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Executive Summary

(I) Infra-Red distribution

The Philips Infra-Red Language Distribution System provides a means of distributing language interpretations through virtually any indoor conference venue. It can be used to distribute a maximum of 16 languages, each on a separate frequency-modulated channel. All the modulated carrier waves are generated by a transmitter, then mixed and fed via a single coaxial cable to one or more infra-red radiators. The output of the radiator(s) is modulated infra-red light which can be collected by purpose-built infra-red receivers. The collected infra-red signals are electronically decoded by the receiver. A delegate can select one of the signals to be relayed to headphones connected to the receiver, using a channel selector on the receiver.

(II) The modularity of infra-red equipment

The modularity of the Infra-Red Language Distribution System facilitates installation and enables distributed system modification and expansion. The modular transmitter has a housing that can accommodate up to seven modules. These modules are added or removed as required, depending on the number of interpretations distributed, the type of congress and interpretation system being used, and whether signals from other audio sources have to be distributed. In addition, one or more radiators must be used, and each delegate must have a receiver and a set of headphones. Accessories such as charging cabinets and floor stands are also available. The system is extendible to allow for different system requirements and varying numbers of delegates.

(III) Interfacing with other systems

The Infra-Red Language Distribution System has facilities for interfacing with digital congress systems, such as Philips Digital Congress Network (DCN), and analogue congress systems, such as Philips CCS 800 and CCS 400. 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 Philips Infra-Red Language Distribution 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. A computer diskette containing the text files is available on request from Philips Communication & 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 Infra-Red Language Distribution System

The Infra-Red Language Distribution System is a language distribution system that provides both the owners and the users of conference venues with a versatile means of language 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 system can transmit up to 16 languages, each via a separate channel, and provides high-quality audio signals to the delegates' headphones for high speech intelligibility.

The modular design of the Infra-Red Language Distribution System enables the required facilities to be specified in virtually any desired configuration, permitting a high degree of system flexibility. The 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.

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2. SCOPE OF THIS SPECIFICATION

This specification shall cover the provision, installation and maintenance of the infra-red Distribution System which includes a transmitter housing with up to seven modules, infra-red radiators, infra-red 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 Infra-Red Language Distribution System shall provide digital signal processing and modulation of audio signals for the purpose of language distribution at conferences. The transmitter shall generate a carrier wave for each channel onto which each interpretation language or other audio input shall be frequency modulated. The frequency modulated carrier waves shall be transmitted to the infra-red radiator(s). It shall be possible to transmit up to 16 separate channels. 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 Infra-Red Language Distribution 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 Infra-Red Language Distribution System products shall include transmitter housings, basic modules, channel modules, symmetrical audio input and interpreters modules, DCN interface modules, infra-red radiators and infra-red 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 Infra-Red Language Distribution System.

Signal transmission and processing shall be by means of advanced Philips 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, crosstalk or distortion.

The Infra-Red Language Distribution System shall provide four main functions that facilitate language distribution at conferences.

Firstly,

the Infra-Red Language Distribution System shall provide full facilities for generating frequency-modulated carrier waves for each channel. It shall be possible to transmit up to 16 separate channels. Facilities shall be provided for transmitting these carrier waves to the infra-red radiator(s).

Secondly,

the Infra-Red Language Distribution 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 Infra-Red Language Distribution System shall provide full facilities for enabling conference delegates to receive, select and listen to distributed languages within the conference venue, by means of infra-red receivers and headphones.

Fourthly,

the Infra-Red Language Distribution 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 Infra-Red Language Distribution 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 Infra-Red Language Distribution 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 and CCS 400;
- accepting asymmetrical inputs;
- generating frequency-modulated carrier waves for up to 16 channels and transmitting these carrier waves to the infra-red radiator(s);
- radiating modulated infra-red radiation 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 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.

All equipment shall be capable of being combined as required to reach the desired specification in terms of system size and/or functions, and shall be capable of later field extension by the addition of the required equipment.

3.3 Compliance

The Infra-Red Language Distribution System shall comply with all applicable regulations and standards for equipment of this type. 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 Infra-Red Language Distribution System shall be an integrated modular configuration, with some or all of the following system components:

- a transmitter housing comprising a power supply and housing for up to seven modules;
- one or more channel modules (up to a maximum of four);
- a basic module;
- a DCN interface module;
- a symmetrical audio input and interpreters module for directly connecting up to 12 interpreter desks (LBB 3222/04), or for connecting analogue conference systems such as Philips CCS 800 and CCS 400;
- 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 battery recharging equipment, receiver storage equipment, mounting equipment and connecting cables.

3.5 System installation and interconnection

Installation of the Infra-Red Language Distribution 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 dedicated slots for up to seven modules, which shall be accessible via the front panel of the housing. Blanking plates shall be provided for any positions not in use. A basic module shall always be present for any system configuration and other modules shall be present according to system requirements. 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 symmetrical audio input and interpreters module shall have a 25-pole sub-D female DIN connector for symmetrical analogue audio input connection of up to 12 interpreter desks, and each channel module shall have four cinch audio input plugs for connecting external audio input sources to the transmitter. The basic module shall have four HF BNC connectors for connecting the transmitter to the radiators. 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 Infra-Red Language Distribution 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 channel modules shall have LCD channel status monitoring indicators and the basic module shall have a built-in mini infra-red radiator for system monitoring. System testing shall be possible by means of a 1 kHz audio signal generated by the basic module. The infra-red radiators shall contain status indication LEDs.

4. CONTRIBUTION EQUIPMENT

4.1 Transmitter Housing and Modules

Transmitter Housing

The transmitter housing shall be a 19-inch rack or table-top unit with a built-in power supply. It shall contain insertion slots for up to seven modules, which shall be added or removed depending on the congress system used, the number of interpretations required, the type of interpretation system used, and whether signals from other audio sources have to be distributed. Blanking plates shall be supplied for any positions not in use. It shall be suitable for use with digital or analogue systems and shall have an auxiliary input for emergency messages, which shall be distributed to every channel.

The transmitter housing shall have the following controls:

- rear panel mains switch. After switching on the power the transmitter shall start up in standby mode when a basic module is installed.

The transmitter housing shall have seven slots for accepting application modules with the following interconnections:

- 55-pole, Z-pack male connector module with pin connections for 16 channels;
- H15 female connector module for supply interconnection;
- a cinch socket for auxiliary audio input shall be provided on the housing.

Dimensions (H x W x D): 150 x 420 x 266 mm (5.91 x 16.54 x 10.47 in)

Weight: 5 kg (11 lb)

Finish: grey

Channel Module

The channel module shall have four carrier channels and shall generate a separate frequency-modulated carrier for each channel. One channel module shall allow the allocation of up to four channels for interpretations, and it shall be possible to install up to four channel modules in slots in the transmitter housing. The output from the channel module shall be the input to the basic module. The channels controlled by a channel module shall be determined by the position of the module in the transmitter housing, as follows:

- position 3: channels 0-3;
- position 4: channels 4-7;
- position 5: channels 8-11;
- position 6: channels 12-15.

The channel module shall have the following controls and indicators:

- four front-panel slide switches to switch the four channels on or off;
- four front-panel LCDs to show the channel numbers (0 to 15). If a channel is switched off, the corresponding LCD shall be blank.

The channel module shall have the following interconnections:

- four cinch audio input plugs;
- audio and data bus connector.

Dimensions (H x W x D): 130 x 50.5 x 270 mm (5.12 x 1.99 x 10.63 in)

Weight: 275 g (0.61 lb)

Finish: grey

Symmetrical Audio Input and Interpreters Module

The symmetrical audio input and interpreters module shall be used for interfacing the Infra-Red Language Distribution System with analogue conference systems. It shall be possible to directly connect up to 12 interpreter desks (LBB 3222/04). 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. Different connections and switch settings shall be required depending on the type of analogue system used. When the symmetrical audio input and interpreters module is used with the DCN interface module, Automatic Gain Control (AGC) shall be automatically switched off.

The symmetrical audio input and interpreters module shall have the following controls located on the printed circuit board inside the unit:

- on-board switches for directly connecting interpreter desks (LBB 3222/04) or connecting other audio sources
- an on-board switch for routing the audio input to audio channels 0-7 or 8-15
- an on-board switch for matching the amplification of floor signals from CCS 800 or from other analogue conference systems
- an on-board switch for replacing the interpretation signal with the floor signal for distribution to the listeners, when an interpreter channel is not in use

The symmetrical audio input and interpreters module shall have the following interconnections:

- 25-pole female sub-D connector for symmetrical analogue audio input.
- Audio and data bus connector.

Dimensions (H x W x D): 130 x 50.5 x 270 mm (5.12 x 1.99 x 10.63 in)
Weight: 200 g (0.44 lb)
Finish: grey

DCN Interface Module

The DCN interface module shall be used for interfacing the Infra-Red Language Distribution System with the DCN conference system. The DCN interface module shall have a fixed 2 m (6 ft 6 in) cable with a 6-pole male connector and a 6-pole female connector for loop-through connection to the DCN system cabling. 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. When the DCN supply voltage is present at the DCN interface module input, the infra-red transmitter shall be automatically switched from standby to operation mode. When the supply is removed, the transmitter shall be switched back to standby mode.

The DCN interface module shall have the following indicator:

- DCN supply voltage presence indicator (green LED).

The DCN interface module shall have the following interconnections:

- DCN trunk input cable (2 m (6 ft 6 in)) with 6-pole male connector for loop-through interconnection;
- DCN trunk output, 6-pole female connector for loop-through connection;
- audio data bus connector.

Dimensions (H x W x D): 130 x 50.5 x 270 mm (5.12 x 1.99 x 10.63 in)
Weight: 385 g (0.85 lb)
Finish: grey

Basic Module

The basic module shall be present in every configuration of the Infra-Red Language Distribution System. It shall be inserted in the transmitter housing. It shall provide the following functions:

- power on/off;
- input selection;
- channel shift;
- radiator status.

The basic module shall have four high-frequency inputs, each of which shall accept an HF signal from a channel module. These signals shall be filtered, summed and supplied as an asymmetric output to the infra-red radiators. The basic module shall have a built-in mini radiator for monitoring the system, and shall be able to generate a 1 kHz audio signal for system testing.

The basic module shall have a 3-position front panel slide switch for selecting one of the three following modes:

- normal, for normal use of the infra-red system;
- aux, whereby an audio signal at the rear-panel auxiliary input is distributed to all channels;
- test, whereby a 1 kHz test signal is sent to all channels.

The basic module shall have the following indicators:

- 'transmitter on' indicator (green LED)/'transmitter standby indicator (red LED);
- 'radiator disconnected/malfunctioning' indicator (red LED);
- 'radiator connected/functioning correctly' indicator (green LED);
- 'channel shift' indicator (yellow LED).

The following controls shall be located on the printed circuit board inside the unit:

- Automatic Gain Control (AGC) on/off switch for symmetrical and asymmetrical audio sources;
- channel shift switch to increase the carrier frequency of all channels by 160 kHz;
- jumper setting to be altered according to the type of infra-red radiator being used.

The basic module shall have the following interconnections:

- 4 HF-output BNC connectors per module;
- audio data bus connector.

Dimensions (H x W x D): 130 x 50.5 x 270 mm (5.12 x 1.99 x 10.63 in)

Weight: 280 g (0.61 lb)

Finish: grey

4.2 6-Channel Interpreter Desk with Loudspeaker

The 6-Channel Interpreter Desk with Loudspeaker shall accommodate up to six different language channels plus the original floor language. It shall be a microprocessor-controlled interpreter desk. It shall be possible to loop-through connect up to 12 of the units within and between interpreter booths. It shall be possible to house up to three units per interpreter booth. It shall be possible to use the 6-Channel Interpreter Desk with Loudspeaker either as a free-standing, desktop or flush-mounted unit.

The 6-Channel Interpreter Desk with Loudspeaker shall have the following controls and indicators:

- microphone mounted on a flexible stem, containing a light ring which illuminates when the microphone is on;
- headphone volume, treble and bass controls;
- A-B channel selector key with channel select indicators;
- 6 outgoing B-channel select keys with channel select indicators;
- microphone activating key with LED status indicator;
- microphone 'Mute' key;
- select key with LED indicators to allow fast switching between the original floor language and the channel set on the channel selector;
- incoming language channel selector for headphone monitoring;
- call key (voice) to provide two-way communication between interpreter and chairman/operator;
- outgoing message key;
- rotary switch to preset the outgoing channel via the A output;
- outgoing 'OR2' (auto-relay) indicator;
- 'Channel engaged' indicators to show which channels are in use by other interpreters;
- 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 message indicator.

The 6-Channel Interpreter Desk with Loudspeaker shall have the following interconnections:

3 m cable terminated with a 25-pin D-type connector;

25-pin D-type socket for loop-through connection;

6.3 mm (0.25 in) stereo jack headphone connectors;

15-pole 180° DIN-type socket for connecting interpreter's headset with microphone plus switch to mute the built-in microphone;

auxiliary socket (message) for the desk's message function.

Dimensions:

(H [front] - H [rear] x W x D) 20 - 58 x 250 x 189 mm (0.79 - 2.28 x 9.84 x 7.44 in)

Weight: 1.75 kg (3.85 lb)

Finish: grey

4.3 Infra-Red Radiators

High-Power Infra-Red 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 252 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. It shall be possible to select either full- or half-power as required. This 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. They shall have a universal mains power supply, and shall be switched on automatically when the transmitter is switched on. If the radiators are not receiving carrier waves, the radiators shall switch to standby mode. The radiators shall have convection cooling, and shall function quietly and unobtrusively. A temperature protection mode shall automatically switch the radiators from full- to half- power if the temperature of the IREDs becomes too high. The infra-red radiators shall be mounted on walls or ceilings, or on a floor stand. A mounting bracket shall be provided for mounting on a floor stand.

The high-power infra-red radiators shall have the following controls and indicators:

- yellow LED which shall illuminate when the radiators are switched on and are receiving carrier waves from the transmitter;
- red LED which shall illuminate when the radiator is on;

Note: Both the red and the yellow LEDs shall illuminate if the radiator is malfunctioning. The yellow LED shall illuminate, and the red LED shall flash if the radiator is in temperature protection mode.

- power reduction switch which shall reduce the power output of the radiators from full-power to half-power.

The high-power infra-red radiators shall have the following interconnections:

- male Euro mains socket for mains connection (mains cable shall be included);
- HF input and output connectors for connection to transmitter and loop-through to other radiators (2 ~ BNC connectors). An automatic cable termination switch shall be built into the BNC connectors.

The 12.5 W version of the high-power infra-red radiator shall be 200 mm (7.9 in) high, 500 mm (19.7 in) wide and 175 mm (7.0 in) deep. It shall weigh 7 kg (15.4 lb) (excluding brackets) and shall be finished bronze coloured.

The 25 W version of the high-power infra-red radiator shall be 280 mm (11.0 in) high, 500 mm (19.7 in) wide and 175 mm (6.9 in) deep. It shall weigh 10 kg (22.0 lb) (excluding brackets) and shall be bronze coloured.

Infra-Red Radiators

These infra-red radiators shall be used to distribute infra-red signals throughout small- and medium-sized conference venues. They shall operate mainly over short distances. The infra-red radiator shall be a wide or a narrow beam radiator. These radiators shall have a built-in power supply and shall be switched on automatically when a connected transmitter is switched on. When not receiving a signal from the transmitter, the radiators shall switch to standby mode.

Each radiator shall be equipped with 88 IREDS and shall have an infra-red output of 1.8 W. The wide-beam radiator shall have a maximum coverage of 77 m² (770 ft²), and the narrow-beam radiator shall have a maximum coverage of 120 m² (1200 ft²). These radiators shall be mounted on walls or ceilings, or on floor stands for portable installations. Brackets shall be included.

The infra-red radiators shall have the following controls and indicators:

- green LED to indicate that the radiator is switched on and is receiving carrier waves from the transmitter;
- red LED which shall illuminate when the infra-red output of the radiator is reduced to 70% or less of normal output level;
- 'Reduced Power' switch.

The infra-red radiators shall have the following interconnections:

- male mains socket for mains connection (3 m (9 ft 9 in) mains cable included);
- female mains socket for mains loop-through connection;
- HF input and output connectors for connection to transmitter and loop-through to other radiators (2 ~ BNC connectors);

The infra-red radiators shall be 300 mm (11.81 in) high, 176 mm (6.93 in) wide and 125 mm (4.92 in) deep. They shall weigh 1.5 kg (3.3 lb) and shall be finished in black. They shall be suitable for mounting on ceilings, walls or floors.

4.4 Infra-Red Receivers

2-Channel Infra-Red Receiver

This type of receiver shall be able to receive two audio channels. One version shall use rechargeable batteries and shall have a mean operating time of 90 hours. The batteries shall typically take 1.5 hours to recharge, using a specially-designed quick charging unit. Another version shall use disposable batteries - such as LR6 mercury- and cadmium-free alkaline cells - and shall have a mean operating time of up to 350 hours.

The 2-channel infra-red receivers shall have the following controls and indicators:

- on switch;
- slide switch for channel selection;
- slide adjustor for volume control.

The infra-red receivers shall have the following interconnections:

- 3.5 mm (0.14 in) jack output socket for headphones.

The infra-red receivers shall be 155 mm (6.10 in) high, 45 mm (1.77 in) wide and 30 mm (1.18 in) deep. The version with rechargeable batteries shall weigh 120 g (0.26 lb) (including batteries) and 90 g (0.20 lb) (excluding batteries). The version with disposable batteries shall weigh 75 g (0.16 lb).

7-Channel Infra-Red Receiver

This type of receiver shall receive up to seven audio channels. One version shall use rechargeable batteries and shall have a mean operating time of 90 hours. The batteries shall typically take 1.5 hours to recharge, using a specially-designed quick charging unit. Another version shall use disposable batteries - such as LR6 mercury- and cadmium-free alkaline cells - and shall have a mean operating time of up to 350 hours. There shall also be a version which has a permanent upshift facility to reduce interference caused by fluorescent lamps operating at 28 kHz.

The 7-channel infra-red receivers shall have the following controls and indicators:

- on switch;
- slide switch for channel selection;
- slide adjustor for volume control.

The infra-red receivers shall have the following interconnections:

- 3.5 mm (0.14 in) jack output socket for headphones.

The infra-red receivers shall be 155 mm (6.10 in) high, 45 mm (1.77 in) wide and 30 mm (1.18 in) deep. The versions with rechargeable batteries shall weigh 120 g (0.26 lb) (including batteries) and 90 g (0.20 lb) (excluding batteries). The version with disposable batteries shall weigh 75 g (0.16 lb).

16-Channel Infra-Red Receiver

This type of receiver shall be designed for more extensive interpretation systems and shall receive up to 16 audio channels. A switch inside the battery compartment shall allow the delegate to preselect the maximum number of channels (8, 12, or 16) and to select the channel shift function. One version shall use rechargeable batteries and shall have a mean operating time of 90 hours. The batteries shall typically take 1.5 hours to recharge, using a specially-designed quick charging unit. Another version shall use disposable batteries - such as LR6 mercury- and cadmium-free alkaline cells - and shall have a mean operating time of up to 350 hours. There shall be a low battery indication facility.

An LCD display shall give information which shall includes channel number and low battery power indication. It shall have push button controls for ease-of-use and a speech boost facility to ensure high speech intelligibility. An upshift channel selection function shall enable channels to be used which are not affected by interference from HF fluorescent lamps.

The infra-red receivers shall have the following controls and indicators:

- on switch;
- speech boost switch;
- channel selection up/down push buttons;
- volume control up/down push buttons;
- LCD display for channel number indication and low battery indication.

The following controls shall be found inside the battery compartment:

- channel shift function switch;
- channel number selection switch (8, 12 or 16).

The infra-red receivers shall have the following interconnections:

- 3.5 mm (0.14 in) jack output socket for headphones.

The infra-red receivers shall be 155 mm (6.10 in) high, 45 mm (1.77 in) deep and 30 mm (1.18 in) deep. The version with rechargeable batteries shall weigh 120 g (0.26 lb) (including batteries) and 90 g (0.20 lb) (excluding batteries). The version with disposable batteries shall weigh 72 g (0.16 lb).

4.5 Suitcases and Cabinets

Storage Case

This storage case shall be used to store receiver units. It shall include a cover and shall accommodate up to 100 receiver units, and its compact design shall make it easy to store.

This storage case shall be 230 mm (8.15 in) high, 690 mm (27.16 in) wide and 530 mm (20.87 in) deep. It shall weigh 7.5 kg (16.5 lb) (excluding receivers).

Quick Charging Suitcase

This suitcase shall be used to recharge receiver units. The suitcase design shall be ideal for storage and transportation of infra-red receivers. Each charging position shall be linked to a microprocessor for controlling the charging rate according to the pulse charge principle, ensuring high charging performance and increasing battery lifetime. It shall have the capacity to store and transport 56 receivers with the lid closed.

This suitcase shall have settings for quick with auto-trickle charge. Quick charging shall take a maximum of 2.3 hours.

The quick charging suitcase shall have the following controls and indicators:

- on/off switch;
- mains input with loop-through facility;
- red and green LEDs shall indicate status at each charging position.

The quick charging suitcase shall be 230 mm (9.06 in) high, 690 mm (27.17 in) wide and 530 mm (20.87 in) deep. It shall weigh 22 kg (48.4 lb) and shall be finished in grey.

Quick Charging Cabinet

This cabinet shall be used to recharge receiver units. The cabinet shall be stylishly designed and shall be intended for fixed installations. It shall be suitable for wall mounting. Each charging position shall be linked to a microprocessor for controlling the charging rate according to the pulse charge principle, ensuring high charging performance and increasing battery lifetime.

This cabinet shall have settings for quick with auto-trickle charge. Quick charging shall take a maximum of 2.3 hours.

The quick charging suitcase shall have the following controls and indicators:

- on/off switch;
- mains input with loop-through facility;
- red and green LEDs shall indicate status at each charging position.

The quick charging cabinet shall be 130 mm (5.12 in) high, 680 mm (26.77 in) wide and 520 mm (20.47 in) deep. It shall weigh 12 kg (26.4 lb) and shall be finished in grey. It shall be suitable for wall-mounting.

Trickle Charging Suitcase

This suitcase shall be used to recharge and store receiver units. The suitcase design shall be ideal for storage and transportation of infra-red receivers. Each charging position shall ensure high charging performance with optimum battery life-time. It shall have a mains loop-through facility which shall allow up to six units to be connected to a single mains socket in a loop-through configuration. It shall have the capacity to charge and store 56 receivers.

This suitcase shall have a universal mains input (90 to 264 V, 47 to 63 Hz), and each charging position will have a red and yellow status LEDs. It shall be able to fully charge a receiver within 14 hours.

The suitcase shall have the following controls and indicators:

- on/off switch;
- mains input with loop-through facility;
- red and yellow LEDs to indicate status at each charging position.

The suitcase shall be 230 mm (9.06 in) high, 690 mm (27.17 in) wide and 530 mm (20.87 in) deep. It shall weigh 14 kg (30.8 lb) and shall be finished in grey.

Trickle Charging Cabinet

This cabinet shall be used to recharge receiver units. The cabinet shall be stylishly designed and shall be intended for fixed installations. It shall be suitable for wall mounting and desktop use. Each charging position shall ensure high charging performance with optimum battery lifetime.

The cabinet shall have a universal mains input (90 to 264 V, 47 to 63 Hz), and each charging position will have a red and yellow status LED. It shall be able to fully charge a receiver within 14 hours.

The cabinet shall have the following controls and indicators:

- on/off switch;
- mains input with loop-through facility;
- red and yellow LEDs to indicate status at each charging position.

The cabinet shall be 130 mm (5.12 in) high, 680 mm (26.77 in) wide and 520 mm (20.47 in) deep. It shall weigh 10 kg (22 lb) and shall be finished in grey. It shall be suitable for wall-mounting.

4.6 Headphones and Accessories

Stethoscopic Headphones

The stethoscopic headphones shall have stethoscopic earpieces and a captive 1.2 m (3 ft 11 in) cable terminated with a 3.5 mm (0.14 in) jack plug. They shall weigh 27 g (0.06 lb).

Single Earphone

The single earphone shall be lightweight, and shall have a captive 1.2 m (3 ft 11 in) cable terminated with a 3.5 mm (0.14 in) jack plug. It shall weigh 25 g (0.06 lb).

High-Quality Dynamic Headphones

The high-quality dynamic headphones shall have a captive 1.2 m (3 ft 11 in) cable terminated with a 3.5 mm (0.14 in) jack plug. They shall weigh 90 g (0.20 lb).

Replacement Ear Pads for High-quality Dynamic Headphones

The replacement ear pads shall be suitable for use with the High-Quality Dynamic Headphones.

Lightweight Headphones

The lightweight headphones shall weigh 84 g (0.18 lb).

Replacement Ear Pads for Lightweight Headphones

The replacement ear pads shall be suitable for use with the Lightweight Headphones.

Wall Mounting Bracket

This shall be a bracket to mount a radiator to a wall. It shall be used for mounting the LBB 3411/00 and LBB 3412/00 radiators.

25-Pole D-Type Plug With Sliding Lock and Backshell

This shall match the 25-pole sockets on the 6-Channel Interpreter Desk (LBB 3222)

25-Pole D-Type Socket With Pin-Lock and Backshell

This shall match the 25-pole plugs on the 6-Channel Interpreter Desk (LBB 3222)

100 m Installation Cable for 6-Channel Interpreter System

This shall be a 12-pair cable with a grey sheath used to connect 6-Channel Interpreter Desks when the standard cabling is too short.

5 m Extension Cable Assembly for 6-Channel Interpreter System

This shall be a 12-pair cable terminated with a 25-pole D-type plug with a sliding lock mechanism, and a 25-pole D-type socket with a pin-lock mechanism. It shall have a grey sheath and shall interconnect 6-Channel Interpreter Desks when the standard cabling is too short.

20 m Extension Cable Assembly for 6-Channel Interpreter System

This shall be identical to the 5 m Extension Cable Assembly for 6-Channel Interpreter System, but with a length of 20 m.

4.7 Manufacturer's type numbers

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Transmitter Housing	LBB 3420/00
Channel Module	LBB 3421/00

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Symmetrical Audio Input and Interpreters Module	LBB 3422/10
DCN Interface Module	LBB 3423/00

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Basic Module	LBB 3424/00
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6-Channel Interpreter Desk with Loudspeaker	LBB 3222/04
High-Power Infra-Red Radiators	LBB 3411/00 and LBB 3412/00

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Infra-Red Radiators	LBB 3410/00 and LBB 3410/10
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2-Channel Infra-Red Receiver	LBB 3432/00 and LBB 3432/10
7-Channel Infra-Red Receiver	LBB 3433/00, LBB 3433/05, LBB 3433/10 and LBB 3433/15
16-Channel Infra-Red Receiver	LBB 3434/00 and LBB 3434/10

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Storage Case	LBB 3404/00
Quick Charging Suitcase	LBB 3406/00
Quick Charging Cabinet	LBB 3408/00

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Trickle Charging Suitcase	LBB 3407/00
Trickle Charging Cabinet	LBB 3409/00
Stethoscopic Headphones	LBB 3011/04
Single Earphone	LBB 3442/00
High-Quality Dynamic Headphones	LBB 3015/04
Replacement Ear Pads for Dynamic Headphones	8222 321 16451

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Lightweight Headphones	LBB 3440/00
Replacement Ear Pads for Lightweight Headphones	LBB 3440/50
Wall Mounting Bracket	LBB 3414/00
25-Pole D-Type plug with Sliding Lock and Backshell	LBB 3185/70
25-Pole D-Type Socket with Pin-Lock and Backshell	LBB 3185/75
100 m Installation Cable for 6-Channel Interpreter System	LBB 3306/00

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Extension Cable Assembly for
6-Channel Interpreter System (5 m) LBB 3306/05
Extension Cable Assembly for
6-Channel Interpreter System (20 m) LBB 3306/20

5. TECHNICAL DATA

5.1 System specifications

Conforming to the international standards:

- IEC 914: conference systems - electrical and audio requirements
- IEC 61603: transmission of audio signals for conference and similar applications using infra-red radiation.

5.2 Overall system characteristics

Crosstalk attenuation	>50 dB
Weighted signal-to-noise ratio	>40 dB(A) (within the footprint)
Total harmonic distortion	<4%
Frequency response	100 Hz to 12.5 kHz (-3 dB)

5.3 System environmental conditions

Temperature range	
Storage IR receiver with batteries LBB 343x/1x	-20 °C
Operating quick-charging suitcase LBB 3406 and LBB 3408	+35 °C
Storage quick-charging suitcase LBB 3406 and LBB 3408	-40 °C (without receivers)
Storage: all other type numbers	-40 to +70 °C
Operating: all other type numbers	0 to 45 °C
Relative humidity	<93%
Safety	according to EN60065
Radiation	according to CENELEC/CISPR, category ii

5.4 Transmitters

Infra-Red Transmitters

HF output	normal	shifted
HF channel frequencies		
Channel 0	55 kHz	215 kHz
Channel 1	95 kHz	255 kHz
Channel 2	135 kHz	295 kHz
Channel 3	175 kHz	335 kHz
Channel 4	215 kHz	375 kHz
Channel 5	255 kHz	415 kHz
Channel 6	295 kHz	495 kHz
Channel 7	335 kHz	535 kHz
Channel 8	375 kHz	575 kHz
Channel 9	415 kHz	615 kHz
Channel 10	495 kHz	655 kHz
Channel 11	535 kHz	695 kHz
Channel 12	575 kHz	735 kHz
Channel 13	615 kHz	775 kHz
Channel 14	655 kHz	815 kHz
Channel 15	695 kHz	855 kHz

Infra-Red Language Distribution System - Architect's and Engineer's Specifications

Modulation	FM, deviation max. ± 7 kHz
LF frequency response	100 Hz to 12.5 kHz
Distortion audio circuitry	<1%
Crosstalk attenuation	>50 dB
Signal-to-noise ratio	>50 dB(A)
Mains voltage	115/230 Va.c. 48 to 62 Hz
AC power consumption	75 VA

Infra-Red Channel Module

Audio input level with AGC	-16.5 (150 mV _{eff}) to +3.5 dBV (1500 mV _{eff})
Audio input level without AGC	-4.4 dBV (600 mV _{eff})
Asymmetric input impedance	10 kW
Audio input plug	4 ~ cinch straight

Infra-Red Symmetrical Audio Input and Interpreters Module

Audio input level with AGC	-16.5 (150 mV _{eff}) to +3.5 dBV (1500 mV _{eff})
Audio input level without AGC	-4.4 dBV (600 mV _{eff})
AC symmetric input impedance	10 kW
DC input impedance	200 kW
Audio input plug	1 ~ 25-pole female sub D-type

Infra-Red DCN Interface Module

Input plug and cable	DCN 6-pole male DIN with 1.6 m (6 ft 6 in) cable length
Output plug (loop through)	DCN 6-pole female DIN

Infra-Red Basic Module

LF auxiliary audio input level	-16.5 (150 mV _{eff}) to +3.5 dBV (1500 mV _{eff})
Asymmetric input impedance	10 kW
HF output voltage, rms	1 V \pm 6 dB (3 V _{pp} , when terminated)
HF output impedance	47 W
Maximum number of radiators	4 ~ 20 (with LBB 3410/xx), 4 x 30 (with LBB 3411/00 or LBB 3412/00)
Maximum cable length RG59	500 m (1640 ft) (with LBB 3410/xx), 750 m (2460 ft) (with LBB 3411/00 or LBB 3412)
HF output plugs	4 ~ BNC

Transmitter Housing

Mechanical specifications	
Housing	19"-rack or table top
Dimensions	height 3HE, width 84TE, depth 266 mm (10.47 in)
Mains inlet	Euromains socket including: appliance inlet, fuse holder, switch
Auxiliary plug	1 x cinch straight

5.5 Infra-Red Radiators

High-Power Infra-Red Radiators

HF input	0.85 (min.) to 8 (max.) V_{pp}
Radiated frequencies	40 to 1400 kHz
IR output	12.5 W (LBB 3411/00), 25 W (LBB 3412/00)
Peak wavelength	870 nm
Supply voltage	90 to 264 Va.c.
Power consumption	105 VA (LBB 3411/00), 245 VA (LBB 3412/00)

Infra-Red Radiators

HF input	1 to 5 V_{pp}
Radiated frequencies	40 to 900 kHz
IR output	2 W (0.75 W at reduced power)
Peak wavelength	approx. 870 nm
Power consumption	25 VA
Mains voltage	selectable 115 or 230 Va.c. $\pm 15\%$, 50 to 60 Hz

5.6 Receivers

Infra-Red Receivers

Required IR irradiance level (S/N ratio >40 dB(A))	4 mW/m ² (1 channel/fluorescent lighting)
HF carrier frequencies:	
LBB 3432/00 and /10	255 to 295 kHz
LBB 3433/00 and /10	55 to 295 kHz
LBB 3433/05 and /15	215 to 535 kHz
LBB 3434/00 and /10	55 to 855 kHz
Squelch level	20 dB(A) \pm 5 dB(A)
LF output, load 32 W to 2 kW	100 Hz to 12.5 kHz
Output level	1 V_{rms}
Max. signal-to-noise ratio	>56 dB(A) (for 1 channel distributed)

5.7 Charging Storage Units

Quick Charging Units

Number of compartments with charging and test facility	56
Mains voltage, 50/60 Hz	115/230 V $\pm 15\%$ (user selectable)
Charging capability	Typically 1.5 hours for 56 receivers
Mains loop-through facility	Yes
Power consumption	240 VA

Trickle Charging units

Number of compartments with charging and test facility	56
Mains voltage, 47 to 63 Hz	90 to 260 V $\pm 15\%$ (automatic selection)
Charging capability	14 hours for 56 receivers
Mains loop-through facility	Yes
Power consumption	60 VA

Storage Case

Number of compartments 100

5.8 Headphones

Stethoscopic Headphone

Type Stethoscope
Impedance 720 ω
Frequency response 20 Hz to 2.4 kHz (-10 dB)
Max. power 50 mW
Sensitivity (1 kHz) 120 dB SPL/earpiece at 0 dBV/system (119 dB at 1 mW/system)

High-Quality Dynamic Headphone

Type Dynamic
Impedance 360 ω
Frequency response 250 Hz to 13 kHz (-10 dB)
Max. power 200 mW
Sensitivity (1 kHz) 97 dB SPL/earpiece at 0 dBV/system (96 dB at 1 mW/system)
Replacement ear pads 8222 321 16451

Lightweight Headphone

Type Dynamic
Impedance 300 ω
Frequency response 80 Hz to 15 kHz (-10 dB)
Max. power 100 mW
Sensitivity (1 kHz) 87 dB SPL/earpiece at 0 dBV/system (85 dB at 1 mW/system)
Replacement ear pads LBB 3440/50

Single Earphone

Type Dynamic
Impedance 32 ω
Frequency response 100 Hz to 5 kHz (-10 dB)
Max. power 5 mW
Sensitivity (1 kHz) 114 dB SPL at 1 mW

5.9 Interpreter Desk (LBB 3222/04)

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

6. Index of Infra-Red Language Distribution System equipment by part number

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