

**STALKER LIDAR EU MODEL
OPERATORS MANUAL
NEW ZEALAND POLICE
01 DECEMBER 2003**



INTRODUCTION

LIDAR EU is the brand name of Applied Concepts Inc USA for their Laser speed detector.

The model of **LIDAR EU** used by New Zealand Police has been designed after consultation with Applied Concepts to meet our specific operating needs. The standard device normally supplied by Applied Concepts Inc is not the same as the *Lidar Eu* used in NZ see letter in rear of this manual.

LIDAR EU is a laser device that measures the speed of vehicles, indicates the distance of the vehicle and whether the vehicle is coming toward or going away from the device. It can be operated hand-held or mounted in a stationary position.

LIDAR EU is a small, lightweight and well-balanced device that has a built-in HUD (Heads Up Display) that allows the operator to track the target vehicle while observing nearby traffic.

LIDAR EU's electronic design is microprocessor based with signal processing and precision cast optics. This allows the unit to be upgraded with future performance features by simply installing a new computer software memory chip, which prevents obsolescence and insures the Customer the ability to benefit from future enhancements.

LIDAR EU New Zealand model provides both speed and distance in a single mode of operation.

Tracking mode provides continuous tracking and immediate, real-time speed updates as long as the trigger is depressed. This coupled with the unique Target Speed Tone gives the operator excellent tracking history and target identification. It sends out 130 pulses per second and operates at a wavelength 905 nanometers.

GENERAL

TRAINING

Once a member has completed both theory and practical sections of NZ Police Training Module DUT244 no further training is required for operating this device.

This document provides users with the details as to operational controls and functions of the Stalker *Lidar Eu* unit.

In line with the “**Keep It Simple**” to operate policy this unit has been designed by Applied Concepts Inc to permit an operator to power the unit on and after completing an internal self-test function the unit is ready to detect speeds with distances without the need to use a menu to navigate around user functions.

OFFICIAL INFORMATION REQUEST

This document is to be supplied on request to any person.

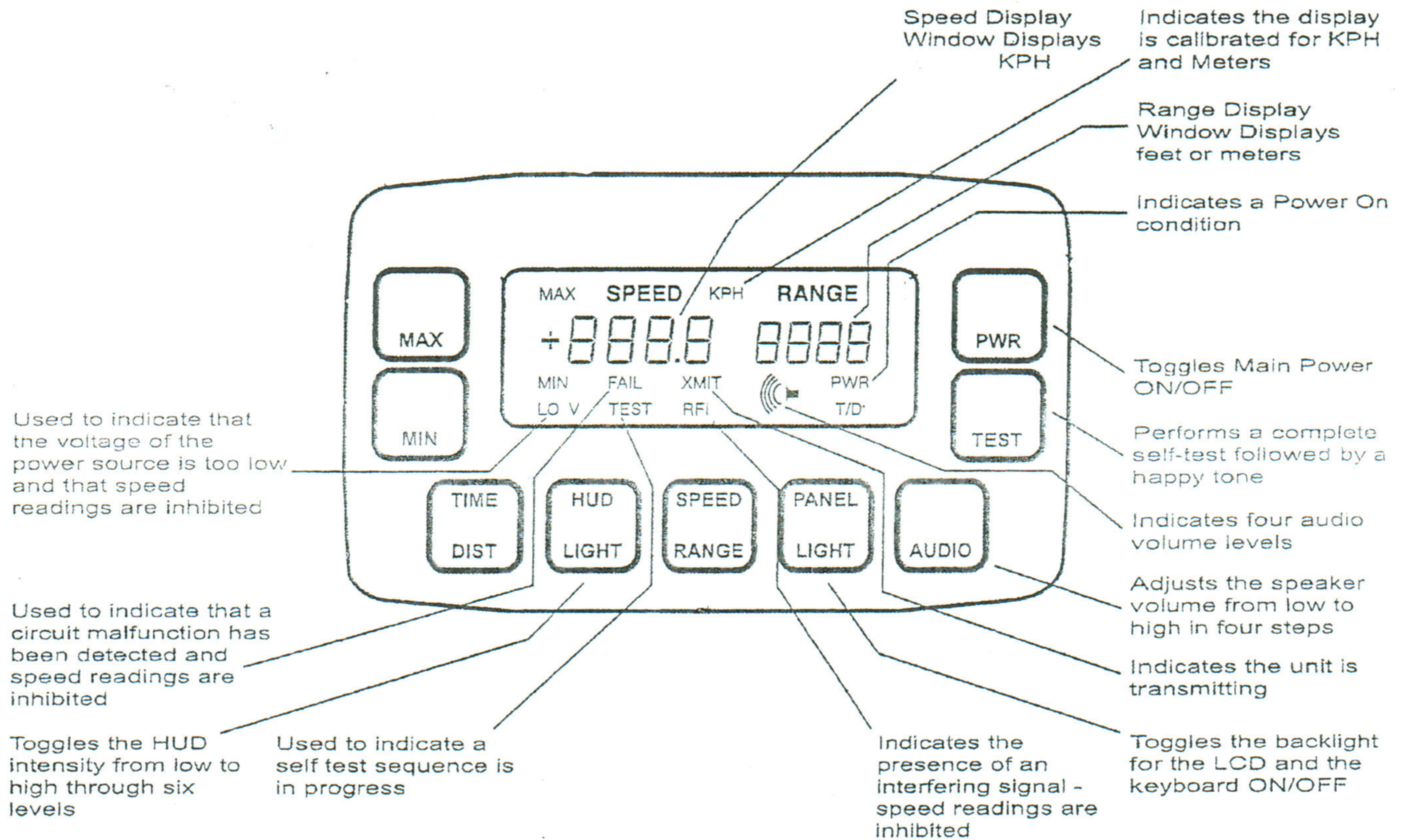
As per the letter from Applied Concepts Appendix A at the rear of this document. This is the only booklet supplied to members of the New Zealand Police for the Stalker *Lidar Eu* device operation.

SERVICE AGENT:

Microwave Systems Ltd
7 Kaiwharawhara Road
Wellington
Phone: 04 472 3651

OPERATOR CONTROLS

REAR PANEL DISPLAY





REAR PANEL DISPLAY FUNCTIONS

RANGE:

The right, four-digit LCD window is the range window. This window displays the range of the last target measured in meters for metric operation.

SPEED:

The left, three-digit LCD window is the speed window. The speed window displays the target speed in **KPH**. The "sign" character in the left side of the speed window indicates target direction. A "+" indicates the target is approaching, while a "-" indicates the target is receding.

- PWR:** The **PWR** icon indicates that the unit is on.
- XMIT:** The **XMIT** icon indicates that **LIDAR EU** is transmitting.
- TEST:** The **TEST** icon indicates that a self-test sequence is in process.
-  The  icon is used to adjust the volume up or down. One bar indicates "off" and four bars indicate loudest.
- FAIL:** The **FAIL** icon indicates that a circuit malfunction has been detected, in which case speed readings are inhibited and the unit should be removed from service and returned to the Service Agent for repair. **FAIL** will remain in the LCD along with an error code until reset by being powered off.
- Lo V:** The **LoV** icon illuminates when the battery voltage is too low. Operation is inhibited while this icon is displayed, but normal operation will resume automatically when the input voltage is restored to a normal voltage.
- RFI:** The **RFI** icon indicates the presence of an interfering signal. Operation is inhibited during an **RFI** indication. Normal operation will resume automatically when the RFI condition ceases.
- KPH:** The **KPH** icon indicates that the unit is measuring in kilometers.

KEYBOARD FUNCTIONS

- MAX:** This function is disabled for NZ Police operation
- MIN:** This function is disabled for NZ Police operation
- TIME/DIST:** This function is disabled for NZ Police operation
- HUD LIGHT:** The **HUD LIGHT** key toggles the HUD intensity from low to high through six levels when pressed. The first key depression displays the current intensity. Subsequent depressions toggle the intensity from **1** (lowest intensity) through **6** (highest intensity), and then back to **1**.
- SPEED/RANGE:** This function is disabled for NZ Police operation works only in speed with distance mode.

- PANEL LIGHT:** The **PANEL LIGHT** key toggles both the LCD backlight and the keyboard backlight on and off.
- AUDIO:** The **AUDIO** key is used to adjust the volume of the speaker from low to high in four steps. The number of speaker bars changes (one bar to four bars) to indicate the setting. One bar turns off the Target Speed Tone but leaves other tones enabled at low volume.
- TEST:** The **TEST** key performs a complete self-test, including verification of crystal accuracy. A “happy tone” and the message **PASS** on the LCD Range display are used to indicate successful completion.
- PWR:** The **PWR** key is the main On/Off power switch.

AUDIBLE INDICATORS

Self-Test tones - A 4-beep “happy” tone indicates the successful completion of a self-test operation. A failure is indicated by a repeating beep code consisting of one to eighteen beeps. The self-test operation is explained in the **TESTING THE LIDAR EU** section.

HUD FEATURES

The Heads Up Display (HUD) is the viewfinder on the top of the LIDAR gun. It is used to sight the desired target in LIDAR mode.

- TARGET RETICULE:** The target reticule consists of a red spot in the middle of the HUD viewfinder. This reticule approximates the size of the transmitted beam and is used for targeting.
- TARGET RANGE:** The upper, four-digit LED that appears in the HUD window. This window displays the same distance information that appears in the Rear Display’s Range field.
- TARGET SPEED:** The lower, three-digit LED that appears in the HUD window. This window displays the same speed information that appears in the Rear Display’s Speed field. The “sign” character in the left side of the speed window indicates target direction. A “+” indicates the target is approaching while a “-” indicates the target is receding.
- HUD SWITCH:** As described in the previous Keyboard Functions section, this switch allows the HUD LED brightness to be adjusted through six levels from **1** (lowest intensity) to **6** (highest intensity).

TESTING THE *LIDAR EU*

The following tests check for proper display, aiming, calibration, and computations in the *LIDAR EU*.

POWER-ON SELF TEST

A complete self-test is performed at power-on. The unit goes through a self-test sequence and displays **1.0 20, 150.0 250, 200.0 1000, 250.0 1000, 299.9 1000**. Successful completion of self-test is indicated by the display of **PASS** and an audio "happy" tone. Self-test fail is indicated by a repeating beep code consisting of one to eighteen beeps. If the unit fails upon power-on, please listen and note the number of beeps (one to eighteen). The unit should be taken out of service and the service agent should be contacted for further instructions.

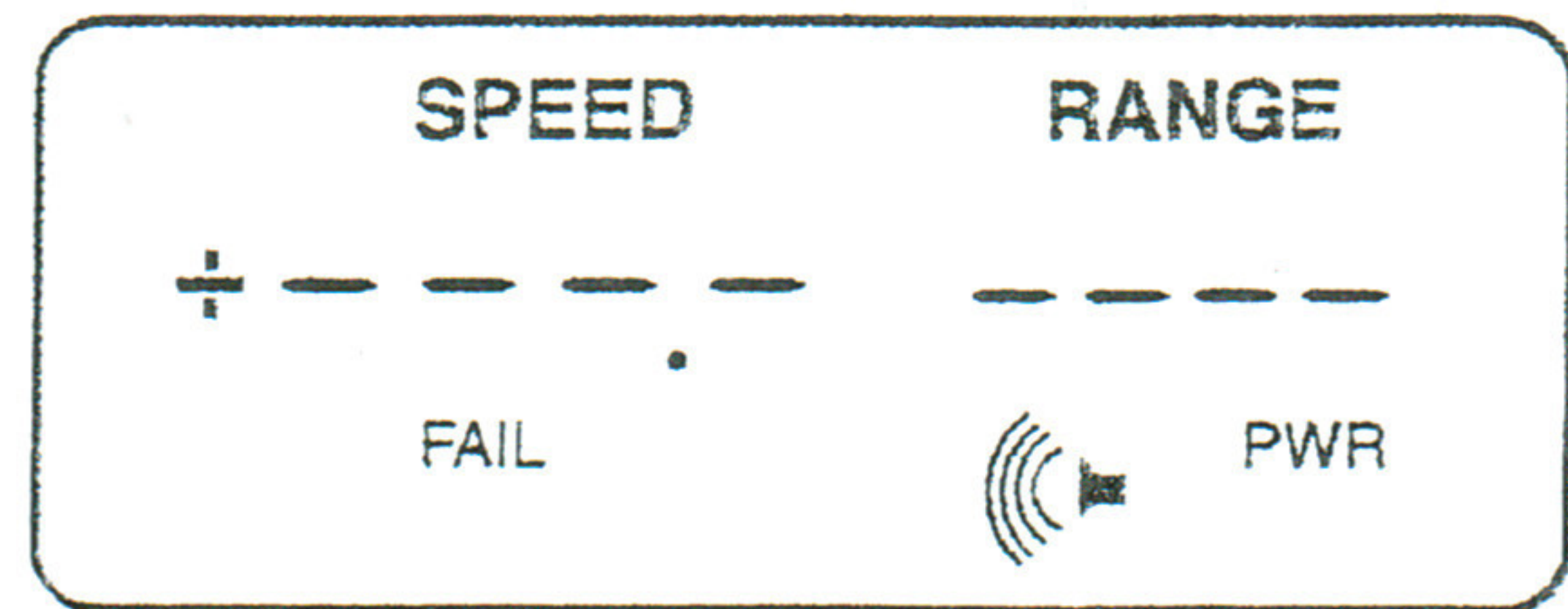
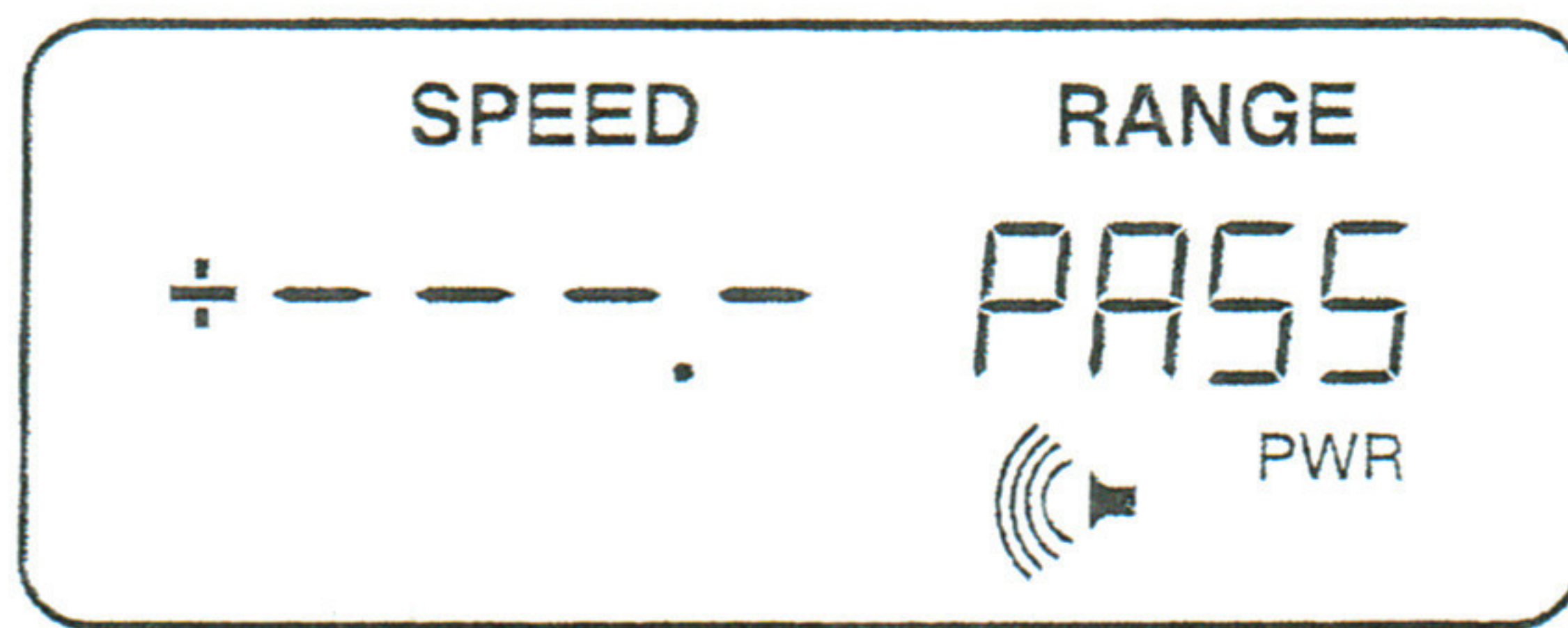
MANUAL SELF-TEST

A self-test can be run at any time by pressing the **TEST** key. Successful completion of self-test is indicated by the display of **PASS** and an audio "happy" tone. If the test is unsuccessful, the **FAIL** icon appears instead.

NOTE: If the **FAIL** icon appears in the Display Window of your *LIDAR EU*, the unit must be turned OFF and then back ON to reset the FAIL mode.

AUTOMATIC SELF-TEST

An automatic self-test (indicated by a 4-beep "happy" tone) is performed every 10 minutes while the *LIDAR EU* is powered on.



DISTANCE AND SIGHT ALIGNMENT

TEST - AS SPECIFIED IN THE "CODE OF OPERATION"

To perform this test, follow these simple instructions:

1. Power the *Lidar Eu* on, a tone sounds when the unit has the target in sight and recognizes it. Verify that the target dot is symmetric with the target both horizontally and vertically.
2. Select a vertical pole or sign at more than 25 metres distance away.
3. Aim the Red Dot directly at the pole or sign and press the trigger to transmit. A distance reading should appear.
4. Continue to press the trigger and slowly move the Red Dot across the pole. You will hear an audio tone.
5. As the Red Dot goes off the target, the distance reading should disappear and the audio tone will stop. This checks the horizontal alignment.
6. Slowly move the Red Dot from the right to left and left to right. Again the distance should disappear and the audio will stop whenever the Red Dot is off the target. A tone sounds when the unit has the target in sight and recognizes it. Verify that the target dot is symmetric with the target both horizontally and vertically.
7. When targeting a sign, go from top to bottom and bottom to top to check the vertical alignment. When targeting a pole, simply rotate the LIDAR 90 degrees and move from side to side again.

NOTE: You may notice that the audio tone continues briefly after the Red Dot moves past the pole or sign. Remember that the beam gets wider as distance is increased, (at 1000 metres the beam is 3 metres wide). The Audio tone gives you an indication of the beam width at the target distance.

Accurate distance measurement insures the operator that the unit is operating properly and will display both accurate distance and speed-readings. The LIDAR actually computes the known distance by timing the time of flight of the transmitted and received light pulses.

Provided your personal distance measurement remains the same between the formal calibrations conducted by the Police Calibration Services, you are not required to measure your reference distance out.

OPERATING THE *LIDAR EU*

TO PLACE THE LIDAR INTO OPERATION:

The *LIDAR EU* features snap-in/snap-out handles. Either a rechargeable battery handle or a coiled cigarette plug handle can power it. Choose which handle/power source you want to use and insert in the bottom of the unit. Be sure to check and make sure the handle is "locked" into place.

1. Power the unit on by pressing the "**PWR**" key. The unit will go through a Power-On Self Test followed by a "happy" tone. It will display **PASS**. The LCD backlight will "light" and then turn off in approximately ten seconds unless the trigger is depressed.
2. The unit is still on and in operational mode. The unit will power on in only in Speed with Distance mode for New Zealand units all other modes of operation have been removed.
3. The "**TEST**" key can be pressed at anytime to initiate a Manual Self-Test.
4. Choose the level of audio. During Tracking, the exclusive Target Speed Tone in the *LIDAR EU* will be heard when a target is being successfully tracked, just like Doppler audio in radar. There will be a higher pitch as the speed increases and a lower pitch as the speed decreases. The *LIDAR EU* also has a Target Return Tone. This helps the operator properly aim the LIDAR. No Target Return Tone is heard when the beam is off the target. Tone repetition increases as the beam strikes the Target and signal quality increases. Once a target speed is acquired, the Target Speed Tone overrides the Target Return Tone.
5. Adjust the HUD brightness to user preference using the "**HUD LIGHT**" key. Normally set the HUD light to 6 for daylight usage.
6. While the unit is powered on, the Red HUD Dot allows target selection prior to transmitting.
7. Once the target is selected, squeeze the trigger to transmit. To "lock" a target in Speed /Distance mode, simply release the trigger. To "lock" a target. ds.
8. Because of the HUD Optical Eye Relief, the operator should position his eye near the HUD to insure that he can see the Distance Display (top numbers), the Red Dot, and the Speed Display (bottom numbers). By moving one's head (or the LIDAR) away from this optimum position, the operator may not be able to see all of the HUD display. Once the operator is familiar with the HUD operation, eye position is not a problem.

NOTE: Operating the *LIDAR EU* when trying to read targets at a long distance, you may see a distance reading before you see a speed-reading. You will also hear the Target Return Tone. No tone indicates the beam is off target or too weak to produce a signal. A slow beeping tone indicates a weak signal. As the signal increases in strength, the beeping tone repetition increases. This indicates correct targeting and the LIDAR has been able to make a distance calculation, but has not received a strong enough signal or the proper validation data to display speed. Continue to track the target and a speed-reading should be displayed when the return signal passes the internal quality checks.

EYE SAFETY

The *LIDAR EU* is designed and tested to meet the European Eye Safe Standard IEC 60825 class 1.

We do, however, recommend that certain reasonable precautions be taken when operating this Laser unit. A person should not stare directly into the lens for an extended time, especially at close distances.

CAUTION – The use of optical instruments with this product will increase eye hazard. Therefore do not point the LIDAR at an observer using instruments such as binoculars, telescopes, or cameras.

BATTERY HANDLE CHARGING

Each LIDAR unit is provided with 2 chargeable battery handles, these batteries should provide a full 8 hours of operational use without the need for charging.

To charge a battery place the handle on the charger unit and flick the charge switch, a green light will appear and will extinguish once the battery is fully charged.

ERROR MESSAGES

In the event that the *Lidar EU* detects an internal fault during operation the rear Panel LCD will display the error code below:

If the error message remains and will not reset once the device is turned on and off a few times, the device requires service by the Authorised Agent.

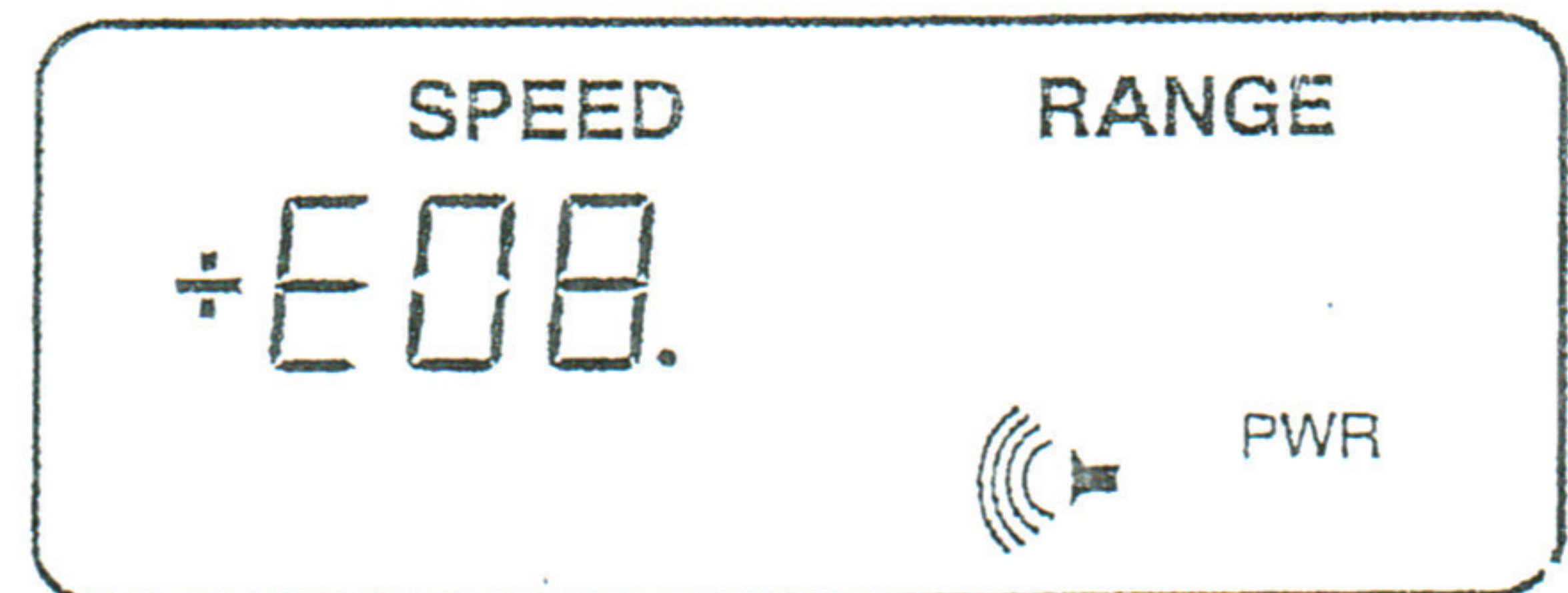
Error E04 can be expected if a vehicle you are tracking has a Laser Jamming Device operating.

EXX: (Where XX is an error number) This message indicates that an error has occurred. Below are the definitions for error messages that can appear on the **LIDAR EU'S** display.

NOTE: If the message number received is not listed below, then the message is a combination of two errors. For example, if the error message is E-03, this indicates that both errors 1 and 2 exist.

The following is a list of errors and their meaning:

E01	=	laser high voltage pulse error
E02	=	APD bias voltage error
E04	=	Jamming signal detected
E08	=	Sweep error detected
E16	=	Insufficient signal quality
E24	=	Combination of E08 and E16
E33	=	Invalid Time/Distance combination



NOTE: Stalker *Lidar EU* is made to comply with the European laser light output standard which is lower than the USA standard, therefore this device will have less range when operating in speed than other devices used in the past.. This lower light output level plus extra quality controls checks on received back signals required by NZ Police may seem to the operator that the **Lidar Eu** has poor range when operating as a hand held device, operating with a tripod or some means of support should ready the lack of range situation.

INTERFERENCE SOURCES AND REMEDIES

A variety of sources, both natural and man-made, can cause misleading indications or poor performance. The operator should note the symptoms described below, and take steps to avoid the problem, or ignore the misleading indications.

TERRAIN

LIDAR signals will not pass through most solid objects, including sign posts, power lines, or tree foliage. Make certain the path between the LIDAR and target vehicle is unobstructed. Successful speed measurements require uninterrupted visual tracking of the target. A glass window is a partial reflector of LIDAR; therefore, some reduction in range will be experienced when aiming through vehicle windows.

RAIN

Rain absorbs and scatters the LIDAR signal. This reduces the range and increases the possibility of obtaining readings from the speed of the raindrops. Laser units should not be used during continuous or heavy rain.

ELECTRICAL NOISE

Electrical noise sources include neon signs, radio transmitters, power lines, and transformers. These influences may cause reduced range or intermittent readings. When electrical noise interference is present, the RFI indicator should come on and suppress all readings.

RADIO FREQUENCY INTERFERENCE

Due to the inherent properties of the LIDAR (highly collimated coherent light) and the vast differences from radio waves, LIDAR devices are generally not affected by RFI. The *LIDAR EU* has been shielded against RFI entering the device and also has an RFI detector circuit. If RFI is present and causes interference, the RFI detector disables the *LIDAR EU* from operating and displays "RFI".

USAGE

This Lidar Eu Laser Gun has been supplied free of charge by Road Policing Support, Office of the Commissioner under the 2010 Initiatives Road Safety Scheme.

Each District is required to utilise each Laser for a minimum period of 50 hours every 6 months.

Failure to do so will result in the Laser being impounded and relocated to another District.

SERVICE COSTS

Normal operational repairs and maintenance costs will be paid for by Police Calibration Services.

However where devices have been dropped or damaged through misuse these costs will be met by the District.

REQUIRED MAINTENANCE

Other than periodic cleaning, no user maintenance is required on the **LIDAR EU**. However, if any problems are experienced during testing procedures or normal operation, the unit should be taken immediately to your department's **LIDAR EU** specialist to determine the extent of the problem. If a malfunction has occurred, the unit will require servicing. Normal care should be taken by the user in handling the **LIDAR EU** to preserve the life and usefulness of the equipment.

OPTICAL SURFACES

All of **LIDAR EU's** optical surfaces have optical coatings and care should be taken to protect these surfaces from scratches or damage, which can reduce effective range and ease of use. In particular, the front lens surfaces should be clean and dry.

All optical surfaces may be cleaned in the following manner:

1. Place a few drops of either pure alcohol or lens cleaning solution on either a lint-free cotton cloth or a lens cleaning tissue. These cleaning materials are inexpensive and are readily available at retail photographic supply stores. Never use items harmful to the coated optical surfaces (e.g., paper towels, abrasive cleaners, household "glass" cleaners, or sharp instruments).
2. Gently wipe the surface using a circular motion.
3. Repeat using a clean portion of the cloth or new tissue, until the surface is free of contamination.

TROUBLESHOOTING

PWR key does not function:

- Check with two different power sources and two different handles.
- If using a battery handle, make sure it is charged
- If a cigarette plug handle is available, make sure receptacle is clean and the cigarette plug fits snugly
- Check the fuse in the cigarette plug

Low or no speaker volume:

- Check to insure that the volume control setting is not in the "OFF" position.

LIDAR has short range:

- Check the HUD alignment. Refer to the **SIGHT ALIGNMENT TEST** section.
- Contact the Service Agent.

NOTE: Vehicles with missing or dirty license plates, different color vehicles, poor weather conditions, etc. can all affect the sensitivity of the LIDAR resulting in short range. Try the LIDAR in different vehicles and perhaps different weather conditions.

LIDAR EU includes extensive self-test routines at power-on, operator-initiated using the **TEST** key, and automatically at 10-minute intervals. A self-test failure will be indicated by one of two types of error codes.

During the power-on self-test, all failures are indicated by a beep code, which repeats until the unit is powered off. The number of beeps between pauses indicates the type of failure, see error messages.

If you require additional help contact:

Police Calibration Services

Ext: 42201

Ext: 42356

Ext: 42308



The World Leader in
Speed Measurement

August 20th, 2001

To Whom It May Concern:

This letter is to confirm that the Stalker models supplied to the New Zealand Police Department are special models with unique settings, and therefore our standard operator manuals are not applicable to the New Zealand Police Department.

These Stalker models include, but are not limited to the following:

Stalker Dual
Stalker DSR
Stalker Lidar

Sincerely,

Stan Partee, President

A handwritten signature in cursive script that reads "Stan Partee". The signature is written over a horizontal line.

applied concepts, inc.
<http://www.stalkerradar.com>

730 F Avenue, Plano, Texas 75074 1-800-STALKER (972) 398-3750 FAX (972) 398-3751