

FYLDE MICROSYSTEMS Ltd

Technical Manual
for

TK255/355 Test Modes

for version 0.99 Portable
software

Prepared by

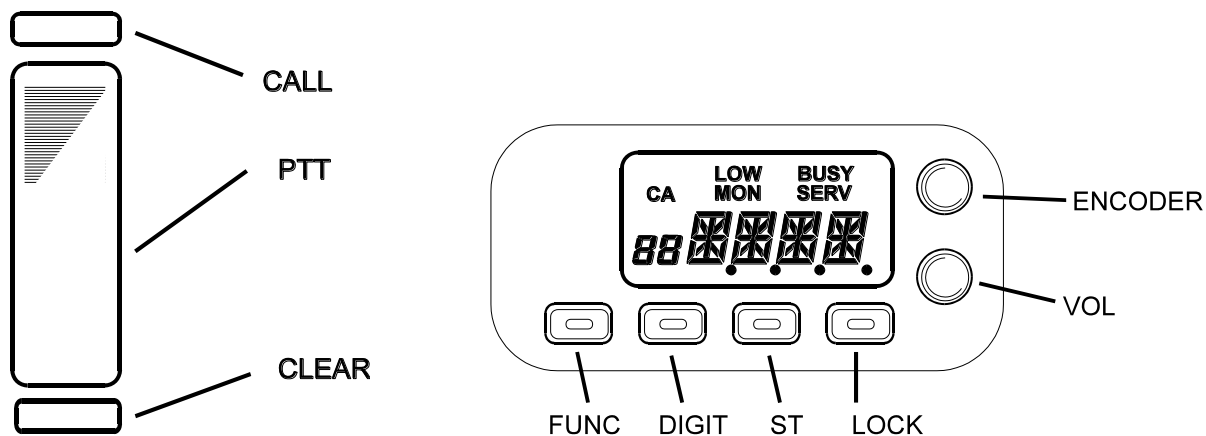
Brian Seedle

BETA TEST

PORTABLE R.F ADJUSTMENTS - KENWOOD TK255/355

In order to provide technician service on the trunked portable, two Test Modes are provided. This enables the mobile to be operated in a non trunked environment.

Note - It is essential that care be taken when keying up the transmitter. If the transmitter were keyed on a local control channel, severe blocking may occur for live users on the system.

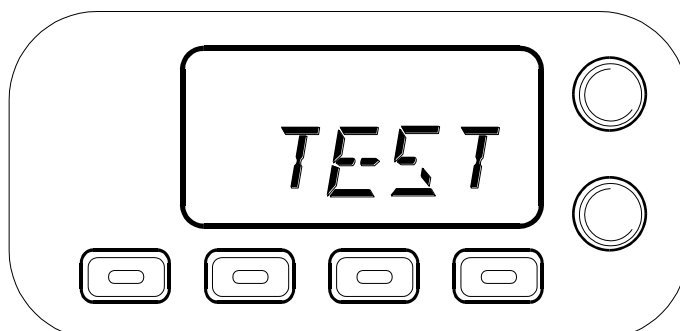


| | | |
|---------|---|------------------------------------|
| VOL | - | Volume Control |
| ENCODER | - | Increment/Decrement menu selection |
| LED | - | Green - Synthesiser Locked |
| | - | Red - Transmit |

TEST MODE 1.

Test mode 1 is entered by powering up the mobile with the Programming Cable inserted in the microphone/speaker socket and then DGT button held.

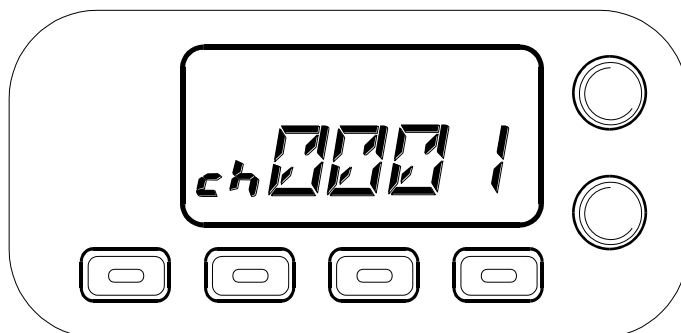
The display shows



The display will then change to the frequency setting menu at logical channel 0001. Note that -

1. If the Rx synthesiser is locked the Green LED will illuminate
2. The mute is squelch controlled but if the RESET key is pressed, the mute will be defeated and the MON icon will appear on the display. The RESET is a toggle so a further press will again deactivate the squelch.
3. If the PTT is pressed -
 - If the Tx synthesiser is locked the Red LED will illuminate.
 - If the Tx synthesiser is unlocked the Red LED will flash

Note that this test must be done using a dummy load since the transmitter is not inhibited if the Tx synthesiser is out of lock.

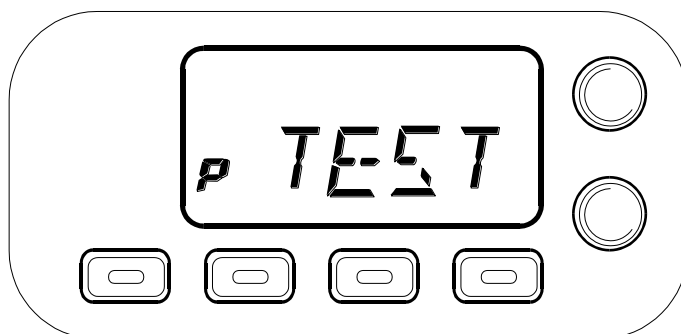


The actual frequency will be dependent on the band in use

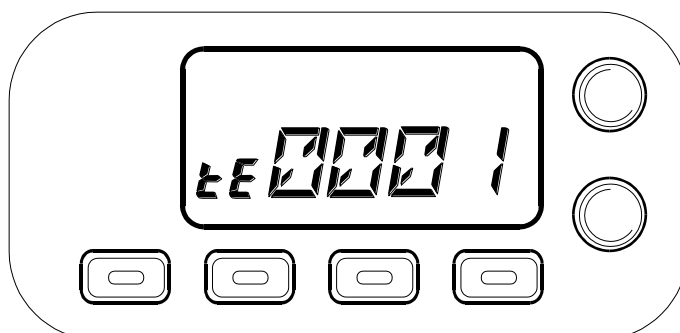
TEST MODE 2

Test mode 2 is entered by powering up the mobile with the Programming Cable inserted in the microphone/speaker socket and then DGT button held and the Reset key held.. The Squelch defeat operates in the same way as test mode 1.

The display shows



Removing the link will program the synthesiser to Test Channel 1.



In Test Mode 2. the engineer has access to 40 pre-set factory channels. These channels are fixed. Not all channels are applicable to particular portable variant. e.g Only the VHF high band channels are relevant to the high band variant. Some bands listed here may never have a variant. The synthesiser locked LED will be useful, because it will indicate the valid channels.

Channels applicable to VHF high band

| | | | | | | | |
|---------|---|--------|-----|---------|---|----------|-----|
| Rx Ch 1 | - | 162.05 | MHz | Tx Ch 1 | - | 162.00 | MHz |
| Rx Ch 2 | - | 150.05 | MHz | Tx Ch 2 | - | 150.00 | MHz |
| Rx Ch 3 | - | 173.95 | MHz | Tx Ch 3 | - | 173.9875 | MHz |
| Rx Ch 4 | - | 162.1 | MHz | Tx Ch 4 | - | 162.1 | MHz |
| Rx Ch 5 | - | 162.25 | MHz | Tx Ch 5 | - | 162.2 | MHz |
| Rx Ch 6 | - | 150.15 | MHz | Tx Ch 6 | - | 150.1 | MHz |
| Rx Ch 7 | - | 173.85 | MHz | Tx Ch 7 | - | 173.9 | MHz |
| Rx Ch 8 | - | 161.9 | MHz | Tx Ch 8 | - | 161.9 | MHz |

Channels applicable to the 223 MHz band

| | | | | | | | |
|----------|---|--------|-----|----------|---|--------|-----|
| Rx Ch 9 | - | 229.00 | MHz | Tx Ch 9 | - | 223.00 | MHz |
| Rx Ch 10 | - | | MHz | Tx Ch 10 | - | | MHz |

Channels applicable to Band III

| | | | | | | | |
|----------|---|----------|-----|----------|---|----------|-----|
| Rx Ch 11 | - | 177.2125 | MHz | Tx Ch 11 | - | 192.35 | MHz |
| Rx Ch 12 | - | 183.4875 | MHz | Tx Ch 12 | - | 185.2125 | MHz |
| Rx Ch 13 | - | 201.2125 | MHz | Tx Ch 13 | - | 199.4875 | MHz |
| Rx Ch 14 | - | 207.4875 | MHz | Tx Ch 14 | - | 191.4875 | MHz |
| Rx Ch 15 | - | 183.5025 | MHz | Tx Ch 15 | - | 183.5025 | MHz |
| Rx Ch 16 | - | 177.3 | MHz | Tx Ch 16 | - | 192.5 | MHz |
| Rx Ch 17 | - | 183.4 | MHz | Tx Ch 17 | - | 185.3 | MHz |
| Rx Ch 18 | - | 201.3 | MHz | Tx Ch 18 | - | 199.4 | MHz |
| Rx Ch 19 | - | 207.4 | MHz | Tx Ch 19 | - | 193.2125 | MHz |
| Rx Ch 20 | - | 201.1 | MHz | Tx Ch 20 | - | 201.1 | MHz |

Channels applicable to 450-470 MHz

| | | | | | | | |
|----------|---|---------|-----|----------|---|---------|-----|
| Rx Ch 21 | - | 451.5 | MHz | Tx Ch 21 | - | 454.25 | MHz |
| Rx Ch 22 | - | 446.05 | MHz | Tx Ch 22 | - | 446.0 | MHz |
| Rx Ch 23 | - | 456.975 | MHz | Tx Ch 23 | - | 462.475 | MHz |
| Rx Ch 24 | - | 452.0 | MHz | Tx Ch 24 | - | 452.0 | MHz |
| Rx Ch 25 | - | 451.4 | MHz | Tx Ch 25 | - | 454.2 | MHz |
| Rx Ch 26 | - | 446.15 | MHz | Tx Ch 26 | - | 446.1 | MHz |
| Rx Ch 27 | - | 456.9 | MHz | Tx Ch 27 | - | 462.4 | MHz |
| Rx Ch 28 | - | 451.0 | MHz | Tx Ch 28 | - | 451.0 | MHz |
| Rx Ch 29 | - | | MHz | Tx Ch 29 | - | | MHz |

| | | | | | |
|----------|---|-----|----------|---|-----|
| Rx Ch 30 | - | MHz | Tx Ch 30 | - | MHz |
|----------|---|-----|----------|---|-----|

Channels applicable to 420-450 MHz

| | | | | | | | |
|----------|---|---------|-----|----------|---|-----------|-----|
| Rx Ch 31 | - | 444.5 | MHz | Tx Ch 31 | - | 432.0 | MHz |
| Rx Ch 32 | - | 440.05 | MHz | Tx Ch 32 | - | 425.0 | MHz |
| Rx Ch 33 | - | 448.975 | MHz | Tx Ch 33 | - | 431.99375 | MHz |
| Rx Ch 34 | - | 440.2 | MHz | Tx Ch 34 | - | 431.9 | MHz |
| Rx Ch 35 | - | 431.9 | MHz | Tx Ch 35 | - | 440.2 | MHz |
| Rx Ch 36 | - | 444.6 | MHz | Tx Ch 36 | - | 432.1 | MHz |
| Rx Ch 37 | - | 440.1 | MHz | Tx Ch 37 | - | 425.1 | MHz |
| Rx Ch 38 | - | 448.9 | MHz | Tx Ch 38 | - | 431.9 | MHz |
| Rx Ch 39 | - | 440.15 | MHz | Tx Ch 39 | - | 431.8 | MHz |
| Rx Ch 40 | - | 431.8 | MHz | Tx Ch 40 | - | 440.15 | MHz |

If the encoder is rotated clockwise, the logical channel will increment in steps of one and conversely decrement for anti- clockwise rotation. To increase the steps, hold either the DGT key or the ST key while rotating the encoder. The ST key makes the step size tens and the DGT key hundreds.

If the 'F' key is pressed, the portable will cycle through the various test modes.

- Mode 1. chnnnn - Channel Select
- Mode 2. MIKE - Speech deviation adjustment
- Mode 3. FFSK - FFSK deviation adjustment
- Mode 4. DTMF - DTMF deviation adjustment
- Mode 5. BEEP - Beeps and Rings volume level
- Mode 6. LPWR - Low Power transmitter setting
- Mode 7. HPWR - High Power transmitter setting
- Mode 8. SL - Squelch Setting
- Mode 9. L0 - L0/L2 Threshold
- Mode A. BA - Battery Voltage Calibration

Note that if a setting is changed, the value will only be permanently saved WHEN THE 'F' KEY IS PRESSED TO CHANGE MODE.

- Mode 1. chnnnn - Channel Select

This is the mode in which Test Mode started. If the 'F' key is pressed past the end of the tests, it will cycle back to this mode.

- Mode 2. MIKE - Speech deviation adjustment

Connect the portable to a suitable R.F transmitter test set. Press the PTT to transmit. While transmitting, the encoder will increase or decrease the speech deviation. Note that the small digits on the left of the display will show the encoder value.

Mode 3. FFSK - FFSK deviation adjustment

Connect the portable to a suitable R.F transmitter test set. Press the PTT to transmit. While transmitting, the encoder will increase or decrease the FFSK deviation. Note that the small digits on the left of the display will show the encoder value. The default FFSK pattern is pre-amble (01010101010). The pattern will change to 1800 Hz (1111111111111) if the ST button is pressed or 1200 Hz (0000000000000) if the DGT key is pressed. The recommended value is 1.5 kHz to 1.7 kHz.

Mode 4. DTMF - DTMF deviation adjustment

Connect the portable to a suitable R.F transmitter test set. Press the PTT to transmit. While transmitting, the encoder will increase or decrease the DTMF deviation. The DTMF generated is digit 0 (low tone 941Hz, High Tone 1336 Hz). Note that again the small digits on the left of the display will show the encoder value.

Mode 5. BEEP - Beeps and Rings volume level

Turning the encoder will generate a beep with a volume level equal to that in service. There are 14 different levels to choose.

Mode 6. LPWR - Low Power transmitter setting

Connect the portable to a suitable R.F transmitter test set. Press the PTT to transmit. While transmitting, the encoder will increase or decrease the RF transmitter power. As before the display shows the encoder value. During trunked operation, the portable will try to use low power setting first

Mode 7. HPWR - High Power transmitter setting

Connect the portable to a suitable R.F transmitter test set. Press the PTT to transmit. While transmitting, the encoder will increase or decrease the RF transmitter power. As before the display shows the encoder value.

Mode 8. SL - Squelch Setting

The squelch circuit is an advanced digital design. A digital filter gives an average noise power which is displayed in the two large right hand digits. The two large left hand digits are the encoder setting.

Select a suitable channel in the area of the Network to which the portable will operate.

Inject an R.F carrier from a signal generator on the portable receive frequency for that logical channel.

Set the level from the signal generator to the point at which the squelch will be adjusted. Turn the encoder to a point whereby the squelch just opens.

If the squelch is open the green LED will illuminate.

Mode 9. L0 - L0/L2 Threshold

Set the signal generator to the point within the range -88dBm to -106dBm. Adjust the encoder until the right most digit of the display just changes from 'L0' to 'L2'.

The actual values of squelch and L2 will depend upon the Network and the noise floor within the coverage area. It may be necessary to get advice from the Network Operator for recommended values.

Mode A. BA - Battery Voltage Calibration

Connect the Portable to a calibrated external power supply set to 7.50 volts. Turn the encoder until the display reads 7-5.

Note concerning TEST MODE 1

It is possible to store data in the EEPROM during personalisation to calculate the transmit and receive frequency. Note that if the portable has not been personalised, it will not be able to calculate the channels from "base+logical number" since the base frequency is entered during personalisation. The portable will therefore default to the fixed factory channel table stored in the portable. If there is no factory channel table has been loaded into the portable using the program KENENG then it will not be possible to use this test.