

VeriFire®

User Manual

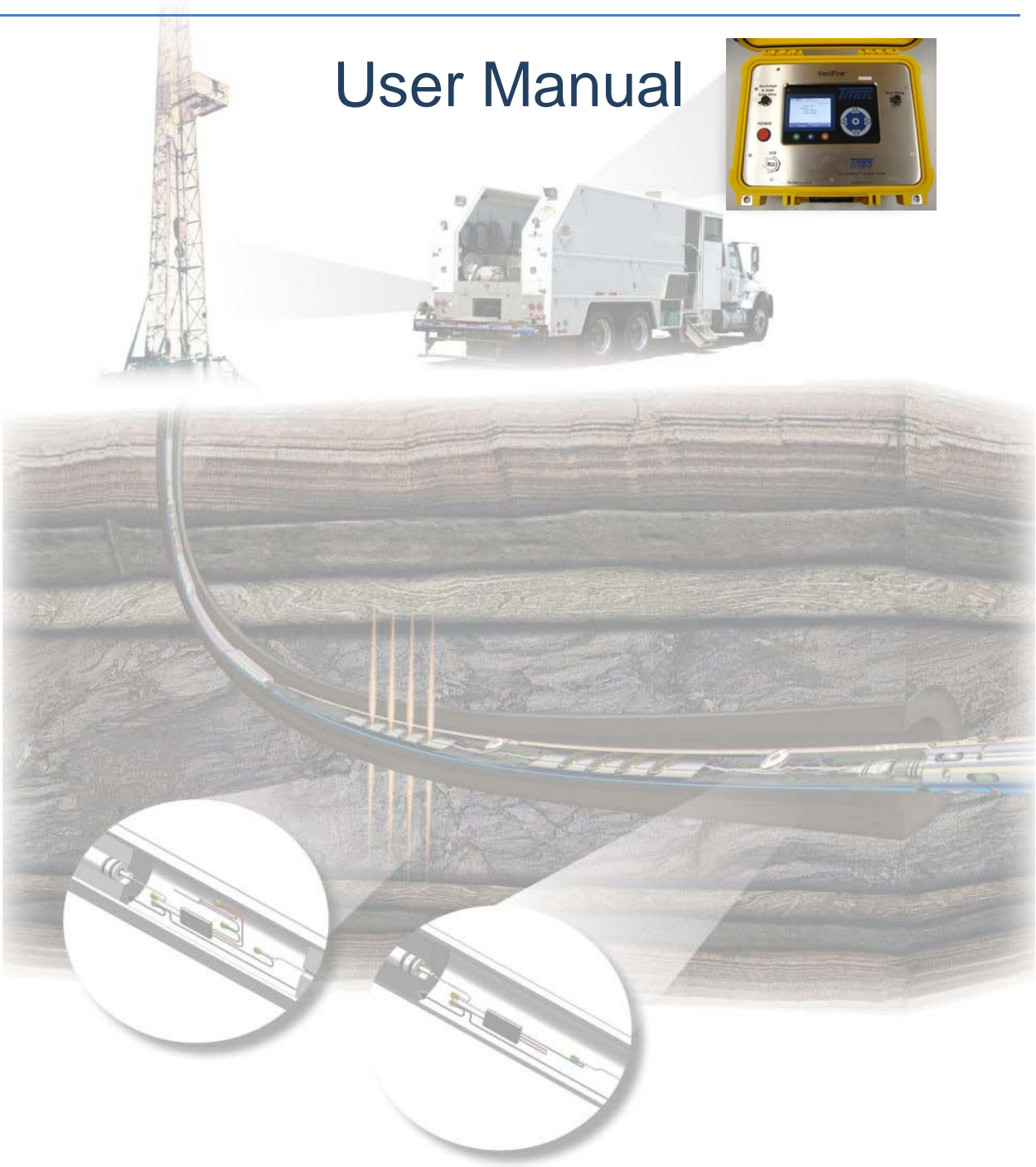


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Safety Precautions When Using VeriFire® Panel

The following precautions must be followed when using the VeriFire® Panel

1. Never connect the VeriFire® directly to a detonator or igniter. A ControlFire® switch must be between the detonator and the leads of the VeriFire®.
2. The VeriFire® is only to be used on gun systems which contain ControlFire® switches and compatible detonators/igniters (if armed).
3. Do NOT open the unit and try and service. If any service or repair is required the unit must be returned to the manufacturer, Hunting Titan Ltd.
4. Always use the recommended battery charger. Do not substitute.
5. Always use the recommended I/O cable between the VeriFire® Panel and the gun string being tested.
6. Never use in the presence of an approaching thunder storm or during extreme weather conditions.
7. When charging battery, make sure you are in a safe area; NOT in a hazardous location as defined as a place where a concentration of flammable gases, vapors, or dusts is present.
8. If equipment is not used in a manner specified by the manufacturer, safety protection may become impaired

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1.0 Equipment Overview

The minimum equipment required for running a VeriFire® panel is listed.

Item	Equipment Description	Titan Part Number
1	VeriFire® Panel	9002-013-210
2	Battery Charger	E4000-PA-110041-01
3	I/O Cable	N/A
4	USB Thumb Drive	N/A
¹ 5	Perf Switch Wireline Simulator Panel	9002-013-610
6	ControlFire® Switch	9002-013-118

¹Item 5 can be used for system verification at the shop or on a job location

- **VeriFire® Panel** – Shown in Figure 1 is a VeriFire® Panel. The purpose of the VeriFire® Panel is to test and confirm the proper operation of ControlFire® switches contained in an armed or unarmed perforating gun while on surface. This unit is self-contained, equipped with a rechargeable battery, built-in touch keys and a sunlight visible LCD. A USB input is also available that supports saving new gun string files and comparing gun strings to existing stored files.

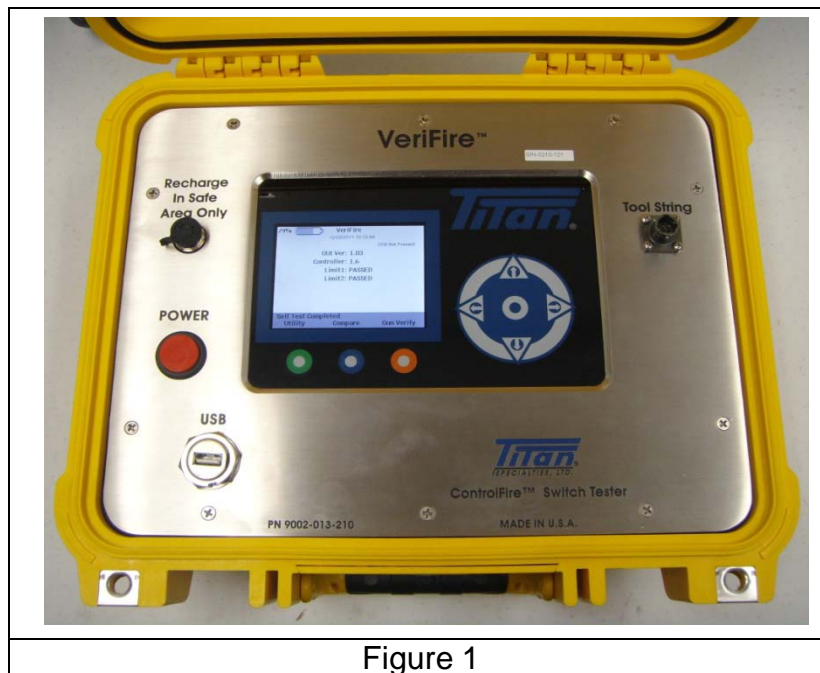


Figure 1

- **Battery Charger** – Shown in Figure 2 is a photo of the VeriFire® Panel battery charger. The battery charger input accepts AC voltage between 100VAC to 240VAC, 47 Hz to 63Hz. While the VeriFire® Panel battery is charging, the unit is in a shutdown mode and will not operate.



Figure 2

- **I/O Cable** – Shown in Figure 3 is a photo of the cable I/O cable used to connect the VeriFire® Panel to a gun string being tested. The Amphenol twist lock connector interfaces to the Tool String I/O of the VeriFire® Panel, and the clips connect to the gun string being tested.



Figure 3

- **USB Thumb Drive** – Shown in Figure 4 is a typical USB thumb drive. This flash memory is used by the VeriFire® Panel to store tested gun string files.



Figure 4

- **Perf Switch and Wireline Simulator Panel** – Shown in Figure 5 is a Perf Switch Simulator that allows the user to perform demonstration and training exercises, as well as troubleshoot interconnections and equipment at the well site.

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NOTE: When using the Wireline Simulator Panel with the VeriFire® Panel the W/L Simulator switch **MUST** be in the Bypass position.

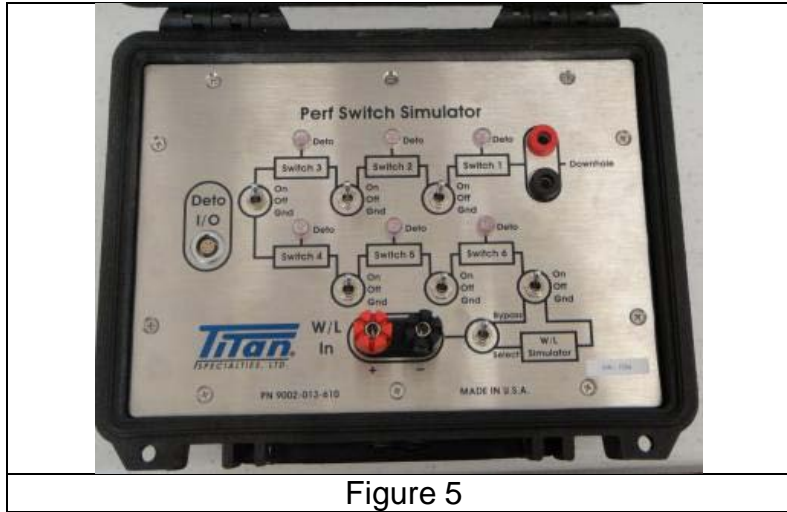


Figure 5

- **ControlFire® Switch Rev 1.7 PCB 1.0D** – Shown in Figure 6 is an expendable ControlFire® Switch. Every gun or plug in a string must be equipped with a ControlFire® Switch and can be verified using the VeriFire® Panel.

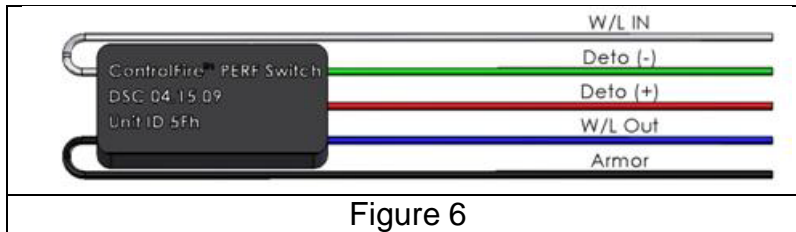


Figure 6

2.0 VeriFire® Panel Specifications

Specification	Rating/Description	Conditions
Temperature	(-10 to +50)C (+14 to +122)F	Operating
	(-10 to +50)C (+14 to +122)F	Start Up
	(-20 to +65)C (-4 to +149)F	Storage
Humidity, RH%, Operating & Storage	10 to 95% RH	Non-Condensing
Vibration & Shock	0.52 1.05 gRMS	1-200Hz

Table 1

3.0 VeriFire® Panel Operation

The following VeriFire® operational procedures are described:

1. Battery Charge operation

2. Turn-on and self-test
3. Utility Menu
4. Gun Verify
5. Compare

Be sure to understand all operations in Section 3 before trying to connect the VeriFire® Panel to live gun string. During the learning process and demos, use the Wireline Simulator Panel in place of the gun string. The VeriFire® Tool String output cable connects to the Wireline Simulator Panel input (Red to Red and Black to Black). Make sure the W/L Simulator switch is in the Bypass position.

3.1 Battery Charger Operation

The steps for charging the battery are as follows:

1. Before connecting the battery charger, make sure the area is safe; NOT in a hazardous location, defined as a place where concentrations of flammable gases, vapors, or dusts are present.
2. Plug the Battery Charger input into either a 120VAC or 240VAC outlet. Make sure the AC power cord is compatible with the AC receptacle.
3. Plug the Battery Charger output plug into the VeriFire® Panel and tighten retainer ring. The VeriFire® Panel turns ON and boots up followed by the Battery Charging screen as shown in Figure 7. The Battery Charging screen indicates that the battery is charging and also shows a battery icon along with the % of battery charge.

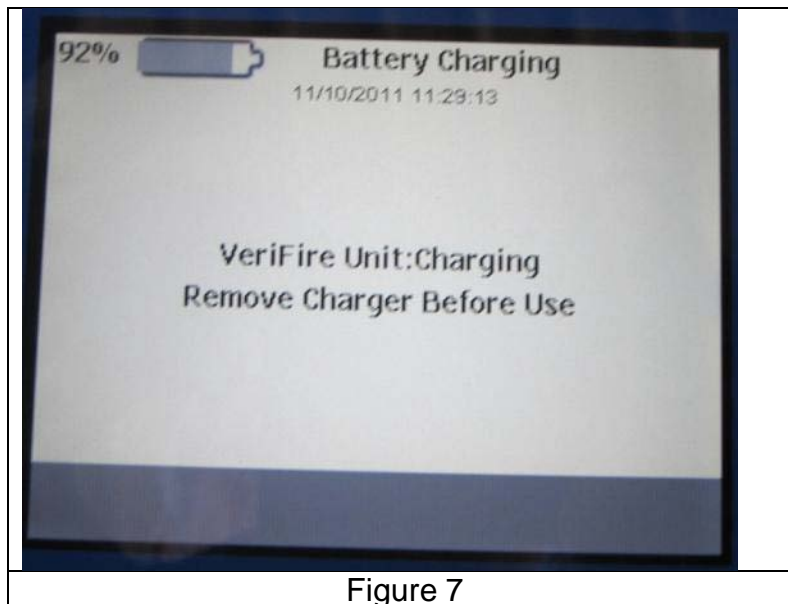


Figure 7

4. After disconnecting the battery charger, the VeriFire® Panel goes through a self-check and displays the VeriFire home screen shown in Figure 8 below. A full description of the VeriFire home screen is given in Section 3.2.

5. The battery charger must be disconnected from the VeriFire® Panel before using the panel. The panel remains inoperative as long as the battery charger is connected.

3.2 Turning VeriFire® Panel ON and OFF

Before using the VeriFire® Panel to test a gun string, make sure that the Battery Charger cable is NOT connected to the unit.

The VeriFire® Panel is turned on by momentarily depressing the RED Power button. It takes about 15 seconds for the unit to boot up and present the VeriFire home screen shown in Figure 8.

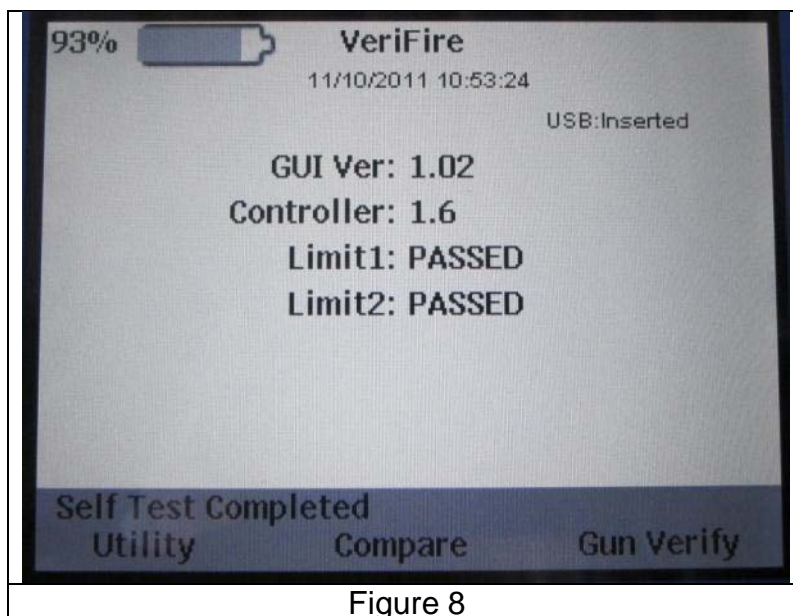


Figure 8

Shown in the VeriFire screen are:

1. Battery Icon along with remaining % or battery life
2. USB inserted or USB not present
3. GUI Ver ##, Controller Ver ##
4. Validation that both current limits, Limit1 and Limit2, passed
5. A successful boot up and self-check is also indicated by the Status line; "Self Test Completed"
6. Soft key Menu buttons
 - a. Utility – Set date and time and view and delete files on USB thumb drive
 - b. Compare – Provide a means to select an existing gun string file (filename.gsi) and test a gun string against selected file name
 - c. Gun Verify – Provides a means to test any gun string. Requirements are that the correct number of guns must be entered before starting the test. Following a successful test, a gun string file (filename.gsi) can be created and saved to the USB thumb drive.

The VeriFire® Panel is turned OFF by depressing the RED Power button and holding for about 3 seconds. The LED readout goes blank indicating the unit has turned OFF.

A VeriFire® Panel will turn OFF automatically if there is no activity for about 10 minutes.

3.3 Utility Menu

The Utility menu is selected from the VeriFire home screen in Figure 8, and transfers focus to the Utility Menu screen shown in Figure 9.

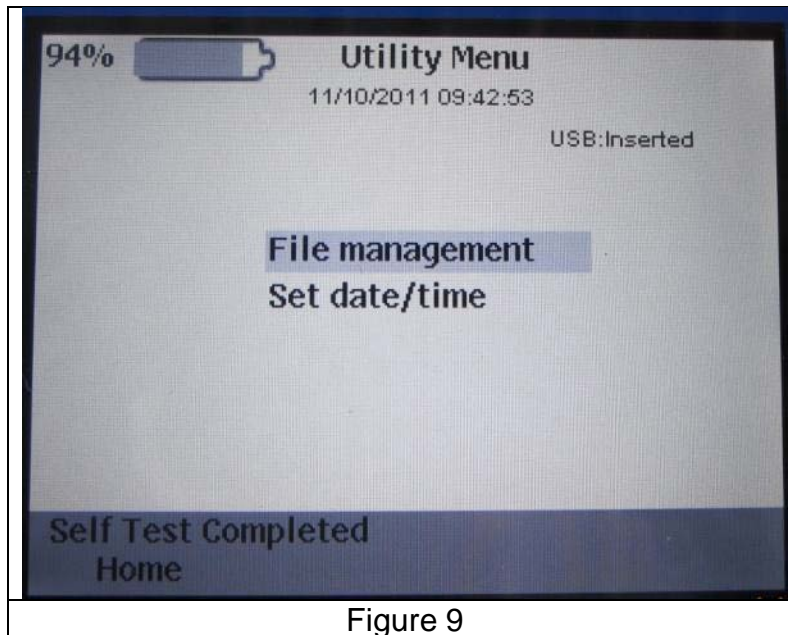


Figure 9

The Utility Menu has two functions:

1. File Management – Used to select folders and files and delete files
2. Set date/time – Used to set the date and time

File Management

The following steps can be used to select and delete a file:

1. Insert a USB thumb drive.
2. Use the Up/Down arrow keys to highlight the File Management utility shown in Figure 9. Once highlighted the Select key (center of arrow keys) activates the function. Up, down and select keys are shown in Figure 10.



Figure 10

3. If folders are present, use the Up/Down arrow keys to highlight a Folder and the Select key to choose the folder. Files in selected folder are then listed. Again use the Up/Down arrow keys to highlight the desired file. The highlighted file can be deleted by touching the soft key (Blue) below Delete.
4. To move up one level to a previous folder: Highlight the <Folder> and touch the Select key. Focus goes back to the previous folder.

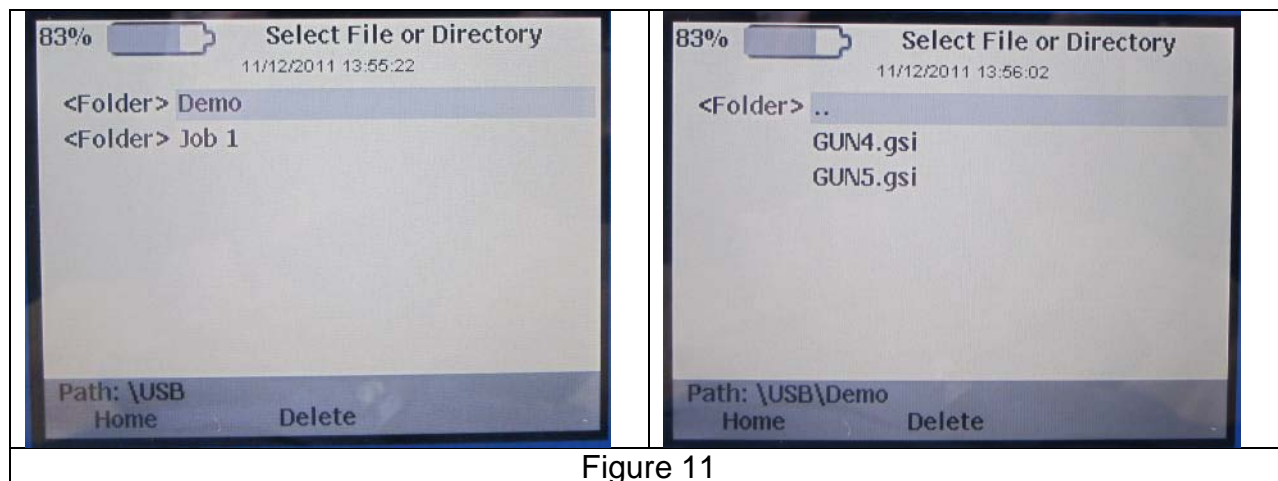


Figure 11

Date and Time

The following describes how to set the date and time:

1. Use the Up/Down arrow keys to highlight the Set Date/Time utility, shown in Figure 9. Once highlighted touch the Select key (center of arrow keys), to activate the function. The Date and Time Entry screen appears.
2. Use the Up/Down arrow keys to highlight the desired setting (Hour, Min, Sec, Month, Day and Year).
3. Use the Left arrow key to decrease highlighted value and use the Right arrow key to increase the highlighted value.
4. Repeat steps 2 and 3 for adjusting each value.

5. When complete, select the soft key below Save. This action saves the entered values and return focus back to the Home Menu.

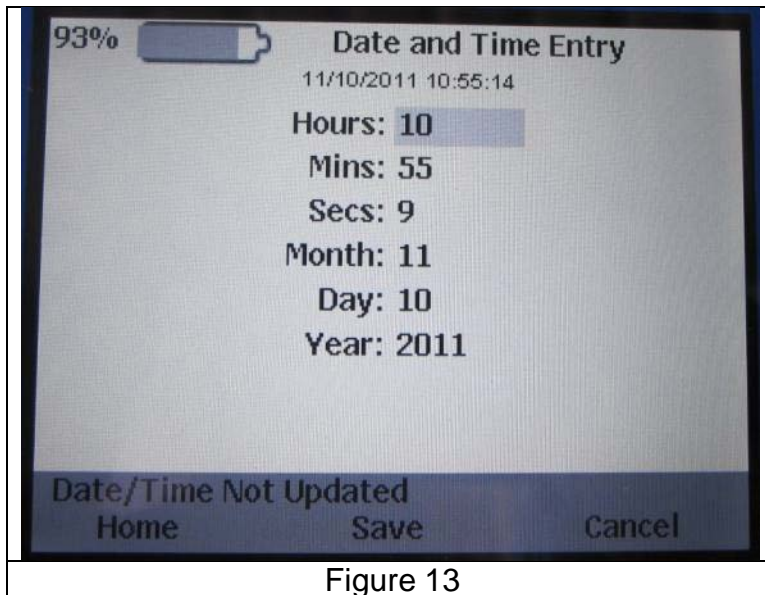


Figure 13

3.4 Gun Verify

The following describes the steps for performing a Gun Verify:

1. A gun string or Switch Simulator must be connected to the VeriFire® Panel before conducting a Gun Verify test.
2. Gun Verify is selected from the VeriFire home screen shown in Figure 8, and results in the Enter Switch Count screen shown in Figure 14.

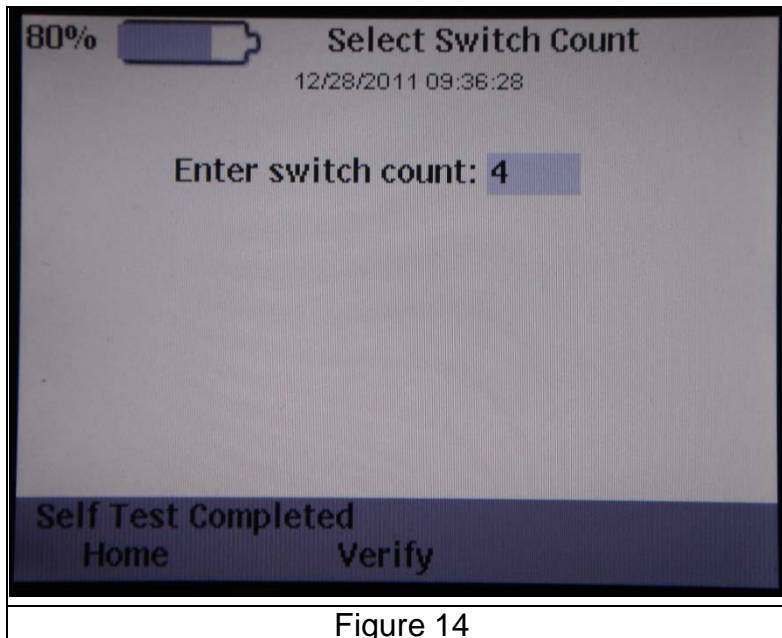


Figure 14

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- Use the Up/Down arrow keys to enter the number of switches in the gunstring that is being tested. The minimum switch number is 1 and the maximum switch number is 20.
- Select the Verify soft key (Blue). This brings up the Verify Gun String screen and actually starts the verification process. Testing occurs in 3 stages: (i) Initializing controller, (ii) Initializing String and (iii) Testing String. As shown in Figure 15A, communication begins at the top switch with a status line indicating “Testing String”. A successfully completed test is shown in Figure 15B with a status line indicating “Correct number of guns found (4)”.

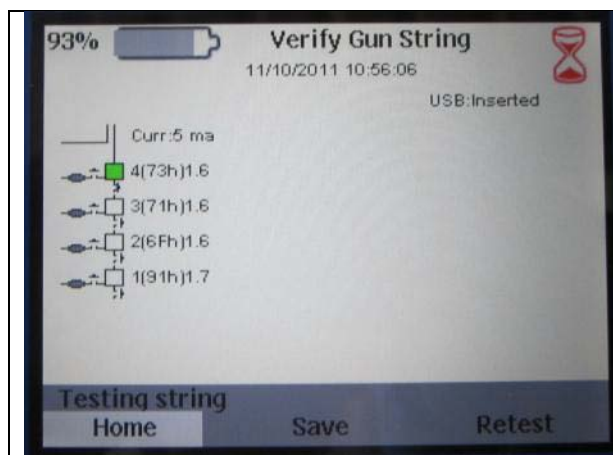


Figure 15A

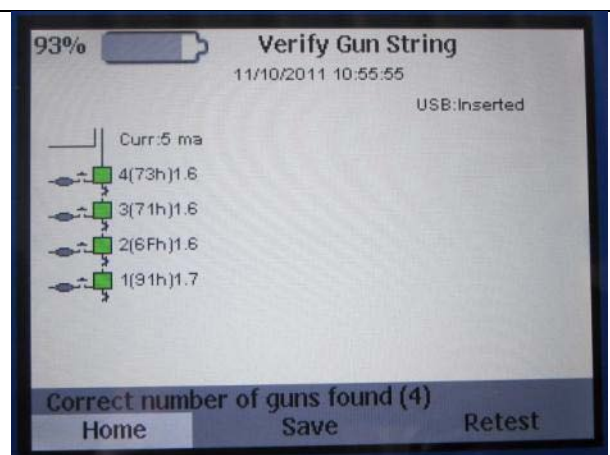


Figure 15B

- Following a good test, a quantity of 3 soft key options are available:
 - Retest - Repeated tests for the same string can be done by selecting the Retest soft key in Figure 15B. This action retests the string each time the Retest soft key is selected.
 - Save - Saves the tested gun string to a USB thumb drive as a filename.gsi file. Selecting the Save option brings up the Select Directory window shown in Figure 16. Highlight a folder or file using the Up/Down arrow keys and Select a folder or root director in which to save the file.

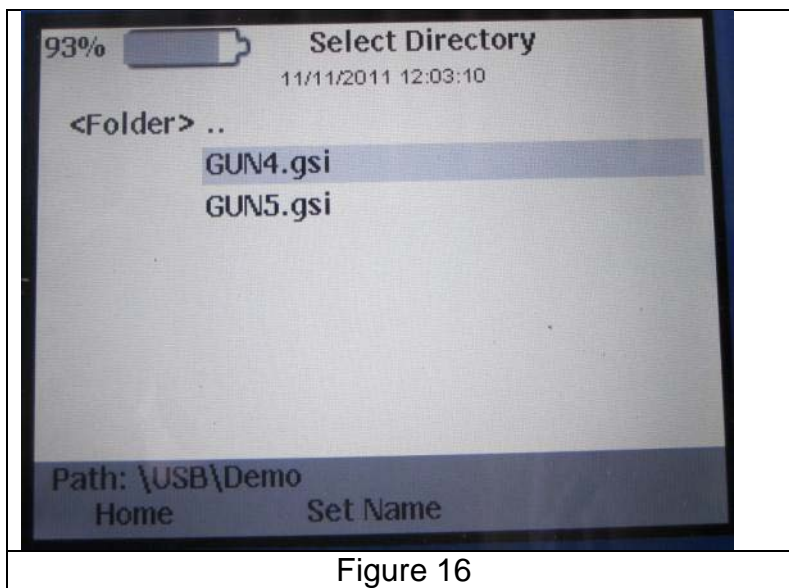


Figure 16

From the Select Directory screen, touch the Set Name soft key. This brings up the Enter Filename screen shown in Figure 17.

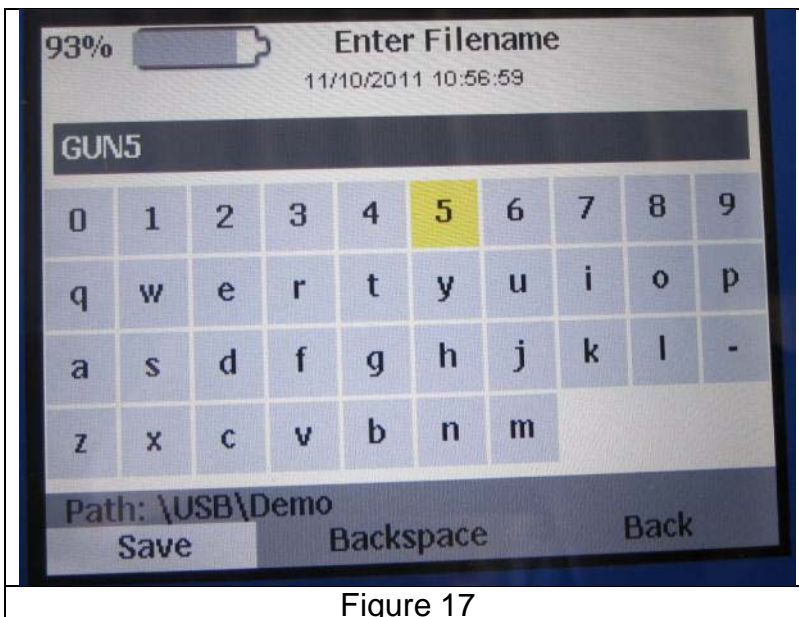


Figure 17

The Enter Filename screen provides a text field, having a prefix “GUN” for the filename along with a qwerty key display, and soft key commands. Characters can be highlighted using the Up/Down/Right/Left keys and transferred to the file name using the Select key. The soft key commands are:

- Save – Saves the listed file name to selected folder
- Backspace – Backspace/delete characters in the file name
- Back – Returns to the Verify Gun String screen
- c. Home – Returns to the VeriFire home screen

6. An example of a bad test is shown in Figure 18. The status line on the Verify Gun String presents, ERROR: “Incorrect number of guns found (3)”. Also note that the Save soft key is inactive.

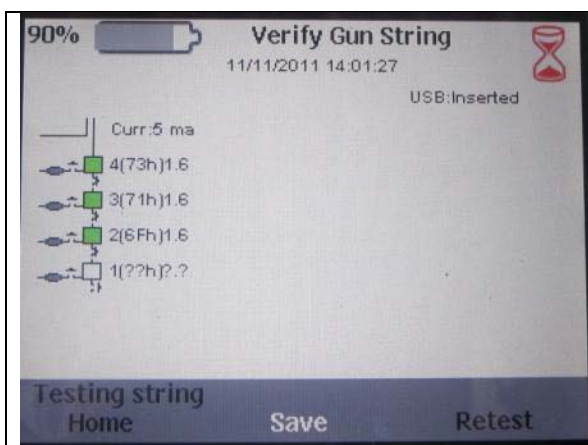


Figure 18A

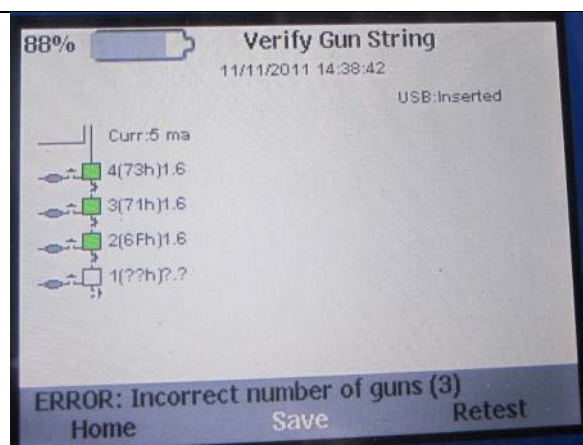


Figure 18B

3.5 Compare (to existing gun string file)

The Compare provides a method of testing a gun string to a previously saved gun string file (Filename.gsi) on a USB thumb drive. The following describe the steps for performing a Compare:

1. A gun string or Switch Simulator must be connected to the VeriFire® Panel before conducting a Compare test.
2. Insert a USB thumb drive.
3. Compare is selected from the VeriFire home screen shown in Figure 8 and results in the Select File or Directory screen shown in Figure 19. Use the Up/Down arrow keys to highlight the desired folder and the select key to select the desired folder. Again use the Up/Down arrow keys to highlight the desired file in the folder. Now use the Open soft key to open the file.

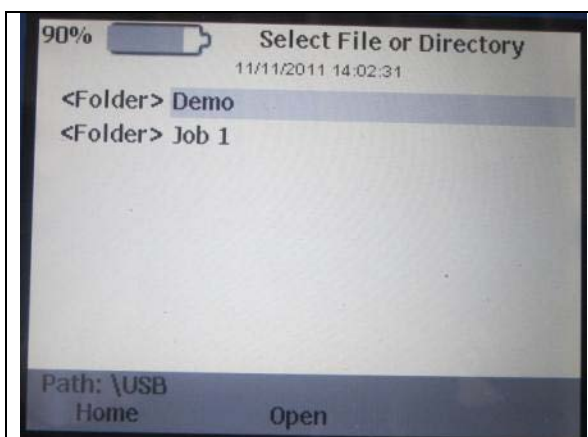


Figure 19A

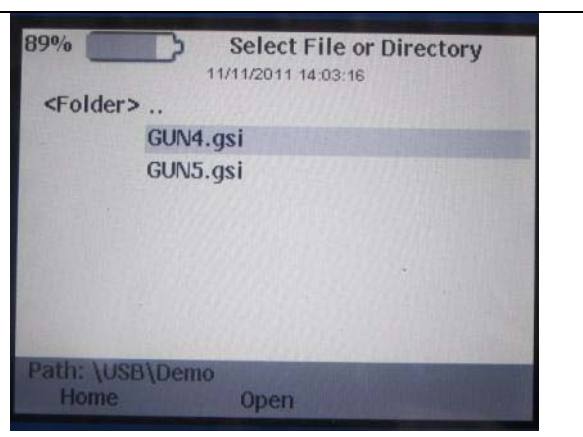


Figure 19B

- The Open soft key brings up the Verify Gun String window shown in Figure 20

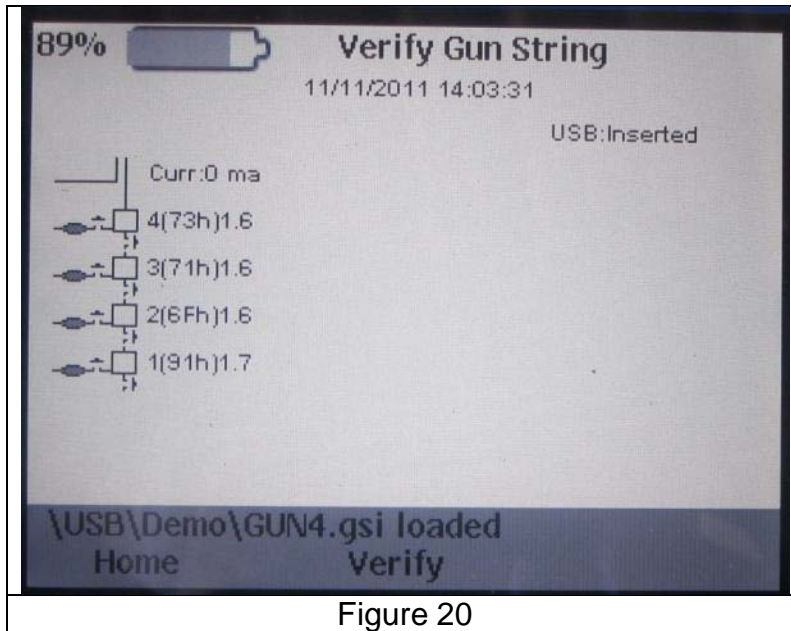


Figure 20

- Selecting the Verify soft key starts the verify process shown in Figure 21. The two phases of testing shown are: Testing string and <Folder> filename.gsi verified

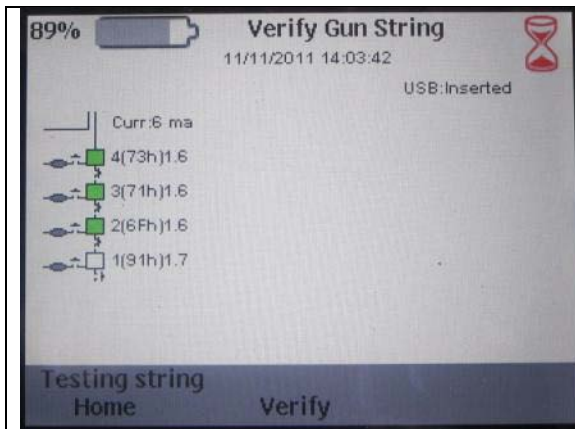


Figure 21A



Figure 21B

- In the event that an error was detected during a Compare, the results of an error will display as shown in Figure 22.

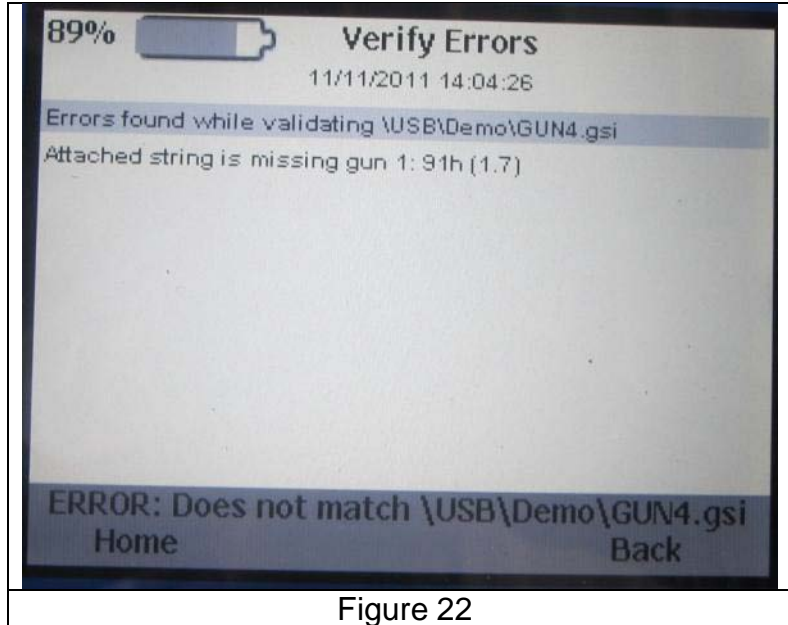


Figure 22

7. The Back key returns back to the Verify Gun String screen showing the result of the error. A Verify can again be repeated if desired.
8. In all cases the Home soft key returns focus back to the VeriFire home screen.

4.0 Connecting VeriFire® Panel to Gun String

It is imperative that Section 1,2 and 3 be read and understood before connection to any gun string.

Before connecting the VeriFire® Panel to any gun, first do the following:

1. Turn the VeriFire® Panel to ON.
2. Verify the following on the “Home” screen:
 - a. Limit1: Passed
 - b. Limit2: Passed
 - c. Remaining Battery is greater than 10%

An example of a proper start is shown in Figure 8.

Shown in Figure 23 is a diagram depicting a typical connection of the VeriFire® Panel to a gun string. The Tool String output cable connects to the gun string:

- RED Wire connects to W/L input
- BLK Wire connects to Armor/Gun Housing

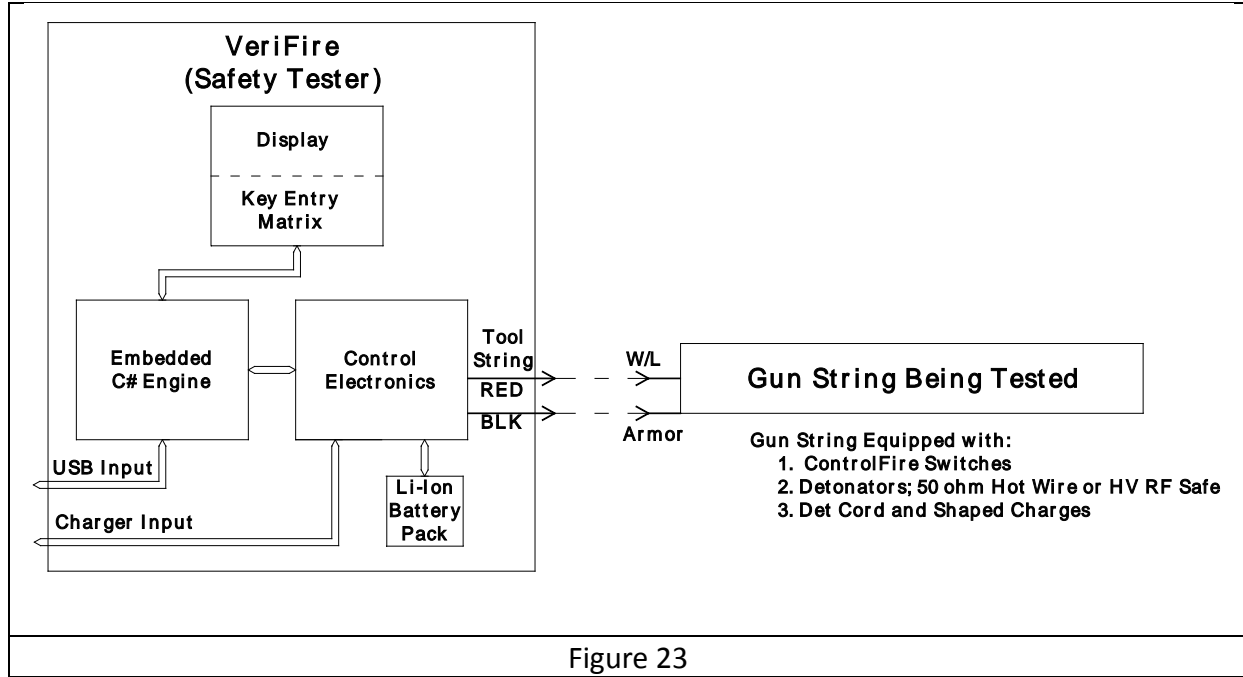


Figure 23

