Calibrating the Placer GPS 455DR

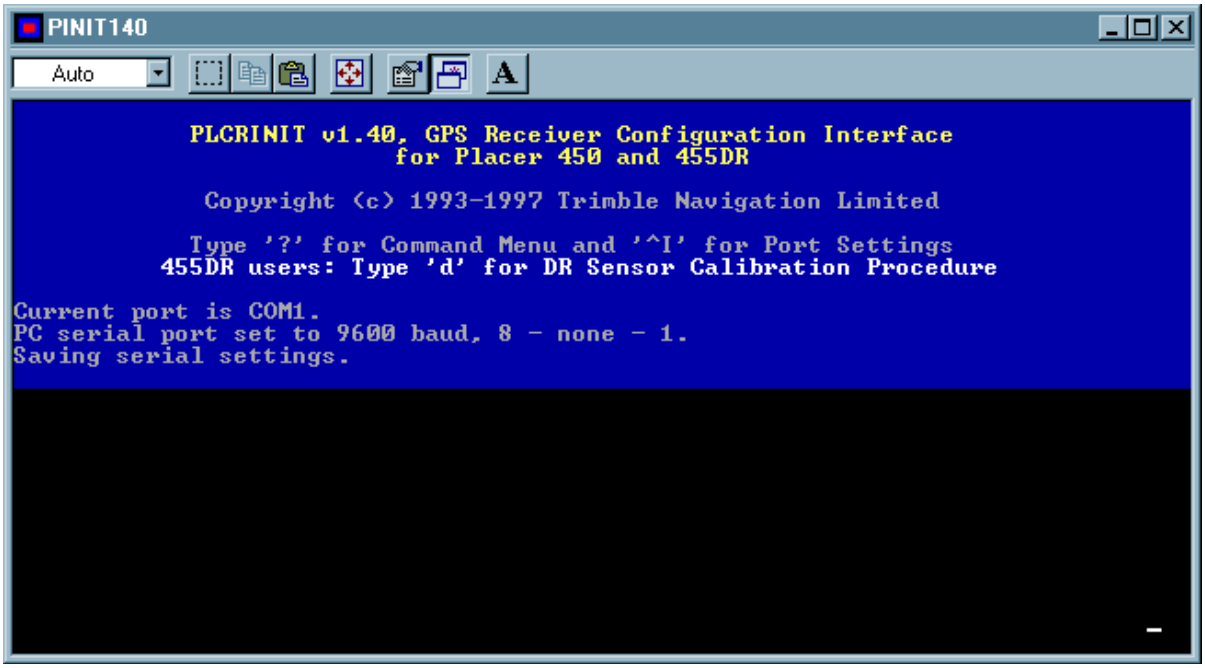
The odometer and gyroscope used in the Placer 455DR system must be calibrated after installation for the system to function correctly. The calibration values are stored in the Placer's battery backed memory for use in the normal daily operation of the system. The calibration needs to be done only at installation. Please read this section thoroughly prior to running the calibration program.

During the calibration procedure, you will be asked to drive specific distances, at varying speeds and in set patterns. The installation program and the Placer 455DR will monitoring the system output during these times and determine the correct settings for your vehicle. The correct functioning of the odometer signal is critical to system performance. The procedure to verify and characterize the odometer signal is designed to work on a wide range of analog and digital signals and is therefore very detailed. This calibration must be completed successfully prior to calibrating the gyroscope. The sensor calibration procedure includes the following steps:

- Check the odometer for pulses while stopped.
- Drive a known distance (at least 0.5 mile or 1 km) to determine the odometer distance per pulse value.
- Verify the odometer for pulse consistency at slow, medium and fast speeds.
- Drive 5 circles clockwise and counterclockwise to determine gyro calibration values.
- Verify backup signal connection.

Trimble provides a DOS compatible calibration program, PINIT140.EXE to guide you through the calibration procedure. After the mechanical installation of the Placer 455DR is complete, connect a laptop IBM compatible PC to the Placer using the MDT side of the communications cable. Copy PINIT140.EXE and PINIT140.INI to the same directory on the hard disk. If executing under DOS, run the program from the directory with PINIT140.EXE. If executing under windows, make the directory containing both files the working directory.

The following graphic shows the opening screen for PINIT140.EXE running under Windows 95. PINIT140.EXE can also be used to view GPS information. The commands for GPS functionality are viewed by typing '?'. This section covers the functionality of the DR Sensor Calibration Procedure. Begin the calibration procedure by typing 'd' <CR> at the opening screen. It may also be accessed any time that the program is not waiting for a specific user response.



For ease of reading the rest of the screen representations, they will be shown as boxed text. The main calibration menu is shown below. The odometer calibration must precede the gyro calibration. The Backup light installation may be verified at any time.

```
          PLCRINIT vX.XX,  Use <Esc> to Quit; Use ? for Help Screen
        ****************** 455DR Sensor Setup Menu ******************


1) Start Odometer Installation Procedure
2) Start Gyro Scale Factor Calibration
3) Check Backup Light Installation
4) View/Set Odometer Parameters
5) Reset Odometer Parameters
6) View/Set Gyro Parameters
7) Exit Sensor Configuration
Enter choice:
```

Calibrating the Odometer Signal

The odometer installation procedure will determine if the chosen odometer signal is acceptable for Placer 455DR use. The system initially expects a digital signal. Most single ended digital odometer signals proceed straight through the process, without repeating any actions. If necessary, the system will adjust to use an analog signal. Further adjustments may be required to avoid corrupting electrical noise that may be present (due to wire running along plug wires, coils or alternators or electrical equipment inside the passenger compartment). However, there are odometer signals that are not usable by the Placer 455DR. If the signal is determined to be unacceptable, a suitable signal will need to be found or generated before the gyro calibration can proceed. The PINIT140.EXE software suggests that the user insert a Hall effect transducer into the speedometer cable line. This may not be an option in some newer cars. Other options include adding targets to a non-driven wheel and using a proximity sensor to detect vehicle motion as the targets pass by the sensor. Please refer to Trimble's web page for suppliers of transducers, signal conditioners and proximity sensors/targets.

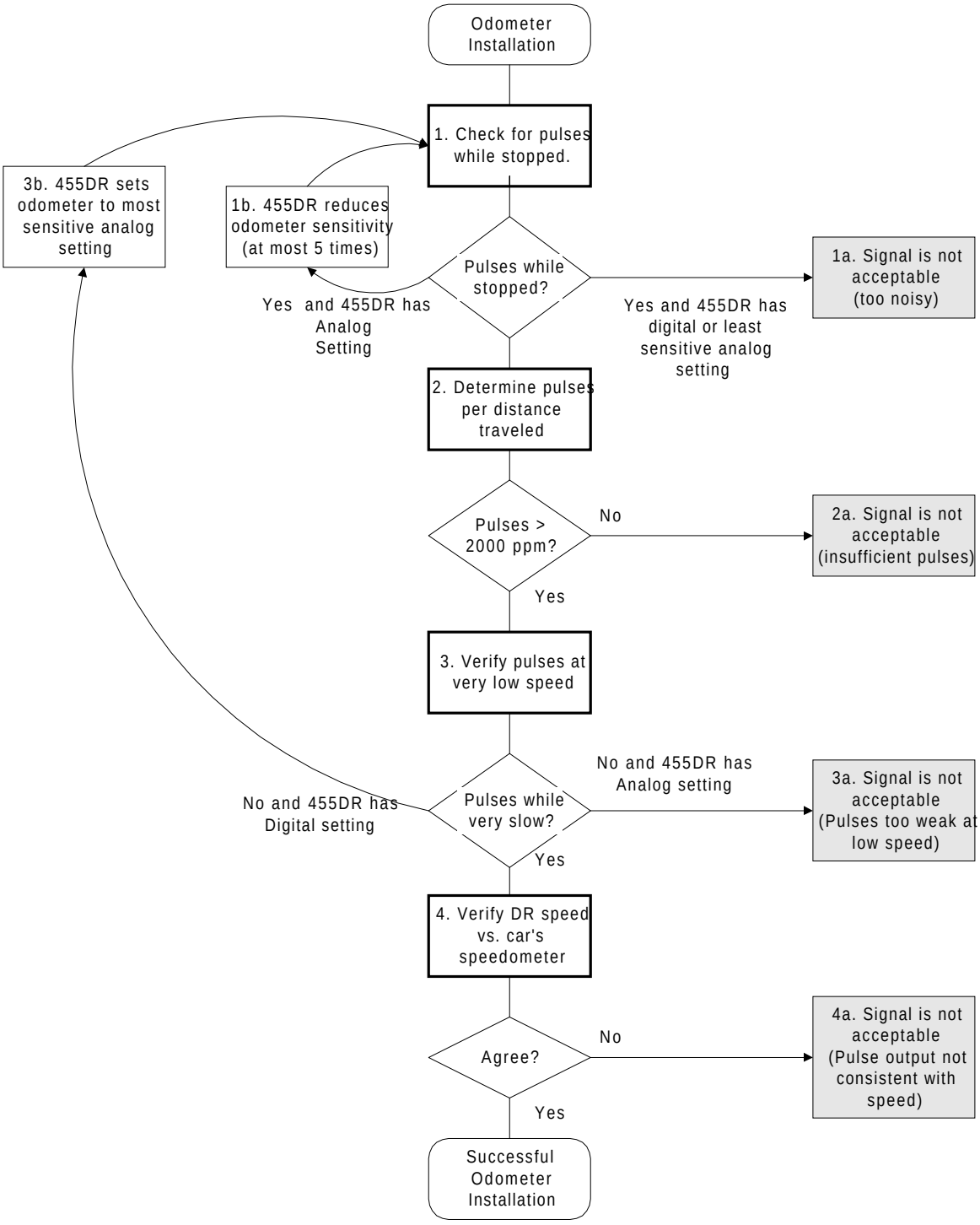
NOTE: Before starting the odometer calibration procedure, select '5' on the main sensor setup menu. This will reset the odometer parameters. This will insure that the odometer calibration starts in the correct way. The following screen will be displayed:

```
      ***************** Odometer Parameter Reset **********************

Resetting odometer parameters to their default values
```

Odometer installation activity flow

After the reset is performed, type ‘d’ to get back to the sensor setup menu, then ‘1’ to proceed with the odometer calibration. The following chart outlines the odometer installation procedure. In the next sections, the heading numbering refers to the appropriate box in the chart.



Odometer installation opening screen. This screen is provided for information only, no action is necessary. Entering ‘y’ will allow the installer to proceed with the calibration.

```
       ****************** Odometer Installation ******************

During This procedure you will check the odometer signal
For output consistent with speed. You will need to drive at slow,
medium and fast speeds. You should perform the procedure in an
area where you will have access to a parking lot, surface streets,
and a freeway or expressway

Would you like to proceed with calibration?  (Y/N)
```

1. Checking for pulses while stopped. Be sure that the vehicle is stopped. It is best to place the vehicle in park on a level surface for this test and leave the vehicle undisturbed for the duration of the test.

```
       ****************** Odometer Installation ******************

During this first section you will check the odometer signal
for correct function while stopped. The odometer should produce
no signals while stopped.

Ready to proceed? (vehicle must be stopped) (Y/N)
```

After pressing ‘y’ the following will be displayed. You should remain stationary for the entire time (10 to 15 seconds). If you move, the procedure will have to be repeated. You may press any key to move to the results of this step.

```
       ****************** Odometer Installation ******************

Odometer calibration procedure

            Press ANY KEY to stop calibration.

ODOM PULSES = X
```

1a. The signal produces pulses while the vehicle is stationary. If no other existing signal is available, a new signal will need to be generated. If the vehicle has a mechanical speedometer cable, a Hall effect transducer can be inserted inline. It the system is electrical, a proximity sensor can be used to generate pulses by sensing targets mounted on the inside of a non-driven wheel. The number of pulses generated per mile (kilometer) should be as high as practical, but cannot be less than 2000 pulses per mile.

```
       *************** Odometer Installation Failed ****************

This signal is not acceptable

Please go to a taxi meter shop to obtain a Hall effect transducer
The transducer should produce the maximum number of pulses possible
The gyro cannot be calibrated until the odometer installation
is completed successfully. Refer to the manual for more information.

If the vehicle moved during the test, or another signal is to be tested
type 'd' to perform the odometer calibration again
```

1b. If there are pulses while stopped and the analog settings are being tried, the analog signal is too noisy for this level of sensitivity. The following screen will appear. The sensitivity will be lessened and the procedure will need to be repeated. The stopped test will be repeated a maximum of five times to find a suitable sensitivity level for an analog signal. If, after five attempts, the system is still too sensitive for this level of noise, the signal will be declared unusable. If this is the case, and if no other existing signal is available, a new signal will need to be generated. If the vehicle has a mechanical speedometer cable, a Hall effect transducer can be inserted inline. It the system is electrical, a proximity sensor can be used to generate pulses by sensing targets mounted on the inside of a non-driven wheel. The number of pulses generated per mile (kilometer) should be as high as practical, but cannot be less than 2000 pulses per mile.

```
       *************** Odometer Installation Failed ****************

With an odometer setting of XXXX, the signal is too noisy.
The odometer setting will be changed to XXXX to provide noise immunity.

Type 'd' to perform the odometer calibration again with the new odometer
value.
```

In the case where no pulses are received while the vehicle is stopped, this indicates successful completion of process 1, you can proceed to process 2. Enter the distance units that you would like for the rest of the procedure.

```
       ****************** Odometer Installation ******************

Odometer raw pulse measurement stopped.

ODOM PULSES = X

The odometer signal is okay while stopped.

What distance units would you like to use for the rest of the calibration?
1)miles
2)kilometers
Enter choice:
```

2. Determine pulses per distance traveled. During the next procedure, you will travel a known distance of at least 0.5 miles or 1 km. The PINIT140.EXE will monitor how many odometer pulses are generated during the interval. It is convenient for this procedure to utilize the vehicle's trip odometer. Reset it at the beginning of this test, or note the odometer reading.

Miles display.

```
        ****************** Odometer Installation ******************

Please note your odometer reading, or reset your trip odometer
then drive at least 0.5 miles.

 Are you ready to proceed? (Y/N)
```

Kilometers display.

```
       ****************** Odometer Installation ******************

Please note your odometer reading, or reset your trip odometer
then drive at least 1 km.

 Are you ready to proceed? (Y/N)
```

After pressing ‘y’ to the above question, the following will be displayed. As you drive, the ODOM PULSES field will update with the elapsed number of pulses since the beginning of this test. When you have traveled the desired distance, as noted on the odometer (trip odometer), press any key to have the odometer pulse distance computed.

```
       ****************** Odometer Installation ******************

Odometer calibration procedure

            Press ANY KEY to stop calibration.

ODOM PULSES = X
```

Once the desired distance is traveled, press any key. The following display is shown. Type ‘y’ and the prompt for distance traveled appears. Enter the number in a X.X form using the distance units that were selected earlier. That is, if you are using miles and you traveled seven tenths of a mile, enter ‘0.7’<CR> to proceed.

```
       ****************** Odometer Installation ******************

Odometer raw pulse measurement stopped.

ODOM PULSES = X

Calculate new odometer pulse scale factor? (Y/N) YES

Please enter distance traveled: 0.7
```

2a. There are various ways that this test can fail. The first failure mode is no pulses are generated while moving. In this case, the most likely cause is that the incorrect signal is being monitored. Please refer to the vehicle’s

electrical diagrams to determine the correct wire. It is important to have wiring diagrams for the correct model year, since manufacturers change wire coloring from time to time.

```
      ****************** Odometer Installation ******************

Odometer raw pulse measurement stopped.

ODOM PULSES = 0

Calculate new odometer pulse scale factor? (Y/N) YES

Please enter distance traveled: X

This signal is not acceptable. The signal does not produce
pulses while moving. If another signal cannot be found, a Hall
effect transducer will have to be inserted into the speedometer line.
The gyro cannot be calibrated until the odometer installation
("is completed successfully. Refer to the manual for more information.
```

Insufficient distance traveled for calibration. If you enter 0 distance, no scale factor can be calculated. It is possible to travel a short distance, but the shorter the distance, the less accurate the initial estimate of odometer distance per pulse will be. The recommended minimum distance is 0.5 miles or 1 kilometer. Long distances are not required, since the Placer 455DR will use GPS information to improve the knowledge of the odometer scale factor after the initial calibration phase.

```
     ****************** Odometer Installation ******************

Odometer raw pulse measurement stopped.

ODOM PULSES = X

Calculate new odometer pulse scale factor? (Y/N) YES

Please enter distance traveled: 0

Some distance must be traveled to determine scale factor.
```

Another type of failure is insufficient pulse resolution. For the correct functioning of the Placer 455DR system, a minimum of 2000 pulses per mile (1250 pulses per kilometer) is required. If the distance per pulse is greater (i.e. less than 2000 pulses per mile) accuracy will be impaired. Again, if the vehicle does not have a speedometer cable, the signal will have to be generated in another way. Please see the discussion on proximity sensors and Hall effect transducers above.

```
      *************** Odometer Installation Failed ****************

This signal is not acceptable. The vehicle does not produce
enough pulses per mile. 2000 pulses per mile are required.

Please go to a taxi meter shop to obtain a Hall effect transducer.
The transducer should produce the maximum number of pulses possible.
The gyro cannot be calibrated until the odometer installation
is completed successfully. Refer to the manual for more information.
```

3. Correct pulses while travelling slowly test. Note the pulse distance so that you can check for this while driving very slowly. If you have selected miles for distance units, you will receive the following screen. In this example step 2 determined that one pulse should be received for each 8.25 inches that the car moves. In this test, you will verify that at low speeds, the pulses are generated at that distance.

```
       ****************** Odometer Installation ******************

Odometer calibration verification
During this procedure you will verify the odometer pulses at low speed.

Please drive very slowly and verify that you are receiving a pulse every
8.25 inches at low speed, less than 2 miles per hour.

Would you like to proceed with the verification? (Y/N)
```

If you have selected kilometers for distance units, you will receive the following screen.

```
       ****************** Odometer Installation ******************

Odometer calibration verification
During this procedure you will verify the odometer pulses at low speed.

Please drive very slowly and verify that you are receiving a pulse every
0.08 meters at low speed, less than 3 kilometers per hour.

Would you like to proceed with the verification? (Y/N)
```

After typing ‘y’ to proceed with verification question, you will see the following display. Drive very slowly (let the car creep). Note the rate that you are receiving pulses. It should correspond to the distance per pulse specified in the previous screen. Try to drive so that you would expect 1 pulse per second. It is very important that pulses are received even at low speeds.

```
        ****************** Odometer Installation ******************

Odometer calibration procedure

            Press ANY KEY to stop calibration.

ODOM PULSES = X
```

If pulses were not received at low speeds enter ‘n’.
3a. If the analog signal settings have already been tried, this signal is not acceptable. In that case, the following screen informs you that the signal will not work. There are no further Placer 455DR settings that can make the signal usable. Again, a proximity sensor for electronic or Hall effect transducer for mechanical systems must be installed.

```
       *************** Odometer Installation Failed ***************

This signal is not acceptable.

Please go to a taxi meter shop to obtain a Hall effect transducer.
The transducer should produce the maximum number of pulses possible.
The gyro cannot be calibrated until the odometer installation
is completed successfully. Refer to the manual for more information.
```

3b. If there are no pulses and the digital setting is still being tried, the signal is not a good digital signal. It is either an analog signal, or a digital signal that cuts out at low speed. If it is an analog signal, there is a good chance that the signal may be usable by modifying settings within the Placer 455DR. The PINIT140.EXE program will change the odometer settings for you. Type ‘d’<CR> when you are ready to repeat the odometer calibration process with the analog settings.

```
       ****************** Odometer Installation ******************

Odometer raw pulse measurement stopped.

ODOM PULSES = X

Were correct pulses received at very low speed? (Y/N) NO

The Placer 455DR odometer parameters will be modified to attempt
to use this signal.

Type 'd' to perform the odometer calibration again with the new odometer
value.
```

If the correct pulses are received at low speed, type ‘y’. This signifies a successful completion of step 3. You may proceed to step 4.

```
        ****************** Odometer Installation ******************

Odometer raw pulse measurement stopped.

ODOM PULSES = X

Were correct pulses received at very low speed? (Y/N) YES

You may proceed with the rest of the odometer verification.
```

4. Verify DR speed versus car's speedometer. In this portion of the test, the pulse distance is checked at various speeds.

```
       ****************** Odometer Installation ******************

Odometer calibration verification
During this procedure you will verify the odometer scale factor.

Please drive at various speeds and check the 455DR speed against
your speedometer.

Would you like to proceed with the verification? (Y/N)
```

You will see the following display after typing 'y' to proceed with verification question. The speed will be in MPH or KPH depending on your distance units. Try a range of speeds while checking for consistency between the PINIT140.EXE displayed speed and the vehicle's speedometer reading. If possible, run the vehicle over the range of speeds that it normally operates in.

```
       ****************** Odometer Installation ******************

Odometer calibration procedure

            Press ANY KEY to stop calibration.


ODOM SPEED = X
```

Once the verification is stopped, the following display is presented. Answer 'y' or 'n' depending on the results of the test. It is unusual to get this far and fail. So if there were problems, you might want to check for continuity in the wiring, before abandoning this configuration.

```
       ****************** Odometer Installation ******************

Odometer speed output stopped.

Was the speed consistent with the speedometer reading? (Y/N)
```

If the speeds were not consistent, answer 'n' to the question. The following will be displayed.

```
      *************** Odometer Installation Failed ****************

This signal is not acceptable.

Please go to a taxi meter shop to obtain a Hall effect transducer.
The transducer should produce the maximum number of pulses possible.
The gyro cannot be calibrated until the odometer installation
is completed successfully. Refer to the manual for more information.
```

If the speeds were consistent, congratulations, you have successfully completed the odometer installation. The following screen will be displayed. Please continue by calibrating the gyro.

```
Successful odometer calibration

You may proceed with the gyro calibration.
Press 'd' to return to the calibration menu.
```

Calibrating the Gyroscope

Having completed the odometer calibration, the next step is to calibrate the gyroscope. The odometer must be successfully calibrated prior to beginning gyroscope calibration, because knowledge of the vehicle motion is imperative to correct gyroscope function.

The calibration of the gyro scale factors requires that the vehicle is driven in 5 circles clockwise, then 5 circles counter-clockwise. The quality of this calibration will have a direct impact on system performance. Unlike the odometer scale factor that will be refined over time, this procedure will compute values that will not change.

The following guidelines are useful in planning a high quality gyro calibration.

- Drive the vehicle on a smooth level surface during the gyro calibration procedure. A large unobstructed parking lot makes a good calibration area.
- Drive the circles at a moderate turn rate. Completing each revolution in 20 to 30 seconds will provide a good turn rate.
- The vehicle turn radius will be a limiting factor, but the circles should be about 60 feet (20 meters) in diameter.
- Be sure that the gyro is mounted in the correct orientation. The ‘THIS SIDE UP’ designator should be as close to vertical in the vehicle as possible. The gyro should be mounted solidly, in an area that will not experience bumping from other items.
- Before each set of circles, it is best to align the vehicle with some reference, that can be used at the beginning and end of the circles. Parking space lines make a good reference. After the five circles, return to the same line and align the vehicle as at the start.

Type ‘d’<cr> to return to the main Sensor Calibration menu.

```
          PLCRINIT vX.XX,  Use <Esc> to Quit; Use ? for Help Screen
        ****************** 455DR Sensor Setup Menu ******************


1) Start Odometer Installation Procedure
2) Start Gyro Scale Factor Calibration
3) Check Backup Light Installation
4) View/Set Odometer Parameters
5) Reset Odometer Parameters
6) View/Set Gyro Parameters
7) Exit Sensor Configuration
Enter choice:
```

Type ‘2’<cr> to proceed with the gyro calibration. Please read guidelines above before proceeding. The following screen will be displayed.

```
    *************** Gyro Scale Factor Calibration ********************

The odometer installation/calibration should be complete before starting
the gyro calibration

Are you ready to calibrate the gyro? (Y/N)
```

Type ‘y’ to begin. The next screen prompts you to press any key when you are ready to begin the calibration.

```
    ************** Gyro Scale Factor Calibration ********************

Gyro scale factor calibration begins with clockwise (RIGHT)
Turns. Prepare to make right turns.

               Press ANY KEY to begin calibration.
```

Once the calibration is begun, the following screen will be updated as you drive the circles. Before starting to drive, please verify that the calibration heading stays fixed at 0.0 degrees. If not, the odometer installation should be checked.

```
    ************** Gyro Scale Factor Calibration ********************

Right Scale Factor Cal Started.

               Press ANY KEY to stop calibration.

DR Sensor Calibration Data:
  Calibration Heading: ddd.ddd
```

Drive 5 circles clockwise returning to the original vehicle direction when done. 5 circles represent 1800 degrees. At completion of the circles, the calibration heading should be between 1620 and 1980 degrees. When the vehicle is aligned properly, type <space> to end the clockwise calibration. The following screen will then be displayed.

```
    ************** Gyro Scale Factor Calibration ********************

Prepare to make left turns.

               Press ANY KEY to begin calibration.
```

Move the vehicle if necessary to the position for completing counterclockwise turns. You should perform the calibration in a similar manner to the clockwise direction. Type <space> to begin calibration.

```
    ************** Gyro Scale Factor Calibration ********************

Left Scale Factor Cal Started.

               Press ANY KEY to stop calibration.

DR Sensor Calibration Data:
  Calibration Heading: -ddd.ddd
```

As you drive, notice that the counterclockwise turns are indicated by a negative calibration heading. Drive 5 counterclockwise circles returning to the original vehicle direction when done. When the vehicle is aligned properly, type <space> to end the counterclockwise calibration. At completion of the circles, the calibration heading should be between -1620 and -1980 degrees. The following screen will then be displayed.

```
    *************** Gyro Scale Factor Calibration ********************

     GYRO BIAS RATE (FYI) : sd.dddddd
     GYRO LEFT SCALE FACTOR : d.dddddd
     GYRO RIGHT SCALE FACTOR : d.dddddd

1) Save these values.
2) Use existing values.
3) Use factory default values.
Enter choice:
```

The bias rate is provided for your information. The bias should be between –10 to +10 degrees per second for a correctly functioning gyro. The left and right scale factors should lie in the range form 0.9 to 1.1 and be close to each other in value. If you feel that the calibration was performed accurately, the scale factor values should be saved in battery backed memory by typing ‘1’<cr>. Otherwise, select 2 if a good calibration had already been performed, or 3 if this was the first attempt.

The gyroscope calibration procedure is complete.

Backup Signal Verification

To have correct positioning of the Placer 455DR system during times that the vehicle is in reverse, the 455DR needs an indication of reverse. By pressing '3'<cr> from the main sensor setup menu you will go to the Check Backup Light Installation section of the initialization program.

```
          PLCRINIT vX.XX,  Use <Esc> to Quit; Use ? for Help Screen
       ****************** 455DR Sensor Setup Menu ******************


1) Start Odometer Installation Procedure
2) Start Gyro Scale Factor Calibration
3) Check Backup Light Installation
4) View/Set Odometer Parameters
5) Reset Odometer Parameters
6) View/Set Gyro Parameters
7) Exit Sensor Configuration
Enter choice:
```

The following screen is displayed for backup signal checkout.

```
   *************** Backup Light Installation Check ******************

The backup input to the Placer 455DR should be connected
to a signal that goes high when the vehicle is backing up.

While parked, shift in and out of reverse not faster than
once per second and note the output on the screen.

Are you ready to check the backup connection? (Y/N)
```

After typing 'y' the following screen will be displayed. If the vehicle is in a forward gear, neutral or park the 'off' will be displayed

```
*************** Backup Light Installation Check ********************


               Press ANY KEY to stop check.

The backup signal is off
```

When the vehicle is shifted into reverse, the following display will be on the screen.

```
*************** Backup Light Installation Check ********************


               Press ANY KEY to stop check.

The backup signal is on
```

After the check is complete, the following summary screen will be displayed.

```
*************** Backup Light Installation Check ********************

If the backup light indication was on each time the vehicle
was shifted into reverse, the backup connection is correct.
If not, please check the wiring and return to this check when
the connection has been made.

Type 'd' to return to the calibration menu.
```

If the signal did not checkout, refer to the vehicle's wiring diagram(s) to determine the correct signal for reverse indication.

Viewing/Setting the Odometer Parameters

```
          PLCRINIT vX.XX,  Use <Esc> to Quit; Use ? for Help Screen
        ****************** 455DR Sensor Setup Menu ********************


1) Start Odometer Installation Procedure
2) Start Gyro Scale Factor Calibration
3) Check Backup Light Installation
4) View/Set Odometer Parameters
5) Reset Odometer Parameters
6) View/Set Gyro Parameters
7) Exit Sensor Configuration
Enter choice:
```

Item 4 on the sensor setup menu is a utility to update/view the odometer calibration values. This utility can be used if the Placer 455DR requires a firmware update. By using these utilities, the calibration procedure will not have to be repeated. Prior to updating the Placer 455DR firmware, the odometer parameter utility can be used to view the parameters, write them down, and reenter the values after the update is performed. To view or set the odometer parameters, type '4'<cr>, at the next screen, press <space> until the Request(0) option is displayed, then type <cr>.

```
        ******************** Odometer Parameter Data ********************

Command: Request (0)

Odom Status: No Status
Odom Parameter Data:
      Digital Odom, potentiometer settings: XXXX
      Odom scale factor = d.dd meters/pulse
```

Possible status messages:

No odom pulses received since start-up	If the vehicle has not been driven, this is just information. If the vehicle has moved, this indicates an error.
Odom scale factor out of tolerance	The odometer has insufficient resolution (i.e. < 2000 pulses per mile)
Backup light is on	Information only.

Selecting Set(1) instead of Request(0) will take you through a set of questions to set the values if the battery backed ram has been cleared.

Resetting the Odometer Parameters

```
          PLCRINIT vX.XX,  Use <Esc> to Quit; Use ? for Help Screen
        ****************** 455DR Sensor Setup Menu ********************


1) Start Odometer Installation Procedure
2) Start Gyro Scale Factor Calibration
3) Check Backup Light Installation
4) View/Set Odometer Parameters
5) Reset Odometer Parameters
6) View/Set Gyro Parameters
7) Exit Sensor Configuration
Enter choice:
```

Item 5 on the sensor setup menu is a utility to reset odometer calibration values. If the odometer calibration procedure was interrupted in the middle, the odometer values should be reset prior to beginning the calibration. To reset the odometer parameters, type '5'<cr>. There is no further action needed by the operator. The following screen will be shown.

```
      ***************** Odometer Parameter Reset **********************

Resetting odometer parameters to their default values
```

Viewing/Setting the Gyroscope Parameters

```
          PLCRINIT vX.XX,  Use <Esc> to Quit; Use ? for Help Screen
        ****************** 455DR Sensor Setup Menu ******************


1) Start Odometer Installation Procedure
2) Start Gyro Scale Factor Calibration
3) Check Backup Light Installation
4) View/Set Odometer Parameters
5) Reset Odometer Parameters
6) View/Set Gyro Parameters
7) Exit Sensor Configuration
Enter choice:
```

Item 6 on the sensor setup menu is a utility to update/view the gyroscope calibration values. This utility can be used if the Placer 455DR requires a firmware update. By using these utilities, the calibration procedure will not have to be repeated. Prior to updating the Placer 455DR firmware, the gyroscope parameter utility can be used to view the parameters, write them down, and reenter the values after the update is performed. To view or set the gyroscope parameters, type '6'<cr>, at the next screen, press <space> until the Request(0) option is displayed, then type <cr>.

```
****************** Gyroscope Scale Factor Data ***** *************

Command: Request (0)

Gyro Status: No Errors
Gyro rate bias: sdd.ddd deg/sec
Gyro Parameter Data:
      Gyro Left Scale Factor  :  d.dddddd
      Gyro Right Scale Factor :  d.dddddd
```

Possible status messages:

Gyro bias is out of tolerance	Gyro failure, call Trimble service
Gyro scale factors out of tolerance	Try the calibration again. First verify odometer calibration and correct mounting of the gyro.
No gyro scale factor calibration has been performed	The gyro needs to be calibrated.

Selecting Set(1) instead of Request(0) will take you through a set of questions to set the gyro scale factor values if the battery backed ram has been cleared.