Integrus Architect's and Engineer's Specifications

Executive Summary

(I) The Integrus system

The Bosch Integrus system provides a means of distributing undistorted language interpretations through virtually any indoor conference venue. By operating in the 2 – 8 MHz frequency band, the Integrus eliminates any interference from hall lighting. The use of advanced digital technology minimises transmission errors and leads to high audio quality. And being an infra-red system, the Integrus gives delegates full freedom of movement while listening to interpretations.

The Integrus can be used to distribute a maximum of 32 languages simultaneously. It is also possible to 'combine' audio channels for higher-quality audio distribution. The transmitter is the central element in the system. It accepts inputs from either analogue or digital sources, modulates these signals on to carrier waves, then transmits the waves to infra-red radiators located elsewhere in the room. The transmitter accommodates special interface modules to ensure compatibility with these external signal sources. The output of the infra-red radiators is intensity-modulated infra-red radiation. Each delegate is supplied with a pocket receiver, which has a lens to collect the infra-red signal and direct it to a sensor. These signals are then decoded back into interpretation languages, which are chosen by delegates using a channel selector and passed to the delegate's headphones.

(II) Advanced digital technology

The Integrus language distribution system incorporates unique, specially-developed Bosch Ir-digital technology. This technology is characterized by a number of features:

- The Integrus conforms to IEC 61603, part 7. This is the industry standard for digital infra-red transmission for language distribution.
- The use of the 2-8 MHz frequency band eliminates disturbance from all types of lighting systems.
- Error correction by means of a Reed Solomon coder, plus the bit error rate threshold, ensures a high audio quality.
- The digital transmission protocol used allows additional information to be sent (e.g. synchronization of the number of channels in use)
- The application of digital technology results in a very high sound quality with a signal/noise ratio of 80 dB.

(III) Interfacing with other systems

The Integrus has facilities for interfacing with digital congress systems, such as Digital Congress Network (DCN), and analogue congress systems, such as CCS 800. In addition, the system can accommodate public address systems and asymmetric inputs.

(IV) Using these Architect's and Engineer's Specifications

When preparing a specification, tender or quotation for a Bosch Integrus system, it may be necessary to provide a detailed functional description of all equipment supplied. The Architect's and Engineer's Specifications presented in this publication are intended to be used for these purposes, and may be copied and/or reproduced as required. Digital text files are available on request from Bosch Security Systems to make compiling tenders easier.

Special note: conference definition

For the purpose of this specification, a conference is any gathering of delegates where audio amplification is required.

1. Introduction

1.1 The Integrus system

The Integrus system is a language and audio distribution system that provides both the owners and the users of conference venues with a versatile means of language and audio distribution. Since it is essentially a wireless system, conference delegates have considerable freedom of movement within the conference venue, as they are not physically connected to the system. The use of digital audio means that additional information can be sent with the interpretations, and a high signal/noise ratio can be achieved. The system can transmit up to 32 languages or audio channels simultaneously, and the high-quality audio signals received by the delegates' headphones leads to high speech intelligibility. The Integrus system conforms to all the relevant ISO and IEC standards.

1.2 Architect's and Engineer's Specifications

This book of Engineer's and Architect's Specifications meets the needs of contractors, consultants and other professionals involved in project management, or in designing, specifying and procuring language distribution systems.

2. Scope of this specification

This specification shall cover the provision, installation and maintenance of the Integrus system, which includes a transmitter with a module, radiators, receivers, headphones and ancillary equipment.

The specific functions needed in any individual situation shall be provided by selection and combination of the required system units. The system shall be extendible, both functionally and in size, by the addition of the required modules or units.

3. System summary

3.1 System overview

The Integrus system shall provide interference-free, high-quality audio distribution which shall enable delegates to listen to language interpretations at conferences. It shall avoid disturbance from lighting systems by operating in the 2- 8 MHz frequency band. It shall provide high-quality audio signals by employing advanced digital technology to minimise transmission errors and increase the signal-to-noise ratio. It shall enable the transmission of up to 32 separate channels. It shall also be possible to transmit a lesser number of higher-quality audio signals by 'combining' channels.

The transmitter shall be the central element in the system. It shall accept inputs from either analogue or digital sources, modulate these signals on to carrier waves, then transmit the waves to infra-red radiators located elsewhere in the conference venue. The transmitter shall have a dedicated slot for accommodating special interface modules to ensure compatibility with these external signal sources.

The infra-red radiators shall output a modulated infra-red signal which conference delegates shall be able to receive on portable infra-red receivers. This infra-red signal shall be demodulated by the receivers and an audio signal shall be made available at an output that accepts headphones. The delegate shall be able to listen to the audio signal via the headphones. The system shall be wireless and the delegates shall require no physical connection to the system.

The Integrus system shall be of a modular design and it shall be possible to connect various combinations of a system. Systems shall be expanded or reduced in size by adding or removing equipment.

The full range of Integrus products shall include a transmitter, audio input and interpreter modules,
DCN interface modules, radiators and receivers.
This range shall be complemented by headphones, battery charging equipment and radiator mounting equipment, all of which shall be fully compatible with and easily integrated into the Integrus system.

Signal transmission and processing shall be by means of advanced Bosch digital audio and infra-red technology. This advanced digital and infra-red technology shall result in high level sound quality and speech intelligibility with no losses in signal quality or level during transmission. There shall be virtually no background noise, interference, cross talk or distortion.

The Integrus system shall provide four main functions that facilitate language and audio distribution:

Firstly,

The Integrus system shall provide full facilities for generating DQPSK modulated carrier waves containing up to 4 audio channels each. It shall be possible to transmit up to 32 audio channels. Facilities shall be provided for transmitting these carrier waves to the infra-red radiator(s).

Secondly,

The Integrus system shall provide full facilities for radiating modulated infra-red light at an intensity sufficient to ensure strong signal reception anywhere within the conference venue (subject to the stated specifications of the radiators).

Thirdly,

The Integrus system shall provide full facilities for enabling conference delegates to receive, select and listen to distributed languages and audio channels within the conference venue, by means of infra-red receivers and headphones.

Fourthly,

The Integrus system shall provide facilities for mounting the infra-red radiators and storing and recharging infra-red receivers.

All these functions shall be provided by the Integrus system. The system shall be simple and logical to operate by all personnel concerned as well as by delegates, and shall comply with accepted professional standards and practices for all the functions provided.

3.2 System functions

The Integrus system in its most complete configuration shall provide all of the following functions by means of purpose-built professional equipment:

- Interfacing with DCN systems;
- Interfacing with analogue systems such as CCS 800;
- Interfacing with emergency systems such as Praesideo and Plena;
- Accepting asymmetrical inputs;
- Generating DQPSK modulated carrier waves for up to 32 channels and transmitting these carrier waves to the infra-red radiator(s);
- Radiating modulated infra-red light at an intensity sufficient to ensure strong signal reception anywhere within the conference venue (subject to the stated specifications of the radiators);
- Enabling conference delegates to receive, select and listen to distributed languages and audio channels within the conference venue, by means of infra-red receivers and headphones;
- Providing facilities for mounting the infra-red radiators and storing and recharging infra-red receivers.

3.3 Compliance

The Integrus system shall comply with all applicable regulations and standards for equipment of this type, and especially with the IEC 61603 part 7, the standard for digital infra red transmission for audio signals for conference and similar applications and IEC 60914, the standard for conference systems. In addition, the system shall comply with all applicable international, national and local regulations for the design, construction and installation of electrical equipment.

3.4 System configuration

The Integrus system shall be an integrated modular configuration, with some or all of the following system components:

- A transmitter with an optional module
- A DCN interface module
- An audio input and interpreter module for directly connecting up to 12 interpreter desks (LBB 3222/04), or for connecting analogue conference systems such as the CCS 800
- One or more infra-red radiators
- Infra-red receivers (number dependent on the number of conference delegates)
- Headphones (one for each infra-red receiver)
- Optional accessories such as receiver recharging and storage equipment, mounting equipment and connecting cables.

3.5 System installation and interconnection

Installation of the Integrus system shall be based on a modular concept. The transmitter housing shall be suitable for 19-inch rack or table-top mounting and shall contain a dedicated slot for one module. One or more infra-red radiators shall be installed and positioned in accordance with their technical specifications. Infra-red receivers shall be required for conference delegates present. In addition, battery recharging equipment, infra-red receiver storage material and receiver mounting hardware shall be present as required.

The transmitter housing shall contain a built-in power supply. The DCN interface module shall have a 2 m (6 ft 6 in) trunk input cable with a 6-pole DIN connector for loop-through interconnection. The audio input and interpreter module shall have a 25-pole sub-D female DIN connector for symmetrical analogue audio input connection of up to 12 interpreter desks. All infra-red radiators shall be supplied with a mains cable and shall have HF input and output connectors for connection to the transmitter and loop-through connection to other infra-red radiators. The infra-red receivers shall be battery powered units with no physical connection to the Integrus system.

3.6 System operation

Operation and/or control of the system shall be possible at the following levels:

- system operator;
- delegate, using channel selection controls and upshift controls on delegate infra-red receivers.

Appropriate control facilities shall be provided for each of these levels.

3.7 First-line maintenance

The system design shall permit fast and effective fault location and correction by local personnel. This shall be supported by built-in self-diagnostic functions.
In particular, the transmitter shall have a display, which provides feedback about the system status and shall have a built-in mini infra-red radiator for system monitoring. System testing shall be possible by means of a test signal generated per audio input by the transmitter and by checking the coverage of the radiators by means of the receivers in a measurement mode. The infra-red radiators shall contain status indication LEDs.

3.8 Transmission Characteristics

The system shall have the following transmission characteristics.

IR transmission wavelength	: 870 nm
Modulation frequency	: Carriers 0 to 5; 2 to 6 MHz, according to IEC 60603 part 7
	: Carriers 6 and 7; up to 8 MHz
Protocol and modulation technique	: DQPSK, according to IEC 60603 part 7

3.9 System Audio Perfomance

The system shall have the following audio performance, measured from the audio input of a transmitter to the headphone output of a receiver:

Audio frequency response	: 20 Hz to 10 kHz (-3 dB) at Standard Quality
	20 Hz to 20 kHz (-3 dB) at Premium Quality
Total harmonic distortion at 1 kHz	: < 0.05 %
Crosstalk attenuation at 1 kHz	: > 80 dB
Dynamic range	: > 80 dB
Weighted signal-to-noise ratio	: > 80 dB(A)

3.10 Cabling and System Limits

The used cable shall be of the type 75 Ohm RG 59.

The maximum number of radiators per HF output shall be 30.

The maximum cable length per HF output shall be 900 m.

4. Transmitter and Modules

4.1 Transmitter

The transmitter shall be suitable for 19-inch rack or table-top mounting and shall contain a dedicated slot for one module. The transmitter is the central element in the Integrus system. It shall accept analogue or digital input (from DCN) and shall modulate these signals onto carrier waves and transmit these carrier waves to radiators located in the room.

4.1.1 Features and Benefits

The transmitter shall offer the following features and benefits:

- Universal mains power facility for use worldwide
- Distribution of a maximum of 4, 8, 16 or 32 audio channels
- Suitability for use with DCN or analogue systems like the CCS 800
- Automatic distribution of emergency messages to all channels
- Auxiliary mode for distribution of music to all channels during a break
- Flexible configuration of channels and channel quality modes for efficient distribution
- Adjustable sensitivity for each input to enable fine tuning of audio levels
- Test mode which produces a different frequency tone for each input/channel, with the tone gradually rising as the channels are stepped through.
- Slave mode for distribution of signals from another transmitter, so multiple rooms can be used
- Built-in mini infra-red radiator for audio monitoring
- Radiator and system status indication via display
- Configuration of transmitter and system via a display and one single rotary push button
- Assignment of a unique name by the installer for each transmitter for easy identification
- Assignment of a unique name by the installer for each audio channel. It shall be possible to select these names from a list of options or enter them manual.
- Automatic standby/on function
- Automatic synchronization to the number of channels in use in a DCN system
- 19" (2U) housing for table top use or rack mounting
- Handgrips for easy transportation
- 19" rack mounting brackets, detachable feet and mounting accessories for modules included
- System installation and operating manual on CD-ROM
- Mains cable

4.1.2 Controls and Indicators

The transmitter shall have the following controls and indicators:

- 2 x 16 character LCD display for status information and transmitter configuration
- Rotary push button for navigation through menus and configuration
- Power on/off switch on front panel

4.1.3 Interconnection

The transmitter shall offer the following interconnection facilities:

- Male Euro socket for mains connection
- Slot with audio data bus connector (H 15, female) for accepting audio input and interpreter module or DCN interface module
- 4, 8, 16 or 32 cinch connectors for input of asymmetrical audio signals
- Two XLR sockets for input of symmetrical signals of floor, emergency messages or music
- One terminal block socket for distribution of emergency messages to all channels
- 3.5 mm stereo headphone socket for monitoring inputs and channels
- One BNC connector for accepting an HF signal from another transmitter
- Four BNC connectors for output of HF signal to up to 30 radiators

4.1.4 Physical Characteristics

The transmitter shall have the following physical characteristics:

Mounting	: Brackets for 19" rack mounting or fixing to a table top
	: Detachable feet for free-standing use on a table top
Dimensions (H x W x D)	: 88 x 483 x 350 mm (3.5 x 19.0 x 13.8 in) for 19" rack use, with brackets, without feet
	: 92 x 440 x 350 mm (3.6 x 19.0 x 13.8 in) for table top use, without brackets, with feet
Weight	: 6.7 kg (14.7 lbs) with brackets, without feet
	: 6.8 kg (15.0 lbs) without brackets, with feet
Finish	: Charcoal with silver

4.1.5 Electrical Characteristics

The transmitter shall have the following electrical characteristics:

Asymmetrical audio inputs	: -6 to +6 dBV nominal
Symmetrical audio inputs	: +6 to +18 dBV nominal
Emergency switch connector	: emergency control input
Headphone output	: 32 Ohm to 2 kOhm
HF input	: nominal 1Vpp, minimum 10 mVpp, 75 Ohm
HF output	: 1 Vpp, 6 VDC, 75 Ohm
Mains voltage	: 90 to 260 V, 50 to 60 Hz
Power consumption	: maximal 55 W
Power consumption (standby)	: 29 W

4.1.6 Products

The transmitter shall be a Bosch LBB 4502/04, LBB 4502/08, LBB 4502/16, LBB 4502/32 or similar.

4.2 DCN Interface Module

The DCN interface module shall be used for interfacing the Integrus system with the DCN conference system. Languages generated by interpreters using DCN simultaneous equipment, plus the floor language, shall be input via this module. The only signals available to the module shall be from DCN channels assigned to the floor language and interpretations.

4.2.1 Features and Benefits

The DCN interface module shall offer the following features and benefits:

- Automatic switching on of the Integrus transmitter when the DCN system is switched on
- Automatic synchronization to the number of channels in use in the DCN system

4.2.2 Controls and Indicators

The DCN interface module shall have the following controls and indicators:

- DCN supply voltage presence indication on the display of the Integrus transmitter

4.2.3 Interconnection

The DCN interface module shall offer the following interconnection facilities:

- DCN trunk input cable 2 m (6 ft 6 in) with 6-pole DIN male connector
- DCN trunk output; 6-pole female DIN female connector for loop-through connection
- Audio and data bus connector; H 15 male connector

4.2.4 Physical Characteristics

The DCN interface module shall have the following physical characteristics:

Mounting	: Mounting plate and 2 screws included
Dimensions (H x W x D)	: 100 x 54 x 231 mm (3.9 x 2.1 x 9.1 in)
Weight	: 324 g (0.72 lb)

4.2.5 Electrical Characteristics

The DCN interface module shall have the following electrical characteristics:

- See DCN data brochure.

4.2.6 Products

The DCN interface module shall be the LBB 3423/20 or similar.

4.3 Audio Input and Interpreter Module

The audio input and interpreter module shall be used for interfacing the Integrus system with analogue conference systems. Eight symmetrical audio inputs at the back of the module shall be routed to an audio bus. The symmetrical audio input and interpreters module shall also accept inputs from auxiliary audio input sources such as public address systems.

4.3.1 Features and Benefits

The audio input and interpreter module shall offer the following features and benefits:

- Direct connection of up to 12 LBB 3222/04 Interpreter Desks for six languages
- Routing of floor signal (for instance from a CCS 800 discussion system) to Interpreter Desks
- Eight symmetrical inputs
- Facility for mounting input transformers for galvanic isolation between audio source and the transmitter

4.3.2 Controls and Indicators

The audio input and interpreter module shall have the following controls and indicators:

- On-board switches which shall be adjustable for directly connecting interpreter desks (LBB 3222/04) or other audio sources
- An on-board switch which shall be used to match the amplification of floor signals from CCS 800 or from other analogue conference systems
- An on-board switch which shall be used to replace the interpretation signal with the floor signal for distribution to the listeners when an interpreter channel is not in use

4.3.3 Interconnection

The audio input and interpreter module shall offer the following interconnection facilities:

- Symmetrical analogue audio input; 25-pole female sub-D connector
- Audio and data bus connector; H 15 male connector

4.3.4 Physical Characteristics

The audio input and interpreter module shall have the following physical characteristics:

Mounting	: Mounting plate and 2 screws included
Dimensions (H x W x D)	: 100 x 54 x 231 mm (3.9 x 2.1 x 9.1 in)
Weight	: 188 g (0.41 lb)

4.3.5 Electrical Characteristics

The audio input and interpreter module shall have the following electrical characteristics:

Audio input level with AGC	: -16.5 dBV (150 mVeff) to +3.5 dBV (1500 mVeff)
Audio input level without AGC	: -4.4 dBV (600 mVeff)
Asymmetric input impedance	: ≥ 10 kOhm
DC input impedance	: ≥ 200 kOhm

4.3.6 Products

The audio input and interpreter module shall be the LBB 3422/20 or similar.

5. Radiators and Accessories

5.1 Radiators

The infra-red radiators shall be high-power infra-red radiators that are suitable for use in large exhibition areas. There shall be two versions; one shall be equipped with 260 IREDs, and the other shall be equipped with 480 IREDs, which shall emit an infra-red radiation output of 12.5 W or 25 W respectively. A selectable power output, coupled with the effective directionality of the radiators, shall give very good coverage of larger venues or halls with high ceilings. By strategic positioning of multiple units, even larger areas shall be covered economically and easily. If the radiators are not receiving carrier waves, the radiators shall switch to standby mode.

5.1.1 Features and Benefits

The radiator shall offer the following features and benefits:

- Power output selection for efficiency and economy
- Universal mains power facility for use worldwide
- No fan - cooled by convection - for quieter operation and less moving parts to wear out
- LED indicators for radiator status checking
- Communication between radiator and transmitter for easy checking by the operator
- Automatic switching on when transmitter is switched on and vice versa
- Automatic gain control to ensure the IREDs (infra-red emitting diodes) function with maximum efficiency
- Automatic cable equalization to ensure maximum transmission efficiency with different quality of cables
- Automatic cable termination for simplified installation
- Temperature protection circuitry for automatic switching of radiator from full- to half- power if the temperature becomes too high
- Brackets for mounting on ceiling and floor stand, for simplified installation
- Adjustable radiator angle to ensure maximum coverage
- IREDs protected by a cover plate, so the units shall be easy to maintain and clean
- Attractive and stylish design
- Mains cable

5.1.2 Controls and Indicators

The radiator shall have the following controls and indicators:

- Two yellow LEDs: one on each radiator panel to indicate that this panel is switched on and is receiving carrier waves from the transmitter
- Two red LEDs: one on each radiator panel to indicate that this panel is in standby mode
- Red and yellow LEDs simultaneously illuminated to indicate the radiator panel is malfunctioning
- Red LED flashing and yellow LEDs to indicate the radiator panel is in temperature protection mode
- Power reduction switch to reduce the output of the radiator to half-power
- Two delay compensation switches to compensate for differences in cable lengths between transmitter and radiators

5.1.3 Interconnection

The radiator shall offer the following interconnection facilities:

- Male Euro socket for mains connection
- HF input and output connectors (2 x BNC) for connection to transmitter and loop-through to other radiators

5.1.4 Physical Characteristics

The radiator shall have the following physical characteristics:

Mounting	: A suspension bracket shall be used for direct ceiling mounting
	: Mounting plates shall be used fo floor stands with M10 and 1/2" Whitworth thread
	: A wall mounting bracket shall be used for fixing the radiator to wall surfaces
Dimensions (H x W x D)	: LBB 4511/00 without bracket: 200 x 500 x 175mm (7.9 x 19.7 x 6.9 in)
	: LBB 4512/00 without bracket: 300 x 500 x 175mm (11.8 x 19.7 x 6.9 in)
Radiator angle	: 0, 15 and 30° for floor-stand mounting
	: 0, 15, 30, 45, 60, 75 and 90° for wall/ceiling mounting.

Weight	: LBB 4511/00 without bracket: 6.8 kg (15 lbs)
	: LBB 4511/00 with bracket: 7.6 kg (17 lbs)
	: LBB 4512/00 without bracket: 9.5 kg (21 lbs)
	: LBB 4512/00 with bracket: 10.3 kg (23 lbs)
Finish	: Bronze coloured

5.1.5 Electrical and Optical Characteristics

The radiator shall have the following electrical and optical characteristics:

Number of IREDs	: 260 (LBB 4511/00), 480 (LBB 4512/00)
Total IR output at 20 °C	: 8 Wrms 16 Wpp (LBB 4511/00), 16 Wrms 32 Wpp (LBB 4512/00)
Total optical peak intensity	: 9 W/sr (LBB 4511/00), 18 W/sr (LBB 4512/00)
Angle of half intensity	: +/- 22°
HF input	: nominal 1Vpp, minimal 10 mVpp
HF output	: 1 Vpp, 6 VDC, 75 Ohm
Mains voltage	: 90 to 260 V, 50 to 60 Hz
Power consumption	: 100 W (LBB 4511/00), 180 W (LBB 4512/00)
Power consumption (standby)	: 8 W (LBB 4511/00), 10 W (LBB 4512/00)

5.1.6 Products

The radiators shall be the Bosch LBB 4511/00, LBB 4512/00 or similar.

5.2 Wall Mounting Bracket

The wall mounting bracket shall be used for mounting the infra-red radiator.

5.2.1 Physical characteristics

The wall mounting bracket shall have the following physical characteristics:

Dimensions (H x W x D)	: 200 x 280 x 160mm (7.9 x 11.0 x 6.3 in)
Weight	: 1.8 kg (4.0 lb)
Finish	: Quartz grey

5.2.2 Products

The wall mounting bracket shall be the Bosch LBB 3414/00 or similar.

5.3 Storage Suitcases

The storage suitcases shall be used for storing and transportation of radiators and cables.

5.3.1 Physical characteristics

The suitcase shall have the following physical characteristics:

Dimensions (H x W x D)	: Audipack 13891: 250 x 540 x 300 mm (9 x 21 x 12 in)
	: Audipack 13892: 250 x 540 x 400 mm (9 x 21 x 16 in)
Weight	: Audipack 13891: 6.5 kg (14 lbs)
	: Audipack 13892: 7.0 kg (15 lbs)
Finish	: Grey

5.3.2 Products

The storage suitcase shall be the Audipack 13891 for the LBB 4511/00 and Audipack 13892 for the LBB 4512/00 or similar.

6. Receivers, Battery Packs, Charging Units and Storage Suitcase

6.1 Receivers

These ergonomically designed receivers shall incorporate the latest electronics technology - including a specially designed IC - to ensure maximum performance and a long battery lifetime. The receivers shall be suitable for both language and music distribution.

6.1.1 Features and Benefits

The receiver shall offer the following features and benefits:

- Specially-designed IC for maximum performance and a long battery life time
- Recharging electronics integrated in the chip to ensure optimum charging performance
- 2-digit LCD display with battery and reception status indication
- Synchronisation facility so number of available channels is always the same as the number of channels in use by the system. This shall eliminate the need to scroll through unused channels
- Automatic muting of audio signal when the signal is too low, to ensure that the user shall only receive high-quality audio
- Power via disposable batteries (2x AA alkaline batteries) or environmentally-friendly NiMH rechargeable battery pack
- No power used when headphone is disconnected
- Clip for easy wearing
- Measurement mode for easy checking of radiator coverage
- Attractive and stylish design
- Up to 200 hours operation with alkaline batteries
- Up to 75 hours operation with battery pack
- Recharge from empty to full capacity within 1 hour and 45 minutes

6.1.2 Controls and Indicators

The receiver shall have the following controls and indicators:

- 2-digit LCD display with channel number, battery and reception status indication
- On/off button
- Volume control slide adjuster
- Channel selection up/down buttons
- Charging indicator LED

6.1.3 Interconnection

The receiver shall offer the following interconnection facilities:

- 3.5 mm (0.14 in) stereo jack output socket for headphones
- Battery contacts for use with AA alkaline batteries
- Connector for use with battery packs
- Charging contacts on the left-hand side of the receiver for compatibility with LBB 4560 charging units

6.1.4 Physical Characteristics

The receiver shall have the following physical characteristics:

Dimensions (H x W x D)	: 155 x 45 x 30 mm (6.1 x 1.8 x 1.2 in)
Weight excl. batteries/ battery pack	: 75 g (0.16 lb)
Weight incl. battery pack	: 125 g (0.28 lb)
Finish	: Charcoal with silver

6.1.5 Electrical and Optical Characteristics

The receiver shall have the following electrical and optical characteristics:

IR irradiance level	: 4 mW/m^2 per carrier
Angle of half sensitivity	: +/-50°
Headphone output level at 2.4V	: 450 mVrms (speech at maximum volume, 32 Ohm headphone)
Headphone output frequency range	: 20 Hz to 20 kHz
Headphone output impedance	: 32 Ohm to 2 kOhm
Max. signal-to-noise ratio	: > 80 dB(A)
Supply voltage	: 1.8 to 3.6 V, nominal 2.4 V
Power consumption at 2.4 V	: 15 mA (speech at maximum volume, 32 Ohm headphone)
Power consumption (standby)	: < 1 mA

6.1.6 Products

The receiver shall be the Bosch LBB 4540/04, LBB 4540/32 or similar.

6.2 NiMH Battery Pack

These NiMH battery packs, available in sets of 10, shall be suitable for use with Integrus receivers.

6.2.1 Features and Benefits

The NiMH battery pack shall offer the following feature and benefit:

- Temperature sensor for optimal charging process

6.2.2 Physical characteristics

The NiMH battery pack shall have the following physical characteristics:

Dimensions (H x W x D)	: 14 x 28 x 49 mm (0.5 x 1.1 x 1.9 in)
Weight	: 50 g (0.11 lb)

6.2.3 Electrical characteristics

The NiMH battery pack shall have the following electrical characteristics:

Voltage	: 2.4 V
Capacity	: 1100 mAH

6.2.4 Products

The NiMH battery pack shall be the Bosch LBB 4550/00 or similar.

6.3 Charging Units

The charging units shall be used to recharge and store receiver units.

6.3.1 Features and Benefits

The charging units shall offer the following features and benefits:

- Accommodation of up to 56 receivers
- Universal mains power facility for use worldwide
- Mains input with loop-through facilities
- Rapid recharging: maximum time required; 1 hour and 45 minutes
- Mains cable

6.3.2 Controls and Indicators

The charging units shall have the following controls and indicators:

- On/off switch

Charging status indication shall be on the receivers

6.3.3 Interconnection

The charging units shall offer the following interconnection facilities:

- Mains input with loop-through facility; male and female Euro mains socket
- 56 charging contacts. Compatibility with LBB 4540 receivers

6.3.4 Physical Characteristics

The charging units shall have the following physical characteristics:

Mounting	: LBB 4560/50: screws and plugs for wall mounting shall be included
Dimensions (H x W x D)	: LBB 4560/00: 230 x 690 x 530 mm (9 x 27 x 21 in)
	: LBB 4560/50: 130 x 680 x 520 mm (5 x 27 x 20 in)
Weight excl. receivers	: LBB 4560/00: 15.5 kg (34 lbs)
	: LBB 4560/50: 11.2 kg (25 lbs)
Weight incl. 56 receivers	: LBB 4560/00: 22.3 kg (49 lbs)
	: LBB 4560/50: 18.0 kg (40 lbs)
Finish	: Charcoal with grey

6.3.5 Electrical Characteristics

The charging units shall have the following electrical characteristics:

Mains voltage	: 90 to 260 V, 50 to 60 Hz
Power consumption	: 270 W (56 receivers charging)
Power consumption (standby)	: 17 W (no receivers in the charging unit)

6.3.6 Products

The charging units shall be the Bosch LBB 4560/00 (charging suitcase), LBB 4560/50 (charging cabinet) or similar.

6.4 Storage Suitcase

The storage suitcase shall be used for storing and transportation up to 100 receivers.

6.4.1 Physical characteristics

The suitcase shall have the following physical characteristics:

Dimensions (H x W x D)	: 207 x 690 x 530 mm (8 x 27 x 21 in)
Weight	: 7.5 kg (16.5 lbs)
Finish	: Grey

6.4.2 Products

The storage suitcase shall be the Audipack 6402 or similar.

7. Headphones

7.1 Lightweight Stereo Headphones

The lightweight stereo headphones shall be suitable for use with Integrus receivers. A set of 100 pairs of replacement ear pads shall be suitable for use with these lightweight stereo headphones.

7.1.1 Physical and Electrical Characteristics

The lightweight stereo headphones shall have the following physical and electrical characteristics:

Connection	: 1.3 m (4 ft) cable with 3.5 mm (0.14 in) jack plug
Impedance	: 32 Ohm
Audio frequency response	: 50 Hz to 20 kHz (-10 dB)
Power handling capacity	: 50 mW
Sensitivity (1 kHz)	: 98 dB SPL/earpiece at 1 mW/earpiece
Weight	: 70 g (0.16 lb)
Finish	: Charcoal with silver

7.1.2 Products

The lightweight stereo headphone shall be the Bosch LBB 3443/00 or similar. The set of replacement ear pads shall be the Bosch LBB 3443/50 or similar.

7.2 Under The Chin Headphones

The under the chin headphones shall be suitable for use with Integrus receivers. A set of 1000 replacement ear tips shall be suitable for use with these under the chin headphones.

7.2.1 Physical and Electrical Characteristics

The under the chin headphones shall have the following physical and electrical characteristics:

Connection	: 1.2 m (4 ft) cable with 3.5 mm (0.14 in) jack plug
Impedance	: 300 Ohm
Audio frequency response	: 50 Hz to 5 kHz (-10 dB)
Power handling capacity	: 60 mW
Sensitivity (1 kHz)	: 107 dB SPL/earpiece at 1 mW/earpiece
Weight	: 33 g (0.07 lb)
Finish	: Black

7.2.2 Products

The under the chin headphones shall be the LBB 3441/00 or similar. The set of replacement ear tips shall be the LBB 3441/50 or similar

7.3 Single Earphone

The single earphone shall be suitable for use with Integrus receivers.

7.3.1 Physical and Electrical Characteristics

The single earphone shall have the following physical and electrical characteristics:

Connection	: 1.2 m (4 ft) cable with 3.5 mm (0.14 in) jack plug
Impedance	: 32 Ohm
Audio frequency response	: 100 Hz to 5 kHz (-10 dB)
Power handling capacity	: 5 mW
Sensitivity (1 kHz)	: 114 dB SPL at 1 mW/earpiece
Weight	: 25 g (0.06 lb)
Finish	: Dark grey

7.3.2 Products

The single earphone shall be the LBB 3442/00 or similar.

7.4 High Quality Dynamic Headphones

The high quality dynamic headphones shall be suitable for use with Integrus receivers. A set of replacement ear pads shall be suitable for use with these high quality dynamic headphones.

7.4.1 Physical and Electrical Characteristics

The high quality dynamic headphones shall have the following physical and electrical characteristics:

Connection	: 1.2 m (4 ft) cable with 3.5 mm (0.14 in) jack plug
Impedance	: 360 Ohm
Audio frequency response	: 250 Hz to 13 kHz (-10 dB)
Power handling capacity	: 200 mW
Sensitivity (1 kHz)	: 96 dB SPL/earpiece at 1 mW/earpiece
Weight	: 90 g (0.20 lb)
Finish	: Black/grey

7.4.2 Products

The high quality dynamic headphone shall be the LBB 3015/04 or similar. The replacement ear pads shall be the 8222 231 16451 or similar.

8. 6-Channel Interpreter Desk and Accessories

8.1 6-Channel Interpreter Desk with Loudspeaker

The 6-channel interpreter desk with loudspeaker shall be a single-user, microprocessor-controlled interpreter desk, which shall offer an economical solution for providing interpretations to conference participants. It shall interface with the transmitter via the symmetrical audio input and interpreters module. The floor signal shall be routed from the transmitter to the interpreter desks.
It shall be possible to use the 6-channel interpreter desk with loudspeaker either as a free-standing, desktop or flush-mounted unit.

8.1.1. Features and Benefits

The 6-channel interpreter desk with loudspeaker shall offer the following features and benefits:

- Built-in loudspeaker
- Accommodation of 6 different language channels plus the original floor language
- Loop-through connection possibilities for up to 12 interpreter desks within and/or between interpreter booths
- Accommodation of up to three interpreter desks per booth
- Incoming channel pre-selector key to eliminate the need to manually search through all available language channels
- Quick switching between the floor language and the channel set on the channel selector to reduce the chance of operator errors
- Electronic channel interlock function to prevent interpreters in different booths from using the same output channel
- Auto relay enable function to allow the interpreter to provide the auto relay language (OR2) for relay interpretation
- A disable function on channel B to allow the interpreter to disable channel B while ensuring that the desk remains connected to channel A

8.1.2 Controls and Indicators

The 6-channel interpreter desk with loudspeaker shall have the following controls and indicators:

- Microphone mounted on a flexible stem, complete with a light ring which shall illuminate when the microphone is on
- Headphone volume, treble and bass controls
- A-B channel selector key with channel select indicators
- Six outgoing B-channel select keys with channel select indicators
- Outgoing 'OR2' (auto relay) indicator
- 'Channel engaged' indicators to show which channels are in use by other interpreters
- Microphone 'mute' key
- Microphone activating key with LED status indicator
- Select key with LED indicators for fast switching between the original floor language and the channel set on the channel selector
- Incoming channel 'OR2' (auto relay) indicator to show that the original floor language has been replaced by a transfer interpretation channel, when the auto-relay facility is in operation
- Incoming language channel selector for headphone monitoring
- Call key (voice) to provide two-way communication between interpreter and chairman/operator
- Outgoing message key
- Incoming message indicator
- Rotary switch to preset the outgoing channel via the A output

8.1.3 Interconnection

The 6-channel interpreter desk with loudspeaker shall offer the following interconnection facilities:

- 3 m cable terminated with a 25-pin sub D-type connector
- 25-pin sub D-type socket for loop-through connections
- 6.3 mm (0.25 in) stereo jack headphone connectors
- 15-pole 180° DIN-type socket for connection of interpreter's headset with microphone, plus switch to mute the built-in microphone
- Auxiliary socket (message) for the desk's message function

8.1.4 Physical Characteristics

The 6-channel interpreter desk with loudspeaker shall have the following physical characteristics:

Mounting	: Table top or flush mounting
Dimensions	: 20-58 x 250 x 189 mm
	(0.79–2.28 x 9.84 x 7.44 in)
	(H[front]–H[rear] x W x D)
Weight	: 1.75 kg (3.85 lb)
Finish	: Light grey

8.1.5 Electrical Characteristics

The 6-channel interpreter desk with loudspeaker shall have the following electrical characteristics:

Frequency response	: 125 Hz (-10 dB) to 12.5 kHz (-2 dB)
Rated equivalent sound pressure due to inherent noise	: < 32 dB
Total harmonic distortion at overload	: < 5%
Crosstalk attenuation	: > 66 dB

8.1.6 Products

The 6-channel interpreter desk with loudspeaker shall be the LBB 3222/04 or similar.

8.2 Interpreter Headphones

These lightweight, dynamic headphones shall be suitable for direct connection to the 6-channel interpreter desk with loudspeaker. A set of replacement ear pads shall be suitable for use with these high quality dynamic headphones.

8.2.1 Physical and electrical characteristics

The interpreter headphones shall have the following physical and electrical characteristics:

Connection	: 1.5 m (59.05 in) cable with 6.3 mm (0.25 in) jack plug
Impedance	: 2 x 720 Ohm
Frequency response	: 250 Hz to 13 kHz (-10 dB)
Power handling capacity	: 200 mW
Sensitivity (1 kHz)	: 97 dB SPL/earpiece at 0 dBV/system
	: 96 dB SPL/earpiece at 1 mW/earpiece
Weight	: 78 g (0.17 lb)
Finish	: Black/grey

Single pair of replacement ear pads: ordering code 8222 321 16451.

8.2.2 Products

The interpreter headphones shall be the LBB 9095/30 or similar. The replacement ear pads shall be the 8222 231 16451 or similar.

8.3 Extension Cables

The extension cables shall be used to interconnect 6-channel interpreter desks when the standard cabling is too short.

8.3.1. Physical characteristics

The extension cables shall have the following physical characteristics:

Type of connectors	: 25-pole sub-D-type plug with sliding lock mechanism
	: 25-pole sub-D-type socket with pin-lock mechanism
Finish	: Grey sheath

8.3.2 Products

The following products –or similar- shall be used for cable extension:

- LBB 3306/05 Extension cable assembly 5 m with 25-pole sub-D-type plug and socket
- LBB 3306/20 Extension cable assembly 20 m with 25-pole sub-D-type plug and socket
- LBB 3306/00 100 m installation cable without connectors

Product index

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