White Paper | 19-Pin Socapex SL419-Compatible Multicircuit Cable Systems

Recommended Wiring Configurations for Event Technology

NEUTRIK®

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Executive Summary

This paper provides guidance on the wiring of 19-Pin Socapex SL419-Compatible Multicircuit Cable Systems used in event technology. It compares relevant standards and common industry practice, and proposes wiring configurations – including a forthcoming DIN 15765 revision – that improve safety, reliability, compatibility and clear differentiation between power and signal applications.

The key concern is that the same mechanical 19-pin connector is used with different pin assignments and cable constructions. Without clear identification, this can result in incompatible connections and potentially hazardous conditions

1 Problem Description

19-Pin, SL419 Socapex-Compatible Multicircuit Cable Systems are widely used in the entertainment industry for different applications and regional wiring configurations. Two largely independent factors drive this variety: the number of power circuits carried (typically 6 or 8), and the protective-earth requirement of the connected equipment.

Class I equipment requires a protective-earth (PE) conductor per circuit; Class II (double-insulated) equipment does not. Because a Class II load needs no PE contact, the pins that would otherwise carry PE can be reassigned to two additional line/neutral circuits within the same 19-pin shell – which is how 8-circuit configurations exist on this connector alongside the more common 6-circuit ones. The same mechanical connector is also used for audio and other signal applications, entirely unrelated to power distribution.

Although these systems may use the same mechanical connector, their pin assignments and conductor functions can differ. In particular, a contact used as protective earth (PE) in one configuration may have a different function in another configuration.

A current, publicly available manufacturer catalogue illustrates this risk directly. A 19-pin-compatible connector of this kind is offered in a 16-pin variant – the identical shell with three central pins deliberately left blind – and is shown wired two functionally unrelated ways on the same 8-way splitter hardware: as an 8-circuit Class II lighting power feed (pins 1–14, 17–18 carrying line/neutral, no PE contact), and as an 8-channel loudspeaker feed (the same pin range carrying polarity-pair audio signals, no PE contact). Both wiring schemes fit the identical mechanical connector and grommet; nothing about the connector itself prevents a power-wired unit from being mated to equipment expecting the audio pinout, or vice versa (see Addendum 5).

This creates a risk of electric shock, equipment damage and incorrect system operation if mechanically compatible but electrically incompatible systems are connected.
The objective is therefore to establish clearly defined power configurations and unambiguous identification, while avoiding dangerous compatibility between power and signal applications.

2 Technical Background

The main standards relevant to 19-Pin Socapex SL419-Compatible Multicircuit Cable Systems in entertainment technology are:

- Germany: DIN 15765:2020-11
- USA: ANSI E1.80-2024
- UK: BS 7909:2023

The following table summarises the key aspects relevant to these systems:

Requirement / characteristic	DIN 15765:2020-11	ANSI E1.80-2024	BS 7909:2023
Application	Power	Power	Power; other applications referenced
6-channel, 19-pin	Yes – Bauart D	Yes – primary scope	Yes – Annex H, Type A
8-channel, 19-pin	No – 8-channel uses a different connector	No – explicitly outside scope	Yes – Annex H, Table H.4, Type I (Class II only, no PE contact)
PE arrangement	PE contacts bridged / common PE	Separate PE functions G1–G6; downstream bonding/ bridging is outside scope	Separate PE per circuit (unbridged) – Annex H.3.2
Pin functions defined (L/N/PE)	Yes	Yes	Yes, directly (Table H.3 legend)
First-make/last-break PE	Yes	Not specified	Not specified for this connector
Product marking / type identification	No specific requirement identified	Yes	General labelling recommendation (Annex H.1); no type-designation clause

Interpretation of the standards

Common requirements:

- Six-circuit configurations use the 19-pin connector in all three standards. Eight-circuit configurations are handled differently: DIN 15765's 8-circuit variant uses a different connector; ANSI E1.80 explicitly excludes 8-circuit/19-pin systems from its scope; BS 7909 documents an 8-circuit, Class-II-only configuration on the 19-pin shell (Annex H, Type I) alongside its six-circuit types.
- Pin functions (L/N/PE) are clearly specified in all three standards.
- No signal/data application is formally defined by any of the three standards for this connector, though BS 7909 explicitly notes that the same connector family is also used for lighting, rigging-motor control, and audio, and cautions users to manage this overlap (Annex H.1).

Differences:

- Common/bridged vs. individual PE: DIN 15765 requires bridged/common PE for this connector; ANSI E1.80 assigns separate PE per circuit (G1–G6), no bridging required; BS 7909 also uses separate, unbridged PE per circuit for the round 19-pin connector (Annex H.3.2: "it is reasonable not to link the CPCs"), aligning with ANSI E1.80 rather than DIN 15765.
- First-make/last-break PE: required by DIN 15765 (PE leads, female side). Not addressed in ANSI E1.80 or in BS 7909's provisions for this connector.
- On-product marking of pin configuration: required by ANSI E1.80 (§3). No such clause in DIN 15765. BS 7909 recommends general labelling of wiring configurations (Annex H.1) but does not tie this to a formal type-designation system as ANSI E1.80 does.

A revision of DIN 15765 is scheduled to is this correct? We already in Q3 2026. Its current direction of travel is twofold: first, to state explicitly that the existing PE-bridging requirement for this connector – which is defined by connector type and, on that wording, already applies to power distributors and splitboxes as well as to cables – removing an ambiguity that has allowed unbridged distribution equipment onto the market; and second, to formally define a second, independently specified 18-core cable configuration (unbridged, six individual PE cores) alongside the existing 13-core, bridged configuration, safe to use only where the connected power distributor and splitbox both implement the bridge themselves.

Please see more details on the pin functions / wiring protocols in Addendum 1 and Addendum 2.

3. Solutions Commonly Used in the Entertainment Market

Real-life practice often differs from the standards above, partly because no EN standard covers this topic, and some aspects remain undefined even in the US standard. (Descriptions below reflect market practice, not standard requirements.)

German market

13-, 17-, and 18-core cables are common. 13-core (6 circuits) and 17-core (8 circuits) cables typically use one shared earth core. 18-core configurations carry a full earth conductor per circuit, bridged at the connector – consistent with DIN 15765 (§5.2). Note: the 17-core/8-circuit configuration uses a different rectangular connector (DIN 15765's Steckverbinder Nr. 6), not the 19-pin round connector, which DIN 15765 limits to 6 circuits.

See example of the wiring protocol in Addendum 3.

Southern Europe and Benelux

18-core configurations with unbridged earth contacts are also used – a deviation from DIN 15765's current bridging requirement. This lets the same 19-pin connector be repurposed with different pin assignments for other applications (e.g. audio), increasing the risk of incompatible connections when configurations aren't clearly identified. This practice anticipates the second, unbridged 18-core configuration under DIN 15765's planned revision (see Section 2); until that revision is finalised, and until the connected distribution equipment reliably implements its own bridge, this configuration remains a deviation from the current standard text and should only be used with that dependency clearly stated in the accompanying instructions for use.

US market

14-core cables with AWG 12/14 conductors are common, typically with two cores paralleled to form a common earth across ANSI E1.80's six ground pins (G1–G6) – an implementation choice left open by the standard, which defines the pins but excludes downstream bonding practice from its scope (§1.3).
See example of the wiring protocol in Addendum 4.

Mechanical coding

At least one manufacturer offers this connector family in a 16-pin variant, mechanically identical to the standard 19-pin shell except for three deliberately blind (blocked) central pin positions. This keeps the two families physically distinct: a standard 19-pin, 6-circuit power connector cannot mate with equipment built for the 16-pin family, and vice versa – a genuine hardware safeguard at that particular boundary. It does not, however, prevent mismatches between different applications that

share the same 16-pin coding: as Section 1 and Addendum 5 show, an 8-circuit Class II lighting feed and an 8-channel loudspeaker feed use identical 16-pin hardware with entirely different pin functions.

4. Proposed Solution

The proposed approach is to establish clearly defined and consistently identifiable power configurations and to avoid using the same 19-pin configuration interchangeably for power and signal applications.

EU market – 6-channel configuration (13-core)

- 2 cores per channel for L and N
- 1 common protective-earth conductor
- Total: 13 cores
- All PE contacts connected to the common protective-earth conductor
- Recommended identification of Multichannel Power Systems: wiring protocol (Example: Ch.1: L:1, N:2, Ch.2: ...) and type label including rated current and voltage, and reference to DIN 15765 and common earth. Example: 250V 20A, DIN 15765 Bauart D / Klasse 2, bridged PE

This provides a simple and clearly defined power configuration while reducing cable size and weight.

EU market – 6-channel configuration, alternative (18-core)

- 2 cores per channel for L and N
- 6 individual protective-earth cores (PE1–PE6), one per channel, not bridged within the cable connector
- Total: 18 cores
- Intended use: only in combination with power distributors and splitboxes that themselves bridge their PE contacts; this dependency should be stated in the accompanying instructions for use.
- Recommended identification: as for the 13-core configuration above, plus an explicit statement in the instructions for use that this configuration's protective-earth path depends on bridging within the connected distribution equipment. Example: 250V, DIN 15765 Bauart D (planned second configuration), unbridged, PE1–PE6

This configuration offers no reduction in cable size or weight compared to the 13-core configuration above – six individual PE cores use more copper than one shared core, not less. Its purpose is

compatibility with distribution equipment that already provides its own PE bridging, at the cost of depending on that equipment for protective-earth continuity.

US market – 6-channel configuration

- 2 cores per channel for L and N
- 2 additional cores connected in parallel as common protective earth
- Total: 14 cores
- AWG 12/14 conductors according to the applicable current and installation requirements
- Identification of Multichannel Power Systems: per ANSI E1.80, each connector must be marked with its voltage, a reference to "ANSI E1.80," and its type designation. Example: "208V ANSI E1.80 Type C"

This configuration reflects common US entertainment-market practice and provides a robust common PE connection.

General design principle

For all configurations, the pin assignment, system voltage and intended application should be clearly defined and identified. Power configurations should be designed so that they cannot be mistaken for audio or other signal configurations using the same mechanical connector.

5. Benefits / Comparison

The proposed approach provides several advantages:

- **Clear and unambiguous power pinout –** Reduces the risk of connecting equipment to a connector with a different electrical configuration.
- **Defined protective-earth arrangement –** Provides a clear and robust PE path while reducing the number of required cable cores where a common PE is appropriate.
- **Reduced cable size and weight –** The 13-core configuration can be lighter and more flexible than configurations using an individual PE conductor per circuit.
- **Flexibility for distribution-side bridging –** The alternative 18-core (unbridged) EU configuration allows protective-earth continuity to be provided by the connected distribution equipment itself, where that equipment already provides it, without requiring a bridge in the cable or connector.
- **Alignment with established market practice –** The proposed configurations reflect commonly used constructions in the US and European entertainment markets and align with relevant standards.

- **Reduced risk of cross-connection –** Clear identification of the power configuration helps prevent accidental connection to audio or other systems with different pin assignments.
- **Simplified manufacturing and configuration management –** A limited number of clearly defined configurations simplifies production, testing, documentation and product identification.

6. Conclusion / Recommendation

The review of DIN 15765, ANSI E1.80 and BS 7909 shows that 19-Pin Socapex SL419-Compatible Multicircuit Cable Systems are primarily addressed in the context of multicircuit power applications, while different pin configurations and cable constructions are used across the entertainment market.

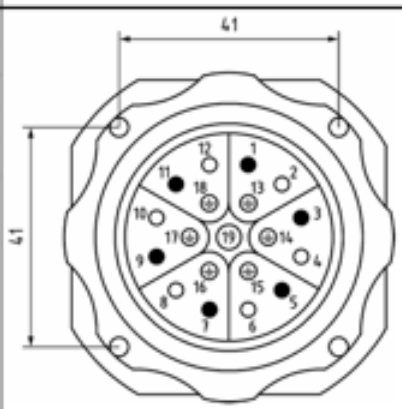
The main safety concern is not the use of different cable constructions itself, but the possibility that the same mechanical 19-pin connector is used with different electrical pin assignments and for different applications. This can result in incompatible connections and, in the worst case, expose contacts intended as protective earth to hazardous voltage.

We therefore recommend:

- **Use clearly defined and documented pin assignments for all power configurations.**
- **Use a common, bridged protective-earth arrangement where appropriate; where an unbridged, individually-wired configuration is used instead, ensure the connected distribution equipment provides the equivalent bridging itself, and state this dependency clearly in the accompanying instructions for use.**
- **Define the intended use of each configuration in the accompanying instructions for use, and clearly identify the wiring configuration, system voltage and intended application on the product and/or cable. Use outside the documented intended use is the responsibility of the end user.**
- **Avoid using the same 19-pin power configuration for audio or other signal applications.**
- **Use dedicated connector systems for audio and other signal applications, such as 8-, 25- or 32-pin connectors or suitable bayonet/multicore connectors, to clearly differentiate them from power applications. Where available, mechanical coding (e.g. deliberately blind pins, see Addendum 5) provides an additional, hardware-level safeguard against cross-application mating, complementing – not replacing – clear marking and documented intended use.**
- **Use a dedicated rectangular multi-pin connector system for 8-channel Class I power configurations rather than a 19-pin connector. Where all connected loads are certified Class II equipment requiring no protective-earth contact, an 8-circuit configuration on the 19-/16-pin shell may be used instead, provided it is unambiguously marked as Class-II-only and never mixed with Class I or 6-circuit products. In all cases, such configurations should not be presented as compliant with ANSI E1.80, which explicitly excludes 8-circuit/19-pin systems from its scope.**

Addendum 1 –
Extract from DIN 15765, Table 3: Types and Contact Assignments of Various Connectors

Tabelle 3 (*fortgesetzt*)

Steckverbinder		Bild	Stromkreis	Kontaktbelegung		
Nr.	Leistungsklasse/Bauart	Maße in Millimeter		L	N	PE
7	2+3/D	 Die Kontakte 13 bis 18 müssen elektrisch leitend miteinander verbunden sein, z. B. mit Hilfe eines passenden Rings. Der Kontakt 19 darf mit den Kontakten 13 bis 18 elektrisch leitend verbunden werden.	1	1	2	13
			2	3	4	14
			3	5	6	15
			4	7	8	16
			5	9	10	17
			6	11	12	18

Legende
○ = N = Neutralleiter
● = L = Außenleiter/Phase
⏚ = PE = PE Schutzleiter
◍ = nicht belegt

ANMERKUNG 1 Die Abbildungen zeigen immer die Aufsicht auf die Steckkontakte des Steckers (male).

ANMERKUNG 2 Drehstromanwendungen ohne mitgeführten Neutralleiter werden in dieser Norm nicht berücksichtigt.

DIN 15765:2020-11, Table 3 (extract), connector No. 7 / Bauart D.

Addendum 2 –
Extract from ANSI E1.80-2024, Pinout Configuration Types, Table 1

TABLE 1 NORTH AMERICA

	120V TYPE U USITT RP-1		208V TYPE C BS7909 C		240V TYPE C Derivative of 208V TYPE C		208V TYPE D BS7909 D		208V TYPE E BS7909 E	
Pin	CIRCUIT	L/N/G	CIRCUIT	L/N/G	CIRCUIT	L/N/G	CIRCUIT	L/N/G	CIRCUIT	L/N/G
1	1	L	1	L	1	L	1	L1	1	L1
2	1	N	1	L	1	L	2	L1	2	L1
3	2	L	2	L	2	L	3	L2	1	L2
4	2	N	2	L	2	L	1	L2	2	L2
5	3	L	3	L	3	L	2	L3	3	L3
6	3	N	3	L	3	L	3	L3	4	L3
7	4	L	4	L	4	L	4	L1	3	L1
8	4	N	4	L	4	L	5	L1	4	L1
9	5	L	5	L	5	L	6	L2	5	L2
10	5	N	5	L	5	L	4	L2	6	L2
11	6	L	6	L	6	L	5	L3	5	L3
12	6	N	6	L	6	L	6	L3	6	L3
13	G1	G	G1	G	G1	G	G1	G	G1	G
14	G2	G	G2	G	G2	G	G2	G	G2	G
15	G3	G	G3	G	G3	G	G3	G	G3	G
16	G4	G	G4	G	G4	G	G4	G	G4	G
17	G5	G	G5	G	G5	G	G5	G	G5	G
18	G6	G	G6	G	G6	G	G6	G	G6	G
19	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

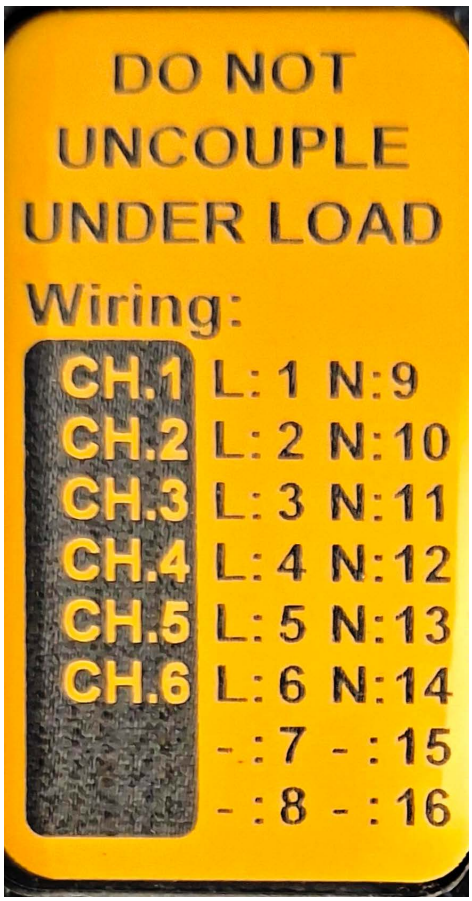
TABLE 2 EUROPE

230V TYPE A BS7909 A DIN15765		
CIRCUIT	L/N/G	Pin
1	L	1
1	N	2
2	L	3
2	N	4
3	L	5
3	N	6
4	L	7
4	N	8
5	L	9
5	N	10
6	L	11
6	N	12
G1	G	13
G2	G	14
G3	G	15
G4	G	16
G5	G	17
G6	G	18
NC	NC	19

Table Key:
L = Ungrounded Circuit Conductor; commonly known as "Hot" or "Phase".
N = Grounded Circuit Conductor; commonly known as "Neutral".
NC = no connection
G = Grounding Conductor; commonly known as "Ground" in North America and "Earth" in Europe.
120V Type U North American pinout configuration originated by USITT RP-1.
208V Type C North American pinout configuration also found in BS7909 Annex H as Type C.
240V Type C North American pinout configuration - a voltage derivative of 208V TYPE C.
208V Type D North American pinout configuration also found in BS7909 Annex H as Type D.
208V Type E North American pinout configuration also found in BS7909 Annex H as Type E.
230V Type A European pinout configuration found in BS7909 Annex H as Type A and DIN15765 Table 3 No 7.

ANSI E1.80-2024, Tables 1 and 2.

Addendum 3 –
Example Wiring Protocol for 19-Pin Cable Assemblies on the EU Market

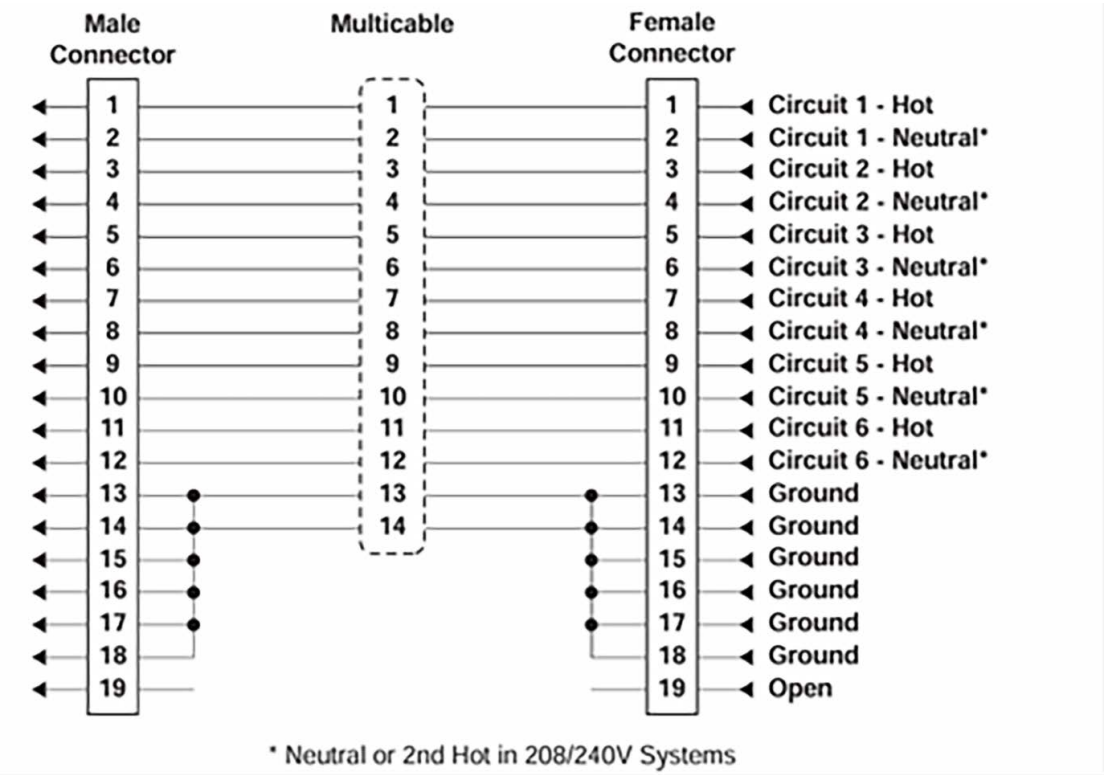


Example EU-market wiring protocol sticker.

Addendum 4 –
Example Wiring Scheme for 19-Pin Cable Assemblies on the US Market (TMB Pro Cables)

Extract from a TMB Pro Cables manufacturer's technical documentation for six-circuit, 14-conductor/19-pin multicable assemblies (manufacturer not identified here):

Electrical Schematic



Electrical schematic, US-market 14-conductor cable assembly (extract).

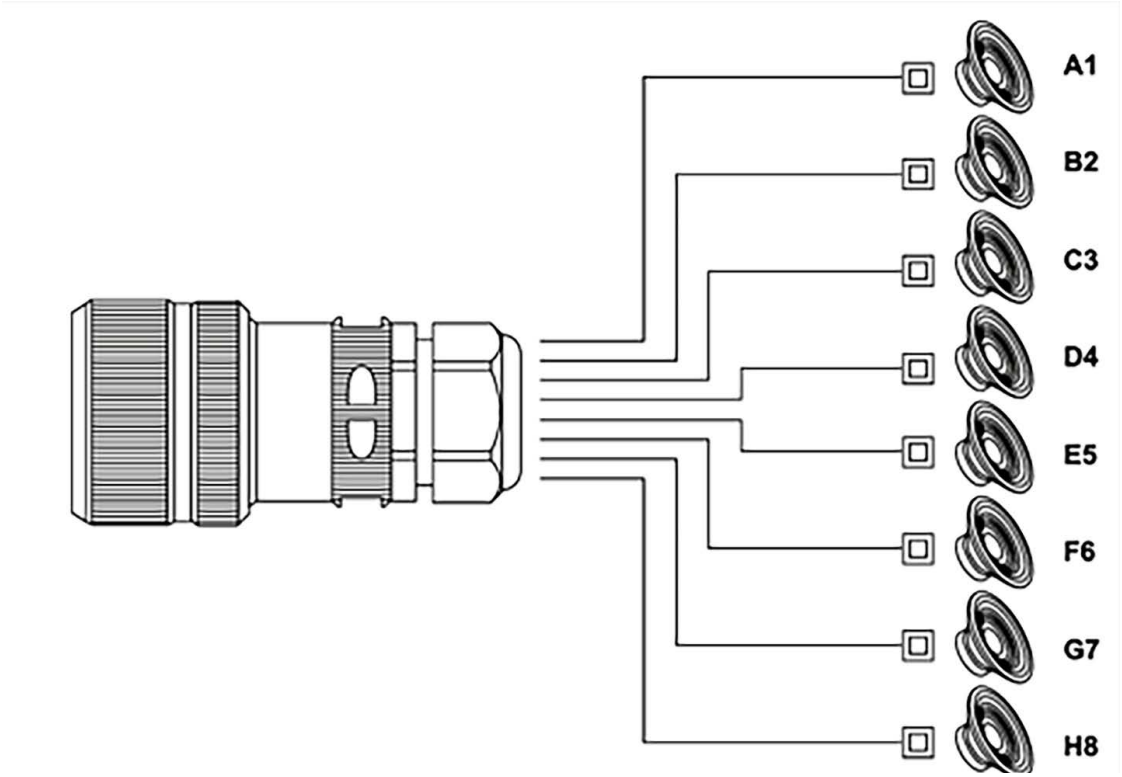
Addendum 5 – Specially Coded 16-Pin Connector and Loudspeaker Wiring Example (Valentini Syntax® SSX)

The 16-pin connector referenced anonymously in Section 1 is a specially coded variant from the Valentini Syntax® SSX programme, intended for Class II applications. Three of the nineteen pin positions are deliberately blocked – visible below as the three highlighted blind positions, compared with the standard 19-pin face on the left – which mechanically distinguishes this coded variant from the standard 19-pin connector and prevents the two from mating with each other (Syntax® SSX catalogue, p. 13). The same coding is also used, with entirely different pin functions, for Class II lighting power feeds (see Section 1); this addendum documents the loudspeaker application in detail as a concrete, fully-referenced example.



Syntax® SSX, Valentini – standard 19-pin face (left) vs. specially coded 16-pin, Class II variant (right).

Loudspeaker wiring example (catalogue p. 25): the connector's 16 active pins break out to eight loudspeakers, each fed by a polarity pair:

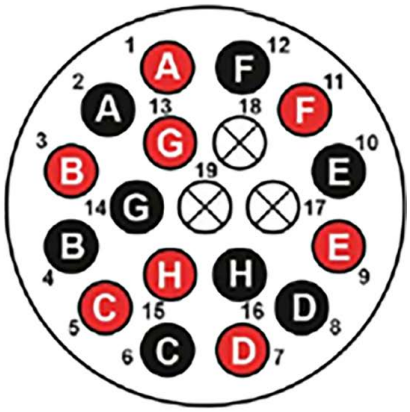


Syntax® SSX, Valentini – connection with 8 loudspeakers (catalogue p. 25).

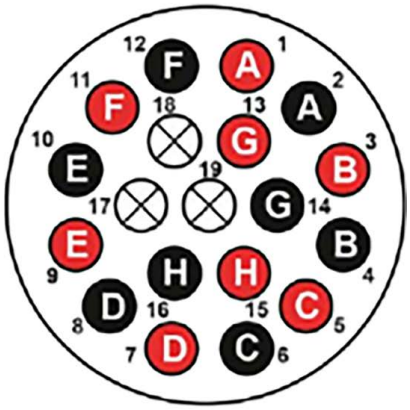
Pin	Polarity	Loudspeaker
1	+	A1
2	–	A1
3	+	B2
4	–	B2
5	+	C3
6	–	C3
7	+	D4
8	–	E5
9	+	E5
10	–	E5
11	+	F6
12	–	F6
13	+	G7
14	–	G7
15	+	H8
16	–	H8
17	blind pin	–
18	blind pin	–
19	blind pin	–
PE contact	None – signal application, no protective-earth conductor	

Pin 7 is shown in the catalogue as carrying only the positive lead of loudspeaker D4, with no corresponding negative pin; loudspeaker E5 is shown with three pins (8, 9, 10) rather than two. Both anomalies are reproduced here exactly as printed in the source catalogue.

The pinout diagrams below, cropped from the same page, show this coded 16-pin face in use: the three blocked positions (19, and the two marked with a cross) are omitted from the colour-coded circuit assignment entirely.



Female connector - Rear view



Male connector - Rear view

Syntax® SSX, Valentini –
female and male connector rear views, loudspeaker wiring example (catalogue p. 25).

19-Pin Socapex SL419-Compatible Multicircuit Cable Systems

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