

OPERATORS MANUAL

KYODO KG510 BASE/REPEATER



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1.0 INTRODUCTION

Thank you for purchasing a KYODO KG510 Base or Repeater.

We trust that it will operate reliably and give you years of service. If not, or if you wish to suggest ways of improving the KG510's operation, or features, we would welcome your comments.

2.0 FEATURES & PRODUCT DESCRIPTION

2.1 Features

- Simplex or two frequency Duplex operation
- EEPROM programmable with a PC computer
- Single Channel and 99 Channel Versions available
- Full Dot Matrix Liquid Crystal Display
- All FM Frequency Bands from 30 to 520 MHz
- Front Facing Speaker
- Transmit Time Limiter to prevent channel jamming
- TX and RX Encryption
- Two Channel Scanning Modes
- 5 Tone Encoder & Decoder plus DTMF Encoder & Decoder
- 22, 26, or 35 MHz switching bandwidth (model dependant)
- Up to 99 channels with Channel Labels
- Two-Stage Front End allows mixed Simplex and Duplex operation
- Channel selectable Wide or Narrow channel spacing
- CTCSS/DCS on a per channel basis
- 5 X 4 Keypad for Channel Change etc
- 2RU Equipment Cabinet
- Step-Up VCO Voltage for Superior Selectivity
- Low Stand-by Current is ideal for Solar Installations
- Watch Dog Timer

2.2 Product Description

The **Kyodo KG510** transceivers represent a quantum advance on the previous rugged & time proven KG110 transceiver. They comprise of separate modules all housed within one 2RU equipment cabinet. The receiver, the transmitter, and the PA Unit are each enclosed within their own diecast housing, that are then directly mounted on the large upper heat-sink. A μ Processor controlled interface module controls the channel selection, LCD Display, timers, interfaces, and signalling features.

Models are available for all FM commercial and military frequency bands from 30 MHz to 520 MHz, with channel selectable 12.5, 20, 25, or 30KHz channel spacing arrangements.

The RF Power Output is 70 Watts on a continuous duty basis. The CTCSS module supports all EIA tones. All tones and different encode and decode tones can be set on a per channel basis during radio programming.

The **KG510** includes 5 tone Selective Calling encoder/decoder with non-predictive decoder, as well as a DTMF encoder, and voice encryption. It supports normal all channel scanning and programmed channel scanning for base use.

The **KG510** is fitted with a large full dot matrix LCD that is used to display the Channel Numbers & Names, frequency & tone programmed information, and signalling information. All user interface keys and knobs are conveniently located on the front of the radio. All user entered functions are easily activated in a logical manner via the keypad.

The **KG510** is supplied with an "N" Type connector for the transmitter, and a TNC Connector for the Receiver to allow easy connection to the diplexer or feeder cables.

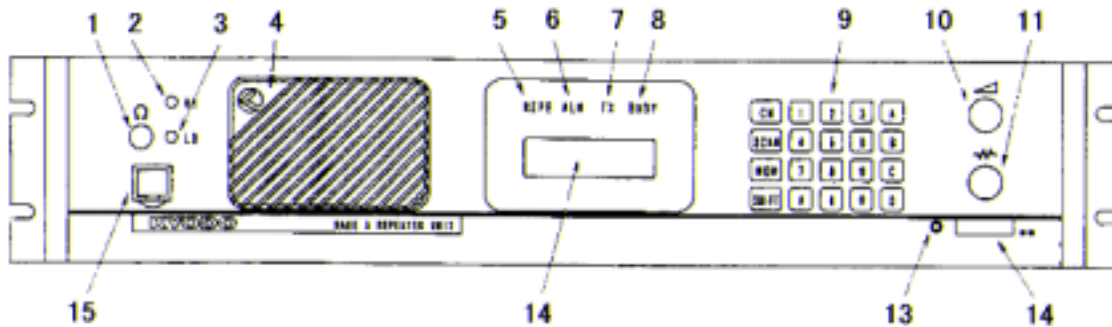
The rear panel includes a 9 way D sub connector for fitment of an external shared tone panel. Also included is a 25 way D sub connector that enables external interface to other radios or control equipment.

2.3 Standard Inclusions

The KG510 transceiver is supplied complete with the following items:
 KG510 transceiver
 DC Cable
 Operators Manual
 KD561 Hand Microphone

3.0 CONTROLS, INDICATORS, & CONNECTORS

3.1 Front Panel Controls



1. Headphone Socket
 This socket is provided to allow users to listen to the KG510 using headphones. Plugging a headphone into this socket will disconnect the built-in speaker. It does NOT include a microphone input, or TX PTT facility.
2. High TX Power
 This is a service point and is not used by the radio operators
3. Low TX Power
 This is a service point and is not used by the radio operators
4. Loud Speaker*
 The receiver audio signals are heard from this speaker (provided that the volume setting is loud enough and provided that the speaker has not been muted by one of the tone signalling formats).
5. Repeater Mode Indicator LED
 The Repeater Mode Indicator LED will illuminate "REP" in Yellow colour when the selected channel has been programmed for Repeater operation. This LED is NOT illuminated on any channel that is programmed to operate in Base mode.
6. Alarm Mode Indicator LED
 The Alarm Mode Indicator LED will illuminate (Flashing) "ALM" in Orange colour whenever the transceiver detects a fault in the receiver module, the transmitter module, or the PA module on the selected channel.

7. **Transmit Mode Indicator LED**
The Transmit Mode Indicator LED will illuminate "TX" in Red colour whenever the KG510 is transmitting.
8. **Busy Mode Indicator LED**
The Busy Mode Indicator LED will illuminate "RX" in Green colour whenever the KG510 receives a carrier signal on the selected channel that is greater than the Squelch setting.
9. **Keypad***
The 5x4 key Keypad is used to enter channel selection, tone information, and other data into the KG510. Specific key sequences are described fully in section 4 of this document. It includes the following keys: CH, SCAN, MON, SHIFT, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, *, #, A, B, C, and D.
10. **Volume Control***
The Volume Control is used to set the audio output level from the loudspeaker. Rotate this knob clockwise to increase the audio level, or counter-clockwise to reduce the audio level.
11. **Squelch Control***
The Squelch Control is used to set the squelch threshold. Select a channel that is not being used and slowly rotate this knob clockwise until the annoying background noise ceases. It may be desirable to rotate this knob clockwise slightly past the squelch threshold to compensate for varying background noise levels.
12. **Power ON/OFF Switch**
The Power ON/OFF Switch is used to switch the KG510 "ON" or "OFF". Press this knob to switch the KG510 "ON". Press this knob again to switch the KG510 "OFF". This knob is slightly more depressed when in the "ON" position.
13. **Power On Indicator LED**
The Power ON Indicator LED will illuminate in Green colour whenever the Power ON/OFF switch is switched to the "ON" position.
14. **Liquid Crystal Display (LCD)***
The LCD comprises of four (4) lines each of which is capable of displaying twenty-one (21) characters.

The first line, in normal operating condition, displays the strength of the signal being received on the selected channel as a bar graph.

The second line displays the strength of the transmitting power as a bar graph.

The third line displays the selected channel number (up to four characters) in the first five left hand character spaces, and displays the channel name (up to eight characters) in the next eight character spaces.

The following characters may be used in the channel name:

0-9, A-Z, a-z, / + - # ! \$ % () = [] < > ? and space

This area of the LCD is left blank when channel names are not used.

The six character spaces on the right hand side of this line are used to display status symbols as follows:

- a. The monitor status. --- symbol is
- b. The key lock status. --- symbol is
- c. The tone encode status. --- symbol is ϕ
- d. The scan mode status. --- symbol is
- e. The high power transmit status. --- symbol is
- f. The [SHIFT] key status. ---This symbol is displayed whenever the [SHIFT] key is held depressed.

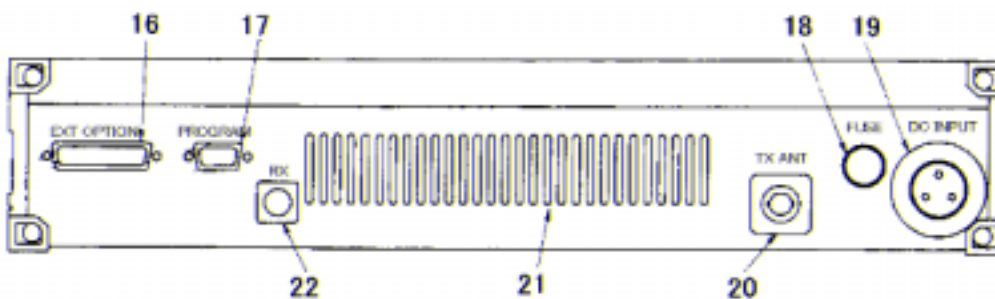
The fourth line displays (in the left hand four character spaces) the type of tone signalling system selected by the user. e.g. "5TON" means 5 Tone signalling while DTMF means Dual Tone Multi Frequency signalling.

The right hand sixteen character spaces are used to display data that the user enters (e.g. 5 Tone calling sequences). These character spaces are also used by the KG510 to display messages and information directed to the user.

- 15. Microphone Input Socket
Connect the supplied Kyodo KD561 microphone into this socket.

* Not used on the Single Channel Model

3.2 Rear Panel Connectors



- 16. 25 way External Options Connector
- 17. 9 way Programming Connector
- 18. DC Input Fuse Holder
- 19. 3 way DC Input Socket
- 20. TX/Antenna Connector (N type)
- 21. Ventilation Slots
- 22. RX Connector (BNC type)

4.0 OPERATION

4.1 Installation and Programming

As the KG510 can be installed to operate as either a Base Station or as a Repeater, some of the instructions in this document may apply to one application only, some may apply in both cases, while others may only apply if the particular function has been enabled during programming of the KG510.

The KG510 must be programmed before it will operate correctly. This is best done by the equipment supplier or a competent radio tradesman. They will require the Kyodo 51BS programming software to do this correctly.

It is important that the KG510 be correctly installed at its working location. It is recommended that this be done by a competent radio tradesman.

As a minimum, it is necessary to:

- Connect the DC Input power lead to a suitable 13.8 Volt Regulated DC Power supply that has sufficient capacity. (Ensure that the DC Polarity is correct).
- Connect the two antenna connectors to suitable antennas. (Ensure that the VSWR of the antennas is correct).
- Insert the Kyodo KD561 Microphone into the microphone connector on the front panel.

4.2 Basic Operation

4.2.1 Switch On

Switch the KG510 "ON" by pressing the knob (12) and then check that the LED indicator (13) is illuminated.

4.2.2 Adjust the Volume Setting

Rotate the Volume Knob (10) clockwise (from the fully counterclockwise position) until the audio level from the speaker is suitable.

4.2.3 Adjust the Squelch Setting

Rotate the Squelch Knob clockwise (from the fully counter clockwise position) slowly until the background noise can no longer be heard. It is wise to slightly rotate the knob further in the clockwise direction (so that variations in the background noise level do not "break" the squelch setting and cause annoying squelch noises to be heard from the speaker).

4.2.4 Select the Channel

Select the required channel by pressing the [SHIFT] key followed by the channel number keys within two seconds. E.g. [SHIFT] + [0] + [1] to select channel #1. The LCD Display should now display CH01 and (if programmed with a channel label) the channel name: "CH01 Kyodo-co".

4.2.5 Receiving

You should now be able to hear any radio traffic that occurs on channel #1 on the KG510. It may be necessary to further slightly adjust the Volume setting to suit your listening requirements.

4.2.6 Transmitting

Depending on the legal requirements in your country, and the operating requirements within your organisation, it may be necessary to announce your Call Sign, and will probably be necessary to announce the Call Sign of the party you are calling at the start of your transmission.

When transmitting, it is necessary to hold the microphone about 75mm (3") from your mouth and speak clearly into the grill of the microphone.

It is also necessary to press and hold the Press To Talk (PTT) bar on the side of the microphone depressed while speaking into the microphone.

4.3 Front Panel Operation

This section describes most signalling and other advanced features that are available on the KG510 Transceiver. The availability of some features is dependent on the programming of the transceiver. You may find it worthwhile to discuss these features in detail with your radio supplier to obtain a full understanding of their benefits.

4.3.1 Keypad Operation

The Keypad is the interface between the user and the KG510 and is used to enable or disable various functions, and to enter the required data for signalling purposes.

(5-Tone) or (DTMF) shown after the described feature indicates that the described feature applies to the particular signalling format.

The following keys are used for these purposes:

- [0] - [9] Entering new channel numbers
Entering the "KILL" password
Entering signalling encoding numbers (5-Tone) (DTMF)
Entering DTMF numbers (DTMF)
- [A] Advancing the KG510 to the next higher channel
Entering the signalling "A" tone (5-Tone) (DTMF)
Encodes the "A" Tone (DTMF)
- [B] Advancing the KG510 to the next lower channel
Entering the signalling "B" tone (5-Tone) (DTMF)
Encodes the "B" Tone (DTMF)
- [C] Entering the signalling "C" tone (5-Tone) (DTMF)
Encodes the "C" Tone (DTMF)
- [D] Entering the signalling "D" tone (5-Tone) (DTMF)
Encodes the "D" Tone (DTMF)
- [] Displays the previously entered encode numbers (5-Tone) (DTMF)
Encodes the " " -Tone (DTMF)
- [#] Encodes the signalling numbers that are displayed in the LCD display (5-Tone) (DTMF)
Encodes the "#"-Tone (DTMF)
- [CH] Used with two channel numbers [0] - [9] to change the active channel on the KG510. E.g. [CH]+[9]+[0] will change the active channel to Channel 90 (provided Ch 90 has been programmed into the KG510).
- [SCN] Used to place the KG510 into the "All-Scan" mode where the KG510 will scan all programmed channels. Pressing the [SCN] key again will cause the KG510 to exit from the "All-Scan" mode.
- [MON] Switches the KG510 between "Monitor ON" mode and "Monitor OFF" mode and is used to "Un-mute" the radio when using selective calling (depending on the programming of the KG510 transceiver).

4.3.2 Keypad Operation using the [SHIFT] Key

Some of the KG510's features and how it operates can be changed by using the [SHIFT] key. To make these changes, it is necessary to firstly press the [SHIFT] key followed by the other keys within a two second timeframe.

The following key sequences are used for these purposes:

- [SHIFT]+[0] Toggles the tone system between 5-Tone signalling and DTMF signalling.
- [SHIFT]+[1] Switches the LCD back-light ON or OFF.
- [SHIFT]+[2] Toggles the transmitting power between High power and Low power.
- [SHIFT]+[3] Invalid Key.
- [SHIFT]+[4] Toggles between "Single Tone Encoding" mode and "5-Tone" or "DTMF" signalling mode.
- [SHIFT]+[5] Invalid Key
- [SHIFT]+[6] Enters the KILL mode to allow entry of the KILL password.
- [SHIFT]+[7] Displays the programmed information for the selected (active) channel in the LCD display.
- [SHIFT]+[8] Locks or Unlocks the KG510's Keypad.
- [SHIFT]+[9] Toggles the KG510 between "Normal Channel Scanning" mode and "Priority Channel Scanning" mode.
- [SHIFT]+[A] Restores a channel to the Channel Scanning List. (The user must firstly select the channel to be restored as the active channel).
- [SHIFT]+[B] Invalid Key
- [SHIFT]+[C] Indicates to the KG510 that you have entered the last number of a DTMF encoding sequence.
- [SHIFT]+[D] Invalid Key
- [SHIFT]+[] Deletes the active channel from the Channel Scanning List.
- [SHIFT]+[#] Will attach the "R-Number" data to the active encode number and transmit the whole sequence.
- [SHIFT]+[CH] Will start or stop the display of the TX and RX bar graphs in the LCD display.
- [SHIFT]+[SCN] Will place the KG510 in the Program Scan mode or exit from the Program Scan mode.
- [SHIFT]+[MON] Invalid Key.

4.3.3 Changing Channels

To change to another channel, simply press the [CH] key followed by the number of the required channel within two seconds.

e.g. To select Channel # 8, press [CH] [0] [8]
To select Channel # 99, press [CH] [9] [9]

Note that it is always necessary to enter two digits for the Channel Number.

The channel # location displayed in the LCD will become blank as soon as the [CH] key is pressed, and the cursor will blink at the location of the channel number, and display the new numbers as they are entered.

It is also possible to change channels by using the [A] and [B] keys instead of entering the channel numbers.

Pressing the [A] key will advance the channel to the next higher programmed channel, while pressing [B] will advance the channel to the next lower programmed channel.

Note that this action will ignore channels that have **not** been programmed into the KG510. Accordingly, the LCD display may appear to advance more than one channel if the missed channel is not programmed into the KG510.

4.4 Signalling

The KG510 includes some very sophisticated signalling capabilities. We suggest that you have your radio supplier conduct some training on the use of these capabilities prior to using them.

While it is possible to use these signalling capabilities in both repeater mode, and in base station mode, many will only be useful in practice when the KG510 is used in base station configuration.

The KG510 supports the 5-Tone sequential, and/or the DTMF, and the Single Tone signalling formats. The required signalling format(s) must be enabled when the KG510 is programmed.

4.4.1 5-Tone Signalling

4.4.1.1 Available Tones

5-Tone signalling is commonly referred to as Selective Calling (or Selcall) and usually comprises of a series of 5 tones sequentially transmitted or received in accordance with certain international standards. It is possible to use longer sequences to enhance the signalling capabilities and to provide further functions.

Accordingly, the KG510 will encode up to sixteen (16) tones and decode up to eight (8) tones.

These tones can be any of the following:

[0] - [9], and [A] - [D]

The most recently entered tone can be recalled and deleted by pressing the [] key repeatedly.

4.4.1.2 Entering a 5-Tone Encode Sequence

When switched "ON", the KG510 carries out its self-test routine, and then waits ready to accept 5-Tone encode numbers. Accordingly, it is only necessary to enter the required 5-Tone digits directly using the keypad, and then pressing the [#] key to transmit the 5-Tone sequence. (Up to sixteen digits can be entered).

If it is necessary to enter the "R" number sequence to activate the repeater, the [SHIFT] key must be pressed before pressing the [#] key.

If a 5-Tone number is NOT displayed in the LCD, and the [#] key is pressed, then the KG510 will recall the most recent 5-Tone number and transmit it.

4.4.1.3 Recalling the last encode sequence

Pressing the [] will recall the most recent 5-Tone encode sequence and display the sequence in the LCD display. Further presses of the [] key will delete the last digit of the sequence until all digits are deleted. In practice users will usually delete the last one or two digits before entering the new digits.

4.4.2 DTMF Signalling

4.4.2.1 Available Tones

The following DTMF tones can be used:

[0] - [9], [A] - [D], [], and [#]

NOTE: Tone [B] is NOT available if the "Attach Decode No" field in the DTMF Encode Menu has been set to "ON".

Up to sixteen (16) DTMF digits can be encoded in one calling sequence.

4.4.2.2 DTMF Tone Entry

There are two methods of entering DTMF tones. The specific tone encoding format is selected during the programming of the KG510 transceiver in the <Main Menu><Encode Set><DTMF Encode><Attach Decode No.> field.

4.4.2.2.1 Attach Decode No. "OFF" format

Pressing the PTT lever first automatically selects the DTMF encoding format and allows direct entry of DTMF tones.

Hold the PTT lever on the microphone depressed while pressing the required DTMF tones. The tones will be transmitted as the keys are being pressed.

4.4.2.2.2 Attach Decode No. "ON" format

Attach Decode No. "ON" automatically encodes the users DTMF decode number after the encode number. This can be used for ANI purposes.

Enter the required DTMF tones (up to sixteen tones except "B" tone) and then transmit the total tone sequence (including the users decode number) by pressing the [#] key. All tones will be transmitted in one continuous sequence after pressing the [#] key.

Pressing the [] key will delete the last entered number.

Always confirm that the LCD is clear before proceeding as it may take up to 5 seconds for the tones to be sent.

e.g. Assume that your decode number is 12345, and that you wish to encode number 12346. You will input 12346, and then press the [#] key. The KG510 will encode 12346B12345. The called radio will display 12345 in their LCD indicating the calling party's number is 12345.

NOTE: The "B" tone is used as the delimiter in this encoding format and therefore CANNOT be used as a DTMF tone.

Pressing the [SHIFT] key and then the [#] will encode ONLY the encode number (and not the decode number).

4.4.2.3 Redialling with DTMF

If during the programming of the KG510, the <Attach Decode No> field has been set to "OFF", the redialling function operates as follows:

Press [SHIFT], then press [#] and the KG510 will redial the last encoded DTMF number.

If during the programming of the KG510, the <Attach Decode No> field has been set to "ON", the redialling function operates as follows:

Press [#] and the KG510 will redial the last encoded DTMF number **with** the KG510's programmed decode number.

Press [SHIFT], and then press [#] and the KG510 will redial the last encoded DTMF number **without** the KG510's programmed decode number.

4.4.2.4 Restoring the last DTMF number to the LCD Display

It is possible to restore the last encoded DTMF number to the LCD display, provided the <Attach Decode No> field has been set to "ON" during the programming of the KG510 transceiver.

Confirm that the LCD is NOT displaying any DTMF numbers, then press [*] and the last encoded DTMF number will be displayed in the LCD display.

It is possible to edit this number at this time by pressing the [*] key (which will erase the last number) or by pressing the required keys to add additional numbers.

4.4.2.5 Encoding DTMF numbers with the 5-Tone system enabled

It is possible to enter DTMF numbers even with the 5-Tone system enabled. This function must be enabled during the programming of the KG510 by setting the <DTMF Encode> field in the <5Tone Encode Menu> to "ENABLE".

To enter a DTMF number (with 5-Tone signalling enabled), the user must press the PTT lever while entering the first DTMF number. Second and subsequent numbers do NOT require the PTT lever to be pressed provided all numbers are entered within a few seconds (before the display reverts to 5-Tone mode and displays "5TON" in the LCD display).

4.4.3 Single Tone Encoding

The KG510 has the ability to encode one of six single tone frequencies for 1, 2, 3, or 4 seconds. This function is enabled during programming of the KG510 by selecting the <Single Tone ON> field in the <Encode Menu> and setting the encode period.

Press the [SHIFT] and the [4] keys to put the KG510 into Single Tone Encoding mode. "S1" and the tone frequency ("xxxxHz") will be displayed in the tone area of the LCD display for about 4 seconds until the KG510 reverts back to the normal signalling mode.

While the KG510 is in Single Tone Encoding mode, it is possible to advance to the next tone frequency by pressing the [A] key, or to return to the previous tone by pressing the [B] key.

Pressing the [#] key will encode the displayed tone (for the programmed time period) and automatically exits the Single Tone Encoding mode and returns the KG510 to the normal signalling mode.

4.4.4 KILL Signalling

The KG510 has the ability to transmit a specially coded signalling sequence that will disable ("KILL") another radio. This feature is particularly useful when transceivers become misplaced, are stolen, if they are used in an incorrect manner, or if they are used for the wrong purposes.

To prevent accidental or mischievous "KILLING" of radios, several security features are in place.

Firstly, the KG510 must have this function enabled during programming.

Secondly, the user must know the required password and enter it correctly into the KG510, and,

Thirdly, the user must know the required "KILL" number (of the radio to be "KILLED", and enter it correctly into the KG510.

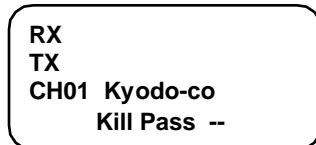
The "KILL" password has four numerical digits. [0] to [9].

With 5-Tone signalling systems, the "KILL" number for a particular radio comprises of the radio's decode number + D + the radio's KILL number.

With DTMF signalling systems, the "KILL" number for a particular radio comprises of the radio's decode number + A + the radio's KILL number. In the case of DTMF signalling, both the decode number and the KILL number must have more than four digits.

4.4.4.1 Kill Signalling Operation

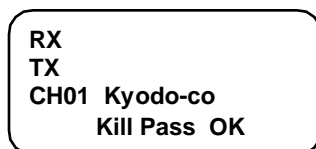
Press [SHIFT] and the press [6] to place the KG510 into the KILL mode. The LCD display will indicate that the KG510 is in the KILL mode



RX
TX
CH01 Kyodo-co
Kill Pass --

Enter the required password by entering the correct four digit number.

If the password has been correctly entered, the LCD display will show this message:

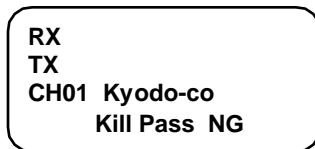


RX
TX
CH01 Kyodo-co
Kill Pass OK

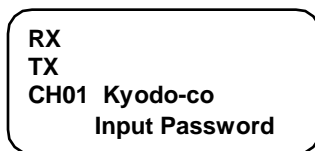
Then enter the "KILL" data from the keyboard that comprises of the decode number + D + the KILL number of the radio to be "KILLED". (In the case of DTMF signalling, it will be necessary to substitute the "A" tone instead of the "D" tone).

Then press [#] to transmit the data.

If the incorrect password has been entered, the LCD display will show the following message:



If you enter the "KILL" data prior to entering the KILL password, and then press the [#] key, the LCD display will show the following message:



If the incorrect password has been entered more than the allowed number of tries, then the KG510 becomes disabled and the following message is displayed in the LCD display:



In such cases, it is necessary to return the KG510 to your radio supplier to have the KG510 repaired.

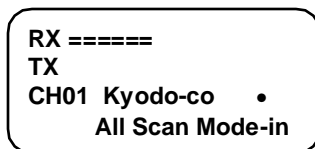
4.5 Scanning

The KG510 is supplied with two scanning modes. These are All Channel Scan mode in which the KG510 will scan all channels that are programmed into the KG510, and the Program Channel Scan mode in which the KG510 will scan only the channels that have been designated during the programming of the KG510 transceiver.

Furthermore, one HIGH priority, and one LOW priority scan channel can be set for each scan mode during the programming of the radio.

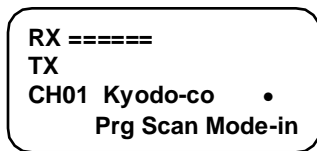
4.5.1 All Channel Scan Operation

Pressing the [SCAN] key places the KG510 into All Channel Scan mode and the Scan mode symbol " " is displayed in the LCD display. Also the LCD will display "All Scan Mode-in" for two seconds as shown below:



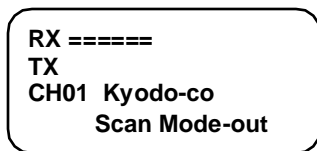
4.5.2 Program Channel Scan Operation

Pressing the [SHIFT] and then the [SCAN] key places the KG510 into Program Channel Scan mode and the Scan mode symbol " " is displayed in the LCD display. Also the LCD will display "PRG Scan Mode-in" for two seconds as shown below:



4.5.3 Exiting All Channel Scan and Program Channel Scan modes

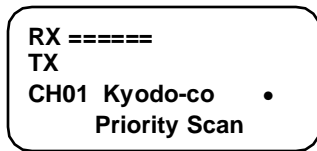
Pressing the [SCAN] key will take the KG510 out of either scanning mode and return the KG510 to normal mode. The scan symbol " " will be removed from the LCD display and the LCD will display "Scan Mode-out" for two seconds as shown below:



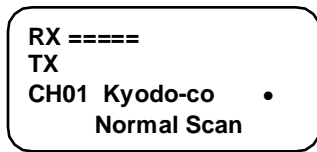
4.5.4 Priority Scanning

The KG510 allows users to firstly enter the required scanning mode, and then they can enable Priority Scanning for the particular scanning mode chosen.

Pressing the [SHIFT] key and then the [9] key places the KG510 into Priority Scanning mode as shown below:



Pressing the [SHIFT] and the [9] keys again will take the KG510 out of Priority Scan mode and return to the Normal Scan mode as shown below:



4.5.5 Removing an Active Channel from the Scan List

It is possible to temporarily delete an active channel from the scan list by pressing [SHIFT] and the [] key and holding the [SHIFT] and the [] keys depressed for more than one second. More than one channel can be deleted from the Scan list, provided that at least one channel remains in the Scan List.

A "beep" sound from the radio confirms correct deletion of the channel from the scan list.

This function CANNOT be used in the Priority Scan mode.

The KG510 automatically restores all channels to their respective scanning list as soon as the KG510 exits from the scan mode.

4.5.6 Restoring Channels to the Scan List

Channels can be restored to the scanning list without exiting from the scan mode by pressing the [SHIFT] key and pressing and holding the [A] key depressed for more than one second.

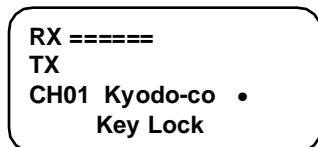
This action will restore all channels to the scan list.

This action CANNOT be used in the Priority Scan mode.

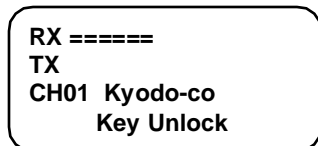
4.6 Locking the Keypad

Pressing the [SHIFT] key and then the [8] key will lock all keys (except the [SHIFT] and [MON] keys) on the KG510's keypad to prevent accidental or inadvertent entry of data.

After pressing the [SHIFT] and [8] keys the keypad becomes locked and the Key-Lock symbol is displayed in the LCD display. The display also shows "Key-Lock" for two seconds as shown below:



Pressing [SHIFT] and [8] again will Unlock the keypad, remove the Key-Lock symbol from the LCD display, and display "Key-Unlock" in the LCD display for two seconds as shown below:



4.7 Changing Tone Signalling Systems

It is possible to switch the KG510's tone signalling system among 5-Tone sequential signalling, DTMF signalling and Non(No-Tone system) (providing the <Miscellaneous Menu> <Tone System Change> field was set to "ENABLE" during the programming of the KG510).

Press [SHIFT] and keep depressed the [0] key for more than one second to change among 5-Tone system, DTMF system and Non and indicate new signalling system in the LCD display as follows:

```

RX =====
TX
CH01 Kyodo-co
      System is DTMF
  
```

Pressing [SHIFT] and pressing the [0] key for more than one second again will change next the signalling system and indicate new signalling system in the LCD display as shown below:

```

RX =====
TX
CH01 Kyodo-co
      System is Non
  
```

4.8 Displaying the Channel Information

The KG510 can display information pertaining to the selected channel (provided that the <Miscellaneous Menu> <Information Display> field was set to "ENABLE" during the programming of the radio.

This information is:

- The RX frequency of the selected channel.
- The TX frequency of the selected channel.
- The channel spacing for the selected channel (Wide or Narrow).
- The operating mode for the selected channel (Base, Repeater, simplex, duplex)
- The RX CTCSS/DCS tone for the selected channel (provided CTCSS/DCS has been programmed for use on the selected channel).
- The TX CTCSS/DCS tone for the selected channel (provided CTCSS/DCS has been programmed for use on the selected channel).
- The tone encoding format (providing 5-Tone signalling was selected during programming of the KG510).
- The tone set (providing 5-Tone signalling was selected during programming of the KG510).
- The ANI mode.
- The tone decoding set (provided 5-Tone or DTMF signalling was selected during programming of the KG510).
- The decode number (provided 5-Tone or DTMF signalling was selected during programming of the KG510).

To view this information in the LCD display, firstly select the required channel. Then press the [SHIFT] key and then the [7] key. You will need to keep the [7] key pressed until the KG510 has cycled through the information steps.

This function is NOT available if the <Miscellaneous Menu> <Information Display> field has been set to "DISABLE" during the programming of the KG510.

4.9 Display of Received Tone Frequencies.

It is possible to set the KG510 to display the received tone frequencies in the LCD display in the area normally used to display the strength of the received signals.

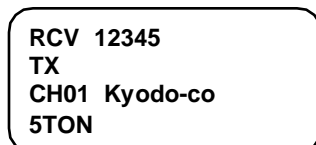
Press [SHIFT] and then press [D] to enable this function.

Once enabled, the LCD will show "RCV" in the area of the LCD display that normally shows the strength of the received signal, as well as "Tone Display on" for two seconds as shown below:



RCV
TX
CH01 Kyodo-co
Tone Display On

Then, whenever a tone frequency is decoded, the frequency number will be displayed in the LCD display to the right of "RCV" as shown below:



RCV 12345
TX
CH01 Kyodo-co
5TON

Pressing the [SHIFT] key and then the [D] key once again will disable this function and return the LCD display to normal as shown below:



RX
TX
CH01 Kyodo-co
Tone Display Off

4.10 Bar Graph Displays

The KG510 will normally show the strength of the received signal to the right of "RX" in the LCD display, and the strength of the transmitted signal to the right of "TX" in the LCD display, both in the form of a bar graph.

This function can be disabled by pressing the [SHIFT] key and then the [CH] key. The LCD display will indicate "RX Display Off" and "TX Display Off" as shown below:



RX Display Off
TX Display Off
CH01 Kyodo-co

Pressing the [SHIFT] key and then the [CH] key once again will return the KG510 to normal and the LCD display will show the normal bar graph display for both the RX signal strength and TX signal strength.

4.11 LCD Display Back Light

The LCD Display has a Back-Light to illuminate the display. It normally switches "ON" whenever any key or the PTT lever is pressed, and will remain illuminated for five seconds after the most recent key press. Some users may prefer the Back-Light to remain illuminated to assist viewing the LCD display in poor viewing situations.

Press the [SHIFT] key and then press the [1] key for more than one second and the LCD Back-light will remain illuminated.

Once again, press the [SHIFT] key and then press the [1] key for more than one second and the LCD Back-light will revert to normal operation.

4.12 Transmit Power Change

It is possible to change the KG510's transmit power from the high power setting to the low power setting from the keypad and vice versa (provided that this function has been enabled during the programming of the KG510).

To enable this function, the <Miscellaneous Menu> <TX Power Change> field must be set to "ENABLE".

Press the [SHIFT] key and the [2] key and the KG510 will change from the high transmit power setting to the low transmit power setting, and the " " symbol will be removed from the third line of the LCD display.

Press the [SHIFT] key and the [2] key a second time, and the KG510 will change from the low transmit power setting to the high transmit power setting, and the " " symbol will be displayed in the third line of the LCD display.

If this function is NOT required, the <Miscellaneous Menu> <TX Power Change> field must be set to "DISABLE".

4.13 Calling Party ID Display

The KG510 has the capability to display a calling radio's ID (ANI) number after being called. When the KG510 is called, "CALL" will be displayed on the fourth line of the LCD display (and continue to flash) and the calling radio's ID number will be displayed to the right of "CALL" as shown below:



RX
TX
CH01 Kyodo-co
CALL 12346

If the KG510 user presses the [#] key (when "CALL" is flashing and the caller's ID number is displayed), the KG510 will automatically call the identified radio.

In the case of 5-Tone signalling systems, this function is enabled in the <5Tone Encode Menu> <Encode Format> field, by selecting one of the following parameters:

- "Encode + B + Decode"
- "Encode + A.Pause + Decode"
- "Decode + A.Pause + Encode"
- "Encode + ANI"

In the case of DTMF signalling systems, this function is enabled by setting the <DTMF Encode Menu> <Attach Decode No> field to "ON" during the programming of the KG510.

4.14 Displaying any Radio's ID Number

The KG510 has the capability to display any calling radio's ID (ANI) number. When the KG510 receives an ANI number, "DISP" will be displayed on the fourth line of the LCD display (and continue to flash) and the radio's ID number will be displayed to the right of "DISP" as shown below:



RX
TX
CH01 Kyodo-co
DISP 1234

In the case of 5-Tone signalling systems, this function is enabled by setting the <5Tone Decode Menu> <ANI Receive> field to "ON" during the programming of the KG510.

In the case of DTMF signalling systems, this function is enabled by setting the <DTMF Decode Menu> <ANI Receive> field to "ON" during the programming of the KG510.

4.15 Emergency Caller Display

The KG510 has the ability to accept and display emergency calls from other radios within the radio system

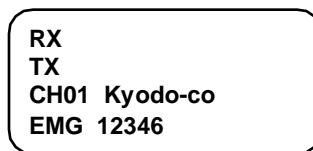
This function is enabled by setting the <Emg Call Receive> field to "ON" in the <5Tone Decode Menu> or <DTMF Decode Menu> during the programming of the radio.

The calling (Emergency) radio must encode its emergency data in the following format:

"000" + the calling radio's ID (decode number).

This format applies to both 5 Tone and DTMF signalling systems.

When the KG510 receives an emergency call, the KG510 will sound a warning tone from the speaker, display "EMG" (flashing) in the fourth line of the LCD display, and display the emergency radio's ID to the right of "EMG" as shown below:



RX
TX
CH01 Kyodo-co
EMG 12346

Upon receipt of an emergency call, the KG510 will automatically respond to the emergency radio by sending the emergency radio's ID number to it.

If the KG510 user presses the [#] key, the KG510 will resend the emergency radio's ID number.

While the KG510 is in the Emergency Mode, all keys (except the [#] key) on the keyboard become disabled.

Pressing the [SHIFT] key and the [] key will return the KG510 to the normal operating mode.

4.16 Automatic Transmit in Repeater Mode

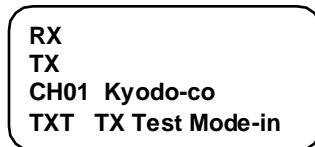
The KG510 can be programmed to automatically repeat valid incoming messages. Firstly, the active channel of the KG510 must be programmed to operate as a repeater. It must then receive a carrier frequency on the designated channel. If the KG510 has been programmed for CTCSS or DCS operation, it must also receive a valid CTCSS or DCS tone. It will then automatically retransmit any received signals.

When the KG510 ceases to receive a carrier frequency, or a valid CTCSS or DCS tone, it activates the <Auto TX Reset Time> timer. This will keep the KG510 repeating (for up to 9.9 seconds depending on the programming of the KG510), and allow other users with a valid CTCSS or DCS tone to access the repeater.

4.17 TX Test Mode

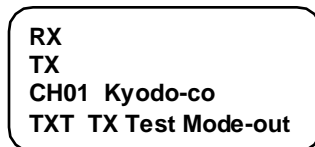
The KG510 is provided with a TX (Transmit) Test Mode. When the KG510 is placed in the TX Test Mode, it will transmit a carrier frequency modulated with a 1KHz tone on the selected active channel. It is possible to change channels while in TX Test Mode.

Pressing the [SHIFT] key and then the [B] key places the KG510 in TX Test Mode and displays the message in the LCD as shown below:



RX
TX
CH01 Kyodo-co
TXT TX Test Mode-in

Pressing the [SHIFT] key and the [B] key a second time will return the KG510 to normal mode and displays the message in the LCD as shown below:

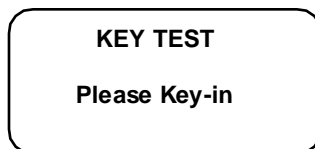


RX
TX
CH01 Kyodo-co
TXT TX Test Mode-out

4.18 Keypad Test Mode

The KG510 is provided with a Keypad Test Mode that allows the user to electrically test all keypad keys as well as the PTT Key.

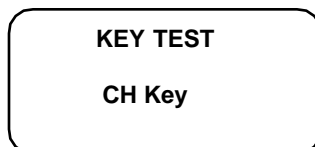
Holding the [C] key pressed while switching the POWER SWITCH "ON" places the KG510 in Keypad Test Mode and displays the message in the LCD Display as shown below:



KEY TEST
Please Key-in

Then press the keys to be tested one at a time. The respective key will be displayed in the LCD when the key is operating correctly.

e.g. If you press the [CH] key, the LCD Display will indicate correct operation as shown below:



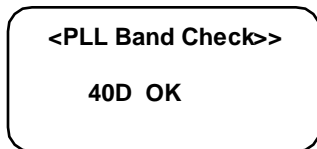
KEY TEST
CH Key

Switch the KG510 "OFF" to exit this Keypad Test Mode.

4.19 Frequency Band Test Mode

It is possible to display the KG510's operating Frequency Band in the LCD display when in Frequency Band Test Mode.

Holding the [B] key pressed while switching the POWER SWITCH "ON" places the KG510 in Frequency Band Test Mode and displays the operating Frequency Band in the LCD Display as shown below:

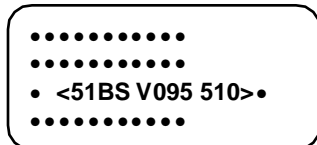


"40D" indicates the frequency band for a particular KG510 radio.

Switch the KG510 "OFF" to exit the Frequency Band Test Mode.

4.20 Starting Message

When the KG510 is Switched "ON", it will display a Starting Message in the LCD display for two seconds. The default Starting Message (using all dots) is shown below:



A personalised message for your business may be shown as the Starting Message. If you require a personalised message, then it should be entered in the <Miscellaneous Menu> <Starting Message> field during the programming of the radio. Such a message is shown below:

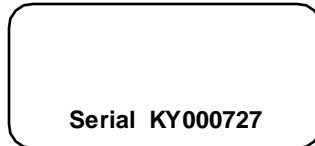


4.21 Serial Number Display

It is possible to display the KG510's Serial Number in the LCD Display. To do so, the Serial Number must be entered into the <Configuration Menu> <Serial No.> field during the programming of the radio. The serial number can be up to eight characters long and can comprise of any of these characters:

"A - Z" & "0 - 9".

Holding the [D] key pressed while switching the POWER SWITCH "ON" places the KG510 in Serial Number Display Mode and displays the KG510's Serial Number in the LCD Display as shown below:



Switch the KG510 "OFF" to exit from the Serial Number Display Mode.

4.22 EEROM Data Check Mode

As soon as the KG510 is switched "ON", it will automatically read and check all the data in the EEROM.

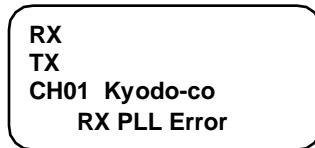
If this check finds damaged or corrupted data, the KG510 will automatically enter the Programming Mode and display the following message in the LCD Display:



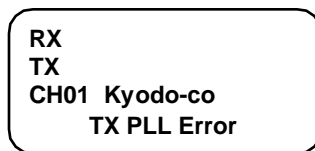
Should this happen, it is necessary to return the KG510 to your radio supplier or to a competent radio trades-person who has the facilities to reprogram the KG510.

4.23 Hardware Error Detection

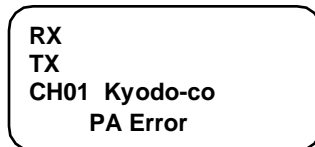
The KG510 automatically tests for certain hardware faults or failures, and when a fault is found, it will blink the "ALM" LED display above the LCD Display and indicate the nature of the fault in the LCD Display as shown below:



This figure indicates an RX PLL error.



This figure indicates a TX PLL error.



This figure indicates a PA error.

Should the KG510 indicate any of these errors, then it is necessary to return the KG510 to your radio supplier or to a competent radio trades-person to have the fault remedied.

4.24 RS232C Communications Error

If a fault is encountered during programming of the KG510, one of the following messages may be displayed in the LCD Display:

- Over Run Error
- Framing Error
- Parity Error
- Unknown Command
- Data Unmatch
- Send Error
- Answer Timeout
- Receive Timeout

Please switch the KG510 "OFF", and then back "ON", and retry reprogramming the KG510 again, should any of the above error messages be displayed in the LCD Display.