OPERATIONS MANUAL

CHAPTER 7

XCONNECT PROGRAMMING

HIGH SIDE TEST

REV B: 2017 Jan

XFLD-0007

Table of Contents

This chapter of the manual provides instructions on how to program the tool using the XConnect Software and performing the bank test.

Please ensure that the tool and the surface system are connected as per the job preparation section on chapter 6.

1. TEST MODE

The XEM tool can be put in "Test Mode"; this allows the X-Connect software to communicate and the XTR to supply power to the tool thereby saving battery life while configuring the Tool and doing bank test. **This is recommended if the Surface tests take time and it is required to save battery life. If the Tool is configured and tested in Test Mode, battery functionality will have to be conformed during the XEM Rx test in Section 8. If the Tool will NOT be configured in test Mode, proceed to Section 2 Programming software.**

Please ensure you use the 22-XEM0021 test box when communicating with the tool in Test Mode. Information on using the Test box is given in Section 2.4 of Chapter 6.

1.1. HARDWARE SETUP

1. Ensure you have:

- Connected the XRT/Azonix, XTR and the XEM as per instructions in Chapter-6.
- Powered up the XTR and the XRT.
    - On the XTR, the +12 V,-12V and +5V should all be ON.
    - The TOOL LED should be OFF indicating the XEM is NOT in Test Mode.

Figure 1 XTR with Power ON

1.2. XEM RX

1. On the XRT launch "XEM Rx" from the short cut on the desk top.

   Or alternatively,

   Launch XEM Rx from START> Extreme Engineering > XEM> Rx.

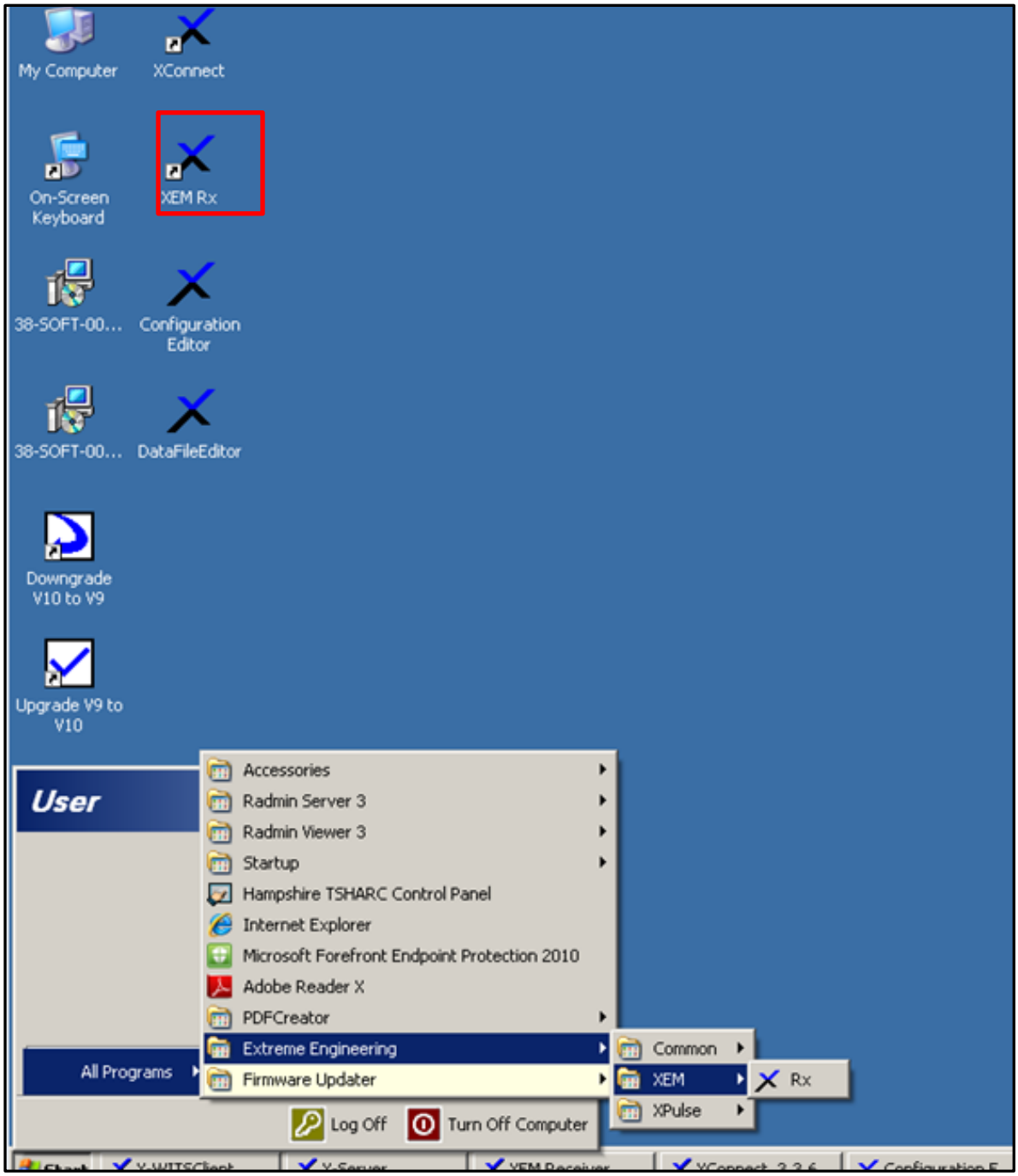

Figure 2 XEM RX launch

1.3. LOAD DATA FILE

On the Load Data File window:

2. Select the “StandardDataFile.V10xdf”.
3. Click “Open”.

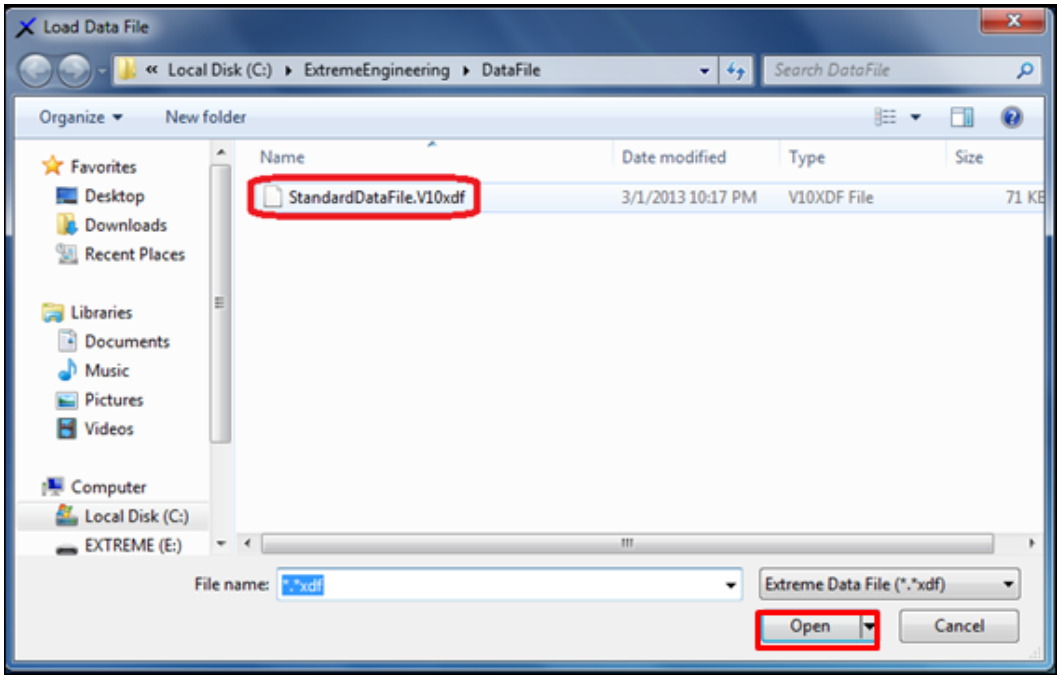

Figure 3 Select Data file

The Data File contains information about the the number of bits, resolution,error codes for all the data points acquired by the tool.

This file is created by the Operations – Engineering team and updated for each software revision.

1.4. CONFIGURATION FILE

4. The Load Configuration window will appear:

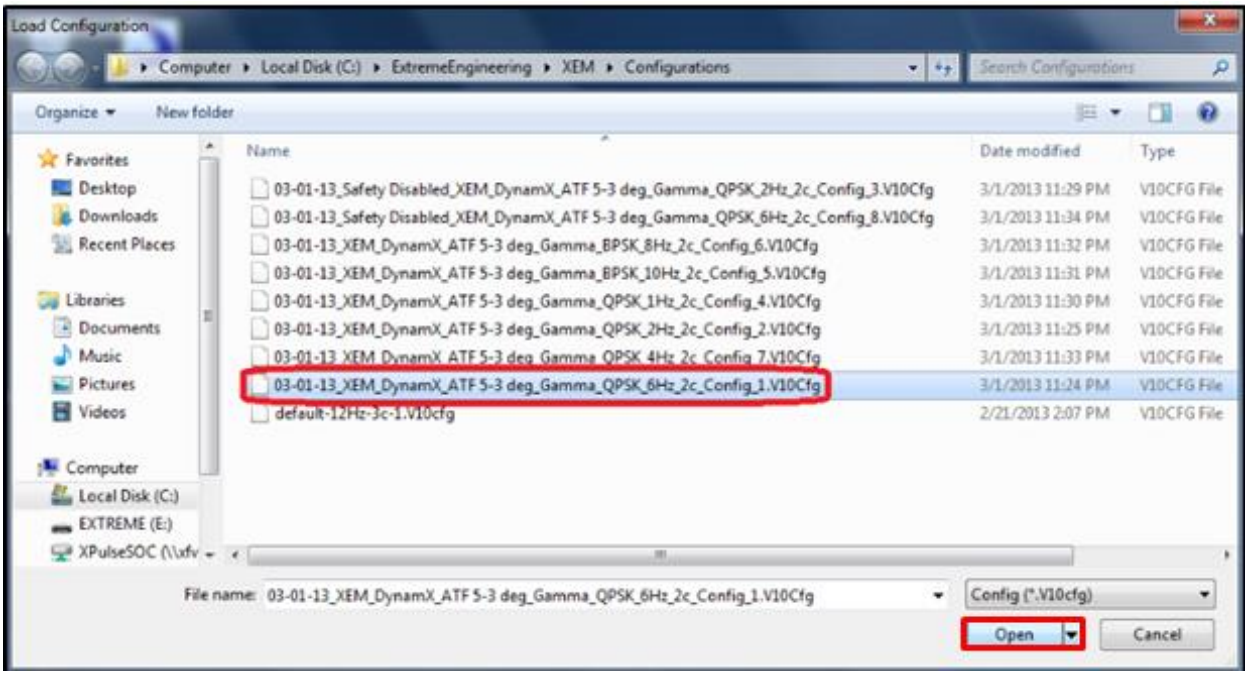

Figure 4 Select Configuration file

5. Select ONLY 1 configuration file that the tool will be operating in.

   When the operator programs the tool, it should initially start in configuration 1, unless the operator has performed a downlink or changed the configuration file setting in the tool using X-connect.

6. Click “Open”.

1.5. SURFACE BOX

7. The XEM Receiver will launch displaying the “Capture” tab.
8. Click on the “Surface Box” tab.

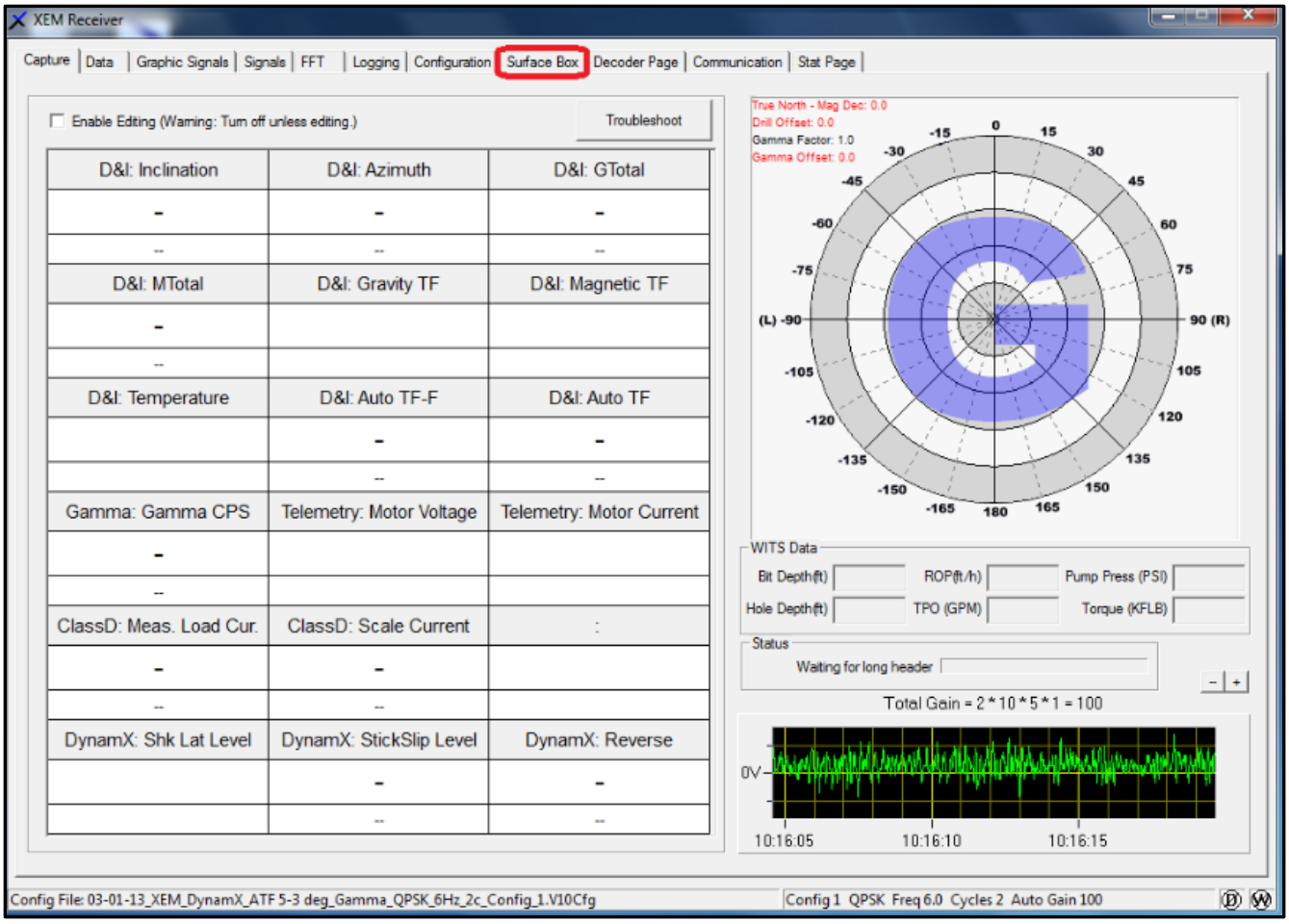

Figure 5 XEM Rx Capture Tab

9. On the Surface Box tab
10. Click on “Test Mode”

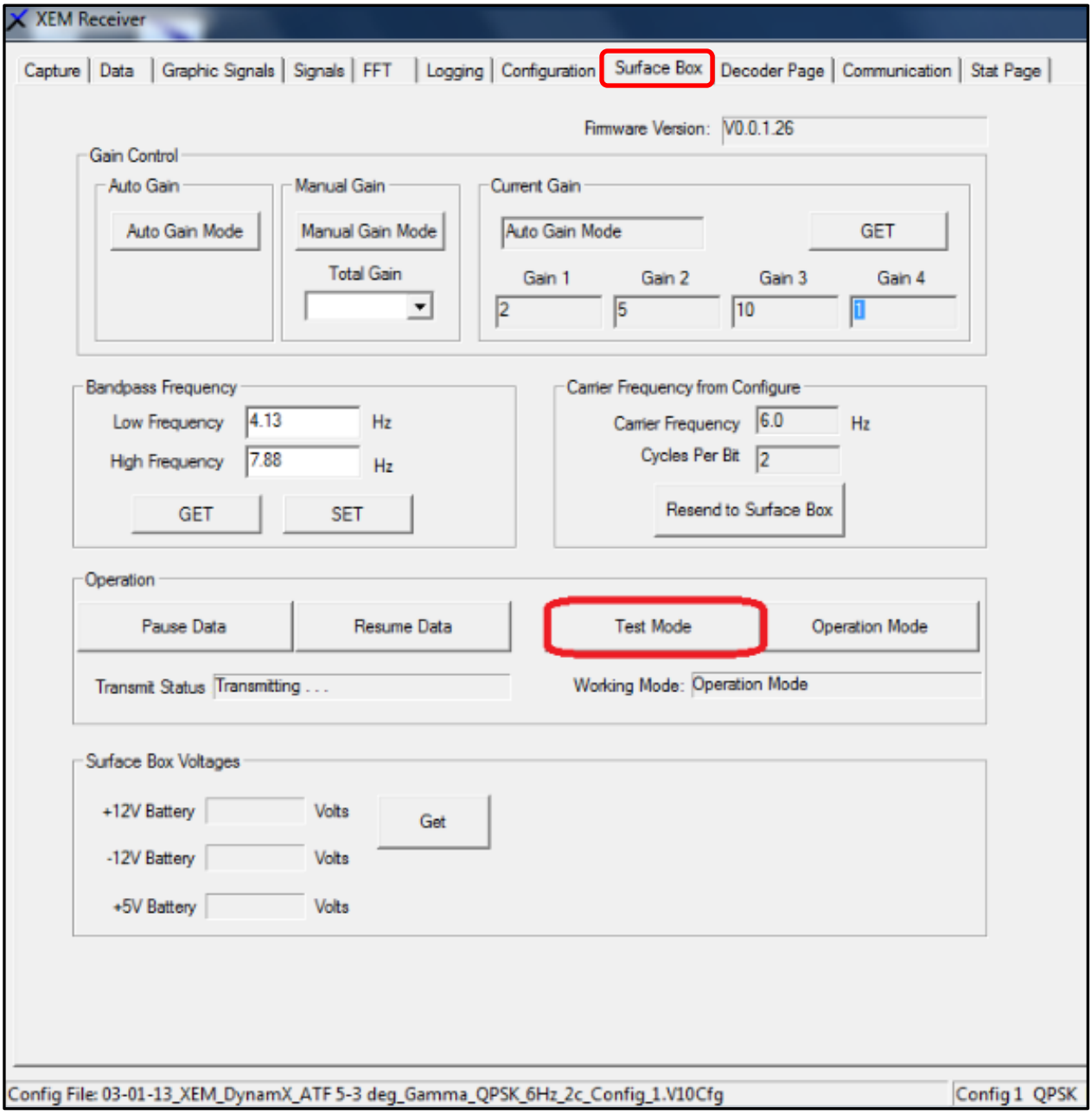

Figure 6 XEM Rx Surface Box tab

11. The XEM receiver will indicate that the Tool is actually in “Test Mode”.

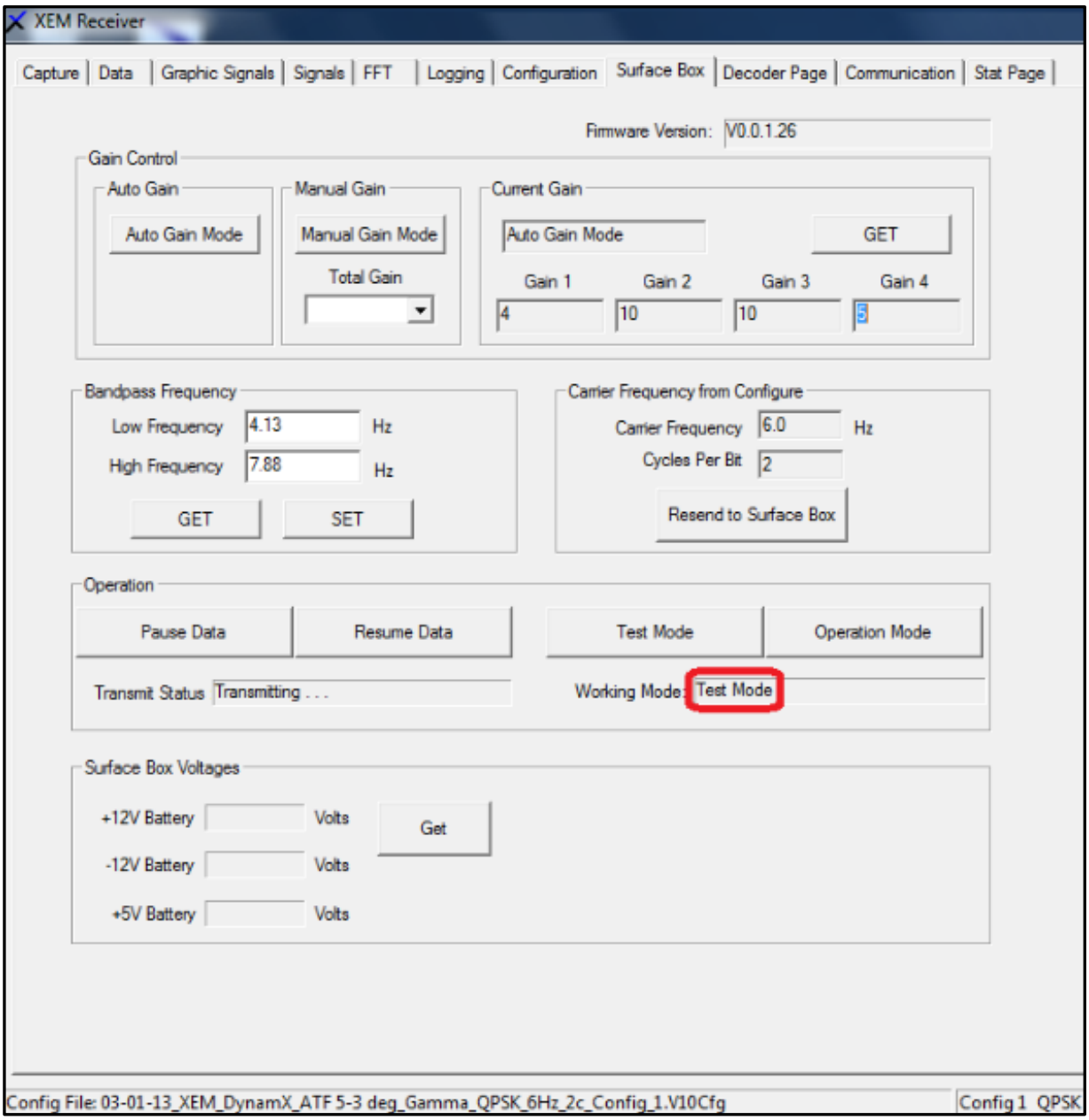

Figure 7 TEST Mode

Now you need to confirm from the XTR that the Tool is in Test Mode.

1.6. XTR TOOL LED

12. On the XTR the “TOOL” LED will turn ON confirming the Tool is in Test Mode.

Figure 8 XTR Showing Tool in Test Mode

13. Proceed to the next stage to use the XConnect .

2. PROGRAMMING SOFTWARE

2.1. LAUNCH X-CONNECT

1. Launch the XConnect application by clicking the “XConnect” short cut on the desk top.

   Or,

2. Alternatively, launch “X Connect” from START >Extreme Engineering>Common> XConnect.

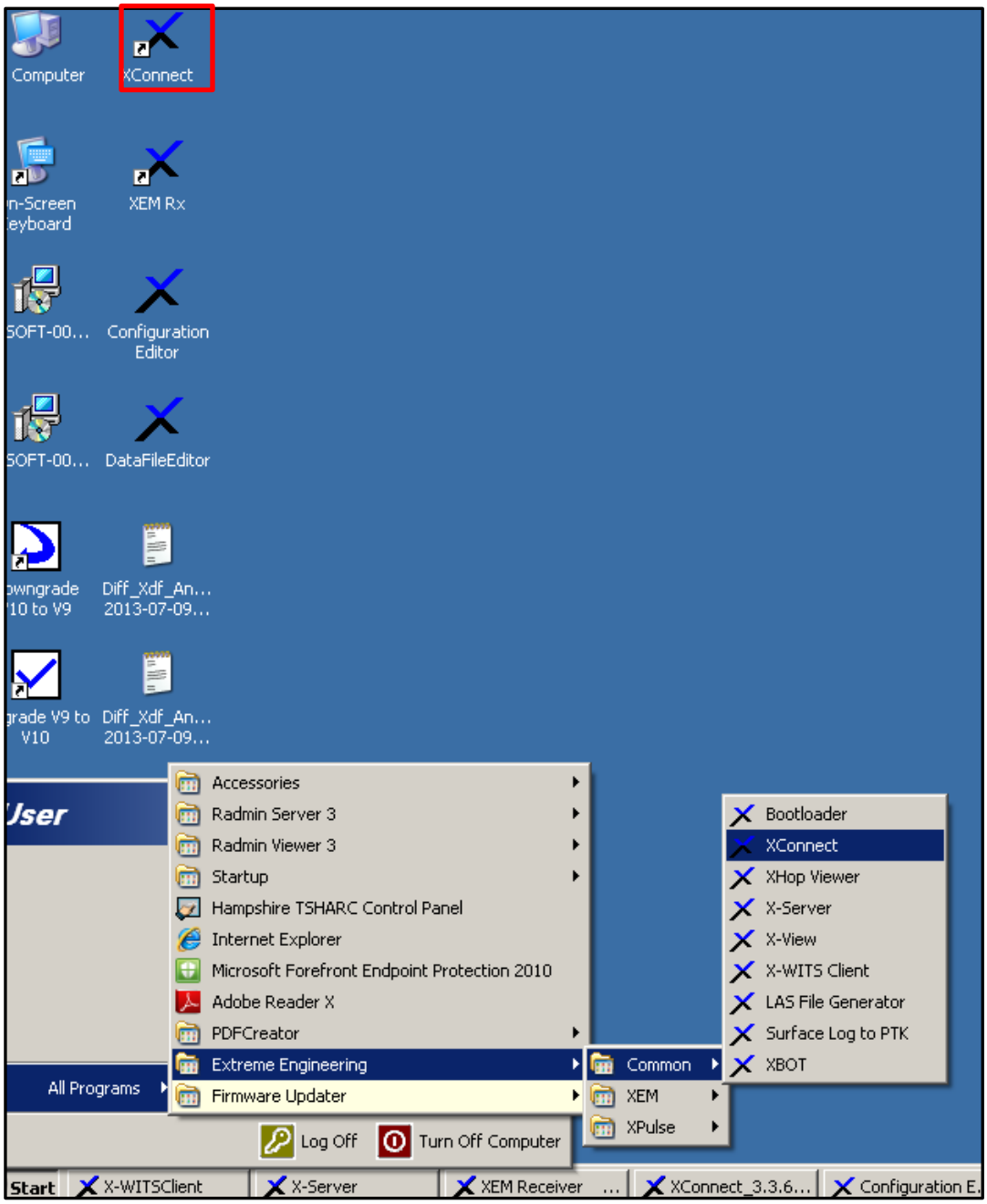

Figure 9 XConnect launch

XConnect is used to:

- Load configuration files that will be used by the tool during the Job.
- Confirm the firmware used by the different probes.
    - The firmware is actually uploaded using the firmware updater which uses the boot loader application.

      CAUTION: When upgrading Firmware or Software on the XEM hardware, ensure that the tools are not disconnected from power. Loss of power may cause the updates to fail, resulting in potentially permanent damage to the equipment.
- Erase the memory in the flash drive.
- Monitor data from the different nodes in the tool.

2.2. LOAD DATA FILE

The Load Data file window will appear:

3. Select the “StandardDataFile.V10xdf”.
4. Click “Open”.

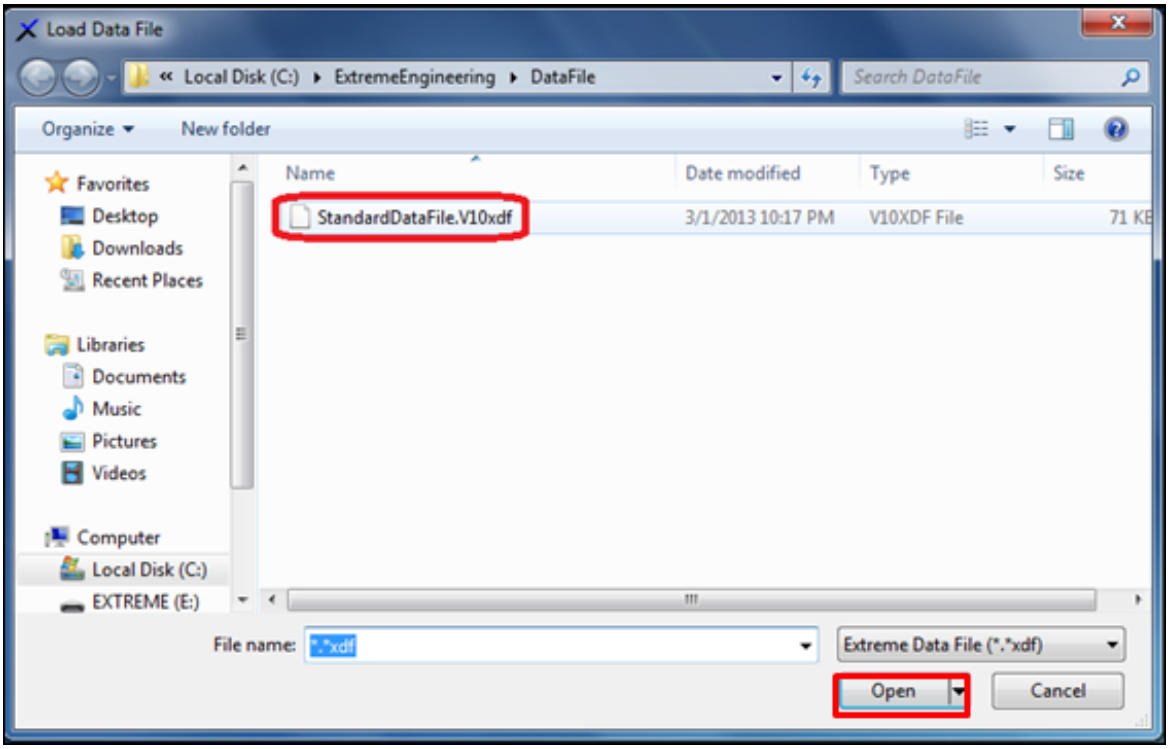

Figure 10 Select the Data file

2.3. XCONNECT

5. The XConnect application will start.
6. At the bottom left on the Window Tab, “Reading CAN….” will appear.
   This means the XConnect is looking for Nodes on the CAN BUS.
   The CAN BUS is used for communicating information between different nodes in the tool.

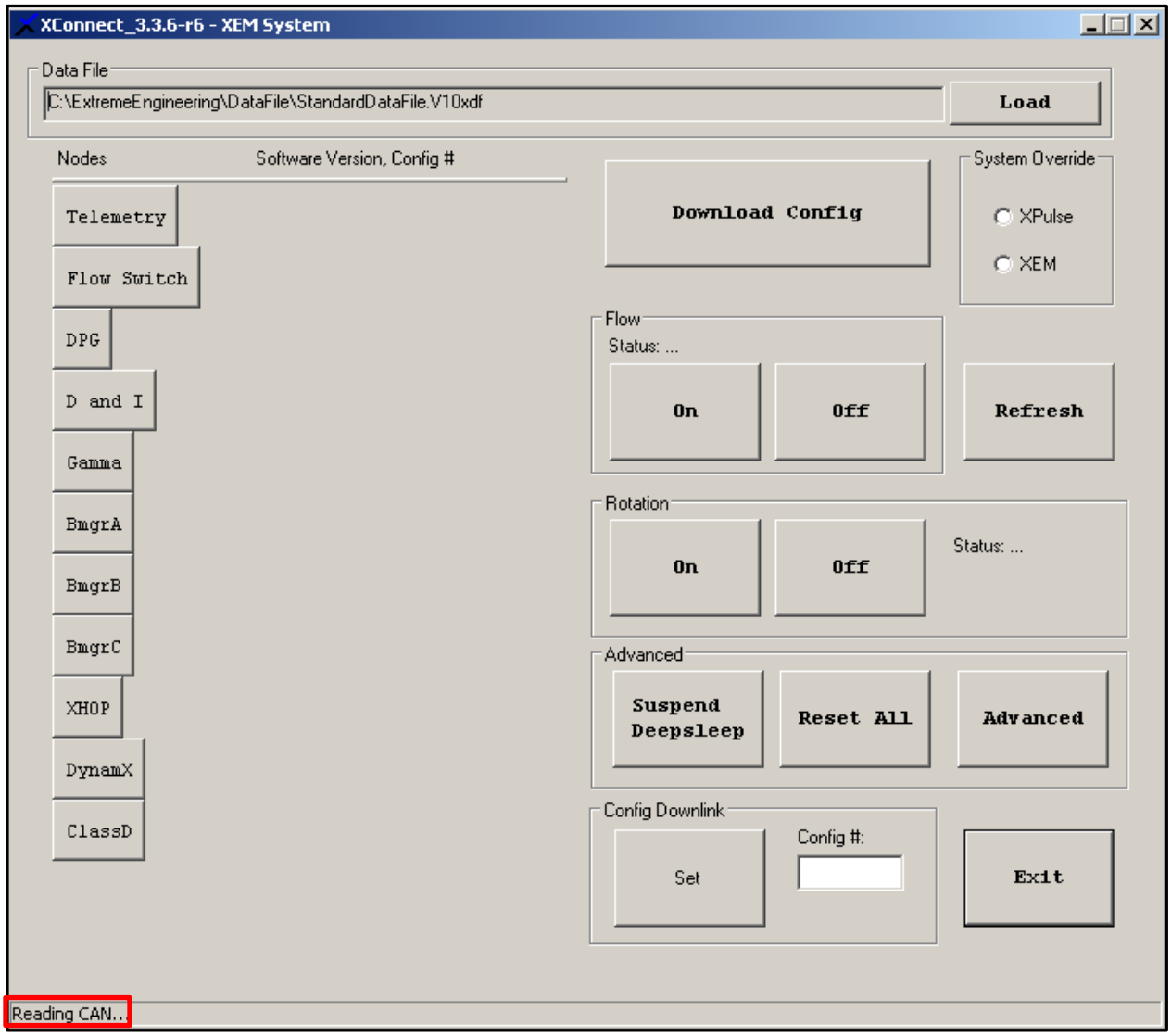

Figure 11 Reading CAN

7. If the Nodes do not appear, inspect all the connections in the Cables and probe.
   Check the TOOL LED on the XRT to ensure that the Tool is powered ON.

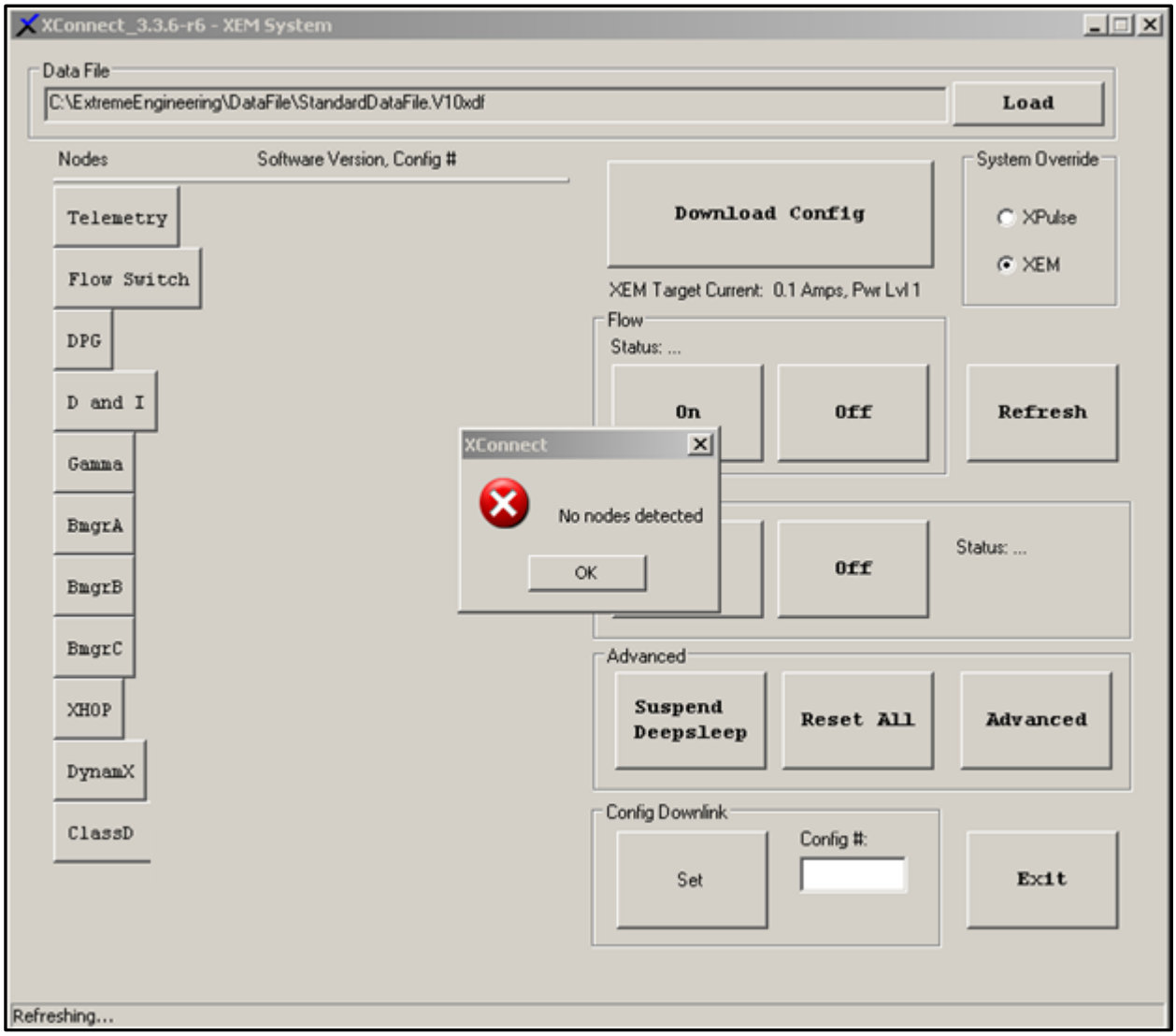

Figure 12 XEM XConnect Console - Reading CAN

8. If a Node is not appearing, click on the 'refresh'.

   This refreshes the list of active nodes.

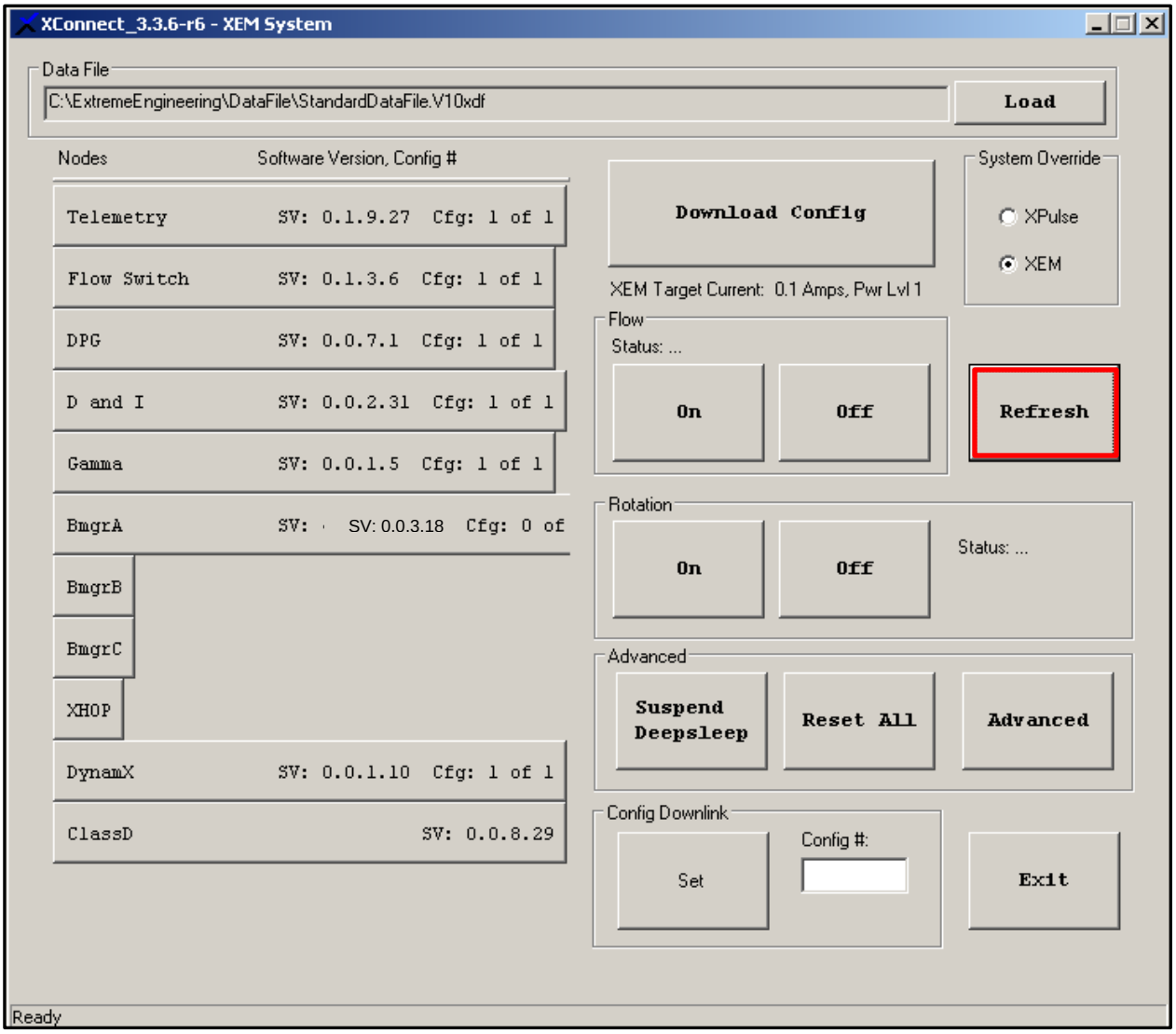

Figure 13 XConnect "Refresh"

If a particular Node still does not appear, you will have to perform basic troubleshooting which may include checking the hardware; this would involve changing one item at a time.

2.4. LOW/ HIGH VOLTAGE

The software versions for the nodes should match the standard list of downhole software maintained by the Operations Engineering Team. The list at the time of writing the manual is given in Table-1 below.

9. The XTX probe contains the Telemetry, Flow switch and the Class D Nodes.
10. Confirm that the XTX probe is a **Low voltage** or a **High voltage probe.**

Low Voltage XTX Probes are currently used in most cases.

The software revision for the Telemetry and the Class D Nodes have the numbers 0.X.X.XX for Low Votage probes.

The XTX probe in the figure below is a low voltage probe.

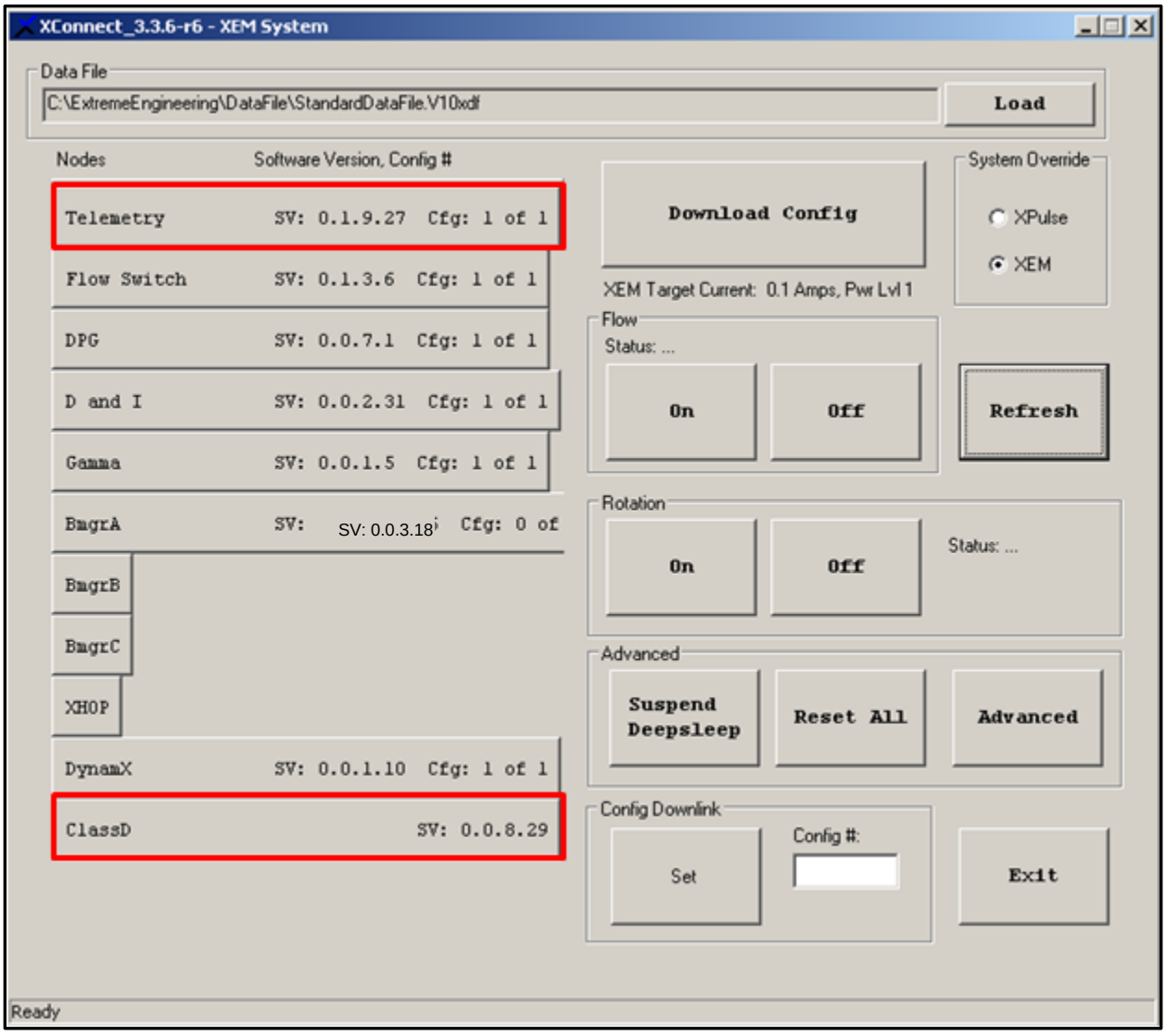

Figure 14 XConnect Low voltage software versions

High Voltage: A special configuration of XTX probes allows the gap sub to inject higher power into the formation and is typically used on deep wells with oil based mud drilling environment.

If you have a **high voltage** Telemetry probe the software revisions for both Telemetry and Class D should both begin with the numbers **3.X.X.XX.**

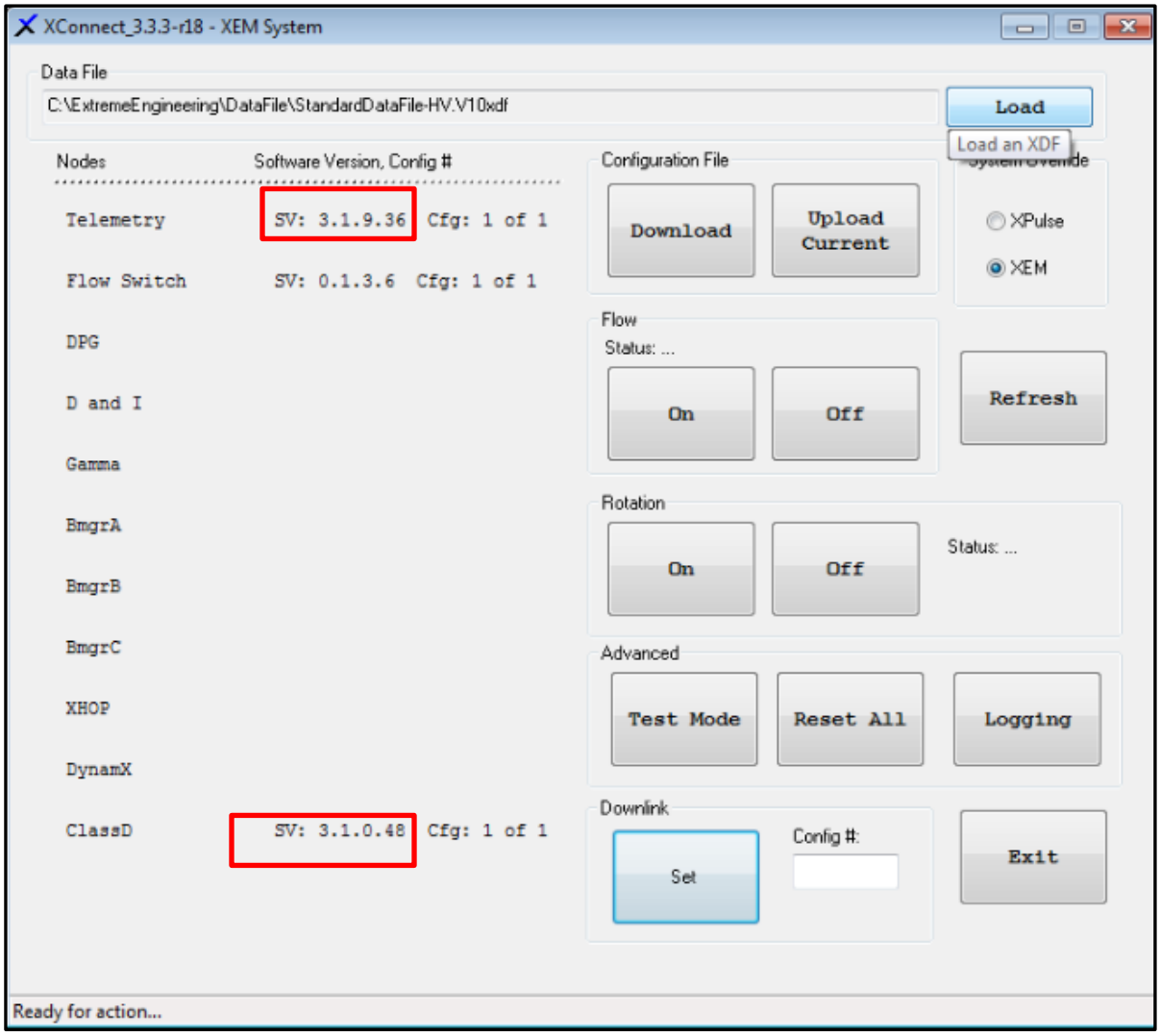

Figure 15 XConnect High Voltage

The software versions for all the Nodes should match the current software list maintained by the Ops Engineering team. Table -1 provides the list of the current software versions at the time of writing this manual.

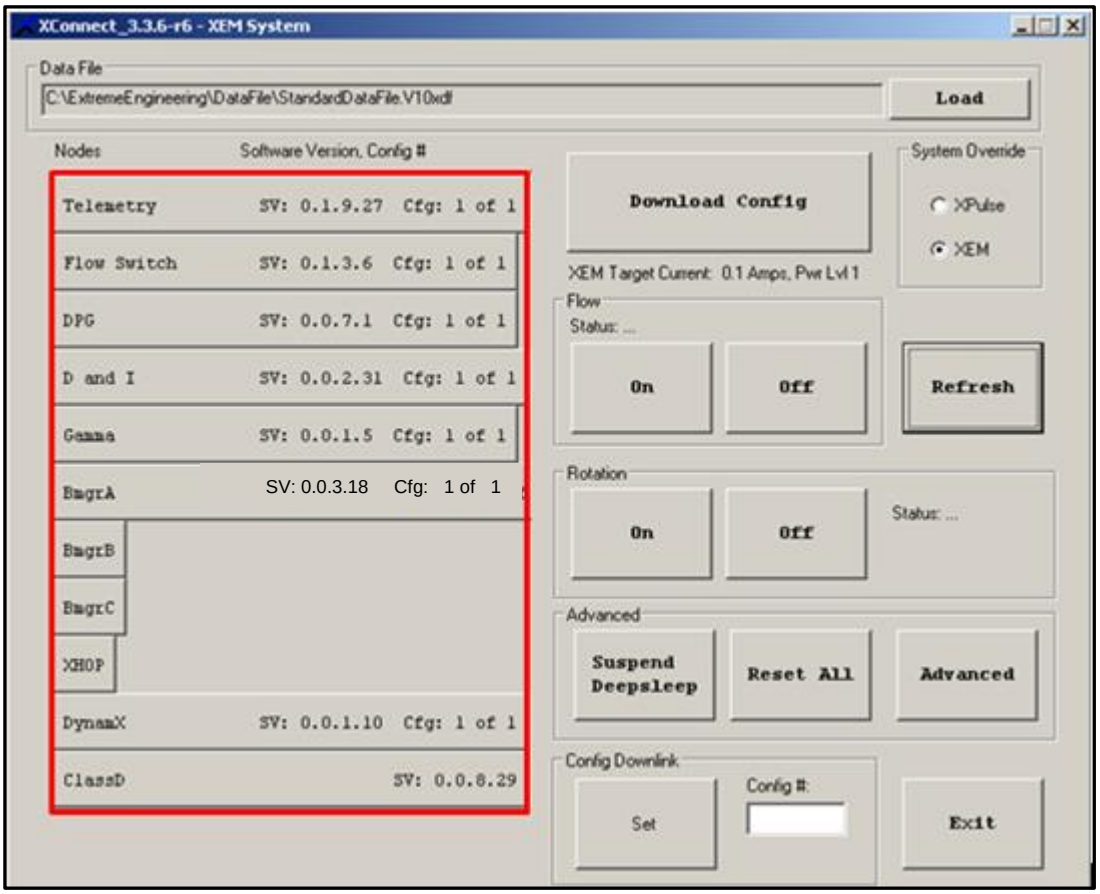

Figure 16 Software Versions for Nodes

NODE	LOW VOLTAGE	HIGH VOLTAGE
Telemetry	0.1.9.27	3.1.9.35 or 3.1.9.36
Flow switch	0.1.3.6	
DPG	0.0.7.1	
D&I	0.0.2.31	
Gamma	0.0.15	
BMGR	0.0.3.18	
DYNAMX	0.0.1.10	
XJDI	0.1.1.4	
Class D	0.0.8.29	3.1.0.45 or 3.1.0.46
XHOP	0.0.06	

only for HVTX 001-003 rev A

Table-1 Software Versions for Probes

2.5. DOWNLOAD CONFIGURATION

11. Click on “Download configuration”.
12. For each job there is a specific configuration which provides information to the Tool on the type of information that is to be transmitted up-hole along with the power level.

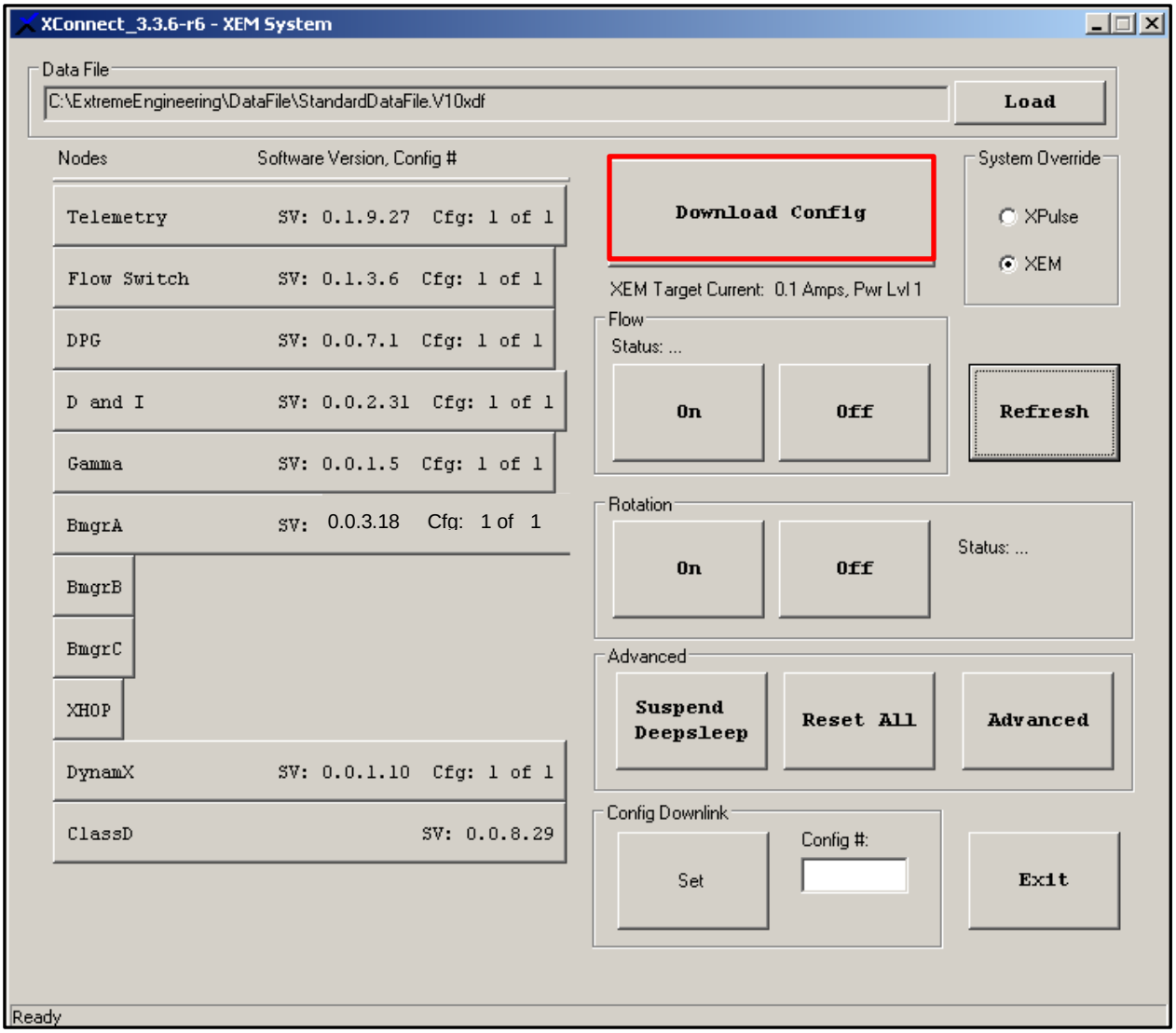

Figure 17 Download Configuration

13. A window will appear and ask you to confirm the time is accurate, as this is the time the tool will store internally and correlate all recorded data to.
14. If the time is not set correctly there can be a mismatch between the data acquired while drilling on surface versus the data recorded in the tool.

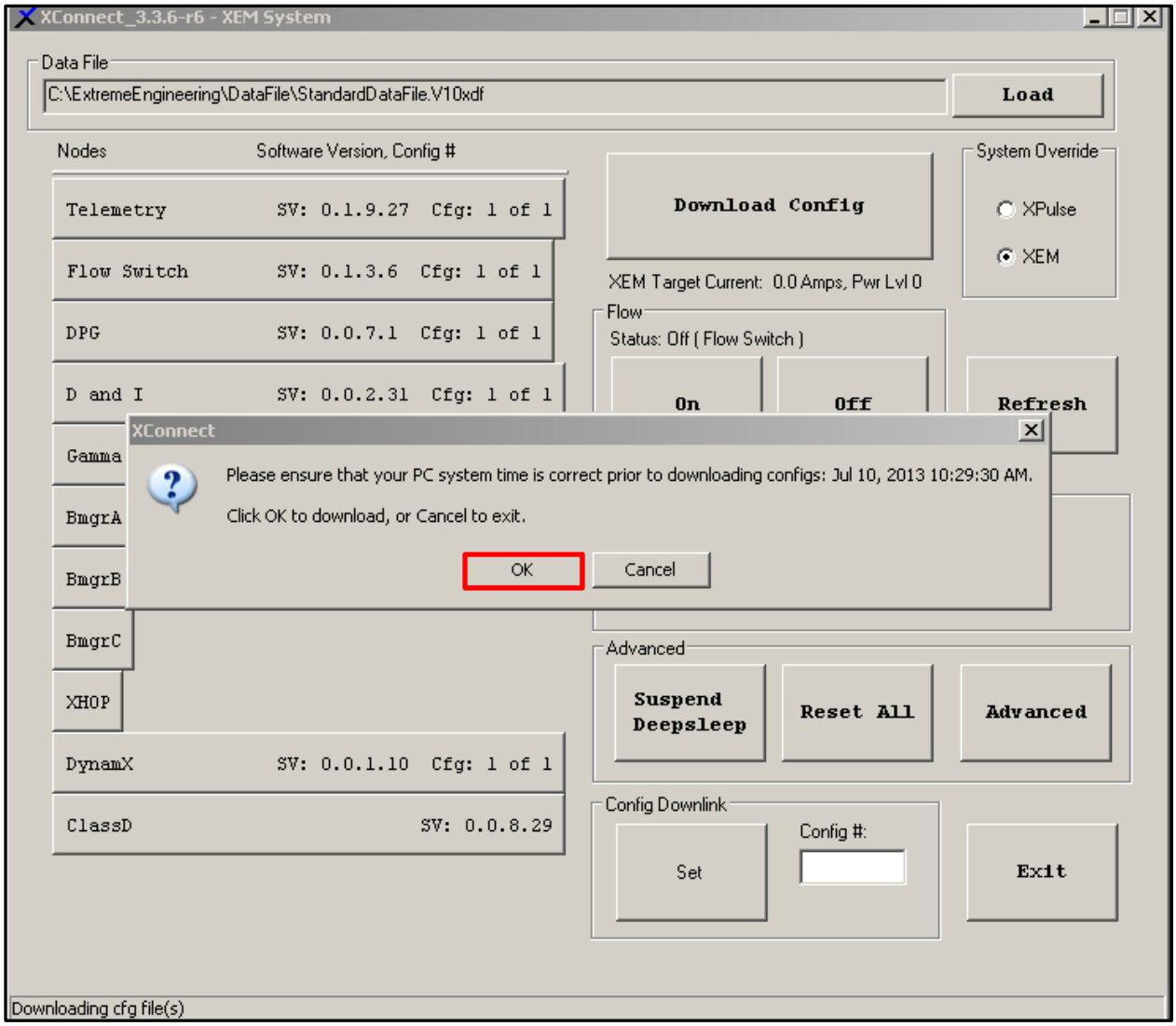

Figure 18 Time synchronization

15. Click “OK” if the computer time is correct.
16. If the time is not correct or the same as the EDR click cancel, change the time on the computer and repeat the steps above.

When prompted

17. Select “ALL” the configuration files that need to go into the tool
18. Click “Open”

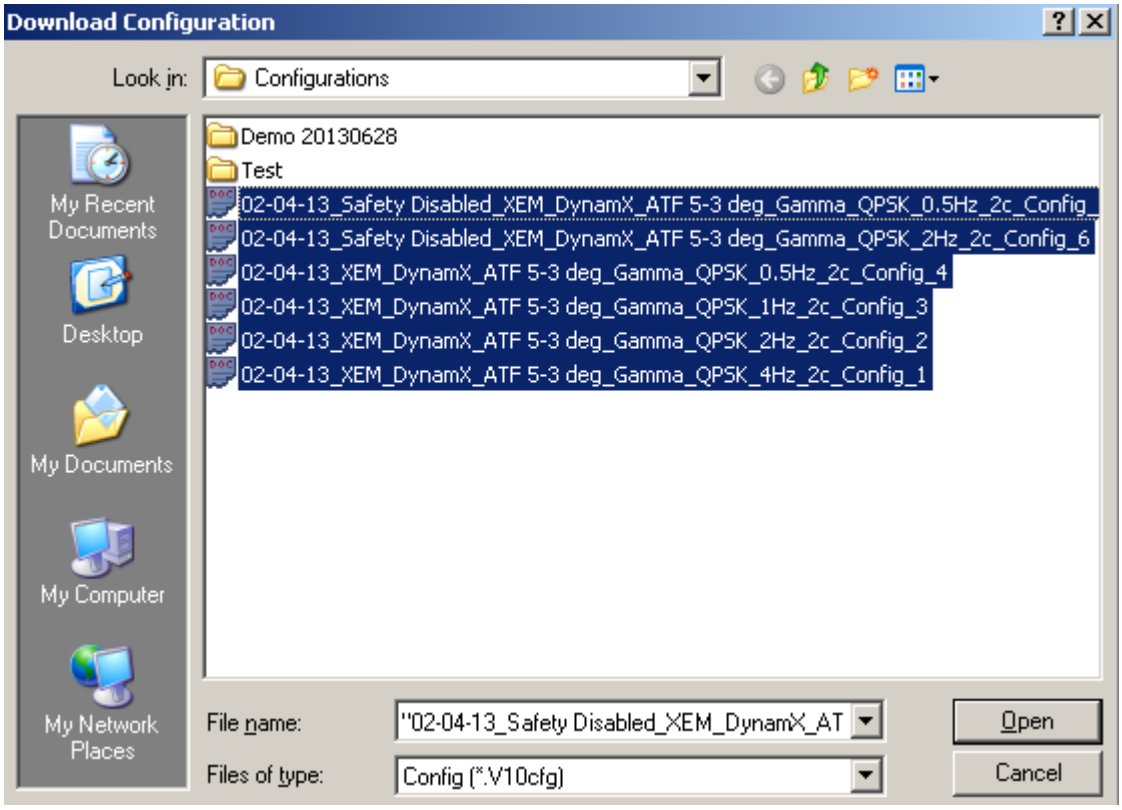

Figure 19 Open configuration files

NOTE:

A maximum of 8 configuration files can be loaded into the tool. The file which ends in Config_1 will be used first by the tool.

The tool will use the 02-04-13_XEM_DynamX_ATF 5-3deg_Gamma_QPSK_4Hz_2c_**Config_1**

In this file

- 02-04-13 is the date configuration file was created.
- XEM refers to the XEM tool.
- DynamX indicates there is a DynamX Probe with Directional, Shock, rpm, Stick& slip sensors.
- ATF5_3 indicates the tool will switch to GTF at 5 degrees and back to MTF at 3 degrees.
- Gamma indicates this probe has a gamma sensor.

- QPSK is the Tool Modulation type. (This can either be BPSK or QPSK).
- 4 Hz refers to the number of Cycles per second.
- 2 C shows that 2 cycles contain the same data for redundancy.
- **Config_1: shows this is the First configuration**

The configuration files with “Safety Disabled” are typically used to bypass the safety barrier where the tool needs to see a pressure of 100psi to work.

This is used when there is a bore pressure sensor failure down hole.

- 02-04-13_safetyDisabled_ XEM_DynamX_ATF 5-3deg_Gamma_QPSK_4Hz_2c_**Config_1**

More information about the structure of the configuration files is given in the Theory chapter.

19. It will take a few minutes to download the configuration into each probe. If a Download error appears, it could indicate a number of different things,

- The configuration file is incorrect.
- There are communication issues.
- Or
- The firmware in Firmware in 1 or more of the probes needs to be upgraded.

20. Stop the process by Clicking “OK”.
21. Check the connections and retry the steps 11 through 19.
22. If you have the same error message at the same probe there is a high possibility of a firmware mismatch.

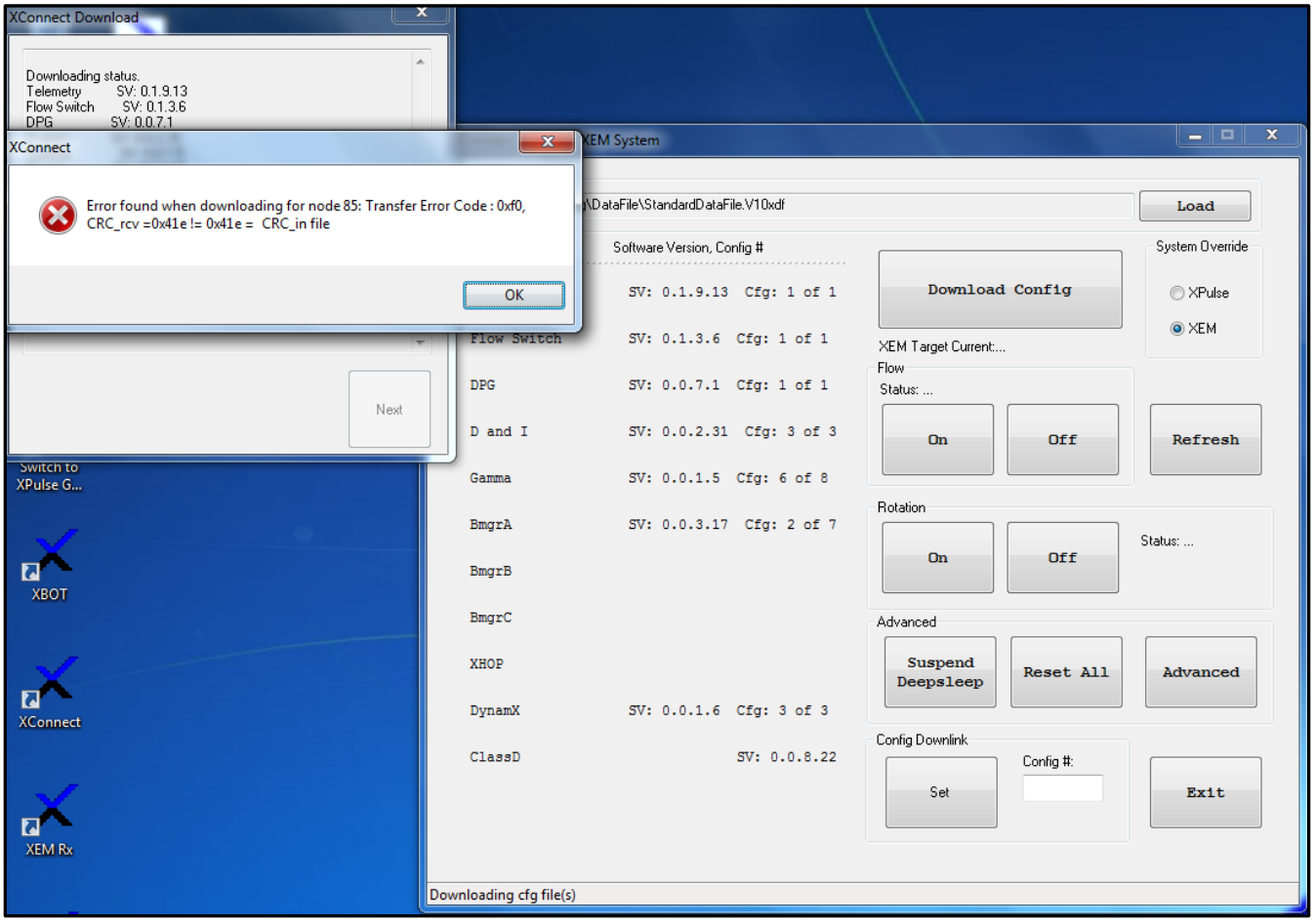

Figure 20 Error while downloading the configuration file

23. Proceed to SECTION-3 to check and upload the firmware versions of all the probes.
24. Once the firmware is upadated you will need to start from the beginning of this section and Load the configuration files again.

25. The XEM Target Current Window will appear.

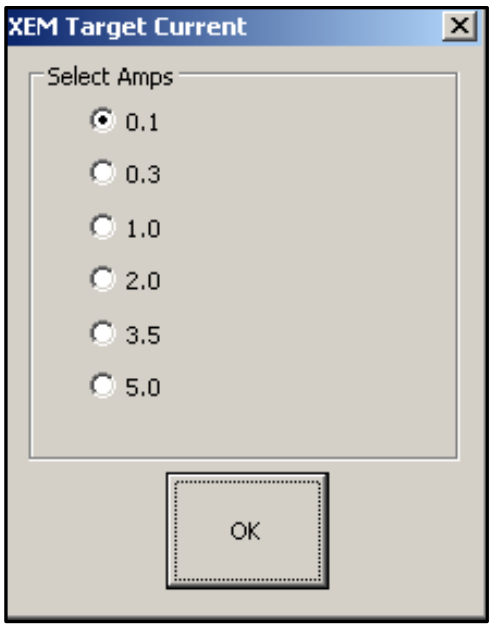

Figure 21 Target Current

26. If the XTX is a Low Voltage probe the information on the XEM Target window is correct.
    - There are 6 x Power Levels.
    - Power levels increase with increasing Amps.
27. If the XTX is a high voltage probe proceed to step 10.

Power Level 1	0.100 Amps
Power Level 2	0.300 Amps
Power Level 3	1.000 Amps
Power Level 4	2.000 Amps
Power Level 5	3.500 Amps
Power Level 6	5.000 Amps

Figure 22 Power levels low voltage probe

28. Select the initial value to be used on the job, this value will be provided by the District Engineer after reviewing the signal strength model for the job.
29. Click “ok”

30. If the XTX is a High Voltage probe the information on XEM Target window is not correct.

- **There are 4 x Power Levels.**
- **The Actual Ampere settings for the Power levels are given in the table below.**

Power Level 1	0.500 Amps (Low Voltage)
Power Level 2	0.100 Amps (High Voltage)
Power Level 3	0.400 Amps (High Voltage)
Power Level 4	No Transmit (Power Off)

Figure 23 Power level High Voltage probe

On the XEM Target window

- Power Level 1 corresponds to 0.1 Amps.
- Power Level 2 corresponds to 0.3 Amps.
- Power Level 3 corresponds to 1.0 Amps.
- Power Level 4 corresponds to 2.0 Amps.

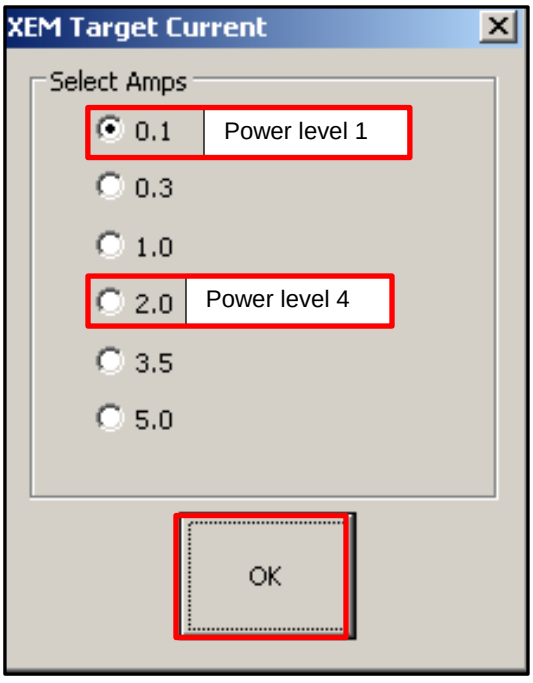

Figure 24 XEM target Current

31. For testing the HV tool on surface select Power Level-1.

32. Click OK.

33. It will take a few minutes to download all the configurations into the different nodes.

34. If the download was successful the XConnect Download Window will show:

- The total number of configurations.
- The current configuration file used by the tool.

35. Click on “Next”:

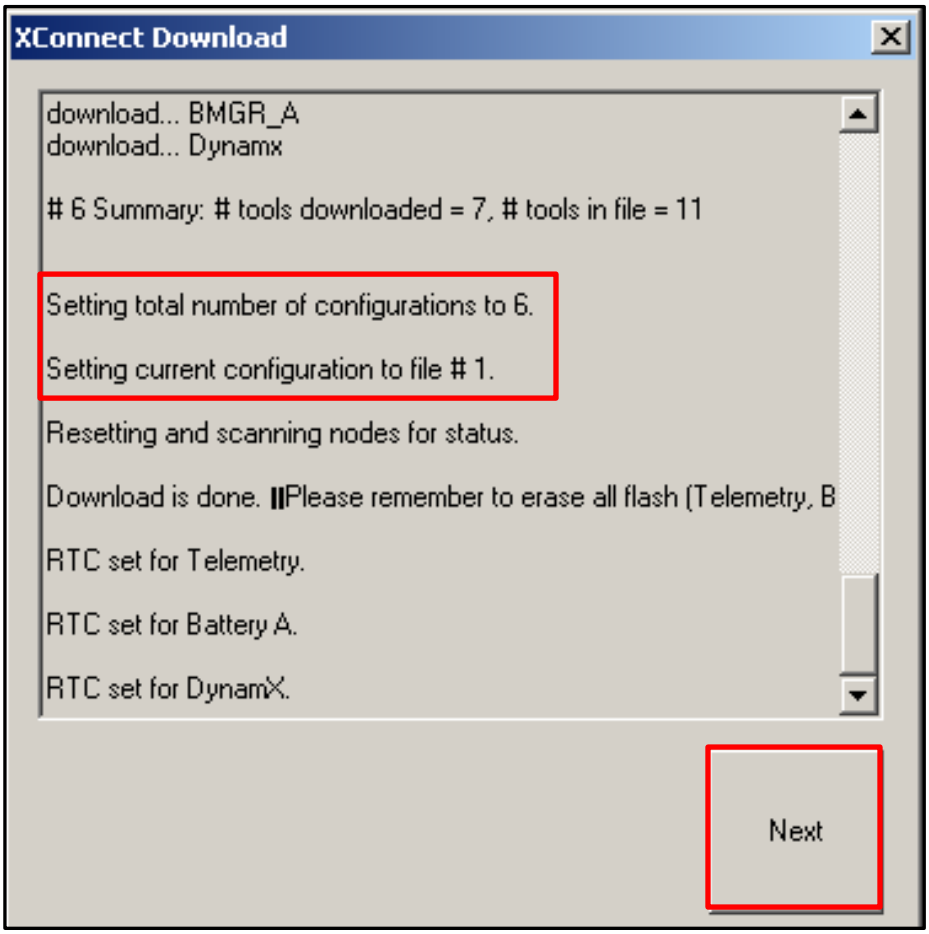

Figure 25 Successful configuration download

36. The “Download is Done” a confirmation message will appear.
37. Click “Done” to return to the XConnect main window.

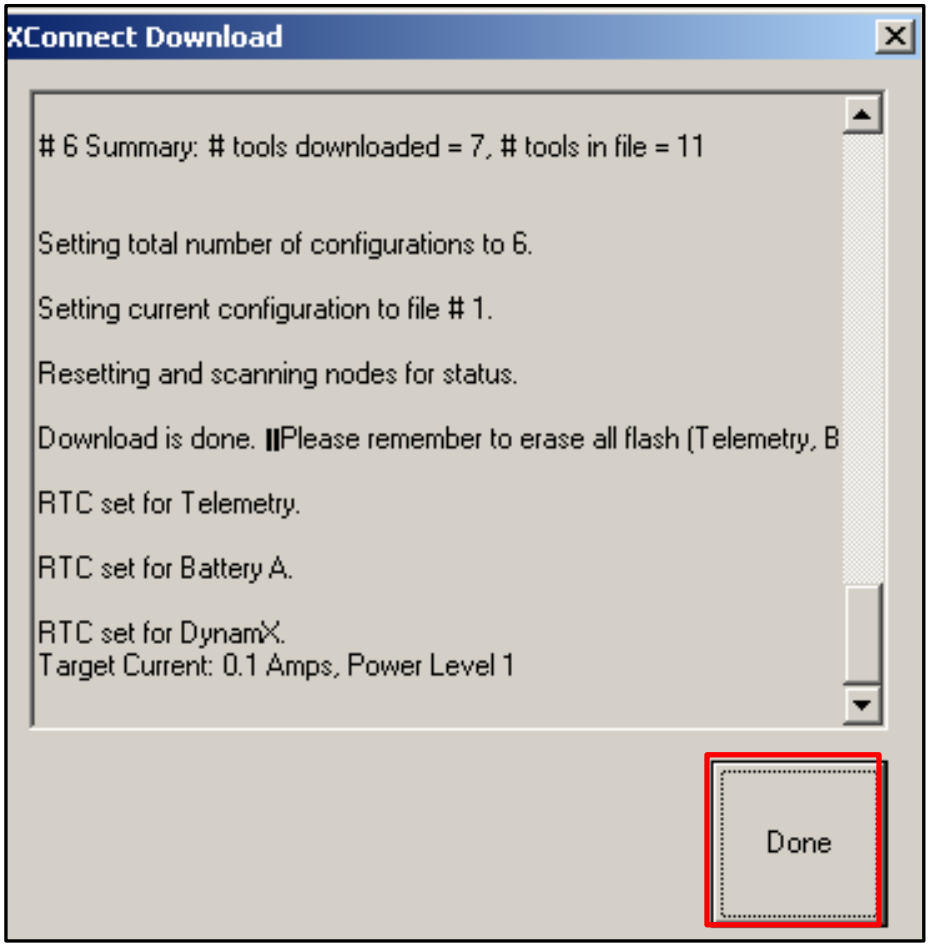

Figure 26 Configuration file Download Complete

38. After downloading the configuration file “cfg: 1 of 6” will appear beside each node on the XConnect window.
39. This indicates Configuration 1(the first file is in use) and there are 6 Configurations downloaded in to the tool.
40. Up to 8 configuration files can be downloaded.

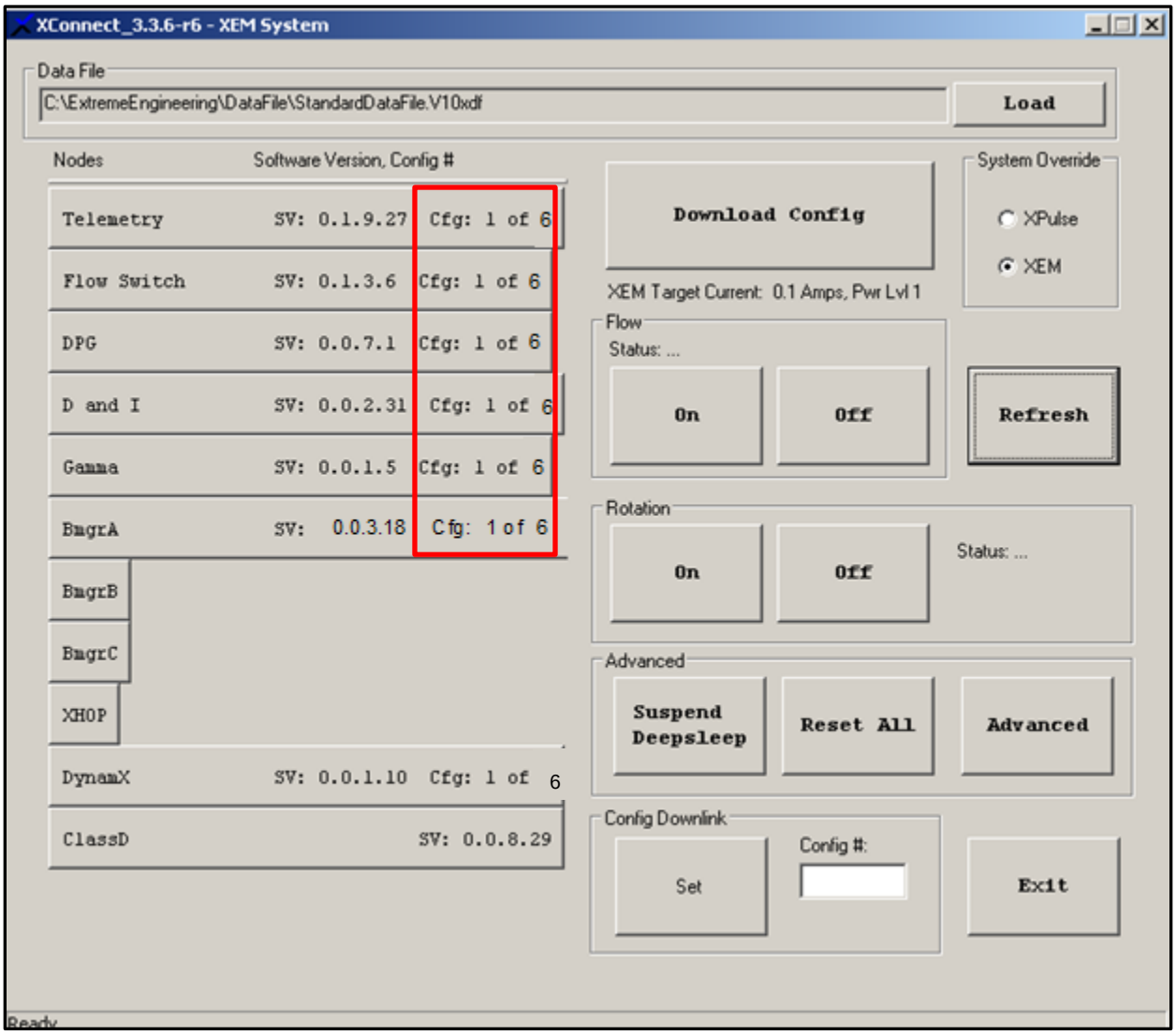

Figure 27 XConnect Configurations in the probes

2.6. SUSPEND DEEP SLEEP

The Deep sleep utility is provided in the tool to conserve battery by switching off at preset Inclination and temperature values. If configuration files are included that are designed for Deep Sleep, they are IDLE configurations and will have IDLE in the name, if so Deep Sleep has to be suspended in order to test the tool.

41. Click on the “Suspend Deep Sleep button”.

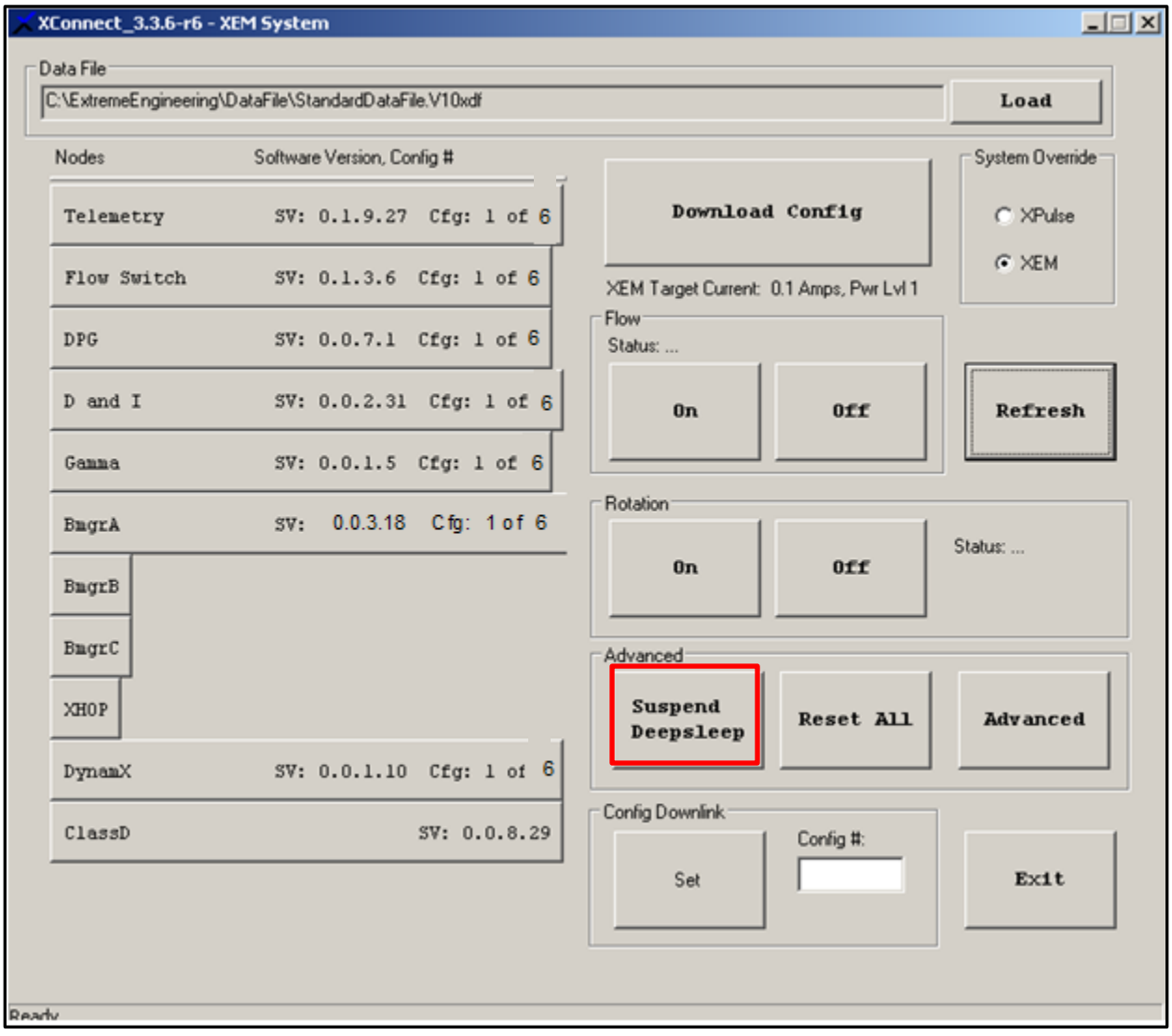

Figure 28 Suspend Deep Sleep

The Suspend Deep Sleep window will appear:

42. Set the time to 59:00 min

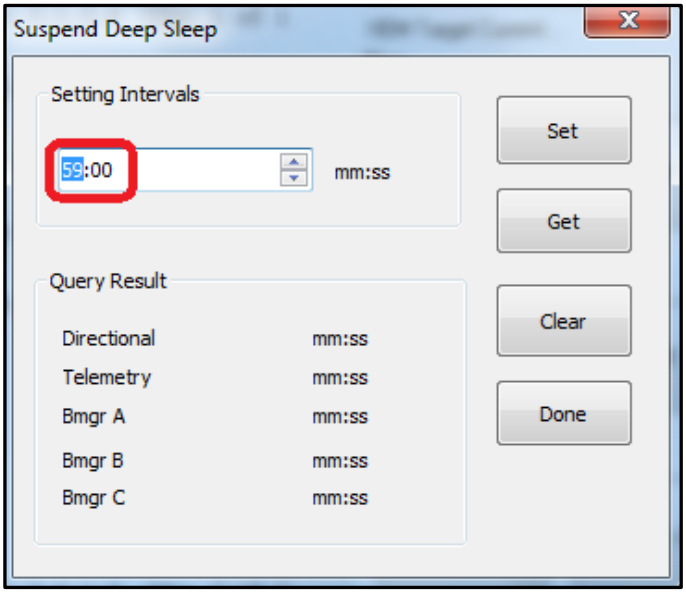

Figure 29 Set Deep Sleep Time 1/2

43. Click ‘Set’.
44. Click ‘Done’.

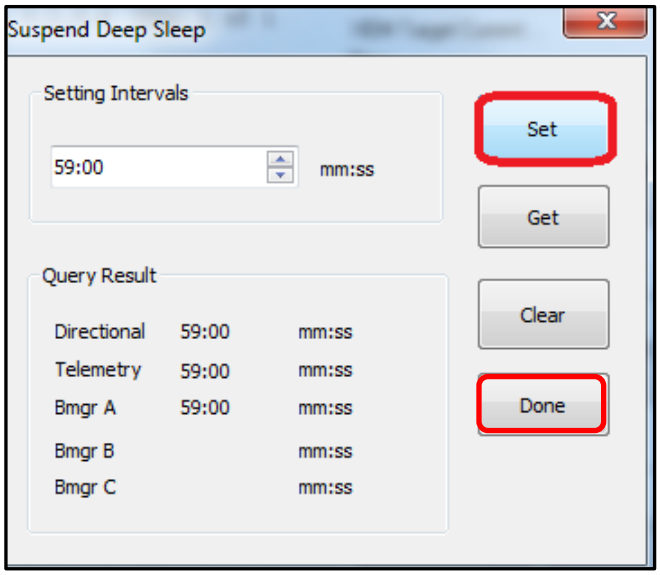

Figure 30 Suspend Deep Sleep 2/2

This will allow you to perform tests without the tool switching OFF.

3. FIRMWARE UPGRADE

This section is **ONLY** needed if.

- You have had issues downloading the configuration file.
- There is a requirement to upgrade the firmware version in your tool. The firmware is referred to as the **software version** beside the node name on the X Connect main window.

Proceed to Section 4 if an upgrade is not required.

To upgrade the firmware:

1. Click on the “Upgrade V9 to V10” shortcut. If you need to upgrade the tool firmware from Version 9 to Version10.
2. If the probes have Version 8, they will first have to be upgraded to Version 9.

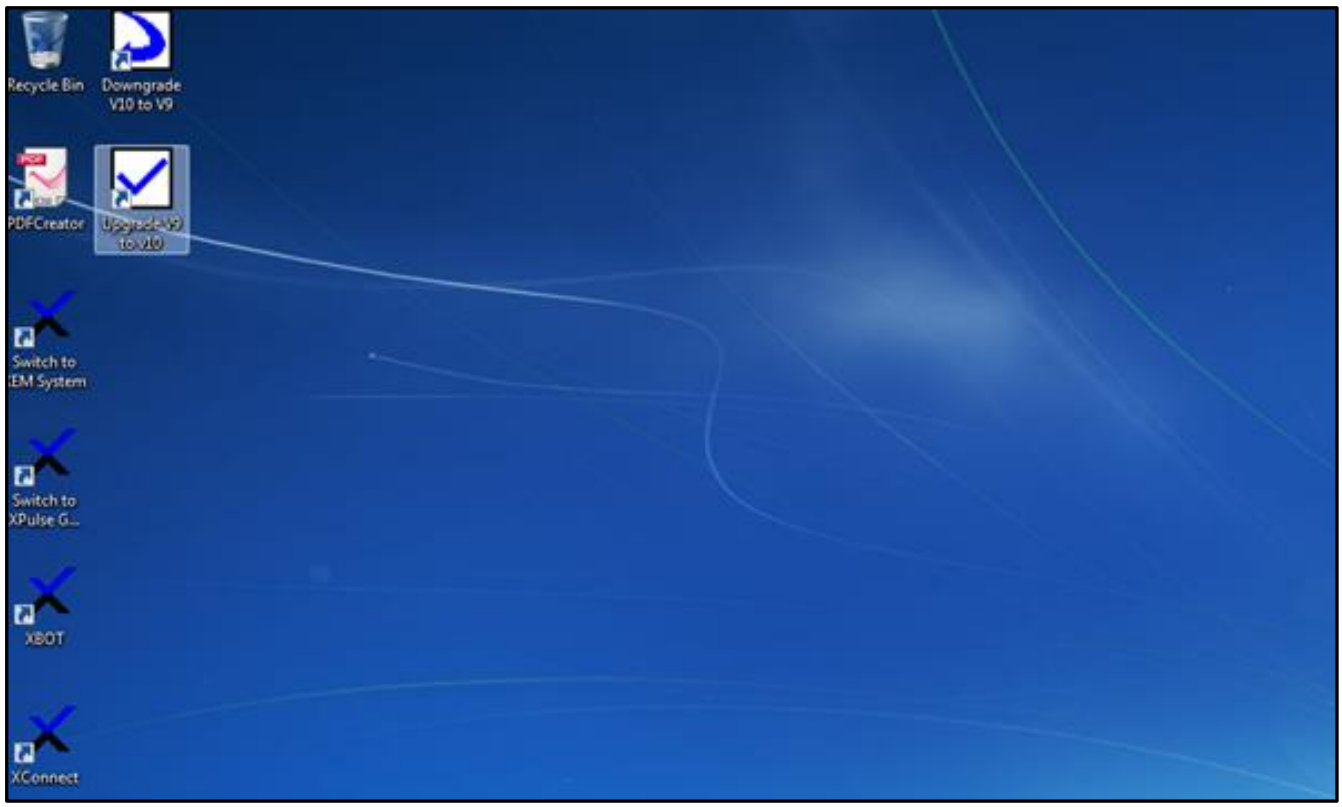

Figure 31 Upgrade to V-10

3. Ensure none of the node is in the Boot loader Mode, The Boot loader is a software application used to update the software versions in the probes.
4. If any of the nodes is in the Boot loader mode then close it right away.
5. Click “Ok”.

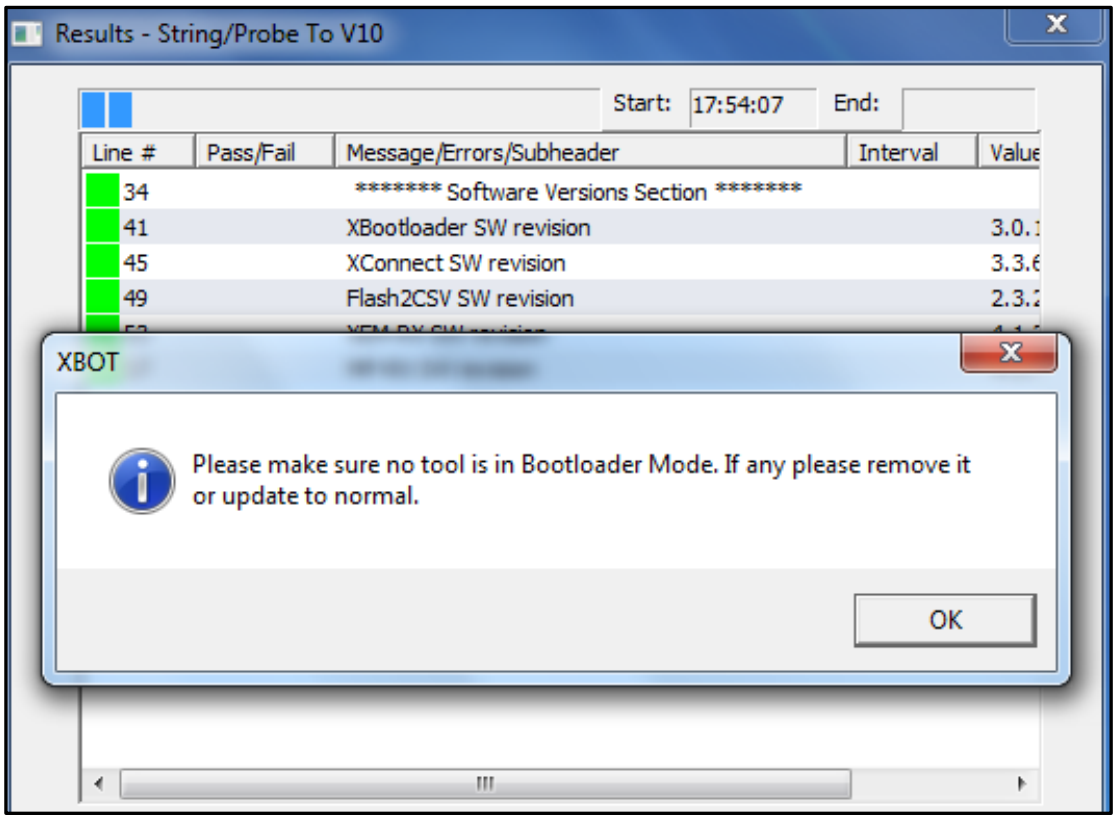

Figure 32 Boot Loader

6. The Boot loader will go through this process of updating the firmware for every node that needs to be updated.
7. Answer “YES” to the prompts as they appear.

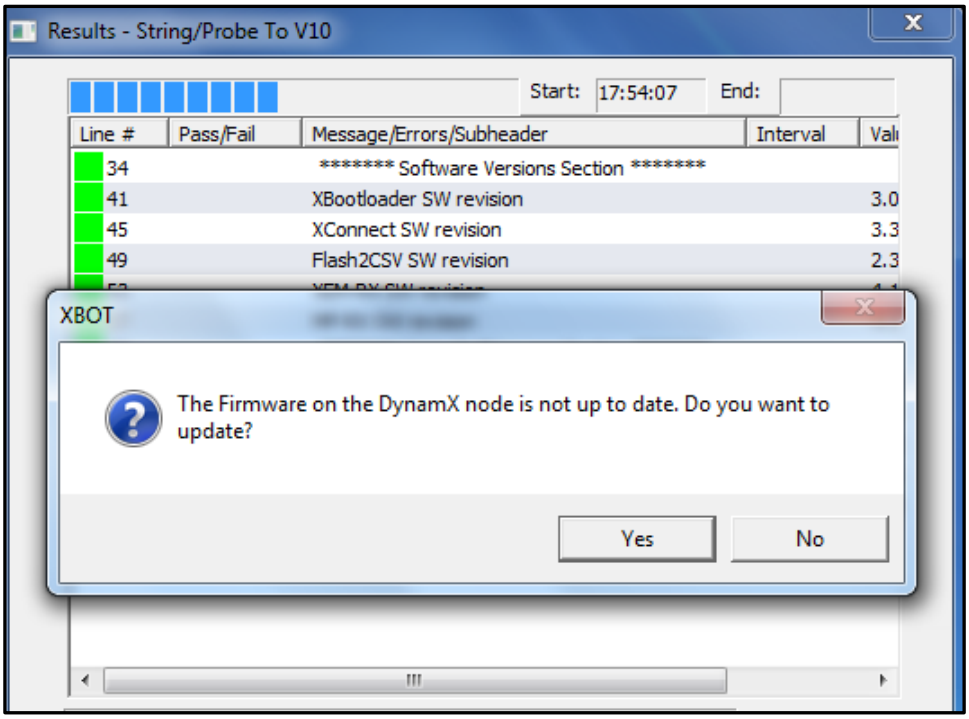

Figure 33 Prompt to Update DynamX window

8. The Status window will provide updates for each node.

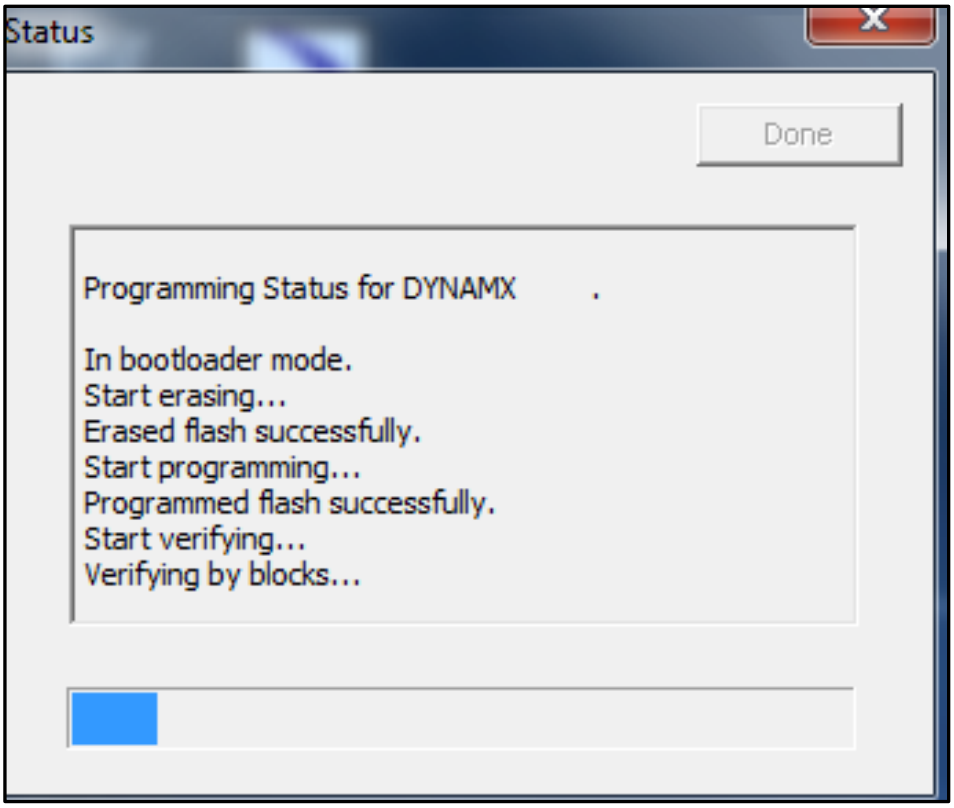

Figure 34 Status updating the DYNAMX window

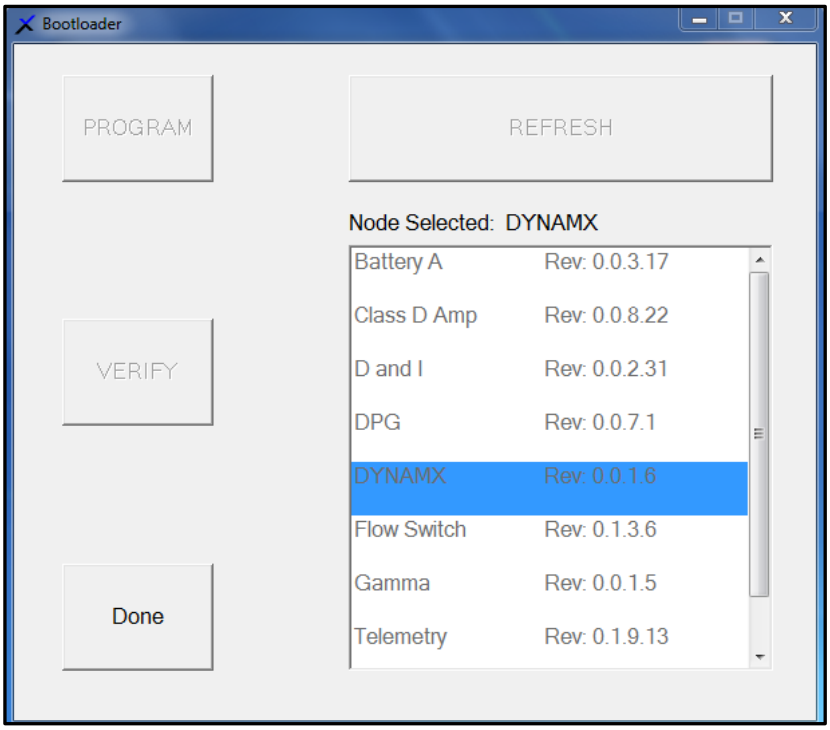

Figure 35 DYNAMX node updated

9. Once the Boot-loader is finished the script will verify that the probes have the firmware that is compatible with Version 10.

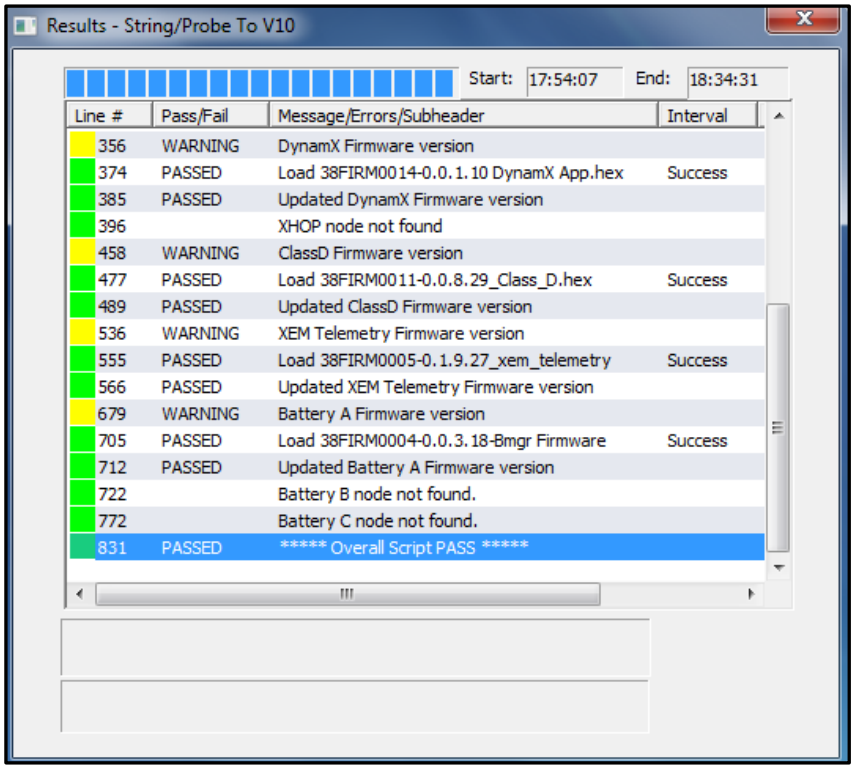

Figure 36 Firmware Updated Successfully

10. A PDF file will automatically be generated with the details of the upgrade.

Job #: --
UUT: String/Probe
UUT Serial #:
Personality Serial #: NA
Main Board Serial #: NA
Work Order #:
Date-Time: Fri, Mar 08, 2013 @ 18:34:31
User Name:
Test Script Revision: 2013.01.16
Software Version: 1.0.1.5
Overall Result: PASS

TEST RESULTS

	******* ***Software Versions Section*** *******		
	XBootloader SW revision		3.0.14.0
	XConnect SW revision		3.3.6.3
	Flash2CSV SW revision		2.3.22.11
	XEM-RX SW revision		4.1.22.15
	MP-RX SW revision		4.1.11.18
	******* ***Upgrade Firmware Section*** *******		
PASSED	XBUS APS D&I Firmware version		0.0.2.31
PASSED	Gamma Firmware version		0.0.1.5
PASSED	DPG Firmware version		0.0.7.1
PASSED	Flow Switch Firmware version		0.1.3.6
WARNING	DynamX Firmware version		0.0.1.6
PASSED	Load 38FIRM0014-0.0.1.10 DynamX App.hex	Success	
PASSED	Updated DynamX Firmware version		0.0.1.10
	XHOP node not found		----------
WARNING	ClassD Firmware version		0.0.8.22
PASSED	Load 38FIRM0011-0.0.8.29_Class_D.hex	Success	
PASSED	Updated ClassD Firmware version		0.0.8.29
WARNING	XEM Telemetry Firmware version		0.1.9.13
PASSED	Load 38FIRM0005-0.1.9.27_xem_telemetry	Success	

Figure 37 PDF report

11. Save the “PDF Report”.

4. ERASE FLASH

1. **The Flash Memory needs to be erased prior to the job to make space for New Data that will be recorded during the job**. This does not erase the Configuration file for the job which is stored separately in the memory.
2. On the XConnect Window click on the “Telemetry Node”.

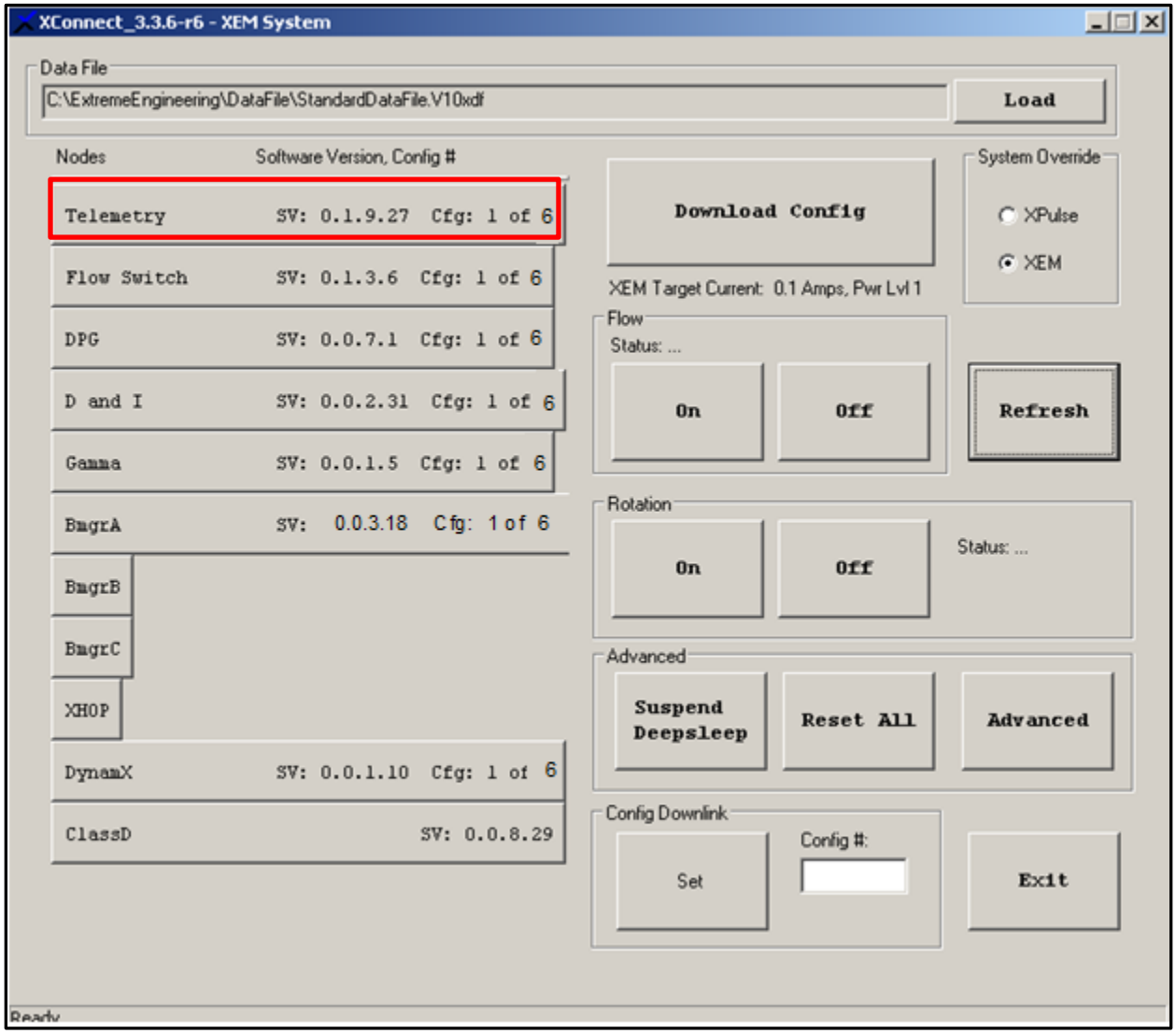

Figure 38 Telemetry Node

3. On the Telemetry window click on the “Flash” Button.

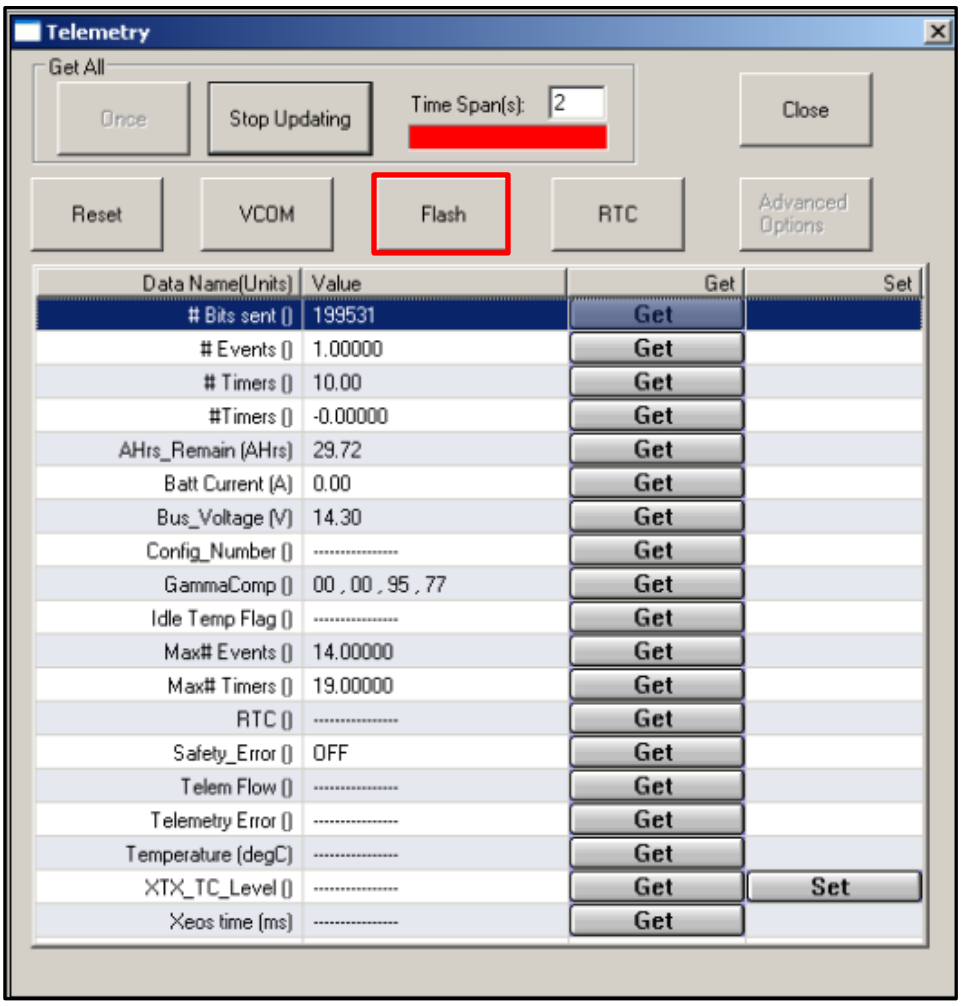

Figure 39 Flash Button

4. The Flash Window will appear showing the Memory size.
5. The Memory size depends on the data stored.
6. Click on “Erase”.

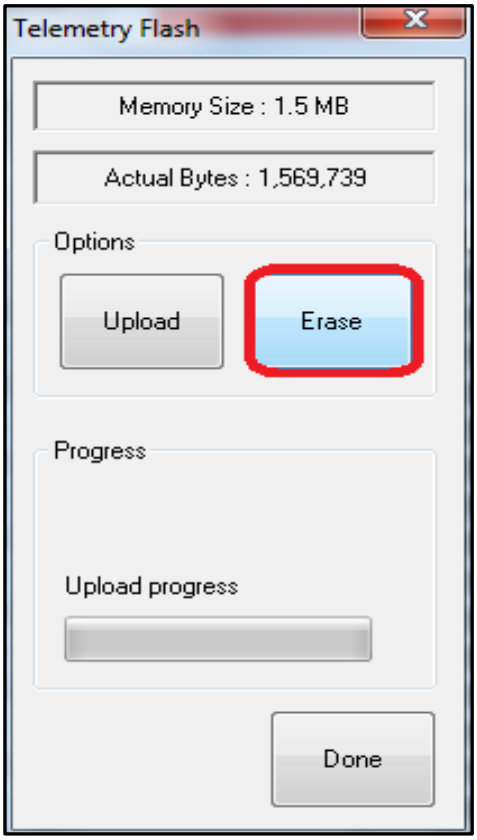

Figure 40 Telemetry Flash

7. Click “Yes” to erase the flash?

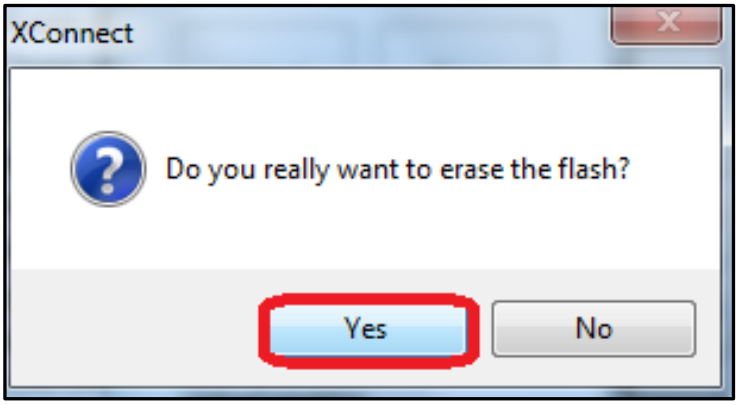

Figure 41 Erase flash

8. The Message “Flash is now erased” will appear.
9. Click “OK”.

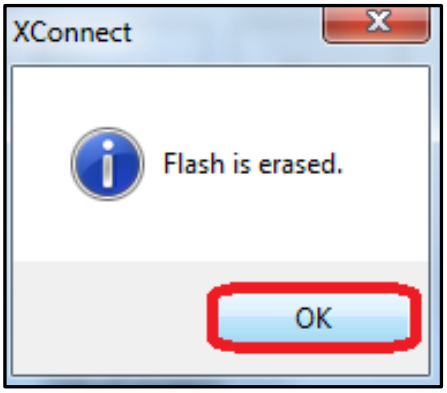

Figure 42 Flash is erased

10. The Telemetry Flash Memory appears indicating size is now Zero.
11. Click “Done” to return to the XConnect Main screen.

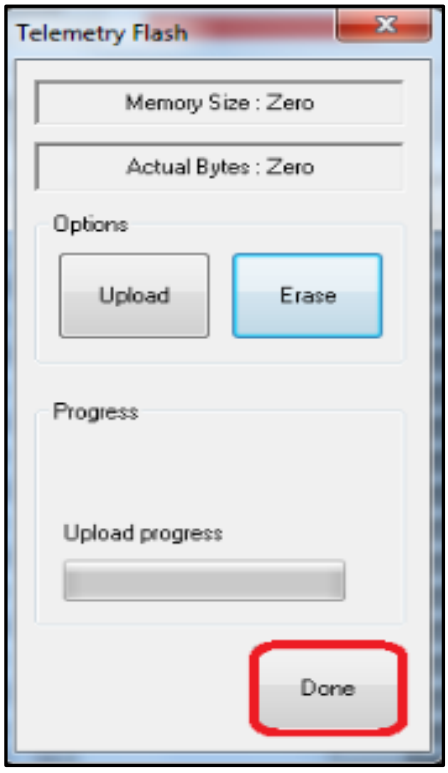

Figure 43 Zero Memory Size

12. Click “Done” to return to the Telemetry window
13. Click “Close” to return to the XConnect main window.

14. Erase the flash for the following nodes using the procedure described above.

a. **Telemetry**

b. **Bmgr A, Bmgr B & Bmgr C**

In the XConnect snapshot below only Bmgr A is connected.

c. **DynamX (if available)**

You will have to click on each node on XConnect to access the flash.

The Gamma and directional information is stored in the Telemetry.

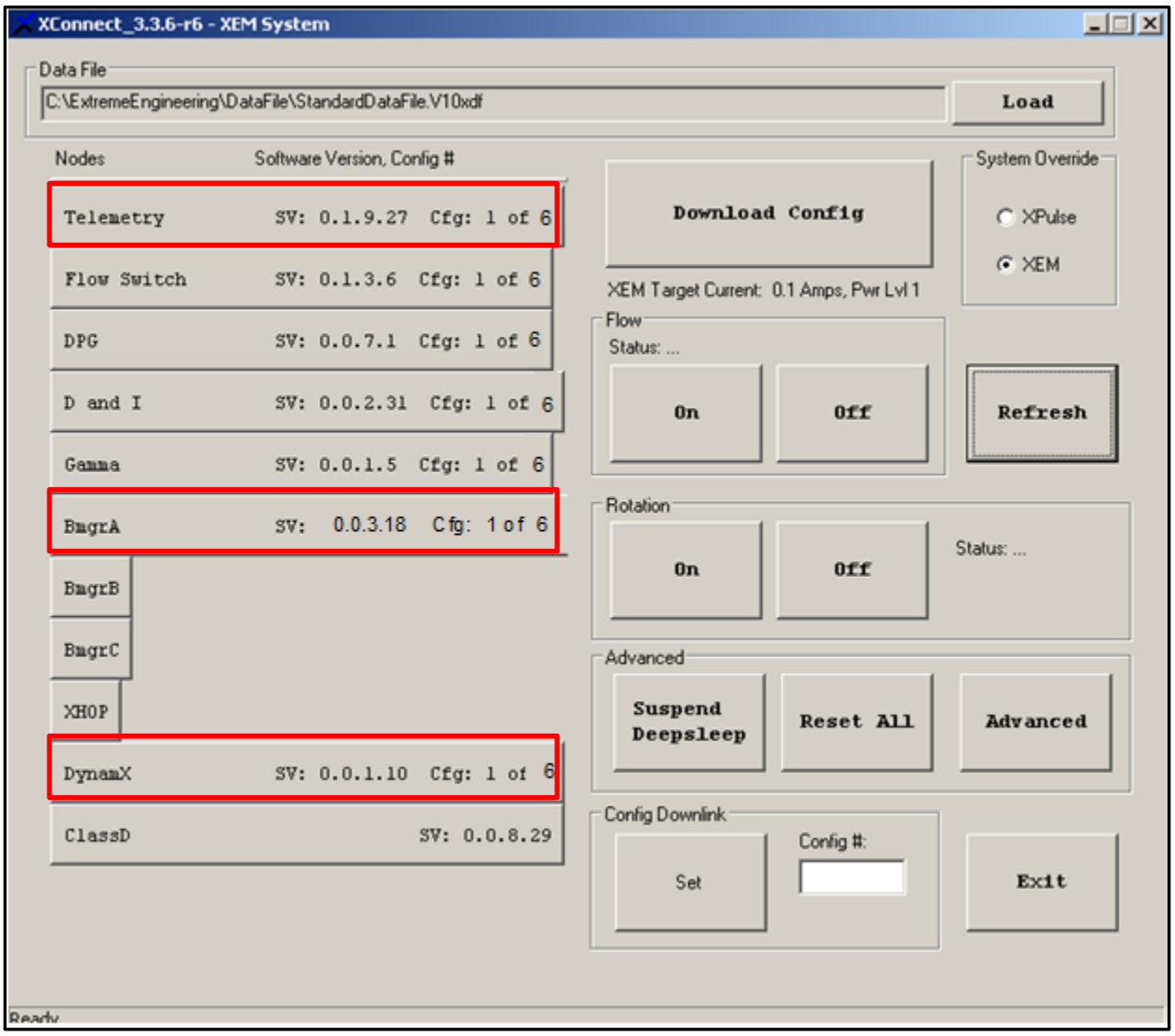

Figure 44 XConnect window showing Nodes with flash

5. MONITORING WITH XCONNECT

This section is required only if you intend to confirm the functionality of the probes using XConnect.

Probe functionality can also be confirmed using the information in the High side in (SECTION 6) of this chapter and an automatic online script utility.

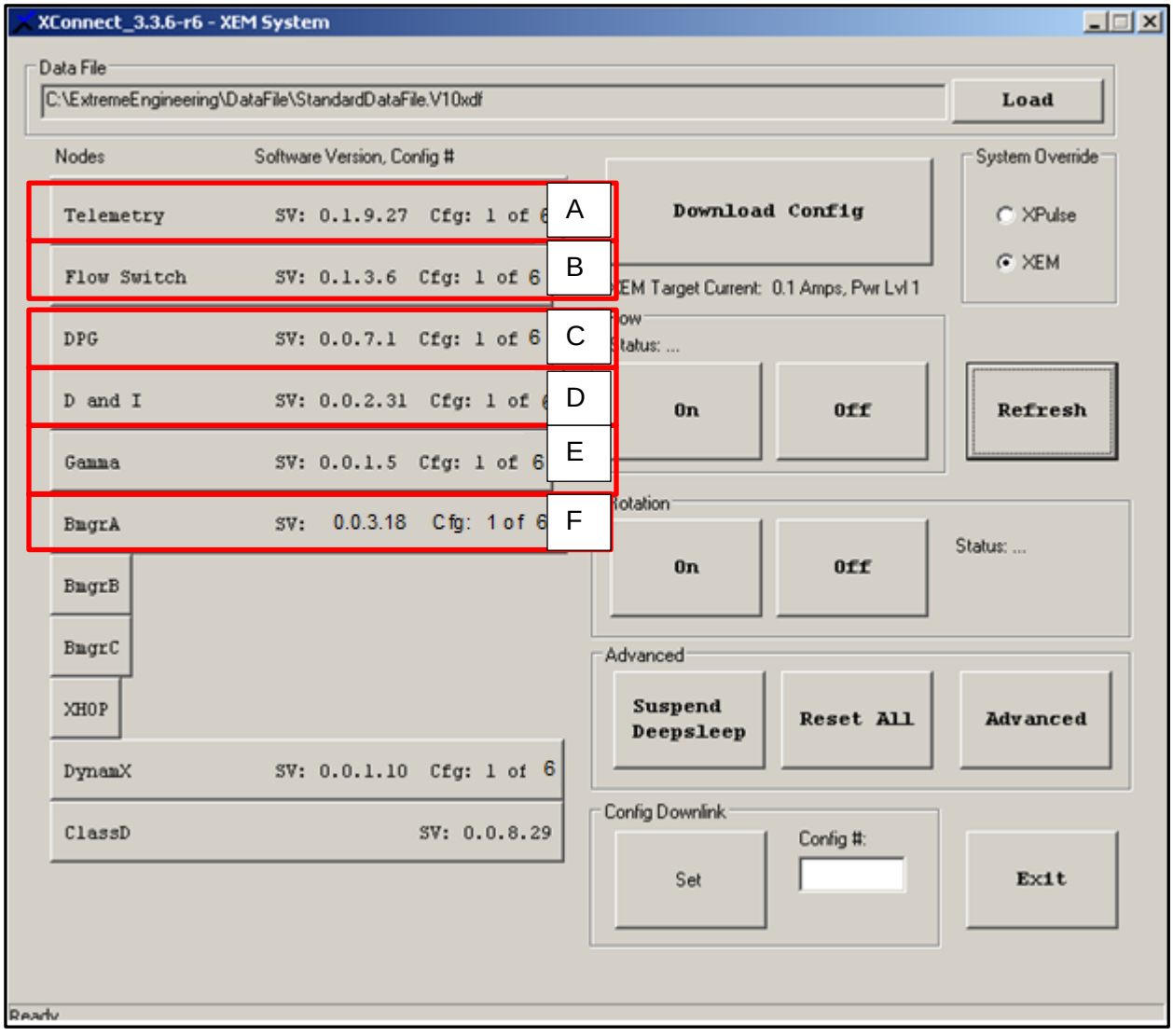

Figure 45 X Connect Window Node showing Nodes that are Monitored

5.1. MONITORING TELEMETRY

15. Click on the Telemetry node on XConnect.

- The Bus voltage should be approximately 14V with new batteries but should not be less than 8.5V even with old batteries.
- The Temperature should read the ambient temperature. (25DegC in the figure below).
- The RTC clock time and should match the time on the XRT, Computer task bar at the bottom right corner.
- Click on continuous.

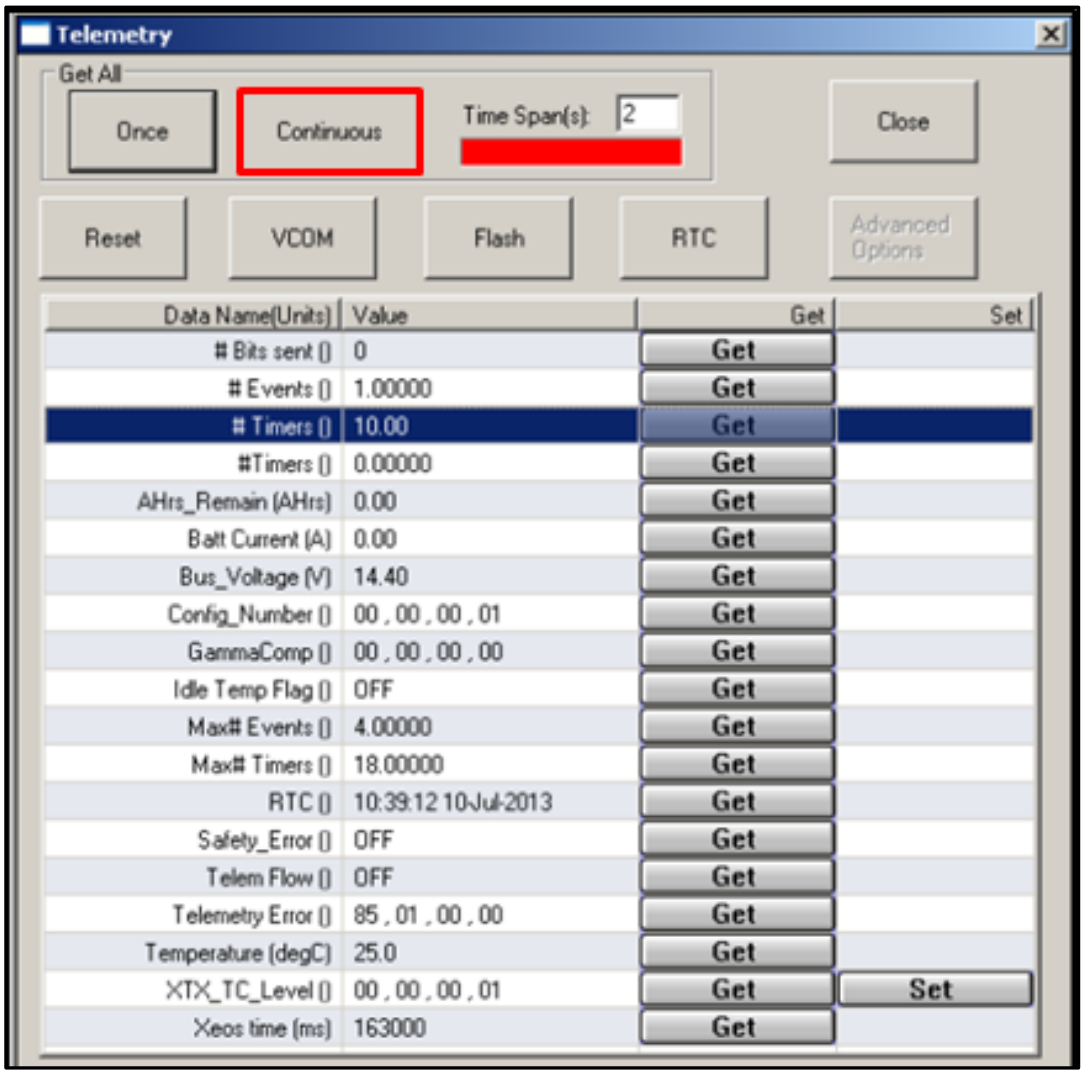

Figure 46 XConnect Telemetry Window

16. The # of Bits sent should keep increasing indicating communication through the telemetry node.

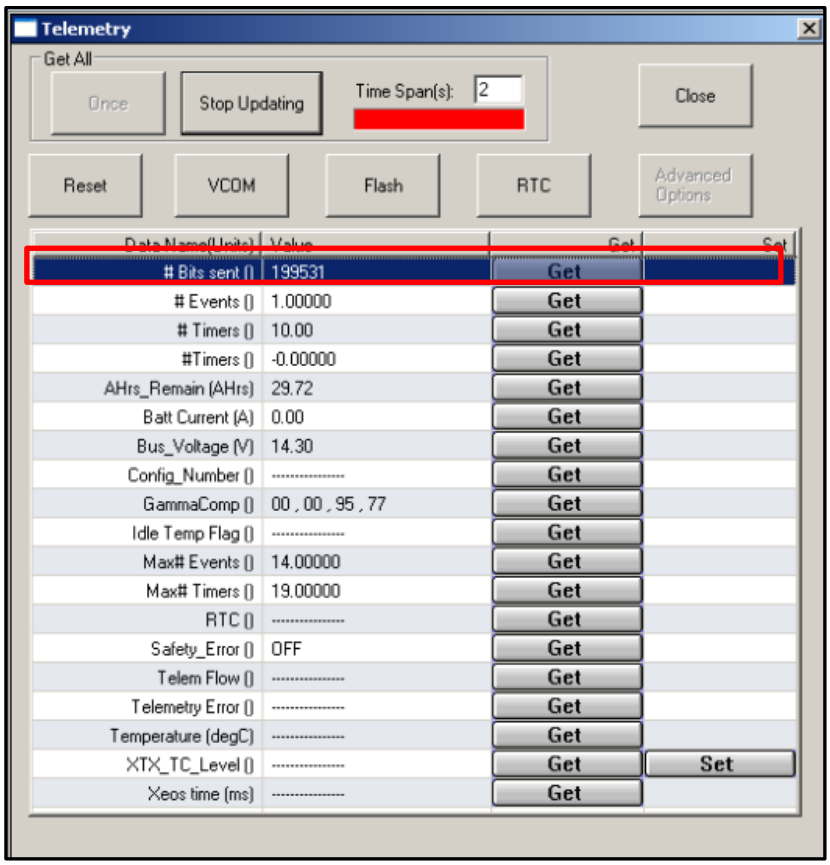

Figure 47 XConnect Telemetry Window

5.2. MONITORING FLOW SWITCH

17. On XConnect click on the “Flow switch” node.

Click on “Continuous”.

- The Flow Status should be OFF unless Pressure is applied or a safety Bypass is applied or has been turned on ON the X Connect window.
- Click on “Get” beside “Downlink Status” to see the Number of times you have downlinked). This is not necessary now but may be required while monitoring the tool after the Run.
- Click on “Close” to exit the Window.

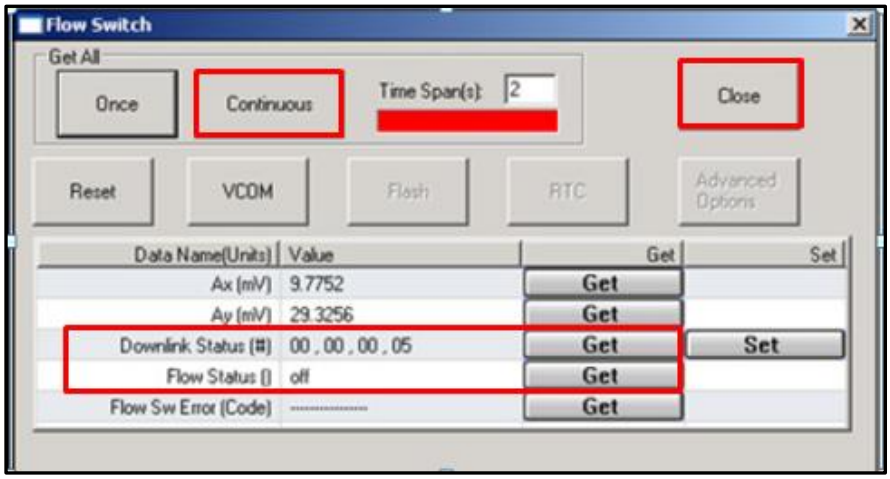

Figure 48 flow Switch Window

5.3. MONITORING DPG

18. On the XConnect window, Click on the “DPG” node.

    Click on “Continuous”.

- Monitor the Annular/ Bore pressure. This should be from 0-30psi. If 100 psi Pressure is applied on the Bore pressure sensor with a Hand Pump latter in the test, the pressure should be within 85-115psi.

  It is important for the Bore or Annular pressure sensor to be working as this is a safety pre-requisite for the Tool to Work.

- Monitor the Annular/ Bore Temperature: This should be reading the ambient temperature.
- Click on “Close” to Exit the Window.

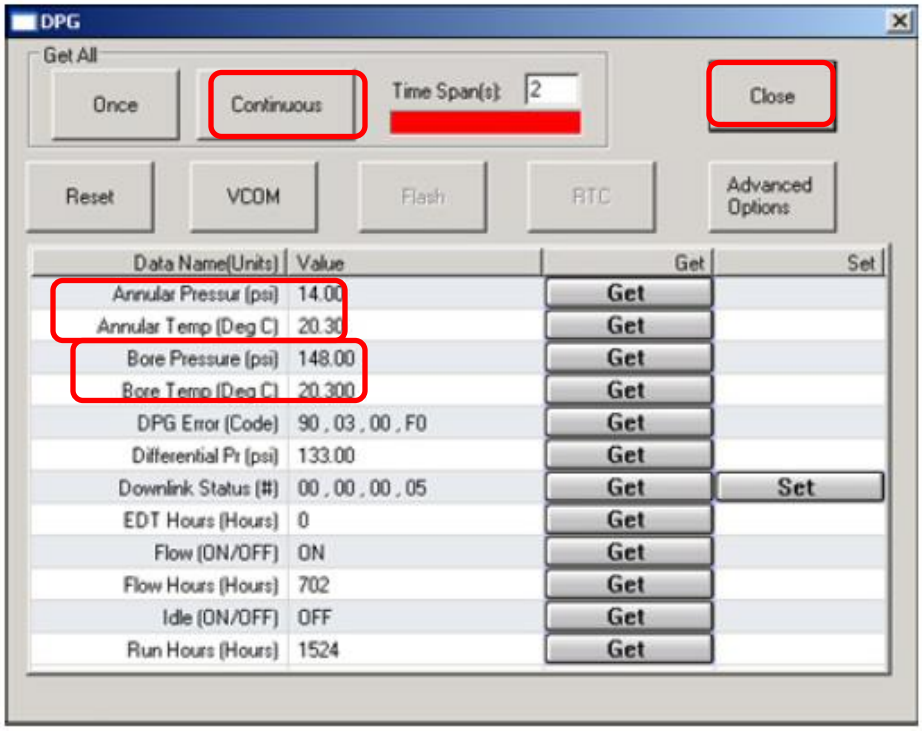

Figure 49 DPG Window

5.4. MONITORING D&I

19. On XConnect click on the “D&I” node.

Click on “Continuous”.

The Raw Survey Sensor values can be monitored on this window.

The Raw Sensors are the 3 x accelerometers: Ax, Ay & Az and 3 x Magnetometers Mx, My & Mz.

The High Side Wizard can be run from this application.

Ay, Az, My & Mz will keep changing when the probe is rotated.

Ax and Mx will not change when the probe is rotated.

More explanation on running the High side wizard is given in Section 6.

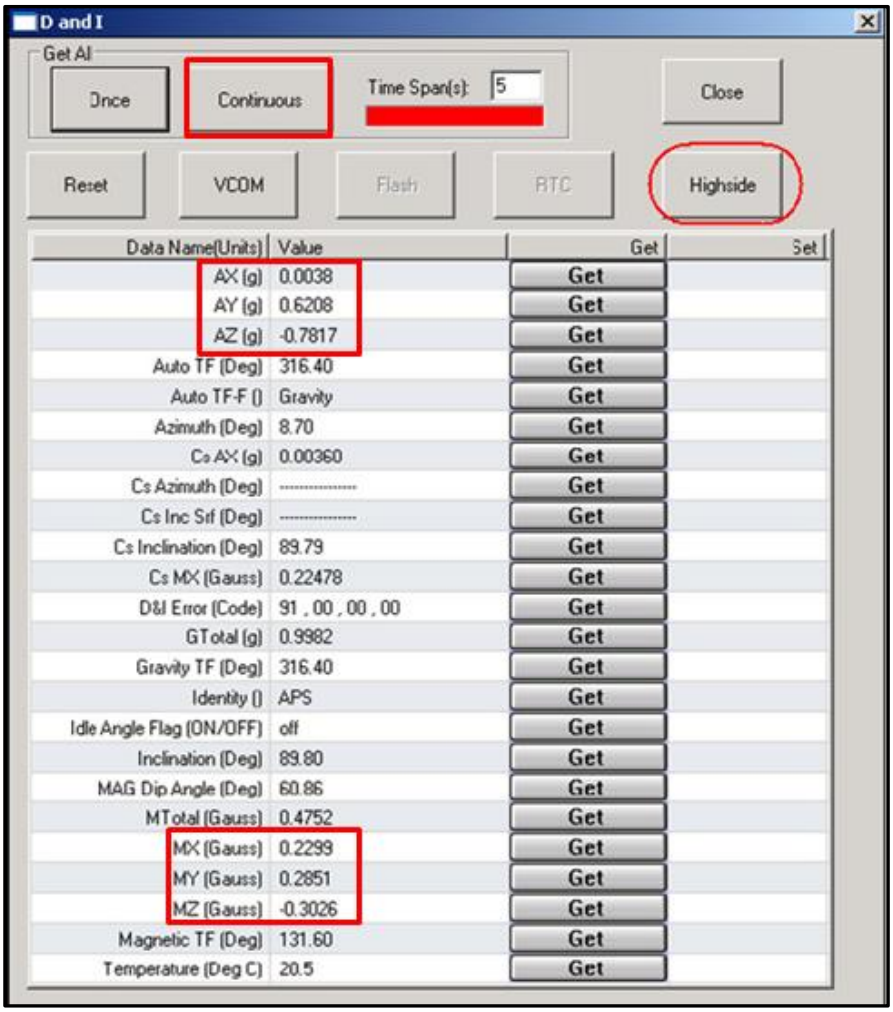

Figure 50 D&I Window

5.5. MONITORING GAMMA

20. On XConnect click on the Gamma Node.

- Monitor the raw counts detected by the probe (CPS). These should be Low counts typically within 0-15 CPS.
- Check the internal API correction to insure that it is not set to a default value (1.00). If it is, contact the Command center in order to obtain the correct factor value and have it programmed into the probe prior to going down hole.

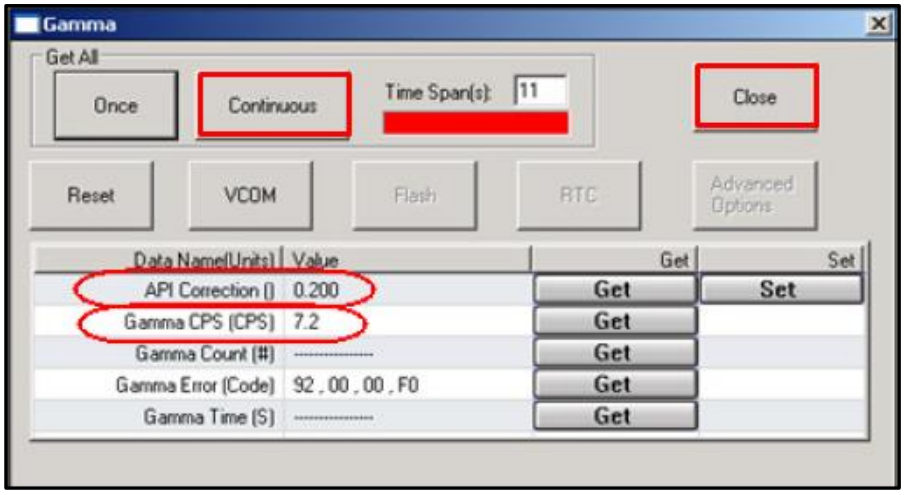

Figure 51 Gamma Node

If there is a gamma ray blanket or thorium welding rod place it on the Gamma Sensor.

The Gamma Probe is 54” Long.

The Gamma sensor is located at approximately 34” from the top of the Gamma ray probe.

With the gamma source on top of the sensor the Gamma ray values will be much higher.

5.6. MONITORING BATTERY MANAGER

21. On XConnect click on the BmgrA node.

Monitor the values in the BmgrA window:

- Battery type : This will indicate if a Lithium or alkaline battery is in use.
- Bus voltage: This should be 14V for a new battery but greater than 8.5V.
- Each battery pack has 2 battery banks connected in parallel.
- Cell 1 voltage = Battery Bank 1 voltage should be close to the Bus voltage.
- Cell 2 voltage = Battery Bank 2 voltage should be close to the Bus voltage.

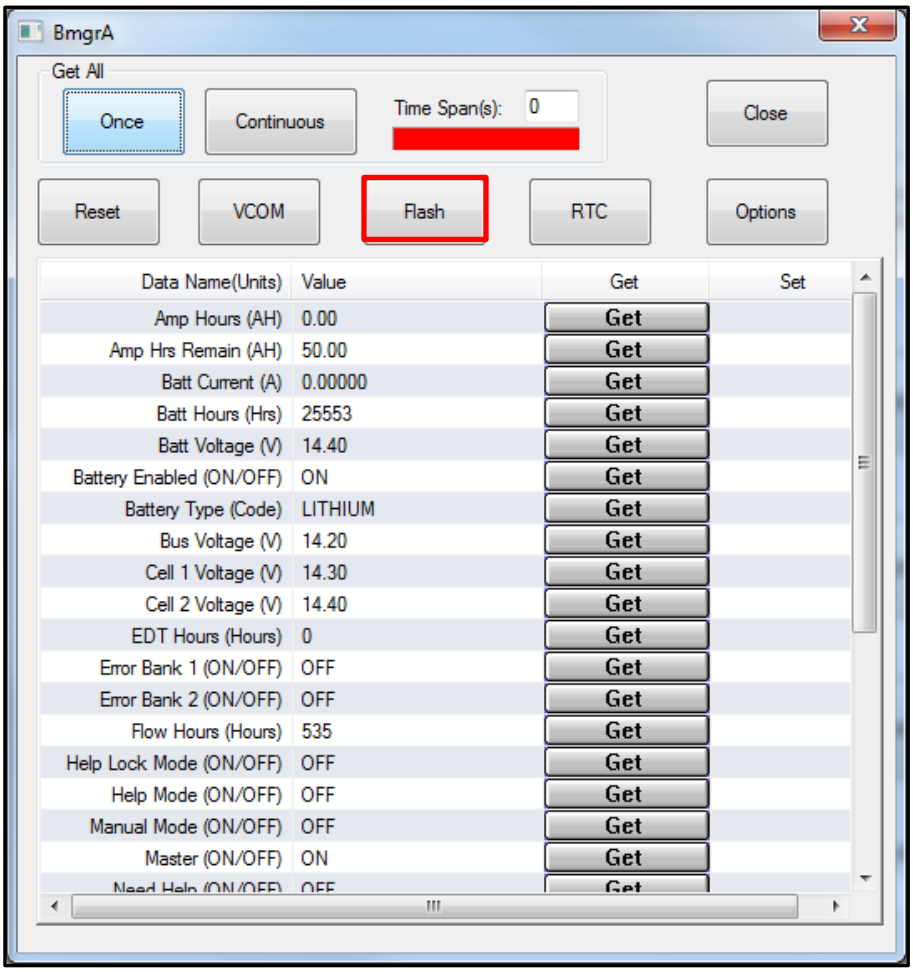

Figure 52 BmgrA

6. HIGH SIDE

The High side test allows testing the tool functionality on surface.

6.1. D&I NODE

1. The tool has to be referenced to the High Side so that tool faces values can be provided correctly.
2. On XConnect click on the “D&I” Node.

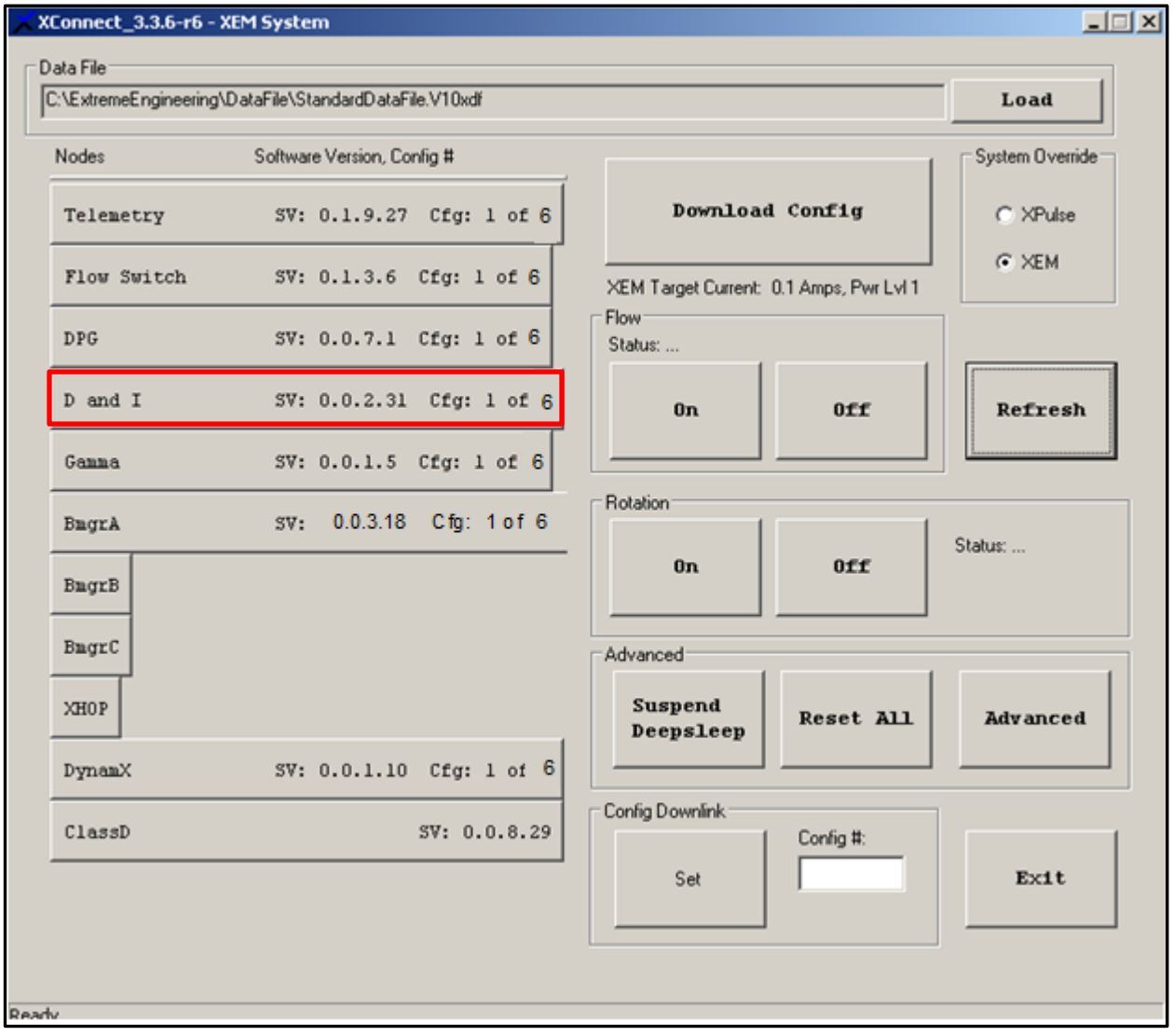

Figure 53 X Connect D&I Node

6.2. HIGH SIDE

3. On the D&I Window, Click on the “High Side” button.

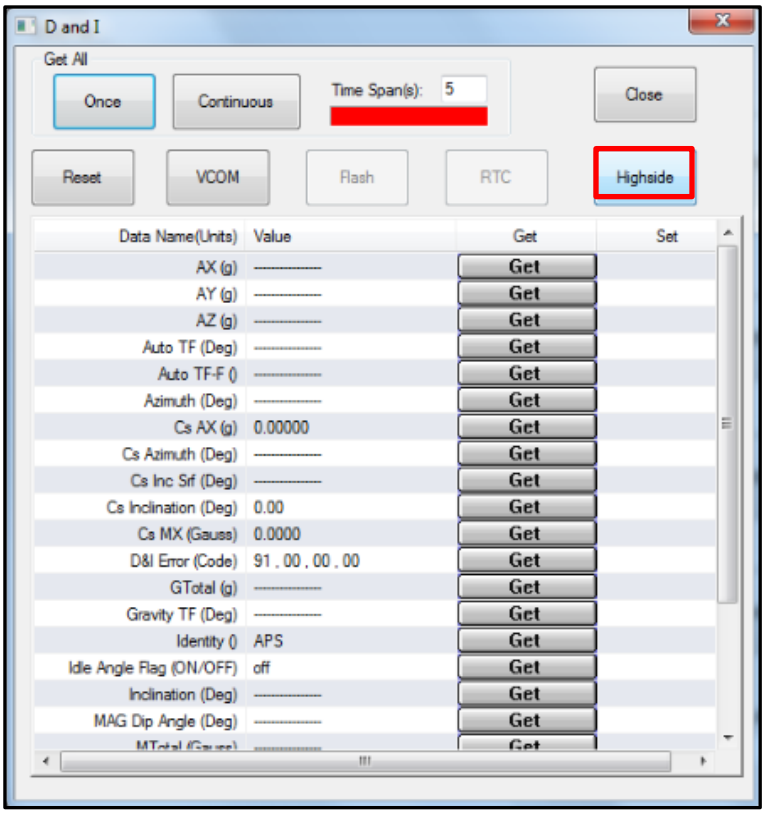

Figure 54 High side

4. The D&I Advanced Options Window will appear.

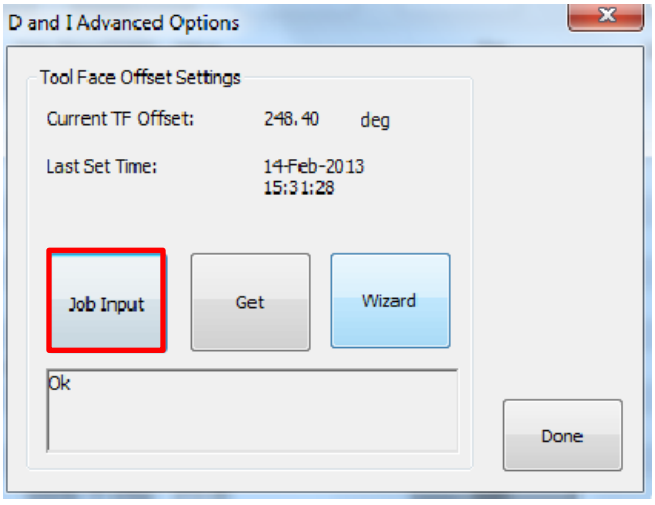

Figure 105 D& I Advanced Options

5. Click On “Job Input”.

6.3. JOB INFORMATION

6. The Configure Job information appears as below. The Records will appear Blank and need to be completed.

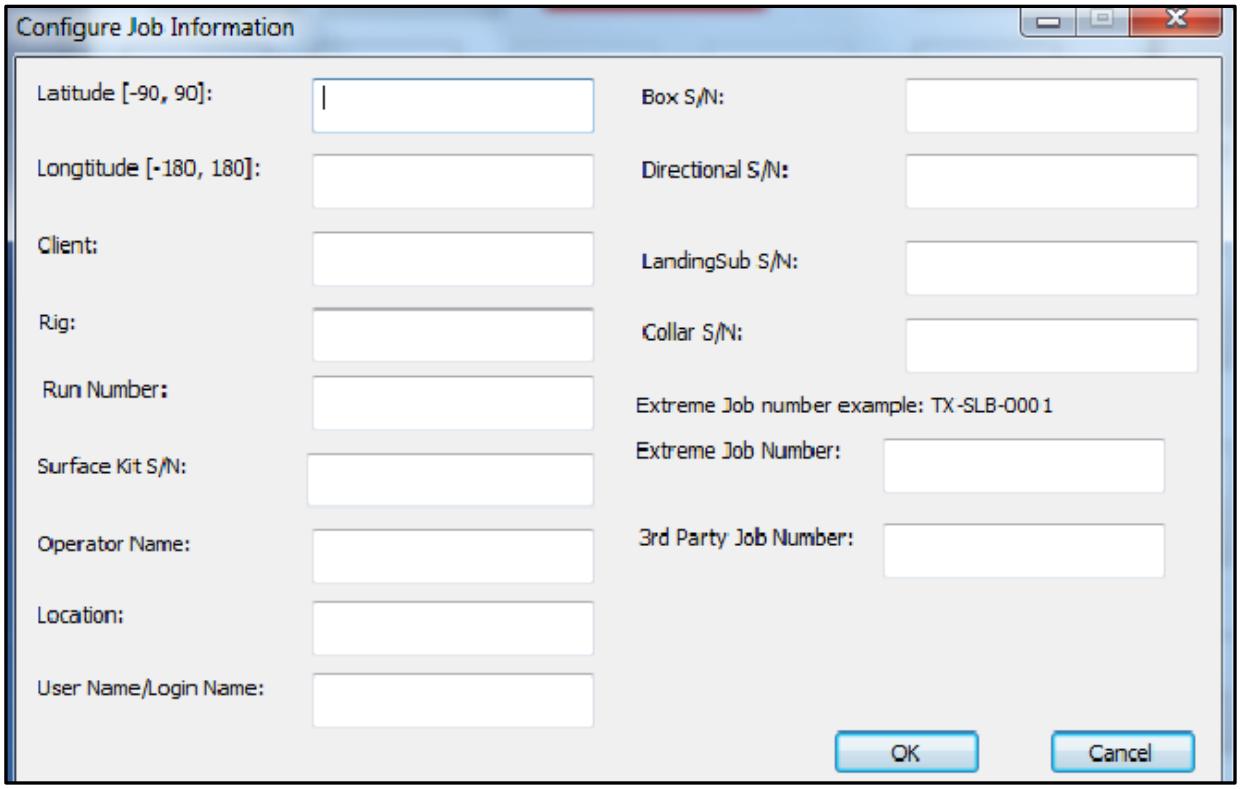

Figure 55 Configure Job Information blank

7. Enter the Job Information.

- The information related to the Equipment S/N (Serial Number) should be available in the Manifest Load out papers.
- The “Latitude” and “Longitude” information should be provided by the Directional Driller.

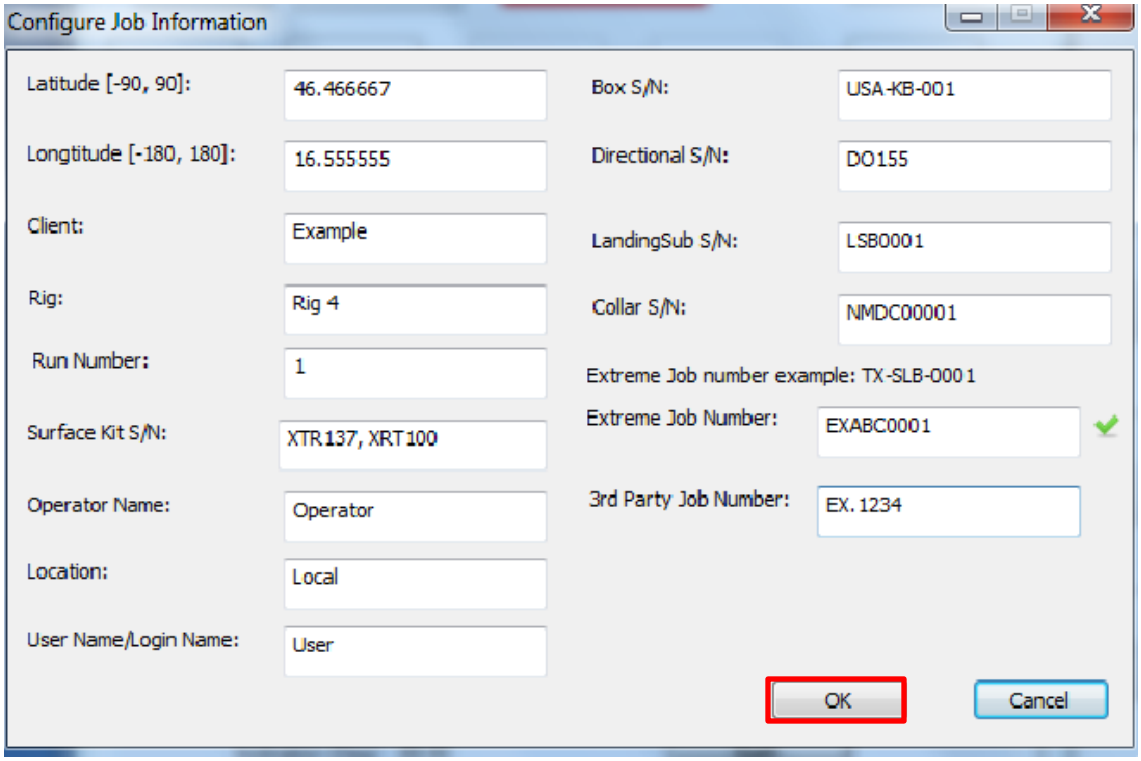

Figure 56 Configure Job Information Complete

8. Click on “Ok” when the information is completed.

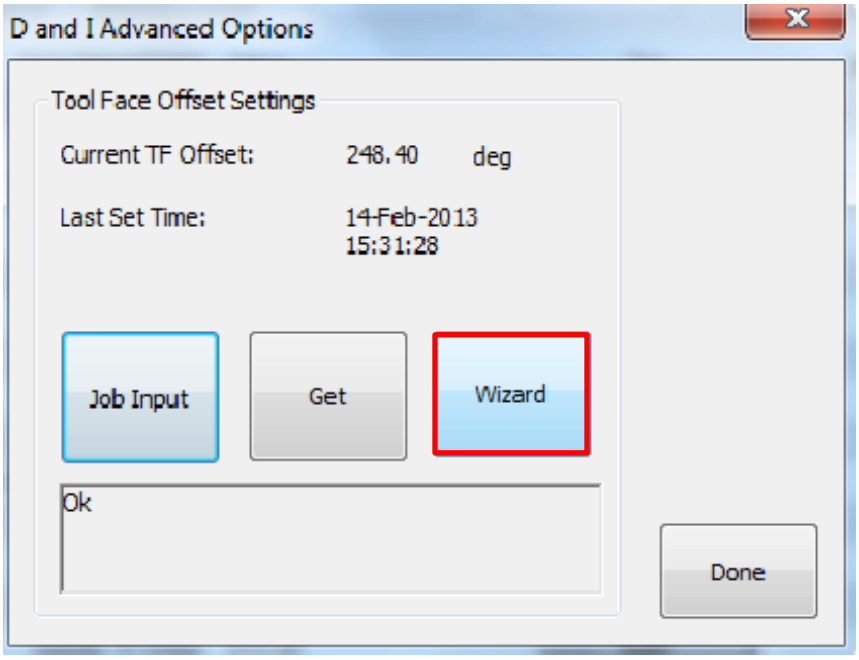

Figure 57 D and I advanced Options

9. Click on “Wizard”.

6.4. HIGH SIDE WIZARD (STEPS 1-10)

Follow the 10 STEP high side wizard procedures.

STEP 1

DO NOT CLICK ON START IN THE WIZARD BEFORE PLACING THE TOOL ON THE HIGH SIDE.

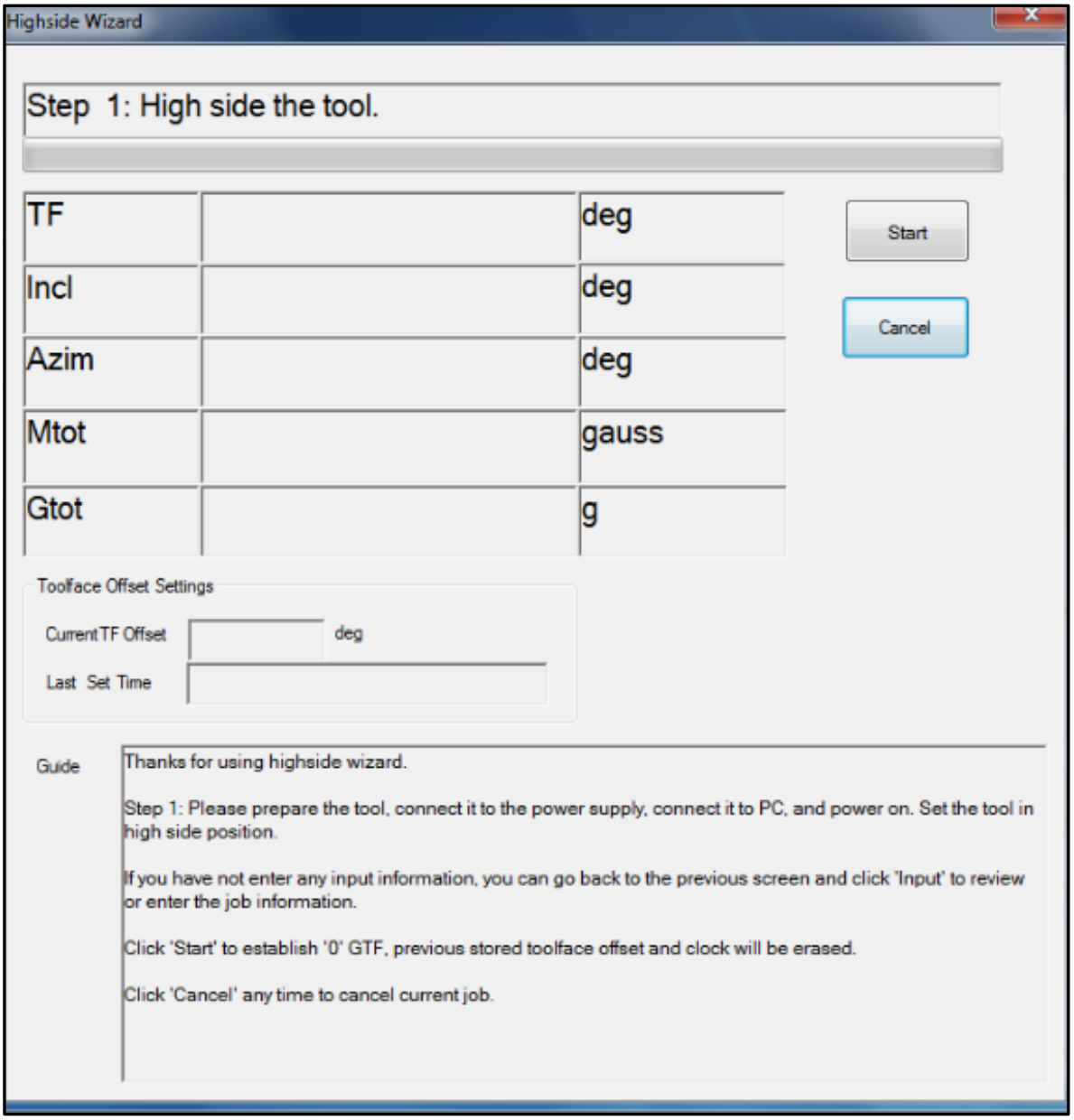

Figure 58 D&I Advanced options

10. Physically place the tool on High Side.
11. Locate the Landing Spider on the DPG Probe.

Figure 59 DPG Landing spider

12. Rotate the tool such that the Key Slot on the Landing spider is facing up.

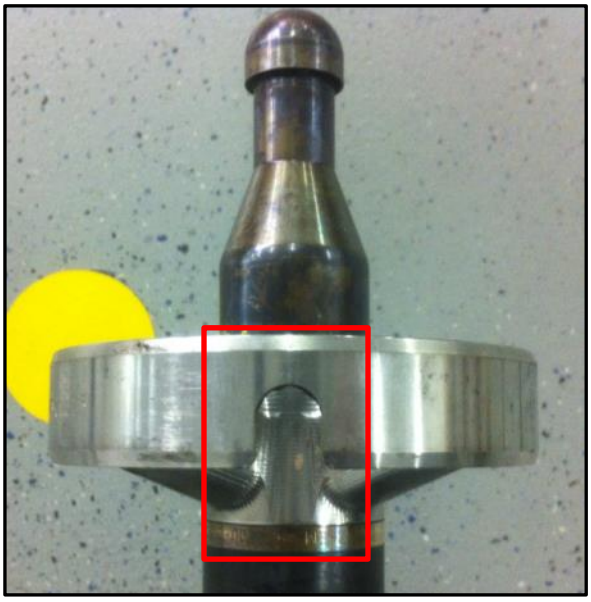

Figure 60DPG Landing Spider with key slot up

THE KEY SLOT MUST FACE UP.

CONFIRM ALL CONNECTIONS ON THE TOOL STRING ARE TORQUED.

13. Place a Level on the Landing Spider in the DPG Probe to ensure that the XEM is horizontal.
14. Ensure the Key slot on the “Landing Spider” aligns with the key slot at the bottom of the Level.

Figure 61 Placing the Level on the spider

15. Make the Tool Level using the Bubble. The bubble should be between the Black lines on the Level.

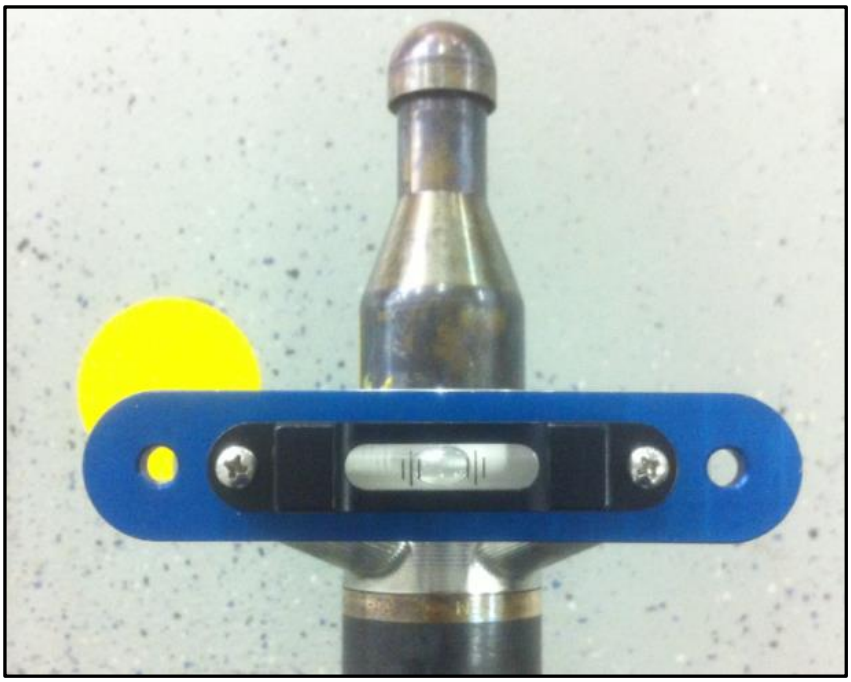

Figure 62 Tool Level

16. Ensure the tool is locked by Barrel Wrenches and is not free to turn.

Figure 63 Landing Spider Key slot at high side

After confirming the tool is in High Side.

17. Click on START in the High Side Wizard Window.

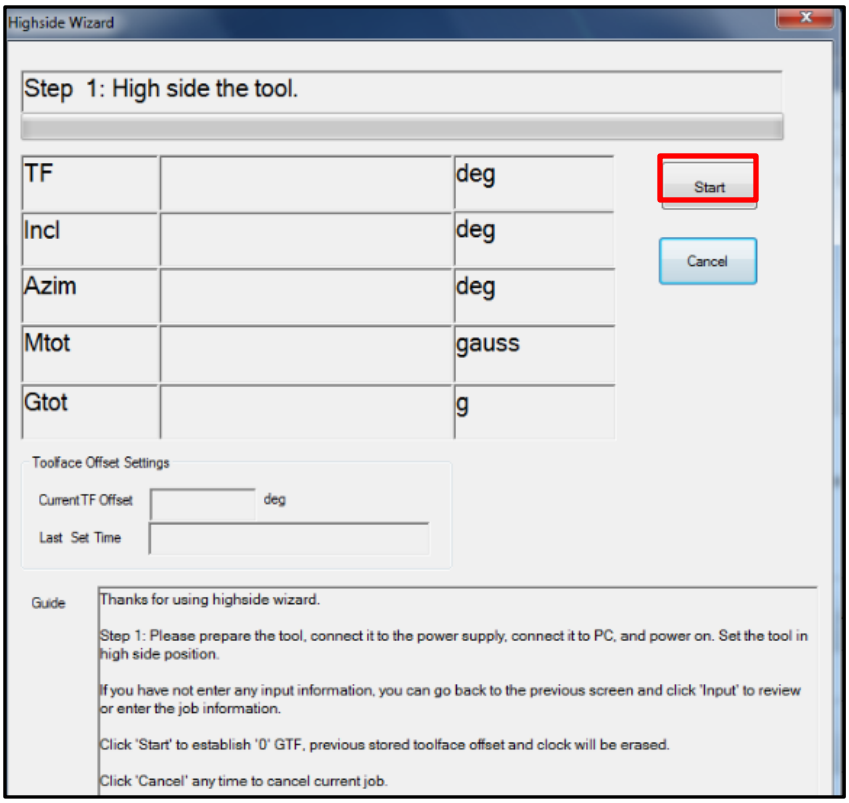

Figure 64 STEP-1 High Side wizard

This will establish the value of the Internal Correction used in the Tool throughout the Run.

STEP 2

When prompted,

18. Click “Confirm” to confirm the value of the Tool face correction.

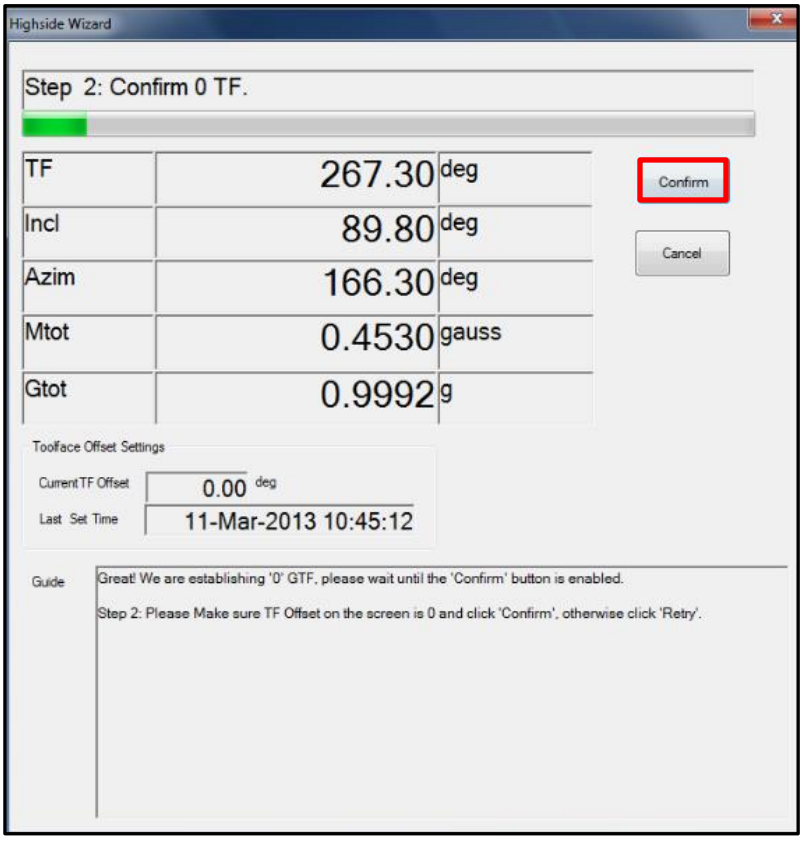

Figure 65 Confirm“0” tool face

In the Example above 267° is the value of the Internal Tool Face Correction between the Directional Sensor and the Landing Spider key slot.

This value will be different each time the tool is assembled.

The G Total value should be within the range G reference +/- 0.0025.

The M Total value will be M reference +/- 0.003 Gauss; however it is difficult to get an accurately value due to Interference from Metallic Objects nearby.

STEP 3

The Value of the Tool Face from the tool should now be 0°.

19. Physically Rotate the Tool 90°.

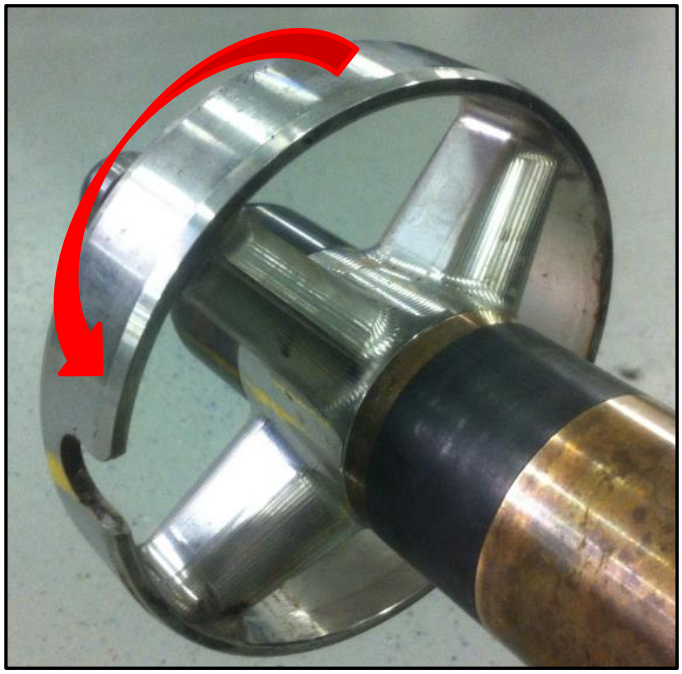

Figure 66 Key slot at 90°

20. Click “Next”.

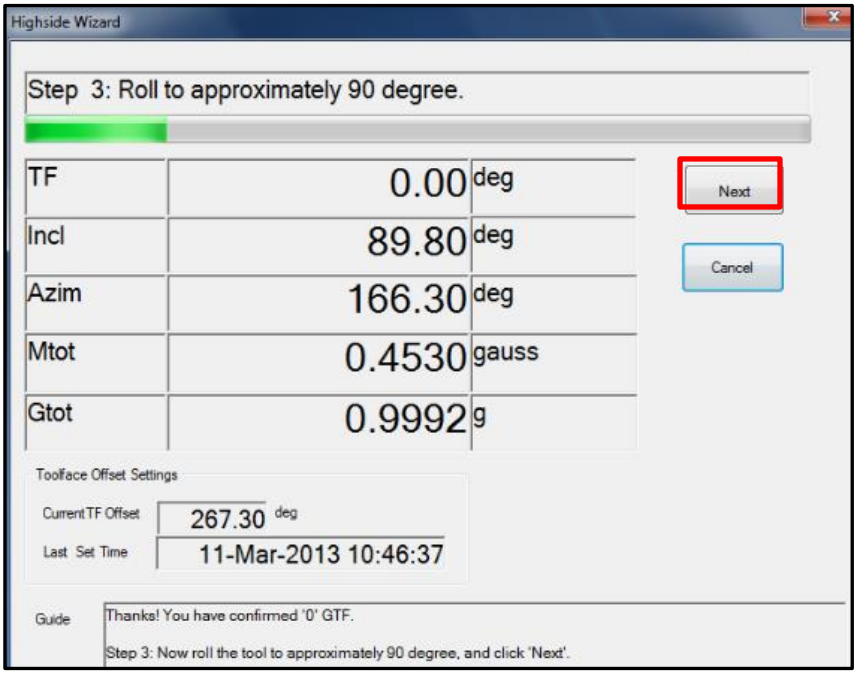

Figure 67 Roll at 90°

STEP 4

You can rotate the tool Back and forth till the tool face value is between 87.5 and 92.5°.

Once you have the desired reading, wait for 3 seconds for the measurements to stabilize.

21. Click “Accept” when the Button is enabled.

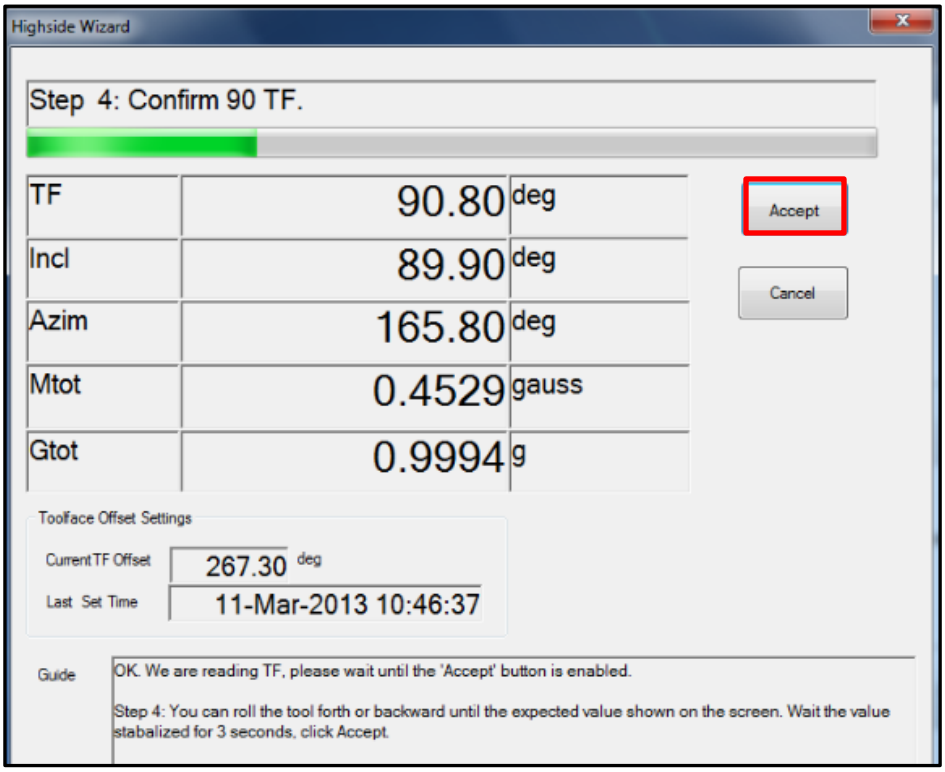

Figure 68 Accept 90° Tool face

STEP 5

22. Now Rotate the Tool such that the Key slot is physically pointing down and the Tool Face is 180°.

Figure 69 Key slot at 180°

23. Now Click “Next” on the High Side Wizard.

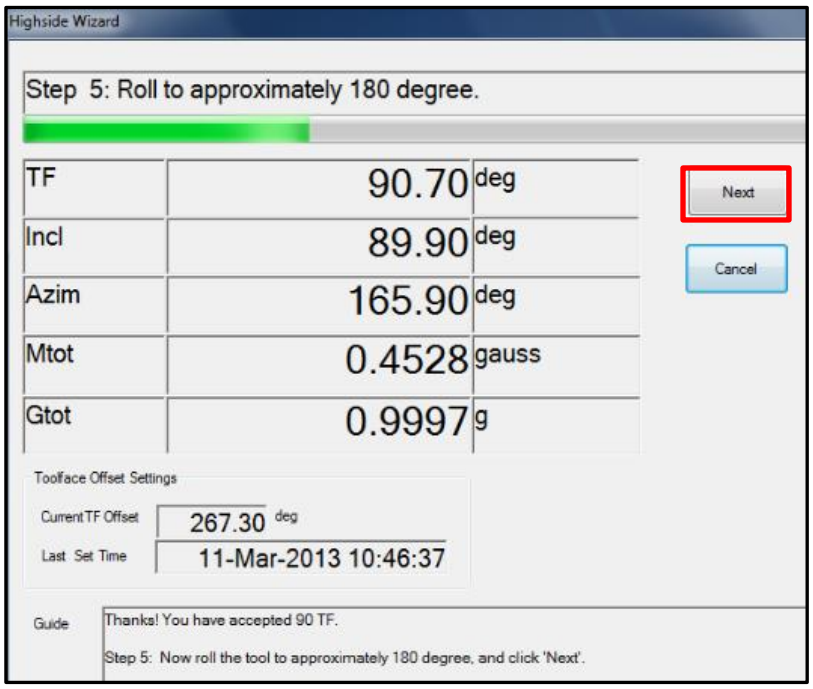

Figure 70 Roll Test at 180°

STEP 6

The Tool Face should be between 177.5° and 182.5°.

24. Click “Accept”.

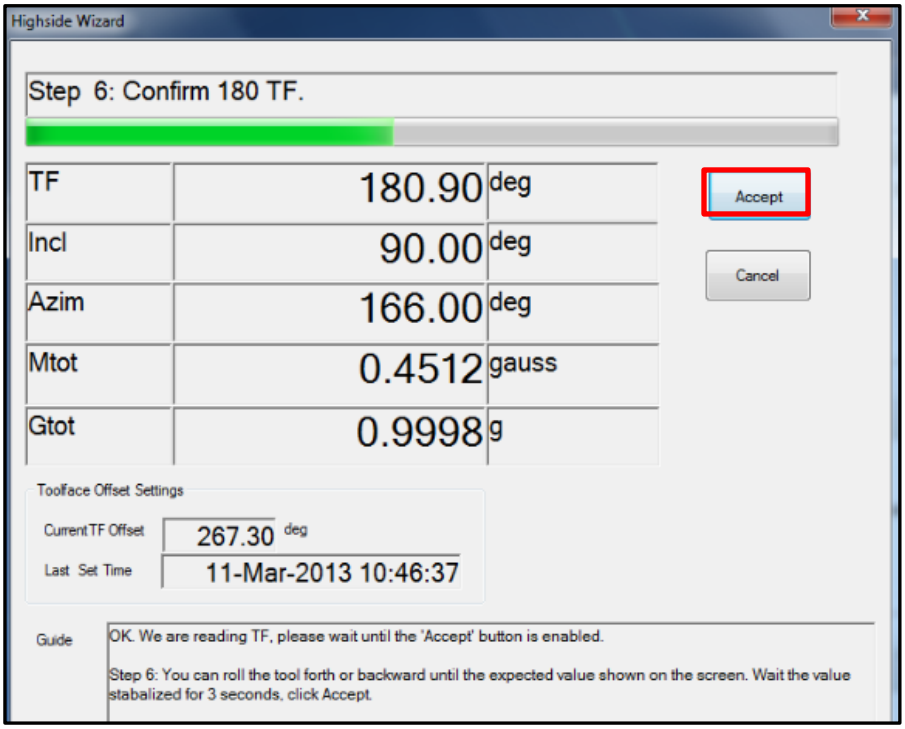

Figure 71 Accept Tool Face at 180°

STEP 7

25. Rotate the Key Slot to 270°

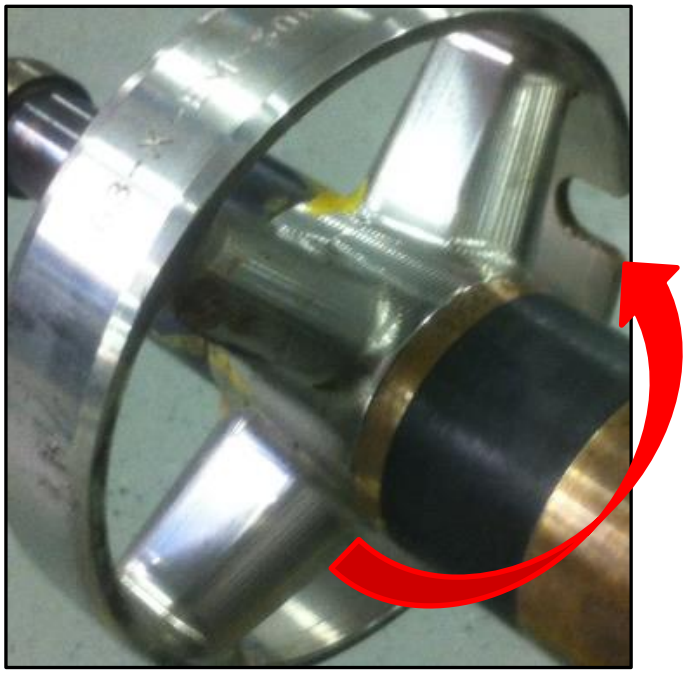

Figure 72 rotate the key slot to 270°

26. Click Next

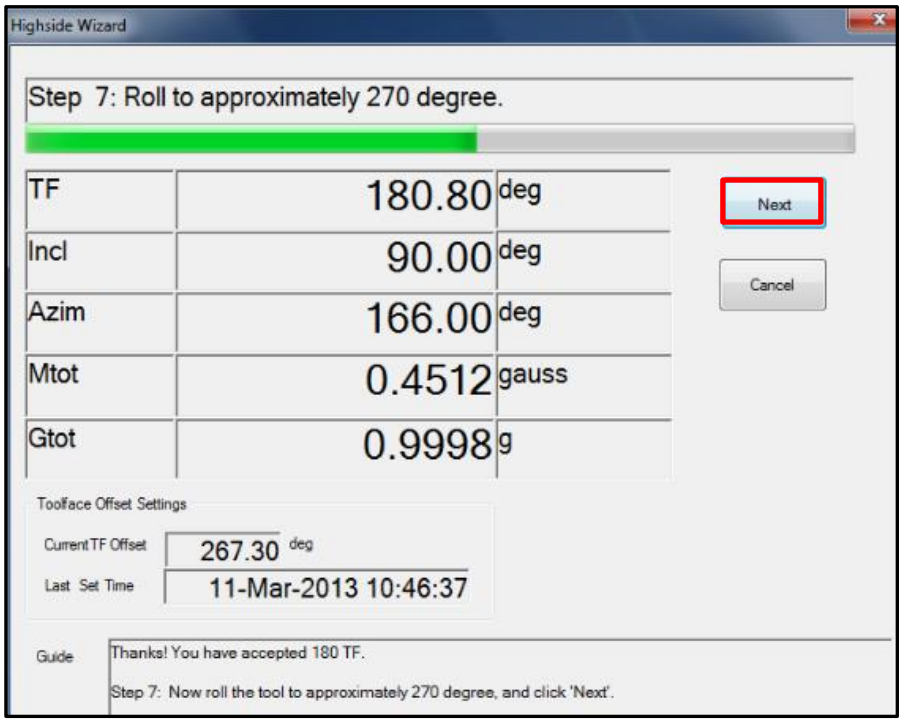

Figure 73 Roll to 270°

STEP 8

The Tool face value should be between 267.5° and 272.5°

27. Click “Accept” to Confirm.

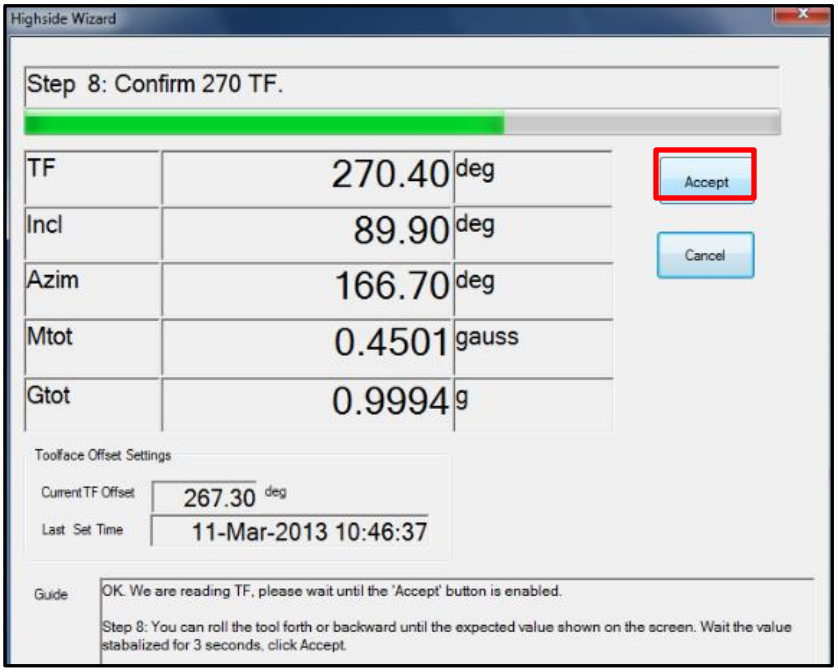

Figure 74 Confirm 270 Tool face

STEP 9

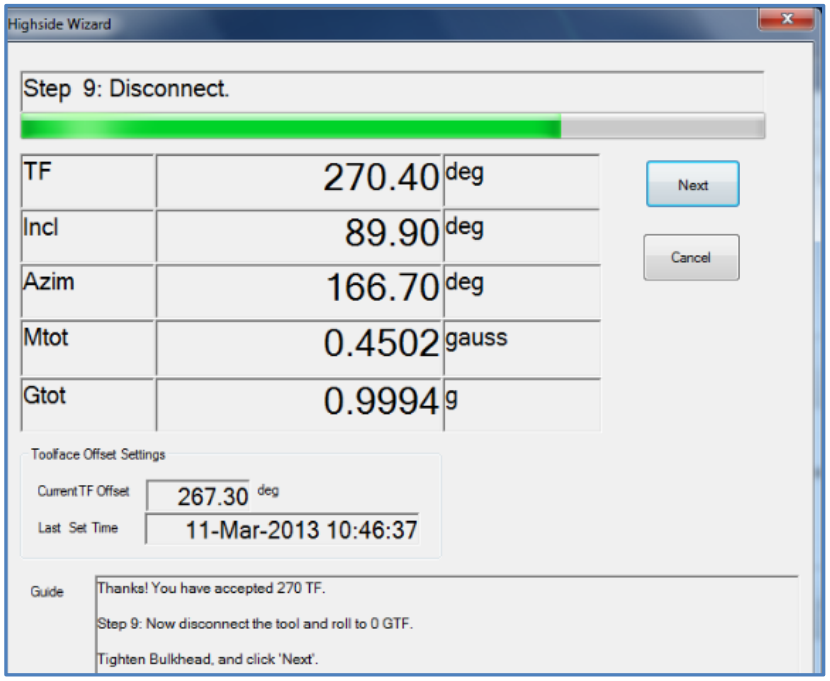

Figure 75 Disconnect

28. Click “Accept” to Confirm.
29. If the tool was programmed in test Mode , switch the Tool back to Operations Mode on the Surface TAB in XEM Rx

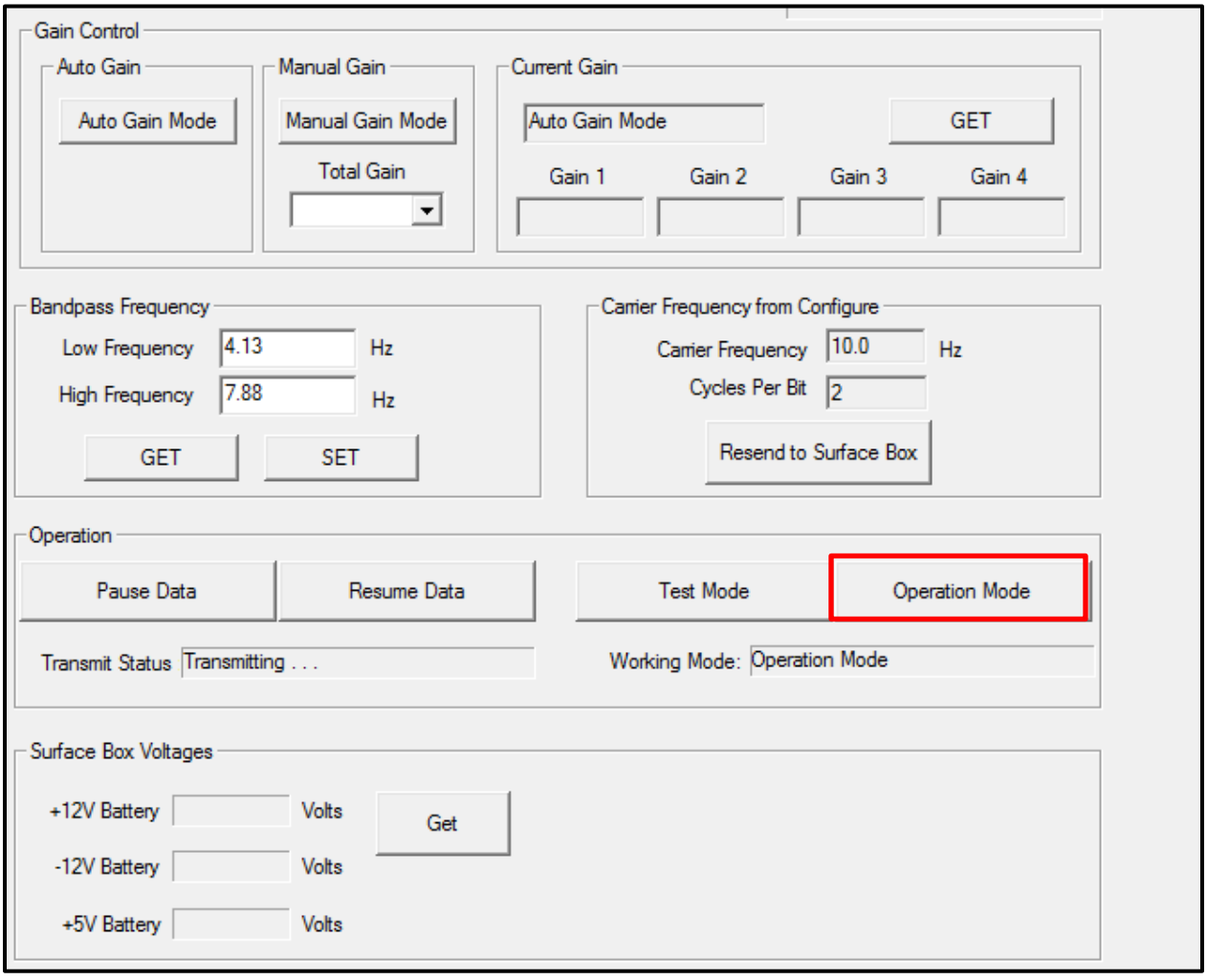

Figure 76 Surface Tab

30. IF the tool was programmed in test Mode, switch the Tool back to Operations Mode on the Surface TAB in the XEM Rx. The Green light on the XRT should go OFF.

Figure 77 XRT

31. Now Disconnect the HHROTC Adapter from the Bottom of the Tool String.

Figure 78 HHROTC at the bottom of the string

32. Remove the HHROTC Connector.

Figure 79 HHROTC being removed

33. Attach the CAN terminator (If an XHOP will be used, it should be connected instead).
    The CAN Terminator is also known as the bulkhead.

Figure 80 CAN terminator attached

34. Torque the Can terminator to 350lb force using barrel wrenches as described in the tool preparation chapter.

Figure 81 Can terminator attached

35. The XEM tool String is now complete.
36. The HHROTC connector can be removed and stored.
    The XConnect cables can be stored away.
    Only the XEM Test box will be required.

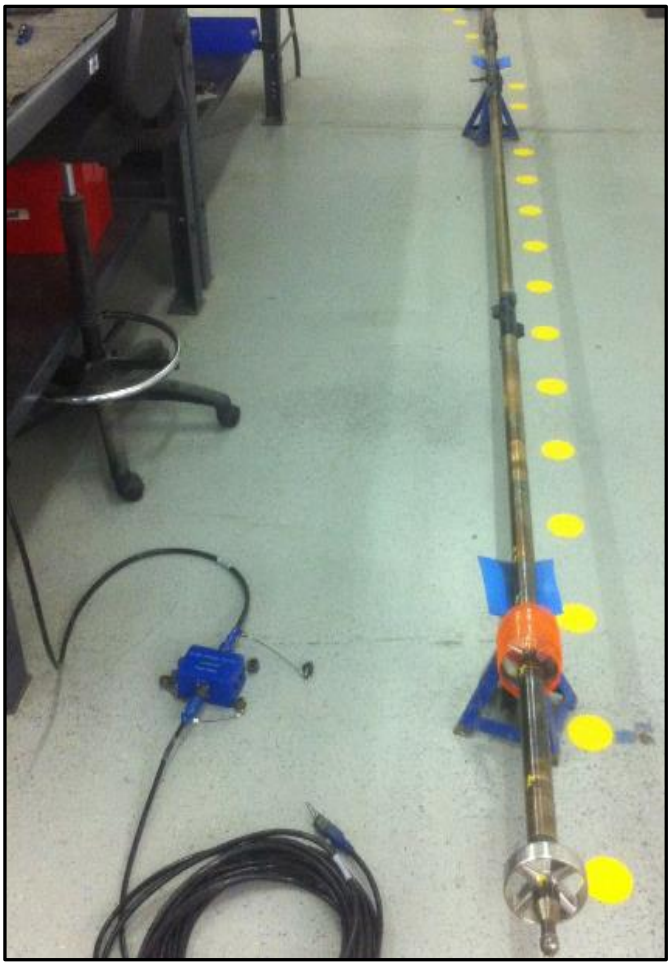

Figure 82 HHROTC and XConnect cables removed

37. On XConnect a message will pop up indicating that the Bulkhead tightened is confirmed.

STEP 10

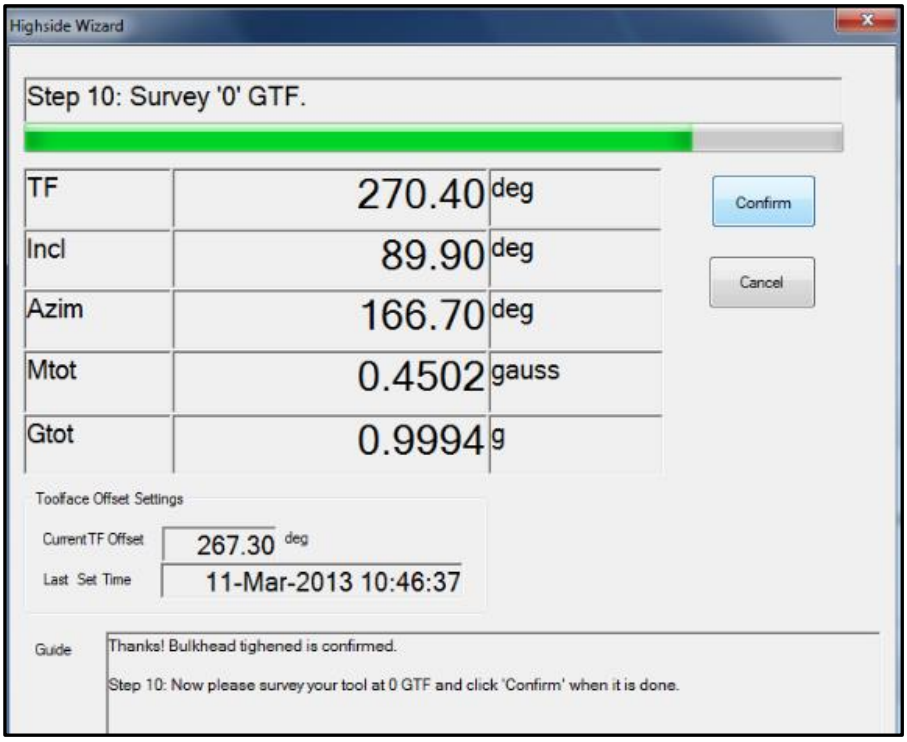

Figure 83 High side wizard Step 10

Since the XConnect Cable is disconnected , you will no longer be able to use the XConnect to get data from the tool.

You have to detect the EM signal the tool transmits and decode them from Antennas(As you would on the Job).

You have to use the XEM Receiver program to get Surveys using the XEM RX program to complete the remaining test.

38. Remove the Programming Cables and store them, Only the XEM Test Box will be needed.

Figure 84 Programming Cables disconnected

Figure 85 Store away all cables; Only the XEM tester will be required

6.5. AIR PUMP

The tool has an in built safety feature and needs to see Pressure >100psi on the Internal or Annular Pressure Port to turn ON.

You will need to apply Pressure using an Air Pump provided in the Kit box to apply pressure.

39. You will need the following equipment

- Pressure Pump
- C- Clamp
- Allen Key
- Soft tip Screw

Figure 86 Equipment to apply pressure on the DPG port

40. Identify the Internal Pressure port on the DPG Probe.

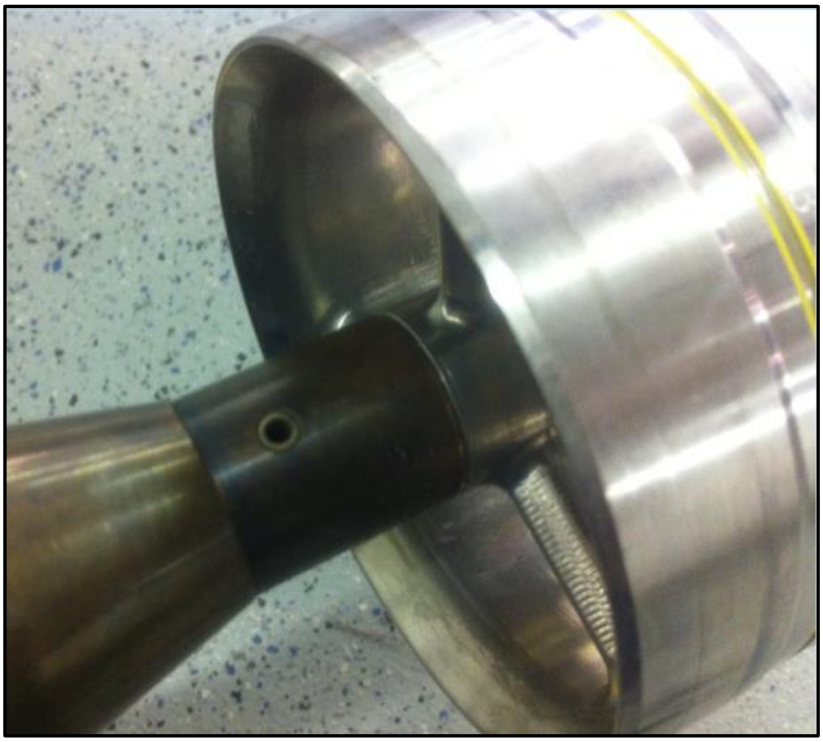

Figure 87 Internal Pressure port on DPG probe

41. Place the Soft Tip Screw on the Internal pressure Port.

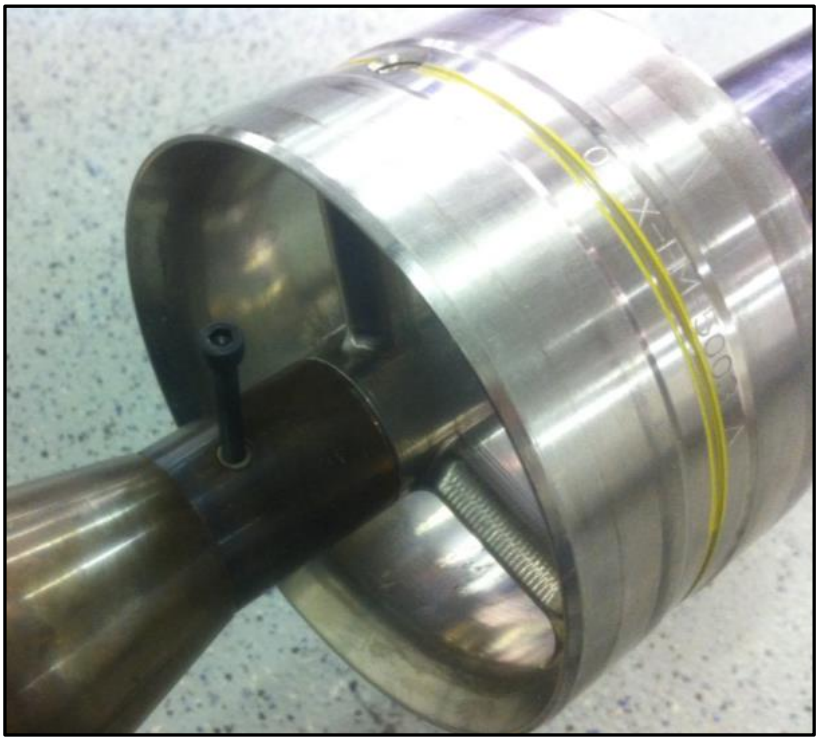

Figure 88 Soft tip Screw on the pressure port

42. Attach an Allen Key to the rotate the Screw Anti-Clockwise. This will remove the Peek Insert.

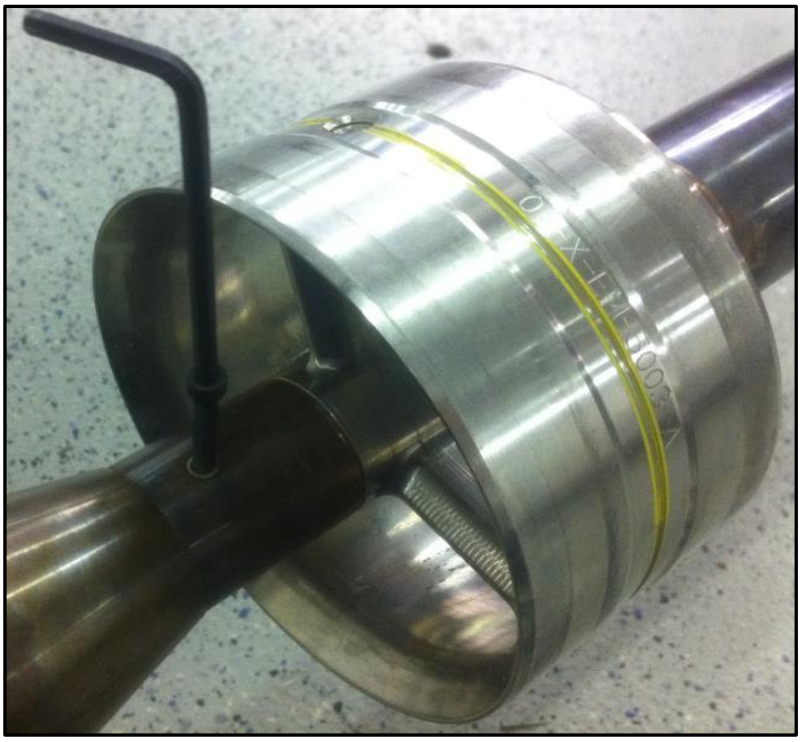

Figure 89 Allen key rotated anticlockwise

43. Once the Peek Insert is free and starts to rotate pull the Peek Insert.

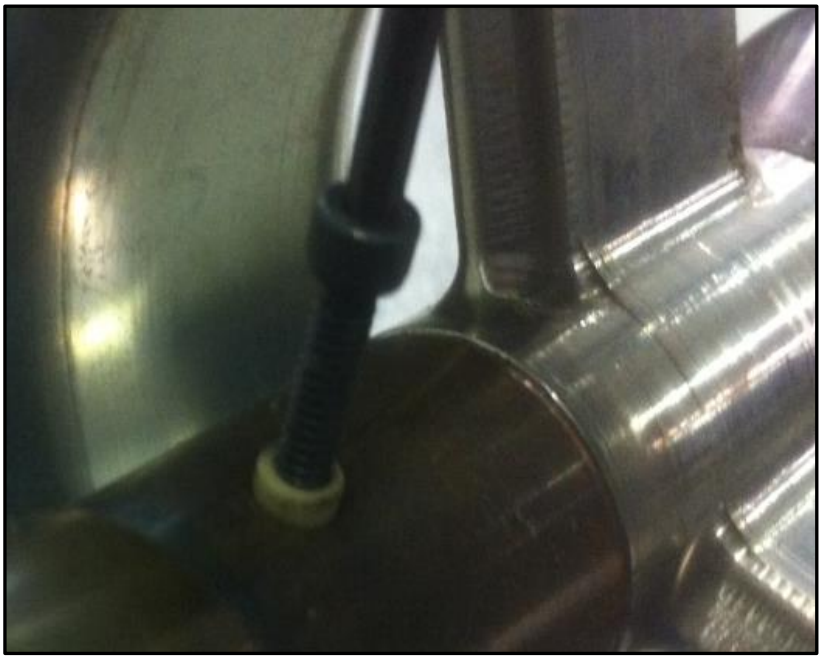

Figure 90 Peek insert being removed

Figure 91 Remove peek insert

44. Leave the Insert on the Screw and keep in a safe place

Figure 92 Peek Insert and Soft Tip Screw

45. Attach the Air Pump “Adapter” to the pressure port; Ensure the O-Ring on the tip of the adaptor is in good condition. Lubricate the O-Ring with DC 111.

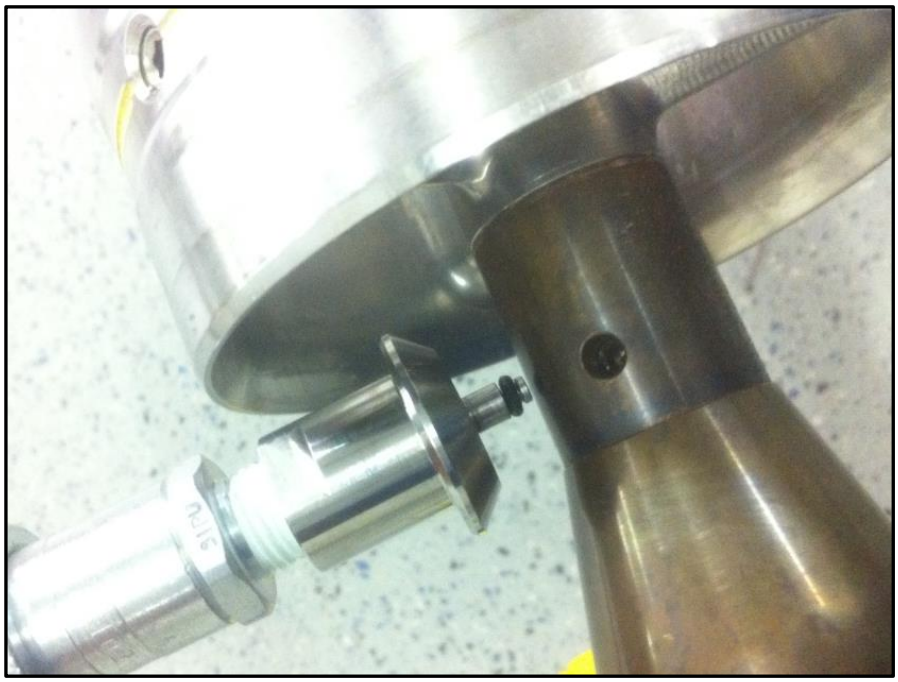

Figure 93 Air Pump adaptor attached to pressure port

Figure 94 Air pump adaptor attached to port

46. Install the C-Clamp around the Neck area below Spider and the Air pump adaptor.

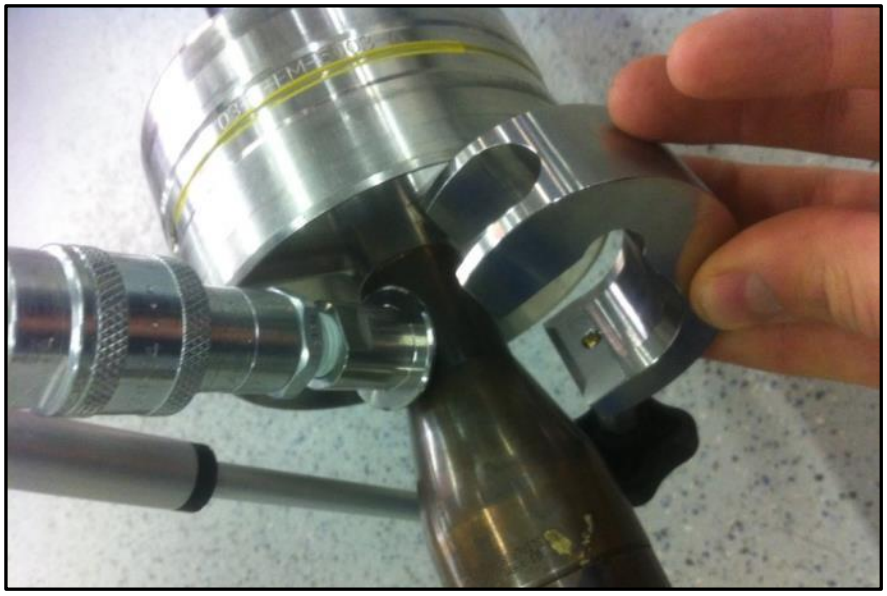

Figure 95 C-Clamp installation-1

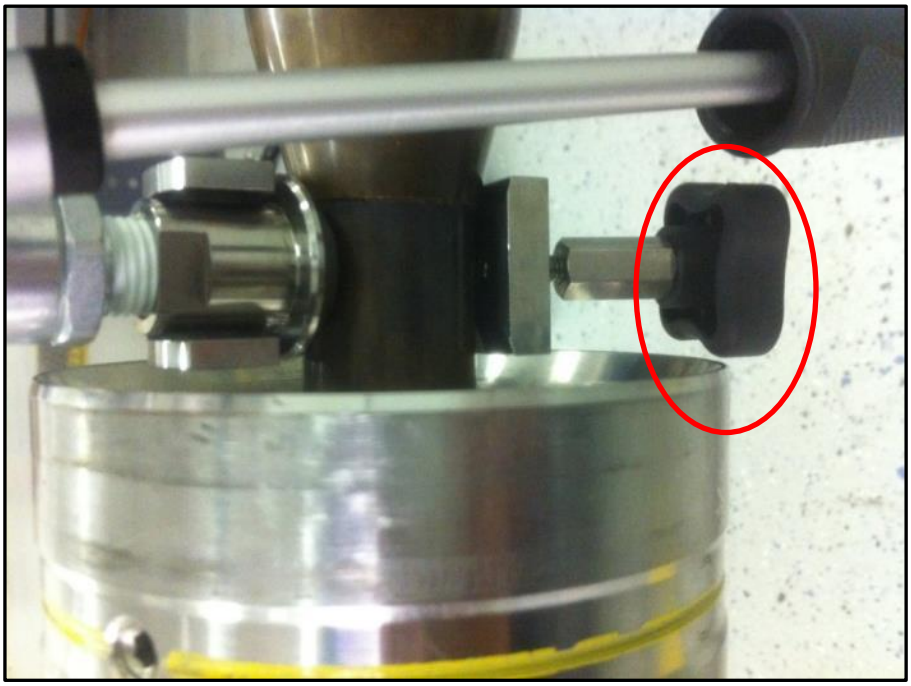

Figure 96 C-Clamp installation-II

47. Tighten the C Clamp with the Screw

Figure 97 Screw tightened

48. The Screw on the C-Clamp needs to be tightened all the way to ensure that the Adaptor/fitting from the Air pump is firmly attached to the DPG probe.

This is important as you will be applying pressure with the Air-Pump.

At this Stage you have connected the Air Pump to the DPG Probe; the setup should appear as the Figure below.

Figure 98 Air pump firmly attached to the DPG probe

6.6. CONNECTING THE XEM RX WITH THE TOOL

You now have to connect the XEM RX (Receiver) to the Tool to complete the High Side tests. This includes the following equipment.

- 2 x Alligator clamps
- 2 x Testing Cables 22CABL0063
- XEM System Tester

Figure 99 Equipment for Surface test with XEM-RX

49. Connect the 2 x Alligator Cables to the “TO SPIDERS” ports on XEM Test Box. They just need to be inserted. The cables can be interchanged and placed on any of the ports.

Figure 100 Alligator cables connected to the XEM Test Box

50. Place 1 x Alligator Clamp on the Spear Point above the Landing Spider.
51. Place 1 x Alligator Clamp on the Air Pump Adaptor.

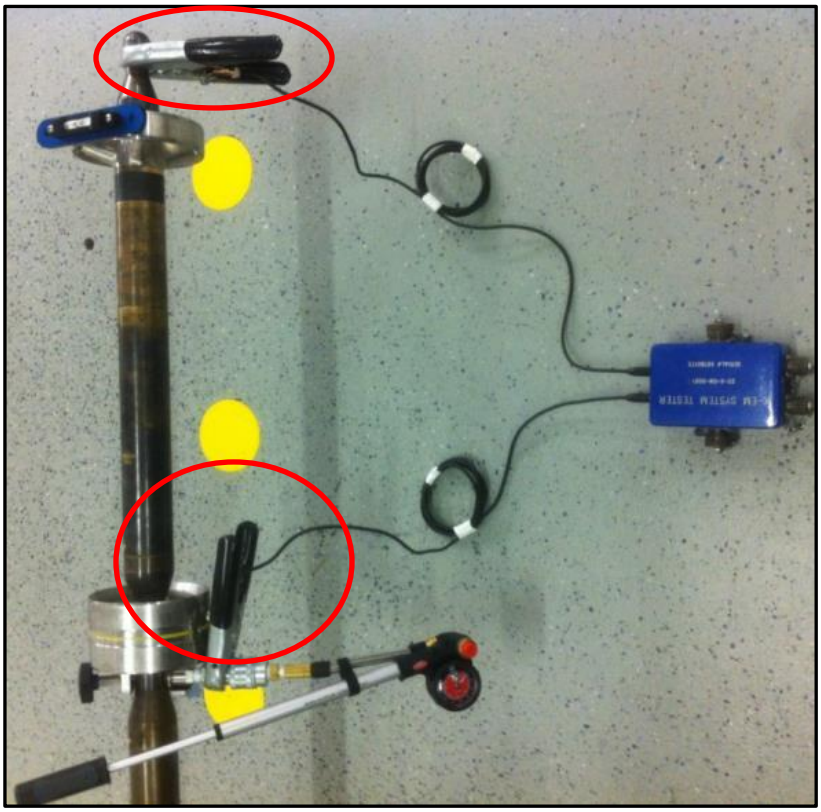

Figure 101 Alligator clamps connected to the test box and probe

52. Connect the Male end of the 2 x Test Cables 22CABL0063 to the ANT & BOP ports on the XTR.

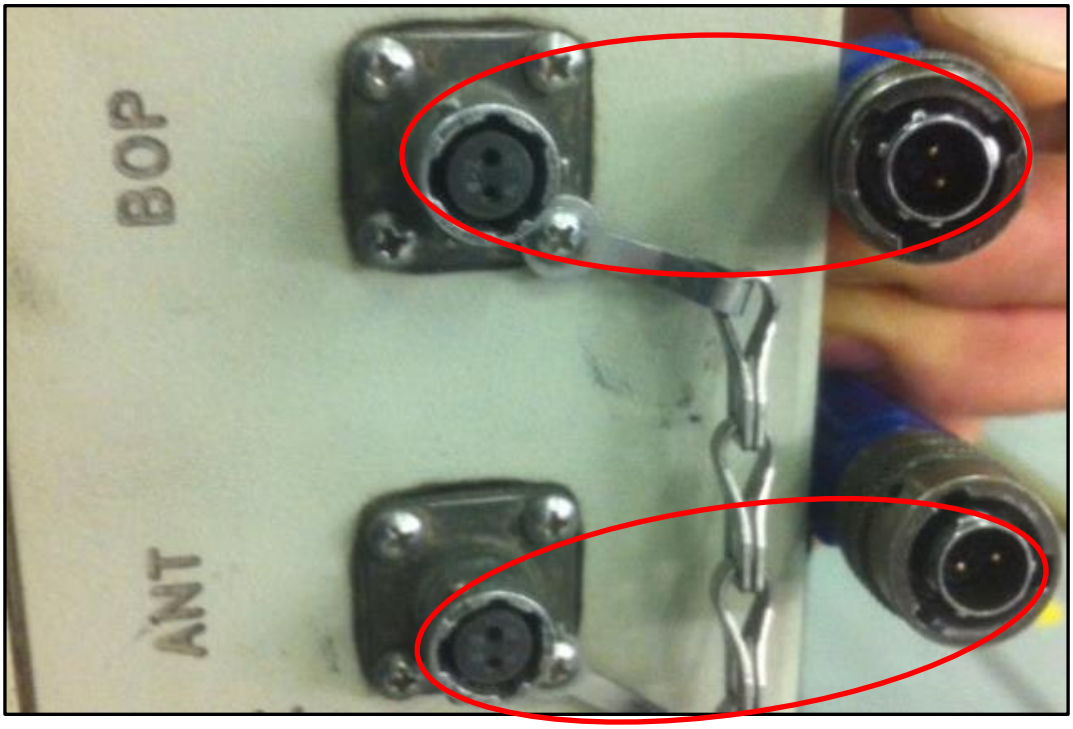

Figure 102 test cables connected to the ANT /BOP ports

53. Connect the other ends of the Test Cables 22CABL0063 to the XEM System tester.

Figure 103 Test cables connected

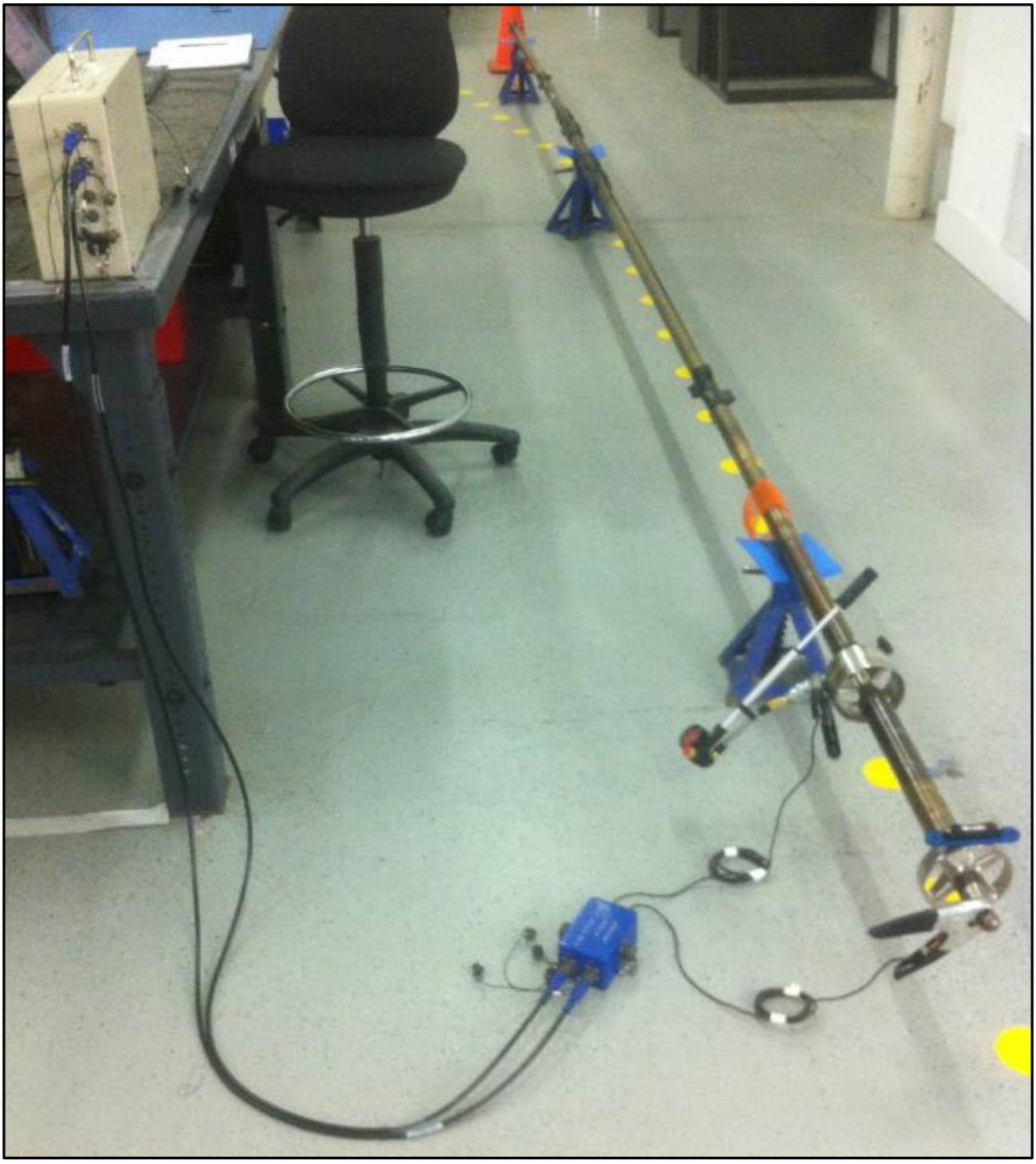

Figure 104 Surface Test Setup Complete Including XTR, Test Cables, XEM System Test Box, and Alligator Clamps connected to the DPG Probe

6.7. ATTACHING THE VIBRATOR

A Survey is taken when the Rig Pumps are switched OFF. The Tool has a “Vibration Sensor” which senses a drop in Vibration when the Flow is switched OFF.

In order for the Tool to take a Survey to complete the High Side tests, you need to attach a Vibrator to the Tool.

54. Attach the Vibrator on the rubber Centralizer below the DPG probe. Use an Allen key to attach the vibrator clamp on to the probe.

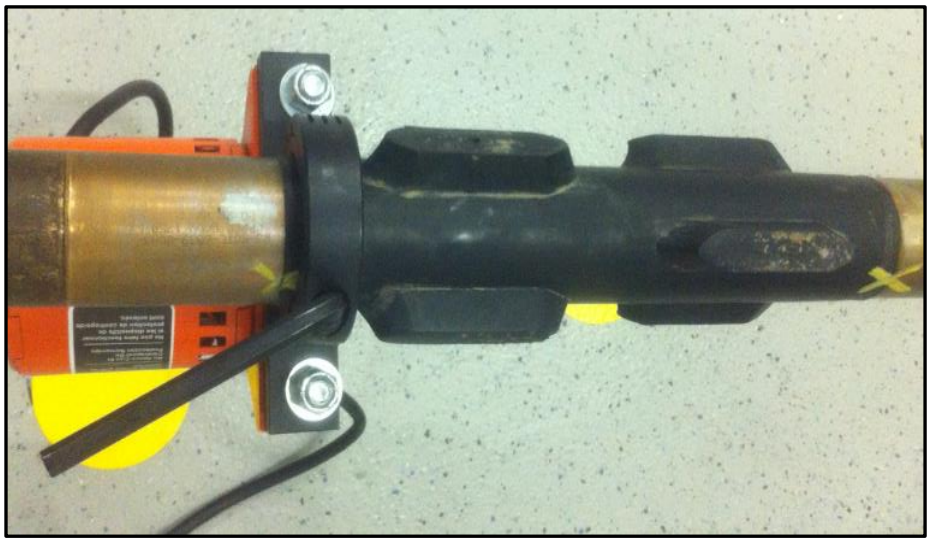

Figure 105 Vibrator Attached to Tool

55. Connect the Vibrator to the AC supply.

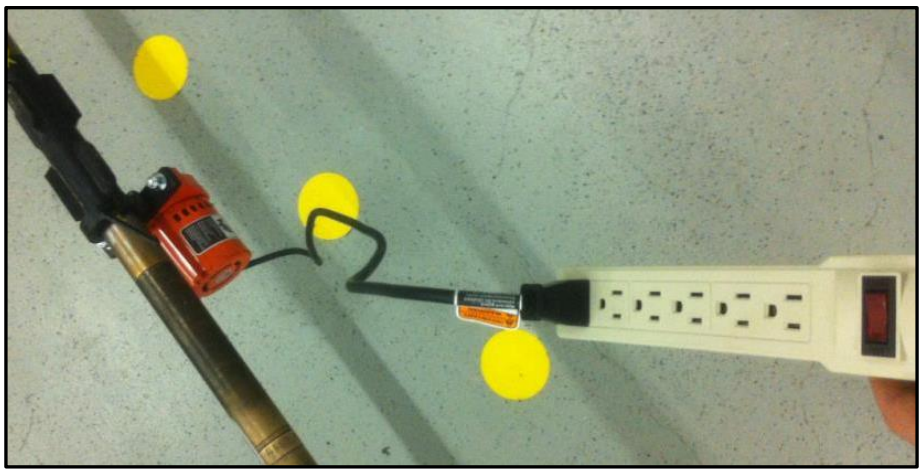

Figure 106 Vibrator connected with Power Supply

6.8. XEM RECEIVER TESTING

56. Ensure the Tool is secured with Barrel Wrenches to prevent the Tool from rotating.

Place the 2 x Barrel Wrenches on Wooden Blocks: This is important otherwise Current will flow from the Tool to the Ground. This is dangerous for the tool.

57. Ensure the Vibrator is ON.

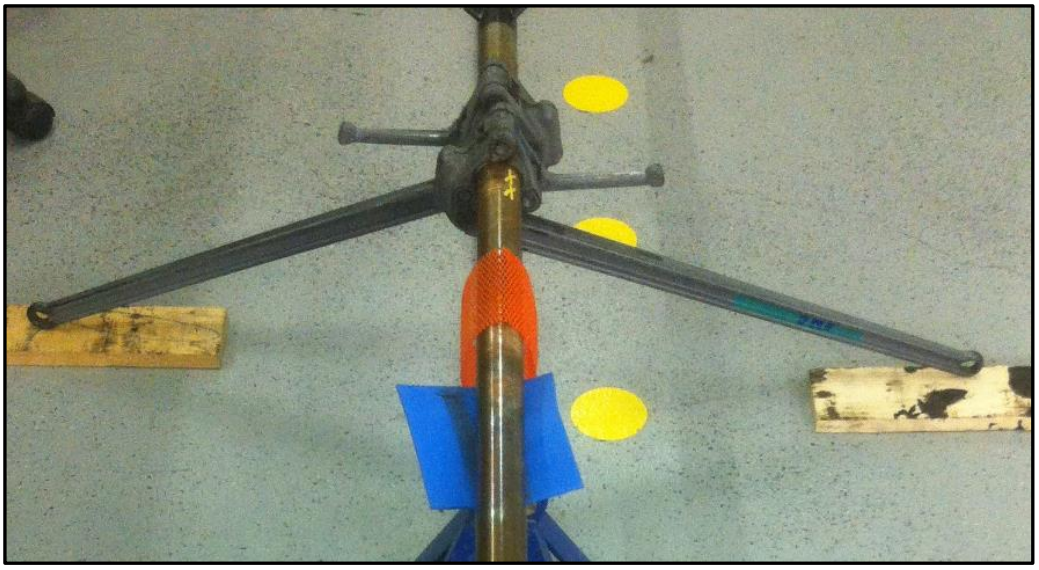

Figure 107 Tool Secured with Barrel Wrenches

58. Monitor the Pressure Gauge on the Air Pump. It should read the Atmosphere pressure (14 psi).

Figure 108 Air Pump Pressure Gauge reading Atmospheric Pressure

59. Confirm the Tool is on the High Side (Key slot pointing Up).

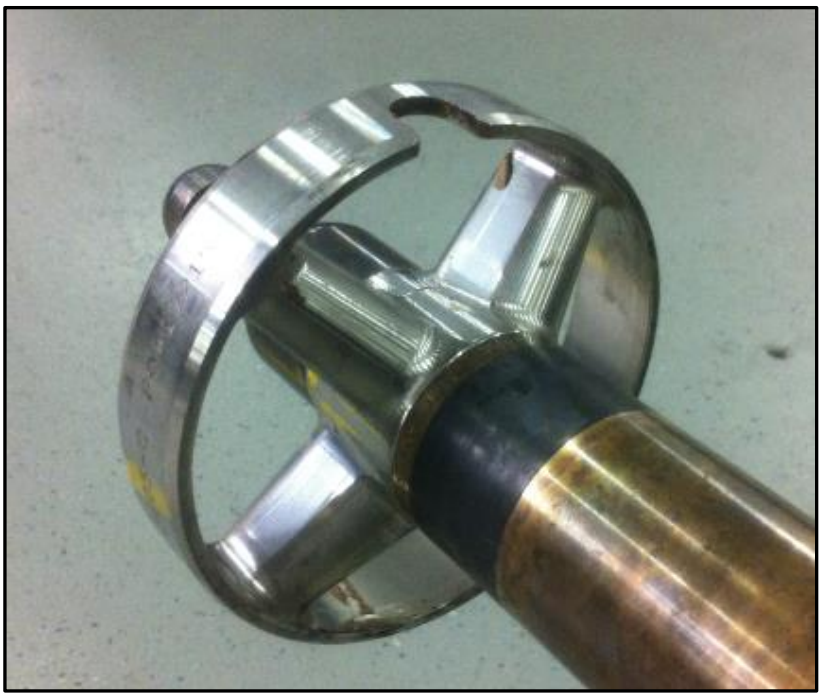

Figure 109 Probe at High side

REMEMBER: You are about to disable the safety interlock by applying pressure. Do not touch the 2 sides of the Landing spider at the same time. You could get an electrical shock.

Exercise caution if it is raining or the tool is wet; there is a risk of getting a shock.

Figure 110 Shock Hazard

60. Confirm the Tool is On High side with a Tool level.

Figure 111 Level to check the High Side

61. Review the Set-Up

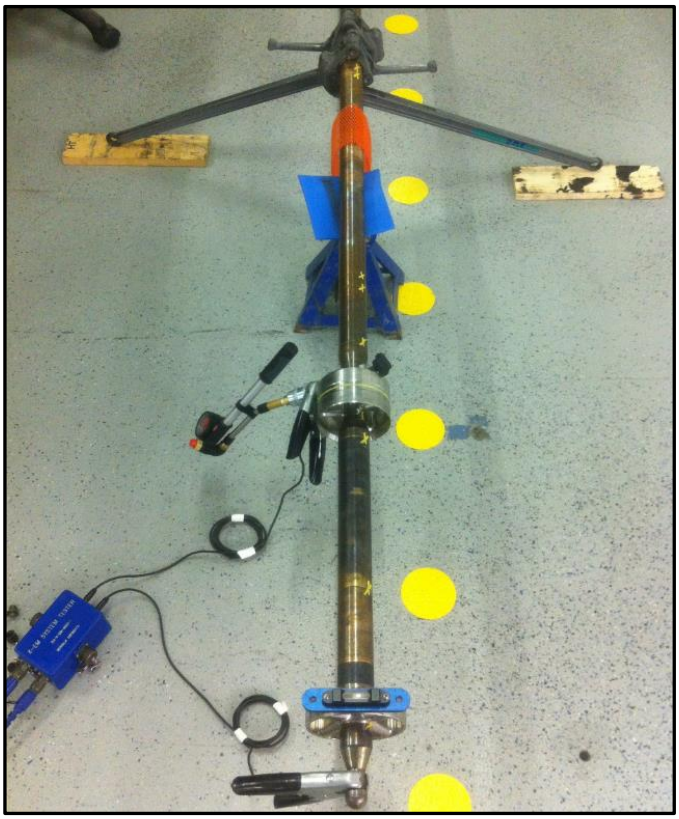

Figure 112 Tool Setup for XEM Receiver

62. Apply Pressure from the Air Pump. This should be > 100psi but < 150psi. Additional pressure will not damage the Probe but could create safety problems.

Figure 113 Pressure Gauge

63. Stop the vibrator to simulate a Survey.

64. The XEM Receiver should be Open. Otherwise launch it from the Start Menu or the short cut on the desktop using instructions in Section 1 of this chapter.
65. Click on the Capture Tab on XEM RX.
66. Watch the Survey information populate on the screen. Tool face data will also populate.

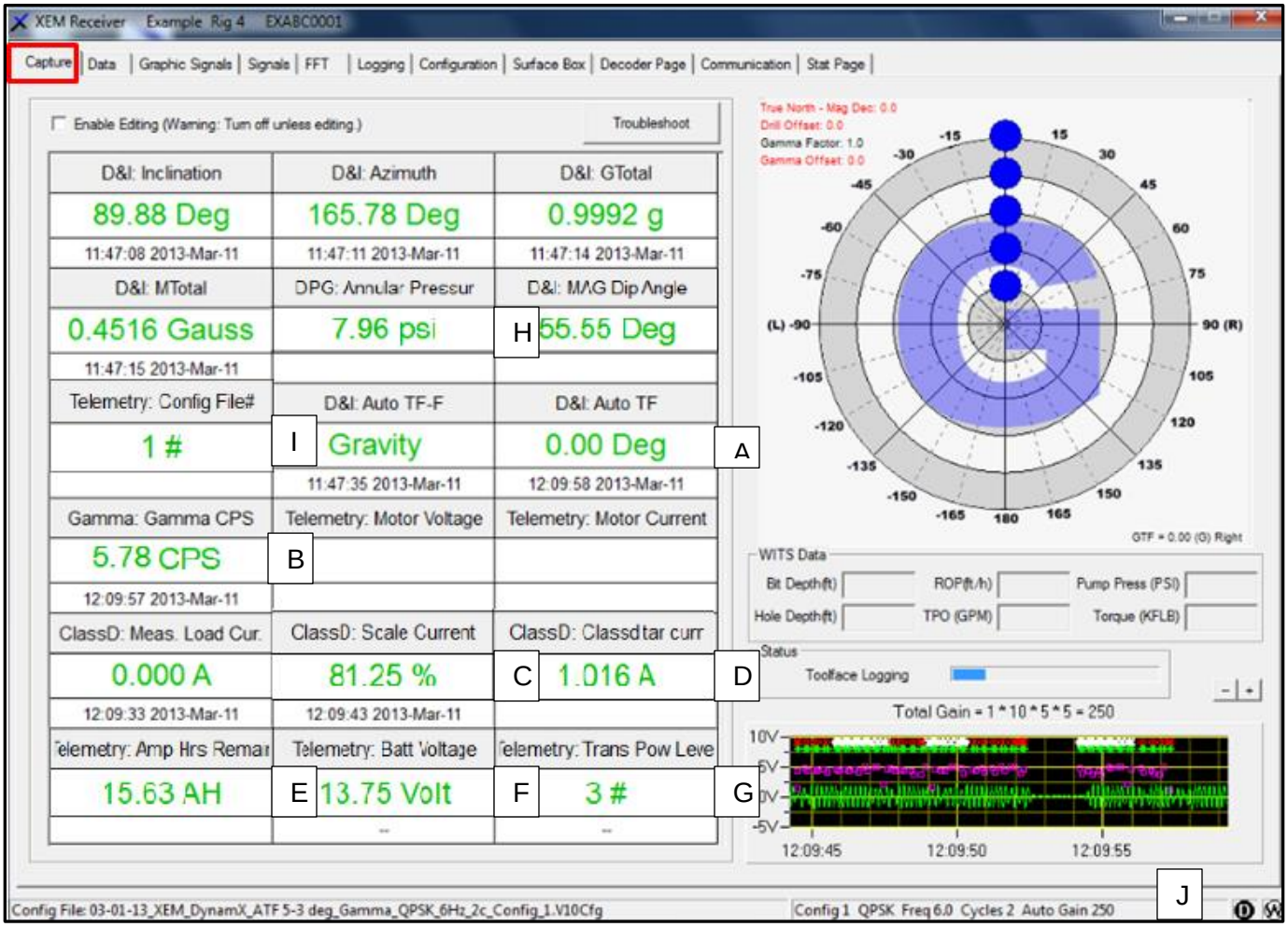

Figure 114 Capture Screen

Explanation on how to configure the capture screen is given in Chapter-8. If you need to monitor the values:

A. The Tool face should be 0°.

   This will also appear in the rose Bud below

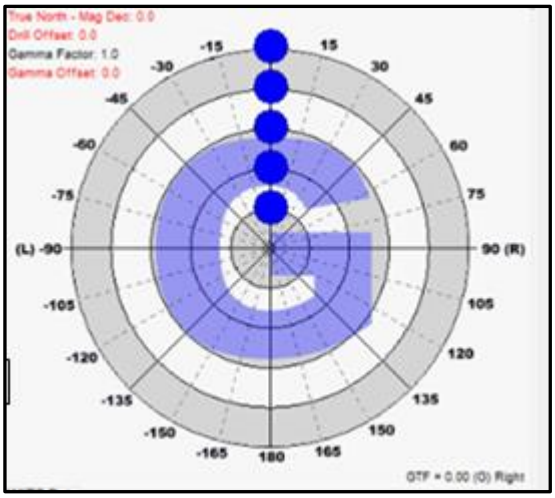

Figure 115 tool face =0

(An explanation of the other directional parameters is given in more detail in step #68 below).

B. The Gamma counts should be low values unless there is a gamma ray source.
C. The Scale Current will be a high value close to 80% (Transmission media is air).
D. Class D target Current should be equal to the initial target current in the configuration file.
E. The Telemetry Amp hours should be 15 A with a New Alkaline battery and 50 A with a New Lithium battery
F. The Telemetry Battery Voltage should be close to 14V with a new battery
G. Telemetry Power level should be as selected in the configuration file.
H. The Annular pressure should be from 0-30 psi
I. Telemetry Configuration file should be 1# (First configuration used).
J. The total Gain should be a small number 500 indicating a strong signal from the tool.

6.9. HIGH SIDE WIZARD (STEPS 11-12)

67. Return to the High Side Wizard on XConnect (Only software)
68. Confirm that a Survey was taken and the tool face was = 0° (Using the receiver program above)

STEP 11

69. Click Next.

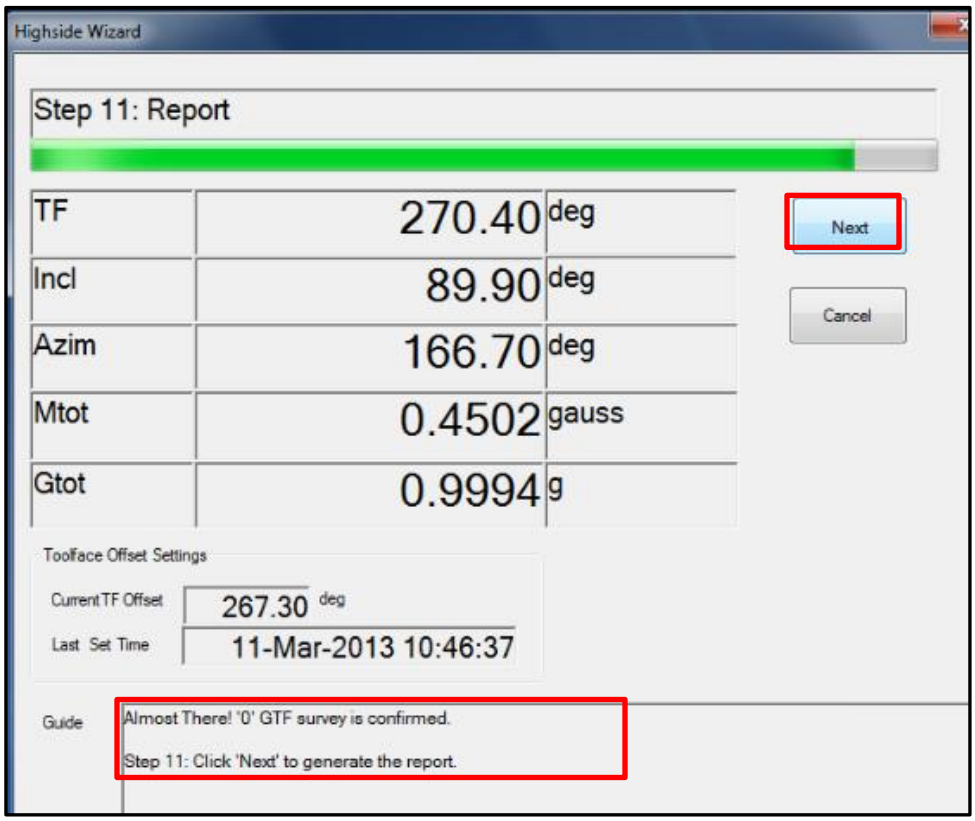

Figure 116 Generate Survey Report

70. The following Highside test report will be generated.

Toolface offset: generated by HS Wizard
Extreme Engineering (c) 2011, 2012

Client,	Example,
Rig,	Rig 4 ,
Job Number,	EX - ABC - 0001,
Run Number,	1,
Surface kit S/N,	XTR137, XRT100,
Operator Name,	Operator,
Location,	Local,
Box S/N,	USA-KB-001,
Directional S/N,	DO155,
LandingSub S/N,	LSB0001,
Collar S/N,	NMDC00001,

TF Zero Confirmed, OK, 10:46:51 11-Mar-2013, 267.3,

Raw Roll Survey Results

#time,	Ref (deg),	GTF (deg),	Incl (deg),	Azim (deg),	Mtotal (gauss),	Gtotal (g),
10:46:51,	N/A	267.3,	89.8,	166.3,	0.4530,	0.9992,
10:49:39,	90	90.7,	89.9,	165.9,	0.4528,	0.9997,
10:51:55,	180	180.8,	90.0,	166.0,	0.4512,	0.9998,
10:53:56,	270	270.4,	89.9,	166.7,	0.4502,	0.9994,

AX (g)	AY (g)	AZ (g)	MX (gauss)	MY (gauss)	MZ (gauss)	Temp. (C)
0.0032,	-0.9980,	-0.0473,	-0.2475,	-0.3712,	-0.0782,	20.4,
0.0011,	-0.0341,	0.9991,	-0.2477,	-0.0752,	0.3715,	20.5,
0.0001,	0.9994,	0.0331,	-0.2475,	0.3698,	0.0742,	20.7,
0.0014,	0.0407,	-0.9986,	-0.2486,	0.0739,	-0.3679,	20.5,

Bulkhead tightened confirmed, 11:05:04 11-Mar-2013,

TF Zero Confirmed, 12:11:39 11-Mar-2013,

#Modules connected at time of HS procedure, firmware version
Directional 0.0.2.31

Config file number, 1.6

Client Signature

Extreme Signature

Figure 117 Highs side test Report

71. In the report confirm:
    A. Toolface is Zero
    B. The Directional Module is connected at the time of the test ,
       The Firmware version should match the list Table 1(Section 2.4).
    C. Config Number 1.6 indicating the tool is now using the first configuration out of 6 configuration.

D. The toolfaces on the roll should be 90+/- 2.5°, 180 +/- 2.5°, 270 +/- 2.5°.

E. The Inclination values should be Average value +/-0.25° .

   a. If the probe is level on ahorizontal surface the average value should be 90°.

F. The Azimuth should be Average value +/- 1°.

G. All the M Total values should be Average value +/- 0.003 Gauss.

H. All The G Total values should be Reference G value +/- 0.0025.

I. All the 6 axis sensor (Ax,Ay,Az, Mx,My,Mz) are displayed.

   a. The values of Ax and Mx should not change significantly.

   b. The values of Ay, Az, My, Mz should keep changing.

J. The temp should read the ambient temperature value.

72. The Document should be signed by the Client Representative and the Extreme representative.

STEP 12

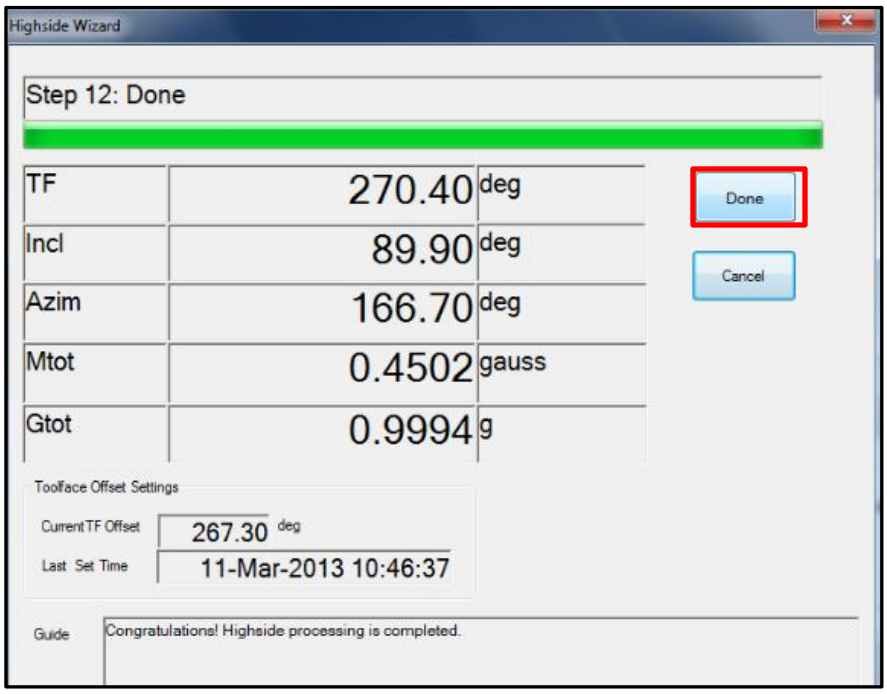

Figure 118 Complete the High Side Wizard

73. Click “Done” to exit the Wizard.

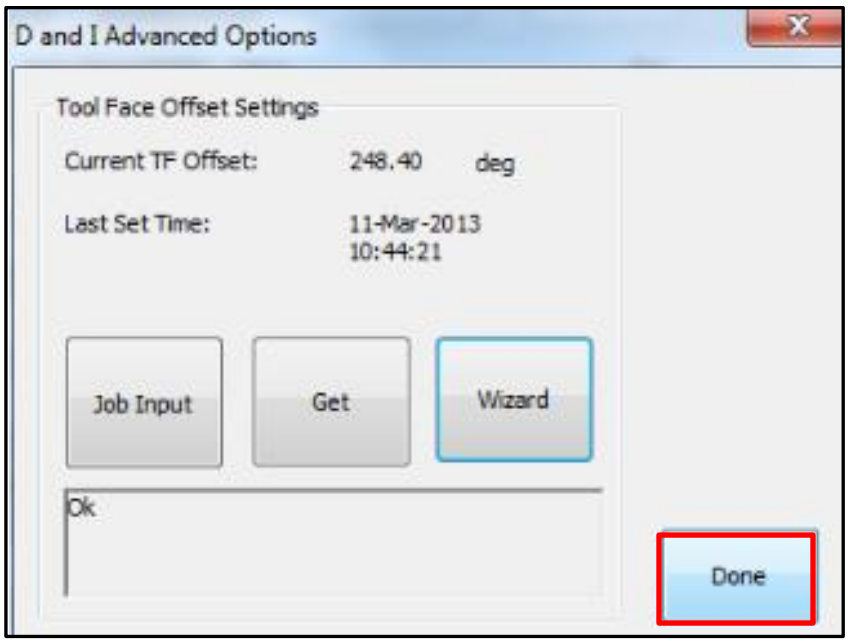

Figure 119 Exit D and I advanced Options

74. Exit the D&I Window by clicking “close”.

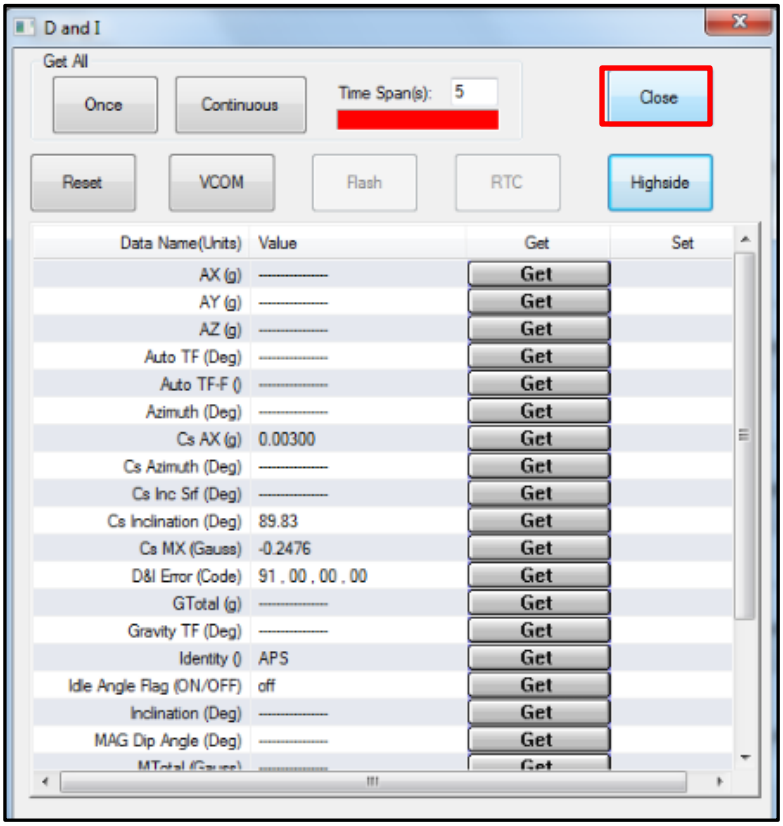

Figure 120 D&I Window

75. Click Exit on the XConnect program.
76. This will close the the XConnect application.

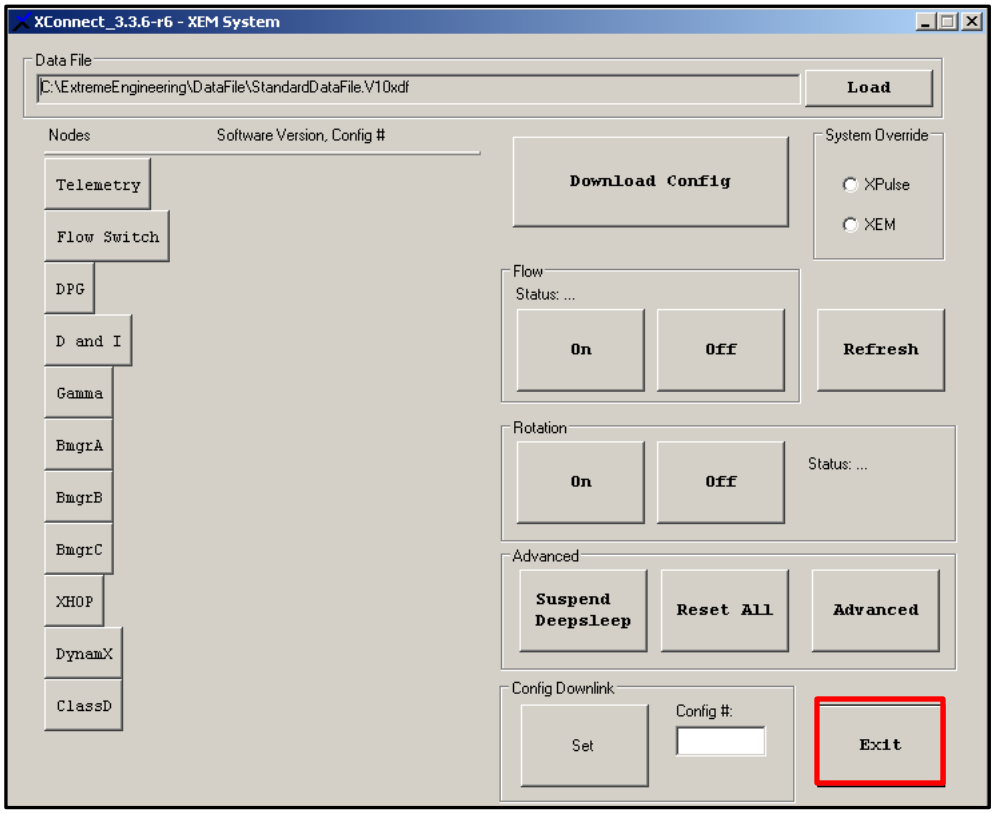

Figure 121 Exit the X Connect window

6.10. DISCONNECT ACCESSORIES FROM THE TOOL

77. Bleed the pressure in the Air Pump.

78. Loosen the crew on the C-clamp to remove the Air pump adaptor.

79. Insert the Peek Insert screw in the bore pressure port.

80. Tighten the peek Insert screw with the Allen Key.

81. Remove A/C Power from the Vibrator.

82. Remove the Vibrator from the Tool.

83. Remove the Level from the tool.

84. Remove the 2 x Alligator clamps from the Tool and the XYM Tester

85. Remove and Spool 2 x Testing cable 22CABL0063 from the XEM Tester

86. Remove and spool the 22CABL0016 from the XEM tester

87. Disconnect 22CABL0030 from the XEM system tester and the HHROTC port on the XTR

88. Spool the 22CABL0030

89. Remove the 2 x Barrel Wrench from the tool.

90. The tool string should now be complete

If 2 batteries are used the typical configuration includes the DPG, XTX, Battery, DynamX, Battery 2, XGM, Can Terminator (Bulkhead)

If an XHOP is used the typical configuration will involve the DPG, XTX, Battery, DynamX, Battery 2, XGM, XHOP

In the figure below only 1 x battery is used and the configuration includes the DPG, XTX, Battery, DynamX, XGM, Can terminator

The tool is now ready to be picked and placed in the collar.

Chapter 8 provides instructions on how to configure the XEM RX to decode signals for a typical job. Chapter 9 provides instructions on how to pick up the tool and load into the collar.

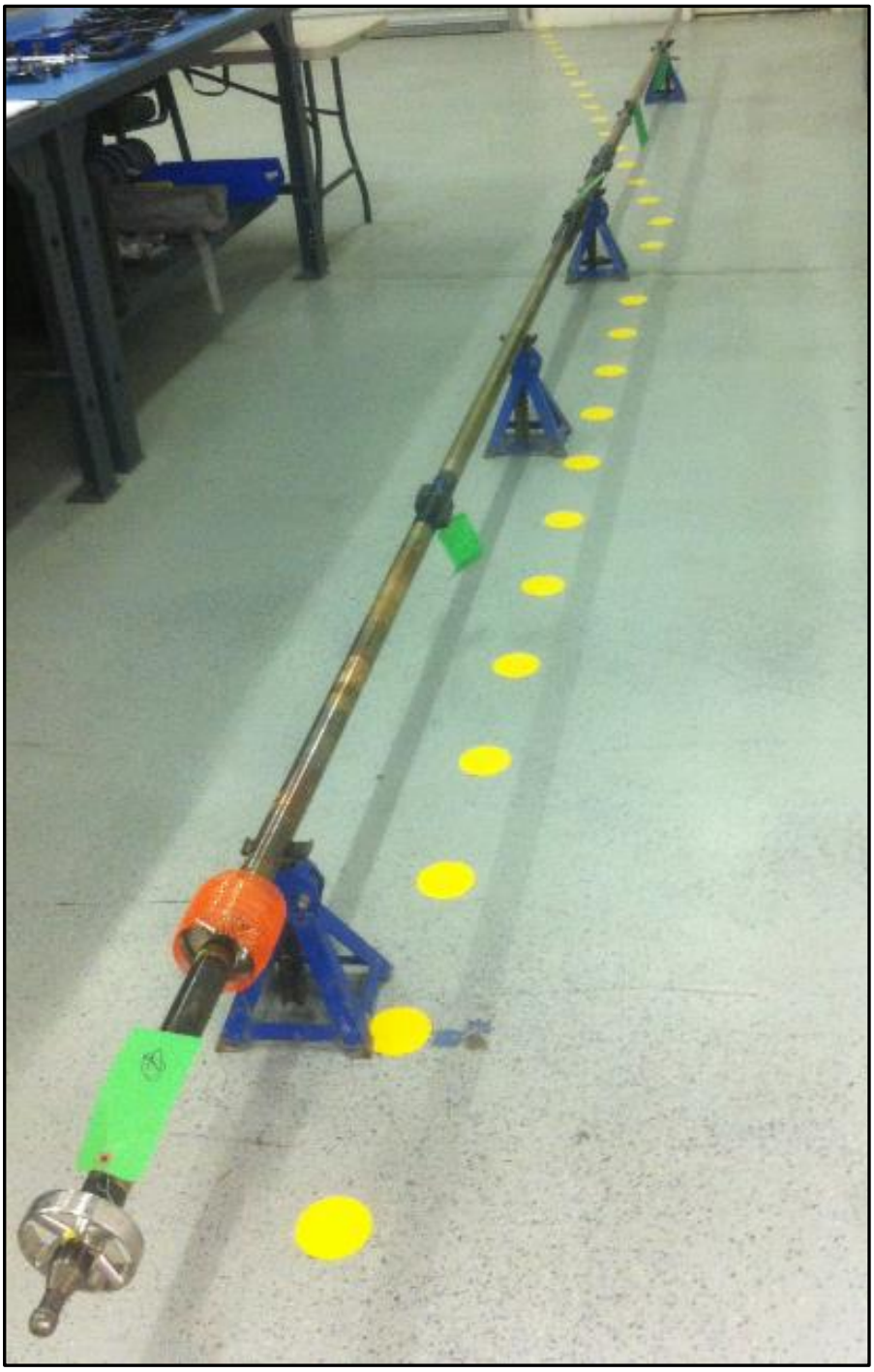

Figure 122 XEM Tool String DPG, XTX, Battery, DynamX. XGM, Can term

7. REFERENCES

TECHNICAL REVIEW

Hoan Chau

Rick Zheng

REFERENCES

V-10 High voltage guide Ryan Kirby

FST Training Material courtesy Dan Bukovec