

FreeSpeak[®] Digital Wireless Intercom Systems



FreeSpeak® uniquely blends digital matrix technology with a locally distributed wireless "network". FreeSpeak operates license-free in the 1.9 GHz frequency band, free of interference with other wireless products such as PCs, talent microphones, IFB and in-ear monitors. To this capability, the system adds broad connectivity to party-line and digital matrix intercom systems. With FreeSpeak, beltpack-to-beltpack, beltpack-to-panel and group communication is finally possible within a wireless system in full duplex.



FreeSpeak10



FreeSpeak10 Base Station: The Heart of the System

All wired and wireless communications flow through the 1-RU base station. Each wireless beltpack and wired intercom connection on the rear panel has its own full-duplex port, and the voice communication from each is sampled, mixed, and re-routed throughout the system as desired.

The FreeSpeak10 base station supports up to 10 wireless beltpacks, with LED indicators and front-panel LCD display to show status and information. Because each beltpack has its own timeslot, it can be individually addressed by the base—allowing multiple combinations of beltpack-to-beltpack and small-group conversations to happen simultaneously.

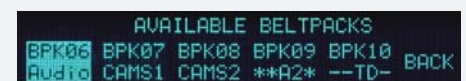
Through the Base Loop connector on the rear panel, two FreeSpeak10 bases can be joined into a 20-beltpack system. Beltpack-to-beltpack and small group conversations are then possible among any of the 20 beltpacks or both base wired connections on either base.

Simply add Active Antennas for every 5 local beltpacks. (Beltpacks can not roam between each others basestation's antennas).

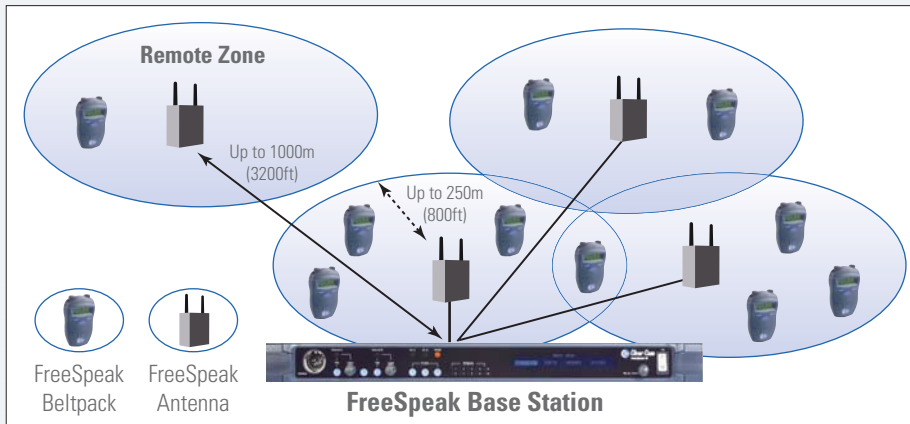
Highly Programmable

FreeSpeak10 is highly programmable, with software menus on the base accessible via the display and a push-to-enter rotary encoder. All aspects of the beltpacks, rear-panel connectors, and creation of communications routes and groups can be addressed.

Each beltpack and rear-panel connector can be labeled with a 5-character name, which appears on the base station and beltpack displays--uniquely identifying the system users. Relative levels among beltpacks, and input and output levels for the wired connections are also under software control.



Base Station Display Screen



Connectivity with Wired Communications

There is 4-wire and PL connectivity on the rear panel of the FreeSpeak10 providing communication with other wired intercom systems. Two party-line connectors, with loop-through, are provided. In addition, five 4-wire connections can be used along with the party-lines. Transformer-isolated input/output for 4-wires as well as program input and stage announce output.

FreeSpeak Active Antenna

The connection between the FreeSpeak wireless beltacks and the base station is made through the Active Antennas. Unlike other wireless intercom systems, where the receive and transmit functions are in the base, FreeSpeak places that function within the Active Antennas.

Each Active Antenna supports up to five full duplex wireless connections with FreeSpeak beltacks in one coverage area. To support more than 5 beltacks in a particular area, co-locate another Active Antenna. The omnidirectional coverage area may be up to 250 metres (800 feet) in radius, though typical distances in production environments range from approximately 50 to 200 metres.

Multiple Active Antennas may be used with the system. 4-pair screened CAT-5 cable

is used to connect the Active Antennas either directly to the 2 antenna ports on the base, or via a 5 way splitter unit. Antennas may be located up to 1,000 metres (3,200 feet) away with local power or 250m when centrally powered from the basestation.

Distributed Coverage

The FreeSpeak10 base station will support up to 10 Active Antennas co-located in one area. By overlapping the individual antenna coverage zones from multiple Active Antennas, large and seamless customised wireless coverage may be achieved.

With FreeSpeak10, coverage areas that were almost impossible to achieve with conventional wireless are now possible. Active Antennas can be placed into areas that are structurally shielded from one another, allowing wireless beltacks to go between without losing connection. A coverage zone can be located far from the base, allowing a wireless user to operate there as part of the communications network.

The Antenna Splitter gives an additional level of flexibility, so that a single CAT-5 cable may be run to it – and then fanning out to up to 5 Active Antennas. With the two antenna ports on the FreeSpeak10 base going to two splitters, the 10 Active Antennas provide extensive coverage.

FreeSpeak10 at a Glance

- No Cost, License-free 1.9 GHz Dect Operations - does not use congested UHF or VHF bands
- 10 wireless beltacks in 1-RU
- Point-to-point and small group wireless communications
- Up to 6 communications routes per beltack
- Create custom coverage zones with up to 10 remote antennas
- Locate active antennas up to 1,000 metres (3,200 feet) from base
- Create 5-character labels for each beltack and connector
- Customise, name, and assign groups
- Two party-line and five 4-wire connectors
- Frequency and channel hopping technology automatically finds clear spectrum
- Base functions like a digital matrix; each beltack has a "virtual port" timeslot
- Secure system—beltacks are registered to a particular base
- Connect two bases for a 20- beltack system via Base Loop port- with added Active Antennas

FreeSpeak Wireless Beltpacks

The FreeSpeak wireless beltpack is the most feature-packed unit available. With its two push-to-talk rotary encoders and three display "pages", up to six communications routes can be assigned to each beltpack. These can be any desired combination of group and point-to-point assignments. For example, one assignment could be a lighting group, with additional one-to-one routes with the stage manager, lighting director, wired party-line Channel A, 4-wire connection three, and the camera group.

The beltpack has an answer-back capability, using the large center button on the front of the beltpack. When another beltpack in the system contacts a user who doesn't have the caller's label assigned, they can still answer and converse using the answer-back key. The label of the caller appears on the display above the key.

Registering Beltpacks to the Base Station

Even in the most crowded RF environments, FreeSpeak10 remains a closed system to interference and eavesdropping. Each beltpack's unique ID is registered with the base station, and only those beltpacks that are registered can communicate with the base. A software utility is used for the initial registration of beltpacks to a base. Two FreeSpeak10 systems operating side-by-side will not "see" each other, or hear each other's conversations.

Informative Displays

The large backlit display shows the name (label) of the beltpack user, plus the names of the individuals and groups assigned to the beltpack under each rotary encoder. The three pages are labeled on the display, and are audibly signaled to the headset when changing pages. Battery level and signal strength are also displayed, with both visual and audible alarms.

LED's associated with the two rotary encoders and the answer-back key flash when another beltpack is calling, and light steadily when answered by latching a talk and replying. These LED's and their talk / listen paths remain active on all of the pages, even though the display only shows one page at a time. As many as all six communications routes may be monitored and talked on simultaneously.



Internal Beltpack Menus

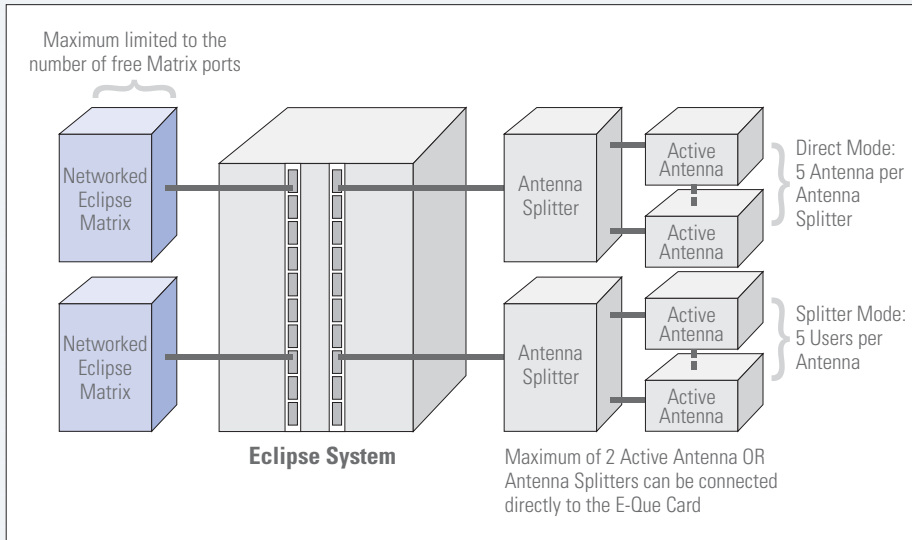
A variety of beltpack menus are accessible via the front-panel scroll and enter buttons. Audio options such as headset levels, mic levels, and local sidetone can be adjusted. Alarms for low battery and low signal strength can be activated or defeated. Connection status and RF status can be studied in depth via these menus. At any given moment, the system selects a clear communications channel to link with the FreeSpeak10 base. It also continually scans for better open channels, and switches as needed to provide the best possible interference-free path.

Beltpack Powering

The FreeSpeak beltpack is powered with a clip of four rechargeable NiMH batteries. They will power the beltpack for approximately 8-10 hours of continuous use. A 5-way multi-bay battery recharger and rechargeable battery packs are available for quick changes during production. In addition, the FreeSpeak10 beltpack has internal charger circuitry, allowing NiMH batteries to be charged while still in the beltpack.



FreeSpeak50



Up to 50 beltpacks can be used with the Eclipse matrix systems, FreeSpeak50 uses a Cell Controller card, called E-Que, fitted within the Eclipse matrix, achieving much larger wireless system than FreeSpeak10. E-Que provides connectivity between the beltpacks and any number of ports within the matrix system, creating a true seamless environment.

FreeSpeak50 uses the same unique cellular auto-roaming technology as FreeSpeak10. This allows each beltpack to continuously detect and automatically select the best connection to the matrix via the Active Antennas. In addition, FreeSpeak50 provides a role based operation so that any beltpack can be switched to use the key settings saved for a particular user.

FreeSpeak50 Architecture

FreeSpeak50 operates using a cellular network of DECT 1.8-1.9GHz Active Antennae located around the production

environment which are connected directly to the Clear-Com Eclipse matrix. Each of the low-cost Active Antennae provides a radio cell supporting up to 5 full- duplex beltpack users. An Antenna Splitter can connect to 5 Active Antennae. To add users, simply add another Antenna, which connects directly back to the Clear-Com matrix which may be 300m away using a single CAT 5 connection – no special RF cabling is required.

The rear of the E-Que has 8 x RJ45. The Eclipse Configuration Software (ECS) can run the E-Que in two modes: Direct or Splitter. In direct mode, all 8 RJ-45s are available for direct connection of Active Antennas. No RJ45 connector can work with a PD2203 antenna splitter. In Splitter mode, the first two RJ45 connectors are available for connection to PD2203 Antenna Splitters. The other RJ45 connectors cannot work antennas.

FreeSpeak50 at a Glance

- No-cost, license-free DECT operation – does not use congested UHF or VHF bands
- No frequency management required even for large numbers of users
- Cellular Architecture using low-cost Active Antennae
- Up to 50 users per Cell (depending on the environment) – users can speak with selected individuals or with selected groups/conferences of people
- Up to 200 pre-set roles can be defined in the management system, ECS
- Up to 250m (800ft) range under good conditions. Range can be extended by creating more cells (i.e. add additional Active Antennas).
- Cellular Roaming – users can freely roam between cells, no need for frequency agility or changing channels
- Patented DPA (Dynamic Port Allocation) technology – select your position directly from the beltpack and talk - you roam, the matrix keeps you connected
- Full duplex 7kHz 'commentator' bandwidth for high-clarity, fatigue-free communications
- Presenters or performers can also use FreeSpeak50 as an earpiece system
- Digital encoding keeps calls private
- Quick & easy programming of audio routes from the beltpack or via standard software
- Seamlessly integrates with Eclipse Omega and Median
- Two battery options – typically 10 hours talk time using rechargeable Nickel Metal Hydride (Ni-MH) cells – also accepts disposable Alkaline AA batteries

FreeSpeak10 Specifications

FreeSpeak10 Base Station	
Base-to-Beltpack Frequency Response	100 Hz – 7.1 kHz.
No. of Beltpacks per Base Station	10
No. of Transceiver/Antennas Supported by Base, Basic Base	10
No. of Active Antenna Ports	2
No. of Base Loop Ports (combines 2 bases into one 20-beltpack system)	1
PC Programming Port	DB9
Relay Port	DB9
Party-Line Intercom A and Intercom B (each)	XLR-3F with XLR-3M loop through, on/off termination switch (via software)
Four-Wire/Matrix Connection	4 RJ-45 (Intercom 3 – 6)
Program Input	XLR-3F, transformer isolated, line-level input
Stage Announce Output	XLR-3M, transformer isolated, line-level output
Front-Panel Headset	4-pin male connector with 2-channel capability and individual talks and listens
Front-Panel Display	254 x 32 dot-graphic VFD
Front-Panel Indicators	2 Talk LED's for front-panel headset, CH A and CH B party-line enable LED's, Program Input enable LED, 10 individual beltpack LED's
Base-Station Programming/Editing	Push-to-enter rotary encoder
Dimensions	1-RU unit, 1.75 x 19.0 x 12.5 inches (hwd) (44 x 483 x 312 mm)
Weight	10.8 lb. (4.9 kg)

Beltpack	
Beltpack Frequency Response	100 Hz – 7.1 kHz
Beltpack Assignment-Select Buttons	Access via left and right scroll buttons, active "page" indicated on display "Label"
No. of Pages	3
No. of Full-Duplex Audio Paths	6 (3 pairs), with individual level control
Level/Talk Controls	2 top-mounted push-to-talk rotary encoders
"Page" / Menu Scroll Buttons	2
Enter / Answer-Back Button	1
Headset Connector	4-pin male, Clear-Com standard
Microphone Type	Dynamic, selectable in beltpack menu
Microphone Level and Headset Limiter	Selectable in beltpack menu
Powering, Alkaline Battery	4 AA alkaline cells, Rechargeable: 4 NiMH cells in AA format
Battery Charging	In unit, via external power supply connected to beltpack
Battery Life	Approximately 10 hours with fresh AA alkaline batteries or with high-amperage NiMH cells
Range	Up to 250 m (800 feet) from transceiver/antenna under ideal conditions (50 to 150 m typical)
Dimensions	Tapered design, at largest points approx. 1.5 x 3.5 x 5.75 inches (dwh) (38 x 87 x 144 mm)
Weight (with batteries)	12 oz. (0.35 kg)

Active Antenna	
Beltpacks Supported Per Active Antenna	5
Active Antenna Transmission Range	Up to 250 m (800 ft) to beltpack (50 to 150 m typical)
Maximum Distance, Base to Antenna via Transceiver Port	1,000 m (3,200 ft) on 4-pair CAT-5 or better cable
Maximum Distance, Antenna Powered by Base	300 m (975 ft) on CAT-5 or better cable
Local Powering	24VDC power supply
Connection to FreeSpeak Base	RJ-45
Antenna Connector Type	SMA, two; supplied omnidirectional whip antennas
Mounting	Via integral tabs with holes for screws
Dimensions	1.5 x 5.0 x 6.1 inches (38 x 125 x 153 mm)
Weight	14 oz. (0.4 kg)

Active Splitter	
No. of Antennas	5
No. of Splitters Per Base	2
Connection Between Base and Splitter	CAT-5 or better cable with RJ-45
Connection Between Splitter and Antennas	CAT-5 or better cable with RJ-45
Powering of Splitter	Locally powered via supplied external power supply
Weight	16 oz. (0.45 kg)

Transmission Method	
Method of RF Operation	Uses two slots per beltpack for wider frequency response
Modulation	QPSK
Frequencies of Operation	from 1.92 to 1.93 GHz (restricted by software)
RF Output	250 mW burst, average as new FCC level 2 – 4 mW

FreeSpeak50 Specifications

System (Cell Controller Card, Active Antenna & Antenna Splitter)	
Frequency Spectrum	1.88GHz – 1.93GHz DECT Cellular auto-roaming technology
Active Antenna Output	200mW Burst, 80mW average
Modulation	GFSK
Size	<p>Cell Controller Card (in Matrix): Standard 6RU Eurocard</p> <p>Active Antenna: 157mm (h) x 128mm (w) x 41mm (d)</p> <p>Antenna Splitter: 157mm (h) x 128mm (w) x 41mm (d)</p>
Maximum Number of Cell Controller Cards per Matrix	4
Maximum Number of Antenna per Cell Controller Card	10
Max number of Duplex Users per Antenna	5
Connection between Cell Controller Card & Active Antenna	2 x RJ45 (CAT 5 screened cable) up to 1500m from matrix
Active Antenna Power Requirement	24V DC (local or supplied from Cell Controller Card)
Active Antenna Connector Type	2 x SMA
Temperature Range (Storage)	-55° C to +70° C

Beltpack	
Audio Bandwidth	200 Hz - 7.5KHz (G.722)
Number of duplex routes per Beltpack	Up to 6 with individual level control
Mode of Operation	Full Duplex on all channels with optional split-ear operation
Frequency Spectrum	1.88GHz – 1.93GHz DECT Cellular auto-roaming technology
Size	132mm (h) x 92mm (w) x 41mm (d)
Weight	250g excluding batteries 350g including batteries
RF Output	200mW Burst, 17mW average
Temperature Range (Storage)	-55° C to +70° C
Battery Life	Typically 10 hours with 4 x Ni-MH – also accepts 4 x Alkaline AA cells
Headset Limiter	Selectable from beltpack menu
Range	Up to 250m (800ft) in good conditions or further with high gain antenna



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FreeSpeak® is available in all countries excluding the USA and Canada