

Division 27 Communications
SECTION 27 51 26
WIRELESS INDUCTIONLOOP HEARING
ASSISTANCE SYSTEM

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Equipment for amplifying, transmitting and receiving sound signals for the hard of hearing, using Induction Loop signal technology.
- B. Large-Area Loop Systems shall have a Network-Controllable Matrix Mixer/Amplifier with Crestron control capability and a Dante Input.

1.2 SUBMITTALS

- A. General: Submit in accordance with Section 01 33 00 Submissions.
- B. Product Data: For each specific piece of equipment.
- C. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, and location of each field connection.
- D. Closeout Submittals: Submit following in accordance with Sections 01 77 19 Contract Closeout, 01 78 23 Operation and Maintenance Data, 0 178 30 Training.
 - 1. Operation and Maintenance Data: For equipment.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Experienced installer who has taken an Advanced Loop Class and is an authorized representative of the equipment manufacturer for both installation and maintenance of equipment required for this Section.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
- C. Comply with NFPA 70.
- D. Comply with UL 50.
- E. Comply with IEC 60118-4.

1.4 WARRANTY

- A. Warrant products in system to be free of defects in operation for five (5) years, including parts and labor, and in accordance with Section 01 78 36 Guarantees and Warrantees.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Williams Sound, Eden Prairie, MN.

2.2 ACCEPTABLE PRODUCTS

A. Transmitters

(Amplifiers): 1. DL

210 NET 2.0

2. DL 210 NET D 2.0

3. DL 207 NET

4. DL 207 NET D

5. DL 107 NET

6. DL 107 NET D

B. Power Loop Wire and Tape:

1. PLW 014

2. PLW F500

3. FWT 001

C. Receivers:

1. PLR BP1

D. Accessories:

1. Earphones

a. EAR 008

b. EAR 013

c. EAR 014

d. EAR 022

e. EAR 042

2. Headphones

a. HED 021

b. HED 026

- c. HED 027
- d. HED 040
- 3. Batteries
 - a. BAT 001-2
 - b. BAT 026-2
- 4. Carry Cases
 - a. CCS 029
 - b. CCS 030 35
- 5. Chargers
 - a. CHG 3512 (for PLR BP1)
- 6. Field Strength Meter (Required for calibration)
 - PLM FSMP

2.3 COMPONENT PERFORMANCE CRITERIA

- A. Large Area Loop System with Network Control (DL 210 NET 2.0):
 1. Dimensions: 2U Rackmount, 19" W x 3.5" H x 12" D. Chassis 17" W.
 2. Weight: 14.3 lbs (6.5 kg)
 3. Color: Case - Black, white and blue legends on front, white legends on back.
LCD - Backlit Blue.
 4. Fan Cooling: Variable Speed, Temperature Controlled.
 5. Power: 100-240 VAC, 50/60 Hz, 500 Watt.
 6. Digital Input: (1x XLR); AES or EBU; 44.1kHz/48kHz.
 7. Analog Line Inputs: (2x RCA, L and R); -10dBV, 10k Ω input impedance.
 8. Microphone/Line Inputs: (2x Phoenix terminal block); balanced or unbalanced.
Input impedance: 1.5k Ω Microphone, 10k Ω Line. Configurable/accepts Microphone, Line +4dBu, Line +8dBu, or Line -10dBV.
 9. 70-100v Input: (1x Phoenix terminal block); speaker-level input, for distributed audio systems.
 10. Line Outputs: (2x Phoenix terminal block); loop-through of Microphone/Line inputs 1 and 2. +4dBu. balanced or unbalanced.
 11. Loop Outputs: (2x Phoenix terminal block).
 12. Required Loop Resistance: 0.5 Ω to 3.0 Ω (DC)
 13. Output Current (Loop): One Loop, Output A or B: 12A rms; Two Loops, Outputs A and B: 10A rms each

14. Output Power (Speaker): Integrated into Loop Output A terminal block (switchable in menu). 225 Watts x 1 channel @ 4 Ω , 125 Watts x 1 channel @ 8 Ω , (Class D). Frequency response = 20 Hz - 20 kHz, THD=0.07%.
15. Loop Frequency Response: 100Hz to 10kHz @400mA (Output A or B)
16. Speaker Frequency Response: 20Hz - 20kHz (Output A).
17. Speaker Dynamic Range: 90 dB; A-weighted, typical.
18. Speaker THD+N: 0.07%; 50 watts into 4 Ω @ 20-20kHz.
19. Loop THD: 1% at nominal power output, 1kHz sine wave.
20. Front Controls: Front LCD display menu access/adjustment via control dial.
21. Remote Control/Configuration: Ethernet, USB, RS-232. Application "PC Mixer App" supports all 3 protocols.
22. Network Control: Ethernet; Standard RJ-45 jack. Supports PC App and Crestron Control.
23. RS-232: Standard DB-9 COM port connector.
24. USB: Standard-B jack. USB 1.1, 2.0 or 3.0 supported.
25. Warranty: two (2) years.
26. Approvals: CE, IC, UL, ULC, FCC, RoHS, RCM, WEEE, CB scheme.

A2. Large Area Loop System with Network Control and Dante

Input (DL 210 NET D 2.0):

1. Dimensions: 2U Rackmount, 19" W x 3.5" H x 12" D. Chassis 17" W.
2. Weight: 14.3 lbs (6.5 kg).
3. Color: Case - Black, white and blue legends on front, white legends on back. LCD - Backlit Blue.
4. Fan Cooling: Variable Speed, Temperature Controlled.
5. Power: 100-240 VAC, 50/60 Hz, 500 Watt.
6. Digital Input: (1x XLR); AES or EBU; 44.1kHz/48kHz.
7. Dante Input (1x RJ-45).
8. Analog Line Inputs: (2x RCA, L and R); -10dBV, 10k Ω input impedance.
9. Microphone/Line Inputs: (2x Phoenix terminal block); balanced or unbalanced. Input impedance: 1.5k Ω Microphone, 10k Ω Line. Configurable/accepts Microphone, Line +4dBu, Line +8dBu, or Line -10dBV.

10. 70-100v Input: (1x Phoenix terminal block); speaker-level input, for distributed audio systems.
11. Line Outputs: (2x Phoenix terminal block); loop-through of Microphone/Line inputs 1 and 2. +4dBu. balanced or unbalanced.
12. Loop Outputs: (2x Phoenix terminal block).
13. Required Loop Resistance: 0.5Ω to 3.0Ω (DC).
14. Output Current (Loop): One Loop, Output A or B: 12A rms; Two Loops, Outputs A and B: 10A rms each.
15. Output Power (Speaker): Integrated into Loop Output A terminal block (switchable in menu). 225 Watts x 1 channel @ 4 Ω, 125 Watts x 1 channel @ 8 Ω, (Class D). Frequency response = 20 Hz - 20 kHz, THD=0.07%.
16. Loop Frequency Response: 100Hz to 10kHz @400mA (Output A or B).
17. Speaker Frequency Response: 20Hz - 20kHz (Output A).
18. Speaker Dynamic Range: 90 dB; A-weighted, typical.
19. Speaker THD+N: 0.07%; 50 watts into 4Ω @ 20-20kHz.
20. Loop THD: 1% at nominal power output, 1kHz sine wave.
21. Front Controls: Front LCD display menu access/adjustment via control dial.
22. Remote Control/Configuration: Ethernet/USB. PC Mixer App and iPad App work on Ethernet. Firmware updates by USB only.
23. Network Control: Ethernet; Standard RJ-45 jack. Supports PC App, iPad App and Crestron Control.
24. USB: Standard-B jack. USB 1.1, 2.0 or 3.0 supported.
25. Warranty: two (2) years.
26. Approvals: CE, IC, UL, ULC, FCC, RoHS, RCM, WEEE, CB scheme.

A3. Medium Area Loop System with Network

Control (DL 207 NET):

1. Dimensions: 1U Rackmount, 19" W x 1.75" H x 10" D. Chassis 17" W.
2. Weight: 7.25 lbs (3.3 kg).
3. Color: Case: Black, white and blue legends on front, white legends on back. LCD: Backlit Blue..
4. Fan Cooling: Variable Speed, Temperature Controlled.
5. Power Supply: Internal, Universal 100-240 VAC, 50/60 Hz, 200 Watt. Fuse: 5 x 20 mm, 5 A, 250 V.

6. Ethernet: (1x RJ-45); 10-100 MBps
7. USB: (1x standard-B). USB 1.1, 2.0 or 3.0 supported.
8. Analog Line Inputs: (1x Phoenix Contact® 3-position terminal block), -10 dBV, 10 kΩ input impedance, balanced or unbalanced.
9. Microphone/Line Inputs: (1x Phoenix 3-position terminal block) / (1x XLR 3-pin input) - paralleled to Phoenix terminal block input. Input impedance: 1.5 kΩ Microphone, 10 kΩ Line. Configurable/Accepts: Microphone, Line -10 dBV, Line +4 dBu, or Line +8 dBu, balanced or unbalanced.
10. 70-100v Input: (1x Phoenix 2-position terminal block); speaker-level input, for distributed audio systems.
11. Line Outputs: (1x Phoenix 3-position terminal block); loop-through of Microphone/Line Input 1 and Line Input 2, +4 dBu, balanced or unbalanced. The line outputs mirror the audio of the loop output.
12. Loop Outputs: (2x Phoenix 2-position terminal blocks). Both Dante inputs (L, R) are internally either off, mixed, or summed to mono for the loop output.
13. Maximum Coverage Area: 10,000 sq. ft. Dependent on loop resistance, frequency, array element spacing, metal loss, etc.
14. Headphone Output: (1x 1/4" stereo headphone jack), on front of unit.
15. Required Loop Resistance: 0.5 Ω to 3.0 Ω (DC).
16. Output Current (Loop): 2 channels at 7 A RMS each.
17. Loop Frequency Response: 100 Hz to 10 kHz @400 mA.
18. Loop THD: <1 % at nominal power output, 1 kHz sine wave.
19. Front Controls: Front LCD display menu access/adjustment via control button/dial.
20. Network Control and Firmware:
 1. Control via ethernet or USB, by PC App, iPad App, or Crestron. Firmware updates through USB only.
21. Warranty: two (2) year limited..
22. Approvals: CE, UL, ULC, FCC, Industry Canada, RoHS, WEEE, CE, UL, CB scheme, RCM.

A4. Medium Area Loop System with Network Control and Dante

Input (DL 207 NET D):

1. Dimensions: 1U Rackmount, 19" W x 1.75" H x 10" D. Chassis 17" W.
2. Weight: 7.25 lbs (3.3 kg).

3. Color: Case: Black, white and blue legends on front, white legends on back.
LCD: Backlit Blue.
4. Fan Cooling: Variable Speed, Temperature Controlled.
5. Power Supply: Internal, Universal 100-240 VAC, 50/60 Hz, 200 Watt. Fuse: 5 x 20 mm, 5 A, 250 V.
6. Ethernet: (1x RJ-45); 10-100 MBps.
7. USB: (1x standard-B). USB 1.1, 2.0 or 3.0 supported.
8. Dante Digital Input Optional (-D model only). (1x RJ-45); 100 MBps.
9. Analog Line Inputs: (1x Phoenix Contact® 3-position terminal block), -10 dBV, 10 k Ω input impedance, balanced or unbalanced.
10. Microphone/Line Inputs: (1x Phoenix 3-position terminal block) / (1x XLR 3-pin input) - paralleled to Phoenix terminal block input. Input impedance: 1.5 k Ω Microphone, 10 k Ω Line. Configurable/Accepts: Microphone, Line -10 dBV, Line +4 dBu, or Line +8 dBu, balanced or unbalanced.
11. 70-100v Input: (1x Phoenix 2-position terminal block); speaker-level input, for distributed audio systems.
12. Line Outputs: (1x Phoenix 3-position terminal block); loop-through of Microphone/Line Input 1 and Line Input 2, +4 dBu, balanced or unbalanced. The line outputs mirror the audio of the loop output.
13. Loop Outputs: (2x Phoenix 2-position terminal blocks). Both Dante inputs (L, R) are internally either off, mixed, or summed to mono for the loop output.
14. Maximum Coverage Area: 10,000 sq. ft. Dependent on loop resistance, frequency, array element spacing, metal loss, etc.
15. Headphone Output: (1x 1/4" stereo headphone jack), on front of unit
16. Required Loop Resistance: 0.5 Ω to 3.0 Ω (DC)
17. Output Current (Loop): 2 channels at 7 A RMS each.
18. Loop Frequency Response: 100 Hz to 10 kHz @400 mA.
19. Loop THD: <1 % at nominal power output, 1 kHz sine wave.
20. Front Controls: Front LCD display menu access/adjustment via control button.
21. Network Control and Firmware:
 1. Control via ethernet or USB, by PC App, iPad App, or Crestron. Firmware updates through USB only.
22. Warranty: two (2) year limited..

23. Approvals: CE, UL, ULC, FCC, Industry Canada, RoHS, WEEE, CE, UL, CB scheme, RCM.

A5. Medium/Small Area Loop System with Network

Control (DL 107 NET):

1. Dimensions: 1U Rackmount, 19" W x 1.75" H x 10" D. Chassis 17" W.
2. Weight: 7.25 lbs (3.3 kg).
3. Color: Case: Black, white and blue legends on front, white legends on back. LCD: Backlit Blue.
4. Fan Cooling: Variable Speed, Temperature Controlled.
5. Power Supply: Internal, Universal 100-240 VAC, 50/60 Hz, 200 Watt. Fuse: 5 x 20 mm, 5 A, 250 V.
6. Ethernet: (1x RJ-45); 10-100 MBps.
7. USB: (1x standard-B). USB 1.1, 2.0 or 3.0 supported.
8. Analog Line Inputs: (1x Phoenix Contact® 3-position terminal block), -10 dBV, 10 k Ω input impedance, balanced or unbalanced.
9. Microphone/Line Inputs: (1x Phoenix 3-position terminal block) / (1x XLR 3-pin input) - paralleled to Phoenix terminal block input.
10. Input impedance: 1.5 k Ω Microphone, 10 k Ω Line. Configurable/Accepts: Microphone, Line -10 dBV, Line +4 dBu, or Line +8 dBu, balanced or unbalanced.
11. 70-100v Input: (1x Phoenix 2-position terminal block); speaker-level input, for distributed audio systems.
12. Line Outputs: (1x Phoenix 3-position terminal block); loop-through of Microphone/Line Input 1 and Line Input 2, +4 dBu, balanced or unbalanced. The line outputs mirror the audio of the loop output.
13. Loop Output: (1x Phoenix 2-position terminal block). Both Dante inputs (L, R) are internally either off, mixed, or summed to mono for the loop output.
14. Maximum Coverage Area: 7,200 sq. ft. Dependent on loop resistance, frequency, array element spacing, metal loss, etc.
15. Headphone Output: (1x 1/4" stereo headphone jack), on front of unit
16. Required Loop Resistance: 0.5 Ω to 3.0 Ω (DC)
17. Output Current (Loop): 7 A RMS
18. Loop Frequency Response: 100 Hz to 10 kHz @400 mA
19. Loop THD: <1 % at nominal power output, 1 kHz sine wave

19. Front Controls: Front LCD display menu access/adjustment via control button.
20. Network Control and Firmware: Control via ethernet or USB, by PC App, iPad App, or Crestron.
21. Firmware updates through USB only.
22. Warranty: two (2) year limited.
23. Approvals: CE, UL, ULC, FCC, Industry Canada, RoHS, WEEE, CE, UL, CB scheme, RCM

A6. Medium/Small Area Loop System with Network Control and Dante

Input (DL 107 NET D):

1. Dimensions: 1U Rackmount, 19" W x 1.75" H x 10" D. Chassis 17" W.
2. Weight: 7.25 lbs (3.3 kg)
3. Color: Case: Black, white and blue legends on front, white legends on back.
LCD: Backlit Blue.
4. Fan Cooling: Variable Speed, Temperature Controlled
5. Power Supply: Internal, Universal 100-240 VAC, 50/60 Hz, 200 Watt. Fuse: 5 x 20 mm, 5 A, 250 V.
6. Ethernet: (1x RJ-45); 10-100 MBps.
7. USB: (1x standard-B). USB 1.1, 2.0 or 3.0 supported.
8. Dante Digital Input: (1x RJ-45); 100 MBps.
9. Analog Line Inputs: (1x Phoenix Contact® 3-position terminal block), -10 dBV, 10 kΩ input impedance, balanced or unbalanced.
10. Microphone/Line Inputs: (1x Phoenix 3-position terminal block) / (1x XLR 3-pin input) - paralleled to Phoenix terminal block input
1. Input impedance: 1.5 kΩ Microphone, 10 kΩ Line. Configurable/Accepts: Microphone, Line -10 dBV, Line +4 dBu, or Line +8 dBu, balanced or unbalanced.
11. 70-100v Input: (1x Phoenix 2-position terminal block); speaker-level input, for distributed audio systems.
12. Line Outputs: (1x Phoenix 3-position terminal block); loop-through of Microphone/Line Input 1 and Line Input 2, +4 dBu, balanced or unbalanced. The line outputs mirror the audio of the loop output.
13. Loop Output: (1x Phoenix 2-position terminal block). Both Dante inputs (L, R) are internally either off, mixed, or summed to mono for the loop output.

14. Maximum Coverage Area: 7,200 sq. ft. Dependent on loop resistance, frequency, array element spacing, metal loss, etc.
15. Headphone Output: (1x 1/4" stereo headphone jack), on front of unit
16. Required Loop Resistance: 0.5 Ω to 3.0 Ω (DC)
17. Output Current (Loop): 7 A RMS
18. Loop Frequency Response: 100 Hz to 10 kHz @400 mA
19. Loop THD: <1 % at nominal power output, 1 kHz sine wave
20. Front Controls: Front LCD display menu access/adjustment via control button/dial.
21. Network Control and Firmware: Control via ethernet or USB, by PC App, iPad App, or Crestron.
22. Firmware updates through USB only.
23. Warranty: two (2) year limited.
24. Approvals: CE, UL, ULC, FCC, Industry Canada, RoHS, WEEE, CE, UL, CB scheme, RCM

B1. Power Loop Wire 14ga. (PLW 014): [select as needed]

1. Length: 500 ft
2. Spool Dimensions: 6.5" Dia.
3. Spool Weight: 9.8 lbs
4. Color: Black

B2. Power Loop Wire Flat 3/4" (PLW F500): [select as needed]

1. Length: 500 ft
2. Spool Dimensions: 8-1/8" Dia. x 3/4" H
3. Spool Weight: 6.5 lbs
4. Color/Material: Copper

B3. Power Loop Wire Flat 3/4" (PLW F300): [select as needed]

1. Length: 300 ft
2. Spool Dimensions: 6-3/4" Dia. x 3/4" H
3. Spool Weight: 3.8 lbs
4. Color/Material: Copper

B4. Flat Wire Warning Tape (FWT 001): [select as needed]

1. Length: 165 ft
2. Spool Dimensions: 6" Dia. x 2" H
3. Spool Weight: 1.28 lbs
4. Color/Material: White cloth tape, blue lettering, "Gaffer Tape", adhesive releases without residue

C1. Receiver (PLR BP1): [select as needed]

1. Dimensions: 4.1"H x 2.85"W x 1.38"D (104 mm H x 72 mm W x 35 mm D).
2. Weight: 4.6 oz (130 g) with batteries, 2.6 oz (73 g) without batteries.
3. Color/Material: Black ABS/polycarbonate molded plastic case.
4. Battery Type: (2) AA (1.5VDC) alkaline or NiMH (rechargeable).
5. Battery Life: Up to 200 hours with alkaline batteries.
6. LED Indicator: Green LED indicates power on, flashes when batteries are low.
7. Headphone Jack: 3.5mm stereo TRS jack works with mono or stereo headphones.
8. Volume control: External switched thumb wheel controls power on/off and volume level.
9. Tone control: Rotary control inside battery compartment (1kHz reference at 400mA/m input with Tone at mid position)
10. Induction Coil: Maximum reception: receiver oriented vertically
11. Power Output: 35mW (maximum) into 33 ohms mono impedance
12. THD: <2%
13. Frequency Response: 300Hz to 10KHz, -6dB

D. Accessories: [select as needed]

1. Earphones
 - a. [Wide Range Earphone: Model EAR 008]
 - b. [Single Mini Earbud: Model EAR 013]
 - c. [Dual Mini Earbud: Model EAR 014]

- d. [Surround Earphone: Model EAR 022]
- e. [Dual, in-ear, isolation: Model EAR 042]
- 2. Headphones
 - a. [Deluxe Folding: Model HED 021]
 - b. [Rear-wear, Mono: Model HED 026]
 - c. [Heavy-duty, Folding, Mono: Model HED 027]
 - d. [Protector, Dual-Earmuff: Model HED 040]
- 3. Batteries
 - a. [AA alkaline: Model BAT 001-2]
 - b. [AA NiMH: Model BAT 026-2]
- 4. Carry Cases
 - a. [Small Briefcase for accessories: CCS 029]
 - b. [Large 35-slot Case: Model CCS 030 35]
- 5. Chargers
 - a. [12 Units, PLR BP1: Model CHG 3512]

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install equipment to comply with manufacturer's recommendations.
- B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with typical service loops, no excess. Use lacing bars in cabinets.

3.2 GROUNDING

- A. Ground cable shields, and equipment, to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

3.3 FIELD QUALITY CONTROL

- A. Operational Test: Perform tests that confirm proper operation of system and proper coverage in area where equipment will be used. System must meet IEC 60118-4 standard.

3.4 DEMONSTRATION

- A. Demonstration and Instruction of Owner's Personnel: Provide in accordance with Section 01800. Engage factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain equipment as specified.

END OF SECTION