Clear-Com
COMMUNICATION SYSTEMS

ECLIPSE DIGITAL WIRELESS

Version 5.1.3

USER MANUAL

Clear-Com
A Vitec Group brand

Eclipse Digital Wireless Beltpack Instruction Manual

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IMPORTANT SAFETY INSTRUCTIONS

Please read and follow these instructions before operating an Eclipse wireless communication system. Keep these instructions for future reference.

Please read and follow these instructions before operating a Eclipse wireless communication system.

(1) WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

(2) Do not use the apparatus near water.

(3) Clean only with a dry cloth.

(4) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions. Install the Eclipse wireless communication system according to the directions in the Installation Chapter of this manual.

(5) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat. Do not place naked flame sources such as candles on or near the matrix.

(6) Do not defeat the safety purpose of the polarized plug or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

(7) Protect power leads from being walked on or pinched particularly at plugs, at convenience receptacles, and at the point where they exit from the apparatus.

Note: A "convenience receptacle" is an extra AC power outlet located on the back of a piece of equipment, intended to allow you to power other equipment.

(8) Only use attachments/accessories specified by the manufacturer.

(9) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

(10) Unplug the apparatus during lightning storms or when unused for long periods of time.

(11) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such

as a power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

(12) The Eclipse wireless communication system contains a non-user serviceable battery.

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.

Lithium batteries can overheat or explode if they are shorted. When you handle the CPU card or a loose battery, DO NOT touch any external electrical conductors to the battery's terminals or to the circuits that the terminals are connected to.

Please familiarize yourself with the safety symbols in Figure 1. When you see these symbols on a Eclipse wireless communication system, they warn you of the potential danger of electric shock if the system is used improperly. They also refer you to important operating and maintenance instructions in the manual.

This symbol alerts you to the presence of uninsulated dangerous voltage within the product's enclosure that might be of sufficient magnitude to constitute a risk of electric shock. Do not open the product's case.

This symbol informs you that important operating and maintenance instructions are included in the literature accompanying this product.

Safety Symbols

EMC AND SAFETY

The Eclipse wireless communication system meets all relevant CE, FCC, UL, and CSA specifications set out below:

EN55103-1 Electromagnetic compatibility. Product family standard for audio, video, audio-visual, and entertainment lighting control apparatus for professional use. Part 1: Emissions.

EN55103-2 Electromagnetic compatibility. Product family standard for audio, video, audio-visual, and entertainment lighting control apparatus for professional use. Part 2: Immunity.

UL 60065-7, CAN/CSA-C22.2 No.60065-3, IEC 60065-7 Safety requirements.

And thereby compliance with the requirement of Electromagnetic Compatibility Directive 2004/108/EC and Low Voltage Directive 2006/95/EC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1 OPERATING THE ECLIPSE WIRELESS BELTPACK

OVERVIEW OF THE WIRELESS BELPACK

You can access six separate audio routes from a beltpack.

Depress the channel A or B talk button to select an audio route. Turn the button to adjust volume.

Figure 1-1: Overview of Beltpack Functions

An Eclipse wireless beltpack gives teh user simultaneous access to six channels of talk/listen communication, with the ability to switch among them as desired. Any or all of these six routes may be kept open during use. Incoming volume levels (“listen levels”) may be individually

Any or all of the beltpack's six audio routes may be kept open while you talk or listen on the beltpack.

adjusted using the two push-to-talk encoders, so that one conversation can be monitored in the background while a primary conversation is held.

The front-panel display contains the name (label) of the beltpack user, identifies the two talk/listen labels currently selected by the user, and gives other information such as signal strength and battery level.

A 4-pin male headset connector is provided for connection with a standard Clear-Com headset or similar. The Eclipse beltpack will operate for approximately 8 hours on four AA alkaline or rechargeable NiMH batteries. Real operational times depend on usage and quality of batteries used.

BELTPACK TOP CONTROL SECTION

Figure 1-2: View of Top of Beltpack

① Rotary Encoder, Channels A and B

The rotary encoder functions as a volume control for incoming audio assigned to channels A and B. Turn the encoder clockwise to increase the volume, and counterclockwise to decrease it.

To talk or listen on a channel, press and hold the encoder down while speaking or listening from the headset. While the encoder is held down audio transmits on that channel. When the encoder is released audio no longer transmits.

To "latch" a encoder "on" for hands-free use, quickly tap the encoder. Another quick tap releases the latch.

② Level-Control Lights, Channels A and B

Three level-control lights are located next to each rotary encoder. The first light is green, the second is yellow, and the third is red. With the

encoder turned fully counterclockwise, only the green LED is lit to indicate low volume. Turning the encoder clockwise, low audio level is heard in the headset. Turning the encoder more, both the green and yellow LED's light, and higher audio level is heard. This continues through the maximum audio level, indicated by only the red light being lit.

③ Talk/Listen Lights, Channels A and B

The green "listen" light blinks whenever a beltpack receives audio from a source whose label is displayed on the beltpack's LED screen. When the talk button is pressed to "talk" the green light illuminates steadily and the red light also illuminates.

④ Answer-Back Lights

The green and red lights labeled "answer" illuminate when a source who is not on the beltpack's presently selected communication routes tries to initiate a call. The green light flashes when a call is coming in. By pressing the answer-back button on the front of the beltpack the user can talk to the source. The green LED then lights steadily and the red LED lights, until the conversation is ended by again pushing the answer-back button.

⑤ Combo Button

Pushbutton A/B and pushbutton C form a combo key that when pressed will call whichever destination has been selected on the beltpack. The call receiver will alerted by a call signal or the beltpack vibration or both depending on the alert options selected at the receiving end.

BELTPACK FRONT/DISPLAY SECTION

Figure 1-3: View of Front of Beltpack

① Backlit LCD Display

The display screen shows the various communications routes and other information relevant to the beltpack. The backlighting comes on when any action is taken with the scroll or enter buttons, and remains on for approximately 10 seconds. During the answer-back process, the label of the source is displayed in the lower center of the display.

② Left and Right Scroll Buttons

When the left and right scroll buttons are pressed the beltpack's display screen scrolls to the left or right, displaying "pages" of information, and menu options on those pages. These buttons work in conjunction with the enter button, described below.

. ③ Enter/Answer-Back Button

The enter/answer-back button has two primary purposes. When the user views the menus on the beltpack's display screen an option can be selected by pressing this button. The user can exit a menu by selecting the up-arrow icon. In this way, the button serves as an enter key.

During normal beltpack operation it functions as the answer-back key, with which the user can activate a talk to an unassigned source when the answer-back "talk" light illuminates to indicate an incoming call (see description in "Beltpack Top Control Section" above).

BELTPACK REAR/BATTERY SECTION

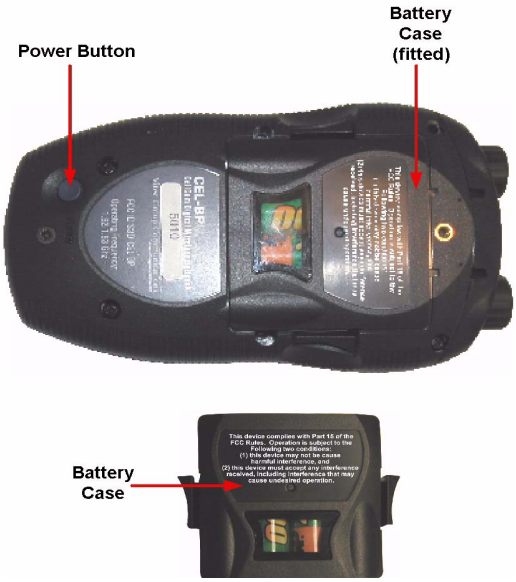


Figure 1-4: View of Back of Beltpack

① Power Button

The recessed power button is used to turn the Eclipse beltpack on and off. Press and hold the button for about three seconds to turn the unit on. To turn the unit off, again press and hold the button for about three seconds.

② Battery Case

The removable battery case will hold four alkaline AA or four NiMH (nickel-metal hydride) rechargeable batteries. These batteries alternate, with the negative pole contacting the spring and the positive pole contacting the plate inside the case.

To remove the battery case, press on the top of the belt clip to lift it off the case, and with the thumb and middle or ring finger of the other hand squeeze the side tabs of the case and lift it out, slightly tilting the lower (toward the bottom of the beltpack) portion of the pack out first.

To insert the battery pack, follow the above instructions in reverse. Note that the battery case has a clip-on lower cover; make sure to put it back in place before putting the battery case back into the beltpack.

Caution: Do not put battery packs containing alkaline batteries into a recharger, or recharge them in the beltpack. Serious damage or injury could result.

③ Belt Clip

The belt clip is spring-loaded, with enough tension to hold the beltpack to the user's belt and against the hip. Note that the upper portion of the rear of the beltpack, connected to the belt clip, is a separate piece; the entire belt clip assembly may be replaced in case of damage.

BELTPACK BOTTOM CONNECTOR SECTION

Figure 1-5: View of Bottom of Beltpack

① Data Connector

This 3.5 mm (1/8 inch) tip-ring-sleeve (TRS) connector is used to connect the beltpack to a computer in order to identify the beltpack to the matrix during initial registration and system setup. It may also be used if an upgrade to the beltpack firmware is ever required in the future, to add new features and capabilities. See the section "Registering the Beltpack with the Matrix" for further details.

② Headset Connector

The male 4-pin headset connector provides audio pathways for the headset microphone and headset earpiece(s). This connector supports all Clear-Com and compatible headsets using female 4-pin connectors. It will support dynamic microphones.

③ Battery Recharger Connector

The Eclipse beltpack features an internal battery charger to charge the four AA-format NiMH batteries used to power the unit. The recharger circuit includes a thermistor that senses the temperature of the battery

pack to prevent overcharging. To use this internal recharger, plug in the small barrel connector on the supplied universal power supply into the beltpack connector, and then plug the supply into the local AC current. The beltpack will automatically shut off when the charging PSU is plugged into it. While it is charging the beltpack cannot be turned on, but charging is indicated by a red LED on the top of the beltpack which will then flash to indicate that the batteries are fully charged. The unit can only be turned on when the charging PSU is disconnected. A full charge takes approximately 3 to 4 hours depending on the battery capacity. After this time, the charger will maintain a trickle charge to keep the beltpack fully charged.

Eclipse beltpack usage time is dependent upon the batteries used. Some batteries require more charge/discharge cycles than others to reach their rated capacity.

Caution: Do not put battery packs containing alkaline batteries into a recharger, or recharge them in the beltpack. Serious damage or injury could result.

BELTPACK TURN-ON SEQUENCE

After pressing the POWER button on the rear of the beltpack for approximately three seconds, the top control panel LEDs will flash and the display will light. The display will say “Clear-Com” and “Searching...” It may briefly say “Getting Roles,” and then will go to the main user screen.

The beltpack will always begin on page 1 (unless it has been locked to another page), which has the first two communication routes assigned to the beltpack. When programming communication routes for the users in the system, it is best to put the most commonly used ones on this page.

BELTPACK TURN-OFF SEQUENCE

To turn off the beltpack, press and hold the POWER button on the rear of the beltpack for about three seconds. The main screen will close, followed by a screen that says “Clear-Com” and “Shutting Down.”

POWERING THE ECLIPSE BELTPACK

The supplied battery pack holds four AA-sized batteries. Standard AA alkaline batteries will provide between 7 and 8 hours of typical use. The batteries alternate in the battery case, with the spring on the negative end and the tab on the positive end.

For best performance, use fresh alkaline batteries that have been properly stored and kept away from excessive heat. As with all other battery-powered electronic items, when the Eclipse beltpack is stored for extended periods of time, remove the batteries to prevent damage from possible leakage of the alkaline cells.

Caution: Make sure that Eclipse battery packs loaded with alkaline batteries are not put into a battery charger, or that the internal beltpack charger is used to attempt to charge them. Damage and possible injury will result.

Rechargeable AA-size NiMH (nickel-metal hydride) batteries may be used with the Eclipse beltpack. Select good quality batteries with high amperage ratings for the best and longest performance. These batteries will last for many charge cycles, and will power the beltpack for approximately 8 hours.

If the batteries are being charged twice daily, then the battery lifetime would be approximately 8 months or approximately 500 charge cycles. It is recommended that the batteries be replaced every 4-5 months in these circumstances (near the end of their service life) as NiMH batteries can become less efficient with time and may develop an internal short circuit.

The beltpack charger defaults to trickle charge once the batteries are fully charged, but some battery manufacturers state a maximum overall charge time of 20 hours.

Note: If the batteries are hot prior to charging then they will switch to trickle charge too early in the charge cycle when the Cel-FS-Charger is used (the green light will come on).

Never mix discharged batteries and fully charged batteries in the same pack and never mix batteries of different types as this can damage the charger.

Batteries should not be left in a beltpack and connected to a charger for more than 20 hours.

Note: Eclipse beltpack usage times are dependent upon the batteries used. Some batteries require more charge/recharge cycles than others to reach their rated capacity.

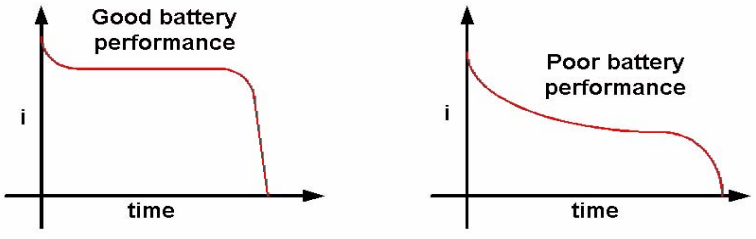


Figure 1-6: Battery Discharge Characteristics

The beltpack front-panel display has an icon that shows the battery condition. It has five vertical bars to signify the remaining charge, each bar representing 20% of battery capacity. When the icon has dropped down to the last two bars, or if it drops quickly after being turned on

after previous use, it will be time in the next few minutes to recharge the batteries (if rechargeable ones are being used) or replace them. The beltpack will turn off by itself at low battery levels.

The length of operational time represented by each bar will depend on how the beltpack is being used. For example, if the beltpack is receiving a large number of calls with the vibrate call alert enabled this will consume more power than if the beltpack is switched on but not making or receiving many calls. The battery indicator will however give a visible indication of how rapidly the batteries are discharging.

Within the menu structure of the beltpack, a low-battery alarm is available and may be set. When activated and when the battery level is below the user configurable alarm threshold the headset user will hear a beep at intervals and the battery indicator will flash to indicate that the batteries must be replaced or recharged soon. This setting is available under Alarm Options. The alarm will also be displayed on the basestation battery monitor.

The Eclipse beltpack features an internal battery charger circuit, with intelligent circuitry to prevent overcharging. It is powered via the pin connector on the bottom of the beltpack, using the supplied universal power supply. A thermistor (temperature-sensing device) measures the change in temperature of the battery when charging, letting the circuit know when to cease charging the batteries.

Spare clips of four batteries are available by contacting the Sales Department. .

REGISTERING BELTPACKS WITH THE MATRIX

The PC-to-Beltpack serial cable is used to register beltpacks with the PC running the Eclipse Configuration Software (ECS). It can also be used to upgrade the firmware of the beltpacks. The beltpacks are registered from the ‘Beltpacks’ tab in ECS (‘Beltpacks’ link in the Setup menu). Click on the ‘Beltpacks’ link to open the tab, click on the ‘Register’ button and follow the beltpack registration instructions displayed.

The cable consists of a female 9-pin D type connector (PC connection) and a 3.5 mm (1.8-inch) stereo jack plug (beltpack connection). Care must be taken to select a jack plug that fits completely through the plastic surround of the connector at the bottom of the beltpack.

The data connections between the D connector and the stereo jack plug are as follows: pin 2 to tip, pin 3 to ring, and pin 5 to sleeve. Pins 1,4,6 and 8 on the PC connector are shorted together.

PC Connection usually 9 way Female D-type connector	Beltpack connection 3.5mm Stereo jack plug
1	N/C

2	Tip
3	Ring
4	N/C
5	Screen
6	N/C
7	N/C
8	N/C
9	N/C

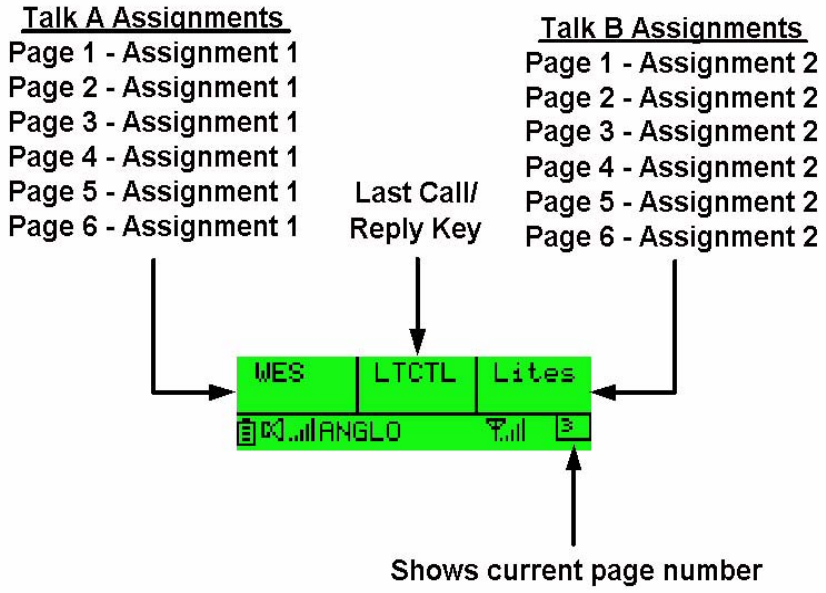
Table 1-1: Beltpack Programming Serial Cable Pinout

ACCESSING THE TALK/LISTEN PATHS ON THE ECLIPSE BELTPACK

You can access up to twelve communications routes with a beltpack. You activate a route by pressing the appropriate talk button (A or B) when the desired label appears on the beltpack's display.

- Page 1 of the beltpack's display screen shows the assignments for the Talk A and Talk B buttons (2 assignments).
- Page two shows the next set of assignments for the Talk A and Talk B buttons (2 assignments).
- Page three shows the next set of assignments for the Talk A and Talk B encoders (2 assignments).
- Page four shows the next set of assignments for the Talk A and Talk B encoders (2 assignments).
- Page five shows the next set of assignments for the Talk A and Talk B encoders (2 assignments).
- Page six shows the next set of assignments for the Talk A and Talk B encoders (2 assignments).

Figure 1-7 shows how the front-panel screen on a beltpack displays its six communications routes.



Note: Use the beltpack's scroll buttons to select a page. One page displays at a time on the front-panel display.

Figure 1-7: How the beltpack displays its six communication routes

The case of a label on the beltpack indicates its assignment type:

- All uppercase - Talk
- First letter in uppercase, rest lowercase - DTL
- All lowercase - Listen

To activate a talk or listen to an assigned source or destination ("label"):

1. Use the beltpack's scroll buttons to scroll to the page on which the desired assignment ("label") appears. The beltpack holds six pages of assignments. Each page displays two assignments.

   As the display is scrolled "beeps" will be heard in the headset that correspond to the page displaying on the beltpack: 1 beep for page 1, 2 beeps for page 2, etc.
2. When the appropriate page is reached select one or both of the assignments on that page by depressing the corresponding talk buttons on the beltpack (A or B).
3. Press and hold the appropriate talk button to talk or listen to the destination. Release the button to close the talk or listen path.

   Alternatively quickly tap the talk button to latch it "on". Quickly tap it again to release the latch.
4. To activate another communication route, repeat steps 1 through 3.

You can keep all six communication routes "open" at the same time. You will hear all activity on these routes in your headset.

Note: Two-wire and four-wire devices can have dual talk-and-listen or just listen assignments.

SETTING AND ADJUSTING LISTEN LEVELS

A beltpack's incoming audio volume ("listen level") can be adjusted in two ways:

- The overall maximum level for the beltpack can be set by using the beltpack menu options.
- The incoming audio level can be adjusted during talk or listen on the beltpack using the beltpack's talk buttons.

To adjust the overall maximum "listen level" for a beltpack:

1. From the beltpack's display, scroll to Audio Options, then Headset Options, then Master Level.
2. Select Master Level by pressing the enter button.

   A bar graph appears on the display.
3. Using the right and left scroll keys, adjust the level up or down as desired on the bar graph.

   Typically, the level control will be set to around 2/3 of maximum.
4. When the desired level is reached, press the enter button.

   That selection is saved in the beltpack's memory. The display returns to the previous screen.

To adjust the listen level as you talk or listen from the beltpack:

- During talk and listen, rotate an assignment's talk button to increase or decrease the incoming volume level ("listen level") for that assignment.
- When scrolling between pages, the listen levels for the various assignments remain intact. For example, rotating the talk button to increase or decrease the listen level for the first assignment on page 2 will not affect the listen level set with the same talk button on page 1 or 3.
- The three lights next to each talk button, labeled "Vol A" and Vol B," show the current listen level. At the lowest audio level, the green light illuminates. As the listen level increases to moderate, the yellow light illuminates, and as it increases to maximum, the red light illuminates. Note that the position of the talk button does not affect the level that is heard or indicated by the lights.

Note: For beltpacks that have both a Direct Key to a panel and a Group Key containing the same panel as the Direct Key the Direct Key will affect the listen volume level in that Group. If the listen volume of the Direct Key to the panel is turned down to -70db/silent and then removed from the beltpack then listening to the group key containing that panel will now result in the panel volume being set to -70db/silent.

HEADSET LIMITER

The overall headset volume may also be affected by the headset limiter value set on the beltpack. See section "BELTPACK MENU OPTIONS" for more details.

USING THE BELTPACK ANSWER-BACK FUNCTIONS

A beltpack's "answer-back" key performs two functions:

The first function is to answer a call from a source whose "label" does not appear on the currently selected beltpack page.

When audio is received from a source whose label does not appear on the currently selected beltpack page, but whose label does appear on a non-selected page, the beltpack's "answer-back" light will flash. The user will also hear the caller's voice in the headset at whatever incoming volume was previously set for that label.

This call can be answered in one of two ways:

- Press the front-panel "answer-back" button on the beltpack. This establishes a return talk path to the calling beltpack. Press and hold the button to talk or quickly tap the button to "latch" it on.
- Use the front-panel scroll buttons to scroll to the page where the source's label appears and press the appropriate talk button as usual.

The second function is to call another beltpack even though it does not have the same "label" assigned to it that is assigned on the local beltpack. The destination beltpack's "label" must be assigned to the local beltpack however to make this type of call.

For example, a stage manager labeled "STMGR" has a lighting crew member's label "LGT1" assigned to the "STMGR" beltpack. However, the lighting crew member does not have the stage manager's label assigned to the "LGT1" beltpack.

The stage manager can call the lighting crew member in the usual way. The lighting crew member can answer the call with the "answer-back" button and establish a private conversation. The lighting crew member cannot however initiate a direct call back to the stage manager

BELTPACK MENU OPTIONS

The Eclipse beltpack presents the user with a number of adjustable parameters. The main categories of the adjustments are: Alarm Options, Audio Options, View Status, and Adjust Contrast accessed through the menu. To enter menu mode hold down both page buttons simultaneously until the beltpack enters menu mode (about 5 seconds).

An icon of an upward pointing arrow designates EXIT or BACK, and is available on each menu page. Selecting this icon and pressing the center ENTER button takes you to the previous screen or exits to the beltpack's main menu.

ALARM OPTIONS

Low Battery Alarm

The low-battery alarm has three settings: ON1, ON2 and OFF. Using the scroll keys, select the desired setting and then press the center ENTER key.

- When ON is selected the user will hear a beep at intervals in the headset to indicate that it is time to replace or recharge the belpack batteries. This will occur when the battery level is sufficiently low. The battery indicator will also flash.
- When ON2 is selected the threshold setting is used to trigger the alarm.
- When OFF is selected the user will not be warned of low battery level.

Low Signal Alarm

The low-signal alarm has two settings: on and off. Using the scroll keys, select the desired setting and then press the center ENTER key.

- When ON is selected the user will hear a beeping in the beltpack's headset when the beltpack is almost out of the range of the antenna, and will soon lose connection with the system.
- When the beltpack's signal-level icon is at the second-lowest increment the user will hear one quick beep and two slightly longer beeps at approximately one-second intervals in the headset. The user will hear the same beeps when going completely out of range and connection is lost with the antenna (and the basestation).
- This setting may be especially useful when establishing the coverage area for a particular location. Because the signal level when the alarm is first activated is still strong enough for conversations to happen (though possibly with occasional audio dropouts), it may not be desirable to keep this alarm on during normal operation of the system. This low signal alarm is also useful for checking out the coverage in a location when first setting up transceiver/antennas, for either a temporary or permanent installation.
- When OFF is selected the low signal alarm does not operate.

AUDIO OPTIONS

Headphone-Off Level Option

This option allows the user to select the signal threshold when the headphone audio “turns off.” Level settings are - 6, -12, -18, and – 70 dB. The typical setting is –70 dB, which functions as “always on.”

Page Lock Option

When the Page Lock option is selected the page change keys no longer operate.

Headphone Limiter Option

This option introduces a limiter into to headphone audio circuitry, to control excessive levels and resulting stress on the ear of the user. The level can be set anywhere in the range -32dBu to +16dBu using the Headphone Limiter display on the beltpack. The typical setting is –6dBu.

Microphone Type Option

This option allows the user to select the proper setting for the headset microphone. The available settings are Dynamic (Balanced) Mic and Dynamic (Unbalanced) Mic. For most Clear-Com and other headsets, the Dynamic (Unbal) Mic setting is proper.

Microphone Level Option

This option allows the user to set the level of the beltpack’s headset mic, increasing or decreasing its gain going into the system. For Type I beltpacks the gain settings are 40, 50, and 60dB, for Type II beltpacks the gain settings are 50, 55, 60 and 65dB. The typical setting is 50dB.

Headset Options

Two headset options are offered:

- Master Level
- Sidetone Level

The Master Level control accesses a slide bar going from “-“to “+”, and controls the overall maximum level that can be heard through the headphones. This gain control permits adjustment among headsets with different sensitivities, and for different use conditions (quiet studio versus loud live performance environment). Typical setting is 2/3 to 3/4 of the way toward “+”.

Sidetone Level controls the amount of the user’s own voice (local sidetone) that is injected into the headphone from the headset mic. It is activated when the user pushes a talk button or an answer-back key to

alert the user that the microphone is on. If a talk button is not pressed no sidetone will be heard.

VIEW STATUS

Role Information

Role Information gives the label (user name) that has been assigned to the particular beltpack, and also gives a numerical Role Number which the system uses – typically starting with 700 for the first beltpack and going up from there.

Beltpack Version

Beltpack Version gives the current software version on the beltpack, and a CRC number. Use these numbers to determine whether a beltpack contains the latest software version, and to confirm the success of a software upgrade.

Beltpack ID

Beltpack ID, also known as IPEI, gives the unique identification number for the transceiver in the Eclipse beltpack.

RF Carrier Mask

The RF carrier mask tells the matrix and beltpacks which of the standard DECT carrier frequencies to use. In Europe, for example, the standard carriers 0 to 9 (1880 to 1900 MHz) are designated as “0x03FF000000.” Other parts of the world, such as South America, use Extended Carriers, such as 18 to 27 (1910 to 1930 MHz), designated as “0x0000007FE0.” The DECT stacks in both the transceiver/antenna and the beltpack must be told which group of 10 carrier frequencies to use via the “mask,” when they are first initialized.

Connection Info

Connection Information defines all of the various DECT information for the beltpack transmission and link to the transceiver/antenna. It also gives the Carrier Number and Slot that the beltpack is currently using (this can dynamically change as needed during use). In addition, the Received Signal Strength Indication (RSSI) is numerically indicated, with 55 being the highest value; also, the error percentage is shown.

Adjust Contrast

Adjust Contrast provides a slide bar going from “-“to “+”, allowing the user to adjust the contrast on the display. Typical range is between 1/2 and 3/4 toward “+”.

2 PROGRAMMING AT THE BELTPACK

INTRODUCTION TO PROGRAMMING ON THE BELTPACK

In programming the Beltpack, the general considerations are:

- It is necessary to have a radio connection to be able to engage programming mode. It is not generally possible to enter programming mode unless the normal working display is present.
- To access the main programming menu, hold both the UP and DOWN keys pressed together for at least 3 seconds. This calls up the main programming menu.
- The Beltpack saves programming data when enter is pressed on a menu which does not have an UP arrow at the right hand end. To exit without saving, press the UP and DOWN buttons simultaneously for 3 seconds.
- Generally buttons auto-repeat when held pressed.
- The "cursor" is the highlighted item and it cycles round to the other end of the menu when it reaches one end.
- The icon shown in a box is the currently selected item.
- If the right hand end of the menu contains an UP arrow, selecting this and pressing Enter will take the user back up one level in the menu structure and will eventually return the user to the main working display.
- The backlight times out after 15 seconds.

The menus in Program Mode are presented graphically as a menu map.

BELTPACK PROGRAMMING - MENU STRUCTURE

On the menu structure below, the flow is downwards and to the right unless indicated otherwise.

MAIN PROGRAMMING MENU

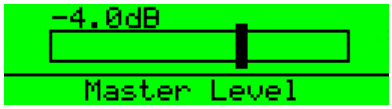
This is the main menu for programming the Beltpack.

This menu is reached by holding both the UP and DOWN keys pressed for at least 3 seconds. To return to normal operation, select Exit (the Up arrow on the display) and press pushbutton C.

To navigate around any menu, use the UP and DOWN scroll buttons to highlight the required item (the highlighted item is shown in inverse video). Then press Pushbutton C (effectively the “Reply/Answerback” key in normal mode or "Enter" key when in Program Mode) to implement the selection.

• Main programming menu showing the Master Level option selected.

This option allows the master volume level to be set in the range -12dB to 0dB using the scroll buttons.



• Main programming menu showing the Settings option selected.

• Main programming menu showing the Button Options selected.

• Main programming menu showing the Information (Status) option selected.

• Main programming menu showing the Page Options selected.

• Main programming menu showing the Exit (from Program mode to normal operation) option selected.

THE ALARM OPTIONS MENU

This is the Alarm menu for determining whether the low battery and/or low signal strength warnings should sound in the headphone.

This menu is reached by selecting the Alarm option on the main programming menu.

To return to the main programming menu, select Exit (the Up arrow on the display) and press pushbutton C.

• The Alarm menu showing the low battery warning option selected.

• Press button C to select the low battery alarm menu and use the scroll buttons to switch between the low battery alarm settings.

• The Alarm menu showing the low signal strength warning option selected.

• Press button C to select the low signal alarm menu and use the scroll buttons to switch between the low signal alarm settings.

• The Alarm menu showing the Vibrate option selected (Type II beltpacks only).

- Press button C to select the vibrate alert menu and use the scroll buttons to switch between the vibrate alert settings.
- Exit the Alarms menu by using the scroll buttons to select the Exit symbol and press button C.

SWITCHING THE LOW BATTERY ALARM ON AND OFF

Select the battery from the above menu and press Pushbutton C. This calls up the low battery alarm menu on which the user can set the low battery alarm options. The low battery alarm options are shown below.

Low Battery Alarm Off

Selecting this option and pressing button C will disable the low battery alarm completely.

Low Battery Alarm On 1

Selecting this option and pressing button C will enable the low battery alarm setting to alert the user when the batteries need recharging or replacing.

Low Battery Alarm On 2

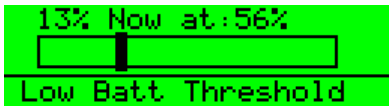
Selecting this option and pressing button C will enable the low battery alarm setting to alert the user when the batteries reach the threshold set by the user.

Low Battery Alarm Threshold

Selecting this option and pressing button C will select the low battery threshold at which the low battery alarm will activate.

Low Battery Threshold Setup

Moving the slider with the left and right scroll buttons allows the low battery alarm threshold to be set. When the battery level reaches the threshold set the low battery alarm will activate. Press button C to confirm the setting and exit back to the low battery menu.



When the low battery alarm is set use the scroll buttons to select the Exit symbol and press button C.

SWITCHING THE LOW SIGNAL STRENGTH ALARM ON AND OFF

Select the transmitted signal icon from the above menu and press Pushbutton C. This calls up menu on which the user can select low signal alarm On or Off.

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When the low signal alarm is set use the scroll buttons to select the Exit symbol and press button C.

THE VIBRA CALL ALERT MENU

This is the menu for determining whether the low battery and/or low signal strength warnings should use the vibrate function (type II beltpacks only) and/or an audio beep function.

This menu is reached by selecting the Alarm option on the main programming menu then selecting the Vibrate/audio option. The alert

options are vibrate only, audio beep only, or vibrate and audio beep selected by pressing button C to step through the options.

When the required option is selected use the scroll buttons to select another menu item.

To return to the main programming menu, select Exit (the Up arrow on the display) and press pushbutton C.

THE HEADPHONE MENU

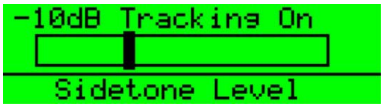
This menu is reached by selecting the Settings option on the top level programming menu, then the headphone options on the audio menu.

- The Headphones menu showing the option to set the lowest level to which the headset can be adjusted (sometimes also known as the "Gate Level").

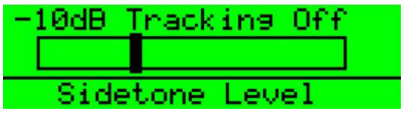
- Press button C to select the Headphone Off menu and use the scroll buttons to select one of the settings.

- Press button C to select the setting, then use the scroll buttons to select Exit and press button C to return to the previous menu.
- The Headphones menu showing Sidetone level selected.

- Press button C to select Sidetone level and use the scroll buttons to set the Sidetone level on the slider. When Sidetone Tracking is enabled the sidetone level will track the master volume level, maintaining the set difference between the master volume level and sidetone level.
- To enable Sidetone Tracking use the right scroll button to increase the sidetone level to 0.0dB and then press the right scroll button again. Once SideTone Tracking is enabled the sidetone level can be set using the scroll buttons in the normal way.



- To disable Sidetone Tracking use the left scroll button to decrease the sidetone level to -70dB and then press the left scroll button again. Once SideTone Tracking is disabled the sidetone level can be set using the scroll buttons in the normal way.
- Then press button C to return to the previous menu.



- The Headphones menu showing the default Normal Loudness setting selected.

In normal mode the noise levels are set to the same levels as in release 1.5.7, with Bass and Treble set to 0dB. Press button C to switch to the ‘LOUD’ mode.

In ‘LOUD’ mode the noise levels can be 10dB higher than in release 1.5.7 as the volume can be higher. The Bass level is reduced for clarity in a noisy environment and set at -12dB. The Treble level is increased for clarity in a noisy environment and set at +12dB.

Warning: The loud setting also turns off the headset limiter as indicated on the menu.

Press button C again to switch the Custom setting. This setting allows the bass and treble levels to be set by the user and has a maximum level 10dB greater than that in release 1.5.7.

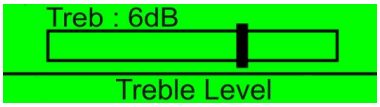
Use the scroll buttons to select ‘BASS’ to set the Bass level.

Press button C to display the bass level setting and use the scroll buttons to adjust the level. Reducing the bass level will reduce any background bussing noise.

When the required bass level is set press the C button to return to headphone menu.

Use the scroll buttons to select ‘TREB’ to set the Treble level.

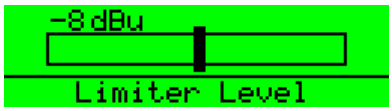
Press button C to display the treble level setting and use the scroll buttons to adjust the level. Reducing the treble level will reduce the background noise.



When the required treble level is set press the C button to return to headphone menu.

- The Headphones menu showing the Headset Limiter threshold option selected.

- This facility allows the user to make a local setting of the maximum signal level which is permitted to reach the headphone. The available levels are -6 to +16 dBu in 1 dBu steps. Use the scroll buttons to set the Headphone Limiter level on the slider then press button C to return to the previous menu.



HEADSET NOISE GATE

To avoid the fluctuation in the headset noise gate it now operates as follows:

- Turns on - upon first detecting audio to the headset audio.
- Turned off - when receiving the loudspeaker off message from the basestation. The basestation sends this message when it is no longer routing audio to the beltpack.

THE MICROPHONE MENU

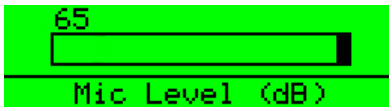
From the main programming menu select Settings and then Microphone Options to display the Microphones menu.

- The Microphones menu will be displayed.

- Select Microphone Type using the scroll buttons to display the Microphone Type menu.

- Use the scroll buttons to select the microphone type from those available (Dynamic (Bal) mic, Dynamic (UnBal) mic, Electret mic) and then press button C to set the microphone type. Use the scroll button to select the Exit symbol and press button C to return to the main Microphone menu
- The Microphone menu showing the microphone level option selected.

- This facility allows the user to select a level of microphone gain and so control the sensitivity of the microphone in the headset. Use the left and right scroll buttons to set the microphone level by moving the slider. The level can be set from 20dB to 65dB in steps of 5dB.



- Press button C to select the level setting and return to the previous menu or use the scroll buttons to select Exit and press button C to exit.
- The Microphone menu showing the Noisegate level option selected.

- This facility allows the user to select a level at which the audio is gated to prevent background noise being transmitted. Use the left and right scroll buttons to set the microphone level by moving the slider. The level can be set from 0 (off) to 14 is steps of 1.

- Press button C to select the level setting and return to the previous menu or use the scroll buttons to select Exit and press button C to exit.

Release 2.0.2 includes a mic profile which cuts the bass by 12 dB and boosts the treble by + 3 dB. This is permanently set for all modes.

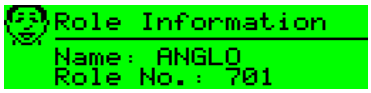
The MkII beltpacks include a hardware mic gate and in release 2.0.2 this has been activated on Mic noise gate level 1 to allow a very low whisper on the beltpacks.

THE STATUS (INFORMATION) MENU

This function appears after the user has selected the Information symbol from the main programming menu.

- The Status (Information) menu showing the Role Information icon selected. Note that this face icon is used in two different menus. It appears in the Talk/Listen menu to denote the Talk and Listen mode and it is used here, in the Status submenu to denote Role Information.

When this icon is selected the display appears showing the Role name and the Role number which represents it.

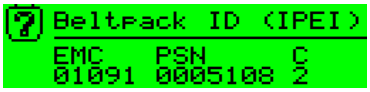


• The Status (Information) menu showing the Beltpack version number icon highlighted.

• When this icon is selected the display appears.

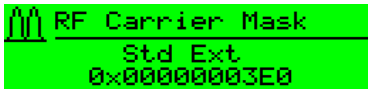
• The Status (Information) menu showing the Beltpack ID icon highlighted.

• When this icon is selected the display appears. IPEI stands for International Portable Equipment Identifier, EMC for Equipment Manufacturer Code, PSN for Portable Serial Number (unique to every Beltpack) and C for check-digit.



• The Status (Information) menu showing the Beltpack RF Carrier icon highlighted.

• When this icon is selected the display appears showing the RF carrier mask in hexadecimal format. This mask is unique to the allowed DECT band in the country of use. It is set to a default European mask. Please see the Product manual for changing this.



• The Status (Information) menu showing the Connection Information icon highlighted.

When this icon is selected the display appears. The components of this display are laid out in the format which is specified for this technology and appear as follows:

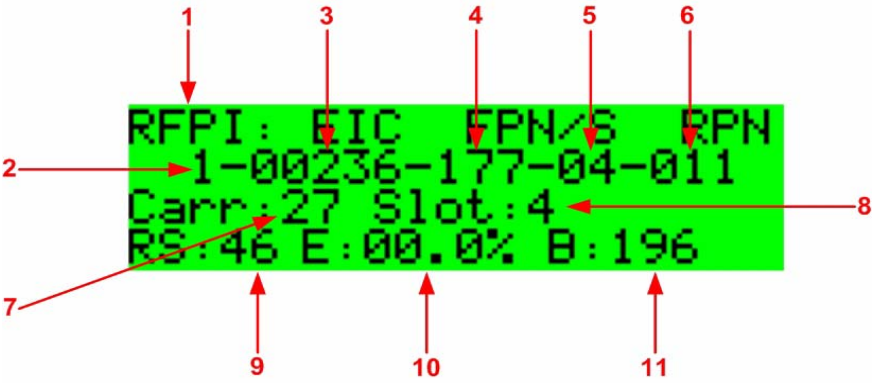


Figure 2-1: Connection Information Display

Table 2-1: Connection Information

Item	Description
1	Radio Fixed Part Identifier. This title refers to the whole of the second line of text. The RFP is the Radio Fixed Part to which the Beltpack is currently connected. (Much of this line of text is not unique to one Active Antenna.)
2	This is the PARK (Primary Access Rights Key) number (reserved for future use.)
3	The abbreviation stands for Equipment Installer Code and the number on the second line is the EIC number.
4	Fixed Part Number. This and item 6 below are unique to the particular Active Antenna.
5	Fixed Part Sub-Number. This is effectively the system number which identifies which matrix the Beltpack is registered with.
6	Radio Fixed Part Number. This is the identifier of the Active Antenna on the system.

Table 2-1: Connection Information

Item	Description
7	Carrier Number (both Active Antenna and Beltpack)
8	Timeslot Number (used by Active Antenna)
9	Received Signal strength Indication (digital indication). This is an arbitrary number in the range 0-52 and, therefore, significant only in the context of a particular installation.
10	Block error rate for received frames.
11	Raw battery level indication.

From these displays, press button C to return to the status menu.

ADJUST CONTRAST

- Select the Adjust Contrast option from the main programming menu and press button C to display the contrast setup.

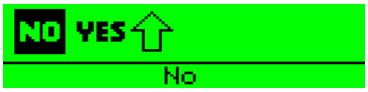
- The contrast adjustment slider is displayed.

- Use the scroll buttons to adjust the contrast level and press button C to set the contrast and exit to the previous menu.

SET FACTORY DEFAULTS

To reset the beltpack to the factory defaults go to the main programming menu and select Set Factory Defaults.

- The factory defaults options are NO to cancel the operation or YES to default all the user settable parameters such as limiters and levels to the factory settings.



- Select NO to cancel or use the scroll buttons to select YES to reset.

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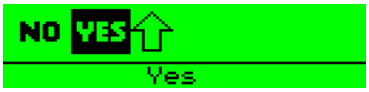
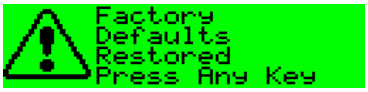


- When the beltpack is reset to factory defaults and confirmation message is displayed.



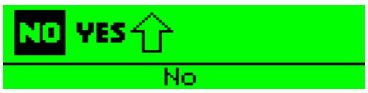
Press any key to return to the main menu.

SET DEFAULT VOLUMES

The Set Default Volumes function will reset the volume levels set by the rotary controls to 0dB (orange on the volume indicators).

- Select the Default Volumes menu from the main programming menu.

- The default volumes options are NO to cancel the operation or YES to reset the volume levels to the 0dB.



- Select NO to cancel and press button C to exit back to the headphone options menu.

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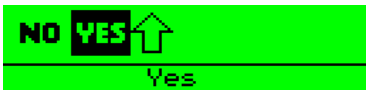
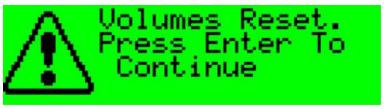


- Use the scroll buttons to select YES and press button C to reset the volume levels.



- The volume levels will be reset to 0dB and the volume indicators will show orange. Press button C to return to the headphones options menu.

TAP LATCH

The Tap Latch function determines whether the rotary push buttons latch with one tap or two taps when the beltpack is set in latching mode.

• Select the Button Options menu from the Programming menu.

• Select the Tap Latch on the Button options menu and use the scroll keys to toggle between the 1 Tap Latch and 2 Tap Latch states.

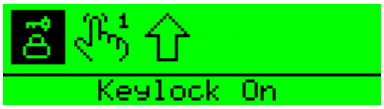
• Press button C to set the Tap Latch mode.

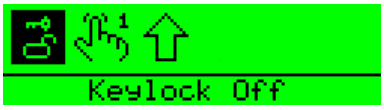
KEYLOCK

Keylock allows the scroll buttons to be disabled when on the main page after 3 seconds of inactivity to prevent accidental activation.

• Select Button options on the programming menu.

• Select keylock on the button options menu and use the scroll buttons to select Keylock On or Keylock Off.





• Press button C to set the keylock mode. If keylock is on a symbol will be displayed on the main pages showing that the keys are locked. To temporarily disengage keylock press and hold the scroll keys simultaneously for 3 seconds. A short beep in the headphones will signal that the keylock has been disengaged.

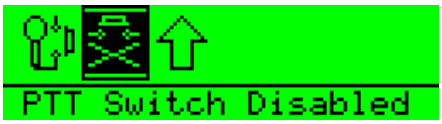
PTT CONFIGURATION

PTT configuration allows a PTT switch to be enabled or disabled.

Note: This feature is only available on PD2202 beltpacks.

• To configure PTT set to the Button options menu and use the scroll keys to select PTT configuration.

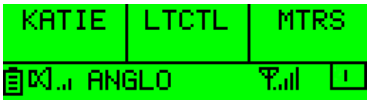
• The PTT configuration menu will be displayed. Use the scroll buttons to enable or disabled the PTT switch.



Use button C to set the PTT switch status.

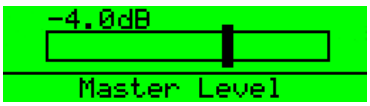
MASTER VOLUME CONTROL

The master volume control is set from the main menu.



Press and hold both scroll buttons until the main menu is displayed.

Select the Master Level and adjust the slider using the left/right scroll buttons until the required volume is obtained.



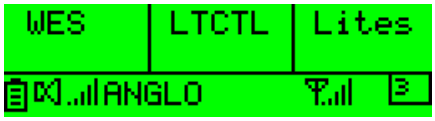
Press the centre button to exit the master level and use the scroll buttons to exit the main menu back to the display page.

PAGE OPTIONS

The Page Options on the main menu give access to the page lock and key options menus.

PAGE LOCKING

When you are looking at a normal display you are looking at one of up to six numbered pages with three key assignments on each. Eclipse supports up to eighteen key assignments. The page icon indicates the page number of the current page. The setting of page number is global to the system and only one page can be current at a time.



The significance of upper and lower case text on the display is explained in the Operational Information.

To display a different page, change to menu mode and select Page Options. This will display the page options menu.

Use button C to change the page status from page change allowed to page locked to prevent the page being changed.

3 OPERATING THE ECLIPSE TRANSCEIVER/ ANTENNA

TRANSCEIVER/ANTENNA

The Eclipse transceiver/antennas form the transmission link between the Eclipse beltpacks and the Eclipse base. Multiple units are used to support the beltpacks and to create larger, customized coverage areas. Each transceiver/antenna is connected to the Eclipse base, either directly or via a PD2203 splitter. The unit has two flanges on the rear side that permit the unit to be screwed or otherwise attached to surfaces.

Figure 3-1: Eclipse Transceiver/Antenna

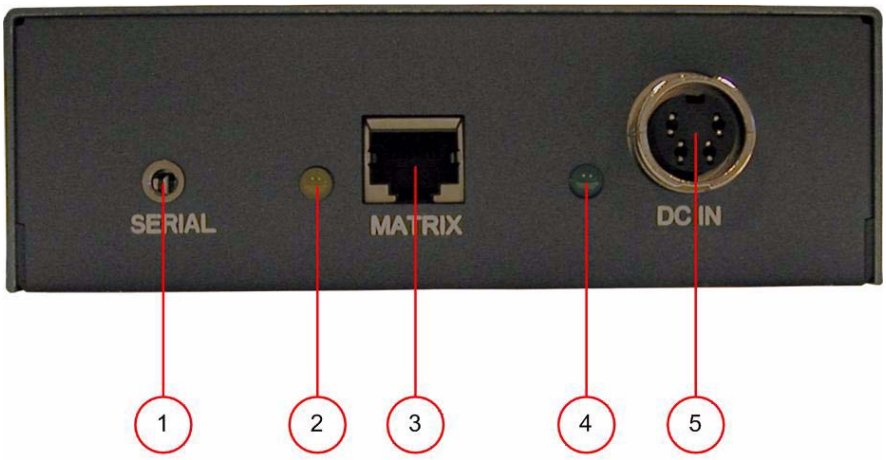
TRANSCEIVER/ANTENNA TOP PANEL

Omnidirectional Antennas

A pair of omnidirectional antennas are provided with the transceiver/antenna.

Antennas with different coverage patterns (directional units) that are appropriate for the 1.9 GHz range may be substituted for the provided antennas, if variations in coverage pattern are required.

TRANSCEIVER ANTENNA BOTTOM/CONTROL PANEL



1 Serial Data Connector
2 Data Signal Light
3 Matrix Connector
4 Power Indicator Light
5 DC IN Power Connector

Figure 3-2: Eclipse Transceiver/Antenna Bottom/Control Panel

① Serial Data Connector

This 3 mm (1/8 inch) tip-ring-sleeve (TRS) connector is used for upgrading the firmware in the transceiver/antenna. It will typically be unused.

② Data Signal LED

This amber LED indicates that a connection has been established between the Eclipse base and the transceiver/antenna, and that it is actively creating a coverage zone within which the beltpacks can operate. If it is off, check the cable connections at both ends, as well as the powering.

When viewing an antenna status directly at the antenna, the amber LED indicates that it is receiving a data link from the basestation, however this does not guarantee that the basestation can receive data messages from the antenna.

③ Matrix Connector

This RJ-45 connector is used to connect the bi-directional signal from the Eclipse base, directly or via the splitter. Up to 1,000 meters of 4-pair 24 AWG CAT-5 cable can be used for this connection between base and transceiver/antenna. If 26 AWG CAT5 cable is used the maximum distance is 500 meters.

④ Power LED

This green LED indicates that the transceiver/antenna is receiving power, either from its local power supply or from the connected CAT-5 cable (distances up to 300 meters, or 925 feet, from the base or the splitter) being powered via the Eclipse base.

⑤ DC In Power Connector

This connector is used to locally power the transceiver/antenna with the supplied universal power supply. Use of local power is required when the transceiver/antenna is located more than 300 meters (925 feet) from the Eclipse base or the splitter, and is recommended even when the transceiver/antenna is closer whenever it is available and convenient.

CABLING THE TRANSCEIVER/ANTENNAS

Each Eclipse transceiver/antenna receives its necessary data and digital communications audio via a direct connection with the matrix E-Que ports. Between these two ports, up to 10 transceiver/antennas can be supported. A transceiver/antenna may either be directly connected to an E-Que port using 4-pair CAT-5 data cable with RJ-45 connectors on each end, or it may be connected to the base through an antenna splitter.

BELTPACK SUPPORT CAPACITIES FOR TRANS-CEIVER/ANTENNAS

Each transceiver/antenna can support five beltpacks within one coverage zone. With the supplied omnidirectional antennas, the coverage pattern is circular or donut-shaped, with a maximum range of up to 250 meters (800 feet), but with typical range between 50 meters and 150 meters – depending on the environment in which it is installed.

When designing the system, determine how many beltpack users will be in or passing through a given coverage zone. If it will be five or fewer users, then place one transceiver/antenna in the center of that area. If it is between 6 and 10 users, place two transceiver/antennas next to each other, both with a direct connection to the Eclipse base or splitter. In larger systems – approaching 20 beltpacks – it is wiser to

allow one transceiver/antenna for every 3 to 4 users to ensure smooth handoffs between transceiver/antennas. It is good practice to have each beltpack “seeing” two or more antennas, so a minimum of two antennas in any system is to be considered.

If a sixth beltpack user goes into a coverage zone with only one transceiver/antenna, and that user is out of range from another transceiver/antenna in the overall system to which that beltpack is currently connected, it will lose connection with the system. This is because the transceiver/antenna has a maximum capacity of five beltpacks at a time. If one of the existing users in that coverage area turns off a beltpack or leaves the area, then the sixth beltpack will find an open slot and will be reconnected with the system.

The proprietary technology within Eclipse permits the beltpack user to go between coverage zones created by different transceiver/antennas connected to the Eclipse base, and for the system to hand over the communication between beltpack and base from one transceiver/antenna to the next one. Thus, a larger, customizable communications area may be designed.

COVERAGE AREAS UNDER VARIOUS CONDITIONS

Just as with any other product communicating via radio waves, the effective distance between the beltpack and the transceiver/antenna (the range) will differ depending on the particular environment in which it is being used. Radio waves can be attenuated by walls, floors, ceilings, trees, shrubbery, the human body (such as an audience), and numerous other objects. They can be reflected and/or stopped by metallic objects such as structural beams, safety doors, lighting equipment and truss, bodies of water, and so on.

Under ideal conditions, the maximum range between a Eclipse beltpack and a transceiver/antenna is 250 meters (about 800 feet). Typical distances are between approximately 50 meters (about 160 feet) and 150 meters (about 485 feet), depending on the particular environment.

As the transceiver/antenna requirements for a particular installation are being determined, keep in mind both the number of beltpack users who will be working in a particular area (based on the five-beltpack capacity of each transceiver/antenna), and the layout and potential RF attenuating and reflecting items in the location. Be conservative in your distance estimates to make sure that you include enough transceiver/antennas to provide the necessary coverage for the installation. Also note that additional transceiver/antennas may be added to a base, up to a maximum of 10.

TRANSCEIVER/ANTENNA SETUP RULES AND TIPS

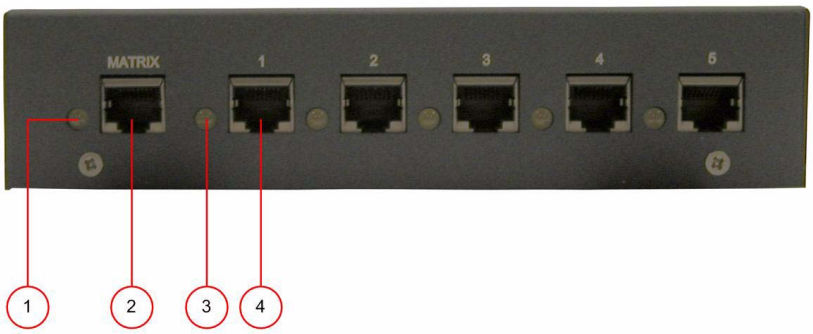
Keep the following general rules and tips in mind:

- Keep antennas high (typically, though lower placements away from interfering objects can at times be beneficial) and line-of-sight.
- Keep them away from larger metallic objects and surfaces, and from lighting truss.
- With the provided omnidirectional antennas, the coverage is circular so put the transceiver/antennas in the center of the area in which you want coverage.
- In outdoor settings with line-of-sight, the absence of beneficial reflections of the radio waves may lead to shorter than expected range; directional antennas may be of benefit here.
- When overlapping the coverage zones of transceiver/antennas to create larger continuous coverage areas, test the in-between areas with a beltpack for potential areas of low RF signal; adjust the positioning of the antennas as needed.
- Because of potential body shielding as the user moves, it will be useful to place two transceiver/antennas in different locations within larger working areas to minimize low-level signals and potential signal dropouts.
- Going between a larger area and a corridor via a door, especially a heavy or shielded one, or where the walls are thick, place a second antenna in the corridor near the doorway to assure continuous coverage.

TRANSCEIVER/ANTENNA SPLITTER (PD2203)

The antenna splitter is the device that connects multiple transceiver/antennas to the Eclipse matrix. It has an RJ-45 connector that carries the data between a base transceiver port and the splitter, and five RJ-45 connectors to feed that information to and from up to five antennas. The splitter is always locally powered via the supplied external in-line universal power supply.

PD2203 FRONT CONNECTOR PANEL



1 Base Connection Indicator Light
2 Matrix (Base Station) Connector
3 Splitter-to-Transceiver/Signal Indicator Lights (5)
4 Transceiver/Antenna Connectors (5)

Figure 3-3: Eclipse Splitter Front Connector Panel

① Base Connection Indicator Light

This yellow light indicates that the splitter is receiving data from the Eclipse base.

② Matrix (Eclipse Base) Connector

This RJ-45 connector accepts a 4-pair data cable from the Eclipse matrix E-Que port. This cable can be up to 1,000 meters in length if 24 AWG cable is used or up to 500 meters if 26 AWG cable is used.

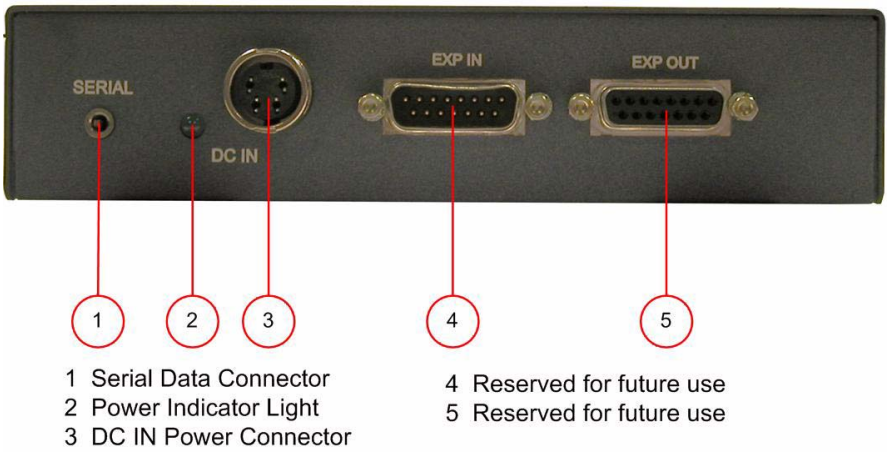
③ Splitter-to-Transceiver/Antenna Signal Indicator Light

These yellow lights indicate that a connection from the Eclipse base is available to the particular transceiver connected to that port.

④ Transceiver/Antenna Connectors

These five RJ-45 connectors are used to connect up to five remote transceiver/antennas to the splitter, and via the splitter to the Eclipse matrix. Each of these cables can be up to 1,000 meters in length if 24 AWG cable is used or up to 500 meters long if 26 AWG cable is used.

PD2203 REAR PANEL



1 Serial Data Connector
2 Power Indicator Light
3 DC IN Power Connector
4 Reserved for future use
5 Reserved for future use

① Serial Data Connector

This 3.5 mm (1/8 inch) tip-ring-sleeve (TRS) connector is used for upgrading the firmware in the splitter. It will typically be unused.

② Power Indicator

This green LED indicates that the splitter is receiving power from the external power supply.

③ DC IN Power Connector

This connector is used to locally power the antenna splitter with the supplied universal power supply. Use of local power is required.

④ EXP IN Connector

This male DB-15 connector is reserved for future use.

⑤ EXP OUT Connector

This female DB-15 connector is reserved for future use.

CONNECTING AN ANTENNA SPLITTER TO THE ECLIPSE BASE AND TO TRANSCEIVER/ANTENNAS

After the connections have been made between the splitter and the transceiver/antennas, make sure that the data LED's are lit at the individual ports on the antenna splitter. Also make sure that the both the green power LED and the yellow data LED are lit on each transceiver/antenna. If all are properly lit, then the connection has been successfully made and the coverage zones will be active and will

support beltpacks. If the transceiver antennas are not lit, check the connections.

4 INSTALLING A SYSTEM

The user can begin using a Eclipse system as soon as it is received, as long as the beltpacks are registered to the base, using the generic user labels for the beltpacks and the rear-panel connections.

PLACING THE MATRIX

The first stage in setup is placing the matrix in a convenient location, knowing that it is the central routing unit of the Eclipse system.

An Eclipse wireless system can work immediately when you receive it, as long as the beltpacks are registered to the system.

At this stage, if they are unregistered, the user may want to register all of the beltpacks with the Eclipse Configuration System (ECS), or at least register one or two for system setup and testing. Follow the instructions in the Eclipse Configuration System instruction manual to register the beltpacks.

PLACING THE ANTENNAS AND SPLITTERS

The next step is to begin placing antennas and splitters to provide the necessary coverage areas for all of the beltpacks. The first placements of antennas and splitters will be experimental and temporary. After placing the antennas, walk through the coverage areas to check for gaps and then re-locate the antennas accordingly.

More information on checking coverage areas is given later in this chapter, in the sections “Determining Coverage Areas” and “Doing a Site Survey to Determine Coverage Areas.”

The following questions will help you to begin placing the antennas:

- What areas will have more than five active beltpack users in them at any time? Co-locate a second transceiver/antenna there.
- Is there a central place to locate an antenna so that it will provide omnidirectional (all directions / circular) coverage?
- Are there balcony areas, corridors, or other rooms or areas that will require coverage with antennas?

Next decide where the antenna splitter(s) that feed these antennas will be safely located. For systems with only one or two transceiver/antennas, the cable runs will go directly from the transceiver ports on the base E-Que card.

WIRING THE ANTENNAS AND SPLITTERS

To wire antennas and splitters:

***Note**: To meet FCC emissions requirements a ferrite must be fitted on any CAT-5 cable plugged into either of the two ports labeled "transceivers." The ferrite should be fitted at the basestation end of the CAT-5 cable. Position the ferrite as close to the basestation as possible.*

The manufacturer of a suitable ferrite is Wurth Elektronix. The part number is 742 711 32.

1. Run 4-pair CAT-5 cable from the Eclipse base to the antenna or splitter, and determine that the antenna or splitter is showing both power (green LED lit) and signal (yellow LED lit when the matrix is on).

Note: To meet FCC emissions requirements, a ferrite must be fittedon any CAT-5 cable plugged into either of the two ports labeled "transceivers." The ferrite should be fitted at the E-Que card end of the CAT-5 cable. Position the ferrite as close to the E-Que card as possible.
The manufacturer of the ferrite is Wurth Elektronix. The part number is 742 711 32.

Note: It is recommended that shielded CAT-5 cable is used.

2. Run 4-pair CAT-5 cable from the splitter to each of the transceiver/antennas.
3. Make sure that the local power supplies are plugged into the antennas, unless they are close enough to the matrix to draw power from the attached CAT-5 cable.

You will know that a transceiver/antenna has sufficient power from the cable if the green power LED and the yellow data LED light up. If you have several longer runs and are attempting to power the transceiver/antennas from the base / splitter connection, check each one again when the are all connected. The local powering for the transceiver/antenna is recommended in most cases to provide the most reliable long-term Eclipse installation.

Note that 4-pair CAT-5 cable with RJ-45 connectors on each end is specified for connection between the E-Que card and the transceiver/antennas. Use of other cable can result in markedly shorter distances of cable runs and other possibly other performance problems.

During the initial system setup, before walking through the system with a beltpack to check for gaps in coverage, it is wise to avoid "permanently" installing the transceiver/antennas. Hold them in place in some temporary way until their optimal position is determined.

DETERMINING COVERAGE AREAS

After the transceiver/antennas and splitters have been initially set up proceed to test the coverage areas and re-locate antennas and splitters, if necessary, for optimal coverage.

To determine coverage areas:

1. Once the base, splitter(s), and transceiver/antennas have been placed and wired, turn on a beltpack (assuming that it has been registered with ECS) and walk the coverage area – ideally speaking with someone else via the on-base headset or a party-line or matrix connection with the base.

Alternatively, use the “site survey” mode on the beltpack (see “Doing a Site Survey to Determine Coverage Areas” below). It is often best to begin with one antenna in place, and then place additional units to enhance coverage.

2. Walk through all of the areas where beltpack users will typically be moving, and note any areas of weak signal, dropout, or disconnection from the system. Pay special attention to the overlap areas between antenna coverage zones, making sure sufficient signal strength is there from each of the transceiver/antennas to make a clean handoff between them for the beltpack.
3. Finally, when the coverage zones have been properly and effectively set up, it is time to program the system. See the ECS Instruction manual for setting up a system.

DOING A SITE SURVEY TO DETERMINE COVERAGE AREAS

Some Eclipse users may want to test coverage areas more extensively before setting up a a complete system. Testing a system in the setting in which it will be located helps to set up the system successfully to meet operational needs. Factors in the local setting may affect the areas a system can cover, so it is important to plan a site setup accordingly.

Doing a complete site survey, as described below, helps you to set up an optimal system.

TESTING COVERAGE AREAS OF INDIVIDUAL ANTENNAS

1. Place the Eclipse matrix in a convenient location. Register one beltpack to the matrix.
2. Place one antenna in the center of the coverage area.
3. If the DECTSync program is being used ensure the serial cable is connected. If no serial cable is connected the beltpack may not initially enter “site survey” mode (see below).
4. Put the beltpack into “site survey mode” by first turning the beltpackoff, then press and hold the right front-panel scroll/menu button while powering the beltpack back on.
   - When this is done the beltpack’s display shows the “site survey” screen. Figure 4-1 shows a beltpack’s site survey screen.
   - If the beltpack does not enter “site survey” mode (for example because no serial cable is present) press the right front-panel scroll button again with the beltpack still switched on. The beltpack will then be forced into “site survey” mode.
5. Walk around the antenna with the beltpack, monitoring the beltpack’s *signal strength* and *error rate* at various distances.

The *signal strength* is shown in the Received Signal Strength Indication (RSSI) field in the leftmost lower corner of the beltpack's display. The *error rate* is shown in the ERR field in the middle of the display.

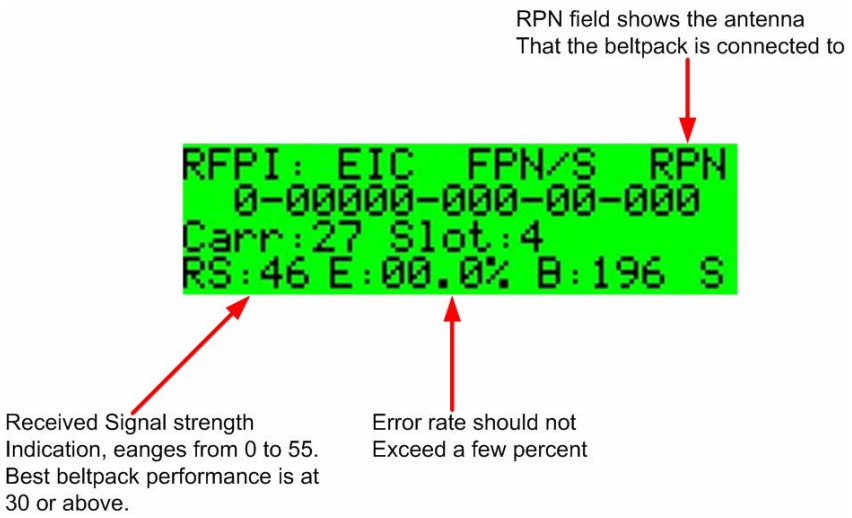


Figure 4-1: A Beltpack's Site Survey Screen

- The **RS** (signal strength) number will fluctuate, ranging from 0 to 55, as the user walks through the coverage area, and may even fluctuate as the user stands still. As a rule-of-thumb the best system performance will be obtained when the signal strength remains at 30 or above. If the signal strength falls below 30 the beltpack may start losing audio. This is the limit of the coverage zone.
- The **ERR** (error rate) number indicates packets of audio which are lost or corrupted. When this number exceeds a few percent the user may start hearing audible audio breakup.
- A high Received Signal strength indication and a high Error rate may indicate that there is another RF system causing interference.

A beltpack can transmit to an antenna outdoors at an average distance of 125 meters when the beltpack has an unobstructed "line-of-sight" path to the antenna. In ideal conditions, the range may be as high as 250 meters. Indoors, a beltpack can transmit to an antenna at an average distance of 50 meters.

6. Draw a map of the coverage zone for the antenna. The coverage zone is the area where the signal strength, as a rule-of-thumb, is 30 or above and the error rate is below a few percent.
7. Repeat this process, one antenna at a time, for as many antennas as necessary to cover the required area. Overlap coverage zones

so that there is no area where the signal strength is below 30, and no area where the error rate is above a few percent.

8. The antenna placement will need to be adjusted to get the best coverage.

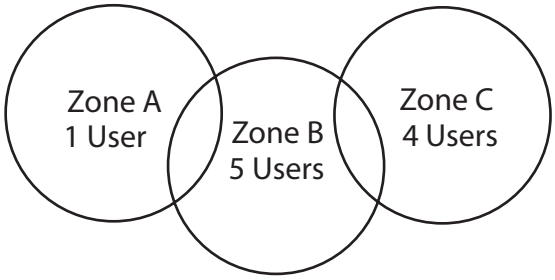


Figure 4-2: Mapping overlapping coverage zones

In some environments you may observe that despite having a high signal strength, the beltpack consistently reports a high error rate.

This could be due to two things:

- In-band interference from an RF source broadcasting in the DECT area of the spectrum. This can be verified using a DECT band monitor or by using a Spectrum Analyzer.
- Long Delay Spread Multipath, where the signal is bounced off a number of reflective surfaces, such as metal ceilings, gantries, walkways or other large structures. This problem is greatest where the reflective surface is large and exists at a range of distances from the antenna. To resolve this problem, consider siting the antenna where it cannot “see” the reflective surface, installing a reflector close to the antenna between it and the reflective surface, or purchasing directional antennas. Contact VGC customer support for more information.

TESTING ANTENNA HANDOFF

After testing the coverage areas for individual antennas, test the handoff between the antennas. When the user walks through a coverage area with the beltpack, the beltpack searches to find the antenna with the best signal strength, and switches transmission to that antenna. Therefore the beltpack continually hands off transmission among antennas as the user moves through the coverage area.

To test antenna handoff, connect any additional antennas in the installation and walk through the coverage areas to ensure that the coverage is continuous and complete, without audio breakups. The user can tell which antenna the beltpack transmits to by looking at the RPN number in the top rightmost corner of the beltpack’s display when the beltpack is in “site survey” mode. Reposition antennas if

necessary. Note that the numbering to identify antennas starts at “6” to identify the first antenna, as shown in the table below.

BELTPACK SCREEN DISPLAYS:	WHICH SIGNIFIES:
RPN 6	Antenna 1 on transceiver port 1
RPN 7	Antenna 2 on transceiver port 1
RPN 8	Antenna 3 on transceiver port 1
RPN 9	Antenna 4 on transceiver port 1
RPN 10	Antenna 5 on transceiver port 1
RPN 11	Antenna 1 on transceiver port 2
RPN 12	Antenna 2 on transceiver port 2
RPN 13	Antenna 3 on transceiver port 2
RPN 14	Antenna 4 on transceiver port 2
RPN 15	Antenna 5 on transceiver port 2

Table 4-1: How antennas are numbered

ASSIGNING BELTPACKS TO COVERAGE AREAS

Each antenna is designed to handle five beltpacks simultaneously. Although it can achieve this in good conditions, this may not always be possible for a number of reasons. First, interference or propagation problems may mean that not all antenna slots are available all the time. Second, a beltpack constantly searches for the best antenna signal, and may frequently switch antennas. To make this transmission seamless, a beltpack maintains the connection to its current antenna until it is confident that the new antenna is functioning well. Therefore, for a short period of time during this transition, a single beltpack can occupy slots on more than one antenna.

This means that for zones likely to need coverage for five or more beltpacks simultaneously it is recommended that a second antenna is installed. Similarly, for good coverage for nine or more beltpacks simultaneously, a third antenna may be required.

CONDITIONS AFFECTING COVERAGE AREAS

The environment in which a system is located affects the coverage area for any particular beltpack/antenna combination. The presence of walls, floors, ceilings, trees, shrubbery, people, and numerous other items may affect the coverage zone. Metallic objects, safety doors, lighting equipment, and bodies of water may possibly block transmission. These factors must be taken into consideration when planning the installation.

5 SPECIFICATIONS

Eclipse Beltpack

Beltpack Frequency Response	100 Hz – 7.1 kHz
Beltpack Assignment-Select Buttons	3, used to scroll and select talk/listen “pages” and also to edit beltpack menu options
“Label” Assignments per Select Button	2 (two simultaneous talk/listen paths or channels)
Number of Full-Duplex Audio Paths	6 (3 pairs), with individual level control
Level/Talk Controls	2 top-mounted push-to-talk rotary encoders
Headset Connector	XLR-4M, Clear-Com standard
Headset Impedance	32 ohm to 2000 ohm
Microphone Type	Dynamic or electret, selectable in beltpack menu
Input Level	-70 to -40 dBu
Microphone and Headset Limiters	Selectable in beltpack menu
Powering	Alkaline Battery, 4 AA alkaline cells Rechargeable, 4 NiMH cells in AA format
Battery Charging	In unit, via supplied external power supply connected to beltpack
Battery Life	Approximately 8 hours with 4 fresh AA alkaline batteries or 4 AA high-amperage NiMH cells
Range from Single Transceiver/Antenna	125 m from transceiver/antenna in line-of-sight conditions; 50 m indoors; use multiple transceiver/antennas for larger, custom coverage areas

Dimensions	Tapered design, at largest points approx. 38 x 87 x 144 mm (dwh) (1.5 x 3.5 x 5.75 inches)
Weight (with batteries)	Approx. 360g (13 oz).

Transceiver/Antenna

Beltpacks Supported Per Transceiver/Antenna	5, in one cellular zone
Transceiver Antenna Transmission Range	Up to 250 m (800 ft.), line of sight
Maximum Distance, Base to Transceiver Via Base Port	1,000 m (3,200 ft.) using 24 AWG cable 500 m (1,600 ft) using 26 AWG cable
Maximum Distance, Transceiver Powered By Base Port	300 m (975 ft.)
Local Powering	Via 24VDC power supply
Range per Transceiver/Antenna	150 m from transceiver/antenna ideal, line-of-sight conditions; 50 m indoors; use multiple transceiver/antennas for larger, custom coverage areas
Connection to Eclipse Base	RJ-45
Mounting	Via integral tabs with holes for screws
Dimensions	38 x 125 x 153 mm (dwh) (1.5 x 5.0 x 6.1 inches)
Weight	Approx. 255g (9 oz).

Transceiver/Antenna Splitter

Number of Transceiver/Antennas Supported	10; ***Note****: In the USA, until FCC opens the allowed bandwidth, any one area can only have 5 antennas.*
Number of Splitters Per Base	2
Connection Between Base and Splitter	4-pair CAT5 cable with RJ-45
Connection Between Splitter and Transceiver/Antennas	4-pair CAT5 cable with RJ-45
Powering of Splitter	Locally powered via external power supply

Transmission Method

Method of RF Operation	DECT standard, using two DECT bands per beltpack for wider frequency response
Modulation	QPSK
Frequencies of Operation	1.92 – 1.93 GHz
RF Output	250 mW burst, average level 2 - 4 mW

Theory of Operation
Dynamic allocation of frequencies and handoff of beltpacks among the transceiver/antennas up to their individual limit of 5 connected beltpacks at a time; each beltpack is assigned a “virtual port” within the Eclipse base.

APPENDIX 1: DECT CARRIER FREQUENCY CHART

RFC	carrier frequency	rfc	carrier frequency
0	1897.344	17	1911.168
1	1895.616	18	1912.896
2	1893.888	19	1914.624
3	1892.160	20	1916.352
4	1890.432	21	1918.080
5	1888.704	22	1919.808
6	1886.976	23*	1921.536
7	1885.248	24*	1923.264
8	1883.520	25*	1924.992
9	1881.972	26*	1926.720
10	1899.072	27*	1928.448
11	1900.800	28	1930.176
12	1902.528	29	1931.904
13	1904.256	30	1933.632
14	1905.984	31	
15	1907.712	32	
16	1909.440		

Table 6-1: DECT Carrier Frequency Chart

*** Carriers 23 through 27 are those used in the USA.**

7 GLOSSARY

Analog Port Any of the Eclipse matrix's analog input/output RJ-45 connectors that are used to connect cable from the matrix to panels and interfaces. Each "port" connects to a separate audio channel in the matrix intercom system.

Bus A bus is the channel or path between the components in the matrix along which electrical signals flow to carry information from one component to the next. In the Eclipse matrix the bus is located in the etched surface of the midplane.

Call Signal A call signal is an electronic signal sent from one panel or interface to another. A call signal can be audible and/or visual. Typically a call signal is sent to get the attention of a panel operator who may have turned down their intercom speaker's volume or removed their headset. It can also be sent to activate an electronic relay.

Category-5 cable EIA/TIA 568 category specification relating to network cabling. Shielded category-5 cabling is required for Eclipse matrix wiring.

CellCom Digital wireless communications product. Sold under the CellCom name in USA and as FreeSpeak in Europe and Asia.

Central Matrix The term "central matrix" is used to differentiate the central hardware and software of the intercom system from the connected audio devices. The central matrix consists of:

1. The metal housing for the circuit cards and power supplies.
2. The circuit cards.
3. The power supplies.
4. The rear panel connectors which connect the matrix's hardware to panels and interfaces.

Destination A device such as an intercom panel, beltpack, or interface to which audio signals are sent. The device from which audio signals are sent is called a "source".

Duplex All real-time communication between individuals talking face to face is full duplex, meaning that they can both talk and listen simultaneously. The Eclipse matrices provide full-duplex audio.

ECS Eclipse Configuration System. Software program that guides the operation of the central matrix circuit cards and connected panels.

EMS Element Management System. Software program that is used to manage the Concert server system resources.

Ethernet International standard which describes how information is transmitted across a network. Provides for the efficient organization of network components.

Fiber-optic Cable A fiber-optic cable consists of a glass core covered with a reflective material called “cladding” and several layers of buffer coating to protect the cable from the environment. A laser sends light pulses through the glass core to the other end of the cable.

FreeSpeak Digital wireless communications product. Sold under the FreeSpeak name in Europe and Asia and CellCom in USA.

Full Duplex Refers to transmission of signals in two directions simultaneously.

IFB “Interruptible Foldback”. The term “foldback” refers to sending “program” audio, or some other audio mix, back to announcers while they are on the air. Doing so allows announcers to monitor themselves, other announcers, videotapes of commercials, or some mix of sources, while they on the air. This is typically found in television news and live broadcast events.

Announcers typically wear a small ear piece so they can hear the selected foldback audio mix. When a director wants to give directions to an announcer on air, or to announce changes in the program, the director must “interrupt” the foldback. To do this, the director uses a channel specifically set up to interrupt the foldback audio.

Interface Module A piece of electronic hardware designed to convert the 4-wire signals of a central matrix port to some other form of communication, such as 2-wire party line, telephone, etc. The interface module is connected to a central matrix port. The external non-4-wire device is then connected to the interface module.

ISO The ISO function, short for “panel ISOlation”, allows a panel operator to call a destination and interrupt all of that destination’s other audio paths and establish a private conversation. When the call is completed the destination’s audio pathways are restored to their original state before the interruption.

IV-R Instant Voice Router. Software that routes digital audio data between Concert users and between Concert users and Eclipse systems.

Label A label is an alphanumeric name of up to five characters that identifies a source, destination, or control function accessed by an intercom panel. Labels appear in the displays of the intercom panel. Labels can identify panels, ports interfaced to other external equipment, fixed groups, party lines, and special control functions.

Mode A term used to describe a light path through a fiber as in multimode or single mode.

Multimode Fiber-optic Cable The glass core of a multimode fiber is larger than the core of a single mode fiber, which causes the transmitted light beam to disperse as it travels through the core. Single mode fiber, with its smaller core, concentrates the light beam so that it carries signals further. Multimode fiber was the first type of fiber offered

by manufacturers. Single-mode fiber evolved as production methods improved.

Multiplexing The process by which two or more signals are transmitted over a single communications channel. Examples include time division and wavelength division multiplexing.

Nanometer (nm) Common unit of measure for wavelength. One billionth of a metre.

Non-volatile Memory Data stored in the CPU's firmware (ROM) that is not lost when the power is turned off.

Optical Signal A laser at one end of a fiber-optic cable pulses on or off to send a light signal through the glass core of the cable to the other end of the cable. Because the light signals are binary (on or off), the signal is digital.

Panel Also referred to as "station" in some cases (usually older manuals). Any intelligent intercom device connected to the rear-panel analog ports of the central matrix. This term does not refer to devices connected through interface modules.

Port Any of the input/output connections (RJ-45 connectors) on the back panel of the central matrix. These connectors and the attached cables connect the central matrix to remote intercom devices. The term "port" emphasizes that the connection is a "portal" between the central matrix and the remote intercom devices.

Program Any separate audio source that is fed into the intercom channels. In television applications, for example, "program" audio is the audio that is broadcast on air.

Rack Unit or RU Standardized unit of mounting space on a rack panel. Each rack unit is 1.75 inches (44.45 mm) of vertical mounting space. Therefore 1 RU is 1.75 inches (44.45 mm) of vertical mounting space, 2 RU is 3.5 inches (88.9 mm), 3 RU is 5.25 inches (133.35 mm), and so on.

Remote Panel Any intelligent intercom device connected to the back-panel ports of the central matrix. This term does not refer to devices connected through interfaces.

Sidetone The sound of the panel operator's own voice heard in their own earphone as they speak.

Single-mode Fiber-optic Cable The glass core of a single-mode fiber is smaller in diameter than the core of a multimode fiber, so that the light signal transmitted over the core is more concentrated than with multimode fiber, which allows the signal to travel further. Single-mode fiber evolved from multimode fiber as production methods improved.

Source In this manual, the term "source" refers to a device—such as an intercom panel, interface, or beltpack —that sends audio into the matrix. The device to which audio is sent is called a "destination".

VOX In the Eclipse system, when audio at a panel exceeds a threshold, a light switches on at the panel's port card to visually cue the operator. The threshold level is set in the Eclipse Configuration Software.

V-Series Communications panels used with Eclipse systems providing advanced facilities. Available in rack mount and desktop formats.

Wavelength-division Multiplexing (WDM) A method of multiplexing optical signals developed for use on fiber-optic cable. Each signal is assigned a particular wavelength on the light spectrum and therefore many signals can be transmitted simultaneously without interfering with each other.

ECLIPSE MANUALS

The following manuals are available covering Eclipse products and accessories.

SOFTWARE MANUALS

Eclipse Configuration System (ECS) Instruction Manual - 810299Z

Eclipse Logic Maestro Instruction Manual - 810414Z

Eclipse Production Maestro Quick Start Guide - 810409Z

Eclipse Production Maestro Installation and User Guide - 810410Z

Eclipse DECTSync Manual - 810412Z

Eclipse Host Computer Interface (HCI) Manual - 810413Z

HARDWARE MANUALS

Eclipse Omega Matrix Instruction Manual - 810290Z

Eclipse Median Matrix Instruction Manual - 810347Z

Eclipse PiCo Matrix Instruction Manual - 810348Z

Eclipse-32 Matrix Instruction Manual - 810315Z

Eclipse Matrix Installation Manual - 810298Z

Eclipse Upgrade Reference Manual - 810377Z

Eclipse V-Series Panels User Manual - 810365Z

Eclipse FOR-22 4-Wire Interface Instruction Manual - 810306Z

Eclipse CCI-22 Party Line Interface Instruction Manual - 810307Z

Eclipse TEL-14 Telephone Interface Instruction Manual - 810308Z

Eclipse GPI-6 General Purpose Inputs Instruction Manual - 810309Z

Eclipse RLY-6 General Purpose Outputs Instruction Manual - 810310Z

DIG-2 Digital Interface Instruction Manual - 810311Z

IMF-3, IMF-102, DIF-102 Interface Module Frame Instruction Manual - 810313Z

Eclipse AES-6 Digital Interface Instruction Manual - 810383Z

Eclipse BAL-8 Isolation Interface Instruction Manual - 810403Z

Eclipse V-Series AES-3 Option Card Installation Instructions - 810388Z

Eclipse V-Series XLR-7M Upgrade Instructions - 810405Z

Eclipse V-Series T-Adapter Installation Instructions - 810406Z

Eclipse FIM-202D Fiber Interface Instruction Manual - 810385Z

Eclipse FIM-102 Fiber Interface Instruction Manual - 810319Z

Eclipse FIM-108 Fiber Interface Instruction Manual - 810291Z

Eclipse IFB-104 Interface Instruction Manual - 810268Z

Eclipse 4000 Series II Panels Installation Guide - STA0530Z

Eclipse 4000 Series II Panels User Guide - STA0531Z

Eclipse ICS 1008E/1016E Panels Instruction Manual - 810404Z

Eclipse ICS 102/62 Panels Instruction Manual - 810302Z

Eclipse ICS 2003 Panel Instruction Manual 810303Z

Eclipse ICS 92/52 Panels Instruction Manual - 810301Z

Eclipse i-Station Instruction Manual - 810305Z

Eclipse ICS-21 Speaker Panel Instruction Manual - 810263Z

Eclipse ICS-22 Speaker Panel Instruction Manual - 810264Z

Eclipse ICS-24 Headset Panel Instruction Manual - 810265Z

Eclipse Digital Wireless Beltpack Instruction Manual - 810376Z

LIMITED WARRANTY

This document details the Clear-Com Standard Limited Warranty for all new products for sale within all regions with the exception of Military, Aerospace, and Government (MAG).

EXCEPT AS SET FORTH HEREIN ("LIMITED WARRANTY"), CLEAR-COM MAKES NO OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, NONINFRINGEMENT OF THIRD PARTY RIGHTS, OR FITNESS FOR A PARTICULAR PURPOSE, ALL OF WHICH ARE EXPRESSLY DISCLAIMED.

1. **Standard Limited Warranty.** Clear-Com Communication Systems ("Clear-Com") warrants its products, including supplied accessories, against defects in material or workmanship for the time periods as set forth below provided it was purchased from an authorized Clear-Com dealer or distributor.

   a) Pursuant to this Limited Warranty, Clear-Com will, at its option:

      i) repair the product using new or refurbished parts, or;

      ii) replace the product with a new or refurbished product.

   b) Remedies: In the event of a defect, the rights detailed in 1 (a) are your exclusive remedies. For purposes of this Limited Warranty, "refurbished" means a product or part that has been returned to its original specifications.

   c) Standard Warranty Period (by Product):

      i) All Clear-Com brand systems and products, including belt packs, have a Limited Warranty of two years, with the exception of;

         (1) Cables, accessories, components & consumable items have a Limited Warranty of 90 days.

         (2) Any Clear-Com product that has been classified as obsolete at the time of sale has a Limited Warranty of 90 days from sales and will be replaced with the same product or a sales credit will be issued, at the sole discretion of Clear-Com.

         (3) Headsets, handsets, microphones, and associated spare parts, as well as UHF wireless IFB products, have a Limited Warranty of one year.

         (4) UHF WBS Analog wireless intercom systems have a Limited Warranty of three years.

(5) All software products, including Concert (Client and Server), ECS, Production Maestro and Logic Maestro are warranted for one year and shall substantially conform to published specifications. The media on which the Software is furnished is warranted to be free of defects in material and workmanship (under normal use) for a period of one year.

(6) Any Clear-Com products that are listed within the last time buy period have the same Limited Warranty for their type 1.i 1 - 1.i.5 as above.

d) Any Clear-Com product that is repaired or supplied as a replacement under the terms of this Limited Warranty shall inherit the remaining warranty period from the original product.

e) Standard Warranty Period Start Date

i) Dealer / Distributor Sales: In view of Dealer or Distributor stocking practices, the Standard Warranty Period for products sold through Dealers or Distributors will commence from the Clear-Com invoice date and will include an automatic extension of three months. Any valid warranty claim within the Standard Warranty Period as determined by the Clear-Com invoice date will be covered without further supporting evidence. All warranty claims after this date must be supported by the Customer's proof of purchase that demonstrates the product is still within the Standard Warranty Period (as detailed in Section 1.c.i above, plus the automatic three month extension) from their purchase date.

ii) Direct Sales: The Standard Warranty Period will commence from the date the product was shipped from Clear-Com to the Customer. The Standard Warranty Period start date for contracts that include commissioning will be the date of the Site Acceptance Test (SAT) or one month from conclusion of the commissioning project, whichever is earlier.

f) Invalidation of Warranty

i) This Limited Warranty shall be invalidated if the product's outer case has been opened and internal modifications have been made or damage has occurred, or upon the occurrence of other damage or failure not attributable to normal wear and tear. Authorized modifications with Clear-Com's express written permission will not invalidate the warranty.

g) Software Updates

i) Software Updates are released periodically to correct discovered program bugs. During the Warranty Period, software updates are available to Customers free of charge.

h) Software Upgrades

i) Software Upgrades include new Features and/or Functional Enhancements and are not included as part of the Standard Warranty but may be purchased at the published rates.

ii) Note: In the absence of a Software Update containing a program correction and no available workaround to mitigate the problem, at the discretion of Service, Sales, Engineering, or Product Management, the Customer may be provided a Software Upgrade under warranty.

2. **Exclusions.** Services do not cover damage or failure caused by any occurrence beyond Clear-Com's reasonable control, including without limitation acts of God, fire, flooding, earthquake, lightning, failure of electric power or air conditioning, neglect, misuse, improper operation, war, government regulations, supply shortages, riots, sabotage, terrorism, unauthorized modifications or repair, strikes, labor disputes or any product failure that Clear-Com determines is not a result of failure in the Services provided by Clear-Com. Further Services excluded from this Agreement include: services required due to errors or omissions in Customer purchase orders; installation or maintenance of wiring, circuits, electrical conduits or devices external to the products; replacement or reconditioning of products which, in Clear-Com's opinion cannot be reliably maintained or properly serviced due to excessive wear or deterioration; Customer's failure to maintain the installation site in accordance with the environmental specifications of the products; or service on products removed from the location originally specified by Customer and/or reinstalled without the prior written approval of Clear-Com. Customer will pay Clear-Com's then current published charges to restore such Covered Products to a condition eligible for further service under this Agreement. Clear-Com shall be excused from and shall not be liable for any failure or delay in performance under this Agreement due to the foregoing or any causes beyond its reasonable control.

3. **Limitation of Liability. IN NO EVENT WILL CLEAR-COM BE LIABLE UNDER THIS AGREEMENT FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), REGARDLESS OF THE FORM OF ACTION, EVEN IF ADVISED IN ADVANCE OF THE POSSIBILITY OF SUCH DAMAGES.**

4. **Assignment.** Neither party may assign this Agreement or any portion thereof without the prior written consent of the other, except in the event of a merger, sale of all or substantially all of the assets or other corporate reorganization.

5. **Ownership of replaced parts or product.** All replaced parts or products become the property of Clear-Com.

6. **Entire Agreement.** This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof, and supersedes all prior or contemporaneous proposals, oral or written, and all other communications between them relating to the subject matter of this Agreement.

TECHNICAL SUPPORT & REPAIR POLICY

NOVEMBER 1, 2008

In order to ensure that your experience with Clear-Com and our World Class products is as beneficial, effective and efficient as possible, we would like to define the policies and share some "best practices" that can accelerate any problem solving processes which we may find necessary and to enhance your customer service experience. Our Technical Support, Return Material Authorization, and Repair Policies are set forth below. These Policies are subject to revision and constantly evolve in order to address our Customers' and the Market's needs. Accordingly these are provided by way of guidance and for information only and may be changed at anytime with or without Notice.

TECHNICAL SUPPORT POLICY

a) Telephone, online, and e-mail technical support will be provided by the Customer Service Center free of charge during the Warranty Period.

b) Technical support will be provided free of charge for all software products under the following conditions:

i) The application, operating, and embedded software is installed on a product covered by Clear-Com's Limited Warranty, and:

(1) The software is at the current release level; or,

(2) The software is one (1) version removed from current.

ii) Older versions of software will receive "best-effort" support, but will not be updated to correct reported bugs or add requested functionality.

c) For Technical Support:

i) North and South America, (inc. Canada, Mexico, and the Caribbean) & US Military:

Hours:	0800 - 1700 Pacific Time
Days:	Monday - Friday
Tel:	+1 510 337 6600
Email:	CustomerServicesUS@vitecgroup.com

ii) Europe, the Middle East and Africa:

Hours:	0800 - midnight Central European Time

Days: Monday - Friday
Tel: +49 40 853 999 700
Email: TechnicalSupportEMEA@vitecgroup.com

iii) Asia-Pacific:
Hours: 0800 - 1700 Pacific Time
Days: Monday - Friday
Tel: +1 510 337 6600
Email: CustomerServicesAPAC@vitecgroup.com

d) Email Technical Support is available for all Clear-Com branded products free of charge for the life of the product, or two years after a product has been classified as obsolete, whichever comes first.

e) Support for Distributor and Dealer Sales

i) Distributors and Dealers may utilize the Customer Service Centers once a system has been installed and commissioned. Clear-Com Systems and Applications Engineers will provide support to the Distributor from the pre-sales stage through to satisfactory installation for new system purchases. Customers will be encouraged to contact their Dealer or Distributor with their installation and technical support enquires rather than using the Customer Service Centers directly.

f) Support for Direct Sales

i) Customers may utilize the Customer Service Centers once a system has been installed and commissioned by Clear-Com Systems and Applications Engineers, or in the case of project installations, once the Project Team has completed the hand-over to the Support Centers.

RETURN MATERIAL AUTHORIZATION POLICY

a) Authorizations: All products returned to Clear-Com or a Clear-Com Authorized Service Partner must be identified by a Return Material Authorization (RMA) number.

b) The Customer will be provided with an RMA number upon contacting Clear-Com Sales Support as instructed below.

c) The RMA number must be obtained from Clear-Com via phone or email prior to returning product to the Service Center. Product received by the Service Center without a proper RMA number is subject to return to the Customer at the Customer's expense.

d) Damaged equipment will be repaired at the Customer's expense.

e) Returns are subject to a 15% restocking fee.

f) Advance Warranty Replacements (AWRs);

i) *During the first 30 days of the Standard Warranty Period:* Once the equipment fault has been verified by Clear-Com or its authorized representative, Clear-Com will ship a new replacement product. The Customer will be provided with an RMA number and be required to return the faulty equipment within 14 days of receipt of the replacement or will be invoiced for the list price of a new product.

ii) *During days 31-90 of the Standard Warranty Period:* Once the equipment fault has been verified by Clear-Com or its authorized representative, Clear-Com will ship a like-new, fully refurbished replacement product. The Customer will be provided with an RMA number and be required to return the faulty equipment within 14 days of receipt of the replacement or will be invoiced for the list price of a new product.

iii) To obtain an RMA number or request an AWR:

(1) North and South America, Asia-Pacific, and US Military:

Hours:	0800 - 1700 Pacific Time
Days:	Monday - Friday
Tel:	+1 510 337 6600
Email:	SalesSupportUS@vitecgroup.com

(2) Europe, the Middle East and Africa:

Hours:	0800 - 1700 GMT + 1
Days:	Monday - Friday
Tel:	+ 44 1223 815000
Email:	SalesSupportEMEA@vitecgroup.com

iv) Note: AWRs are not available for UHF WBS Analog wireless intercom systems. UHF WBS Analog wireless intercom systems out-of-box failures must be returned to Alameda for repair.

v) Note: Out-of-box failures returned after 90 days will be repaired and not replaced unless approved by Clear-Com Management.

vi) Note: AWRs are not available after 90 days of receipt of product unless an AWR Warranty Extension is purchased at the time of product purchase.

vii) Note: Shipping charges, including duties, taxes, and insurance (optional), to Clear-Com's factory is the responsibility of the Customer. Shipping AWRs from Clear-Com is at Clear-Com's expense (normal ground or international economy delivery). Requests for expedited shipping (E.g. "Next-Day Air") and insurance are the responsibility of the Customer.

REPAIR POLICY

a) Repair Authorizations: All products sent to Clear-Com or a Clear-Com Authorized Service Partner for repair must be identified by a Repair Authorization (RA) number (see above).

b) The Customer will be provided with an RA number upon contacting Clear-Com Customer Services as instructed below.

c) The RA number must be obtained from Clear-Com via phone or email prior to returning product to the Service Center. Product received by the Service Center without a proper RA number is subject to return to the Customer at the Customer's expense.

d) Return for Repair

i) Customers are required to ship equipment at their own cost (including transportation, packing, transit, insurance, taxes and duties) to Clear-Com's designated location for repair.

(1) Clear-Com will pay for the equipment to be returned to the Customer when it is repaired under warranty.

(2) Shipping from Clear-Com is normal ground delivery or international economy. Requests for expedited shipping (E.g. "Next-Day Air") and insurance are the responsibility of the Customer.

ii) **Clear-Com does not provide temporary replacement equipment ("loaner") during the period the product is at the factory for repair.** Customers should consider a potential prolonged outage during the repair cycle, and if required for continuous operations purchase minimum spare equipment required or purchase an AWR Warranty Extension.

iii) No individual parts or subassemblies will be provided under warranty, and warranty repairs will be completed only by Clear-Com or its Authorized Service Partners.

iv) Customers requesting a non-warranty repair will be provided an estimate of the total repair cost prior to the return of the equipment. In the event that Clear-Com is unable to estimate

the cost of repair, the Customer may elect to return the product to the factory for an estimate. The Customer is responsible for shipping costs both to and from the factory in the event they choose not to accept the estimate.

v) The Customer must provide either a purchase order for the repair work, or will be required to make an advance payment (as a debit against the Dealer's line of credit, or credit card) prior to the repaired product being returned to the Customer.

vi) For requesting a Repair Authorization number:

(1) North and South America, Asia-Pacific, and US Military:

Hours:	0800 - 1700 Pacific Time
Days:	Monday - Friday
Tel:	+1 510 337 6600
Email:	CustomerServicesUS@vitecgroup.com

(2) Europe, the Middle East and Africa:

Hours:	0800 - midnight Central European Time
Days:	Monday - Friday
Tel:	+49 40 853 999 700
Email:	TechnicalSupportEMEA@vitecgroup.com

vii) Note: Clear-Com's Limited Warranty does not cover normal wear and tear. The Customer will be charged the full cost of the repair if their equipment has been tampered with by non-approved personnel, or has been subject to damage through electrical failure, liquid damage or mishandling. The Customer Service Center will provide the Customer with a cost estimate for any such repairs prior to undertaking the work.