section on page 3):

Switch on Dual PPI	Equivalent Switch on PPI	Notes
SW1	S1 on either zone A PPI or zone B PPI	Assigns middle nibble of board address

NOTE: The dual PPI occupies two distinct board addresses. Therefore, the installer must ensure that these two board addresses do not conflict with any other cards, in the card rack. To prevent this, it may be necessary to change the board address of another card, in the card rack.

- Use the following conversion table, as a guide, to set the board ID values for the dual PPI (see the SW2 and SW3—Board ID section on page 4):

Switch on Dual PPI	Equivalent Switch on PPI	Notes
SW2	S2 on zone A PPI	Assigns board ID for zone A
SW3	S2 on zone B PPI	Assigns board ID for zone B

- GAI-Tronics recommends the following settings for switch SW4 for most installations (see the SW4—Board Configuration DIP Switch section on page 4):

Switch (SW4)	Setting
Position 1	OPEN
Position 2	OPEN
Position 3	CLOSED
Position 4	OPEN
Position 5	OPEN
Position 6	OPEN
Position 7	OPEN
Position 8	OPEN

- For most installations: set the *page balance select*, jumpers P6 and P7, to the **EN** position (*internal page balance enabled*.)

- Use the following conversion table, as a guide, to set the *monitor bus transmit/receive* jumpers on the dual PPI:

Jumper(s) on Dual PPI	Equivalent Jumper(s) on PPI	Notes
P8/P9	J6/J8/J11/J12 on Zone A PPI	Zone A Page Audio → Monitor Bus
P12	J9/J10 on Zone A PPI	Monitor Bus → Zone A Page Line
P10/P11	J6/J8/J11/J12 on Zone B PPI	Zone B Page Audio → Monitor Bus
P13	J9/J10 on Zone B PPI	Monitor Bus → Zone B Page Line

Interfaces
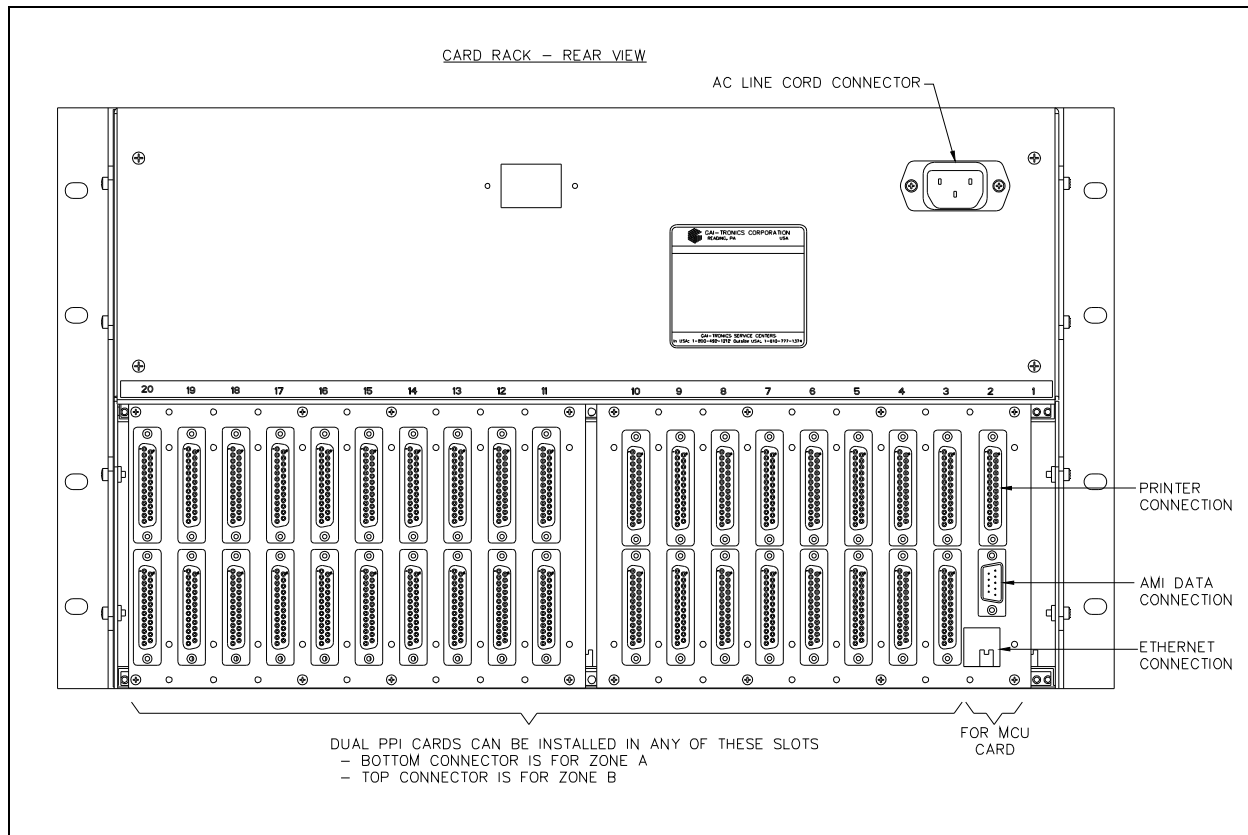
Figure 2. No.69609-002 Interfaces

All field device interfaces are through connector **P2** on the No.69609-002 Dual PPI PCBA. **Zone A's** field connections are to the card rack's lower D-subminiature connector and Zone B's field connections are to the card rack's upper D-subminiature connector. and include the following connections for each of the two available Page/Party zones:

• page line,

• party line one,

• party line two,

• contact closure input, and

• external relay control output.

Operation

The ADVANCE system MCU controls the operation of the dual PPI card. See the MCU configuration details in the system manual for all dual PPI operational information.

Troubleshooting

Status/Message	Possible Cause	Suggested Action
One or both ON-LINE LEDs <u>not</u> illuminated	No power to the card	• Verify power is applied to the card rack. • Verify the dual PPI is properly seated in the card rack. • Call for service.
	A component failure has occurred	• Replace the dual PPI with a spare. • Call for service.
	Zone is not in the configuration	• Verify the proper board address and board ID settings on the dual PPI. • Verify proper board configuration DIP switch (SW4) settings. • Verify proper MCU configuration. • Call for service.
One or both RTS LEDs do not flash	Card improperly configured.	• Verify the *FSK Test Mode* switches (SW4 Positions 5 and 7) are in the **OPEN** position.
	No configured external devices.	• Verify proper MCU configuration. • Call for service.
	component failure.	• Replace the Dual PPI with a spare. • Call for service.
One or both EOL Fault LEDs are illuminated	An End-of-Line (EOL) station is not reporting	• Verify the connection between the dual PPI and connector P2. • Verify the connection between the P2 connector and the external module. • Verify power is applied to the external module. • Verify the EOL station is installed. • Verify the proper MCU configuration. • Call for service.
One or both GND Fault LEDs are illuminated	A conductor on the page line or Party Line 1 is grounded	• Identify which conductor is grounded, by measuring the resistance to ground of each conductor. Then, remove ground from the associated conductor. • Call for service.
No audio in the zone	The audio path is impaired.	• Verify the connection between the dual PPI and connector P2. • Verify the connection between connector P2 and the affected zones. • Call for service.
	MCU configuration is not correct.	• Verify the proper MCU configuration. • Call for service.
Receiver sidetone is high.	The page line balance needs adjustment	• Check the *page balance select* jumper settings (P6 and P7). • Adjust the *page balance* for the affected zone. • Call for service.
Monitored audio levels are low.	The monitor level needs adjustment.	• Check the *monitor receive* jumper settings (P12 and P13). • Increase the *monitor level* adjustment for the affected zone. • Call for service.

Specifications

Electrical

Power requirements .... +5 V dc from backplane

+12 V dc from backplane

−12 V dc from backplane

Current draw .... nominal +5 V, 80 mA

+12 V, 110 mA

−12 V, 70 mA

Connections...two (P1, P2) × 64-pin DIN connectors

Inputs/outputs (× 2 zones)... page line, 33 Ω, 250–6000 Hz, 1.5 V $_{RMS}$ nominal

party line one, 33 Ω, 250–3500 Hz, 1.5 V $_{RMS}$ nominal

party line two, 33 Ω, 250–3500 Hz, 1.5 V $_{RMS}$ nominal

dry contact closure input, NO, maintained

external relay control output, 105 mA short circuit current

Data communications... 2400 baud FSK modem

Off hook detection .... less than 120 Ω across party lines one and two

Ground fault detection .... less than 5000 Ω to ground for page line and party line one

Output ....1.5 V $_{RMS}$ nominal into 33-Ω load

Distortion ....1.5% max. THD @ 1 kHz

FSK output to line...0.7 V $_{RMS}$, 2 V $_{P-P}$ into 33-Ω load

FSK frequencies.. 30.720 kHz (Mark)

32.914 kHz (Space)

Front Bezel Controls.. monitor speaker level adjustment (Zone A/Zone B)

page line balance adjustment (Zone A/Zone B)

Front Bezel LED Indicators

On Line Zone A/Zone B (green—on/off)...on during operation

RTS Zone A/Zone B (green—flashing)..indicates FSK transmission

EOL Fault Zone A/Zone B (red—on/off)......................................indicates no response from EOL station

Ground Fault Zone A/Zone B (red—on/off)... indicates ground fault

Front Bezel Controls

Monitor Level Zone A/Zone B .... Volume adjust for the Monitor Receive

0.5–1.8 V $_{RMS}$ into 33-Ω useable adjustment range (with 1.5 V $_{RMS}$ across backplane)

Page Balance Zone A/Zone B ....Sets page line loading

16 to 116-Ω adjustment range

Environmental

Temperature range (operating/storage)...+32 °F to +122 °F (0 °C to +50 °C)

Humidity ....95% non-condensing relative humidity

Mechanical

Unit dimensions .... 10.30 H × 0.78 W × 9.07 D in (264.16 × 19.812 × 230.378 mm)

Unit weight.. 1.3 lb (0.59 kg)

Reference Material

Published by	Title	GAI Tronics Ref. No.
GAI-Tronics	Dual Page/Party® Interface PCBA Assembly Drawing	75656

Warranty

Equipment. GAI-Tronics warrants for a period of one (1) year from the date of shipment, that any GAI-Tronics equipment supplied hereunder shall be free of defects in material and workmanship, shall comply with the then-current product specifications and product literature, and if applicable, shall be fit for the purpose specified in the agreed-upon quotation or proposal document. If (a) Seller's goods prove to be defective in workmanship and/or material under normal and proper usage, or unfit for the purpose specified and agreed upon, and (b) Buyer's claim is made within the warranty period set forth above, Buyer may return such goods to GAI-Tronics' nearest depot repair facility, freight prepaid, at which time they will be repaired or replaced, at Seller's option, without charge to Buyer. Repair or replacement shall be Buyer's sole and exclusive remedy. The warranty period on any repaired or replacement equipment shall be the greater of the ninety (90) day repair warranty or one (1) year from the date the original equipment was shipped. In no event shall GAI-Tronics warranty obligations with respect to equipment exceed 100% of the total cost of the equipment supplied hereunder. Buyer may also be entitled to the manufacturer's warranty on any third-party goods supplied by GAI-Tronics hereunder. The applicability of any such third-party warranty will be determined by GAI-Tronics.

Services. Any services GAI-Tronics provides hereunder, whether directly or through subcontractors, shall be performed in accordance with the standard of care with which such services are normally provided in the industry. If the services fail to meet the applicable industry standard, GAI-Tronics will re-perform such services at no cost to buyer to correct said deficiency to Company's satisfaction provided any and all issues are identified prior to the demobilization of the Contractor's personnel from the work site. Re-performance of services shall be Buyer's sole and exclusive remedy, and in no event shall GAI-Tronics warranty obligations with respect to services exceed 100% of the total cost of the services provided hereunder.

Warranty Periods. Every claim by Buyer alleging a defect in the goods and/or services provided hereunder shall be deemed waived unless such claim is made in writing within the applicable warranty periods as set forth above. Provided, however, that if the defect complained of is latent and not discoverable within the above warranty periods, every claim arising on account of such latent defect shall be deemed waived unless it is made in writing within a reasonable time after such latent defect is or should have been discovered by Buyer.

Limitations / Exclusions. The warranties herein shall not apply to, and GAI-Tronics shall not be responsible for, any damage to the goods or failure of the services supplied hereunder, to the extent caused by Buyer's neglect, failure to follow operational and maintenance procedures provided with the equipment, or the use of technicians not specifically authorized by GAI-Tronics to maintain or service the equipment. THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES AND REMEDIES, WHETHER EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Return Policy

If the equipment requires service, contact your Regional Service Center for a return authorization number (RA#). Equipment should be shipped prepaid to GAI-Tronics with a return authorization number and a purchase order number. If the equipment is under warranty, repairs or a replacement will be made in accordance with the warranty policy set forth above. Please include a written explanation of all defects to assist our technicians in their troubleshooting efforts.

Call 800-492-1212 (inside the USA) or 610-777-1374 (outside the USA) for help identifying the Regional Service Center closest to you.