

Master Format Specifications

Guide Specification

Wireless Induction Loop Hearing Assistance System

**SECTION 27 41 16.xx**

**RADIO COMMUNICATION SYSTEM & EQUIPMENT**

**WIRELESS INDUCTION LOOP HEARING ASSISTANCE SYSTEM**

This document is intended to aid the specifier in developing a specification section for a Williams Sound Induction Loop Listening System for use in churches, schools, auditoriums, conference rooms, and theaters.

Edit this master specification to suit your project requirements. Modify or add items as necessary. Delete items, which are not applicable. Words and sentences within brackets [ ] reflect a choice to be made regarding inclusion or exclusion of a particular item or statement.

This guide specification is based on the Construction Specifications Institute (CSI), Section Format standards. References to section names and numbers are based on MasterFormat 2004.

For specification questions, assistance with systems integration and specific product options contact:

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SPECIFICATION

PART 1 GENERAL

* 1. **SUMMARY**
1. Section Includes: Equipment for amplifying, transmitting and receiving sound signals for the hard of hearing, using Induction Loop signal technology.
2. Large-Area Loop Systems shall have a Network-Controllable Matrix Mixer/Amplifier with Crestron control capability and a Dante Input.
	1. **SUBMITTALS**
3. General: Submit in accordance with Section 01330.
4. Product Data: For each specific piece of equipment.
5. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, and location of each field connection.
6. Closeout Submittals: Submit following in accordance with Section 01780.
	1. Operation and Maintenance Data: For equipment.
	2. **QUALITY ASSURANCE**
7. 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.
8. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
9. Comply with NFPA 70.
10. Comply with UL 50.
11. Comply with IEC 60118-4.
	1. **WARRANTY**
12. Warrant products in system to be free of defects in operation for 5 years, including parts and labor. Warranty for cords, external power supplies and accessories is 90 days.

**PART 2 PRODUCTS**

1. **MANUFACTURERS**
	1. Acceptable Manufacturers:
		1. Williams AV, Eden Prairie, MN.
2. **ACCEPTABLE PRODUCTS**
	1. 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
		7. DL 102
	2. Power Loop Wire and Tape:
		1. PLW 014
		2. PLW F500
		3. PLW F300
		4. FWT 001
		5. PLM 001
	3. Receivers:
		1. PLR BP1
	4. Accessories:
		1. Earphones
			1. EAR 008
			2. EAR 013
			3. EAR 014
			4. EAR 022
			5. EAR 042
		2. Headphones
			1. HED 021
			2. HED 026
			3. HED 027
			4. HED 040
		3. Batteries
			1. BAT 001-2
			2. BAT 026-2
		4. Carry Cases
			1. CCS 029
			2. CCS 030 35
		5. Chargers
			1. CHG 3512 (for PLR BP1)
		6. Field Strength Meter (Required for calibration)
			1. PLM FSMP
3. **COMPONENT PERFORMANCE CRITERIA**
4. 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 is 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 & R); -10dBV, 10kΩ input impedance
		8. Mic/Line Inputs: (2x Phoenix Terminal Block); balanced or unbalanced. Input impedance: 1.5kΩ Mic, 10kΩ Line. Configurable/accepts Mic, 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 Mic/Line inputs 1 & 2. +4dBu. Balanced or Unbalanced.
		11. Loop Outputs: (2x Phoenix Terminal Block).
		12. Required Loop Resistance: 0.5Ω to 3.0Ω (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 4Ω @ 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: 2 years
		26. Approvals: CE, IC, UL, ULC, FCC, RoHS, RCM, WEEE, CB scheme
5. 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 is 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 & R); -10dBV, 10kΩ input impedance
	9. Mic/Line Inputs: (2x Phoenix Terminal Block); balanced or unbalanced. Input impedance: 1.5kΩ Mic, 10kΩ Line. Configurable/accepts Mic, 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 Mic/Line inputs 1 & 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: 2 years
	26. Approvals: CE, IC, UL, ULC, FCC, RoHS, RCM, WEEE, CB scheme
1. Medium Area Loop System with Network Control

(DL 207 NET):

* 1. Dimensions: 1U Rackmount, 19” W x 1.75” H x 10” D. Chassis is 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. Mic/Line Inputs: (1x Phoenix 3-position Terminal Block) / (1x XLR 3-pin input) - paralleled to Phoenix Terminal Block input. Input impedance: 1.5 kΩ Mic, 10 kΩ Line. Configurable/Accepts: Mic, 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 Mic/Line Input 1 & 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 & Firmware: Control via ethernet or USB, by PC App, iPad App, or Crestron. Firmware updates through USB only.
	21. Warranty: 2 year limited
	22. Approvals: CE, UL, ULC, FCC, Industry Canada, RoHS, WEEE, CE, UL, CB scheme, RCM
1. 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 is 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 kΩ input impedance, balanced or unbalanced.
	10. Mic/Line Inputs: (1x Phoenix 3-position Terminal Block) / (1x XLR 3-pin input) - paralleled to Phoenix Terminal Block input. Input impedance: 1.5 kΩ Mic, 10 kΩ Line. Configurable/Accepts: Mic, 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 Mic/Line Input 1 & 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/dial.
	21. Network Control & Firmware: Control via ethernet or USB, by PC App, iPad App, or Crestron. Firmware updates through USB only.
	22. Warranty: 2 year limited
	23. Approvals: CE, UL, ULC, FCC, Industry Canada, RoHS, WEEE, CE, UL, CB scheme, RCM
1. 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 is 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. Mic/Line Inputs: (1x Phoenix 3-position Terminal Block) / (1x XLR 3-pin input) - paralleled to Phoenix Terminal Block input Input impedance: 1.5 kΩ Mic, 10 kΩ Line. Configurable/Accepts: Mic, 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 Mic/Line Input 1 & Line Input 2, +4 dBu, Balanced or Unbalanced. The line outputs mirror the audio of the loop output.
	12. 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.
	13. Maximum Coverage Area: 7,200 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): 7 A RMS
	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 & Firmware: Control via ethernet or USB, by PC App, iPad App, or Crestron.
	21. Firmware updates through USB only.
	22. Warranty: 2 year limited
	23. Approvals: CE, UL, ULC, FCC, Industry Canada, RoHS, WEEE, CE, UL, CB scheme, RCM
1. 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 is 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. Mic/Line Inputs: (1x Phoenix 3-position Terminal Block) / (1x XLR 3-pin input) - paralleled to Phoenix Terminal Block input Input impedance: 1.5 kΩ Mic, 10 kΩ Line. Configurable/Accepts: Mic, 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 Mic/Line Input 1 & 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 & Firmware: Control via ethernet or USB, by PC App, iPad App, or Crestron. Firmware updates through USB only.
	22. Warranty: 2 year limited
	23. Approvals: CE, UL, ULC, FCC, Industry Canada, RoHS, WEEE, CE, UL, CB scheme, RCM

A7. Counter Loop Amplifier (DL 102)

1. Dimensions: 3.9” x 2.3” x 1” (100mm x 60mm x 25mm)
2. Weight: 0.48 lbs (218 g)
3. Audio Input: 3 (1 microphone or line input, isolated line input, Mic)
4. Connector Type: 3.5mm jack, Mic-2 pole line in, 3 pole line in, Mic in
5. Power Supply: 12V DC 1.5 A output
6. Power Voltage: 100-240VAC, 50/60Hz - 2.0A Input
7. Dynamic Range: > 60 dB
8. THD: THD+N < 0.5% - 1kHz
9. Amplifier Type: Constant current
10. Loop Resistance: 0.1 Ω to 1.0 Ω
11. Current Output: 2A RMS at 1kHz (2.8 APK)
12. Protection: Thermal, short-circuit and start
13. Warranty: 2-year
14. Power Loop Wire 14ga. (PLW 014): [*select as needed*]
15. Length: 500 ft
16. Spool Dimensions: 6.5" Dia.
17. Spool Weight: 9.8 lbs
18. Color: Black
19. Power Loop Wire Flat ¾” (PLW F500): [*select as needed*]
	1. Length: 500 ft
	2. Spool Dimensions: 8-1/8” Dia. x ¾” H
	3. Spool Weight: 6.5 lbs
	4. Color/Material: Copper
20. Power Loop Wire Flat ¾” (PLW F300): [*select as needed*]
	1. Length: 300 ft
	2. Spool Dimensions: 6-3/4” Dia. x ¾” H
	3. Spool Weight: 3.8 lbs
	4. Color/Material: Copper
21. Flat Wire Warning Tape (FWT 001): [*select as needed*]
22. Length: 165 ft
23. Spool Dimensions: 6” Dia. x 2” H
24. Spool Weight: 1.28 lbs
25. Color/Material: White cloth tape, blue lettering, “Gaffer Tape”, adhesive releases without residue

B5. Power Loop Mat (PLM 001)

1. Lead Wire Length: 16 ft / 5 m
2. DC Resistance: 1.3 Ohms
3. Weight: 0.5 lbs / 225 g
4. Pad: 14 in / 0.4 m square
5. Wire In Pad: 10-turn loop
6. 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 (max) into 33 ohms mono impedance
	12. THD: <2%
	13. Frequency Response: 300Hz to 10KHz, -6dB

D. Accessories: [*select as needed*]

1. Earphones
	* + 1. [Wide Range Earphone: Model EAR 008]
			2. [Single Mini Earbud: Model EAR 013]
			3. [Dual Mini Earbud: Model EAR 014]
			4. [Surround Earphone: Model EAR 022]
			5. [Dual, in-ear, isolation: Model EAR 042]
2. Headphones
	1. [Deluxe Folding: Model HED 021]
	2. [Rear-wear, Mono: Model HED 026]
	3. [Heavy-duty,Folding,Mono:Model HED 027]
	4. [Protector, Dual-Earmuff: Model HED 040]
3. Batteries
	1. [AA Alkaline: Model BAT 001-2]
	2. [AA NiMH: Model BAT 026-2]
4. Carry Cases
	1. [Small Briefcase for accessories: CCS 029]
	2. [Large 35-slot Case: Model CCS 030 35]
5. Chargers
	1. [12 Bay Units, PLR BP1:Model CHG 3512]

**PART 3 EXECUTION**

1. **INSTALLATION**
	1. Install equipment to comply with manufacturer’s recommendations.
	2. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with typical service loops, no excess. Use lacing bars in cabinets.
2. **GROUNDING**
	1. 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. **FIELD QUALITY CONTROL**
	1. 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.
4. **DEMONSTRATION**
	1. 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**

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