ACLARA®

STAR ZoneScan

Technical Manual

Y20284-TUM

Rev. C

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CHAPTER

1

STAR ZONESCAN INSTALLATION

Purpose & Scope

This instruction outlines general practices and procedures for the installation of STAR ZoneScan leak detection MTUs.

What You'll Learn

Topics covered in this chapter include:

- fundamentals of acoustic leak detection
- system components required for leak detection
- installation/activation of STAR ZoneScan MTUs
- deactivation/redeployment of STAR ZoneScan MTUs
- upload procedure for Activity Logs

Acoustic Leak Detection Overview

Management of water leakage consists of four key activities which include:

- measuring water loss
- locating leaks
- monitoring leakage
- repairing leaks

In order to understand leak noise, it is important to know the various sources of constant noise. Acoustic leak detection equipment collects and evaluates this noise to identify the probability of a leak.

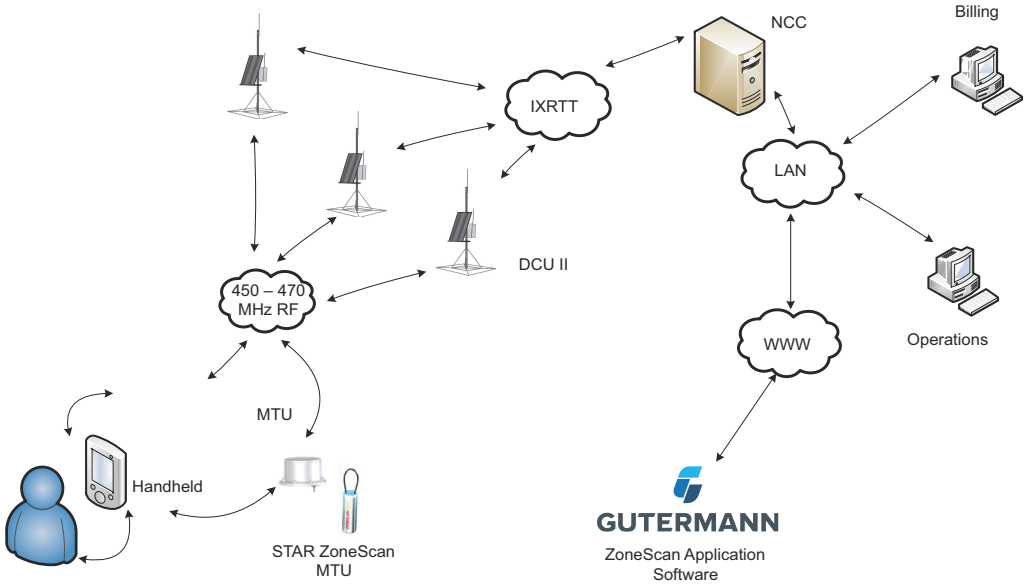
Sources of Noise

The sources of constant noise in the water pipes include:

- leakage
- partial obstruction of pipe bore
- consumption (flow & meters)
- pressure reducing valves (PRVs)
- partially closed valves (throttled or passing)
- close proximity of main to sewer pipe
- changes in pipe diameter
- water pumping - swimming pool pumps
- electrical hum
- pipe lining
- air conditioning

STAR ZoneScan Leak Identification Process

Data loggers are devices that continuously monitor and analyze leak noise in a water distribution system. They are attached to valve stems on water mains throughout the pipeline network. Each data logger is cable-connected to an Aclara STAR ZoneScan MTU that mounts on the underside of a non-metallic valve cover.Acoustic data collected by the logger is transmitted by the STAR ZoneScan MTU to Data Collector Units (DCUs) and on to the Network Control Computer (NCC). In addition to displaying system operational data, the NCC makes the acoustical data available to the Gutermann application software.



STAR ZoneScan Leak Detection System Components

Each STAR ZoneScan unit (Product #4381-506-Z) includes the following components:

- Gutermann Model 820 data logger with watertight connector cable
- STAR ZoneScan MTU with connector cable
- Circular 7-1/4" diameter non-metallic valve cover
- Web-based application software

The following hardware and software is required to support STAR ZoneScan leak detection:

- NCC Software Version 7.3.4.3 or higher (7.4.1 or higher recommended) with ZoneScan software option
- Windows-based field programmer with probe
- DCUIIs with J-boards and STAR ZoneScan firmware
- STAR Programmer Software Version 2.0.6.19 or higher (2.1.1 or higher recommended)

For new systems, the Network Control Computer (NCC) and Data Collector Units (DCUs) noted above must be installed and operational prior to installing STAR ZoneScan MTUs. For existing systems, NCC and DCU upgrades must be completed and operational prior to installing STAR ZoneScan MTUs. Please contact your Aclara representative to schedule the necessary DCU and/or NCC upgrades.

STAR ZoneScan MTU Installation Procedure

Accessories

We recommend the following supplies. Quantities depend on the number of MTUs to be installed and the conditions that will be encountered at each location.

- 6-foot extension cable (Aclara PN 070-2009-002F)
- 1/4” rope (nylon or polyproplene)

Recommended Tools

- Safety goggles
- #1 Phillips screwdriver
- 3/16” Allen wrench
- Pry bar
- Wire brush
- Flashlight
- Field Programmer with cable, programming coil and STAR Programming Software
- Portable GPS device (if Field Programmer does not have GPS capability)

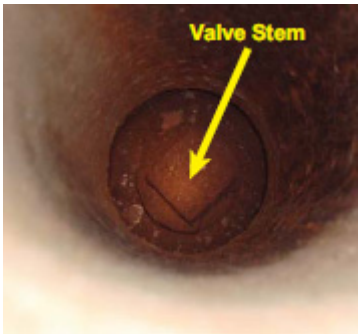
Installation / Activation Procedure

Perform the following steps to properly install and activate a STAR ZoneScan MTU.

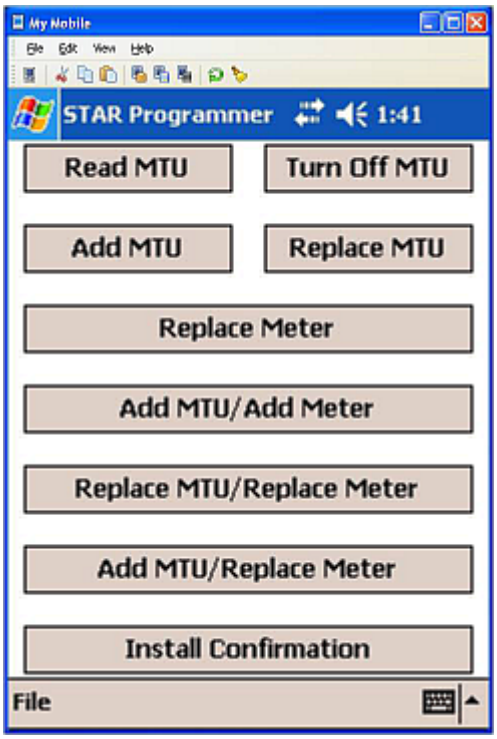
1. Locate valve cover.

2. Remove existing valve cover and set it aside. Clean the entire ID and step surface areas with a steel wire brush to remove any obstructions that would prevent the top of the new cover from laying even with the top surface of the opening.

3. Use flashlight to inspect valve stem at bottom of valve chamber. Brush off any debris. Ensure valve stem is clean to provide a good connection with the data logger.



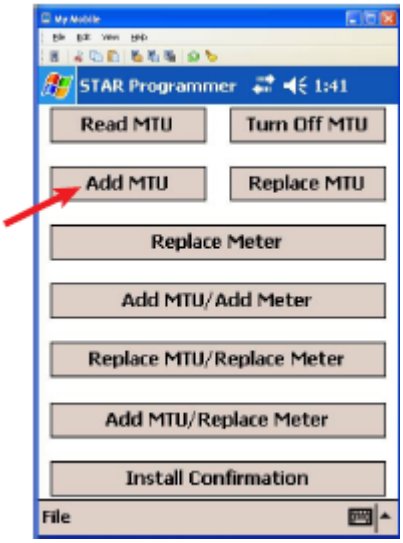
4. Verify that the date and time on the Field Programmer are correct.
5. Navigate to the STAR Programmer software on the Field Programmer and log on with your assigned username and password. This menu screen will appear after successfully logging on.



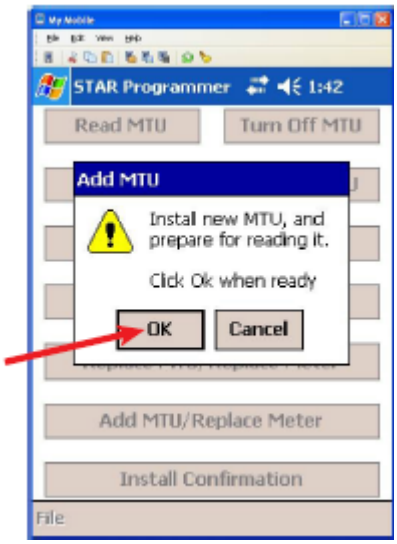
6. Place programming coil in the largest radial slot on MTU casing as shown below.

NOTE There is only one radial slot large enough to seat the entire programming coil.

7. Tap **Add MTU**.

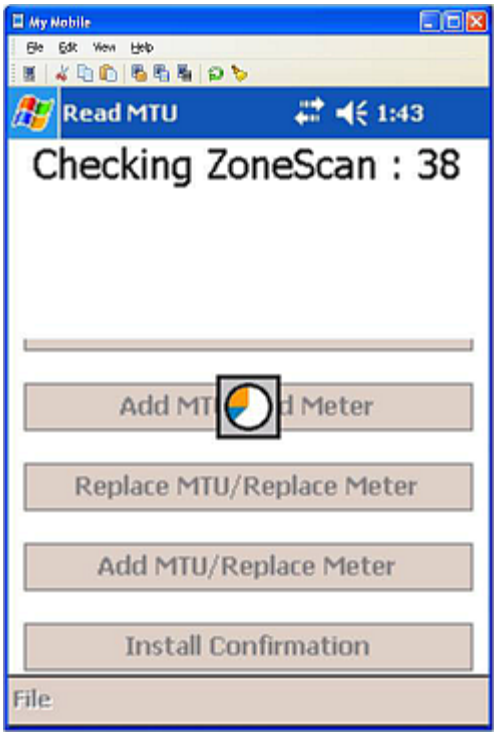


8. Tap **OK** in the Add MTU window.

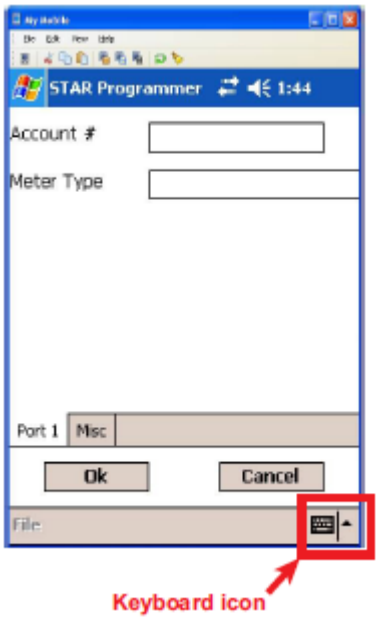


9. Wait while the software reads the MTU within three (3) seconds.

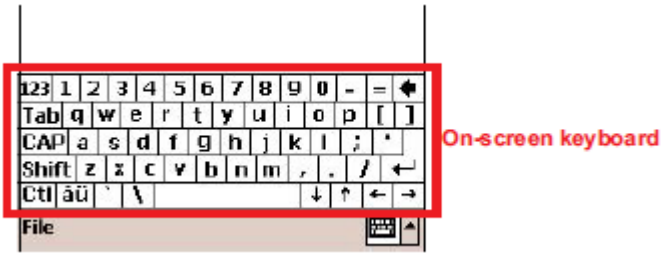
10. Wait while the software checks the STAR ZoneScan unit. This could take up to 40 seconds.



11. When the software successfully reads the STAR ZoneScan MTU, the following screen will appear.



NOTE The icon for the on-screen keyboard appears only on user input screens. Tap the icon in the lower right corner of the touch screen to open the on-screen keyboard.

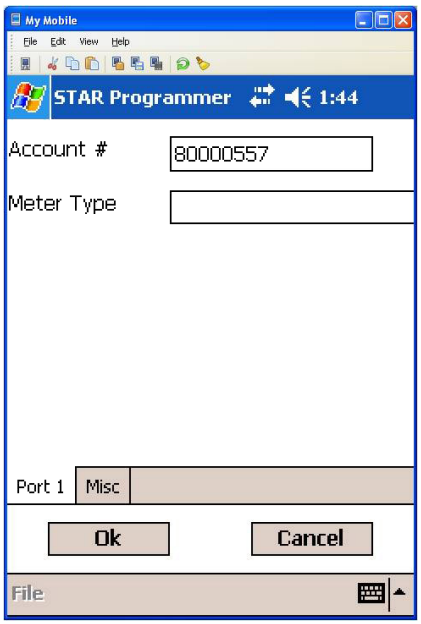


When working with an on-screen keyboard, select a specific key by tapping it with a stylus. Tap keyboard icon again to remove on-screen keyboard from the display.

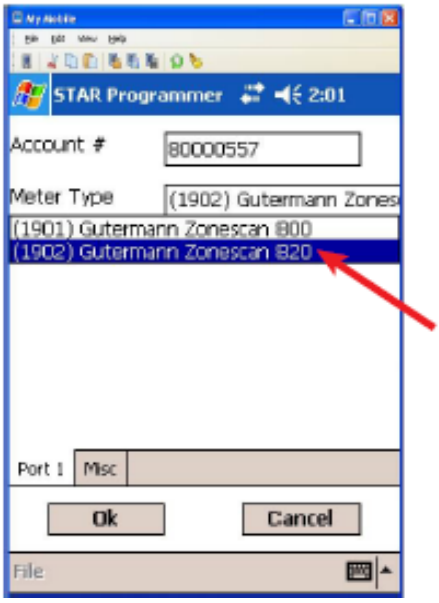
CAUTION Do not use anything other than an approved stylus because you may damage the touch screen with items such as a pen, screwdriver, etc.

12. Enter an account number with up to 12 alpha, numeric or alphanumeric characters in the Account # field.

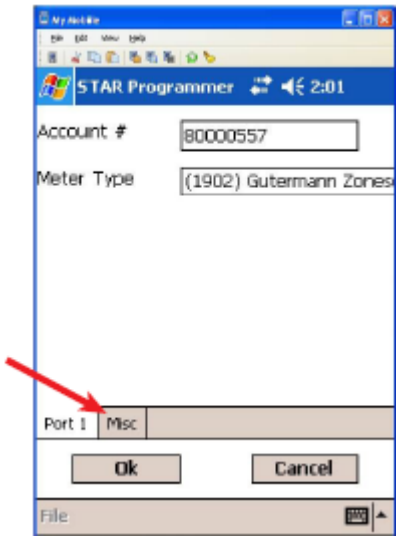
NOTE A unique account number is not necessary for each STAR ZoneScan MTU. Create an account number that will identify all STAR ZoneScan MTUs in the system.



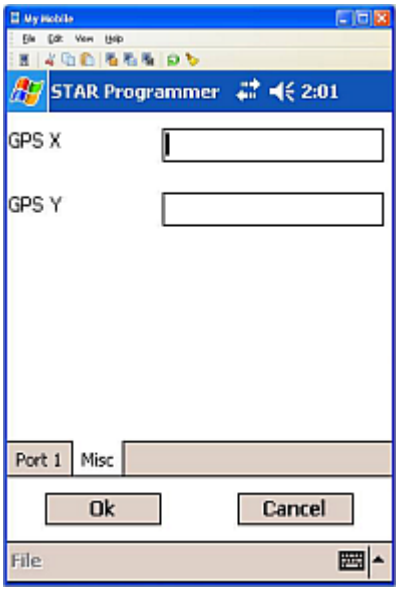
13. Select (1902) Gutermann ZoneScan 820 from the Meter Type pull-down menu.



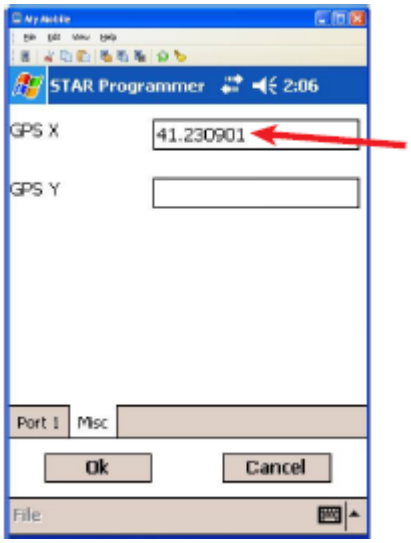
14. Tap the **Misc** tab.



15. The Misc tab is displayed with the GPS coordinate fields. Position Field Programmer (if GPS capable) or portable GPS device directly over valve pipe.

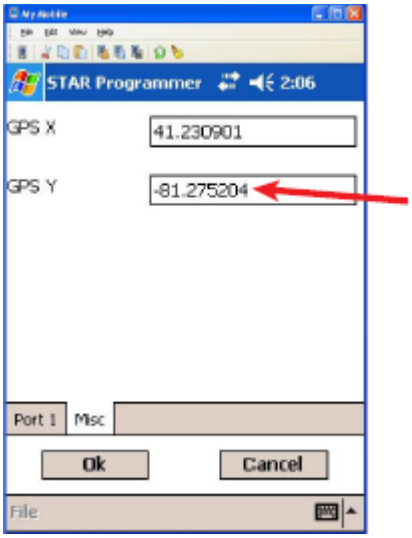


16. Enter the GPS X (latitude) coordinate to six (6) decimal places into the Field Programmer.

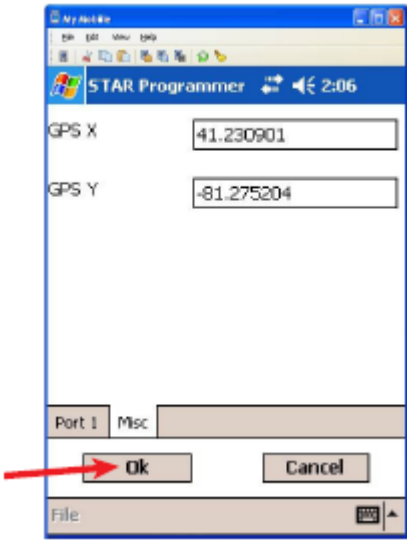


NOTE If the specific field programmer has GPS capability, the two GPS X and Y fields may fill automatically. In this case, no manual entry of coordinates is needed.

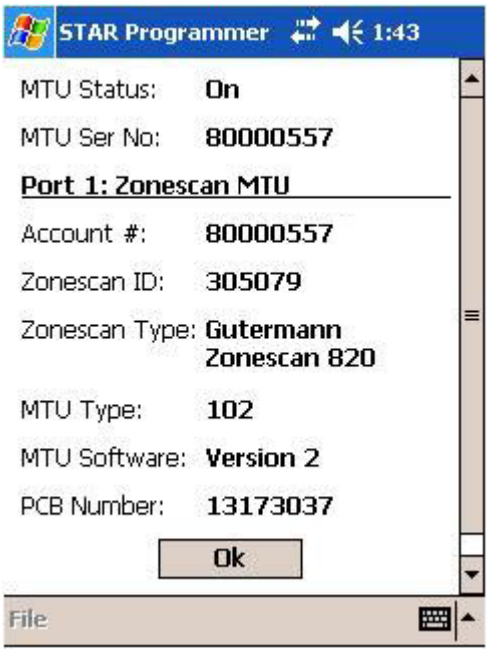
17. Enter the GPS Y (longitude) coordinate to six (6) decimal places into the Field Programmer.



18. Tap **Ok** to complete STAR ZoneScan programming.

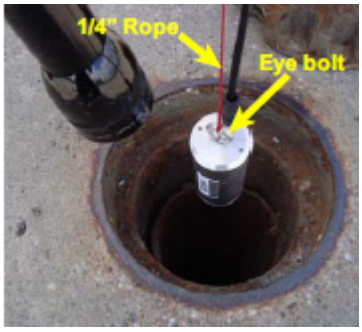


19. When the STAR ZoneScan programming is completed, the following screen will appear with information displayed related to the specific installation.



20. Verify that the account number is correct and the MTU Status is On. If the information is correct, complete programming by clicking the **OK** button. The system will then return to the main STAR menu.

21. Attach a 1/4" rope (nylon or polypropylene) to the eye bolt on the ZoneScan logger. Slowly lower the data logger down the valve chamber by only the 1/4" rope and not the cable.



22. Make sure magnet on bottom of data logger comes into contact with valve stem and ensure they are securely coupled. Securely tie the other end of the rope to the pit lid by providing additional rope length as slack when removing valve cover.

23. Place a non-metallic valve cover onto chamber and tighten screw with 3/16" hex key wrench.

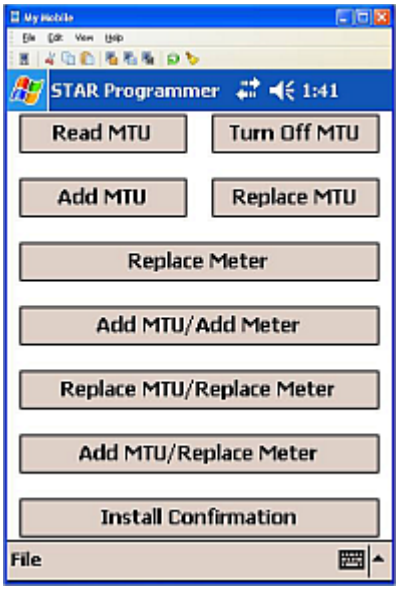
Deactivation / Redeployment Procedure

STAR ZoneScan MTUs can be deactivated and redeployed in a different location to check for potential leaks in another part of the service area. When redeploying STAR ZoneScan MTUs, you must first deactivate the MTU before moving it to its new location. Follow these instructions when redeploying a STAR ZoneScan MTU.

1. Loosen set screw and remove valve cover/MTU assembly from pipe.

2. Set valve cover/MTU assembly aside.

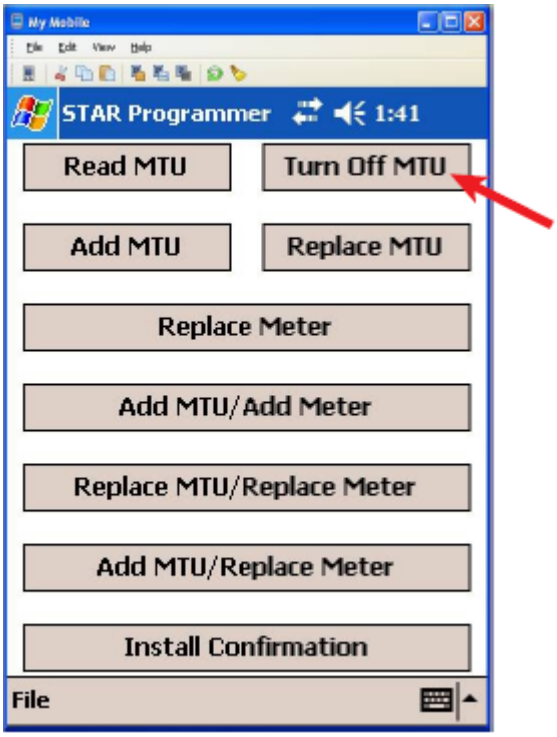
3. Navigate to the STAR Programmer software on the Field Programmer and log on with your assigned username and password.



4. Place programming coil in the largest radial slot on MTU casing as shown below.

NOTE There is only one radial slot large enough to seat the entire programming coil.

5. Tap **Turn Off MTU**. Wait for confirmation message that the “MTU has been successfully turned Off.”



6. Gently pull data logger out of valve chamber by the 1/4" rope (nylon polypropylene).

7. Replace metal valve cover on chamber.

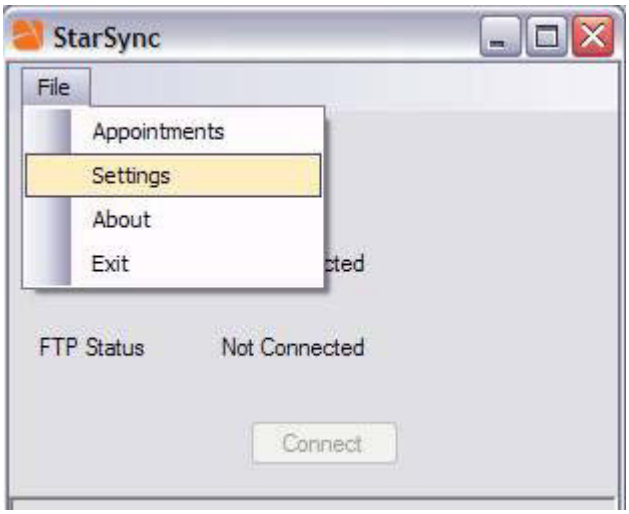
8. Travel to new deployment location and remove existing valve cover from chamber and set aside. Clean the entire ID and step surface areas with a steel wire brush to remove any obstructions that would prevent the top of the new cover from laying even with the top surface of the opening.

9. Proceed to Step *3* of the *Installation/Activation Procedure* on page 7 and continue through the remaining steps of the Installation/Activation Procedure.

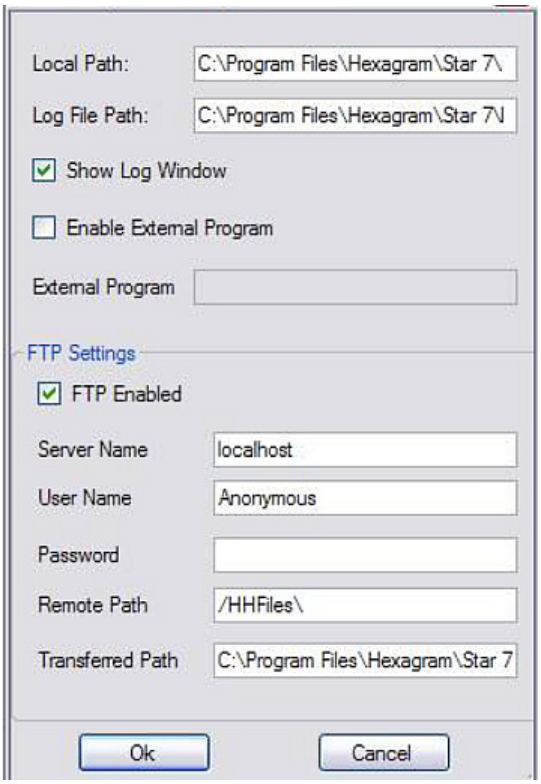
STAR Sync Application Configuration

1. Select the STARSync Software on the Start menu or double-clicking on the **STARSync** icon on the desktop.

2. Click **File** and then **Settings**.



The STARSync Settings window will appear.



3. Carefully verify the following fields:
   - Local Path – ***C:\Program Files\Hexagram\Star 7\Data\HHfiles***
   - Log File Path – ***C:\Program Files\Hexagram\Star 7\Logs***
   - Show Log Window check box is selected
   - Enable External Program check box is cleared
   - FTP Enabled check box is selected
   - Server Name – This should be the IP of the NCC server you are attempting to transfer the files to
   - User Name – Anonymous
   - Password – This field should be left blank (no password)
   - Remote Path – ***/HHFiles***
   - Transferred Path – ***C:\Program Files\Hexagram\Star 7\Data\ Transferred HHFiles***
4. After verifying these fields click the **OK** button and then close the STARSync window
5. Select **File** and then **Exit**.

Uploading Activity Logs to the NCC

The handheld programmer logs information such as account number, meter type, GPS coordinates, and MTU ID during the original activation of the STAR ZoneScan MTU and during later reprogramming or reading of the STAR ZoneScan MTU.

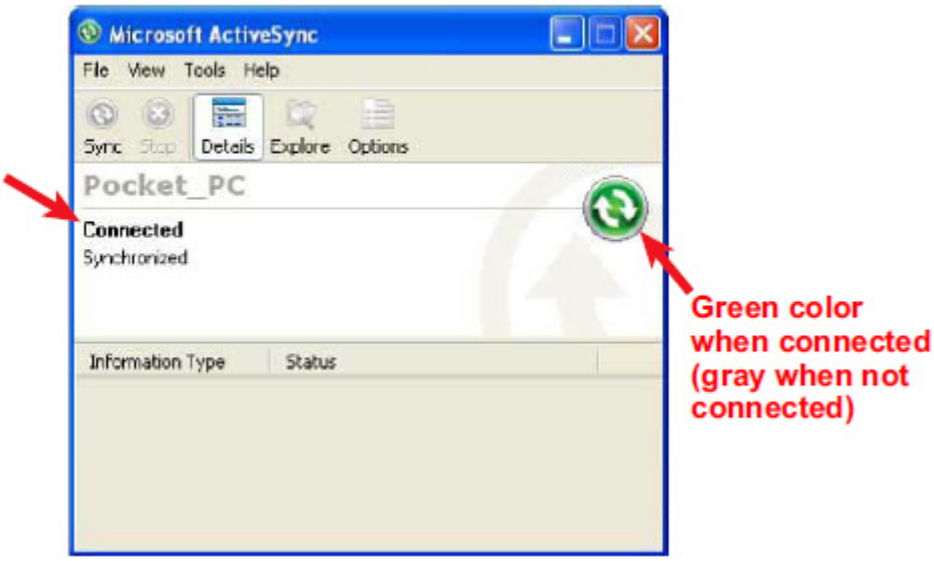
After deploying or redeploying STAR ZoneScan units, it is very important that the field technician uploads all Activity Logs from the field programmer to the NCC on the same day that the installation and programming are performed. The upload process uses the STARSync Software that is installed on a personal computer configured as a Meter-Shop PC. (See the current version of the STAR Field Programmer and Software User's Manual, 471-1001 for details).

1. Before connecting the field programmer for the activity log upload, make certain that you have exited the STAR Programmer Software and that the field programmer is at the Windows handheld Start screen.

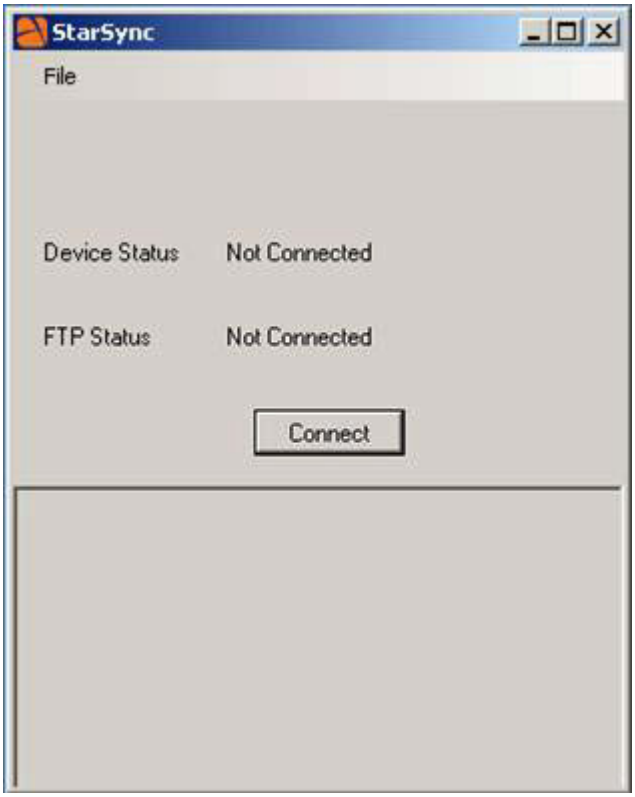
2. Connect the field programmer to the designated Meter-Shop PC using a cable and/or docking station depending on the specific field programmer configuration you are using.
3. Verify that the field programmer is recognized by the PC by checking that the ActiveSync icon in the system tray has changed from

   gray to green . This indicates that the field programmer is properly connected and recognized by ActiveSync.

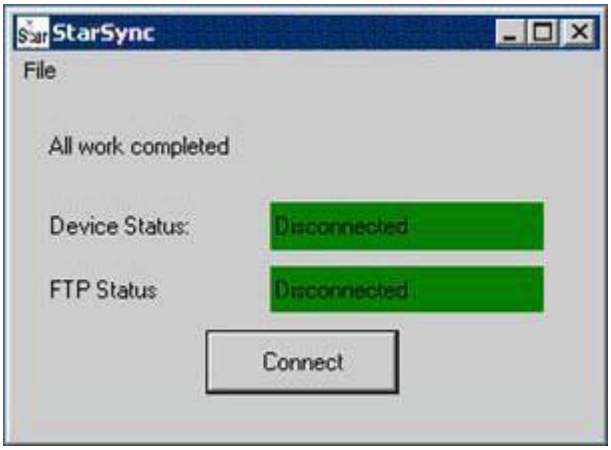
The ActiveSync interface will also open and indicate when the field programmer is connected.



4. Double-click on the **STARSync** icon on the Meter-Shop PC desktop to open the STARSync application.



5. Click on the **Connect** button and the field programmer will upload all Activity Logs to the remote PC for transfer to the NCC. When the upload transfer is complete, the message All work completed, Device Status: Disconnected, and FTP Status Disconnected will be shown. The next field programmer can be docked and the process can be repeated as necessary.



NOTE If any changes or updates have been made to the field programmer XML configuration files on the NCC, these changes will be downloaded to the field programmer at this time.

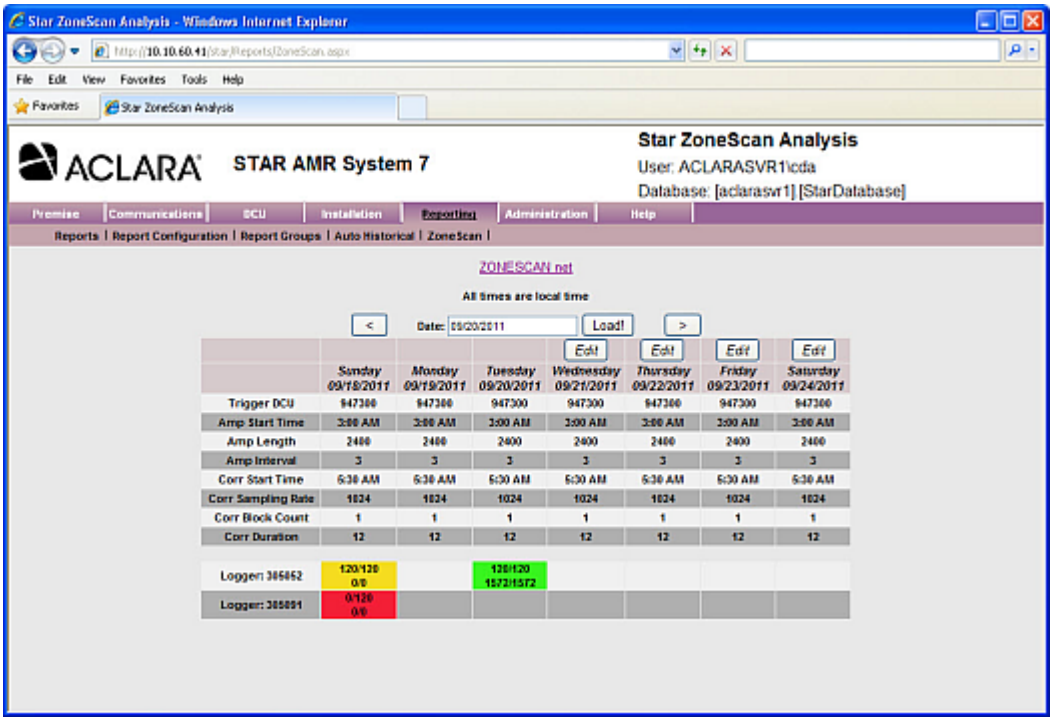
CHAPTER

2

STAR ZONESCAN OPERATION

Purpose & Scope

This instruction will describe the procedures for the operation of STAR ZoneScan leak detection MTUs.



What You'll Learn

Tasks covered in this chapter include how to:

- Monitor STAR ZoneScan data collection
- Change Trigger DCU
- Connect to Gutermann ZoneScan net website to identify potential leak locations

STAR ZoneScan System Operation

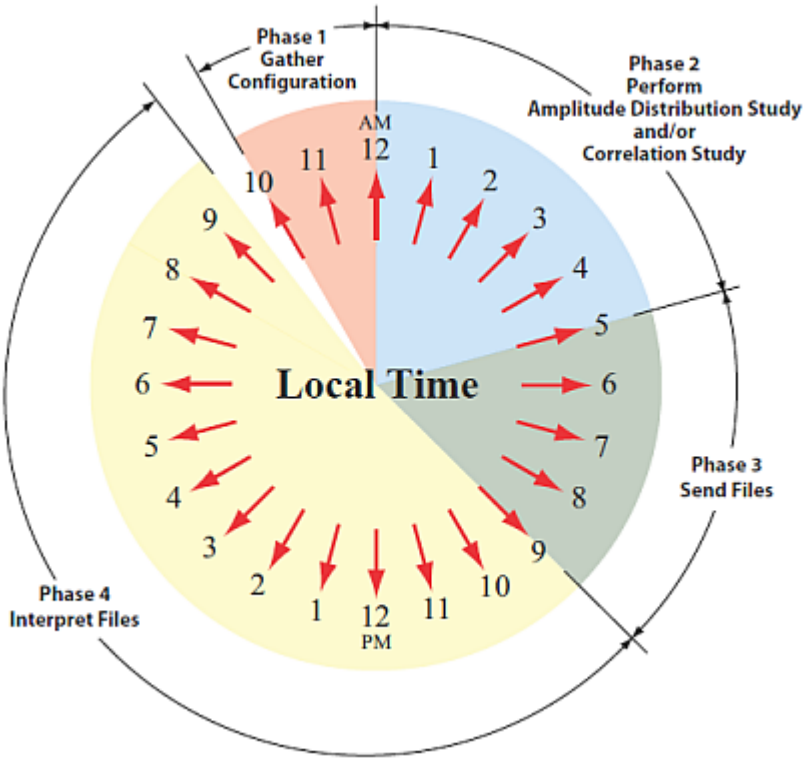
The STAR ZoneScan leak detection system operates in a 24-hour cycle according to four distinct phases.

The four phases are:

1. MTU gathers new configuration parameters for the ZoneScan data loggers.
2. Performs recordings (always perform an Amplitude Distribution Study and possibly a Correlation Study. Please see *Recording Data* on page 29)
3. Sends files from ZoneScan data loggers to NCC.
4. User interprets data and may modify configuration parameters.

In order for the STAR ZoneScan leak detection system to work properly, each of the four phases must be performed in order according to a 24-hour cycle. The time when the phases begin and end may vary, however, they must all be completed within a period of 24 hours.

NOTES Phase 1 always begins at 10:00 p.m. and ends at 12:00 midnight local time. Phase 2 must end by 8:00 a.m. local time.



Recording Data

All Gutermann Model 820 data loggers perform a nightly Amplitude Distribution study consisting of a decibel reading every 10 seconds over a two-hour window..

Amplitude Distribution Study

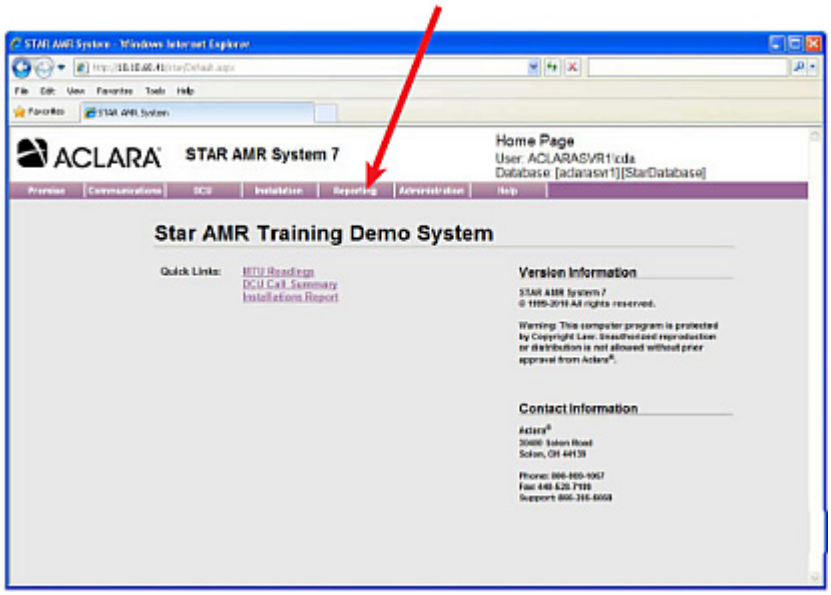
An Amplitude Distribution Study is a two-hour recording performed each day by all Gutermann Model 820 data loggers.

Correlation Study

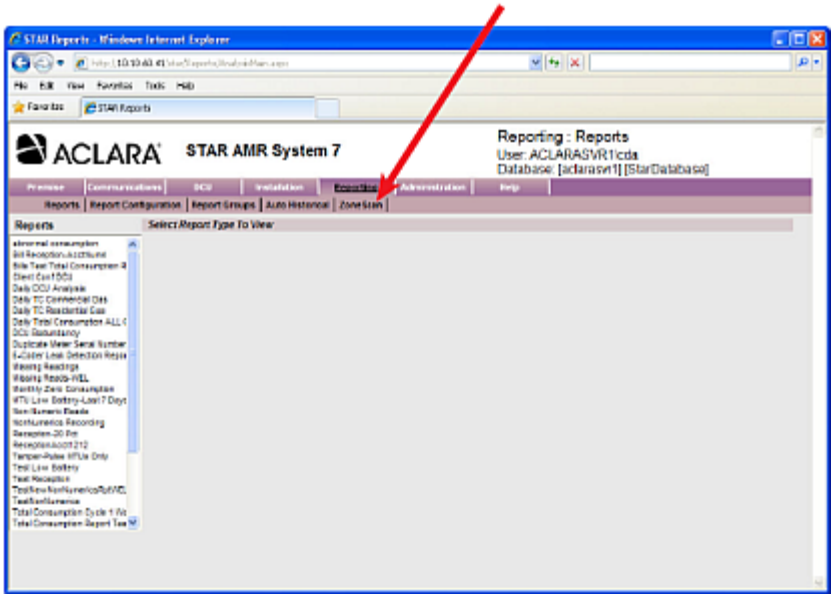
A Correlation Study is a time-synchronized 12 second recording performed by selected data loggers to pinpoint suspected leaks.

Viewing STAR ZoneScan Data

1. Click the **Reporting** tab, from the NCC STAR Home Page.



2. Click **ZoneScan**, from the Reporting menu. The ZoneScan screen will display data for the current week.



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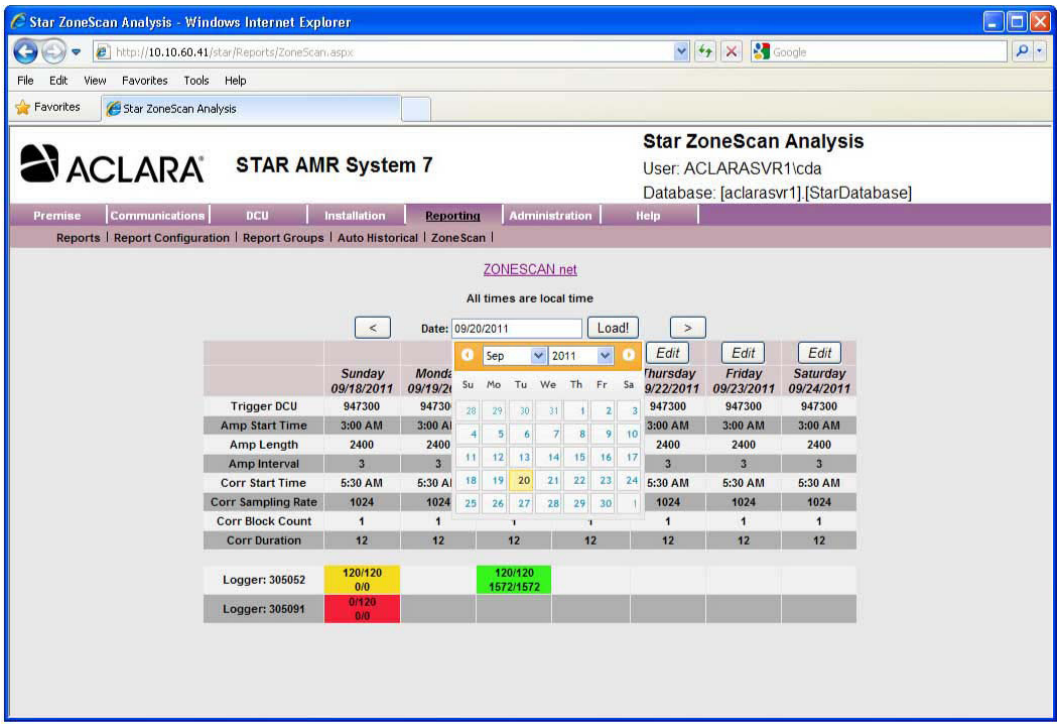
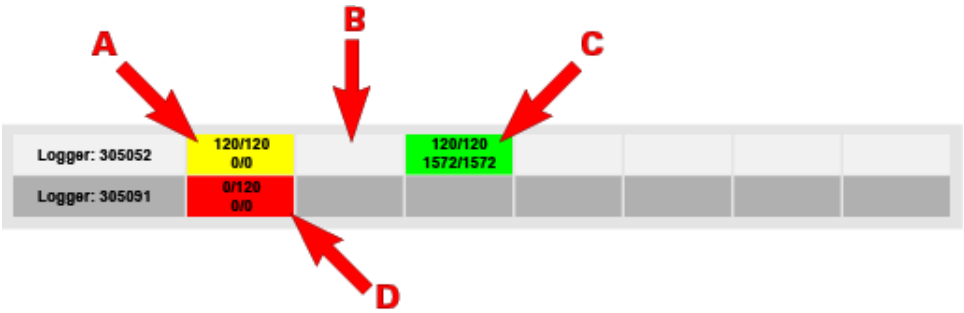
3. Click inside the Date field to select the desired date and then click the **Load!** button.

NOTE Use the **<** button to go back one week, or the **>** sign to go forward one week.

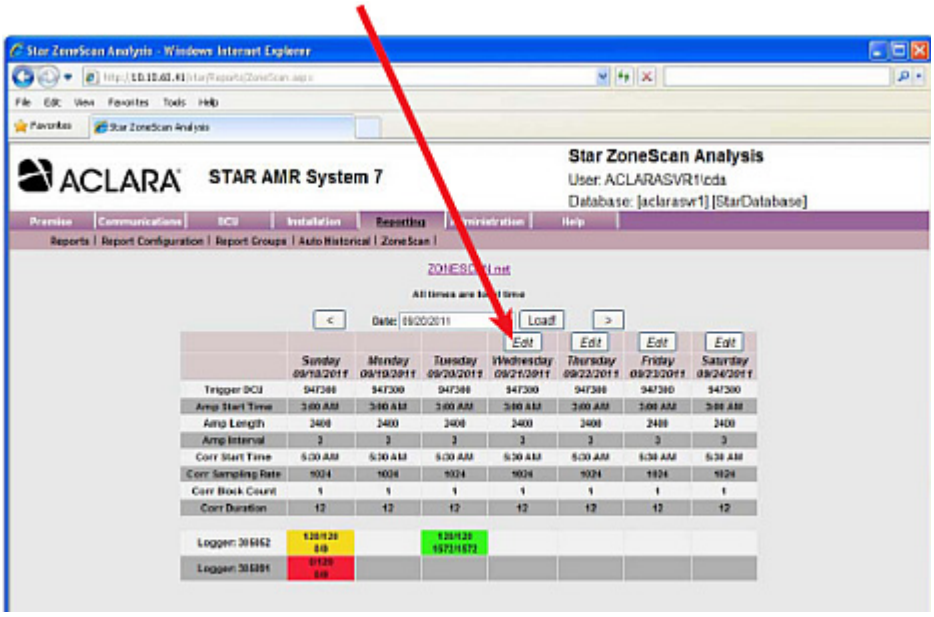


4. Data results will be displayed in four different colors :
   - A Yellow = Amplitude data was successfully received with no Correlation data.
   - B Blank = No recordings exist for this logger on this day.
   - C Green = Both the Amplitude and Correlation data were successfully received
   - D Red = Either the Amplitude data or Correlation data is missing critical packets.



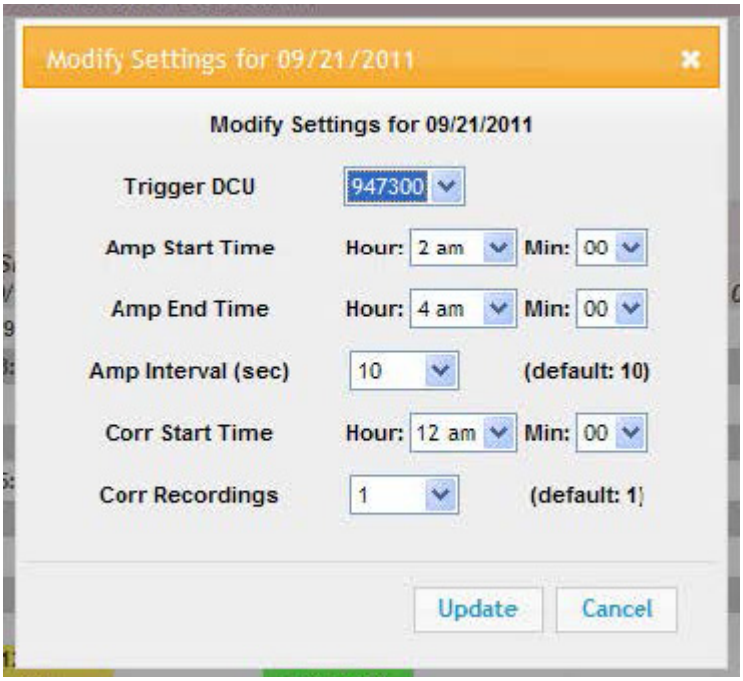
NOTE STAR ZoneScan study parameters are automatically preset each day. Except for the Trigger DCU, there is no need to change any of these parameters under normal operating conditions.

5. Click the **Edit** button to access the Modify Settings window.



The Trigger DCU is defined as that DCU which sends out a start recording signal to initiate correlation recordings. Only STAR ZoneScan MTUs that receive the signal will perform the correlation recording. The Trigger DCU will automatically rotate among all designated DCUs in the system. No operator action is required.

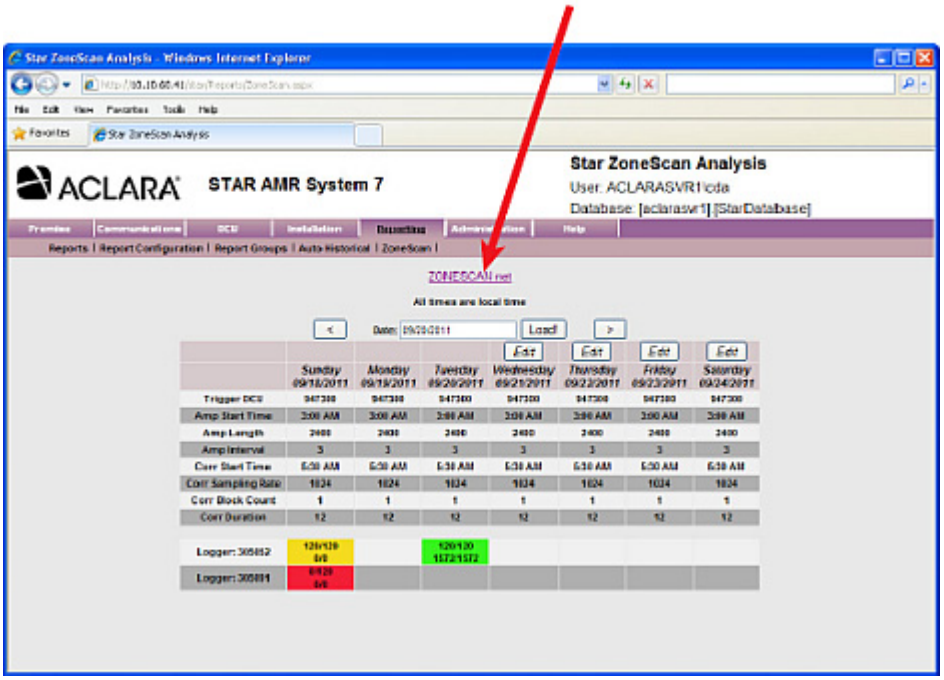
6. To select a specific Trigger DCU, On the Modify Settings window, use the `Trigger DCU` drop-down menu to select the desired Trigger DCU. Leave all the remaining settings at their default values.



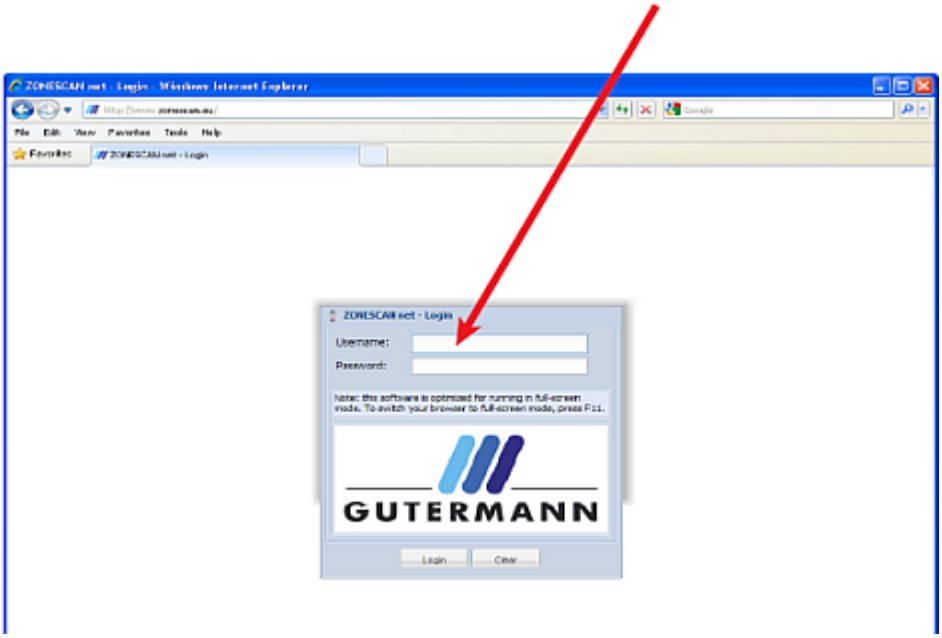
7. Click the **Update** button.

Connecting to Gutermann ZoneScan net website

1. Select ***Reporting>ZoneScan***.
2. Click the **ZONESCAN net** link.



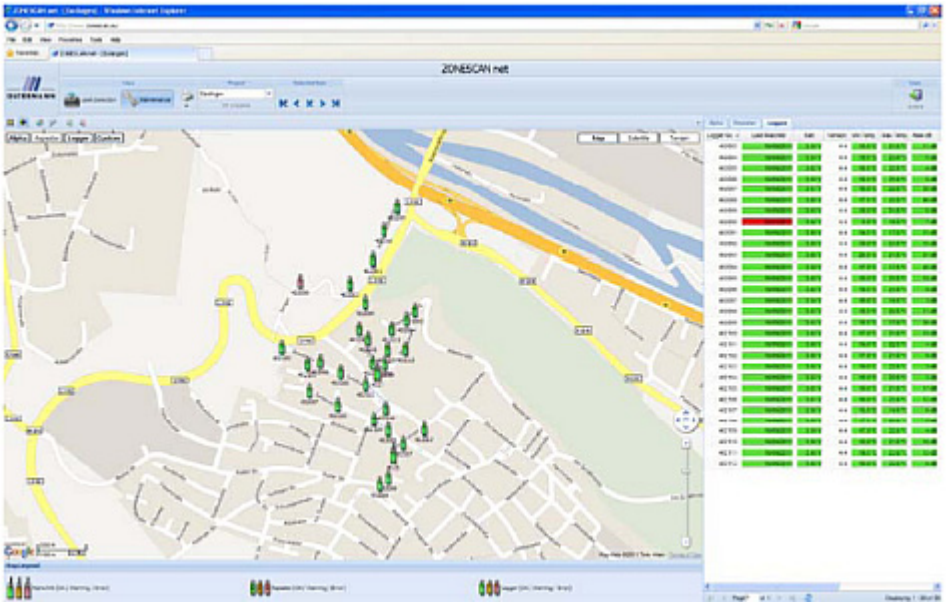
3. The ZONESCAN net - Login page appears in a new browser window. Enter your credentials in the Username and Password fields.



4. Click in the **Login** button.

5. The Gutermann ZONESCAN net page appears in the browser. Select your project from the Project drop-down window.

NOTE A new project must be created when STAR ZoneScan MTUs are redeployed.



6. Refer to the Gutermann ZoneScan net Operation Manual, Version 1.4, for data entry and interpretation beginning in Section 1.3.