MOTOROLA

WIRELINE INTERFACE BOARD

MODELS CLN6955D
CLN6957D

1 DESCRIPTION

The Models CLN6955D and CLN6957D wireline interface boards (WIBs) are described in this section. A general description, identification of jumpers, indicators, and inputs/outputs, functional block diagrams, and functional theory of operation are provided. The information provided is sufficient to give service personnel a functional understanding of the module, allowing maintenance and troubleshooting to the module level. (Refer also to the Maintenance and Troubleshooting section of this manual for detailed troubleshooting procedures for all modules in the station.)

General Description

Note: *Model CLN6955 WIB is designed for use in stations installed in locations where local codes permit phone line connections to either the 50-pin Telco connector or the orange screw terminal connector. Model CLN6957 allows only connections to the orange screw terminal connector.*

The WIB serves as the interface between the customer telephone lines and the station equipment. Each WIB contains circuitry to interface with a variety of telephone line configurations and signal types. In addition, the board contains a connector to accept one modem card. This card is required to interface with an ASTRO 9.6kbps input.

The WIB is installed behind the SCM front panel and connects to the station backplane. Phone line connections may be made either to a 50-pin Telco connector and/or an orange screw terminal connector (see sidebar).

Overview of Circuitry

The WIB contains the following circuitry:

- Audio and Data Circuits — the WIB provides a number of voice and data circuits that interface with the customer phone lines
- Microprocessor (µP) — serves as the main controller for the WIB; communicates with the SCM microprocessor, interfaces with the ASTRO data signals, and provides monitoring and control for a variety of on-board I/O circuits
- Peripheral Application Specific IC (PASIC) — primarily responsible for injecting and retrieving PCM voice signals into/from the time division multiplexing (TDM) bus that connects from the WIB to the SCM
- DC Remote Detection — circuitry provides current sensing and detection for dc remote control of station
- Simulcast Processing Circuitry — circuitry is provided for summing and control of simulcast PL and reverse burst tones

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2 CONTROLS, INDICATORS, AND INPUTS/OUTPUTS

Figure 1 shows the WIB jumpers, indicators, and all input and output external connections.

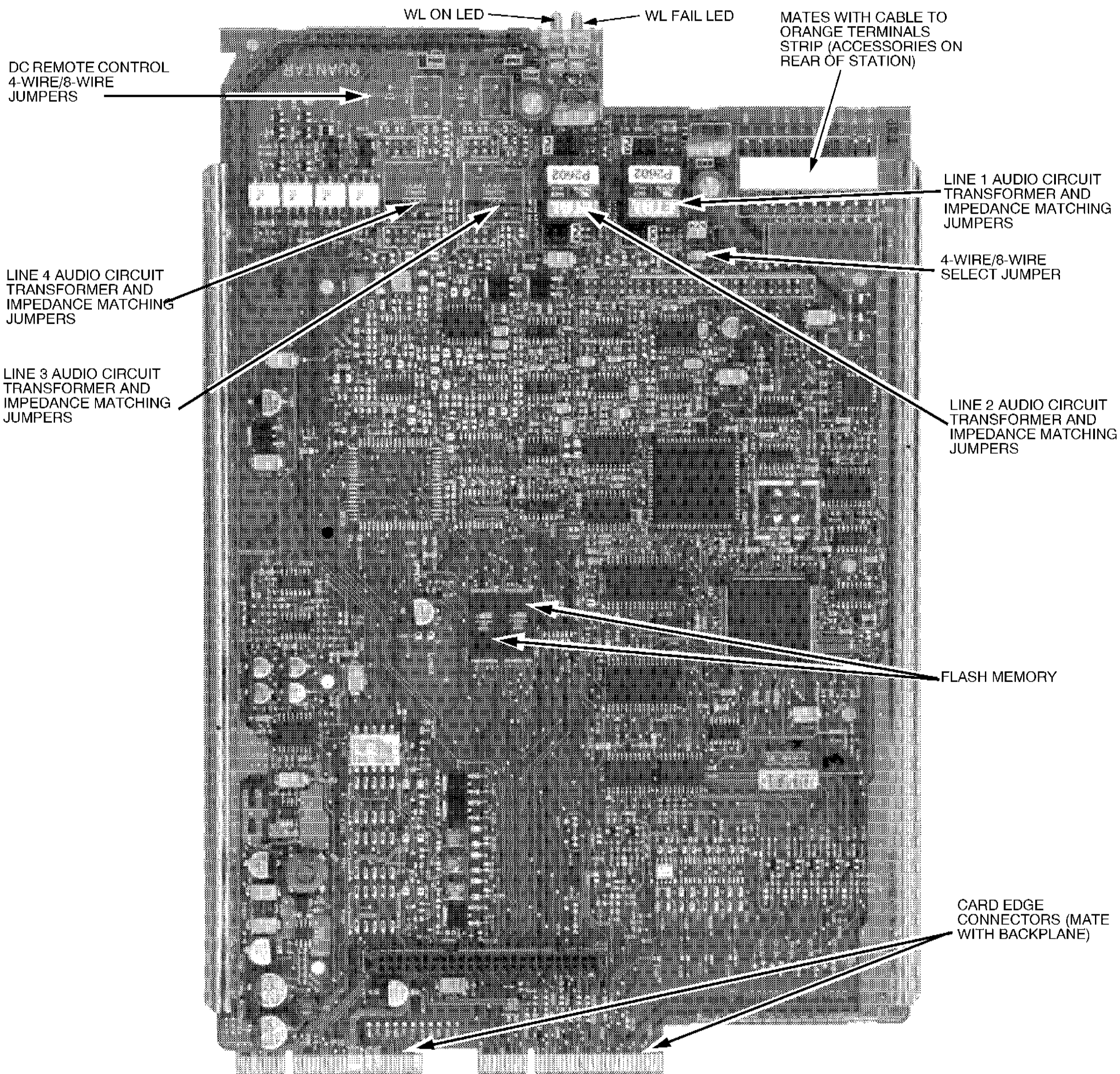

Figure 1 Wireline Interface Board Jumpers, Indicators, and Inputs/Outputs (CLN6955D Shown)

3 FUNCTIONAL THEORY OF OPERATION

The following theory of operation describes the operation of the WIB circuitry at a functional level. The information is presented to give the service technician a basic understanding of the functions performed by the module in order to facilitate maintenance and troubleshooting to the module level. Refer to Figure 2 for an overall block diagram of the WIB, and Figure 3 through Figure 5 for block diagrams for 2-wire voice, 4-wire voice, and ASTRO 9.6kbps signal paths.

Functional Overview

Introduction

As mentioned previously, the WIB serves as the interface between the customer telephone lines and the station equipment. In general, the WIB processes and routes all voice and/or data signals between the station equipment and the landline equipment such as a control center or modem.

As shown in the block diagram in Figure 2, the WIB contains a µP with RAM and EPROM, a PASIC, one 4-wire audio circuit, and one 2-wire audio circuit. Also provided are a dc remote decoding circuit, Simulcast processing circuitry, and miscellaneous I/O circuits. All of these circuits are described in the following paragraphs.

Microprocessor Circuitry

The WIB µP provides overall control of the WIB operation, provides two serial bus links, and communicates with the µP in the SCM.

The WIB operating code and other parameters are stored in two 256k x 8 FLASH ICs. Short term storage is provided by two 128k x 8 RAM ICs.

The µP data bus is connected to each of the PASICs to provide control.

Two serial bus links are provided and managed by the µP. One of these is dedicated to interfacing with a plug-in modem card for ASTRO 9.6kbps applications. The other serial link is used to interface with the microprocessor in the SCM using HDLC protocol.

Peripheral Application Specific IC (PASIC)

One PASIC is provided on the WIB to interface with the various audio/ data circuits. In general, the PASIC is responsible for accepting either PCM voice information (for 4-wire or 2-wire operation) and routing the information to the proper destination such as from landline to station and from station to landline. Details of the signal paths are provided in *Description of Audio/Data Signal Paths* later in this section.

Audio/Data Circuits

Each WIB contains circuitry for one 4-wire audio/data circuit, one 2-wire audio/data circuit, and one ASTRO 9.6kbps data circuit. As shown in the block diagram, the PASIC and its associated circuitry function to provide the following signal paths:

- 4-wire voice audio from landline to station, and from station to landline
- 2-wire voice audio from landline to station, and from station to landline
- 9.6kbps (ASTRO) modem data from landline to station, and from station to landline

Description of Audio/Data Signal Paths provided later in this section contains block diagrams of each of the major signal paths with an explanation of the signal flows.

DC Remote Detection

The WIB contains circuitry to monitor the Line 1 Audio and Line 2 Audio input lines and detect dc control currents. The detection outputs (±12.5mA, ±5.5 mA, +2.5 mA, and -2.5 mA) are dc voltages (nominally either +.7V or +5V) that are fed to an A/D converter. The converter serves as a comparator and interprets the inputs as highs and lows. The data is then sent serially to the µP.

Miscellaneous Inputs/Outputs

The following inputs and outputs are provided on the WIB. These lines may be assigned various functions according to customer specifications.

- One (1) optically-coupled input
- Seven (7) transistor-coupled inputs
- One (1) relay closure output (normally open contact)
- Three (3) transistor-coupled outputs

Simulcast Processing Circuitry

Summing and gating circuitry is provided on the WIB to allow PL tones, reverse burst, and TX audio (GEN TX DATA) to be combined and output to the VCO in the exciter module (after signal processing by the SCM) to directly modulate the rf carrier. The simulcast circuitry is controlled by the SCM µP via the WIB µP and the PASIC on the WIB.

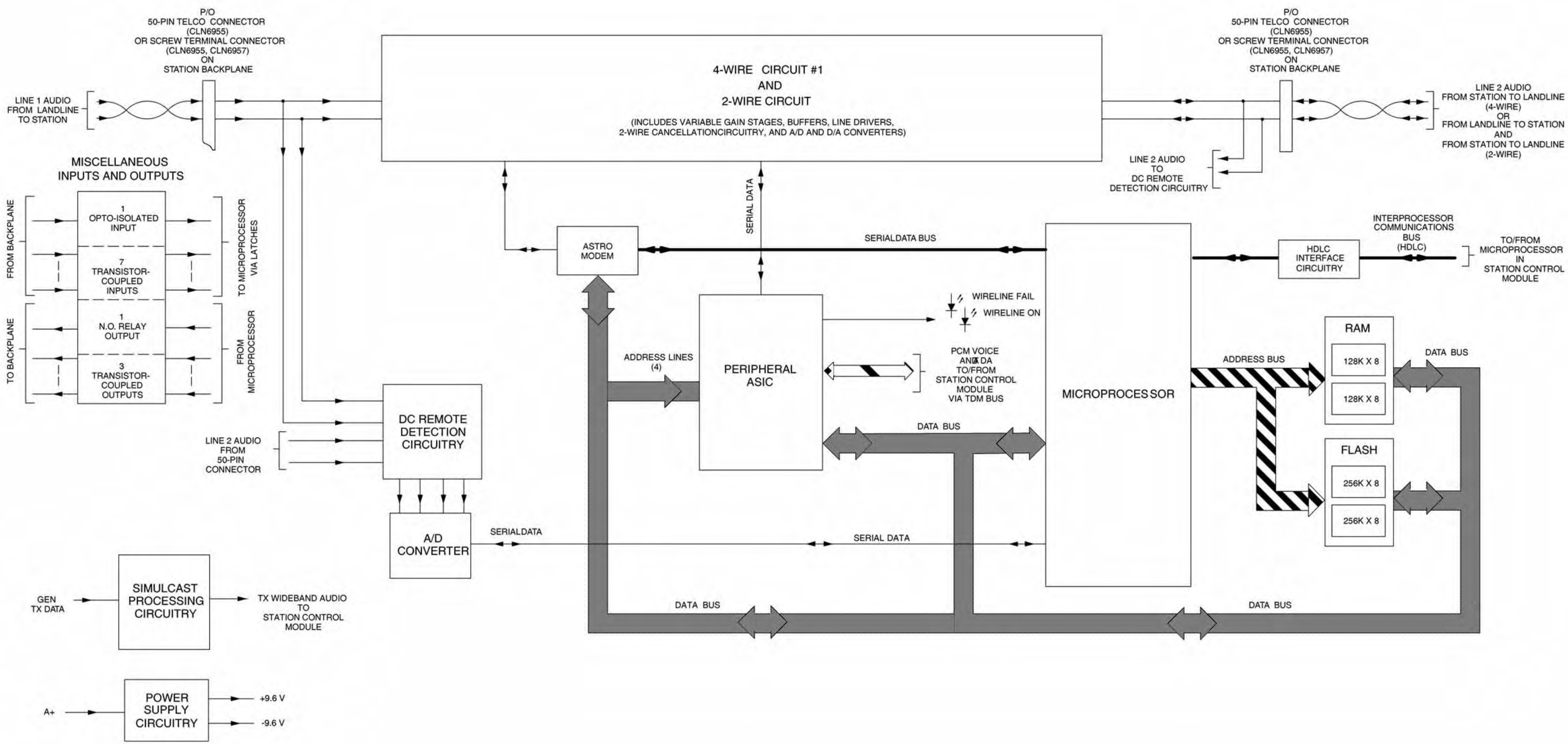

Figure 2 CLN6955D / CLN6957D Wireline Interface Board Functional Block Diagram

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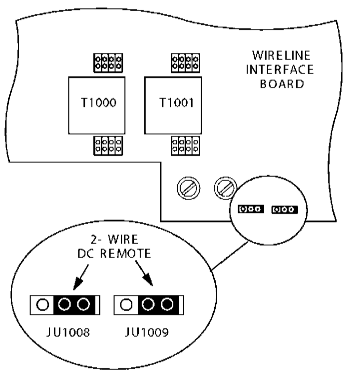
Description of Audio/Data Signal Paths

Note: *Depending on local codes and/or customer preference, phone line connections may be made at either the 50-pin Telco connector or the screw terminal connector on the station backplane. 2-wire audio connections are made at Line 2 Audio.*

For systems using dc remote control, set jumpers JU1008 and JU1009 as shown below for 2-wire applications:



Four levels of gain adjustment are provided by circuitry on the WIB for Landline-to-Station and Station-to-Landline audio paths. Additional fine level adjustments are performed in software in the SCM.

(Note that a sample of the outbound signal is fed from one of the output transistors to the cancellation amplifier in the landline to station circuitry. This signal is used to cancel the outbound signal and allow the inbound signal to pass through the landline to station circuitry.)

2-Wire Voice Audio Path (Refer to Figure 3)

Voice audio signals sent to/from the station via 2-wire copper pair are processed by the 2-wire audio circuit on the WIB (line 2 audio). The audio transformer in this circuit may have both inbound and outbound audio signals present simultaneously, and therefore employs circuitry to pass audio in each direction while cancelling the alternate signal. The 2-wire audio circuit operates as follows:

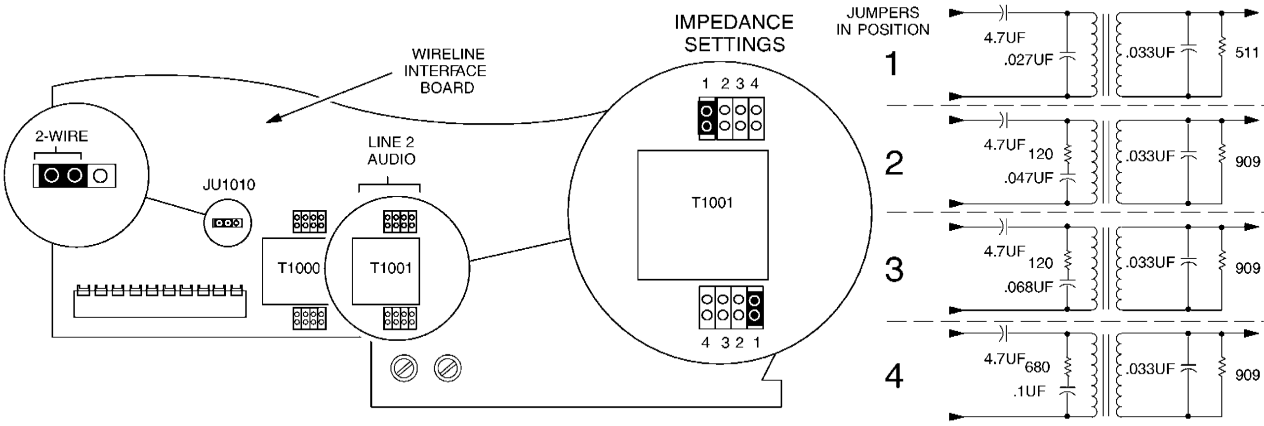
Landline to Station balanced audio is input to the primary of an audio transformer. The signal is induced into the transformer secondary and fed to an amplifier. [Note that jumper fields in parallel with both the primary and secondary coils provide for selectable impedance matching. Refer to the illustration below for impedance setting information.]

The amplifier sums the inbound and outbound signals and feeds one input to the cancellation amplifier. The other input to this amplifier is the output signal only. A cancellation of the outbound signal results, and the output from this amplifier is the inbound signal only. The signal is fed to a buffer (through jumper JU1010 placed in the 2-wire position, as shown in the figure at the top of the next page) that feeds the gain adjust circuitry. Under control of the PASIC, the gain control circuitry provides eight levels of gain adjust: 5, 10, 15, 20, 25, 30, 35, and 40 dB.

The output of the gain adjust circuitry is fed to an A/D converter that digitizes the audio signal into a PCM output. The PCM output is fed serially to the PASIC, which places the data in the proper TDM timeslot (as instructed by the µP in the SCM) and output to the SCM on the TDM Bus.

Station to Landline audio is input to the PASIC in the form of PCM data on the TDM bus. The PASIC extracts the data and feeds it to a D/A converter that takes the PCM data and converts it to an analog audio signal. The audio signal is fed to the gain adjust circuitry. Under control of the PASIC, the gain control circuitry provides four levels of gain adjust: 0dB, -6dB, -12dB, and -18dB.

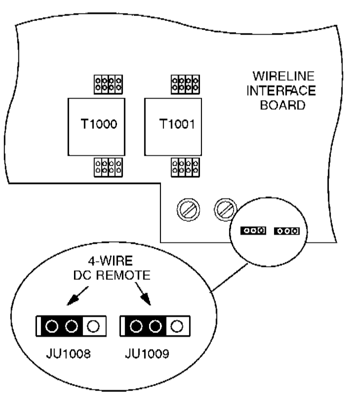
The output of the gain adjust circuitry is fed through a 2-pole low-pass filter and into the inputs of two amplifiers. The outputs of the amplifiers are fed to two transistors that are connected in a push-pull configuration to drive the primary of an audio transformer. The audio signal is induced into the secondary and output to the landline system (via either the 50-pin Telco connector or screw terminal connector) as balanced audio.



Note: All jumpers removed for high impedance input/output.

Note: Depending on local codes and/or customer preference, phone line connections may be made at either the 50-pin Telco connector or the screw terminal connector on the station backplane. Landline to Station signals are connected at Line 1 Audio. Station to Landline signals are connected at Line 2 Audio.

For systems using dc remote control, set jumpers JU1008 and JU1009 as shown below for 4-wire applications::



Four levels of gain adjustment are provided by circuitry on the WIB for Landline-to-Station and Station-to-Landline audio paths. Additional fine level adjustments are performed in software in the SCM.

4-Wire Voice Audio Path (Refer to Figure 4)

Voice audio signals sent to/from the station via 4-wire copper pairs are processed by the 4-wire audio circuit on the WIB (line 1 audio & line 2 audio). The 4-wire circuit operates as follows:

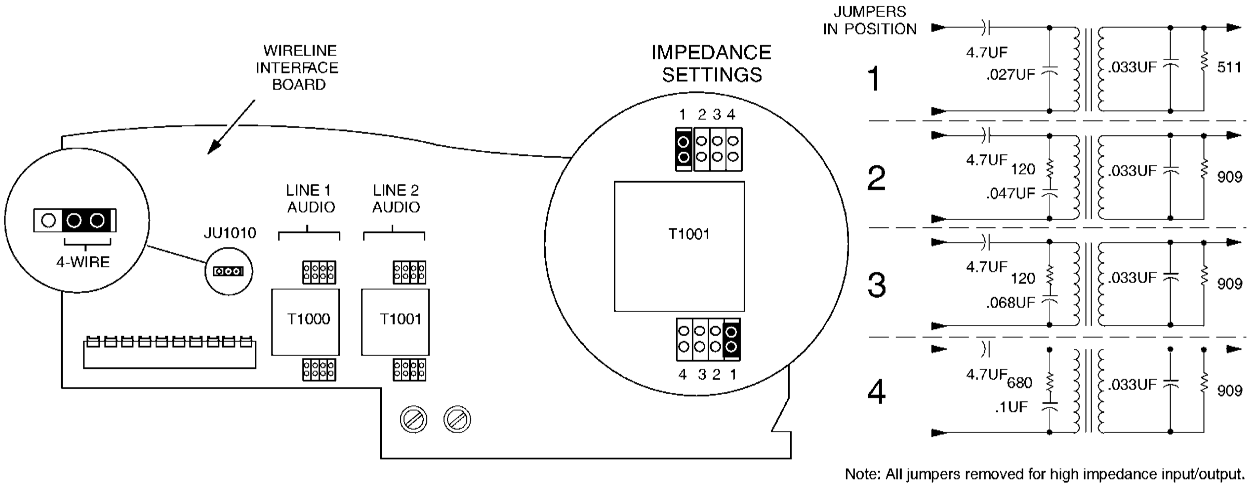
Landline to Station balanced audio is input to the primary of an audio transformer. The signal is induced into the transformer secondary and fed to a buffer (through jumper JU1010 placed in the 4-wire position, as shown below). [Note that jumper fields in parallel with both the primary and secondary coils provide for selectable impedance matching. Refer to the figure at the top of the next page for impedance setting information.]

The buffer output is fed to the gain adjust circuitry. Under control of the PASIC, the gain control circuitry provides eight levels of gain adjust: 5, 10, 15, 20, 25, 30, 35, and 40 dB.

The output of the gain adjust circuitry is fed to an A/D converter that digitizes the audio signal into a PCM output. This output is fed serially to the PASIC, which places the data in the proper TDM timeslot (as instructed by the µP in the SCM) and output to the SCM on the TDM Bus.

Station to Landline audio is input to the PASIC in the form of PCM data on the TDM bus. The PASIC extracts the data and feeds it to a D/A converter that takes the PCM data and converts it to an analog audio signal. The audio signal is fed to the gain adjust circuitry. Under control of the PASIC, the gain control circuitry provides four levels of gain adjust: 0dB, -6dB, -12dB, and -18dB.

The output of the gain adjust circuitry is fed through a 2-pole low-pass filter and into the inputs of two amplifiers. The outputs of the amplifiers are fed to two transistors that are connected in a push-pull configuration to drive the primary of an audio transformer. The audio signal is induced into the secondary and output to the landline system (via either the 50-pin Telco connector or screw terminal connector) as balanced audio.



9.6KBPS (ASTRO) Modem Data Path (Refer to Figure 5)

9.6kbps (ASTRO) modem data signals are sent to/from the station via 4-wire copper pairs and are processed by the 4-wire audio circuit on the WIB (line 1 audio & line 2 audio). The 4-wire circuit operates as follows:

Note: *Depending on local codes and/or customer preference, phone line connections may be made at either the 50-pin Telco connector or the screw terminal connector on the station backplane. Landline to Station signals are connected at Line 1 Audio. Station to Landline signals are connected at Line 2 Audio.*

The WIB is equipped with a connector to accept a plug-in ASTRO modem card.

Landline to Station modem data is input to the primary of an audio transformer as balanced audio. The signal is induced into the transformer secondary and fed to a buffer (through jumper JU1010 placed in the 4-wire position, as shown at the top of this page). [Note that jumper fields in parallel with both the primary and secondary coils provide for selectable impedance matching. Refer to the illustration above for impedance setting information.]

The buffer output is fed to a modem (a separate card that plugs into the WIB) that converts the modem signal to detected data. The data signal is then fed to the µP over a serial bus. The µP sends the data to the µP in the SCM over an interprocessor communications bus (HDLC protocol).

Station to Landline modem data is input to the µP from the SCM µP via the interprocessor communications bus (HDLC protocol). The µP feeds the data to the modem that converts the data to a modem signal.

The output of the modem is fed to the gain adjust circuitry. Under control of the PASIC, the gain control circuitry provides four levels of gain adjust: 0dB, -6dB, -12dB, and -18dB.

The output of the gain adjust circuitry is fed through a 2-pole low-pass filter and into the inputs of two amplifiers. The outputs of the amplifiers are fed to two transistors that are connected in a push-pull configuration to drive the primary of an audio transformer. The modem data signal is induced into the secondary and output to the landline system (via either the 50-pin Telco connector or screw terminal connector) as balanced audio.

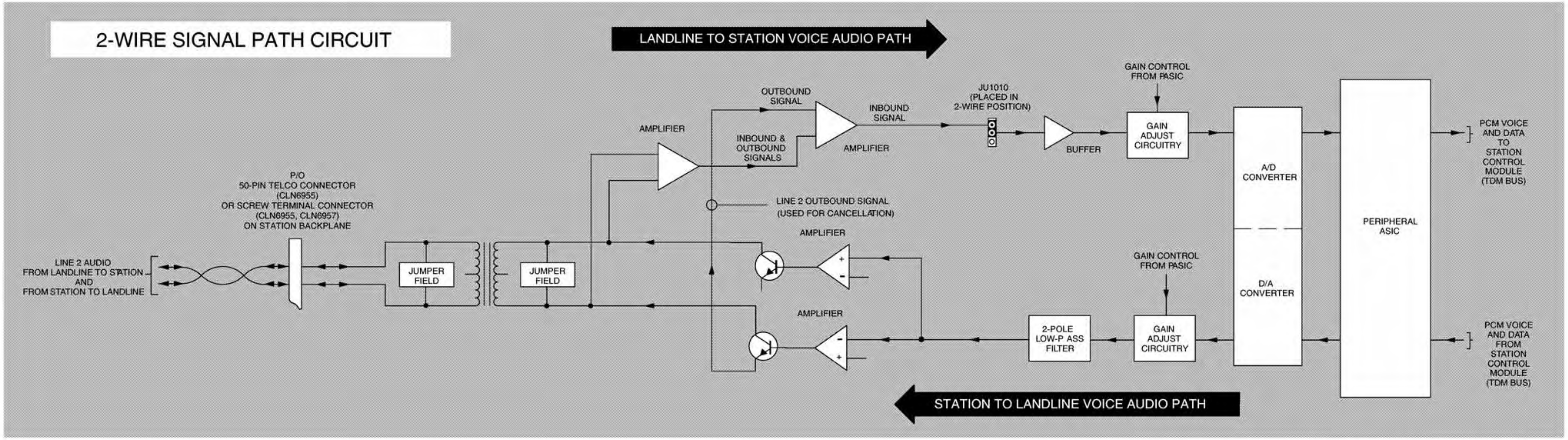


Figure 3 2-Wire Voice Audio Path Functional Block Diagram

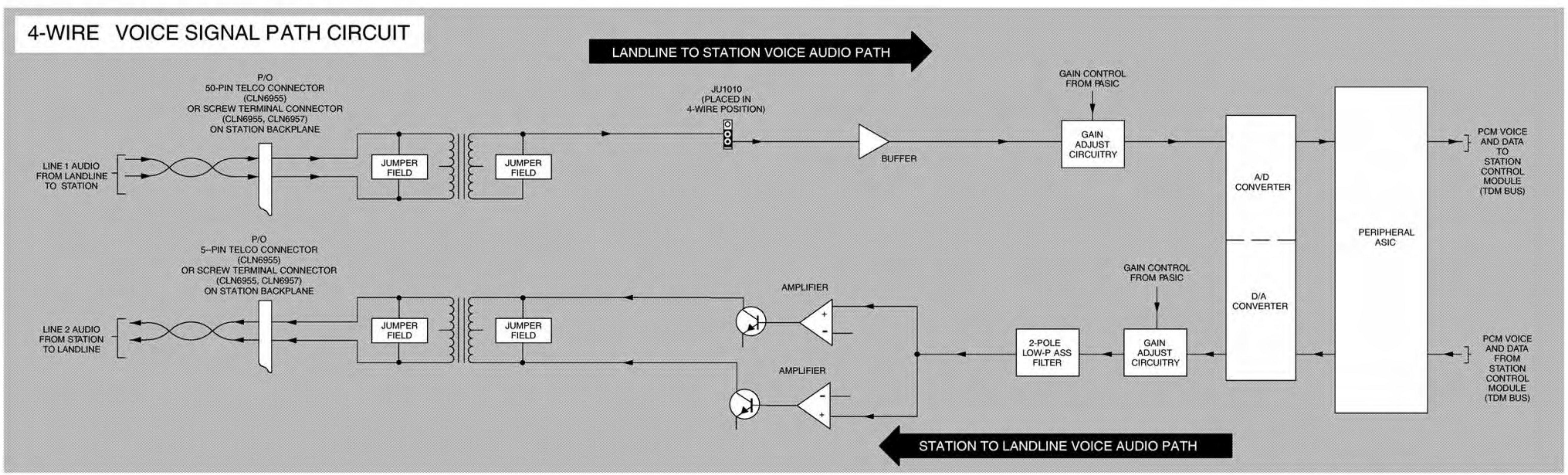


Figure 4 4-Wire Voice Audio Path Functional Block Diagram

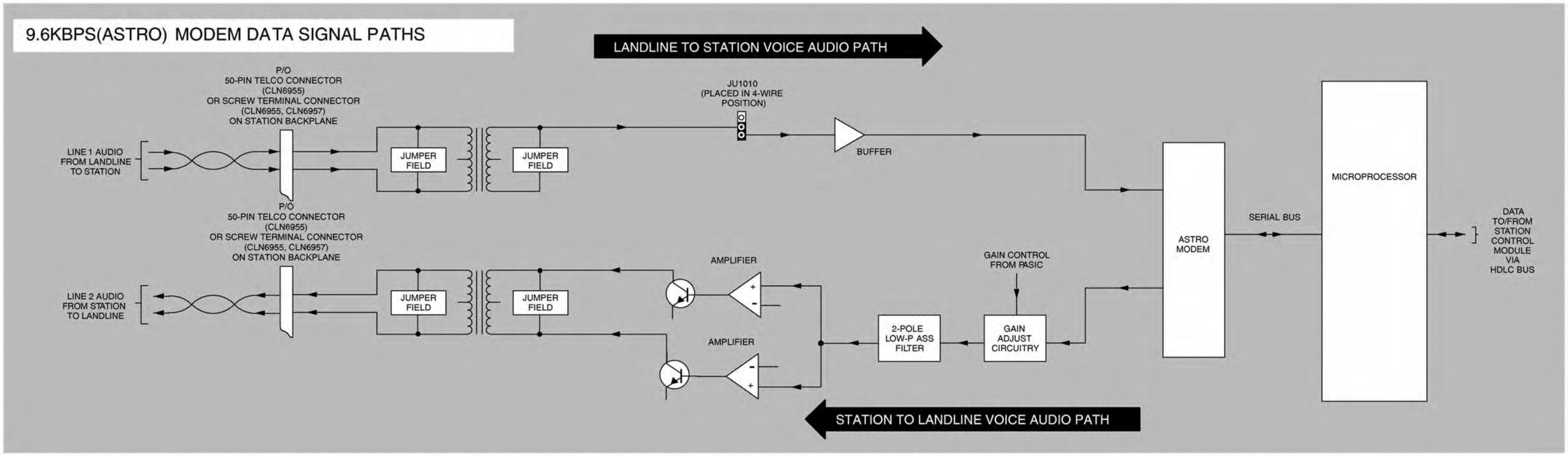


Figure 5 9.6kbps (ASTRO) Modem Data Signal Path Functional Block Diagram

WIRELINE INTERFACE BOARD

MODELS CLN6956D CLN6958D

1 DESCRIPTION

The Models CLN6956D and CLN6958D wireline interface boards (WIBs) are described in this section. A general description, identification of jumpers, indicators, and inputs/outputs, functional block diagrams, and functional theory of operation are provided. The information provided is sufficient to give service personnel a functional understanding of the module, allowing maintenance and troubleshooting to the module level. (Refer also to the *Maintenance and Troubleshooting* section of this manual for detailed troubleshooting procedures for all modules in the station.)

General Description

Note: *Model CLN6956 WIB is designed for use in stations installed in locations where local codes permit phone line connections to either the 50-pin Telco connector or the orange screw terminal connector. Model CLN6958 allows only connections to the orange screw terminal connector.*

The WIB serves as the interface between the customer telephone lines and the station equipment. Each WIB contains circuitry to interface with a variety of telephone line configurations and signal types. In addition, the board contains connectors to accept two modem cards. These cards are required to interface with up to two ASTRO 9.6kbps inputs.

The WIB is installed behind the station control module (SCM) front panel and connects to the station backplane. Phone line connections may be made either to a 50-pin Telco connector and/or an orange screw terminal connector (see sidebar).

Overview of Circuitry

The WIB contains the following circuitry:

- Audio and Data Circuits — the WIB provides a number of voice and data circuits which interface with the customer phone lines
- Microprocessor (µP) — serves as the main controller for the WIB; communicates with the SCM µP, interfaces with the ASTRO data signals, and provides monitoring and control for a variety of on-board I/O circuits
- Peripheral Application Specific IC (PASIC) — primarily responsible for injecting and retrieving PCM voice signals into/from the time division multiplex (TDM) bus that connects from the WIB to the SCM
- DC Remote Detection — circuitry provides current sensing and detection for dc remote control of station

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- Simulcast Processing Circuitry — circuitry is provided for summing and control of simulcast PL and reverse burst tones

2 CONTROLS, INDICATORS, AND INPUTS/OUTPUTS

Figure 1 shows the WIB jumpers, indicators, and all input and output external connections.

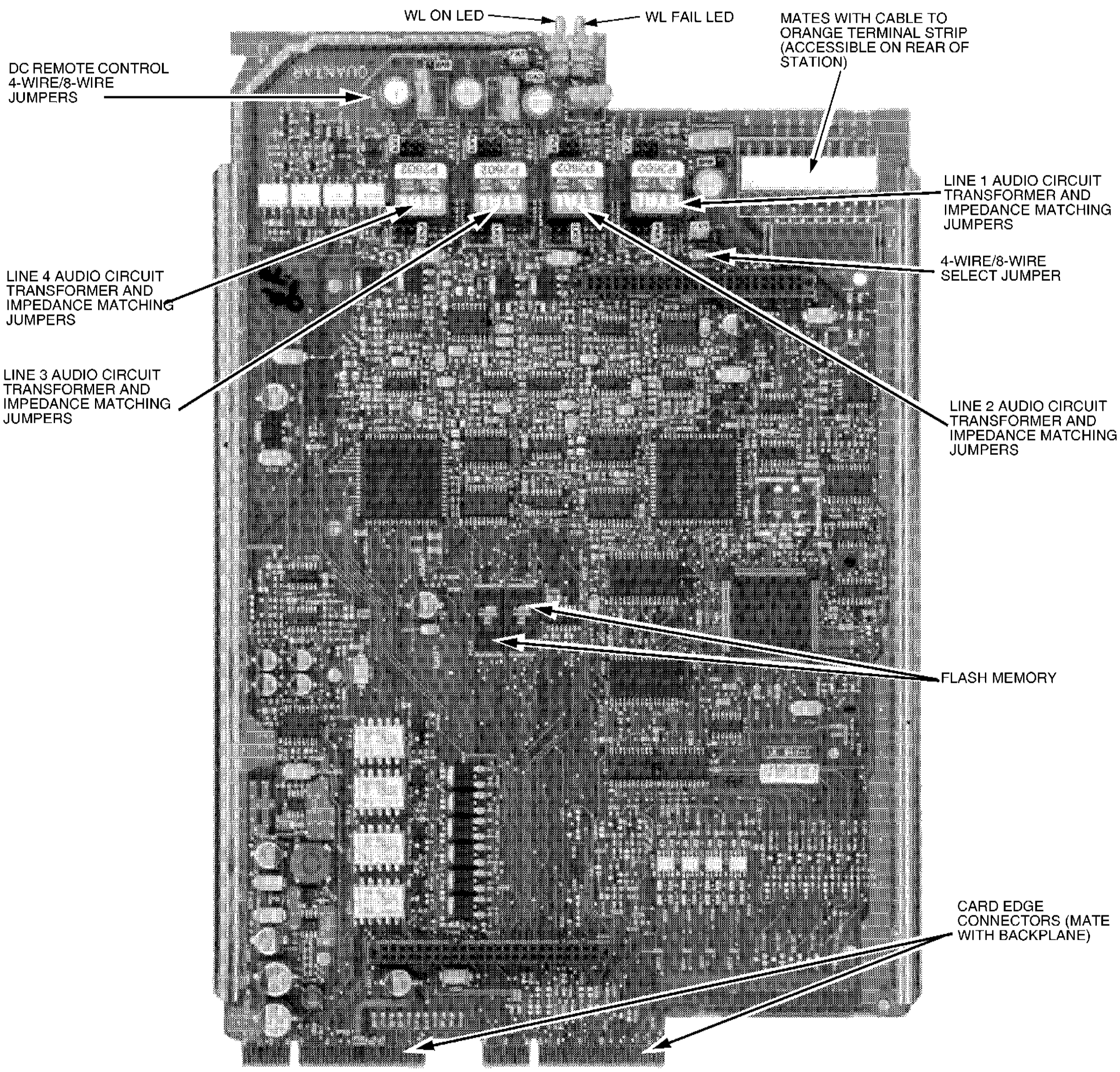

Figure 1 Wireline Interface Board Jumpers, Indicators, and Inputs/Outputs (CLN6956D Shown)

3 FUNCTIONAL THEORY OF OPERATION

The following theory of operation describes the operation of the WIB circuitry at a functional level. The information is presented to give the service technician a basic understanding of the functions performed by the module in order to facilitate maintenance and troubleshooting to the module level. Refer to Figure 2 for an overall block diagram of the WIB, and Figure 3 through Figure 5 for block diagrams for 2-wire voice, 4-wire voice, and 9.6kbps (ASTRO) signal paths.

Functional Overview (Refer to Figure 2)

Introduction

As mentioned previously, the WIB serves as the interface between the customer telephone lines and the station equipment. In general, the WIB processes and routes all voice and/or data signals between the station equipment and the landline equipment such as a control center or modem.

As shown in the block diagram in Figure 2, the WIB contains a µP with RAM and EPROM, a peripheral application specific IC (PASIC), one 4-wire audio circuit, and one 2-wire audio circuit. Also provided are a dc remote decoding circuit, simulcast processing circuitry, and miscellaneous I/O circuits. These circuits are described in the following paragraphs.

Microprocessor Circuitry

The WIB µP provides overall control of the WIB operation, provides two serial bus links, and communicates with the µP in the SCM.

The WIB operating code and other parameters are stored in two 256k x 8 FLASH ICs. Short term storage is provided by two 128k x 8 RAM ICs.

The µP data bus is connected to each of the PASICs to provide control.

Two serial bus links are provided and managed by the µP. One of these is dedicated to interfacing with a plug-in modem card for ASTRO 9.6kbps applications. The other serial link is used to interface with the µP in the SCM using HDLC protocol.

Peripheral Application Specific IC (PASIC)

One PASIC is provided on the WIB to interface with the various audio/ data circuits. In general, the PASIC is responsible for accepting either PCM voice information (for 4-wire or 2-wire operation) and routing the information to the proper destination, such as from landline to station and from station to landline. Details of the signal paths are provided in *Description of Audio/Data Signal Paths* later in this section.

Audio/Data Circuits

Each WIB contains circuitry for one 4-wire audio/data circuit, one 2-wire audio/data circuit, and one ASTRO 9.6kbps data circuit. As shown in the block diagram, the PASIC and its associated circuitry function to provide the following signal paths:

- 4-wire voice audio from landline to station, and from station to landline
- 2-wire voice audio from landline to station, and from station to landline
- ASTRO 9.6kbps modem data from landline to station, and from station to landline

Description of Audio/Data Signal Paths provided later in this section contains block diagrams of each of the major signal paths with an explanation of the signal flows.

DC Remote Detection

The WIB contains circuitry to monitor the line 1 audio and line 2 audio input lines and detect dc control currents. The detection outputs (±12.5 mA, ±5.5 mA, +2.5 mA, and -2.5 mA) are dc voltages (nominally either +.7V or +5V) which are fed to an A/D converter. The converter serves as a comparator and interprets the inputs as highs and lows. The data is then sent serially to the µP.

Miscellaneous Inputs/Outputs

The following inputs and outputs are provided on the WIB. These lines may be assigned various functions according to customer specifications.

- One (1) optically-coupled input
- Seven (7) transistor-coupled inputs
- One (1) relay closure output (normally open contacts)
- Three (3) transistor-coupled outputs

Simulcast Processing Circuitry

Summing and gating circuitry is provided on the WIB to allow PL tones, reverse burst, and TX audio (GEN TX DATA) to be combined and output to the VCO in the exciter module (after signal processing by the SCM) to directly modulate the rf carrier. The simulcast circuitry is controlled by the SCM µP via the WIB microprocessor (µP) and upper PASIC on the WIB.

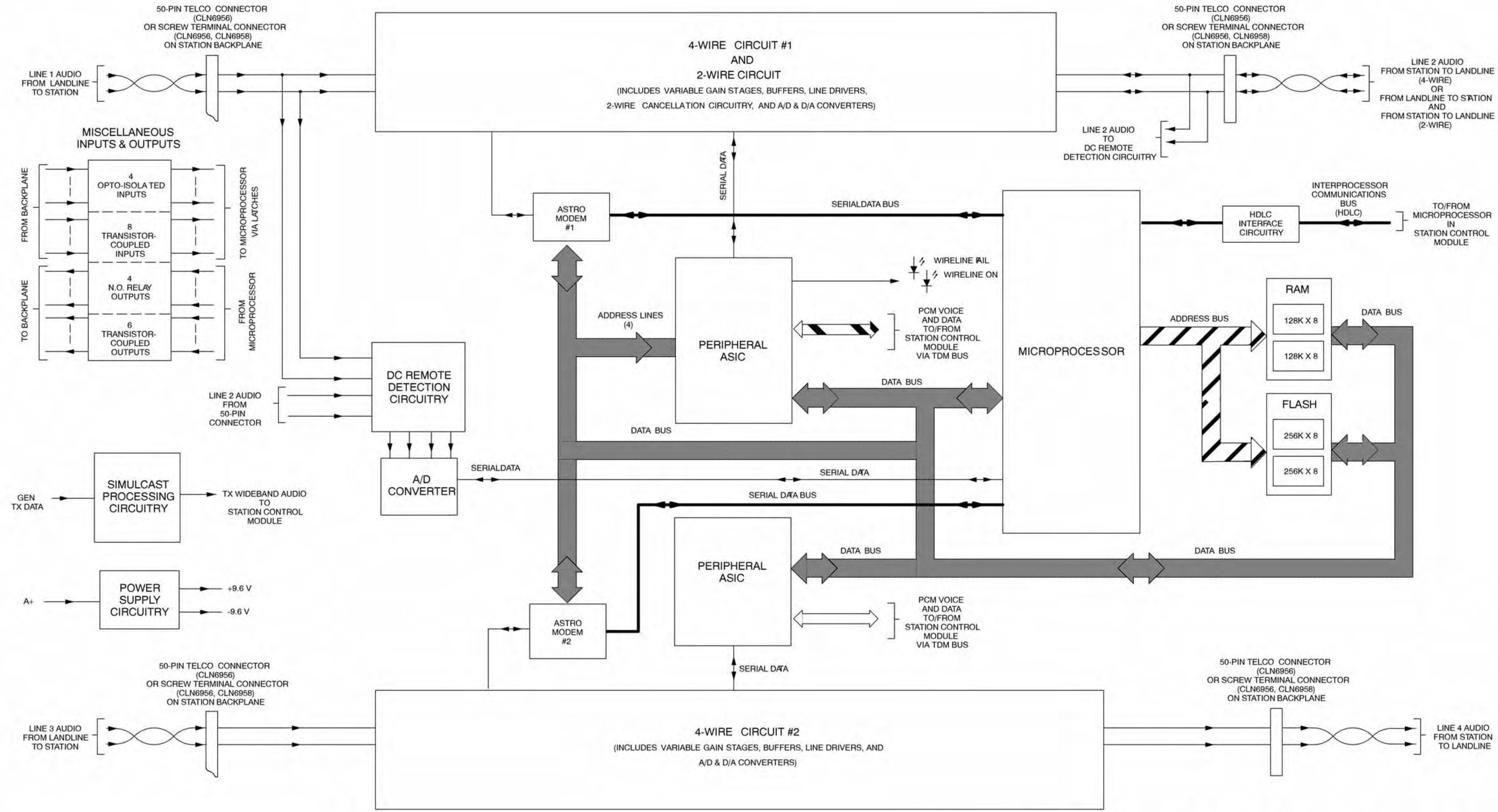

Figure 2 CLN6955D / CLN6957D Wireline Interface Board Functional Block Diagram

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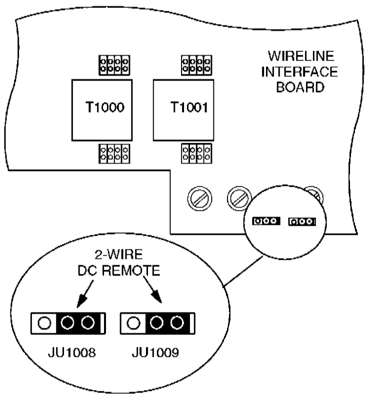
Description of Audio/Data Signal Paths

Note: Depending on local codes and/or customer preference, phone line connections may be made at either the 50-pin Telco connector or the screw terminal connector on the station backplane. 2-wire audio connections are made at Line 2 Audio.

For systems using dc remote control, set jumpers JU1008 and JU1009 as shown below for 2-wire applications:



Four levels of gain adjustment are provided by circuitry on the WIB for Landline-to-Station and Station-to-Landline audio paths. Additional fine level adjustments are performed in software in the SCM.

(Note that a sample of the outbound signal is fed from one of the output transistors to the cancellation amplifier in the landline to station circuitry. This signal is used to cancel the outbound signal and allow the inbound signal to pass through the landline to station circuitry.)

2-Wire Voice Audio Path (Refer to Figure 3)

Voice audio signals sent to/from the station via 2-wire copper pair are processed by the 2-wire audio circuit on the WIB (Line 2 Audio). The audio transformer in this circuit may have both inbound and outbound audio signals present simultaneously, and therefore employs circuitry to pass audio in each direction while cancelling the alternate signal. The 2-wire audio circuit operates as follows:

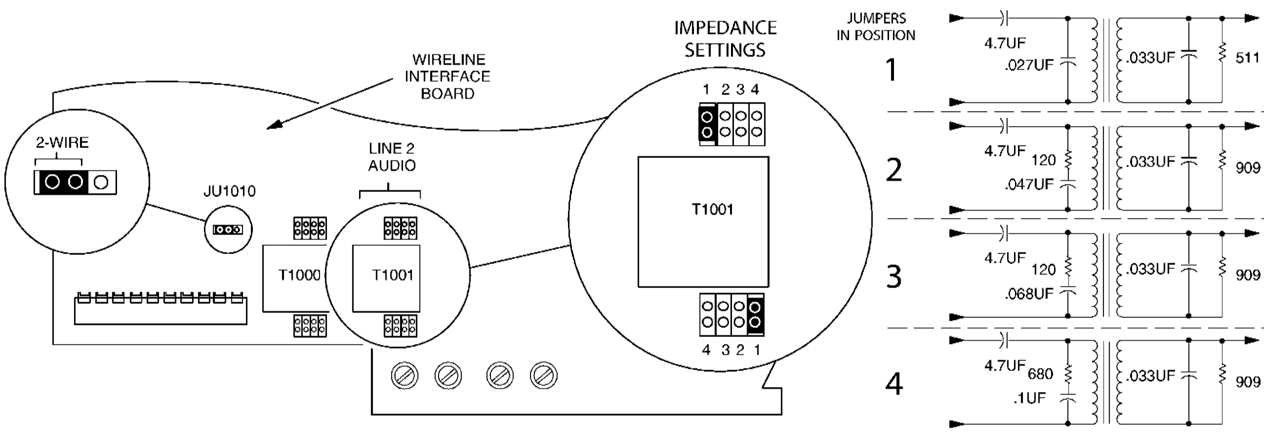
Landline to Station balanced audio is input to the primary of an audio transformer. The signal is induced into the transformer secondary and fed to an amplifier. [Note that jumper fields in parallel with both the primary and secondary coils provide for selectable impedance matching. Refer to the illustration at the top of the following page for impedance setting information.]

The amplifier sums the inbound and outbound signals and feeds one input to the cancellation amplifier. The other input to this amplifier is the output signal only. A cancellation of the outbound signal results, and the output from this amplifier is the inbound signal only. The signal is fed to a buffer through jumper JU1010 placed in the 2-wire position, as shown in the figure at the top of the following page, which feeds the gain adjust circuitry. Under control of the PASIC, the gain control circuitry provides eight levels of gain adjust: 5, 10, 15, 20, 25, 30, 35, and 40 dB.

The output of the gain adjust circuitry is fed to an A/D converter, which digitizes the audio signal into a PCM output. This output is fed serially to the PASIC, which places the data in the proper TDM timeslot (as instructed by the microprocessor in the SCM) and output to the SCM on the TDM Bus.

Station to Landline audio is input to the PASIC in the form of PCM data on the TDM bus. The PASIC extracts the data and feeds it to a D/A converter which converts the PCM data to an analog audio signal. The audio signal is fed to the gain adjust circuitry. Under control of the PASIC, the gain control circuitry provides four levels of gain adjust: 0dB, -6dB, -12dB, and -18dB.

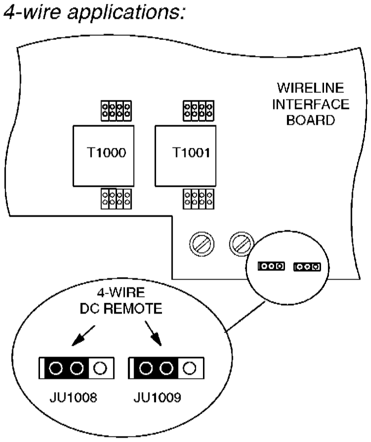
The output of the gain adjust circuitry is fed through a 2-pole low-pass filter and into the inputs of two amplifiers. The outputs of the amplifiers are fed to two transistors which are connected in a push-pull configuration to drive the primary of an audio transformer. The audio signal is induced into the secondary and output to the landline system (via either the 50-pin Telco connector or screw terminal connector) as balanced audio.



Note: All jumpers removed for high impedance input/output

Note: *Depending on local codes and/or customer preference, phone line connections may be made at either the 50-pin Telco connector or the screw terminal connector on the station backplane. Landline to Station signals are connected at Line 1 Audio or Line 3 Audio. Station to Landline signals are connected at Line 2 Audio or Line 4 Audio.*

For systems using dc remote control, set jumpers JU1008 and JU1009 as shown below for 4-wire applications:



Four levels of gain adjustment are provided by circuitry on the WIB for Landline-to-Station and Station-to-Landline audio paths. Additional fine level adjustments are performed in software in the SCM.

4-Wire Voice Audio Path (Refer to Figure 4)

Voice audio signals sent to/from the station via 4-wire copper pairs are processed by one of two 4-wire audio circuits on the WIB:

- Line 1 Audio & Line 2 Audio
- Line 3 Audio & Line 4 Audio

Both 4-wire circuits operate identically as follows:

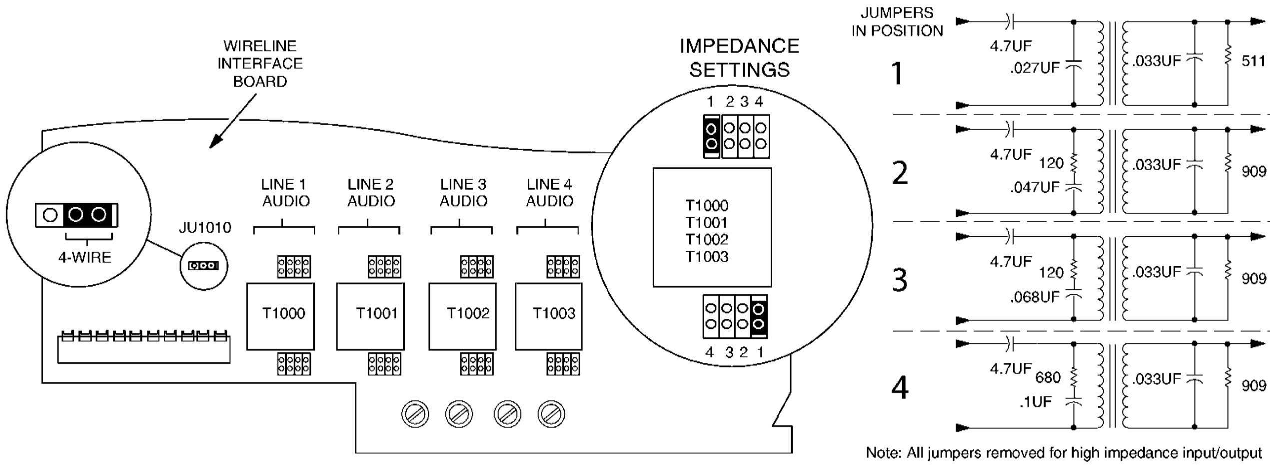
Landline to Station balanced audio is input to the primary of an audio transformer. The signal is induced into the transformer secondary and fed to a buffer, through jumper JU1010 placed in the 4-wire position, as shown in the figure at the top of the following page. [Note that jumper fields in parallel with both the primary and secondary coils provides for selectable impedance matching. Refer to the figure at the top of the following page for impedance setting information.]

The buffer output is fed to the gain adjust circuitry. Under control of the PASIC, the gain control circuitry provides eight levels of gain adjust: 5, 10, 15, 20, 25, 30, 35, and 40dB.

The output of the gain adjust circuitry is fed to an A/D converter, which digitizes the audio signal into a PCM output. This output is fed serially to the PASIC, which places the data in the proper TDM timeslot (as instructed by the microprocessor in the SCM) and output to the SCM on the TDM Bus.

Station to Landline audio is input to the PASIC in the form of PCM data on the TDM bus. The PASIC extracts the data and feeds it to a D/A converter which converts PCM data to an analog audio signal. The audio signal is fed to the gain adjust circuitry. Under control of the PASIC, the gain control circuitry provides four levels of gain adjust: 0dB, -6dB, -12dB, and -18dB.

The output of the gain adjust circuitry is fed through a 2-pole low-pass filter and into the inputs of two amplifiers. The outputs of the amplifiers are fed to two transistors which are connected in a push-pull configuration to drive the primary of an audio transformer. The audio signal is induced into the secondary and output to the landline system (via either the 50-pin Telco connector or screw terminal connector) as balanced audio.



9.6KBPS (ASTRO) Modem Data Path (Refer to Figure 5)

9.6kbps (ASTRO) modem data signals are sent to/from the station via 4-wire copper pairs and are processed by one of two 4-wire audio circuits on the WIB:

- Line 1 Audio & Line 2 Audio
- Line 3 Audio & Line 4 Audio

Both 4-wire circuits operate identically as follows:

Note: Depending on local codes and/or customer preference, phone line connections may be made at either the 50-pin Telco connector or the screw terminal connector on the station backplane. Landline to Station signals are connected at Line 1 Audio or Line 3 Audio. Station to Landline signals are connected at Line 2 Audio or Line 4 Audio.

The WIB is equipped with two connectors to accept two plug-in ASTRO modem cards, one for each 4-wire modem data card.

Landline to Station modem data is input to the primary of an audio transformer as balanced audio. The signal is induced into the transformer secondary and fed to a buffer (through jumper JU1010 placed in the 4-wire position, as shown at the top of this page). [Note that jumper fields in parallel with both the primary and secondary coils provide for selectable impedance matching. Refer to the illustration at the top of this page for impedance setting information.]

The buffer output is fed to a modem (a separate card which plugs into the WIB) which converts the modem signal to detected data. The data signal is then fed to the microprocessor over a serial bus. The microprocessor sends the data to the microprocessor in the SCM over an interprocessor communications bus (HDLC protocol).

Station to Landline modem data is input to the microprocessor from the SCM microprocessor via the interprocessor communications bus (HDLC protocol). The microprocessor feeds the data to the modem which converts the data to a modem signal.

The output of the modem is fed to the gain adjust circuitry. Under control of the PASIC, the gain control circuitry provides four levels of gain adjust (0dB, -6dB, -12dB, and -18dB).

The output of the gain adjust circuitry is fed through a 2-pole low-pass filter and into the inputs of two amplifiers. The outputs of the amplifiers are fed to two transistors which are connected in a push-pull configuration to drive the primary of an audio transformer. The modem data signal is induced into the secondary and output to the landline system (via either the 50-pin Telco connector or screw terminal connector) as balanced audio.

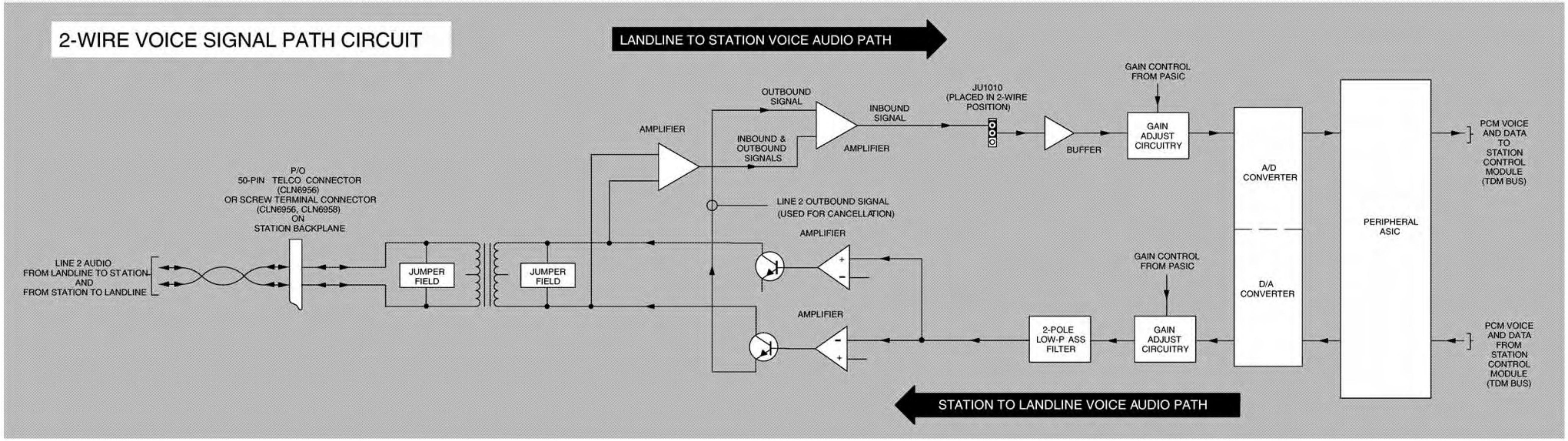


Figure 3 2-Wire Voice Audio Path Functional Block Diagram

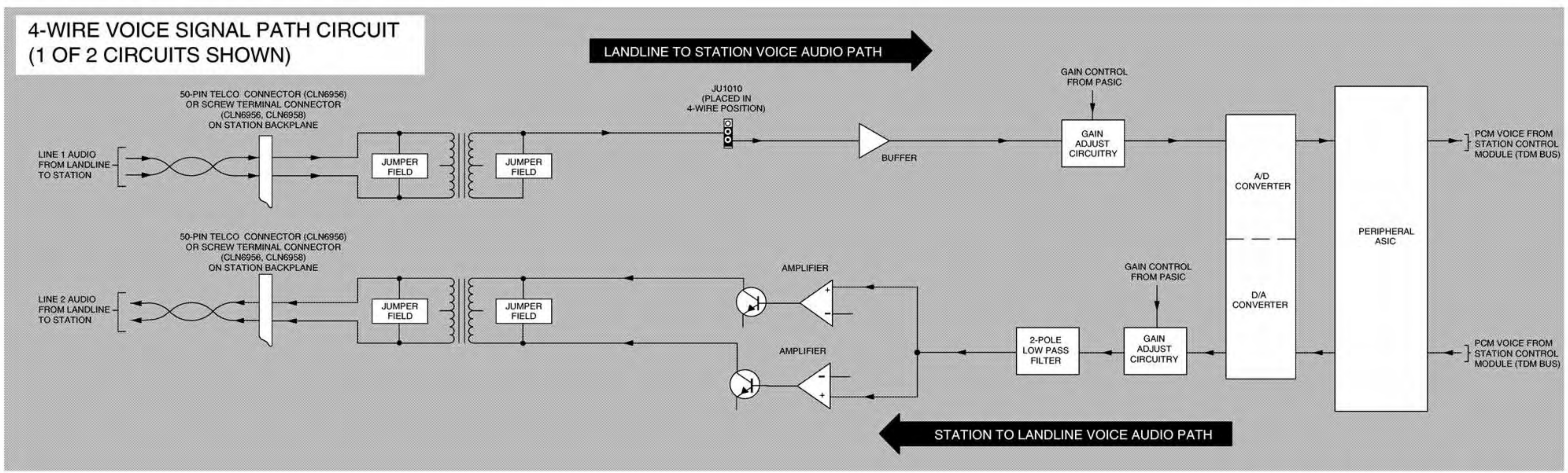


Figure 4 4-Wire Voice Audio Path Functional Block Diagram

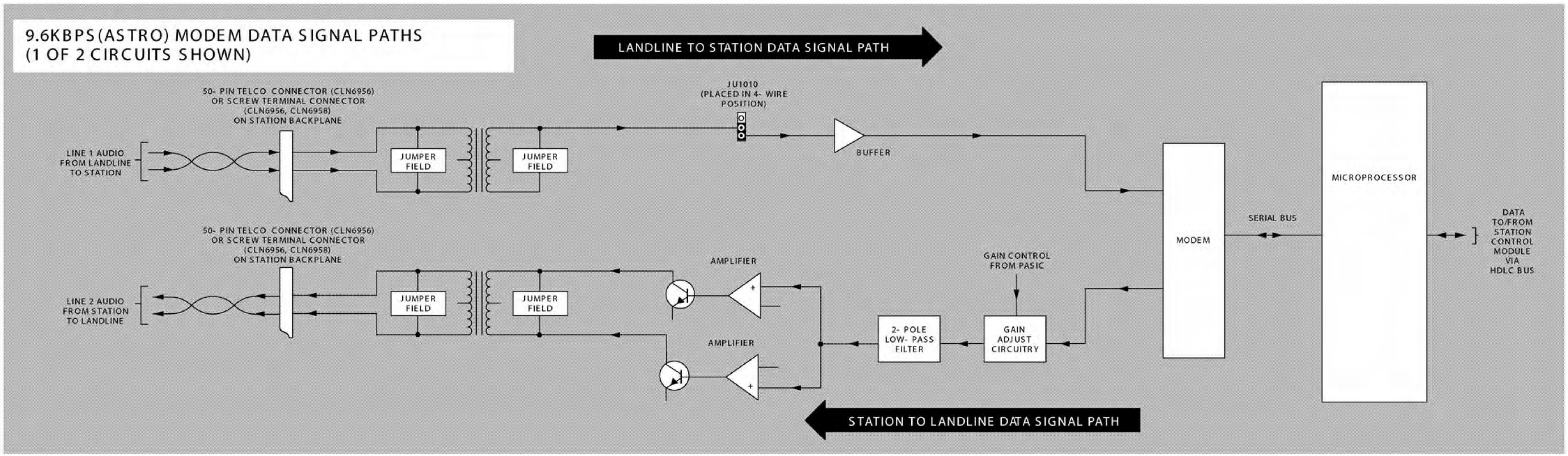


Figure 5 9.6kbps (ASTRO) Modem Data Signal Path Functional Block Diagram

END OF PART 8