

**EXHIBIT F**

**Paragraph 2.983(d)(8)**

**Instruction Manual**



**Retlif Testing Laboratories**

Test Report Number No. R-7456-5  
FCC ID: F3S4KMTX

# **TRANTEC SYSTEMS**

## **OPERATING INSTRUCTIONS**

### ***S3500 & S4000 SERIES***

## **Introduction:**

Thank you for purchasing your Trantec S3500 or S4000 system. All systems incorporate a diversity receiver - this uses two antennas and switches to the one with the best signal strength to minimise the chance of drop out - when the signal is lost momentarily due to natural radio wave phenomena.

The set up procedure for each of these systems is detailed in these instructions and if followed will ensure your complete satisfaction with the product.

- **Background Information:**

The S3500 and S4000 are VHF and UHF diversity systems respectively. They offer an easy to use microprocessor controlled synthesised receiver and transmitter which can operate on up to 32 different channels. The exact selection of channels available will depend on how your system has been programmed in the factory. To simplify the process of locating the desired channel, the selection can be divided up into banks. There can be up to four banks, again this will depend upon how your system has been programmed. The ability to change operating channel will be immediately useful in any situation where the system is to be used at varying locations, where the presence of other radio microphone users may cause problems when using a fixed channel system.

- **General Radio Microphone Operating Guidelines:**

Always try to locate the receiver as close as possible to the transmitter, as this minimises the chance of there being any drop out. Although this is most unlikely with a diversity system, the greater the transmitting range, the greater the chance of problems. Always try to ensure a line of sight signal path between the transmitter and receiver - obstacles such as walls can significantly reduce the radio signal strength. Obviously the transmitter and receiver must be on the same channel. If you are using more than one system simultaneously, choose a set of intermodulation free frequencies. Please refer to the channel listings at the end of these instructions as a guide to finding a suitable set of frequencies. Your local distributor will be able to assist in this matter. It is wise to avoid placing the receiver near to computer or mobile telephone equipment, as this can create unwanted radio interference. As emphasised in these instructions, always operate any radio microphone system with its antennas fully extended. Always test a radio microphone system in the location where it is to be used by doing a 'walk test'. This is where the system is tested as the transmitter is walked around the area in which it is to be used. This will normally show up any problem areas, allowing you to try a new receiver location. By adjusting the location of the receiver, or even just the alignment of its antennas, it should be possible to obtain trouble free operation over the desired area, provided that it is not too large to exceed the transmitter's range, which is typically around 100m.

- **Guarantee:**

All Trantec products are guaranteed for a period of one year from date of purchase against defects in materials and workmanship. In the event of a claim under guarantee the system should be returned to your local distributor in its original packaging and with proof of purchase. Defects caused by modification, misuse or accident are not covered by the guarantee.

Due to our continual policy of research and development we reserve the right to alter specifications without prior notice.

**UK Address:**

Trantec Systems  
BBM Electronics Group Ltd  
Kestrel House  
Garth Road  
Morden  
Surrey  
SM4 4LP

Tel: (0181) 330 3111  
Fax: (0181) 330 3222

E-Mail: [enquiries@trantec.co.uk](mailto:enquiries@trantec.co.uk)

**US Primary Distributor Address:**

Beyerdynamic USA  
56 Central Ave.  
Farmingdale, NY 11735

Tel: (516) 293-3200  
Fax: (516) 293-3288

## ***S3500 & S4000 Diversity Receivers:***

- **Setting Up:**

*S4000 only* - connect the two antennas to the rear. An angle of around 60 degrees between each antenna is recommended for optimum coverage - the antennas should never be exactly parallel as this reduces the effectiveness of the diversity switching system. The status of the two antennas (*Pass* or *Not Connected*) is displayed briefly when the power is first connected.

*S3500 only* - fully extend the two attached antennas, and if possible set them to angles as described above.

Connect the mains power adapter to the **DC IN** rear panel connection and to the mains supply. **Always and only use the Trantec power supply provided with your system.**

Turn down gain of your mixer or PA system down and connect the audio output, either from the XLR (S3500 & S4000 only) or jack connector to the desired audio input on your system. The output of the XLR is fixed, but the output of the jack can be varied using the adjacent **GAIN** control. For details on how to set the optimum level for this control, see the section below on optimising the gain of your system. Note that you should always turn down the volume on your system whilst connecting in order to prevent there being a 'pop' as you connect the audio lead.

The receiver will start on whatever frequency it was last set to. If you have a transmitter tuned to this frequency and switched on, then the receiver should immediately receive, otherwise it will stay in **RF MUTE** mode. If you receive interference from other transmissions on the same channel, adjust the **MUTE LEVEL** control on the rear panel. This can only be done when the transmitter is turned off.

- **An Explanation of the Front Panel and Options:**

When the receiver is muted, it will display **RF MUTE** and the current frequency.

When the receiver is receiving, it will display the frequency of the current channel and a small bar chart indicating the received RF power, unless the **Display Name?** Option has been selected (see below), in which case a user name will be displayed rather than the bar chart. This facility is useful in situations where you need to know who is using which channel.

To view a large RF power bar chart, press the **RF** button. Pressing either button will return you to the normal display. The large RF power bar chart will give an indication of how good the radio signal from the transmitter is. The more segments that are lit, the better the signal, although there is little degradation until 3 segments or less are showing. This feature is most useful when first locating the receiver in order to receive the strongest possible signal. It is also useful for finding potential trouble areas where the signal from the transmitter reduces in strength very rapidly due to natural wave phenomena.

To view a large VU meter, press the **AF** button. Pressing either button will return you to the normal display. The VU meter indicates the audio level from the transmitter. It is most useful when optimising the system's gain as described later.

The three LEDs indicate which antenna is being used and the presence of a high (> +3dB) audio signal. The two antenna LEDs simply indicate the operation of the diversity system. The audio peak LED is useful when setting the system's gain.

- **Configuring the Receiver:**

All configuration is done using the two front panel push buttons. To change the configuration first enter the **SETUP MENU** by pressing both buttons together. The following options are available from the menu, in this order:

1. **CHANNEL CHANGE**
2. **BANK CHANGE**
3. **PROGRAM INFO**
4. **MUTE LEVEL**
5. **NAME INPUT**
6. **DISPLAY NAME?**

To scroll through these options, press the **Δ** button. To select a particular option, press the **SELECT** button. The results of selecting a particular option are outlined individually in the sections that follow. Note that any changes made to the configuration are stored in memory in the receiver, and will thus not be lost when power is disconnected.

- **Selecting CHANNEL CHANGE:**

Initially the current channel's frequency is displayed. Press or hold down the  $\Delta$  button to scroll through the available channels in the current bank. When you reach the required new frequency, press the **SELECT** button to choose it. The receiver will immediately switch to the new frequency, and the normal display will return.

*The exact selection of channels available in each bank will depend on how the transmitter has been programmed in the factory. It can contain up to 32 unique channels, which can be arranged in up to 4 banks, but your transmitter will not necessarily contain this many channels or banks.*

- **Selecting BANK CHANGE:**

The current bank is displayed. Pressing the  $\Delta$  button will change to the next bank. Pressing the **SELECT** button will choose the bank being displayed to become the current bank, and will then return you to the normal display. Note that doing this will reset the current frequency to the first in the new bank, so it will probably be necessary to change the frequency after changing the bank.

*As already mentioned above, the exact selection of banks available will depend on how the transmitter has been programmed in the factory. There can be up to 4 banks, but if there is only 1, this option will not be functional.*

- **Selecting PROGRAM INFO:**

This will display information on the program in the receiver. To clear this information, press the **SELECT** button to return to the normal display.

- **Selecting MUTE LEVEL:**

This will show the setting of the rear **MUTE** control, and will change to reflect adjustments made to this control. Press the **SELECT** button to clear this information. If the receiver is muted, this will return you to the normal display, otherwise you will see the RF bar chart. In this case, pressing either button will then return you to the normal display. See the section below for details of how to set the mute level for optimum performance. When adjusting the mute level, the transmitter should be switched off.

- **Selecting NAME INPUT:**

This allows you to enter a user name which can be displayed in the normal display. The user name can be up to eight characters long. In order to change the name from this option, the name is displayed with a cursor under the first character. Pressing or holding down the  $\Delta$  button will scroll through the available characters at the cursor position. Pressing the **SELECT** button will move the cursor along one position. Pressing the **SELECT** button on the last character in the name will return you to the normal display. It will be necessary to change each of the eight character locations in turn. If you miss the character you want, simply scroll round until it comes back again.

- **Selecting DISPLAY NAME?:**

This allows you to configure whether or not the user name is displayed in the normal display. Pressing the  $\Delta$  button will toggle this setting on and off. Pressing the **SELECT** button will return you to the normal display.

- **Setting the Mute Level:**

The mute level can be adjusted if the receiver is picking up unwanted radio signals (due to intermodulation and other FM signals). In order to make this adjustment, the transmitter must be switched off. The receiver should now be muted. If it is not, then slowly adjust the **MUTE LEVEL** control until all unwanted signals are muted. Due to the receiver's noise searching circuitry, no noise should be present at the audio output regardless of the mute setting. Once you have done this, switch the transmitter back on and check its operation. If desired, the mute level can be viewed in a numerical format on the S3500 and S4000 by selecting the appropriate menu option as described above. Setting the mute level too high will reduce the range of your system. S3500 and S4000 receivers indicate on their display that they are muted.

- **Optimising the Gain of your system:**

In order to achieve the best possible audio performance from your radio system, it is worth spending a few minutes setting the optimum gain level.

First adjust the gain of your transmitter, as described in the appropriate section. The optimum setting for this will be found by first adjusting the transmitter gain so that the audio peak LED on the receiver just illuminates for the loudest signal that is likely to be transmitted. The gain should then be decreased slightly so that the peak LED never lights in normal operation. If the peak LED is lit, then distortion is likely. The optimum setting will vary according to who is using the microphone and how close the microphone is placed to the mouth. For guitar systems, different instruments will require a different setting. The front panel VU meter is also available as a guide.

Once the transmitter gain is optimised, it is necessary to match the receiver's output gain to your mixing desk or PA system. If using the jack output, adjust the **GAIN** control to give the optimum level for your system. Adjusting this too high may cause distortion.

## SS3500 & S4000 Handheld Transmitters:

- **Setting Up:**

Screw the external antenna into the antenna connector on the base of the microphone. For maximum range and performance it is important not to place your hand around this antenna whilst the microphone is in operation.

Turn the microphone's collar round to the left and gently slide down the body shell to reveal the battery compartment. Insert a 9v (MN1604) battery observing the correct polarity. Close the body shell and turn the collar back to lock it in place.

Switch on the microphone using the switch on its base. The LED will light up if the battery is good. Note that the LED will extinguish when the battery needs replacing. The LCD display will also indicate the current channel and bank - the bank is indicated at the bottom of the display.

- **Changing the Transmitting Channel:**

Sliding open the body of the microphone as described above will not only reveal the battery compartment, but also two small push button switches. These are located on the opposite side of the microphone to the battery compartment, adjacent to the LCD.

Whilst the microphone is switched on, press and hold the switch nearest to the base of the microphone until **FrEq** is displayed on the LCD. Releasing the switch at this stage will advance the transmitting frequency to the next frequency in the current bank. Continuing to hold down the switch will scroll through the available frequencies in the current bank, and whatever frequency is displayed when the switch is released will be chosen as the transmitting frequency. This setting is stored in memory within the microphone and will be retained even when the microphone is switched off.

*The exact selection of channels available in each bank will depend on how the transmitter has been programmed in the factory. It can contain up to 32 unique channels, which can be arranged in up to 4 banks, but your transmitter will not necessarily contain this many channels or banks.*

- **Changing the Current Bank:**

Slide open the microphone body and locate the two push button switches as described above.

Whilst the microphone is switched on, press and hold the switch nearest the LCD until **BAnc** is displayed on the LCD. The current bank (displayed at the bottom of the LCD) will then scroll through the available banks (up to 4 in total). Release the switch when the desired bank is shown, and this will become the current bank. After changing the current bank, it will probably be necessary to choose the desired transmitting frequency from the new bank as described above. This setting, like the transmitting frequency, is stored in memory and will be retained even when the microphone is switched off.

*As already mentioned above, the exact selection of banks available will depend on how the transmitter has been programmed in the factory. There can be up to 4 banks, but if there is only 1, this option will not be functional.*

- **Changing the Audio Gain:**

Locate the two push button switches as described above and press them both down together. After a short delay, **GAIn** will be displayed on the LCD along with a number from 0 to 9. This number is the current gain setting. Continuing to hold down only the right hand switch (nearest the LCD) will increase the gain up to the maximum of 9, whilst holding down only the left hand switch will decrease the gain down to the minimum of 0. When neither switch has been pressed for a period of time, the display will revert to showing the transmitting frequency, and the new gain will have been selected and stored. Refer to the receiver instructions for details on how to optimise the gain of your system to best suit the application for which it is to be used. Normally setting 9 (maximum) will be best for low SPL level microphone applications such as interviews and conferences and gain 0 (minimum) is best for high SPL level applications such as stage use with high vocals. The gain is initially set to 5 or 6 in the factory.

## **S3500 & S4000 Beltpack Transmitters:**

- **Setting Up:**

Screw the external antenna into the antenna connector on the top of the beltpack. The antenna can either be a short wire or a helical type. Under no circumstances should the length of a wire antenna be shortened. Neither should a wire antenna be coiled up or wrapped with the audio lead - this will reduce the performance of the radio system.

*Beltpack Transmitters only* - Insert the Lemo connector for the lapel microphone into the audio connector using the two red identents as a polarity guide. Do not twist this connector. Keep the audio lead and the antenna separated at all times.

Slide the side of the beltpack up and place a 9v (MN1604) battery in the compartment observing the correct polarity and with connectors facing into the case.

Switch on the beltpack using the switch on the top. The LED will light up if the battery is good. Note that the LED will extinguish when the battery needs replacing. On the S3500 and S4000, the LCD will also display the current channel and bank - the bank is indicated at the bottom of the display.

- **Changing the Transmitting Channel:**

Slide down the side of the beltpack to reveal two small push button switches and a gain control.

Whilst the beltpack is switched on, press and hold the switch nearest to the base of the beltpack until **FrEq** is displayed on the LCD. Releasing the switch at this stage will advance the transmitting frequency to the next frequency in the current bank. Continuing to hold down the switch will scroll through the available frequencies in the current bank, and whatever frequency is displayed when the switch is released will be chosen as the transmitting frequency. This setting is stored in memory within the beltpack and will be retained even when the beltpack is switched off.

*The exact selection of channels available in each bank will depend on how the transmitter has been programmed in the factory. It can contain up to 32 unique channels, which can be arranged in up to 4 banks, but your transmitter will not necessarily contain this many channels or banks.*

- **Changing the Current Bank:**

Slide down the side of the beltpack and locate the two push button switches as described above.

Whilst the beltpack is switched on, press and hold the switch nearest the top of the beltpack until **BAnc** is displayed on the LCD. The current bank (displayed at the bottom of the LCD) will then scroll through the available banks (up to 4 in total). Release the switch when the desired bank is shown, and this will become the current bank. After changing the current bank, it will probably be necessary to choose the desired transmitting frequency from the new bank as described above. This setting, like the transmitting frequency, is stored in memory and will be retained even when the beltpack is switched off.

*As already mentioned above, the exact selection of banks available will depend on how the transmitter has been programmed in the factory. There can be up to 4 banks, but if there is only 1, this option will not be functional.*

- **Changing the Audio Gain:**

Slide down the side of the beltpack and locate the audio gain control. Adjust this to set the audio gain as required. Refer to the receiver instructions for details on how to optimise the gain of your system to best suit the application for which it is to be used.

## Frequency Guide:

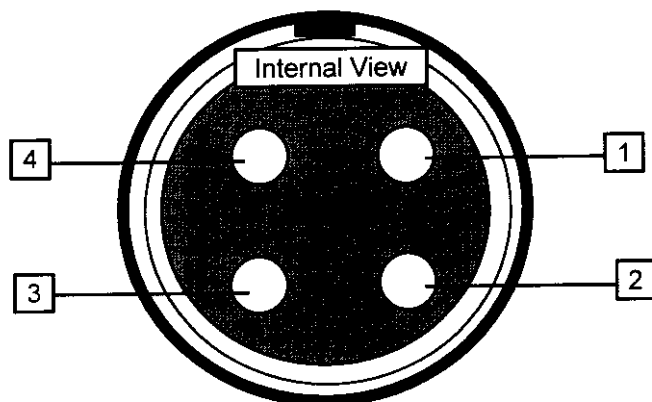
- **VHF:**

These units can be programmed anywhere between 174.000MHz and 216.000MHz subject to local licensing requirements as per part 74 sub-part H of the FCC Rules. The unit may be loaded with up to 32 channels as defined by your local distributor.

- **UHF:**

These units can be programmed anywhere in TV Channels 66,67,68,69 (US) (782.000MHz to 806.000MHz) subject to local licensing requirements as per part 74 sub-part H of the FCC Rules. The unit may be loaded with up to 32 channels as defined by your local distributor.

## Transmitter Lemo Connector Details:



### Pin Connections:

Pin 1 Ground  
Pin 2 +9v  
Pin 3 Audio/+9v  
Pin 4 Audio

#### Trantec TS259:

Pin 1 Screen  
Pin 2 Not connected  
Pin 3 White  
Pin 4 Not Connected

#### Trantec TS33:

Pin 1 Screen  
Pin 2 Not Connected  
Pin 3 White and Red  
Pin 4 Not Connected

#### Trantec TS44:

Pin 1 Screen  
Pin 2 Red  
Pin 3 Not Connected  
Pin 4 White

#### Trantec TS55:

Pin 1 Screen  
Pin 2 Red  
Pin 3 Not Connected  
Pin 4 White

#### Trantec TS912:

Pin1 Screen  
Pin 2 Red  
Pin 3 Not Connected  
Pin 4 Yellow

#### Sennheiser MKE2:

Pin 1 Screen  
Pin 2 Not connected  
Pin 3 Red  
Pin 4 Not Connected

#### Sony ECM77:

Pin 1 Screen plus Clear  
Pin 2 Not Connected  
Pin 3 Red  
Pin 4 Not Connected

#### Sanken COS-11PT:

Pin 1 Screen  
Pin 2 Black  
Pin 3 Not Connected  
Pin 4 White

#### Beyer MCE5:

Pin 1 Screen  
Pin 2 Red  
Pin 3 Not Connected  
Pin 4 Blue



## ***S3500 Technical Specifications:***

- **S3500RX:**

RF Frequency Range: 174-216Mhz (subject to FCC licensing requirements)  
Grid Spacing: 25KHz  
Switching Range: min 50Mhz, 2000 channel capability. 32 channel selectable  
Diversity Control: Microprocessor based Digital switching  
Antennae: Integral front mounted telescopic  
RF Sensitivity: 0.7uV for 12dB sinad  
IF Bandwidth: 100KHz max.  
Frequency Stability: > 7KHz (-10 to 45 °C)  
Nominal Deviation: 22KHz  
Audio Frequency Response: 30Hz -18KHz (-3dB)  
Distortion: < 0.3%  
Noise Reduction: complementary variable ratio compression/expansion with pre-emphasis / de-emphasis  
Dynamic Range: >110dBA  
Audio Outputs: ¼" Jack -4dBu unbalanced, XLR output -20dBm balanced  
Display : Multi-functional LCD with VU/ RF levels, Channel info, Mute info, User Name and function control menu  
DC input: 10.5 - 18V, 250mA Unregulated. Protected against reverse polarity  
Dimensions: 210 by 165 by 30mm  
Weight: 900g  
Meets the requirements of part 15, sub-part B of the FCC Rules

- **S3500LTX:**

Frequency Range: 174-216 (subject to FCC licensing requirements)  
Grid spacing: 25KHz.  
Switching Range: 50MHz, 2000 channel capability. 32 channel selectable  
Power Output: typically 20mW (50MHz -1dB). 2mW erp Deregulated channels  
Nominal Deviation: typically 22KHz  
Stability: >7KHz (-10 to 45 °C)  
Audio Frequency Response: 70Hz - 18KHz (-3dB)  
Audio Input: Lemo FGG304 pin1 0V, pin2 DC bias +9V, pin3 audio / DC bias, pin4 Ac coupled audio  
Audio level : +3dBu- -30dBu via adjustable gain control  
Input impedance: nominally 10K ohm  
Battery Type: 6LR61-MN1604 9V Alkaline  
Battery Life: > 10Hrs Typical consumption 45mA  
Dimensions: 60 by 25 by 95mm  
Weight: 100g  
Meets the requirements of part 74, sub-part H of the FCC Rules

- **S3500GTX:**

As above except:

Audio Input: Standard ¼" Jack socket.  
Audio Input Impedance: nominally 470K ohm  
Audio level: -10dBu to +10dBu fully adjustable  
Audio Frequency Response: 40Hz-18KHz.

- **S3500MTX:**

Technical spec as per S3500LTX except:

Microphone Head: AT MU-48C as standard, others available  
Microphone Gain Adjust: Digitally controlled with 26dB range in 10 steps  
Dimensions: Length 235mm including Windshield  
Weight: 200g

## ***S4000 Technical Specifications:***

- **S4000RX:**

RF Frequency Range: 782-866MHz TV Channels 66,67,68,69 (US) (subject to FCC licensing requirements)  
Switching Range: 24 MHz (-3dB) 960 channel capability 25KHz Grid spacing  
Diversity Control: Microprocessor based Digital Switching  
RF Sensitivity: 0.5uV for 12dB sinad minimum  
Image Rejection: 1st IF >75dB 2nd IF >70dB  
2nd IF Bandwidth : 100KHz.  
Frequency Stability: > 10KHz (-10 to 45 °C)  
Nominal Deviation : 22KHz  
Audio Frequency Response: 30Hz-18KHz (-3dB)  
Distortion: < 0.3%  
Noise Reduction: complementary variable ratio compression/expansion with pre-emphasis/de-emphasis  
Dynamic Range: >110dBA  
Audio Output Levels: ¼" Jack Output -0dBu unbalanced, XLR Output -20dBm balanced  
Display: Multi-functional LCD with VU/ RF levels, Channel info, Mute info, User Name and function control menu  
DC Input: 10.5 - 18V 250mA Unregulated. Protected against reverse polarity.  
Dimensions: 210 by 165 by 30mm  
Weight: 900G  
Meets the requirements of part 15, sub-part B of the FCC rules

- **S4000LTX:**

Frequency Range 782-866MHz TV Channels 66,67,68,69 (US) (subject to FCC licensing requirements)  
Grid Spacing: 25KHz  
Power Output: typically 30mW (24MHz -1dB)  
Nominal Deviation: typically 22KHz (UK)  
Stability: >7KHz (-10 to 45 °C)  
Audio Frequency Response: 70Hz - 18KHz (-3dB)  
Audio Input: Lemo FGG304 pin1 0V, pin2 DC bias +9V, pin3 audio/dc bias, pin4 Ac coupled audio  
Audio Level: +3dBu to -30dBu via adjustable gain control  
Input Impedance: nominally 10K ohm.  
Battery Type: 6LR61-MN1604 9V Alkaline  
Battery Life: > 10hrs Typical consumption 42mA  
Dimensions: 60 by 25 by 95mm.  
Weight: 100g  
Meets the requirements of part 74, sub-part H of the FCC rules

- **S4000GTX**

As above except:

Audio Input: Standard ¼" Jack socket.  
Audio Input Impedance: nominally 470K ohm  
Audio Level: -12dBu to +10dBu, fully adjustable  
Audio Frequency Response: 40Hz-18KHz

- **S4000MTX**

Technical spec as per S4000LTX except:

Microphone Head: AT MU-48C as standard (UK) others available  
Microphone Gain Adjust: Digitally controlled with 26dB range in 10 steps  
Dimensions: Length 235mm including Windshield. Antenna length 45mm  
Weight: 200G

## ***FCC Compliance:***

Transmitters comply with the requirements of part 74, sub-part H of the FCC rules and may require a license to operate.

Receivers comply with the requirements of part 15 of the FCC rules. Operation is subject to the condition that this device does not cause harmful interference.