TT-TS12 AND TT-TS12-E TOUCHSCREEN MANUAL

Operation manual

Contents

READ BEFORE USE

Please read these instructions carefully and keep them in a safe place (preferably close to the TT-TS12) for future reference. These instructions must be followed carefully to ensure proper operation. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

These instructions apply to both the nVent RAYCHEM TraceTek TT-TS12 (UL) and TT-TS12-E (CE) versions of the TraceTek TS12 touchscreen system. While internal panel wiring and layout differences may exist to comply with those regional approvals, the screen layouts, information, programming and set-up of both units are identical.

PREPARATION

Before operation, follow the Installation Instructions to ensure that each module is properly mounted and wired. If these steps have not been taken, refer to the installation documents provided for each module. To obtain this literature or for technical assistance - contact your local TraceTek distributor or visit our website nVent.com.

Important: There should be a 'System Map' for each sensor circuit. A simple System Map (typically an as-built drawing of the sensor installation with reference measurements) shows where the sensor cable/components have been installed.

The System map should show the sensor cable/component layout with reference to readily identifiable landmarks, preferably with actual distance measurements every 5m (16ft) throughout the system. The System map is normally completed at the time the leak detection system is commissioned. It is recommended to keep a hardcopy of the System map for each sensor circuit near the TT-TS12 for general staff reference. The System Map can be uploaded/utilized in JPG or BMP or GIF file format in the TT-TS12 software, and serves an important role in quickly identifying the actual leak location to expedite response efforts.

Note: Later versions of software may provide new features and change certain other details. This manual documents TT-TS12 software version 1.1

TT-TS12 CAPABILITIES

The TT-TS12 Touch Screen Panel provides a graphic user interface to manage and display information from a network of up to 250 external TraceTek leak detection circuits. The 12" full color, high resolution SVGA display is complimented with an industrial quality touch screen for user interaction and control. The TT-TS12 collects data from a network of TraceTek sensor interface Modules or wireless Mesh Transmitters. The status of all leak detection cables and probes is displayed in a top level summary and the current details of any selected channel are displayed at a single touch. The display features interactive and dynamic leak location maps and displays. The location of any detected leak is displayed by a flashing icon positioned over the floor plan, piping layout or the photo of a single piece of equipment at the user's discretion. Audible alarms, summary relays, serial data and web interfaces are provided as standard features.

Every installed Sensor Interface Module (TT-SIM) or wireless mesh point (TT-702) is scanned on a continuous basis. When a leak is detected by any sensor, the TT-TS12 will display the leak location with the name of the reporting channel and the distance along the cable in feet or meters. The leak location information is also used to position a flashing "LEAK" icon over a user designated background image. The image can be a floor plan showing where the sensor cable has been installed, a pipe or tank plan, or the photo of a single piece of equipment. "Mapping Points" are entered into the system's non-volatile memory during initial start-up and commissioning to provide the reference for later leak location displays. Entering and editing mapping points is quick and easy. Once the map image and location references are stored in system memory, any future leak detection is positioned appropriately over the designated background image. Intuitive zoom and pan gestures allow the user to quickly identify the source of any leak alarm and easily dispatch and direct a response effort.

Background images are transferred from the user's PC into the TT-TS12 as a jpeg formatted photo or similar graphic via a USB memory stick. The TT-TS12 can store up to 250 images (each image can have up to 100 mapping points), so that multiple branch circuits or complex cable patterns are easily captured for future leak location displays.

With a fully implemented network, it is possible to monitor as much as 190km (119 miles) of TraceTek sensor cable and provide as many as 320 discrete relays to handle a wide variety of alarm and telemetry functions.

In most installations the TT-TS12 comes with 8 alarm relays. The first of these relays is used to control the buzzer. The second relay is a summary LEAK alarm. The third relay is used as a TROUBLE signal. The fourth relay is used as WATCHDOG TIMER. The remaining four relays can be set to specific functions by the user.

When liquid is detected on any sensor cable/component in the leak detection system, the TT-TS12 sounds an alarm, closes relay contacts and displays the SIM number and location of the leak. Each alarm event (leak, service, fault, etc.) and user action is logged into the event history file. The event history file shows the type of event and the time and date that it occurred.

Each individual sensor circuit detects, locates and tracks leaks independently from the other circuits in the leak detection system. There is no loss of sensitivity and no re-mapping required after an initial leak is detected.

All TT-TS12 units provide a built in Modbus RTU serial interface with user adjustable baud rates and port set-up. Modbus/TCP is supported via one of two Ethernet connectors. TraceTek publishes the complete Modbus register map and provides programming suggestions for system integrators. Since the TT-TS12 panel uses Windows CE as an operating system, Windows based remote viewing options are built-in. It is possible to view and interact with the TT-TS12 from a remote desktop or laptop via a LAN or web connection.

For some installations, alarm notification and response may be off-loaded to a BMS or other host system. A 'graphics and data only' TraceTek panel may be appropriate. In other applications the user will require a local audible alarm and a minimum set of local relay contacts. A simple add-on module (TT-TS12-ADAM 4069) is available that adds 8 user programmable relays. By default the first four relays of the first ADAM 4069 module are dedicated to audible device control, leak detection, trouble signals and Watchdog Timer. The remaining 4 relays are user programmable and can be used to control local pumps, valves, horns or beacons, or provide additional digital inputs to the host system. Additional relays can be added as required. Off-the-shelf industrial I/O devices allow the system to operate hundreds of relays. It is possible to subdivide any one sensor circuit into 10 regions and assign a different relay to each of those ten regions.

When requested to do so by the user, the TT-TS12 scans all network addresses to determine what resources are available and then displays possible relay assignment options in context sensitive set-up menus and in summary "where-used" tables.

TT-TS12 has a 5000 event history stored in non-volatile memory. Events can be filtered by channel number and event type and sorted chronologically. The user can scroll up or down the event list to zero in on the desired events and time frame. All event history can be downloaded to a USB memory stick in XML format. This makes it simple and efficient to capture all the event history and analyze the data using Excel on a PC. The complete set-up details including SIM tags, Region tags, and relay assignments and other set-up parameters can be saved to the USB stick as well.

TT-TS12 provides multi-level password protection. Simple leak display and status screens are always available for viewing. Set-up options are protected by several levels of password protection depending on the potential impact to overall system performance. All memory is non-volatile. Start-up is automatic and should there be a power disruption, the system picks up where it left off including the re-flashing of any working alarms that have not been cleared or that occurred during the power outage.

The capability for future automated software updates has been built into every TT-TS12 system. As these updates become available, new features can be downloaded from the web. The user can transfer updated software to the TT-TS12 with a USB memory stick and the appropriate password protected security level.

TT-TS12 INSTALLATION

Specific Installation Instructions are discussed in separate TraceTek documents H80856 (TT-TS12) and H81299 (TT-TS12-E) Installation Instructions. Please refer to these documents before attempting to run the TT-TS12 software package.

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nVent

Technical support can be obtained by contacting your local nVent sales representative or contacting our customer service organization through nVent.com.

TT-TS-12 SOFTWARE: IMPORTANT INFORMATION

PRODUCT OVERVIEW:

The TT-TS12 Touch Screen Panel software provides a graphic user interface to manage and display information from a network of up to 250 external TraceTek leak detection circuits.

VITAL INFORMATION:

Important: All information, including illustrations, is believed to be reliable. Users, however, should independently evaluate the suitability of each product for their particular application. nVent makes no warranties as to the accuracy or completeness of the information, and disclaims any liability regarding its use. nVent' only obligations are those in the nVent Standard Terms and Conditions of Sale for this product, and in no case will nVent or its distributors be liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of the product. Specifications are subject to change without notice. In addition, nVent reserves the right to make changes—without notification to Buyer—to processing or materials that do not affect compliance with any applicable specification.

USER RESPONSIBILITY:

The performance, reliability and safety of your leak detection system depend on proper design, selection and installation. The TT-TS12 program will help you monitor a system that meets your requirements, but it is only a tool. It assumes that your input is accurate, that you are familiar with leak detection system design and configuration, and that you will ensure that all components of the leak detection system are installed, maintained and used as intended. The configuration of the TT-TS12 program should be reviewed by a knowledgeable engineer to ensure it is appropriate for your application. Additional information relating to safety, design and installation is contained in Design Guides, Installation Manuals, Data Sheets, and other literature available from nVent. Be sure to consult these documents as needed.

SAFETY WARNINGS

There are important safety warnings shipped with our products and printed in our literature. Be sure to read and follow them to reduce the risk of fire, shock or personal injury. If you have any questions, contact nVent directly.

TECHNICAL SUPPORT

Technical support can be obtained by contacting your local nVent sales representative or contacting our customer service organization through nVent.com

TT-TS12 START-UP

As the computer starts up, the TT-TS12 program starts automatically. During startup, the TraceTek logo screen below is briefly displayed.

MAIN SCREEN

After the computer finishes its power-up sequence, the Main Screen is displayed. See example Main screen below:

The status of all SIM alarm modules present in the leak detection system is displayed on the Main Screen.

SIM numbers are displayed in numerical sequence-with the lowest numbers at the top of the Main screen.

Arrows at the bottom of the screen can be touched to move to the next page of SIM numbers.
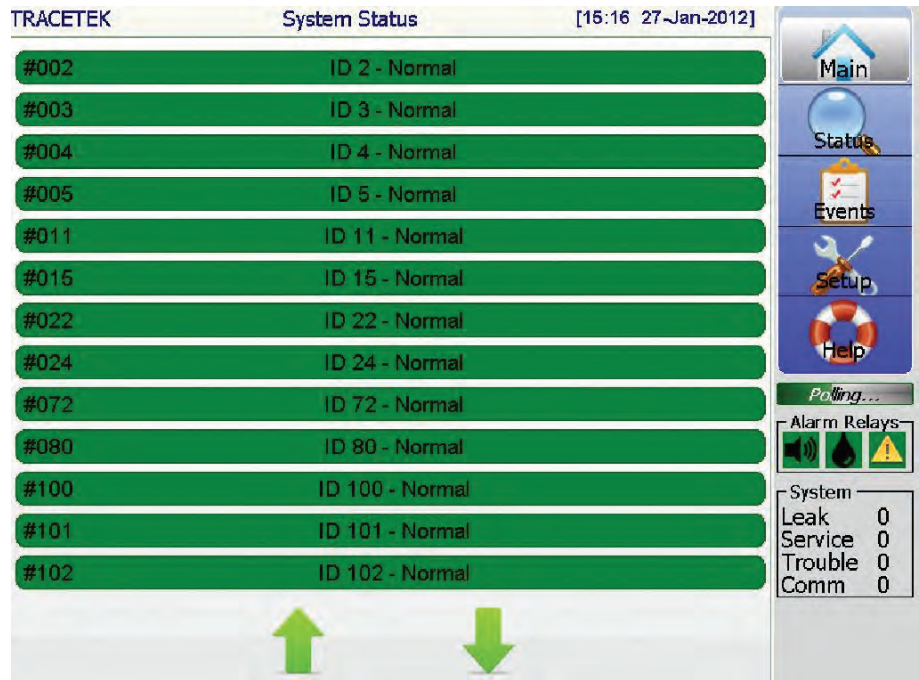
Note the features displayed along the right side of screen. These features always remain visible within the TT-TS12 software, so that you can maintain visibility on system performance and easy access to each major section of the software.

The major software sections include:

Main

Status

Events

Setup

Help

Touch any of the labeled software section keys to advance to that section. For example, when you touch Status, the Status screen is displayed.

In the lower right area of the Main screen is the System Alarm summary of the number of Leak, Service, Trouble and Comm alarms. Normally all these values are zero. If any of these values are not zero, you should investigate to confirm what is happening in the leak detection system.

Slightly above the System Alarm summary is the real time display of the state of the Alarm Relays. Normally each Alarm Relay is shown in green color, except when a relay is activated, at which time the color changes to red.

There are a total of 3 pre-assigned relays, with icons used to indicate what they relate to.

Relay 1 is used for the Audible alarm, and is indicated by the horn icon.

Relay 2 is used for the Leak alarm, and is indicated by the fluid drop icon.

Relay 3 is used for the Service, Trouble and Comm alarm, and is indicated by the yellow alert icon.

Other relay assignments are can be made during commissioning of the system, using the System Relays screen (in Setup portion of TT-TS12 software).

Frequent system polling of the SIM network is performed by the system; the polling progress is shown using the graphic positioned above the Alarm Relay display. The green color bar shows the polling progress. If the green polling bar stops moving, that may be a signal the TT-TS12 software has stopped working.

Typically the Main screen is always displayed, unless someone uses other TT-TS12 screens. The Menu Settings screen (discussed later in the Setup-System section) provides two user defined time delays that are important. The Main Menu Timer defaults to the Main screen if no activity is detected for the defined period of time. More importantly, the Screen Saver Timer turns the screen dark if no activity is detected for the defined period of time.

NOTE: The TT-TS12 system will be active even when the Screen Saver Timer has turned the screen dark. During an active Leak alarm, the screen will light up and the audible alarm will sound. If no one responds to the Leak alarm for a long time, the TT-TS12 Screen Saver Timer will turn the screen dark again, but the audible alarm will continue to sound. In this case the TT-TS12 is programmed to automatically turn on once per hour as a visual signal that attention is needed.

NOTE: If the TT-TS12 screen is dark, and you want to verify what is happening with the system, touch the screen. If you see the TraceTek logo screen displayed- then touch the screen again to display the Main Screen.

NOTE: The Main Screen is the recommended starting point for system status and leak alarm investigation. Each SIM address number has its own Status bar.

Color highlighting of the SIM condition (green, red, yellow) is used to visually signal different SIM conditions. The circumstances that result in the various color highlights are discussed later in this manual, but are outlined below.

On the Main Screen green indicates a Normal condition, no leak present, and no action required.

#011	ID 11 - Normal

On the Main Screen red can indicate a Leak alarm- which has not been acknowledged, or an unacknowledged but cleared leak alarm which requires more attention.

#011	ID 11 - Leak 10 ft

#011	ID 11 - Normal

On the Main Screen yellow can indicate an acknowledged active Leak alarm, and a cleared leak alarm which requires more attention.

#011	ID 11 - Leak 10 ft

#011	ID 11 - Normal

MAIN SCREEN

When a leak is detected:

1. The SIM number with the most recent leak alarm is shown in red at top position on the Main screen, with corresponding leak location distance also shown.

2. The alarm relay is activated and the corresponding icon for the alarm relay turns red.

3. The audible alarm buzzer sounds, and a red Acknowledge key appears in the lower right corner.

4. The System relay portion of the screen is updated to show the current alarm types and the number of alarms.

See below for an example of the Main screen during an active leak event.
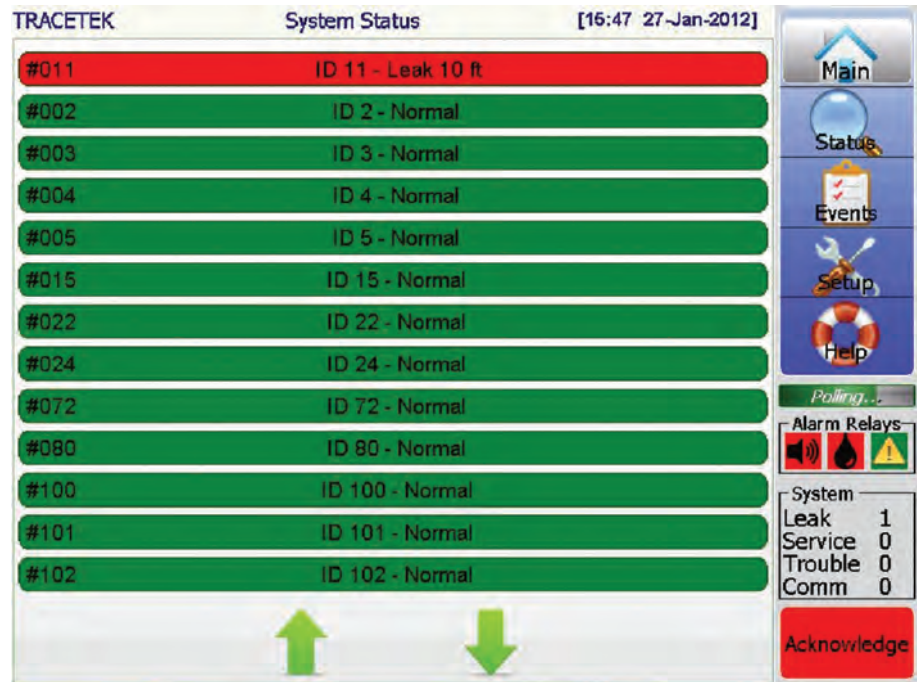
The SIM with a leak is displayed in red, as is the Acknowledge key. Relay 1 (horn icon) is active, and the audible alarm is sounding.

To silence the audible alarm, press the red Acknowledge key.

Touch the SIM address number label to further investigate the leak.

NOTE: The TT-TS12 has been designed to provide a visual indication of leak location on the customer's System Map (Image file). See further discussion of this capability in the SIM Setup portion of this manual. However, if the Image file is not mapped during the Map Setup process, the Leak Map will not display the flashing red leak location icon during an active leak alarm.

If an Image file has been loaded, the TT-TS12 software jumps to the Status/Leak Map screen.

If the Image file Map Setup process has defined leak detection circuit distances, then a flashing red triangle icon indicates leak location.

If no Image file is uploaded into TT-TS12, the Summary screen is displayed instead of the Leak Map screen during an active leak alarm.

See example screen below that displays the flashing red icon at the leak location on the Leak Map screen.

Further leak alarm investigation is performed with the other Status screen types (Summary, Leak Map, SIM Details and Event Details).

Typically the Summary screen is checked next. Press the Summary tab along screen bottom.

Active Leak Alarm-color highlight strategy

During a Leak Alarm, the Status field and Events list use color highlighting to assist the response efforts.

The Status field color highlighting strategy is explained below:

When no leak is present, the word Normal is shown in green text.
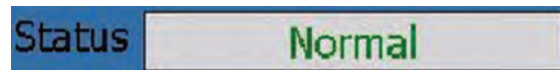
During a Leak alarm, the Leak alarm and distance are shown in red text.
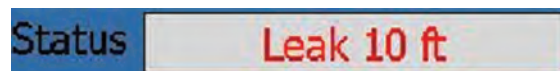
The Event list color highlighting strategy for a typical leak event is explained below:

A red highlight means a leak alarm is present, and the alarm has not been acknowledged.

Event 248, Leak 10 ft
16:15 26-Jan-12

After the red Acknowledge key is pressed, the event is highlighted in yellow.

Event 248, Leak 10 ft
16:15 26-Jan-12

After the leak has been cleaned up and cleared (but the Alarm Reset key has not been pressed), the event is highlighted in blue.

Event 250, Leak Cleared, Press Alarm Reset
16:17 26-Jan-12

Event 248, Leak 10 ft
16:15 26-Jan-12

After the Alarm Reset key is pressed, the leak event sequence is over. Conditions are normal again.

The event list returns to normal appearance without any color highlights.

In rare cases a leak alarm could occur, might not be acknowledged, and the leak is cleaned up and cleared. This results in an orange highlight of the event.

Event 254, Leak Cleared, Press Alarm Reset
16:21 26-Jan-12

Event 253, Leak 10 ft
16:20 26-Jan-12

STATUS SCREEN

The Summary screen below is displaying an active leak alarm.

The Status field changes to LEAK and includes the leak distance, while being displayed in red text. The leak event in the Event List is highlighted in red, and the red Acknowledge key is displayed.

On the Main screen the SIM field continues to be displayed with red highlight color.
See screens below:

When the Acknowledge key is pressed with the leak still active, the audible alarm is turned off, the leak event highlight color changes to yellow and the Acknowledge key disappears.

However, the leak alarm is still considered active, so the Status field remains displayed as red text.

On the Main screen yellow highlighting is used to indicate the leak is active and requires attention.

See screens below.
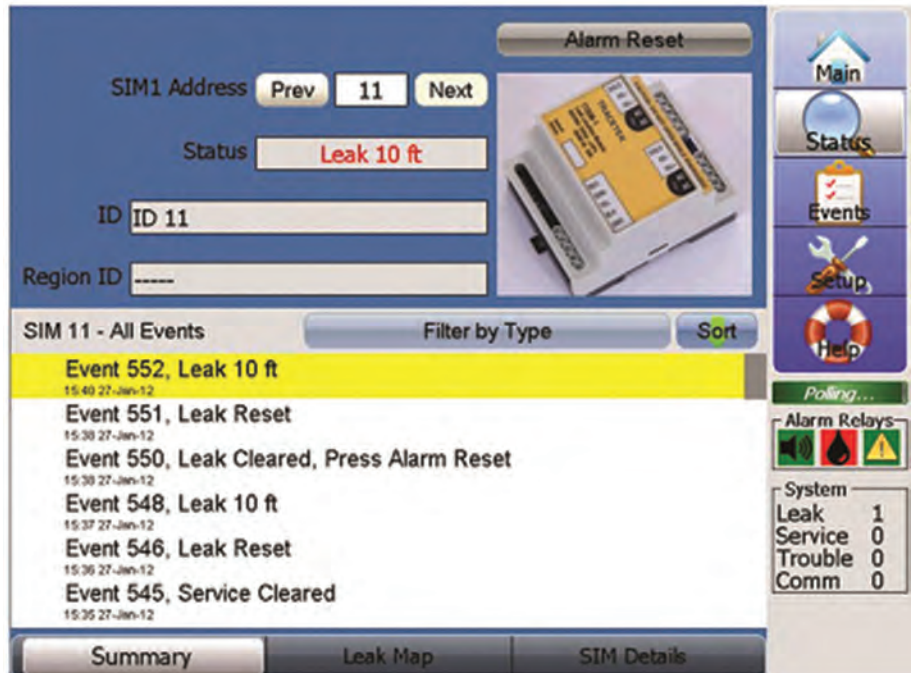
As part of leak alarm response, a physical inspection of the suspected leak alarm location should be performed immediately after TT-TS12 indication.
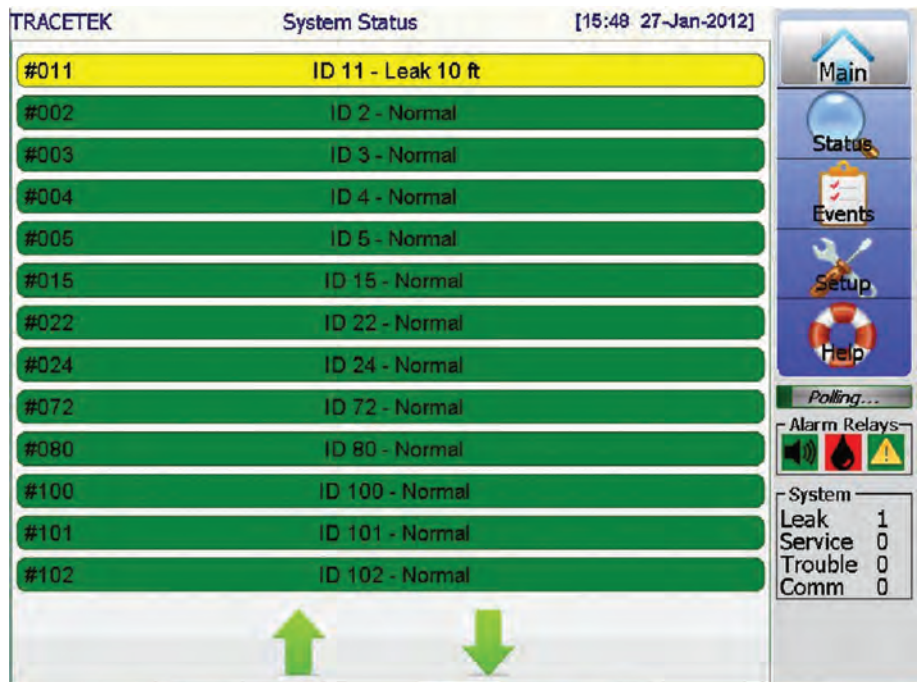
If the leak alarm has not been cleared within the user defined Re-Alarm Interval (see Alarm screen discussion in Setup-System portion of this manual), a Re-Alarm leak event is triggered, the red Acknowledge key is displayed and the horn sounds.

The Summary screen highlights the Re-Alarm event in red, as does the Main screen.
See the screen below.
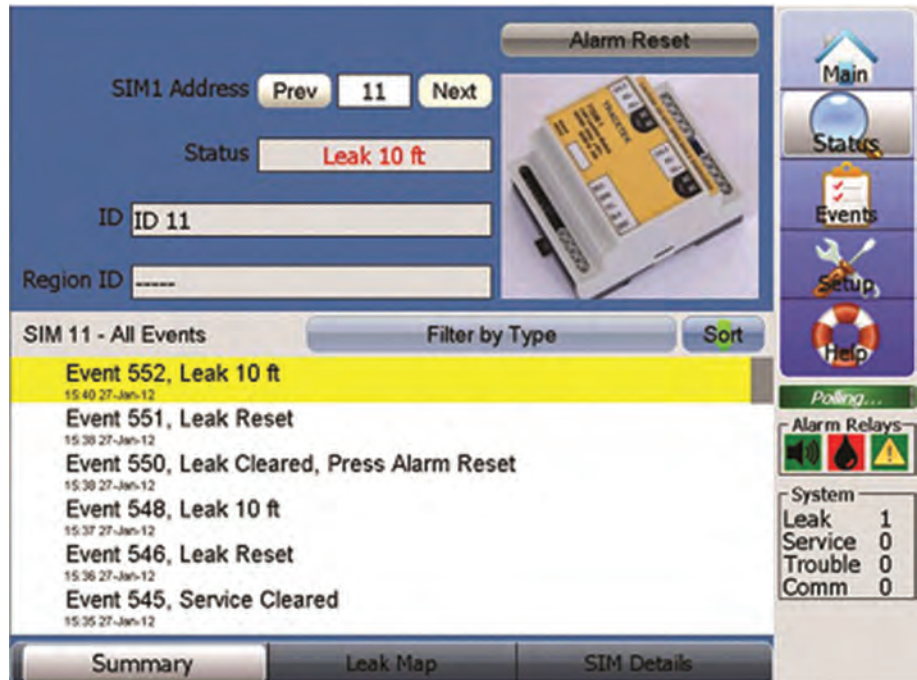
Suppose that before repairs can be made to the original leak, the leak spreads.
The TT-TS12 reacts to spreading leaks or additional leaks by creating a new Leak alarm that replaces the original alarm. The sensitivity of this Re-alarm function is set with the user definable Re-Alarm Distance (see Basic screen discussion in SIM Setup portion of this manual).

When the Re-Alarm distance is exceeded, another leak alarm occurs, and is labeled as a Re-Alarm. The distance associated with a Re-Alarm shows the 'electrical center' of the leak (basically a weighted average). See the screen below for an example.

AFTER THE LEAK HAS BEEN CLEANED UP

Once a leak has been cleaned up- including dealing with the affected TraceTek sensing cable/component- then the leak automatically clears.

On the Summary screen, if the Leak alarm has been acknowledged and then the leak is cleared, the original leak event is now highlighted in blue, and a new Leak Cleared event is displayed.

The Status changes to NORMAL and is displayed in green text, and the Alarm Reset field in top right area of the Summary screen blinks with a red highlight color.

On the Main screen, the Status field changes to NORMAL and the SIM is highlighted in yellow to indicate attention is needed.

See the screens below.

TOUCH THE RED ALARM RESET FIELD TO RESET THE ALARM.

The blue highlighted leak event and the red Alarm Reset color will return to normal appearance.

The Main screen also returns to normal appearance.

For some leak events, monitoring personnel may not press the Acknowledge key prior to the leak event being cleared.

Although the Status is changed to NORMAL, the leak event is highlighted in orange on the Summary page, and the SIM is highlighted in red on the Main screen to indicate attention is needed.

See screens below.

Even though the leak is cleared and Status is NORMAL, the Acknowledge key and Alarm Reset key need to be pressed to restore normal appearance of the screens.

NOTE: For Service/Trouble/Comm Alarms , if monitoring personnel do not press the Acknowledge key prior to the Service/Trouble/Comm event being cleared, the Acknowledge key and Alarm Reset key are automatically reset when the event clears.

Active Service/Trouble/Comm alarms are displayed with the same red color highlight as a Leak Alarm.

STATUS SCREENS

There are 5 types of Status screen displays. They are called Summary, Leak Map, SIM Details, Event Details and Delete Events.

The bottom row of each Status screen has 5 tabs (labeled Summary, Leak Map, SIM Details Event Details and Delete Events) that are used to change from one screen type to another.

NOTE: Each type of Status Screen plays a role in leak alarm investigation. The Summary screen is important because it shows all events for each SIM, and provides access to the Event Details list. The Leak Map provides a flashing icon indicating leak distance and location on the System Map image (if Map Setup has been performed by the user). The SIM Details screen provides a snapshot look at the current SIM parameter values.

SUMMARY SCREEN

Press the Status key (or press the Summary tab at bottom of Status screen) to display the Summary Screen.

The Summary screen displays Status and Event/Alarm history for the specific SIM address number displayed on top row.

A generic picture of the SIM model type is displayed on the screen as a visual reference.

If a Wireless Node is part of the Device Network, the picture of the SIM module is replaced with a picture of a Wireless transmitter.

The Summary screen below shows a SIM with Normal Status. Note the green text color used to display the Status as Normal. The Status field and Events list use color highlighting to focus attention during leak events, as explained later in this section.
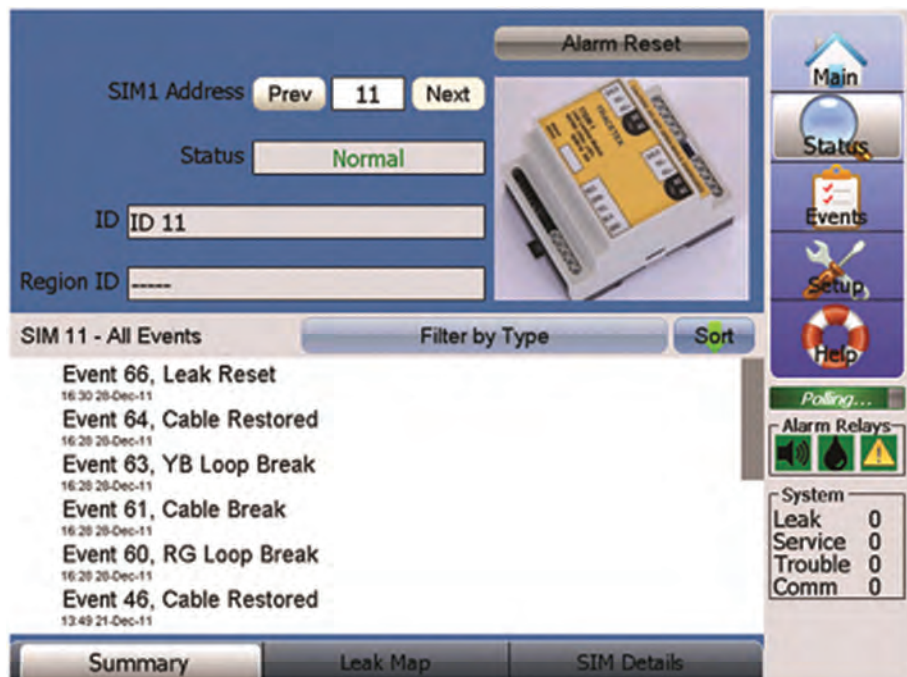
The ID field contains the user defined alphanumeric SIM name, which is entered using the SIM SETUP screen.

The Region ID field only displays the user defined alphanumeric ZONE region name when ZONE capability is established in SIM SETUP and a leak is active. Otherwise the Region ID field is blank, showing just a series of dashes (- - - - -).

To change the SIM number, press the Prev or Next buttons to go the next SIM number in sequence, or press the SIM number field to bring up the number keypad. Identify the desired SIM number and press the enter key.

Events are displayed in chronological order, with the most recent event displayed first. Use finger pressure to move (drag) the event list up and down, monitoring the scroll bar position on the right side of screen for progress.

Events can also be sorted by type (for example-Active Alarms/Leak Alarms/Cable Break/ Loop Imbalance/All events) by sequentially pressing the title bar labeled: Filter by Type

The Sort up or down arrow changes the chronological order of the event type being viewed (with most recent events first, or last).

NOTE: To investigate the recorded values of SIM parameters associated with a specific event, quickly double touch the event, to switch to the Event Details screen. The Event Details screen is discussed later in this manual.

LEAK MAP SCREEN

NOTE: The successful utilization of the Leak Map screen requires the uploading of a detailed System Map, which is further defined with circuit length data using the Map Setup screen. The process is described later in this manual.

The System map is normally completed at the time the leak detection system is commissioned. The System Map is defined for each SIM sensor circuit, typically an as-built drawing of the sensor cable/component layout with reference to readily identifiable landmarks, preferably with actual distance measurements every 5m (16ft) throughout the system.

It is recommended to keep a hardcopy of the System map for each SIM sensor circuit near the TT-TS12 for general staff reference.

Each SIM can have its own unique System Map Image loaded.

During a leak event the Leak Map screen provides a flashing red triangle icon indicating leak distance and location on the System Map image (if Map Setup has been performed by the user), to expedite response efforts.

Press the Leak Map tab (at bottom of Status screen) to display the Leak Map Screen. If the System Map has already been loaded using the Setup Map screen, the Map is visible (without the circuit length data defined during the Setup map process). Allow several seconds for the Map to load. The Map can be moved around the screen with finger pressure, and the Zoom In and Zoom Out keys can be used to fine tune the display. See example Leak Map shown below.

If the System Map has not been loaded using the Setup Map screen, the screen is blank when the Leak Map key is pressed.
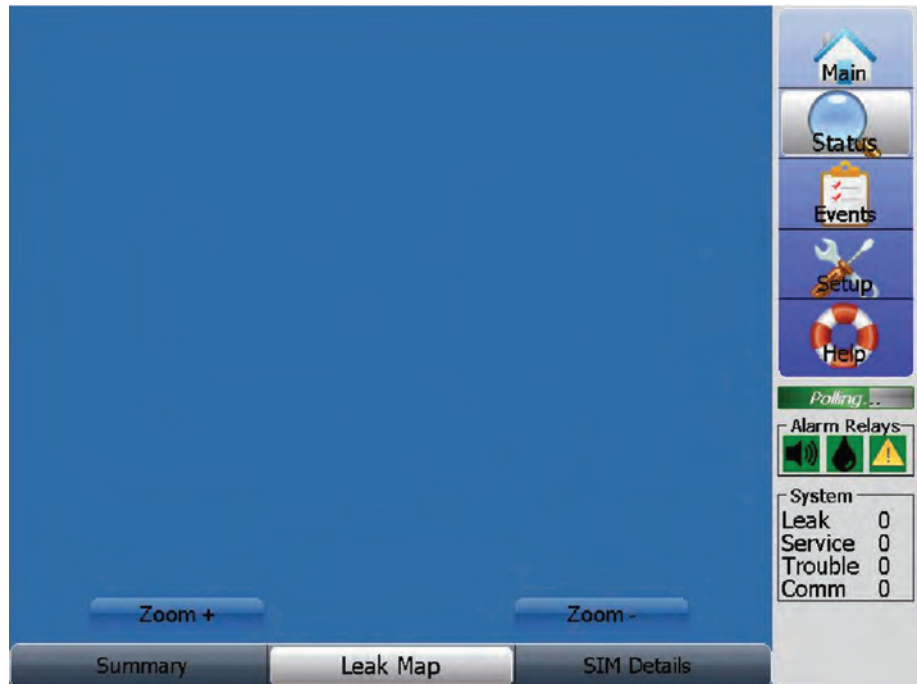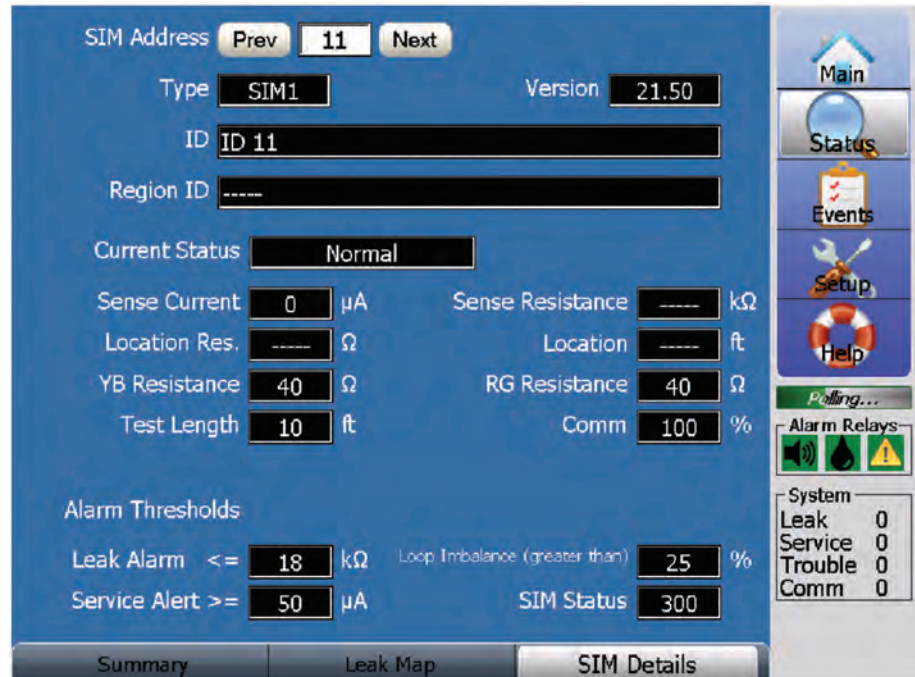
SIM DETAILS SCREEN

Press the SIM Details tab (at bottom of Status screen) to display the SIM Details Screen.

The SIM Details screen provides a snapshot look at the current parameter values for the SIM number shown in the SIM Address field (upper left portion of screen). The current parameter values are updated every couple seconds as the TT-TS12 scans all the SIM modules in the system.

Detailed explanations of each SIM parameter are discussed relative to the SIM Details screen shown below.

SIM-1 and SIM-1A and SIM-2 Details screen

To change the SIM number, press the Prev or Next buttons to go the next SIM number in sequence, or press the SIM number field to bring up the number keypad. Identify the desired SIM number and press the enter key.

SIM type, SIM software version and current status are displayed in upper portion of screen, along with any ID and Region ID information defined during SIM Setup process.

Sense Current is displayed in uA. The Sense Current measured value indicates the condition of the sensing cable/components. In a clean leak-free sensing circuit, the Sense Current value should be less than 5uA.

If the Sense Current value is greater than 20uA, service is recommended-as it may indicate the presence of contamination on the sensing cable.

When a Service Alarm is generated, the Sense Current has reached a level that may affect the accuracy of leak location.

If a leak is detected, the Sense Current value rises to greater than 270uA (depending on the type of SIM used).

Sense Resistance is displayed in kohms. The Sense Resistance is measured between the sensor cable wires.

For a clean leak-free sensing circuit, the Sense Resistance value is typically more than 20,000 kohms.

For SIM-1, a Sense Resistance value greater than 62,000 kohms displays a series of dashes (- - - - -).

For SIM-1A and SIM-2, a Sense Resistance value greater than 999 kohms displays a series of dashes (- - - - -).

If the Sense Resistance value is decreasing, it may indicate a leak in progress.

During leak detection events, the Sense Resistance value drops to less than 30kohms.

Location Resistance is displayed in Ohms. This fundamental resistance value is translated into location using the Units value specified by the user on the SIM Setup screen.

Location is displayed in units of feet (ft) or meters (m) or Z (zones) as specified on the SIM Setup screen.

YB Resistance and RG Resistance are displayed in Ohms. These values are the measured resistances of the Yellow-Black (YB) and Red-Green (RG) loops in the TraceTek sensing circuit. If the YB and RG Resistance values are significantly different from each other, the TT-TS12 creates a Loop Imbalance Alarm. If either the YB or RG Resistance value becomes very high, the TT-TS12 creates a Loop Break or Cable Break Alarm. Loop Imbalance and Loop Break Alarms are typically associated with damage to sensing cables or connectors.

Test Length is displayed in units of feet (ft) or meters (m) or zones (Z) as specified on the SIM Setup screen.

Test Length represents the total length of sensing circuit attached to the SIM. Test length does not change over time, it stays the same unless the system is modified (sensing cable/components removed or added). When the Zones unit is used, the Test Length represents the total number of zones in the system.

NOTE: The Test Length normally is about 1% longer than the mapped length for the SIM channel.

Comm is displayed in % of signal strength. The Comm parameter represents the quality and consistency of SIM communication with the TT-TS12. The Comm alarm is hard coded to provide an alarm when Comm signal strength falls below the established limit. Investigation of Comm alarms should focus on the wire connections between the SIM and TT-TS12.

The **Leak Alarm, Service Alert** and **Loop Imbalance** Alarm Thresholds are generally maintained at the default values, but are changeable using the SIM Setup screen.

SIM Status is a code that has meaning only to TraceTek factory personnel. Although this code is displayed, it is not meant for any customer action.

If an Emerson Wireless Node is part of the Device Network, the SIM Details screen includes extra parameter values related to Voltage and Temperature.

See screen below:
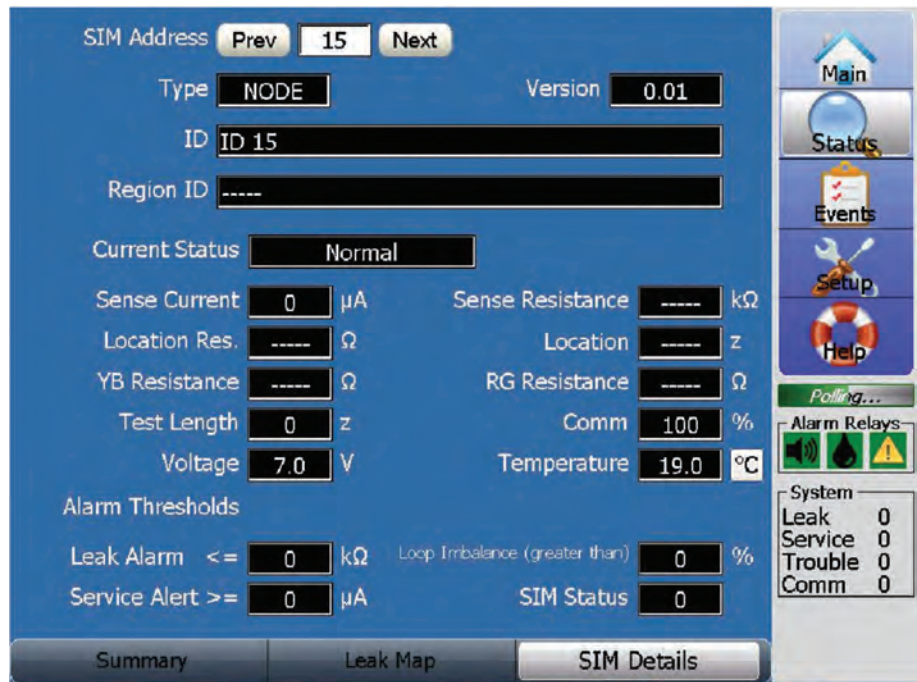
Emerson Wireless Node SIM Details screen

EVENT DETAILS SCREEN

Direct access to the Event Details screen occurs when an event on the Summary screen is quickly double touched.

Access also is provided by pressing the Event Details tab at bottom of Status screen. Note however that the Event Details tab is located to right of the SIM Details tab, so you need to drag the tab bar at the bottom of the Status screen to the left to make the Event Details tab visible.

The Events Details screen is a useful troubleshooting resource. As part of investigating any Alarm condition you can review the SIM event history in chronological sequence. Whenever a change in Status occurs, an event is recorded. Important SIM parameters including Status, Sense Current, Sense Resistance, Location, Loop RG Resistance and Loop YB Resistance are recorded for each event.

To change the SIM number, press the Prev or Next buttons to go the next SIM number in sequence, or press the SIM number to bring up the number keypad. Identify the desired SIM number and press the enter key.

To scroll the Event Number sequence, use the Prev and Next keys to move from one event number to another. Note that the Event Numbers for an individual SIM may not be consecutive, since the Event Numbers are assigned on the Events screen for the entire system.

DELETE EVENTS SCREEN

Access to the Delete Events screen is provided by pressing the Delete Events tab at bottom of Status screen. Note however that the Delete Events tab is located to right of the Event Details tab, so you need to drag the tab bar at the bottom of the Status screen to the left to make the Delete Events tab visible.

Delete Events provides the capability to clear the entire Events List for an individual SIM.

This capability is provided in case the overall Events screen list is becoming excessively large due to contributions from a single SIM.

Touch the Delete Events tab, which displays the Password entry keypad.

NOTE: The Delete Events screen requires Password level 2. The Password entry keypad will be displayed if current Password level is not level 2.

If the correct Password is not entered, no error message is shown, and the previous screen continues to be displayed.
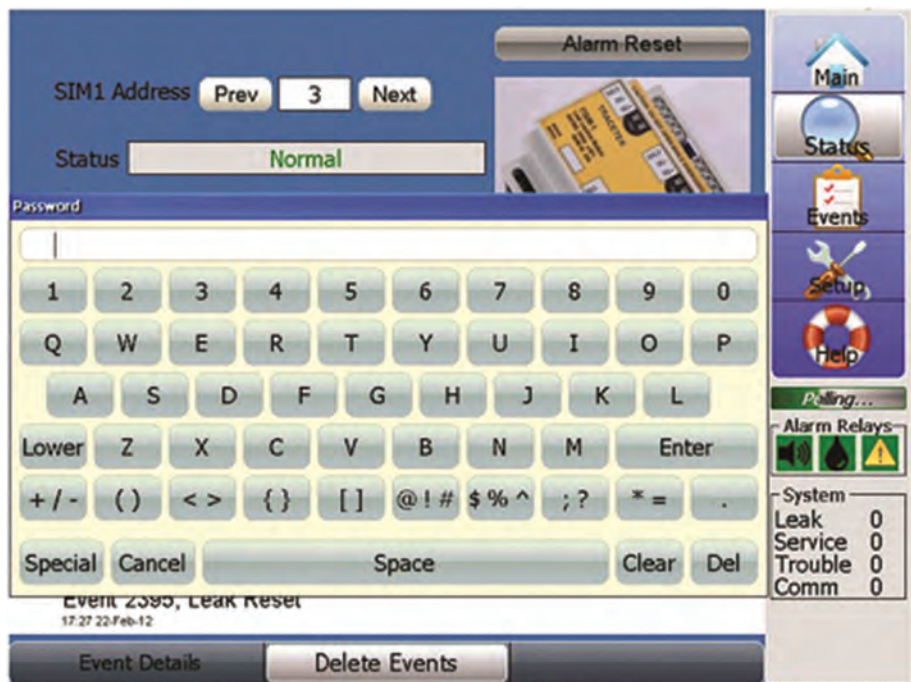
After successful password entry, the Delete Events warning message is displayed.
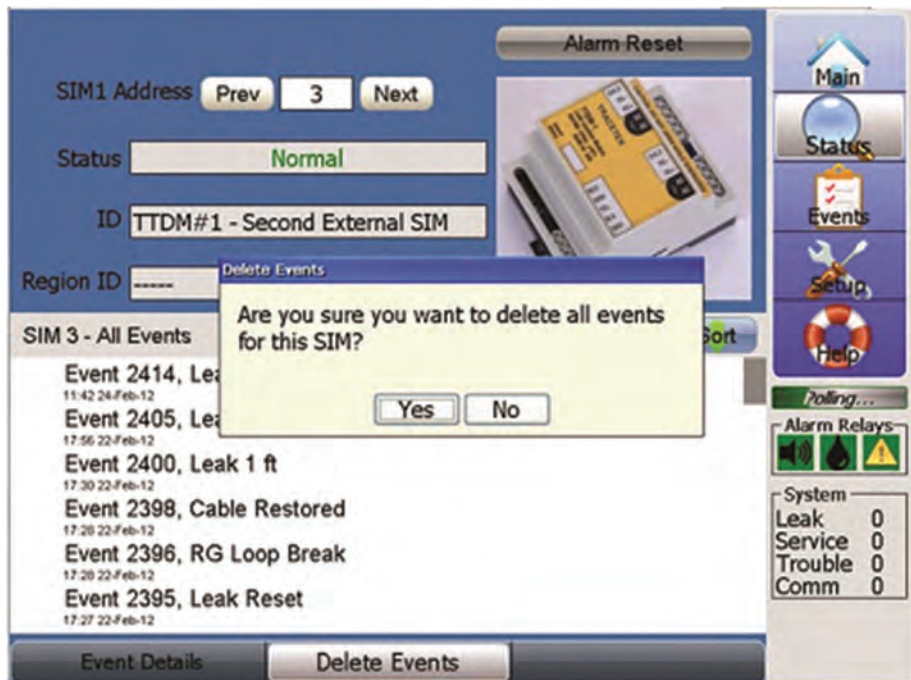
Due to the complete removal of the event history for this individual SIM, the Delete Events message requires response. Note that once the Events List for this individual SIM is deleted, there is no way to retrieve it.

Before Deleting the Event List for the SIM, it is recommended to backup the TT-TS12 Database Files (which includes the entire system Event List) to a USB device.

See the USB Options section of this manual for more information regarding this procedure.

Answer Yes to the warning message only after you have backed up the Database files, or have considered and decided to Delete Events for this individual SIM.
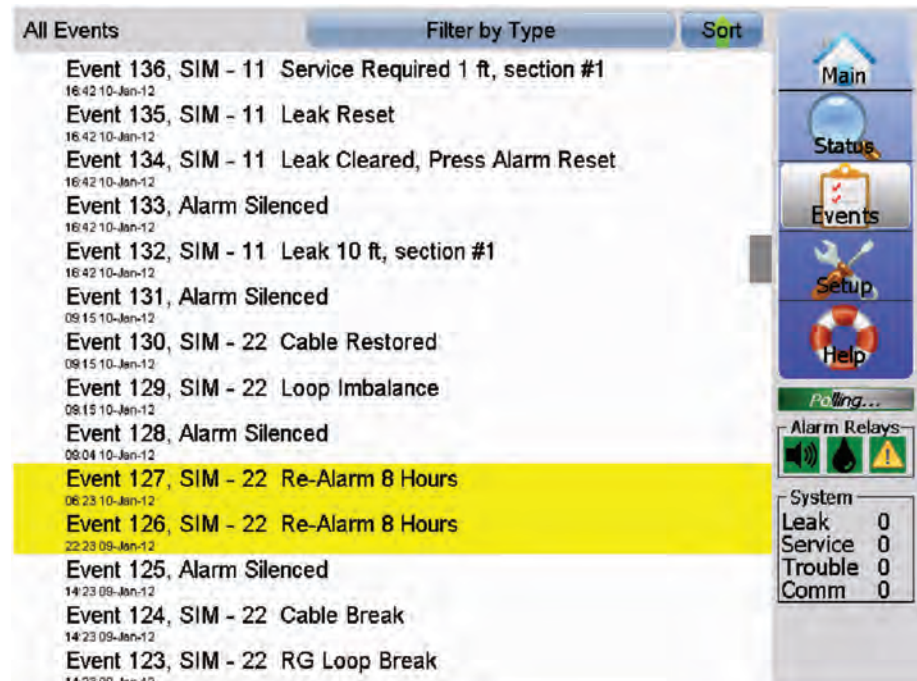
EVENTS SCREEN

Press the Events key to display the Events Screen.

The Events screen provides a listing of all events related to <u>all</u> SIM modules. As part of investigating any Alarm condition you can review the event history.

Events are displayed in chronological order, with the most recent event displayed first.

The same active leak alarm color highlight strategy described earlier for the Summary screen is maintained.

Use finger pressure to move (drag) the event list up and down, monitoring the scroll bar position on the right side of screen for progress.

Events can also be sorted by Alarm type (for example: Active/Leak/Service/Cable Break/ YB Loop Break/RG Loop Break/Loop Imbalance/Comm Alarm/All events) by sequentially pressing the title bar labeled: Filter by Type. The screen below shows a filtered alarm list.
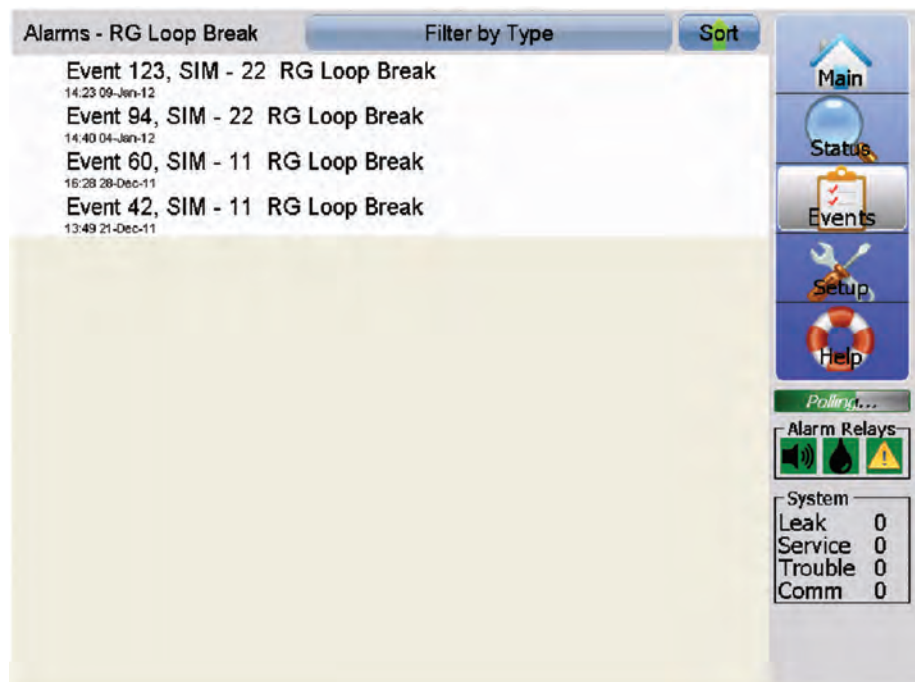
The Sort up or down arrow changes the chronological order of the event type being viewed (with most recent events first, or last).

NOTE: To further investigate any specific event, quickly double touch the event to display the Summary screen for the specific SIM.

NOTE: If your system has accumulated a very large Events List, and you decide you want to Clear the Events List, see the System Maint screen portion of this manual for further instructions.

Clearing the Events List removes all the Event History for all the SIMs in the system, and once Clearing the Events List has occurred, it cannot be reversed.

SETUP SCREEN

Press the Setup key to begin access of Setup screen.

The Setup screen is password protected. The Password entry keypad is displayed as shown below.

To access the Setup screen, enter either the Level 1 or Level 2 system password, then press the enter key.

Some areas of the software require Level 2 password access in order to execute higher level tasks.

Note the Upper and Lower case key, and how it changes the keypad characters between upper and lower case.

The multifunction keys on the bottom row of the keypad require multiple quick touches to display the second or third function symbol.
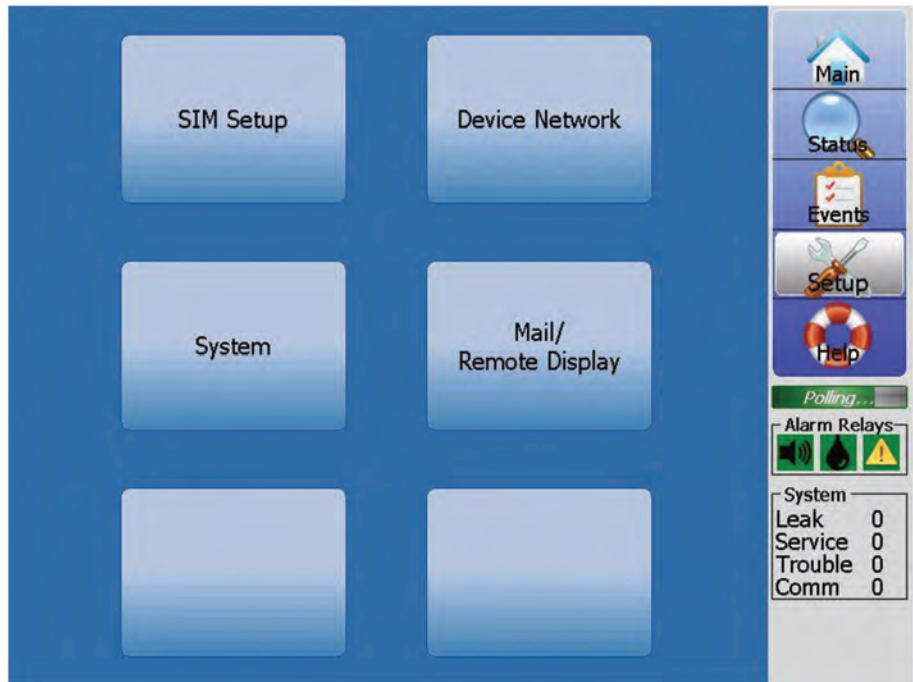
Del is used to backspace one character.

Clear removes all characters.

Use the Cancel key to exit the Password entry screen.

If the correct level 1 or 2 Password is not entered, no error message is shown and the Password entry keypad is removed.

Successful Password entry displays the Setup screen shown below.

There are 4 general areas of Setup capability, titled SIM Setup, Device Network, System and Mail/Remote Display.

Press the general area name of the Setup capability to be accessed next.

SIM SETUP SCREENS

Access Sim Setup from the Setup screen.

There are 5 types of SIM Setup screens. They are called Basic, Map Setup, Regions, SIM Utility and Advanced.

The bottom row of each SIM Setup screen has 5 tabs (labeled Basic, Map Setup, Regions, SIM Utility and Advanced). Press the tab to change from one screen type to another.

NOTE: that the Advanced tab is located to right of the SIM Utility tab, so you need to drag the tab bar to the left to make the Advanced tab visible. This placement has deliberately been done as a visual signal that accessing the Advanced screen is discouraged, since it could lead to inexperienced users creating significant problems with their system.

BASIC SCREEN

Press the Basic tab to display the Basic Screen, which includes a reference picture of the device type.

If your Network includes a Wireless Node, a limited Basic screen is displayed.

See examples below.
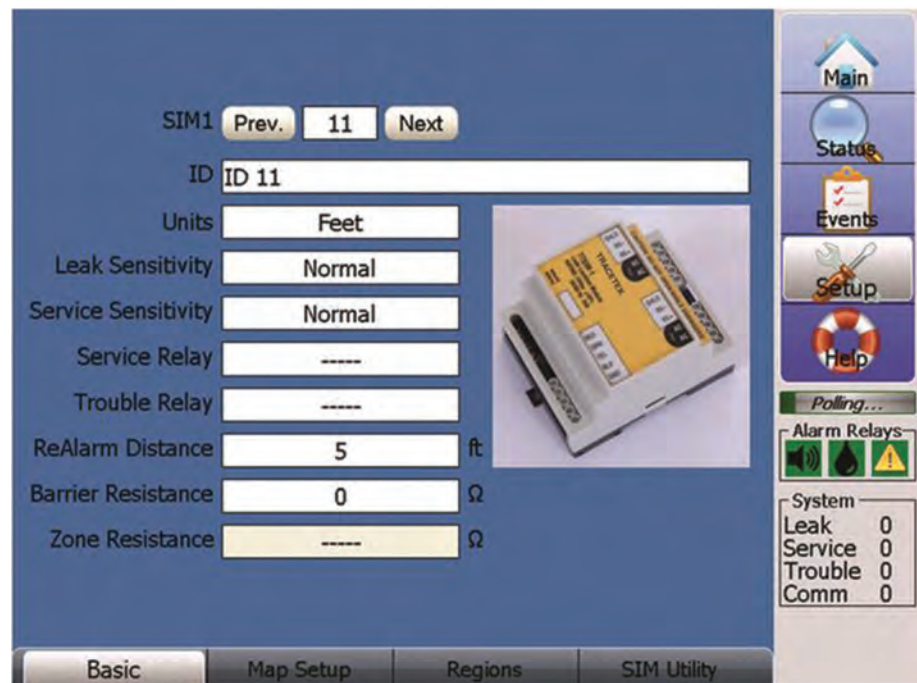
SIM-1 and SIM-1A and SIM-2 Basic screen

Wireless Node Basic screen

The current Basic values for an individual module are shown on this screen. The datafield values that are displayed in a white background field can be changed. Touch the datafield to initiate any change of value.

To change the module number, you can press the Prev or Next buttons to go the next number in sequence, or press on the number datafield to bring up the number keypad. Identify the desired number and press the Enter key.

The **ID** field is alphanumeric, and uses simulated keypad entry as shown below. When using the keypad, be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes.

The **Units** field provides a choice between Feet, Meters, or Zones for SIM-1 and SIM-1A and SIM-2 modules. Zones represents a leak detection application that is characterized by repetitive leak sensor configurations, with sensor cable lengths the same in each Zone of the SIM circuit.

WIRELESS NODES ALWAYS USE ZONES.

Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press Select.
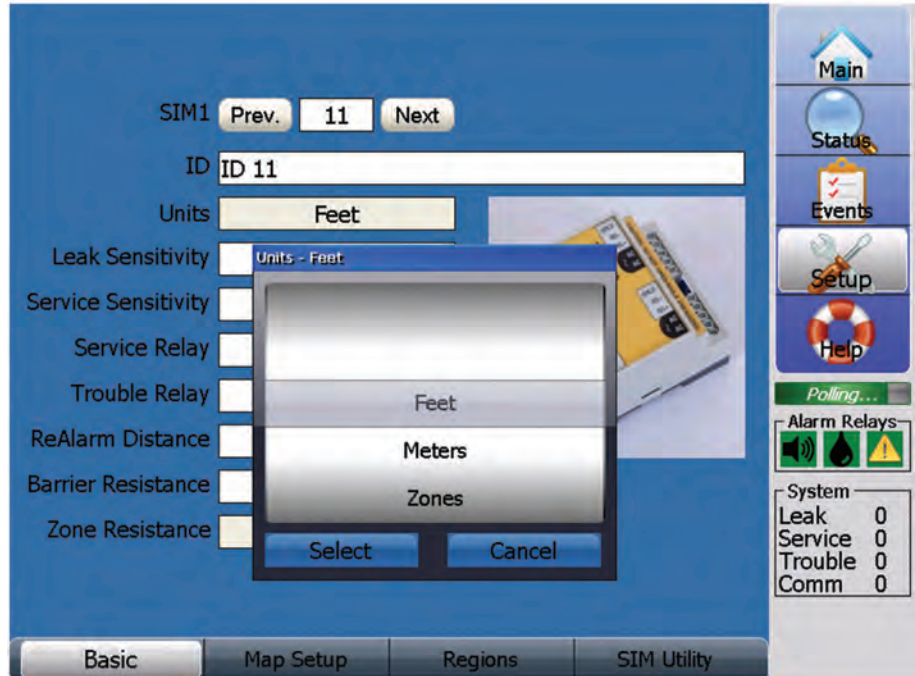
The **Leak Sensitivity** field provides a choice between High, Normal, Low and TT500x settings. Note that if Level 2 password is used, for a SIM-1 additional settings of TT5DB and TT7000 are displayed. Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press Select.
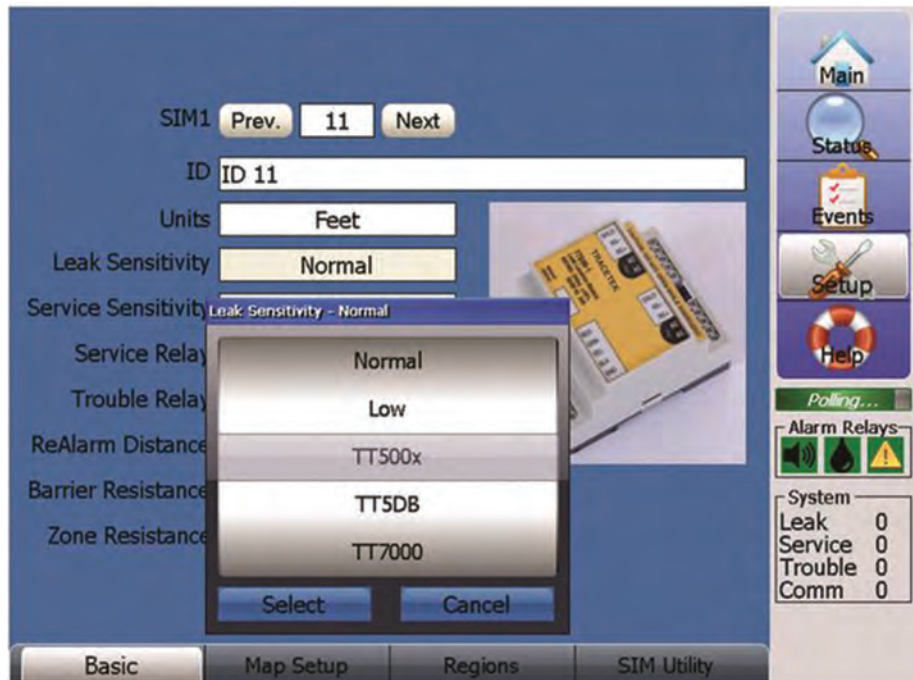
This setting controls Leak Alarms. If Sense Resistance is less than the Leak Sensitivity setting, the TT-TS12 signals a Leak Alarm. Each SIM can have a different Leak Sensitivity setting if desired.

The proper setting for the Leak Sensitivity is based on the type of liquid leak being detected and the environment in which the sensing cable is located. Guidelines associated with the Selectable settings are discussed below.

High (30kohm) is used for de-ionized water applications.

Normal (18kohm) is the default setting and is used for most applications, including TT-FFS, TT-FLAT-PROBE and TT-MINI-PROBE.

Low (14kohm) is used for particularly active or exposed applications.

TT500x (10kohm) is used for hydrocarbon sensing cable applications.

TT5DB (3kohm) is used for hydrocarbon sensing cable in Direct Bury applications. Only applies to SIM-1, not SIM-1A or SIM-2. Only selectable if level 2 password used.

TT7000 is used for TT7000-HUV acid sensing cable applications. Only applies to SIM-1, Not SIM-1A or SIM-2. Only selectable if level 2 password used.

NOTE: 'Custom' is displayed in the Leak Sensitivity datafield if the Advanced screen has been used to enter a value not equivalent to any of the Leak Sensitivity selectable settings.

The **Service Sensitivity** field provides a choice between High, Normal, Low, TT500x or Never settings. Note that if Level 2 password is used, for a SIM-1 an additional setting of TT5DB is displayed Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press Select.
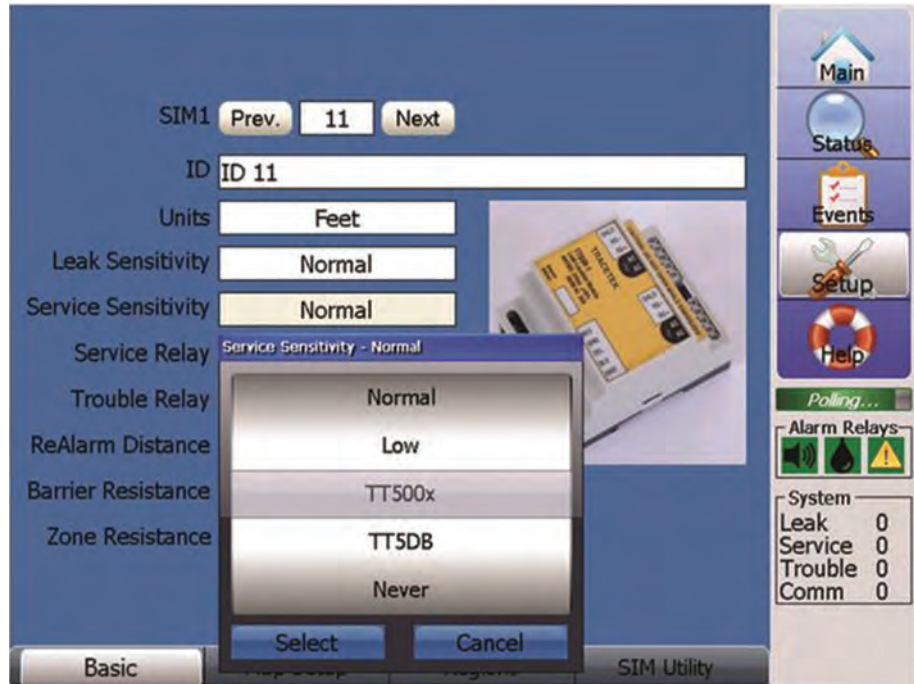
This setting controls Service Alarms. If Sense Current is greater than the Service Sensitivity setting, the TT-TS12 signals a Service Alarm. Each SIM can have a different Service Sensitivity setting if desired.

The proper setting for the Service Sensitivity is based on the type of liquid leak being detected and the environment in which the sensing cable is located. Guidelines associated with the Selectable settings are discussed below.

High (20uA) is used for de-ionized water applications.

Normal (50uA) is the default setting and is used for most applications, including TT7000-HUV, TT-FFS, TT-FLAT-PROBE and TT-MINI-PROBE.

Low (80uA) is used for particularly active or exposed applications.

TT500x (40uA) is used for hydrocarbon sensing cable applications.

TT5DB (20 uA) is used for hydrocarbon sensing cable in Direct Bury applications. Only applies to SIM-1, not SIM-1A or SIM-2. Only selectable if level 2 password used.

Never is used to turn the Service Sensitivity feature OFF. It is not recommended to use the Never setting, because this disables the Service Alarm, which is designed to maintain system performance.

NOTE: 'Custom' is displayed on the Setup SIM screen Service Sensitivity datafield if the Advanced screen has been used to enter a value not equivalent to any of the Service Sensitivity selectable settings.

SERVICE ALARM DISCUSSION

A TraceTek sensing circuit consists of two electrical loops. The SIM module constantly monitors for current passing between loops. When the system is normal, there is no current passing between the loops.

When there is a leak on the system, the maximum current flows. If a SIM detects a lower but significant level of current flow between the loops, the TT-TS12 signals a Service Alarm.

A low-level current could indicate one or more of the following:

A very small leak (which may soon develop into a full Leak Alarm).

Heavy condensation or small spills (coffee, tea, etc) on a water or aqueous solution sensing cable (TT1000 and TT3000 for example).

Conductive material on a water or aqueous solutions sensing cable. The material might be metal filings, concrete dust, flux, mastic or other construction debris, or carbon-based dust from air handling units, printers, or copiers.

While Service Alarms should be investigated, they do not disable the operation of the system. The TT-TS12 and SIM modules continue to detect leaks during a Service Alarm. However, Service Alarms may affect the accuracy of leak location in certain cases.

The **Service Relay** field and **Trouble Relay** field provide management of relay assignments. For currently assigned relays, the relay number is displayed in the corresponding Service relay or Trouble relay field on the Basic screen. For currently unassigned relays, the field does not show any number, just a series of dashes (- - - - -).

Touch the Service or Trouble relay field on the Basic screen to start any type of relay assignment activity. The Select relay list is then displayed, see below for example.
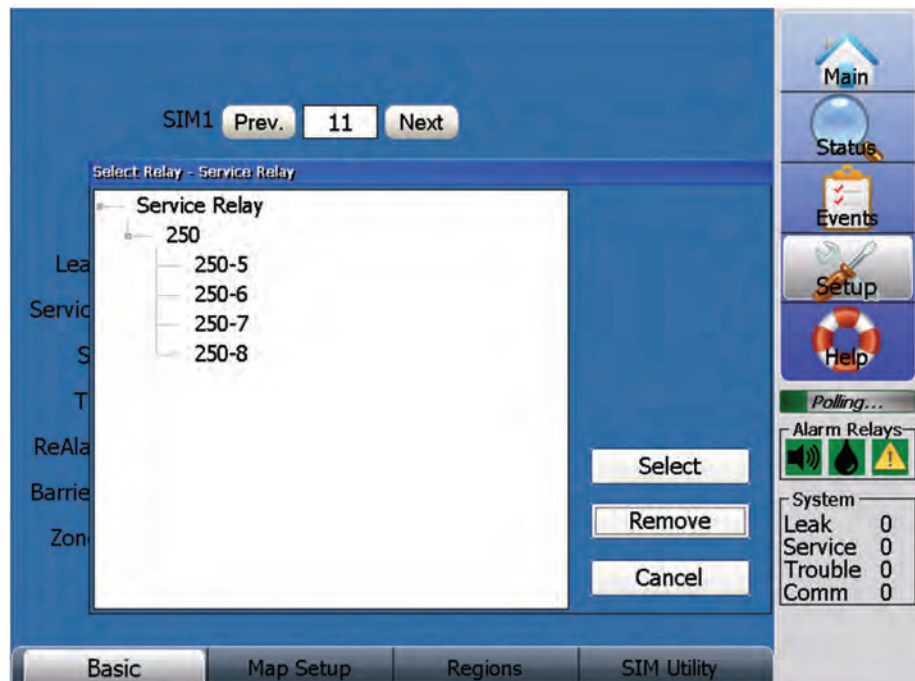
To assign an unused relay from the Select relay list, highlight the desired relay number, then press the Select key. The newly assigned relay number is displayed in the corresponding Service or Trouble relay field on the Basic screen, and also is indicated with a small X to the left of the relay number the next time the Select relay list is displayed.
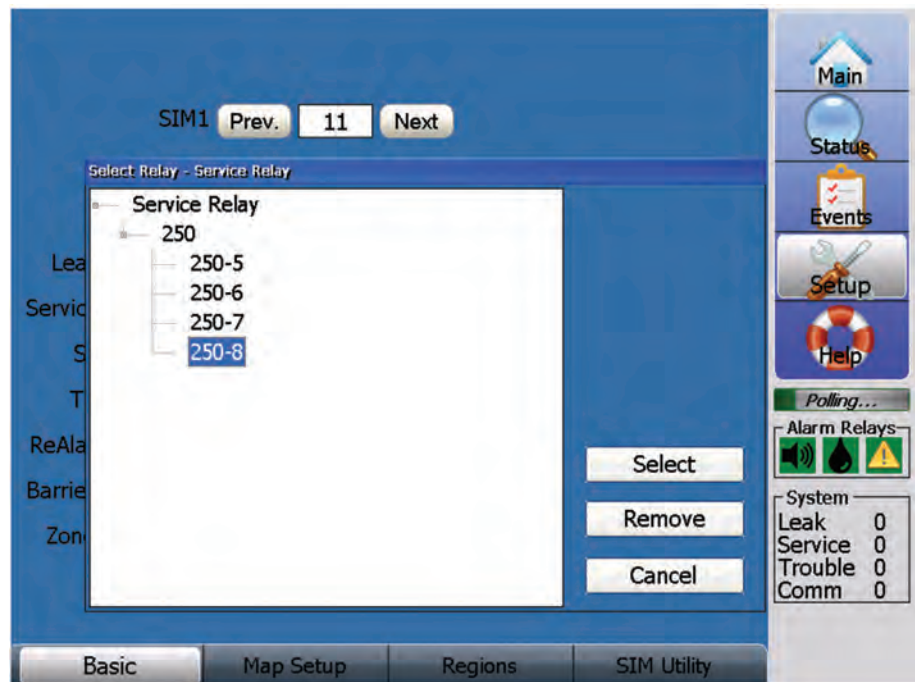
If a relay is already assigned, a small X is visible to the left of the relay number on the Select relay displayed list.

To change a relay assignment, highlight the desired new relay number, then press the Select key. The newly assigned relay number is displayed in the corresponding Service or Trouble relay field on the Basic screen.

To remove an already assigned relay number, highlight the currently assigned relay number on the Select relay list, then press the Remove key. The corresponding Service or Trouble relay field on the Basic screen is displayed as a series of dashes (- - - - - -).

RE-ALARM DISTANCE

The TT-TS12 reacts to spreading leaks or additional leaks by creating a new Leak Alarm that replaces the original alarm. The sensitivity of this Re-alarm function can be set using the Re-alarm distance.

Press on the datafield to bring up the number keypad. Identify the desired number and press the enter key. The Units value identified on the Basic screen determines the Re-alarm Distance values that can be used.

For units of feet, values between 3 and 20 can be used.

For units of meters, values between 1 and 6 can be used.

For units of zones, only a value of 1 can be used.

Press Cancel to leave the screen with no changes.
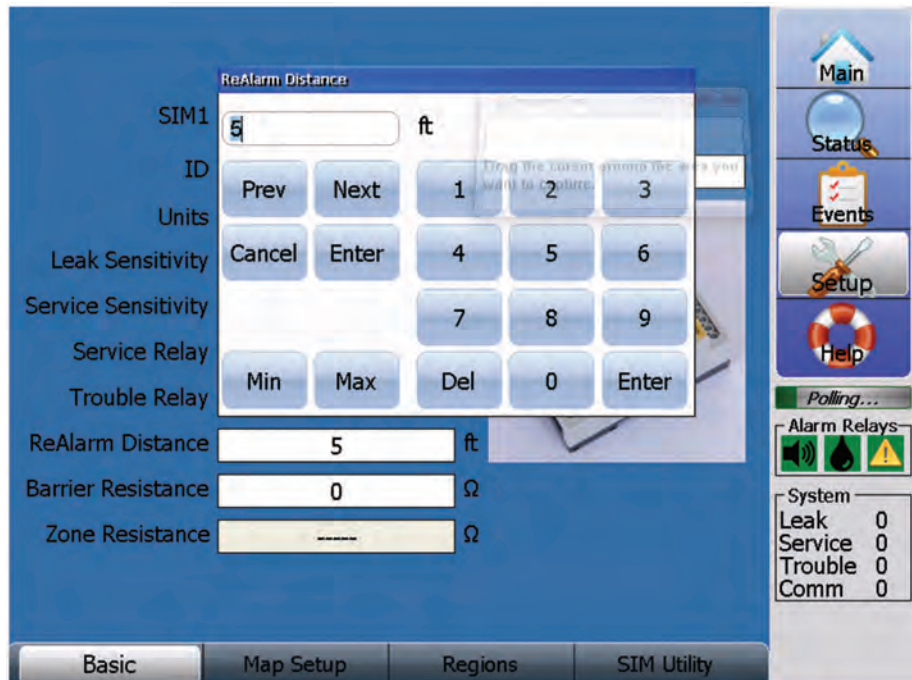
Suppose that before repairs can be made to the original leak, the leak spreads. When the Re-alarm distance is exceeded, another leak alarm occurs, and is labeled as a Re-alarm. The distance associated with a Re-alarm shows the 'electrical center' of the leak (basically a weighted average). See the screen below for an example.

Should the leak continue to spread, additional Re-alarm events may occur. The Events History screen can be used to track the events between the first leak and the most recent Re-alarm.

BARRIER RESISTANCE

In some leak detection applications (typically involving hazardous areas) a zener safety barrier is used to restrict the electrical energy transferred to the sensing cable. The risk of fire or explosion in the hazardous area is reduced as a result of the zener barrier energy restriction.

The use of a zener barrier results in extra resistance (about 114 ohms) between the TT-TS12 and the sensing cable. This extra resistance in the sensing circuit adds effective sensing cable length, which results in leak location errors (location distance is overestimated), unless the extra resistance is compensated for.

The Barrier Resistance datafield allows compensation for the zener barrier resistance, when a zener barrier is used.

Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 0 and 1000. Press Cancel to leave the screen with no changes

ZONE RESISTANCE

If Unit values of Feet or Meters are selected, then the Zones datafield displays only a series of dashes (- - - - - -).

NOTE: ZONES represents a leak detection application that is characterized by repetitive leak sensor configurations, with sensor cable lengths the same in each Zone of the SIM circuit. The Zone Resistance value represents the repeatable resistance value that separates each ZONE.

This datafield is only active when ZONES has been selected as the Unit. Press on the datafield to bring up the Zone Resistance keypad. The default value is 200. Identify the specific repeatable resistance value that separates each Zone in your application, then press the Enter key. Allowable values are between 180 and 300. Press Cancel to leave the screen with no changes
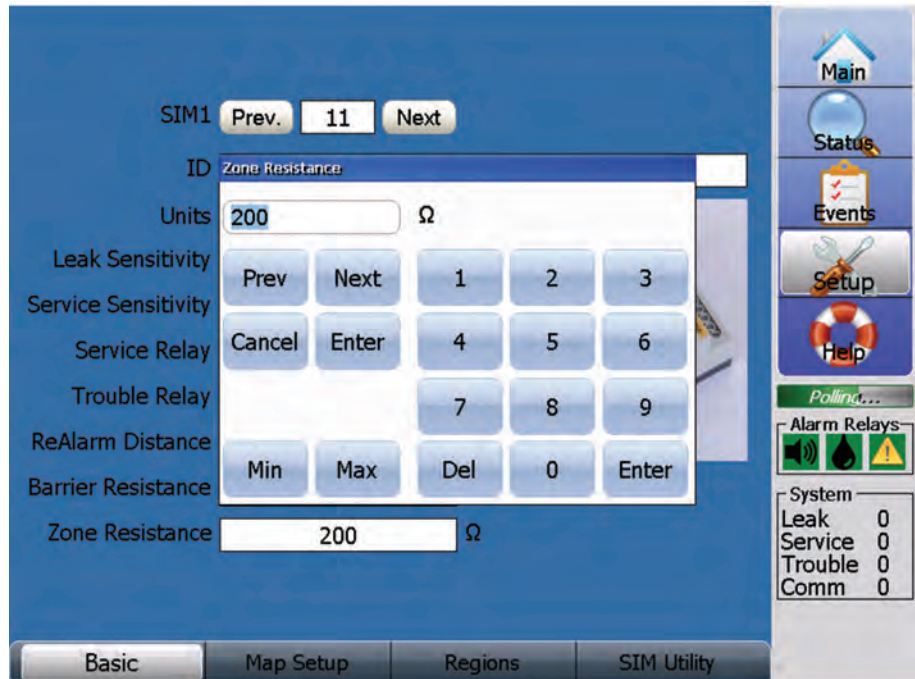
Note that the ReAlarm Distance automatically changes to a value of 1 when ZONES has been selected as the Unit, as shown on the screen below.
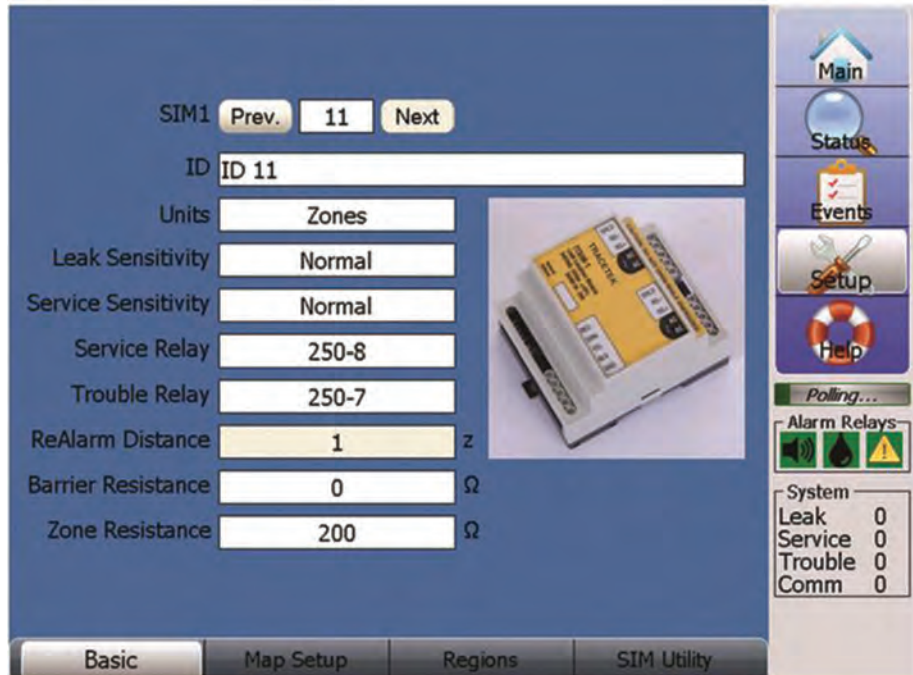
MAP SETUP SCREEN

NOTE: The successful utilization of the Leak Map screen requires the uploading of a detailed System Map, which is further defined with circuit length data using the Map Setup screen. When a leak alarm occurs a blinking red triangle is positioned on the Leak Map to display the leak location. See the Leak Map screen description in this manual for more information.

The System Map is normally completed at the time the leak detection system is commissioned. The System Map is defined for each SIM sensor circuit, typically an as-built drawing of the sensor cable/component layout with reference to readily identifiable landmarks, preferably with actual distance measurements every 5m (16ft) throughout the system.

It is recommended to keep a hardcopy of the System Map for each SIM sensor circuit near the TT-TS12 for general staff reference.

Each SIM can have its own unique System Map Image loaded into the TT-TS12.

Press the Map Setup tab to display the Map Setup Screen. The SIM number identified on the Basic screen is used for the Map Setup screen. Note the 4 tabs at the bottom of the Map Setup screen, which are labeled Image, Set, Zoom In and Zoom Out.

If a System Map Image has not yet been uploaded, the Map Setup screen is blank, as shown below.
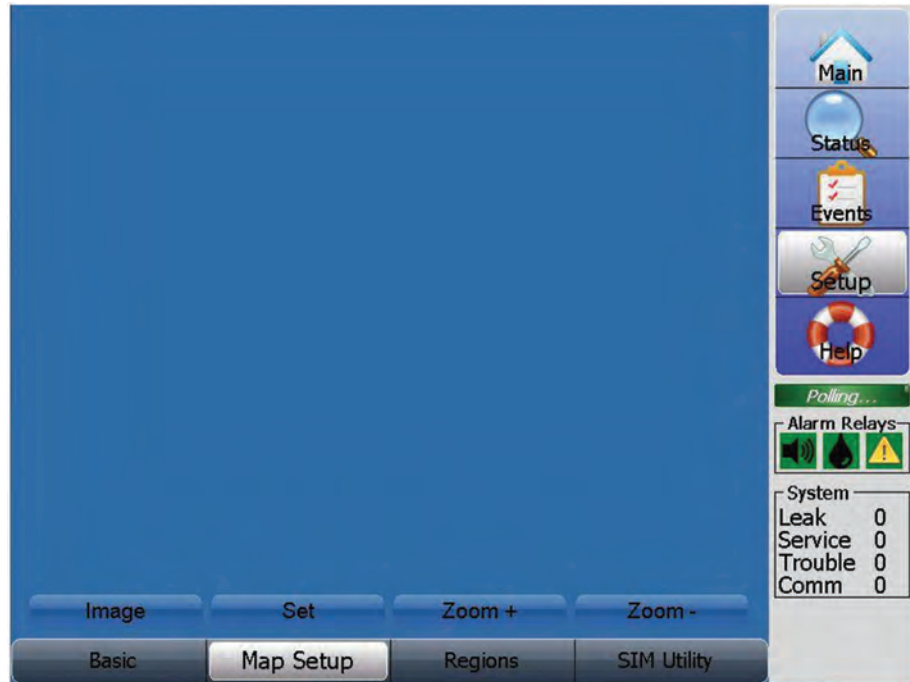
MAP IMAGE PREPARATION

You can use virtually any image for a Map. For example, a floor plan showing leak detection cable layout, the plan view of a pipe network, a tank farm aerial photograph, or a photo of a specific piece of equipment.

Allowable file formats for the Map Image include JPG and BMP and GIF files, up to 7,000,000 total pixels in size. For example, a picture file that is 3500 x 2000 pixels represents the maximum file size.

NOTE: the Operating system and TT-TS12 memory are limited compared to a typical desktop/laptop PC. Consequently there is a Map Image file size limit related to the number of pixels. As a general rule, keep the file size below 3000 x 2000 pixels. Smaller Map Image file sizes are better, as they will load faster during actual TT-TS12 use.

If the Map Image file size is too big, the TT-TS12 software displays a warning message during the Map Image upload process.

HINT: the size (MB or KB) of the original JPG/BMP/GIF file is not necessarily a good indicator of the amount of memory required to display the image. A large System Map with a lot of white space can compress to a small JPG file size (KB), but still require a large number of pixels.

## USING PAINT PROGRAM TO RESIZE MAP IMAGE FILE

Use a separate computer (not the TT-TS12 system) to copy any image from a JPG or PDF file or word document into the standard Windows accessory program called Paint. The Paint program is used for RESIZING and saving the smaller Image as a JPG file. Alternately you may be able to use Adobe Photoshop to create the small Image JPG file.

The screen shots below capture a sequence of steps used to take an original JPG file, and resize it using the Paint program to be suitable for use with the TT-TS12 program.

The first screen below shows the original image opened as JPG.

The cursor is used on the toolbar at top left portion of screen to select OPEN, and then the Paint program is selected as shown in the next screen.
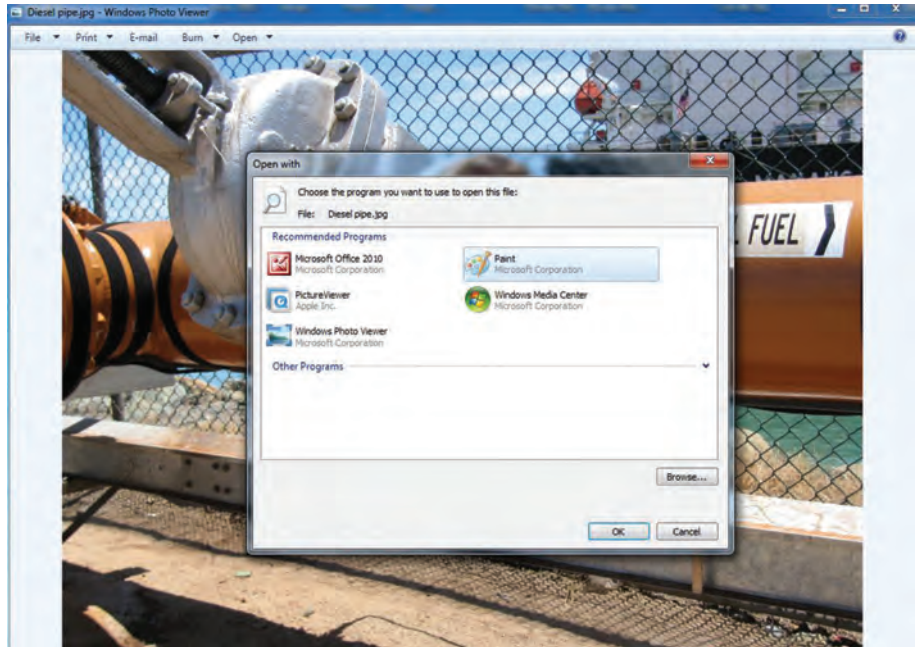
After the Paint program opens up, the VIEW tab is selected, and Zoom In/Zoom Out used to generally scale the image and make it easily visible. See the screen below.

Then the HOME tab is selected, and in the Image section of the toolbar the RESIZE key is pressed, which displays the Resize screen.

On the Resize screen, select Pixel (not Percentage). Note that the horizontal and vertical Pixel sizes associated with the original image are now shown in the corresponding fields of the Resize screen. See example below.

Examine the horizontal and vertical numbers to see if either number is above 2000 pixels.

If both horizontal and vertical numbers are 2000 or below, then it is appropriate to save the file without making any resize adjustments.

If either the horizontal or vertical numbers are above 2000, then a Resize adjustment is needed.

Compare the horizontal and vertical Pixel numbers to determine which is larger. (In the example above, the horizontal number is larger than the vertical number). Click in the field with the larger number (horizontal in this example), enter a new number of 2000, and press OK.

This should result in resizing the pixels, and the resized horizontal and vertical numbers are displayed. See example below.
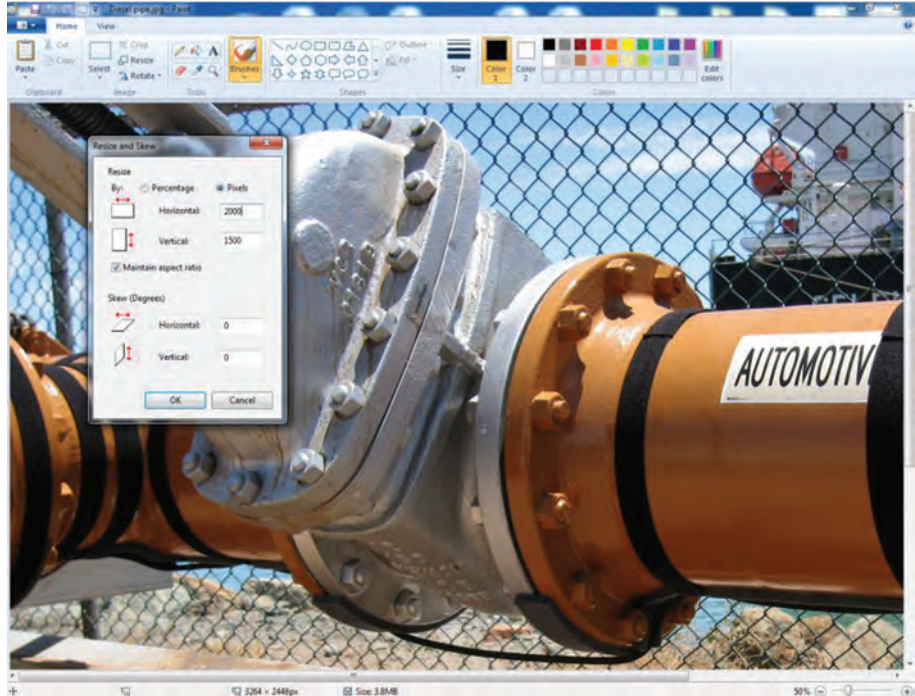
Verify both horizontal and vertical numbers are 2000 or below, then press OK to close the Resize screen.

Save the file as JPG type, as shown below. You may notice the reduced pixel and file size are shown at the bottom row of the screen.
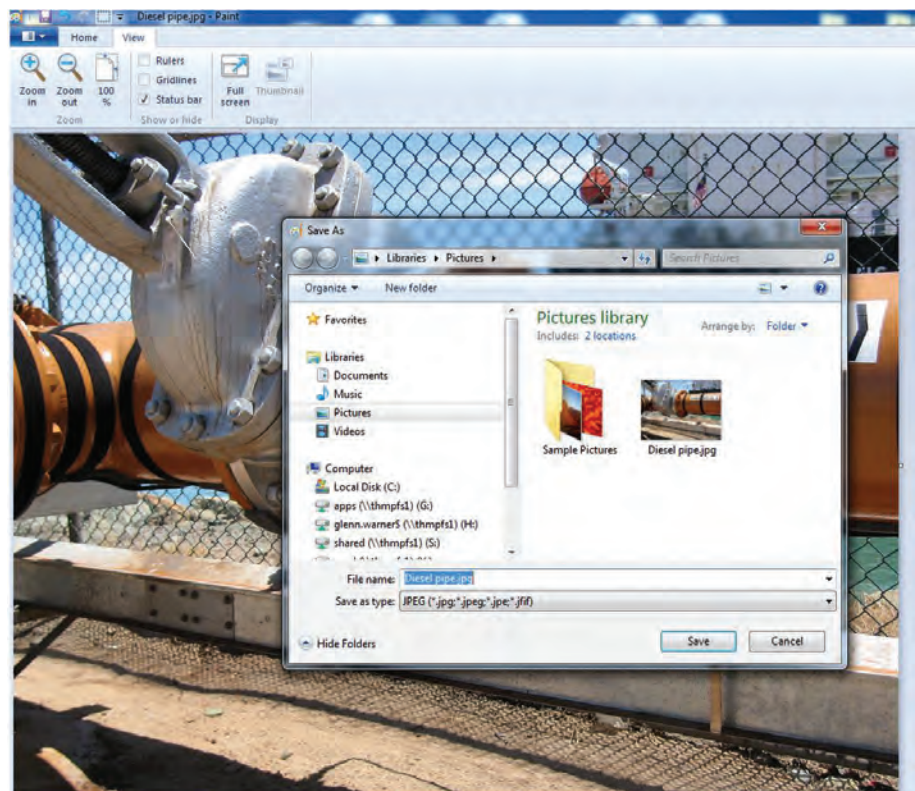
The last step in Map Image file preparation is to create a folder called /Maps in a TraceTek directory on a portable USB drive.
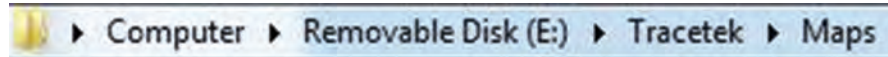
Save this smaller JPG Map Image file into the Maps folder on the USB drive.

COPY MAP FILES FROM USB DRIVE ONTO THE TT-TS12 HARD DISK

The TT-TS12 has been designed for easy transferring of your System Map Image file from a portable USB drive to the TT-TS12 Hard Disk.

On the USB drive create a folder titled TraceTek.

Within the TraceTek folder create a folder titled **Maps**.

Verify your Image file has been loaded onto the USB drive in the TraceTek/Maps folder.

If not already done, load the Image file into the Maps folder.

When you insert the USB drive into the TT-TS12 panel USB port, the screen below will appear after several seconds. Take action within a minute, otherwise the Main screen will be displayed, and you will have to re-insert the USB drive to display this screen again.

Touch the Copy Map files from USB drive field to display the screen below.
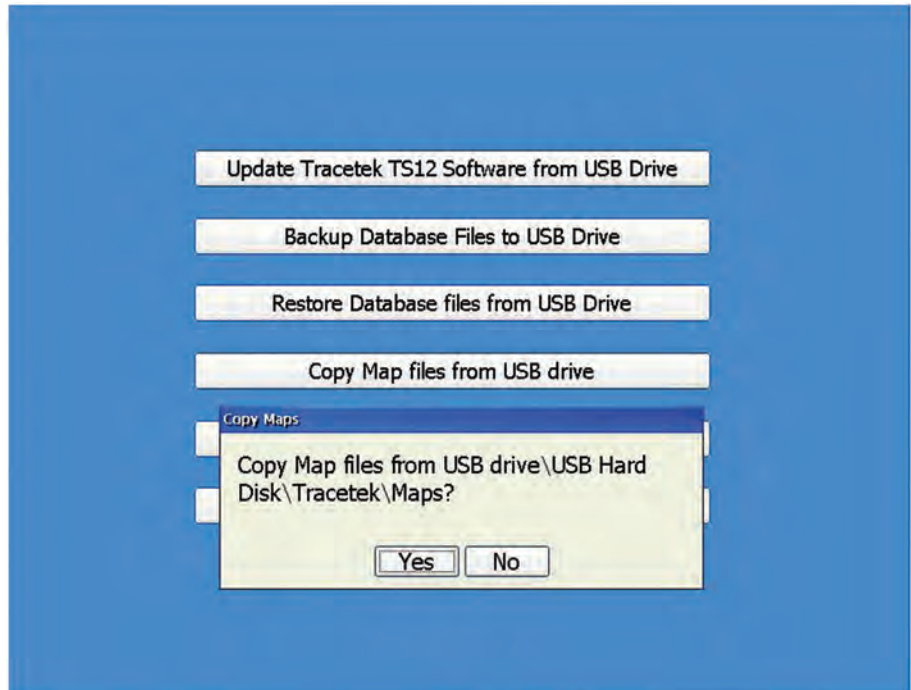
Answer YES to the prompt and all uniquely named JPG files in the TraceTek /Maps folder of the USB will be added to the Hard Disk/TraceTek /Maps folder of the TT-TS12.

You will briefly see the Copying Maps message displayed on the screen if any files are being copied.

If you do not see the Copying Maps message, you might not have set up the proper TraceTek /Maps folder structure on the USB.

NOTE: File copying/overwriting is not performed if a file in the TraceTek /Maps folder of the USB shares the same name as an existing file in the TT-TS12 Hard Disk/TraceTek / Maps folder.

NOTE: All TT-TS12 Map Images are stored in the Hard Disk/TraceTek /Maps folder on the Hard Disk. The software defaults to this Maps folder during the Image Upload process.

Remove the USB drive after the Copy Map process is completed.

UPLOADING THE MAP IMAGE

Before starting the upload process, you will have to navigate through the Setup screen (which requires Password access). Use SIM Setup to identify the desired SIM number, and then select the Map Setup tab.

If the SIM has not had a Map Image uploaded before, then the Map Setup screen will be empty, showing a blue field.

If a Map Image is displayed, then a Map Image was previously loaded, and caution should be taken to verify that the correct SIM number is being referenced.

Otherwise a new Map Image may be uploaded in place of a previously Setup Map, in which case existing defined Setup points will be lost.

To upload the Map Image, start by pressing the Image tab on the MAP SETUP screen, which displays the file selection screen below .

The list of available Maps is displayed.
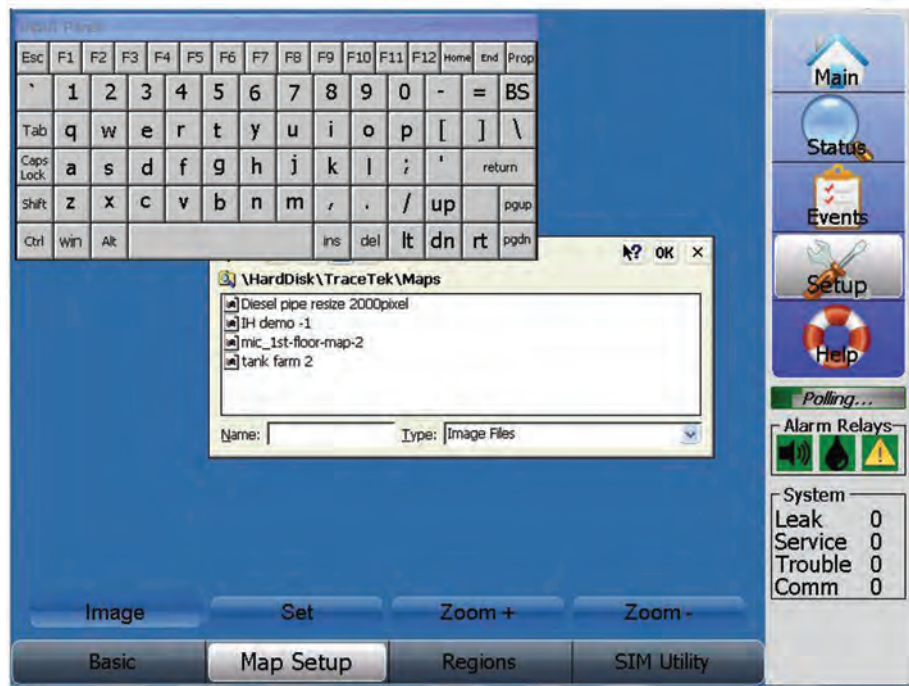
To close the Image filename entry screen, press the X field (in the top right corner next to the OK field).

Press the desired Image filename to highlight the name, then press the name again to upload the Image.

Alternately, the Input Panel with the simulated keyboard can also be used to identify the Image filename, press the OK field once the filename has been entered to load the Image.
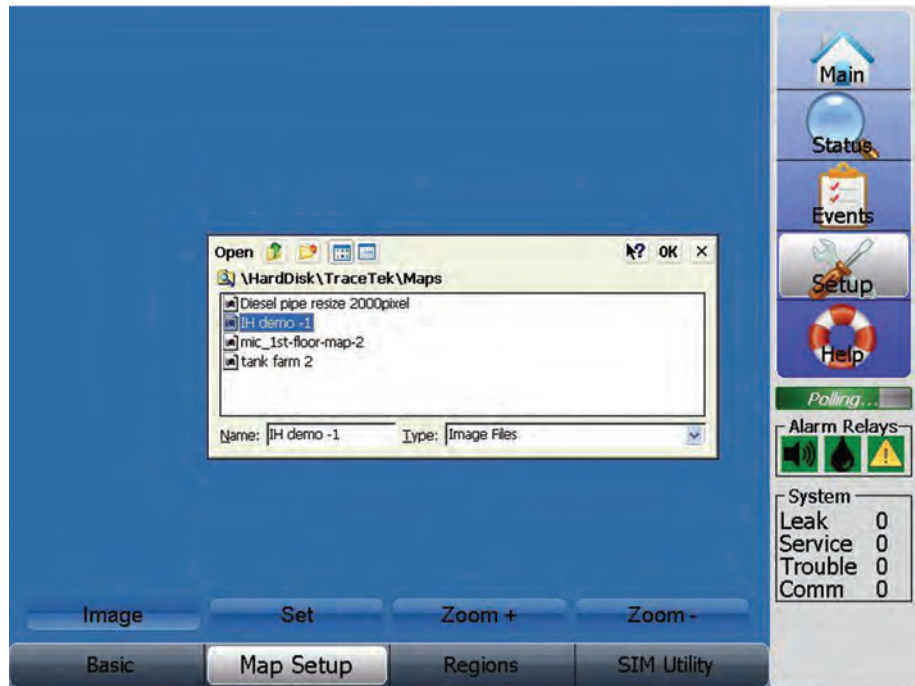
You may need to wait several seconds before the uploaded Image is displayed on the screen.

If the Map Image file size is acceptable, it will be uploaded. Inspect the Image to verify the entire leak circuit is visible. You may want to use the Zoom In and Zoom Out keys, and move the Image around the screen with your finger to improve the leak circuit visibility.

If the Image file size is too big, the TT-TS12 software displays the warning message below.
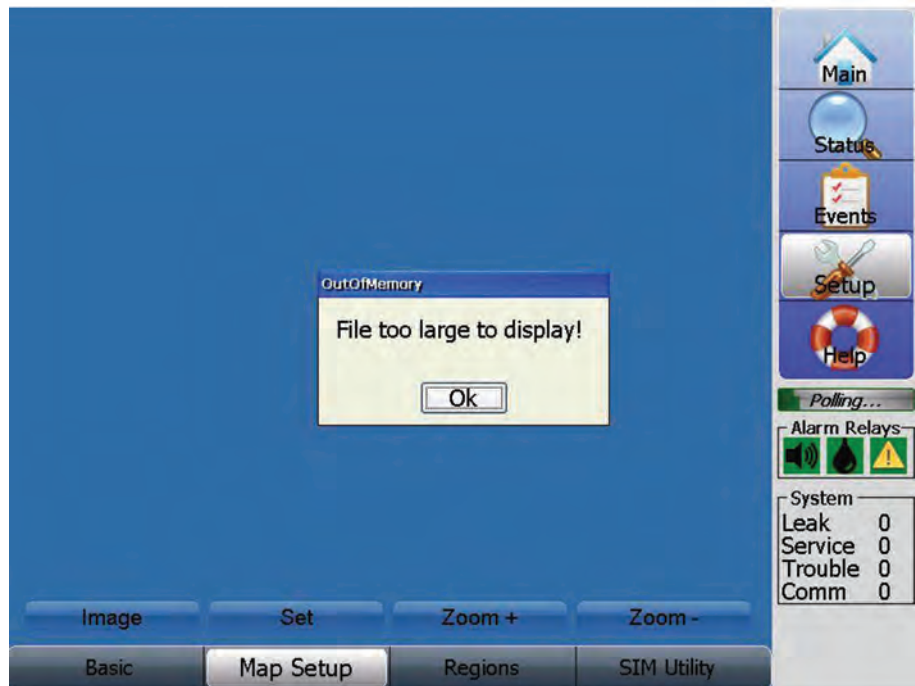
Press OK, then take action to create a new smaller Image file. Use the PAINT program to resize the file to a smaller size, as described earlier in this manual.

REPLACING MAP IMAGE

If the wrong Map Image has been uploaded, the incorrect Image can be replaced. Simply repeat the upload process and specify the correct Image. The old image is replaced with the new one. Any Map Set defined points related to the old Image are lost when the new Image is uploaded.

MAP SET PROCESS-DEFINING CIRCUIT LENGTH ON THE MAP IMAGE

The Map Set process is best performed starting with the definition of the first point at the beginning of the leak detection circuit, electrically closest to the TT-TS12. (Note that the start of the circuit could be at left or right, or top or bottom or middle area of the Image).

The Map Set process can define a maximum of 100 Points for each SIM. The user must decide on the best strategy for point definition for the specific leak detection circuit. When sensing cable is used in a straight linear run, a minimum of two points should be defined, representing the start and end of the sensing cable segment. However, if the sensing cable follows a complicated (non-linear) path, multiple points should be defined, in order to improve the accuracy of the Leak Map screen leak location indication, since the TT-TS12 leak location display algorithm interpolates between defined points.

Press the Zoom In and Zoom Out keys to make the beginning section of the leak detection circuit visible. You can move the Image around the screen with finger pressure if needed.

See the screen below as an example of a Map Image that is starting the Setup process. No defined points are visible on the Map.

Use the Set tab to define important reference points on the leak detection circuit.

DEFINING THE FIRST POINT ON THE LEAK DETECTION CIRCUIT

Start the Map Set process. Touch the Map Image at the first point of the leak detection circuit to be defined. Notice the small blue square that appears on the screen. If the blue square is not close to where you want it to be, touch the screen again and the blue square should be relocated. Press the Set tab to display the Map Set keypad.

The Map Set keypad recognizes the Device type and Distance unit selected, and displays the minimum and maximum acceptable distance values. The table below summarizes the possibilities:

DEVICE TYPE	UNIT	MINIMUM VALUE	MAXIMUM VALUE
TTSIM-1	Feet	1	5500
TTSIM-1A	Feet	1	660
TTSIM-2	Feet	1	660
TTSIM-1	Meters	1	1676
TTSIM-1A	Meters	1	201
TTSIM-2	Meters	1	201
TTSIM-1	Zones	1	107
TTSIM-1A	Zones	1	13
TTSIM-2	Zones	1	13
Wireless Node	Zones	1	1

HINT: Set a point before the start of circuit and after the end of circuit that is beyond the true electrical start and end of circuit. This will account for variable resistance/ rounding errors in the leak location algorithm. This will ensure the flashing red leak location icon is displayed on the Leak Map at the start/end of circuit when appropriate.

For a true leak at the start/end of the circuit, the algorithm must be able to position the leak icon within the range of the defined distances-otherwise the leak icon cannot be displayed.

For example, if the Circuit start point defined was at 10 foot, add another point at 9 ft.

If the circuit end point defined was at 100 feet, add another point at 101 feet.

On the Map Set keypad, the arrow keys can be pressed to fine tune the location of the blue square.

When the blue square is positioned properly, touch the number keypad to display the length value corresponding to this point.

If an incorrect length number is displayed, use the DEL key or CLEAR key to remove the number.

Make sure the length unit used in Map Set matches the unit specified on the SIM Setup Basic screen.

NOTE: If the UNITS field on the SIM Setup Basic screen changes (for example between Feet and Meters), already defined Map Set points are maintained with the length values adjusting automatically to the new Unit.

Use the Cancel key to stop defining the point and return to the prior screen.

After the correct length number is displayed, press the SET key on the keypad to complete the definition of this single point.

After each point is defined, the blue square changes to a small white circle with a black X inside, with the distance indicated below.

Invalid Map Set distances (for example 0, or a value greater than the allowed maximum for the device) will result in the Illegal Input error message displayed below. Press OK and try defining the point again.
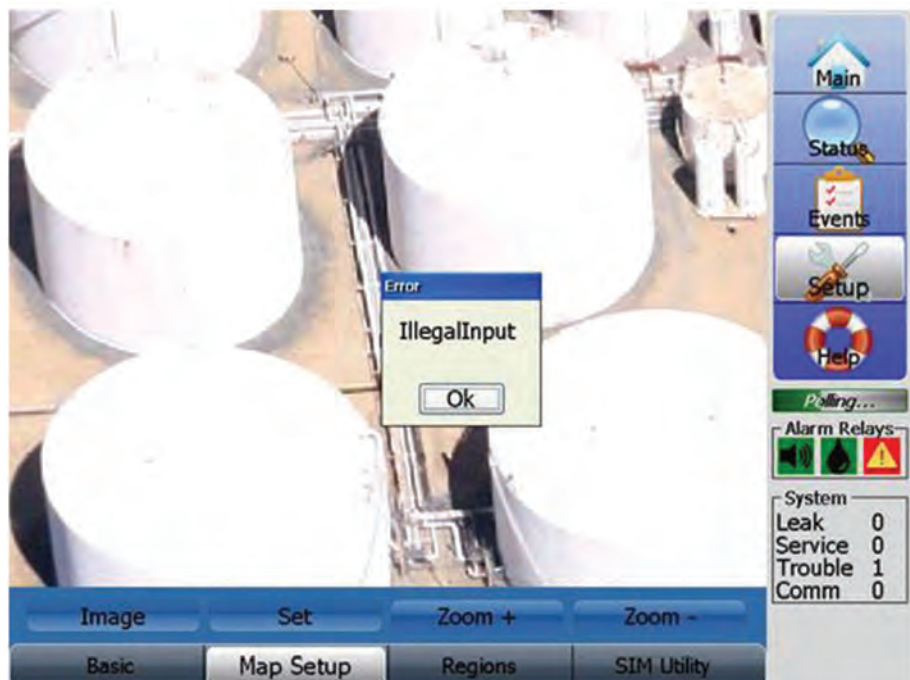
DEFINING ADDITIONAL POINTS ON THE LEAK DETECTION CIRCUIT

It is recommended to enter each point in sequence along the leak detection circuit. Start with the point at the beginning of the leak detection circuit. If the sensing cable is routed along a straight line, then the second data point can be defined at the end of the cable segment. If the sensing cable makes significant turns, then a new point can be defined at every major turn. Just remember that the Map Set process can define a maximum of 100 Points for each SIM.

As the Map Setup process advances with multiple points being defined, the circuit path is highlighted with a series of small white circles with the black X inside, along with the length number corresponding to each point. See the screen below as an example.

Whenever you leave the Map Setup screen and change to a different screen, the existing Map Setup information is saved.

FINE TUNING PREVIOUSLY DEFINED SETUP POINTS

If a Map Image has already been uploaded, it is displayed after the Map Setup tab is pressed. It may take several seconds to display the Image.

Inspect the Image carefully (you may need to use the Zoom In and Zoom Out keys and move the Image around the screen with your finger) for small white circles with a black X inside, along with a distance label underneath each point. These represent previously defined Map Set points.

If for some reason a previously defined point needs to be fine-tuned for location, or to modify the length value, quickly double-touch the distance label under the small white circle with the black X representing the point. The Map Set keypad is displayed, and can be used to redefine the point. Press the SET key to complete the editing of the point.

If for some reason a new point must be inserted between two previously defined points, it is very simple. Just treat the new point as any other point. Make sure the length value for the inserted point is between the two previously defined points.

If for some reason a previously defined point needs to be removed, quickly double-touch the point to display the Map Set keypad. Press Remove.

REGIONS SCREEN

Press the Regions tab to display the Regions Screen. The SIM number identified on the Basic screen is used for the Regions screen. See below for a completed example of the Regions screen, including relay assignments, which are not always required.

The Regions capability lets the user divide a length of sensing cable (associated with an individual SIM) into as many as 10 smaller logical sections (Regions), and assign an ID or Relay to those Regions.

For some systems, it may be helpful to divide a circuit of sensing cable into regions to identify the location of an alarm condition. When a length of sensing cable is divided into regions, the TT-TS12 identifies the region in which a Service alarm or Leak alarm occurs. Each region represents a section of the entire length of sensing cable. Regions are defined by a Start (starting distance) and an End (ending distance). Regions can contain the entire sensing circuit, or only a part of the circuit. By assigning relays to regions, it is also possible to create a wide range of alarm actions depending on the region and sensor cable condition.

The SIM number is displayed on the top of the screen, but is not changeable. The SIM number identified on the Basic screen is used for the Regions screen.

Enter the Start and End lengths and ID and assign the Relay for each Region if desired.

The Start and End datafields are numeric, and use simulated keypad entry. Be sure to press the Enter key to save any changes.

The ID field is alphanumeric, and uses simulated keypad entry. Be sure to press the Enter key to save any changes.

The Latch and No-Latch states change with by touching the field. The default condition is No-Latch.

The Select Relay list is created automatically when you press on the field.

To assign an unused relay from the list, touch the screen to highlight the desired choice, and press the Select key. The newly assigned relay number is displayed in the field.

If a relay is already assigned, the Select Relay list displays a small X is visible to the left of the relay number. See screen below for example:
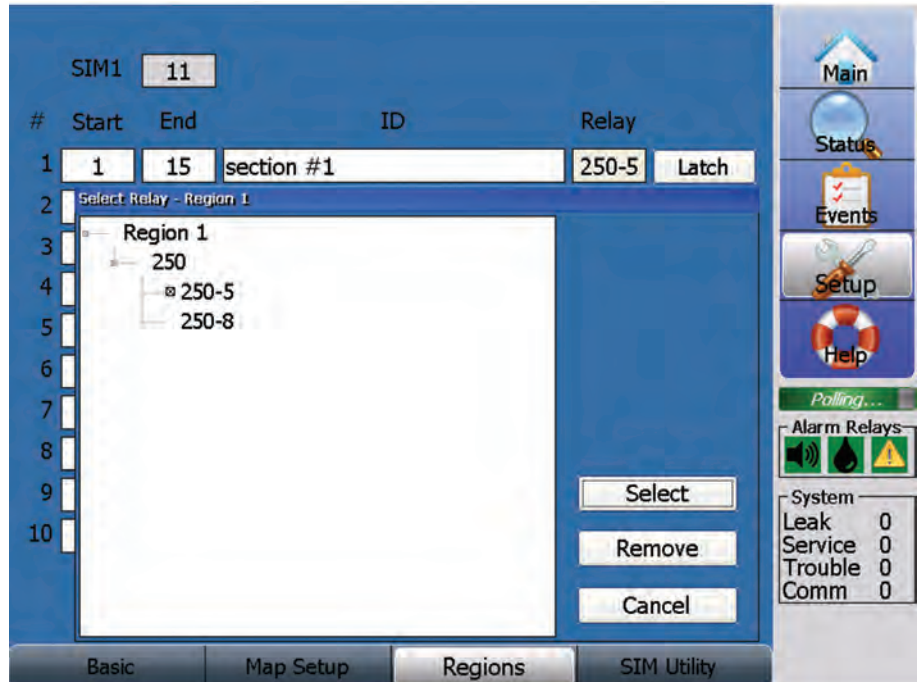
To change a relay assignment, highlight the desired new relay number, then press the Select key. The newly assigned relay number is displayed in the corresponding relay field.

To remove an already assigned relay number, highlight the currently assigned relay number on the Select relay list, then press the Remove key. The corresponding relay field now displays just a series of dashes (- - - - - -).

SIM UTILITY SCREEN

The SIM Utility screen is not relevant for an Emerson Wireless Node. The Emerson Wireless Node address number is defined as part of the setup process for the device, and is not discussed in this manual.

Press the SIM Utility tab to display the SIM Utility Screen.

This screen has two different looks, depending on the SIM type.

For SIM modules that utilize a relay (SIM-1A and SIM-2), the SIM Utility screen (shown below) provides additional capabilities related to relay parameters. For SIM-1, the screen only displays the Change Address field.
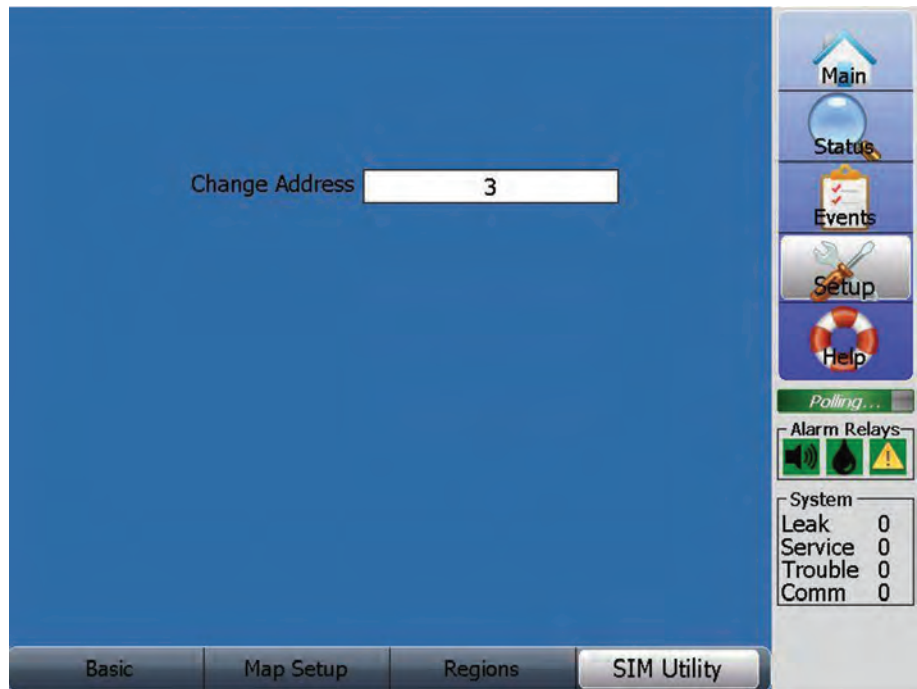
SIM-1 Utility screen
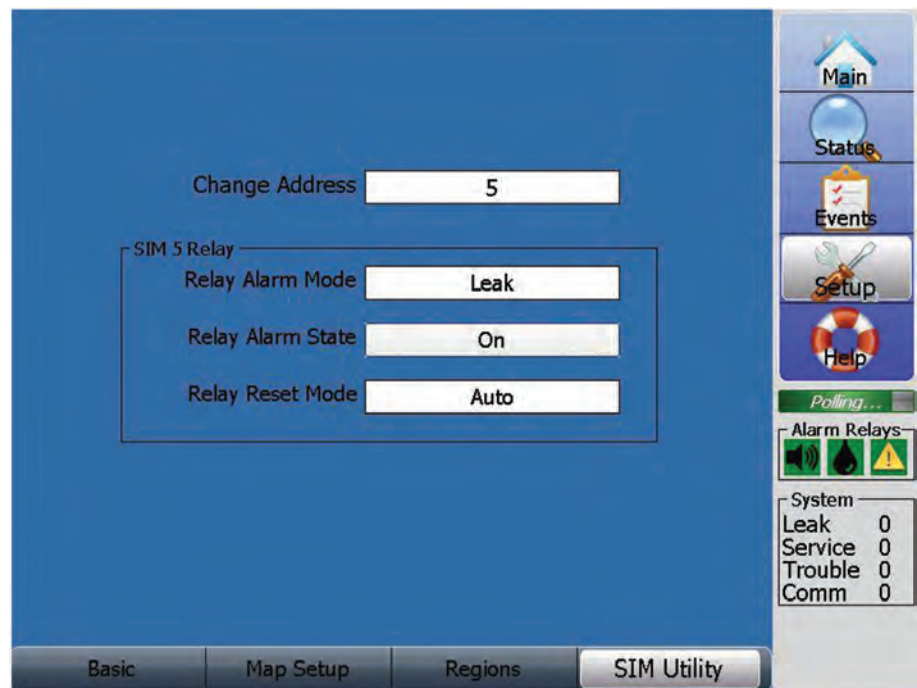
SIM-1A/SIM-2 Utility screen

CHANGE ADDRESS

The user can change the address of a previously addressed SIM module. Normally the Change Address utility is not required, but in the event of a new SIM being placed in the Device Network it may be useful.

Important: Be sure to assign a unique SIM address number, or communications problems may result.

Press the Change Address datafield to display the Change SIM address reminder message shown below.
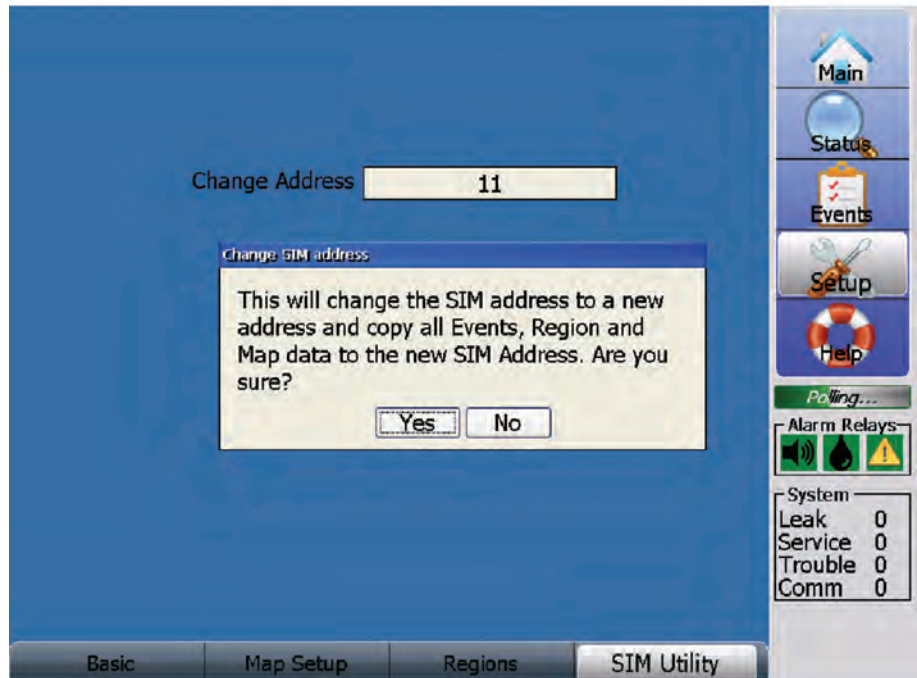
Touch the YES key to continue, or the No key to stop the Address Change process.

After the YES key is pressed, the Change Address number keypad is displayed. Touch the number keys to identify the desired new Address number, as shown below. Press the Enter key.
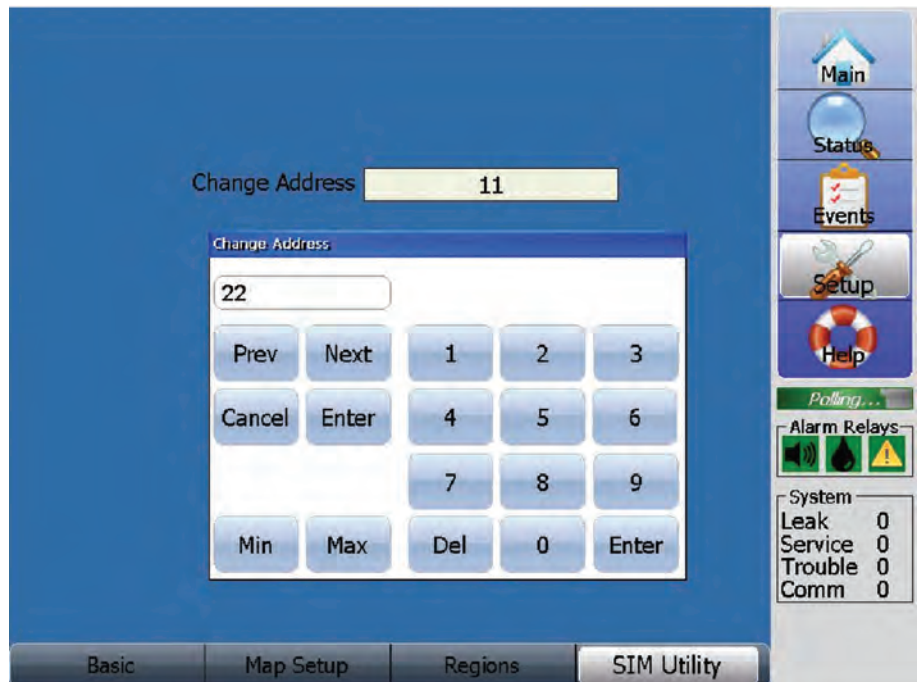
If an unused Address Number has been entered, the Change address process is completed with the SIM Utility screen now displaying the new SIM Address number.

If an Address number already in use was entered, a Device Not Configured warning message is displayed, as shown below. Press OK and you can restart the Address Change process.
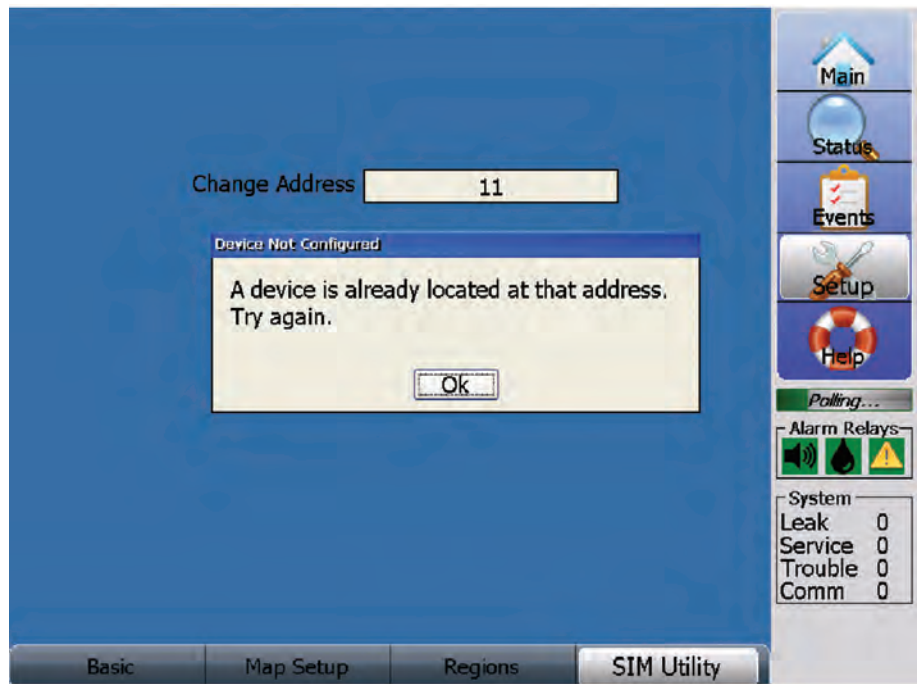
Important: If the TT-TS12 is used to change a SIM address, and that specific SIM is connected to a TTDM-128, then the TTDM-128 INIT NETWORK procedure needs to be performed at the TTDM-128 control panel. The new SIM address is recognized by the TTDM-128, and the previous address is removed.

Similarly, if the TTDM-128 control panel is used to change a SIM address, the TT-TS12 INITIALIZE NETWORK procedure (described in the Setup/Device Network portion of this manual) needs to be performed. The new SIM address is recognized by the TT-TS12, and the previous address is removed.

The **Relay Alarm** Mode must also be defined for SIM modules that utilize a relay (SIM-1A and SIM-2).

Press the Relay Alarm Mode datafield to display a choice of selectable values, as shown below.
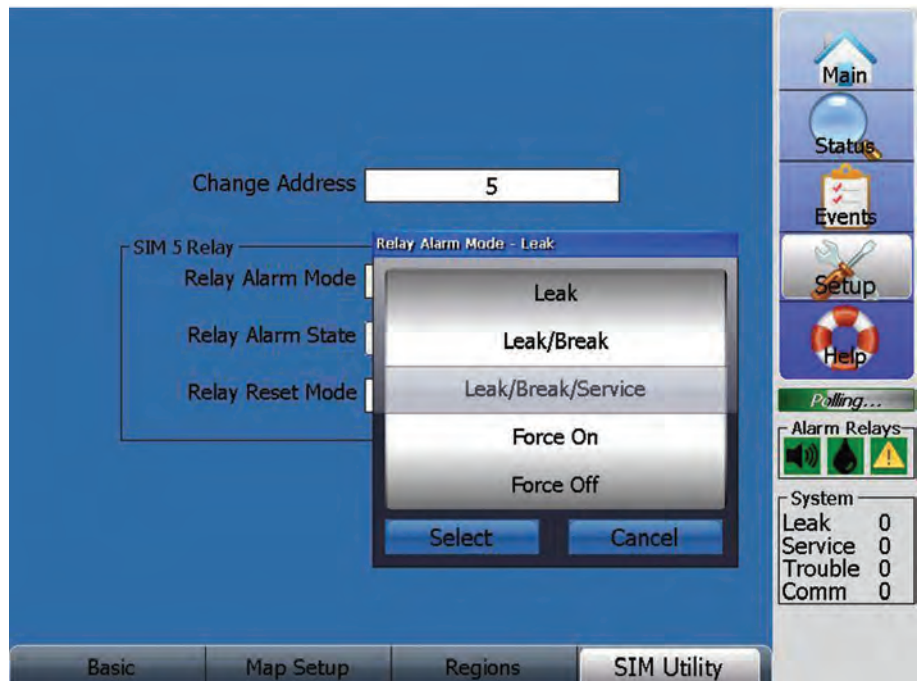
Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press select. Press Cancel to leave the screen with no changes

There are 3 different relay logic modes that can be used during normal system operation, including either Leak, or Leak/Break, or Leak/Break/Service.

Leak is used if you want the relay to activate only on a leak alarm.

Leak /Break is used if you want the relay to activate for either a leak alarm or cable break condition.

Leak /Break/Service is used if you want the relay to activate for either a leak alarm or cable break or service alarm condition.

Important: SIM-1A and SIM-2 relays activate for any leak on the circuit, regardless of region definitions.

The two other Relay Alarm Mode choices are Test options, related to manual control of the Relay.

Force On is a Test option used to energize the relay.

Force Off is a Test option used to de-energize the relay.

The **Relay Alarm State** datafield provides a choice between On and Off. Touching the screen on the datafield changes the value. For example, if the datafield value currently displays Off, touch the datafield to change the value to On.

Select Off if you want the relay to be normally energized, then de-energized for alarms.

Select On if you want the relay to be normally de-energized, then energized for alarms.

The **Relay Reset Mode** datafield provides a choice between Auto, Manual or Safe settings. Press the Relay Alarm Mode datafield to display a choice of selectable settings, as shown below.
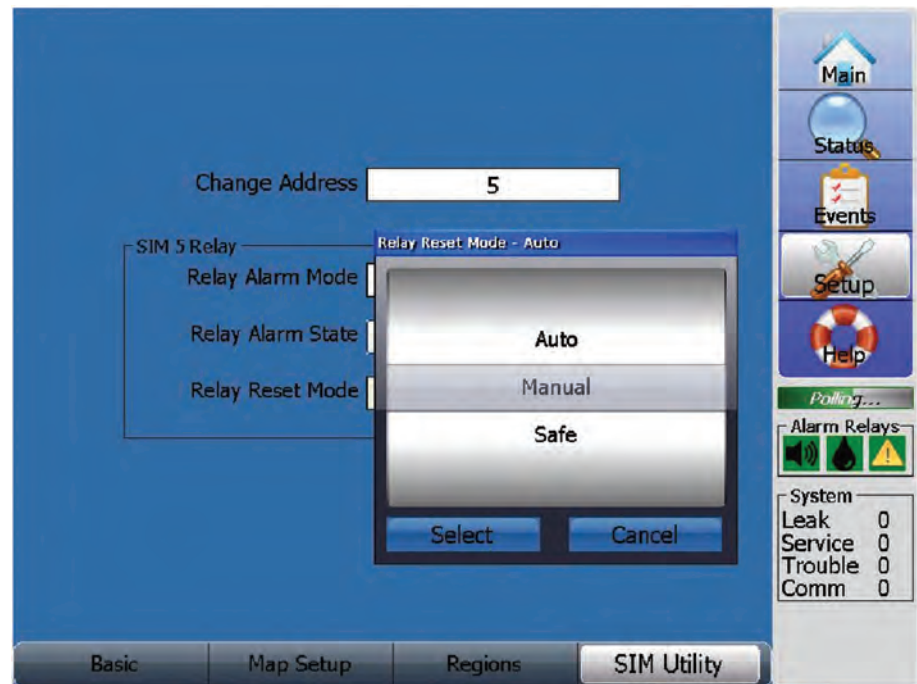
Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press select. Press Cancel to leave the screen with no changes.

Auto - the relay resets when the red Acknowledge key is pressed (regardless of the current alarm condition), or it automatically resets when the alarm condition clears.

Manual - the relay remains latched and reset only when the red Acknowledge key is pressed. The relay resets regardless of the current alarm condition.

Safe - the relay resets only when the alarm condition has been cleared and the red Acknowledge key is pressed.

If your application uses the relay to control an exterior device (such as a sump pump, etc) then the Safe Relay Reset mode is recommended. The alarm condition that activates the relay results in the exterior device being activated, and the relay remains activated until the alarm condition is fixed. After the alarm condition is fixed, the red Acknowledge key needs to be pressed to allow the relay to reset. If the red Acknowledge key is pressed while the alarm condition is active, the relay remains activated, the alarm condition is still active, and the Acknowledge key continues to be displayed.

The Auto Relay Reset mode is typically used for convenience when the relay is not controlling an exterior device. After the alarm condition is fixed, the red Acknowledge key automatically resets, and the alarm relay automatically resets. If the red Acknowledge key is pressed while the alarm condition is active, the relay resets temporarily-but since the alarm condition is still active, the alarm condition and Acknowledge key will return.

The Manual Relay Reset mode is risky, but is provided. During an alarm condition, the Manual Relay Reset mode allows the red Acknowledge key to be pressed, and acts as a relay override. The relay is reset temporarily-but since the alarm condition is still active, the relay is activated again, and the Acknowledge key returns.

ADVANCED SCREEN

The Advanced screen is not relevant for an Emerson Wireless Node.

Press the Advanced tab to display the Advanced Screen.

NOTE: The Advanced screen requires Password level 2. The Password entry keypad will be displayed if current Password level is not level 2.

The tab for this screen is located to the right of the SIM Utility tab. Use your finger to slide the SIM Utility tab to the left to access the Advanced tab.

This screen has been deliberately made more difficult to access, and is recommended for use only by very experienced personnel.

NOTE: It is possible for inexperienced users to create significant operational problems by improperly adjusting parameter values on the Advanced screen.

NOTE: There are two different Advanced screens- one specific to the SIM-1 parameters, and one specific to the SIM-1A/SIM-2 parameters, shown below.

SIM-1 Advanced screen

SIM-1A/SIM-2 Advanced screen

The top left datafield identifies the SIM number for which the current parameter values are displayed. To change the SIM number, press the datafield and use the keypad to enter the desired number. To the left of the SIM # the type of SIM (SIM-1 or SIM-1A or SIM-2) is displayed.

For the SIM-1 and SIM-1A/SIM-2 modules, the common parameters below are shown:

Mode - The Operational Mode parameter value of 0 is normal. Do not adjust this value, leave it at 0. Under special test circumstances, a unique mode number provided by TraceTek factory may be required. However, the parameter value of 0 should always be used during normal operation. Press on the datafield to bring up the number keypad. Identify the desired number and press the enter key. Allowable numbers are between 0 and 566. Press Cancel to leave the screen with no changes. The SIM-1A and SIM-2 do not use this parameter, so the datafield is not active.

Leak Alarm - This parameter is the same as Leak Sensitivity, with units of Kohm. This setting controls Leak Alarms. If Sense Resistance is less than or equal to the Leak Sensitivity setting, the TT-TS12 signals a Leak Alarm. Each SIM can have a different Leak Sensitivity setting if desired.

The Leak Sensitivity field provides a choice between Normal, High, Low, TT500x or TT5DB or TT7000 settings, which can be selected using the SIM Setup-Basic screen.

If a custom value of Leak Sensitivity is required, the Leak Alarm datafield can be used to enter the custom value. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 1 and 100. Press Cancel to leave the screen with no changes.

NOTE: 'Custom' is displayed on the SIM Setup-Basic screen Leak Sensitivity datafield if the Advanced screen has been used to enter a Leak Alarm value not equal to any of the Leak Sensitivity selectable settings.

Service Alert - This parameter is the same as Service Sensitivity, with units of uA. This setting controls Service Alarms. If Sense Current is greater than or equal to the Service Sensitivity setting, the TT-TS12 signals a Service Alarm. Each SIM can have a different Service Sensitivity setting if desired.

The Service Sensitivity field provides a choice between Normal, High, Low, TT500x, TT5DB or Never settings, which can be selected using the SIM Setup-Basic screen. If a custom value of Service Sensitivity is required, the Service Alarm datafield can be used to enter the custom value. Press on the datafield to bring up the number keypad. Identify the desired number and press the enter key. Allowable numbers are between 10 and 100. Press Cancel to leave the screen with no changes.

NOTE: 'Custom' is displayed on the SIM Setup-Basic screen Service Sensitivity datafield if the Advanced screen has been used to enter a Service Alert value not equal to any of the Service Sensitivity selectable settings.

Loop Delta - This parameter is the same as Loop Imbalance (displayed on Status-Details screen), with units of %. If the resistance of the YB and RG Loops are different from each other by more than the Loop Delta %, the TT-TS12 creates a Loop Imbalance Alarm. Use of the default value is recommended.

If a custom value of Loop Delta is required, the datafield can be used to enter the custom value. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 10 and 500. Press Cancel to leave the screen with no changes.

Settle Time - This parameter represents the wait time after the MUX sets switches into measurement configuration. Settle time is in units of 0.01second (1/100th s). Use of the default value is recommended. SIM-1A and SIM-2 use the same default Settle Time of 0.01 second, while the SIM-1uses 0.5 second. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 1and 4095. Press Cancel to leave the screen with no changes.

R ref - This parameter represents the reference resistor value used by the SIM-1 only, with units of ohm. The R ref value is set during the SIM-1 factory calibration process, it is not intended to be user changeable. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 3500 and 4500. Press Cancel to leave the screen with no changes.

The SIM-1A and SIM-2 do not use this parameter, so the datafield displays a series of dashes (- - - - -).

Cycles/Polarity - This parameter represents the number of cycles between changing polarity for loop measurement. The default value is 0. Do not adjust this value, leave it at 0. A Value of 4095 represents a fixed measurement cycle with Polarity reversed. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 0 and 4095. Press cancel to leave the screen with no changes.

Gain 1 - This parameter represents the gain value associated with high level range of SIM-1 only, and has no units. It is set during factory calibration process. Do not adjust this value. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 10000 and 12000. Press Cancel to leave the screen with no changes.

The SIM-1A and SIM-2 do not use this parameter, so the datafield displays a series of dashes (- - - - -).

Gain 2 - This parameter represents the gain value associated with current reading of SIM-1 only, and has no units. It is set during factory calibration process. Do not adjust the value. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 1800 and 2200. Press Cancel to leave the screen with no changes.

The SIM-1A and SIM-2 do not use this parameter, so the datafield displays a series of dashes (- - - - -).

Offset - This parameter is used as part of zero point calibration on SIM-1 only during factory calibration process. It is not intended to be user changeable. It has no units. Do not adjust the value. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between -200 and 200. Press Cancel to leave the screen with no changes.

The SIM-1A and SIM-2 do not use this parameter, so the datafield displays a series of dashes (- - - - -).

Misc - This parameter controls whether loops are depolarized between cycles on SIM-1 only. Normal value is 1, which means loops are depolarized between cycles. A value of 0 means loops are not depolarized between cycles. Use of the default value is recommended. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 0 and 1. Press Cancel to leave the screen with no changes.

The SIM-1A and SIM-2 do not use this parameter, so the datafield displays a series of dashes (- - - - -).

V ref - This parameter represents the reference voltage value used by the SIM-1 only, with units of mV. The V ref value is set during the SIM-1 factory calibration process, it is not intended to be user changeable. Do not adjust the value. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 2300 and 2700. Press Cancel to leave the screen with no changes.

The SIM-1A and SIM-2 do not use this parameter, so the datafield displays a series of dashes (- - - - -).

FOR THE SIM-1 MODULE, THE UNIQUE PARAMETERS BELOW ARE SHOWN:

K value - This parameter is associated with a gross calibration change. The parameter has no units and is used on SIM-1 only. Use of the default value is recommended. Do not adjust the value. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 1 and 20. Press Cancel to leave the screen with no changes.

Cycle Time - This parameter represents the amount of time to complete measurement of all loops, with units of second. Use of the default value is recommended. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 0 and 65. Press Cancel to leave the screen with no changes.

Settle/Ground Time - This parameter is useful on long cable systems where capacitance is high. The parameter has units of 0.1 second and is used on SIM-1 only. It is set during initial calibration. Do not adjust the value. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 1 and 1000. Press Cancel to leave the screen with no changes.

FOR THE SIM-1A/SIM-2 MODULES, THE UNIQUE PARAMETERS BELOW ARE SHOWN:

Sample Time - This parameter represents length of measurement time period that includes sampling RG loop, YB loop and leak check, with units of 0.1 second. Use of the default value is recommended. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 1 and 100. Press Cancel to leave the screen with no changes.

Loop Ground Time - This parameter represents length of time period, with units of 0.1 second. Use of the default value is recommended. Press on the datafield to bring up the number keypad. Identify the desired number and press the Enter key. Allowable numbers are between 1 and 100. Press Cancel to leave the screen with no changes.

DEVICE NETWORK SCREENS

Access Device Network from the Setup screen.

There are 4 types of Device Network screens. They are called Devices, Relays, Add New SIMs and Field Port Settings.

The bottom row of each Device Network screen has 4 tabs (labeled Devices, Relays, Add New Sims and Field Port Settings). Press the tab to change from one screen type to another.

DEVICES SCREEN

Press the Devices tab to display the Devices Screen, shown below.

The Devices screen presents a list of all devices currently connected to the network, including the address number, device type, software version and Comm %. At the bottom of the screen are the Initialize Network key, and the Update Network key.

INITIALIZE NETWORK - Used to initialize the TraceTek network once all SIM and TT-NRM units have been connected and assigned unique addresses. When activated, the Initialize Network command immediately searches all possible addresses to determine what equipment has been connected. The current event status of all devices is reset by this command.

NOTE: Initialize Network requires Password level 2. The Password entry keypad will be displayed if current Password level is not level 2.

UPDATE NETWORK - Used to update the TraceTek network once all SIM and TT-NRM units have been connected and assigned unique addresses. When activated, the Update Network command immediately searches all unused addresses to determine what new equipment has been connected. The current event status of all devices is maintained by this command.

ADDING A TT-NRM TO NETWORK AND ASSIGNING THE ADDRESS:

Install and connect the TT-NRM in accordance with the Installation Instructions that accompanied it. Using the switches on the TT-NRM base unit, select a unique address (see TT-NRM Installation Instructions). The address must not be used by any other device on the network. Configure relay assignments once the TT-NRM installation is complete.

RELAYS SCREEN

Press the Relays tab to display the Relays Screen, shown below.

The Relays screen presents a where-used list of all user programmable relays in the network, including relay state and current assignment.

The Relays screen is not used for assignment. Service and Trouble Relay assignment is performed using SIM Setup-Basic screen, while Regions Relay assignment is performed using the SIM Setup-Regions screen. System Relays are set up using the System Relays screen, accessible from the System screen.

The TT-TS12 system comes with a preinstalled ADAM device that provides 8 relay outputs total.

The TT-TS12 system uses relays 1-4 as described below.

Relays 5-8 are available for general use as Service, Trouble or Regions relays.

Relays 1, 2 and 3 of ADAM device (address 250) are assigned as TT-TS12 System Relays. These relays are used for the Audible alarm, Leak alarm, and Service/Trouble/Comm alarm respectively, and are associated with the graphic horn, fluid drop and yellow alert Alarm Relay icons.

Relay 4 is used as a Comm Watchdog timer by the TT-TS12 system.

If other relay modules are utilized in the system (for example- an NRM module), they are displayed on the Relays screen also.

ADD NEW SIMS SCREEN

Press the Add New SIMs tab to display the Add new SIMs Screen, shown below.
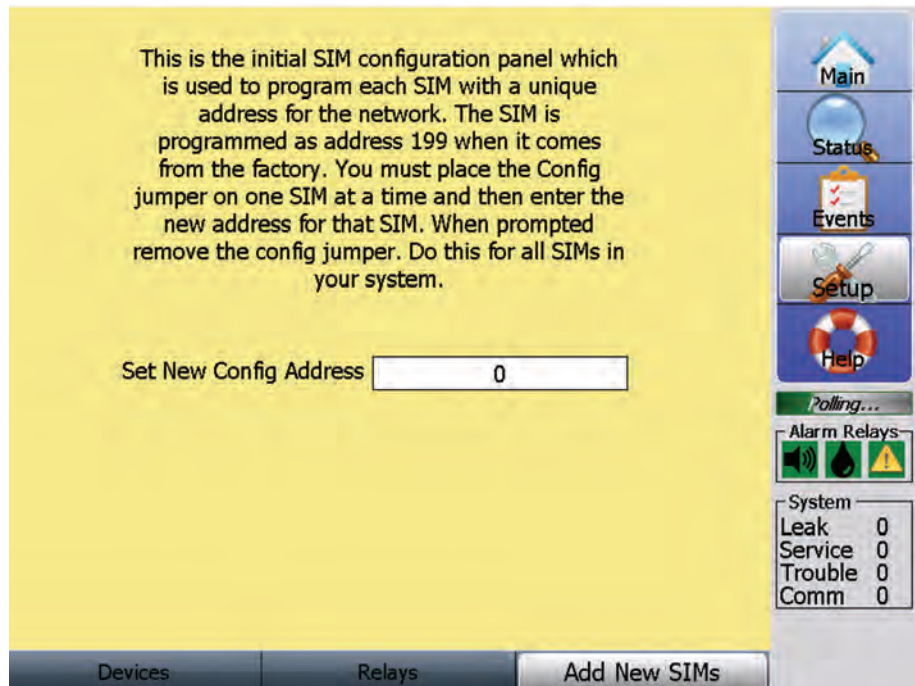
A new SIM can be added to the Network and given a unique address number. To Set the New Config address, the new SIM module must be powered up and connected to the network, with valid RS 485 communication. The SIM module must be set to the configure mode. This is accomplished by placing a jumper on the CFG pins (refer to the appropriate SIM module Installation Instructions document for details). After setting the address, you must remove the CONFIG jumper when prompted, before proceeding to another SIM module.

Important: Be sure to assign a unique SIM address number, or communications problems may result.

Important: Only one SIM module can be set to Config at one time.

Press the Set New Config Address datafield, which displays the Install Config Jumper reminder message, shown below. Once the CFG jumper is in place, press OK to continue.
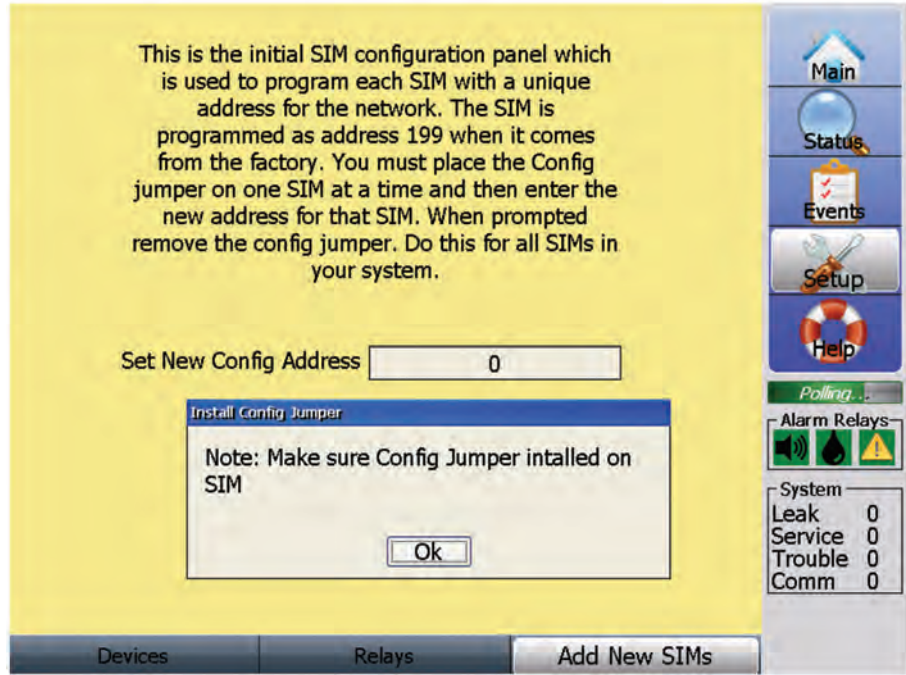
Use the numeric keypad to enter the SIM address number, as shown below. Allowable numbers are between 1 and 255. Press Enter to assign chosen address. Press Cancel to leave the screen with no changes.
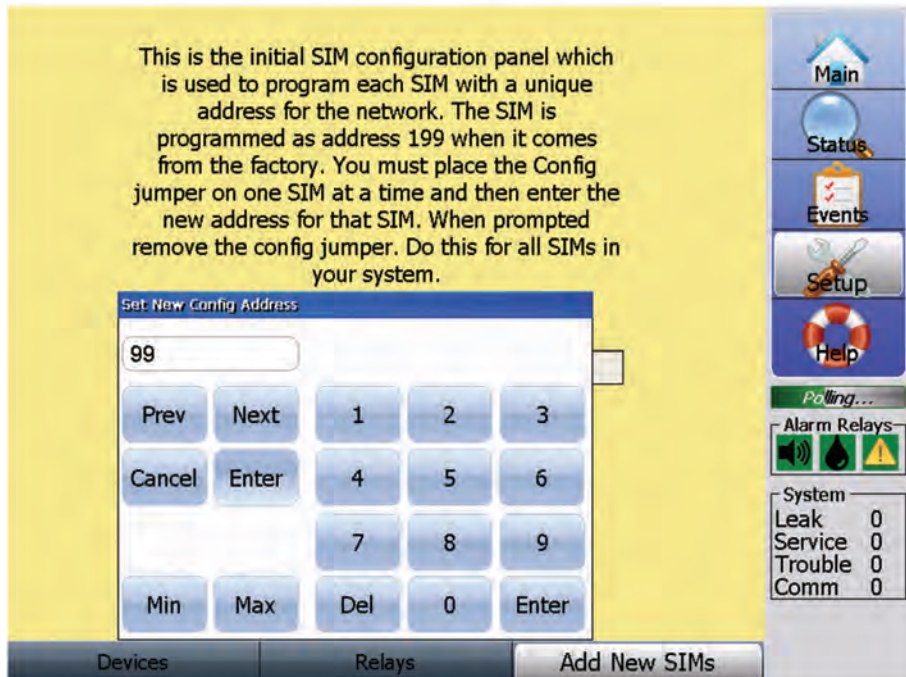
Remove Config jumper and return to original position. Press OK to complete.

Repeat this process as necessary for each SIM module added to the network.

When finished, check the Devices screen to verify each SIM has been successfully added and Comm % is 100.

FIELD PORT SETTINGS SCREEN

The tab for this screen is located to the right of the Add New Sims tab, use your finger to slide the Add New Sims tab to the left to access the Field Port Settings tab.

Press the Field Port Settings tab to display the Field Port Settings Screen, shown below.

Note that the parameter values displayed represent the recommended values.

The Field Port Settings screen allows modification of RS-485 Field Bus parameters, including RTU Character timeout, Receive Message Timeout, Transmit Delay, Baud Rate, Stop Bits, and Parity.

The **RTU Character Timeout** datafield is numeric, and is defined in milliseconds. It uses simulated keypad entry. A minimum value of 1 can be used. The maximum value is 2500. Use of the default value is recommended. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes.

The **Receive Message Timeout** datafield is numeric, and is defined in milliseconds. It uses simulated keypad entry. A minimum value of 0 can be used. The maximum value is 2500. Use of the default value is recommended. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes.

NOTE: The recommended value of 500ms for Receive Message Timeout considers utilization of TTDM-128 modules in the network, and provides a long enough timeperiod for the communication signals to be properly received, especially during multiple leak alarm events. If Comm errors are being experienced in your application, consider trying a higher value than 500ms.

The **Transmit Delay** datafield is numeric, and is defined in milliseconds. It uses simulated keypad entry. A minimum value of 0 can be used. The maximum value is 5000. Use of the default value is recommended. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes.

Use the **Baud Rate** datafield to select the Baud Rate of the external communications (host) serial port. Selectable values include 2400, 4800, 9600, 19200, 38400, 57600, 115200 and 128000. Use of the default value is recommended. Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press Select. Press Cancel to leave the screen with no changes.

The **Stop Bits** datafield is numeric. It uses simulated keypad entry. A minimum value of 1 can be used. The maximum value is 2. Use of the default value is recommended. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes.

The **Parity** datafield provides a choice between settings of None, Odd and Even. Use finger pressure to move the list of choices up and down. Use of the default value is recommended. Move the desired value into the shaded region and press Select. Press Cancel to leave the screen with no changes.

SYSTEM SCREENS

Access System from the Setup screen.

There are 7 types of System screens. They are called System Relays, Alarms, Menu Settings, Comm Ports, Clock, Password and Maint.

The bottom row of each System screen has 7 tabs (labeled System Relays, Alarms, Menu Settings, Comm Ports, Clock, Password and Maint). Press the tab to change from one screen type to another.

SYSTEM RELAYS SCREEN

Press the Systems Relay tab to display the System Relays Screen, shown below.
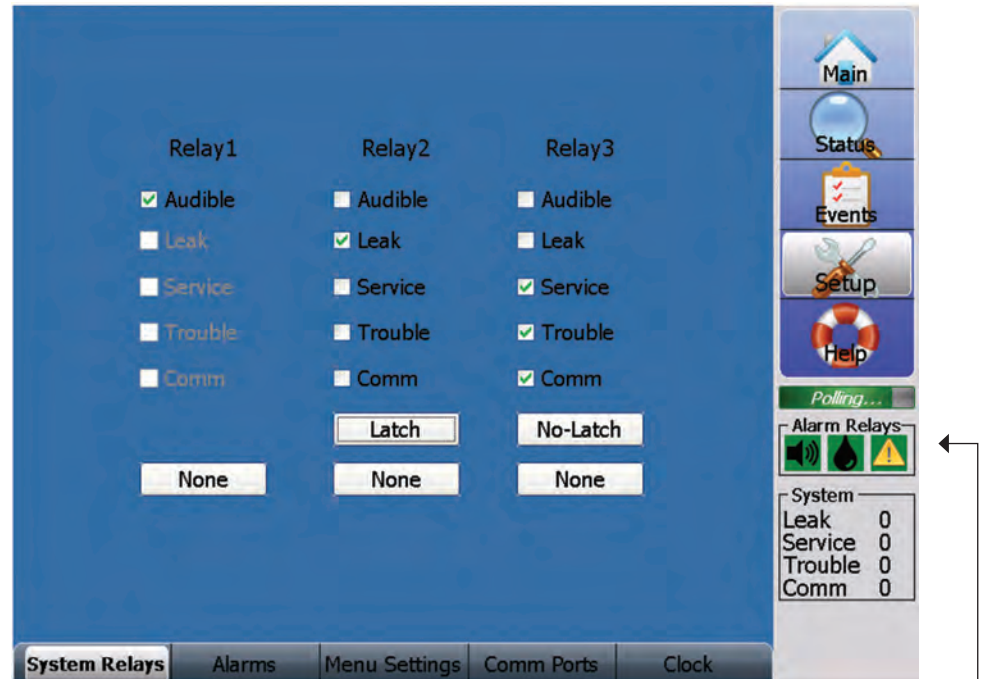
NOTE: Relays 1, 2 and 3 are identified as System Relays, and are used by the TT-TS12 software for the Audible alarm, Leak alarm, and Service/Trouble/Comm alarm respectively. These System Relays are associated with the horn, fluid drop and yellow alert icons identified as Alarm Relays in the lower right region of the Main screen. The ADAM device with address 250 uses Relays 1, 2 and 3 for the System Relays.

The System Relays screen allows modification of parameters related to Relay 1, Relay 2 and Relay 3.

Check the box next to the parameter value to be activated relative to the specific relay.

Relay 1 should be checked as Audible.

Relay 2 should be checked as Leak, with the Latch datafield displaying Latch.

Relay 3 should be checked as Service, Trouble and Comm, with the Latch datafield displaying No-Latch.

If no relays are checked, the alarm relay icons are displayed as RED X. See screen below.
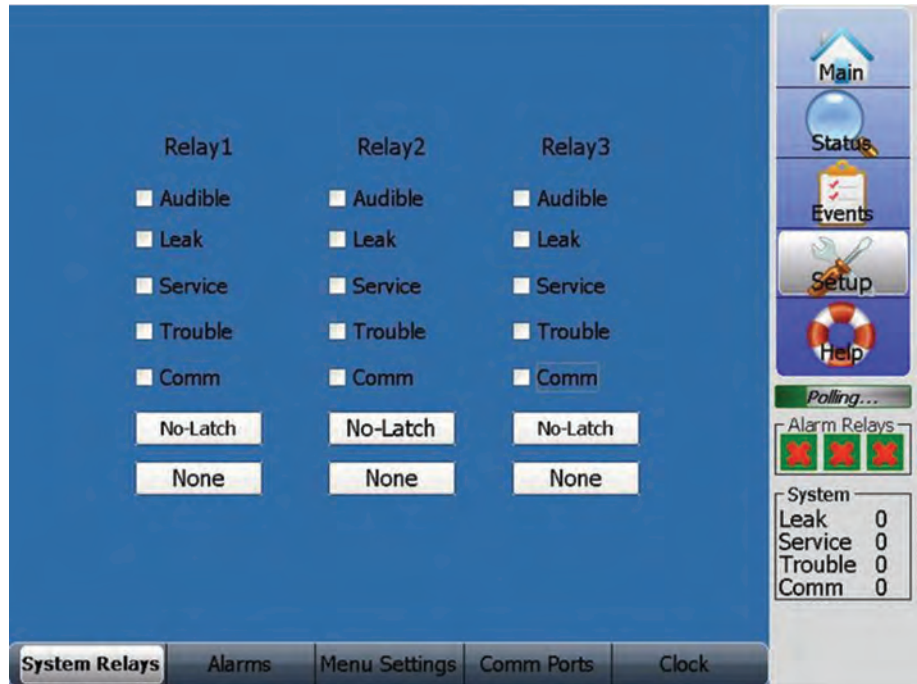
ALARMS SCREEN

Press the Alarms tab to display the Alarms Screen, shown below with recommended values.
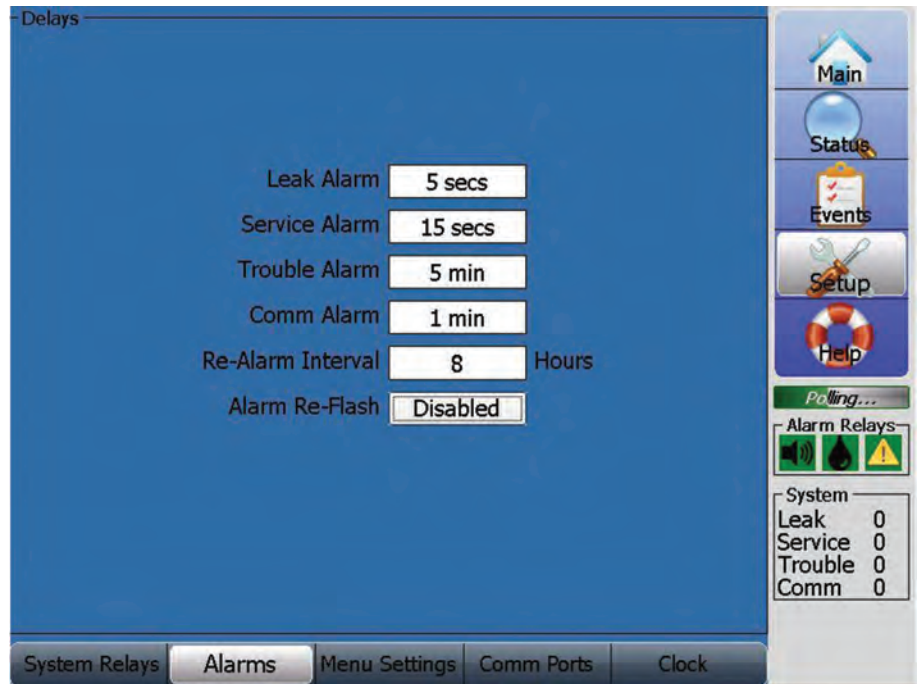
The Alarms screen allows modification of the Delay time associated with Leak Alarm, Service Alarm, Trouble Alarm, Comm Alarm, Re-Alarm Interval and Alarm Re-flash.

The **Leak Alarm** datafield provides a choice between settings of 5 secs, 15 secs, 1 min, 5 min, 15 min, 30 min and 60 minutes. Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press select. Press Cancel to leave the screen with no changes. A value of 5 secs is recommended, reflecting a strategy of instant response when an alarm is detected.

The **Service Alarm** datafield provides a choice between settings of 5 secs, 15 secs, 1 min, 5 min, 15 min, 30 min and 60 minutes. Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press select. Press Cancel to leave the screen with no changes. A value of 15 secs is recommended.

The **Trouble Alarm** datafield provides a choice between settings of 5 secs, 15 secs, 1 min, 5 min, 15 min, 30 min and 60 minutes. Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press select. Press Cancel to leave the screen with no changes. A value of 5 min is recommended to facilitate occasional troubleshooting involving cable separation for test purposes.

The **Comm Alarm** datafield provides a choice between settings of 5 sec, 15 secs, 1 min, 5 min, 15 min, 30 min and 60 minutes. Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press select. Press Cancel to leave the screen with no changes. A value of 1 min is recommended.

Re-Alarm Interval: The TT-TS12 can be set to Re-Alarm automatically if any alarm event has not been cleared after a certain length of time. The Re-Alarm capability can be used to automatically alert the next shift when the system has an uncleared alarm (leak, cable break/fault, or service alert). The datafield is numeric, and is defined in hours. It uses simulated keypad entry. A minimum value of 0 can be used. The maximum value is 24. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes. A value of 8 hours is recommended. A value of 0 result in no Re-Alarm capability.

The **Alarm Re-Flash** option causes the leak alarm relay contacts to revert to their no-alarm state for approximately 5 seconds, then return to the alarm state whenever an additional leak occurs (before an existing leak is cleared). This is useful when a multi-channel system is connected to a host computer via a simple relay-only interface. Alarm Re-Flash typically causes the host computer to log each new leak event as it occurs, whether or not preceding events have been cleared.

The Alarm Re-Flash datafield toggles between enabled and disabled whenever it is touched. Be sure the datafield shows the desired value before leaving the Alarms screen. The disabled condition is recommended.

MENU SETTINGS SCREEN

Press the Menu Settings tab to display the Menu Settings Screen, shown below.

NOTE: At the top left of the Menu Settings screen the TT-TS12 software code version is indicated.
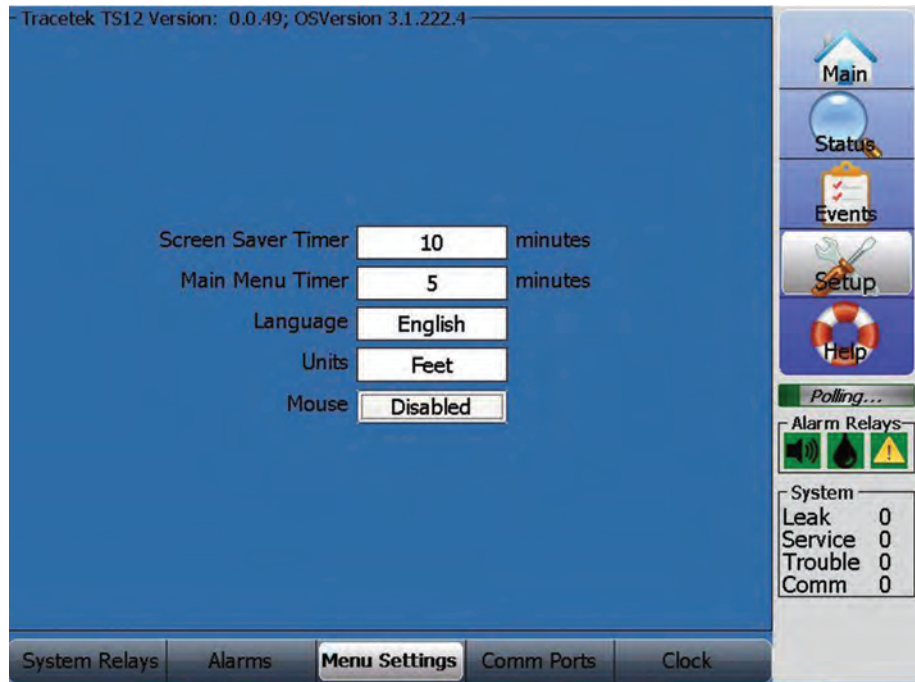
The Menu Settings screen allows modification of the Screen Saver and Main Menu Timer, along with Language and Units modifications, and allows a user provided mouse to be enabled.

The **Screen Saver Timer** datafield is numeric, and is defined in minutes. It uses simulated keypad entry. When the inactivity time exceeds the selected value, the TT-TS12 display goes dark. A minimum value of 0 can be used, but is not recommended. The maximum value is 300. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes. A value of 10 minutes is recommended.

The **Main Menu Timer** datafield is numeric, and is defined in minutes. It uses simulated keypad entry. When the inactivity time exceeds the selected value, the TT-TS12 display returns to Main from whatever screen was previously displayed. A minimum value of 1 can be used. The maximum value is 100. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes. A value of 5 minutes is recommended.

The **Language** field provides a choice between English, Francais, Deutsch, Espanol, Italiano or Japanese settings.

Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press Select. Press Cancel to leave the screen with no changes.

**NOTE:** Some software utility screens are always displayed in English and are not translated into selected language. Typically this occurs for software features called by TT-TS12 code, but not contained within TT-TS12 code.

The **Units** field provides a choice between Feet, Meters and Zones. Because the Units change is globally applied to all SIM units, it overrides individual SIM unit assignments that were previously defined using the Setup SIM Basic screen. For this reason, in order to use this feature the following Set All SIM Units Warning message is displayed when you press on the Units datafield.
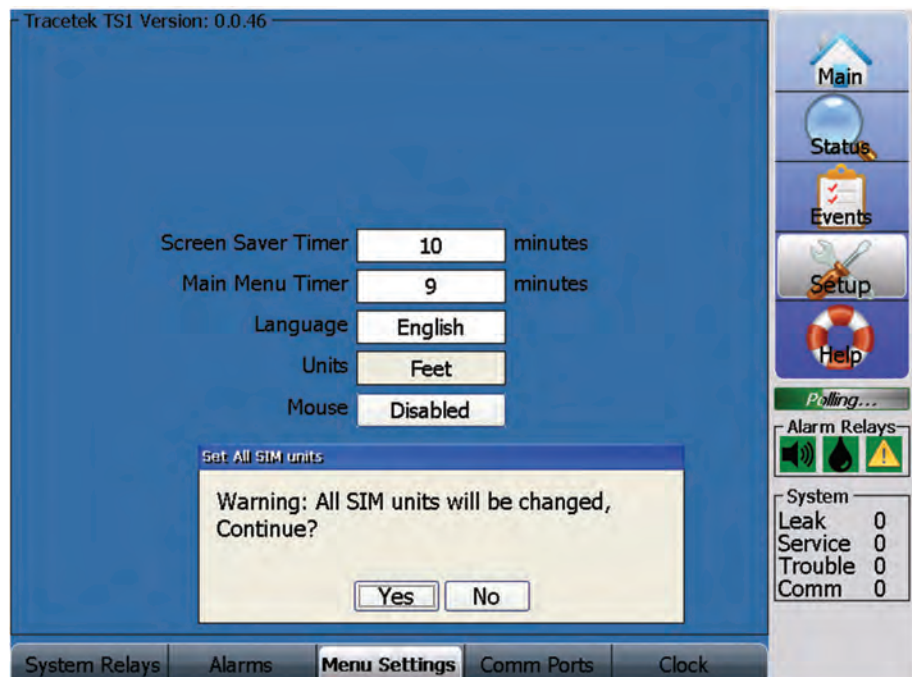
If you are sure you want to change the Units globally for all SIM units, press the YES key.

The **Units** field is displayed, and provides a choice between Feet, Meters, or Zones.
Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press Select. Press Cancel to leave the screen with no changes.

To enable the **Mouse** capability, click on the datafield, which alternates between disabled and enabled.

NOTE: Connect the mouse to the USB port connection at the front of the TT-TS12-Panel enclosure.

COMM PORTS SCREEN

Press the Comm Ports tab to display the Comm Ports Screen, shown below. There are two different styles of Comm Ports screen, depending on what Port selection is made.

The **Select Port** datafield provides a choice between settings of RS-232 Host, Ethernet Host 1 and Ethernet Host 2, as shown below. Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press Select. Press Cancel to leave the screen with no changes.
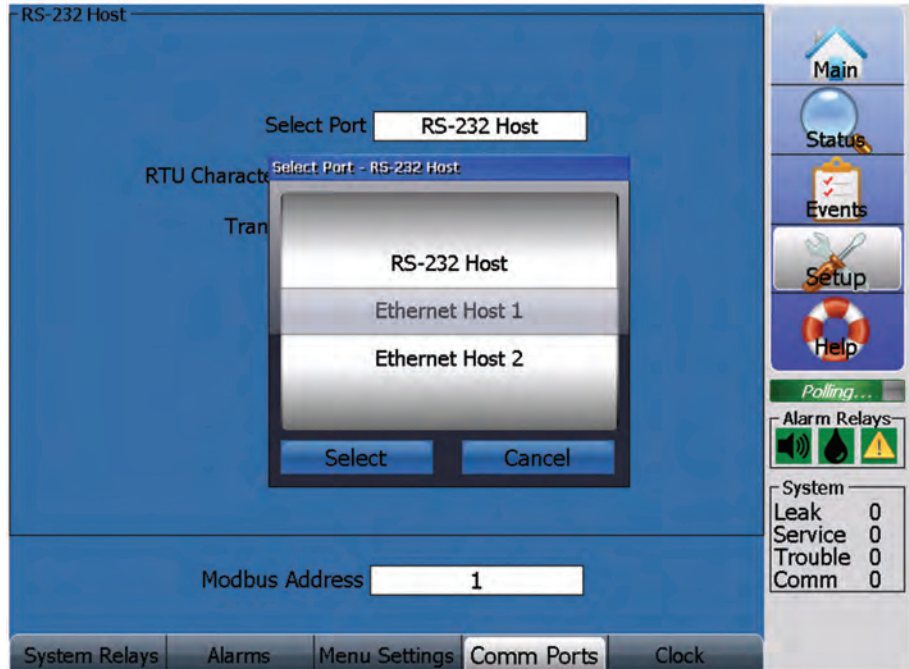
RS-232 HOST PARAMETERS:

When the RS-232 port selection is made, the Comm Port screen shown below is displayed. The screen allows modification of RS-232 Host parameters, including RTU Character timeout, Transmit Delay, Baud Rate, Stop Bits, Parity and Modbus Address.
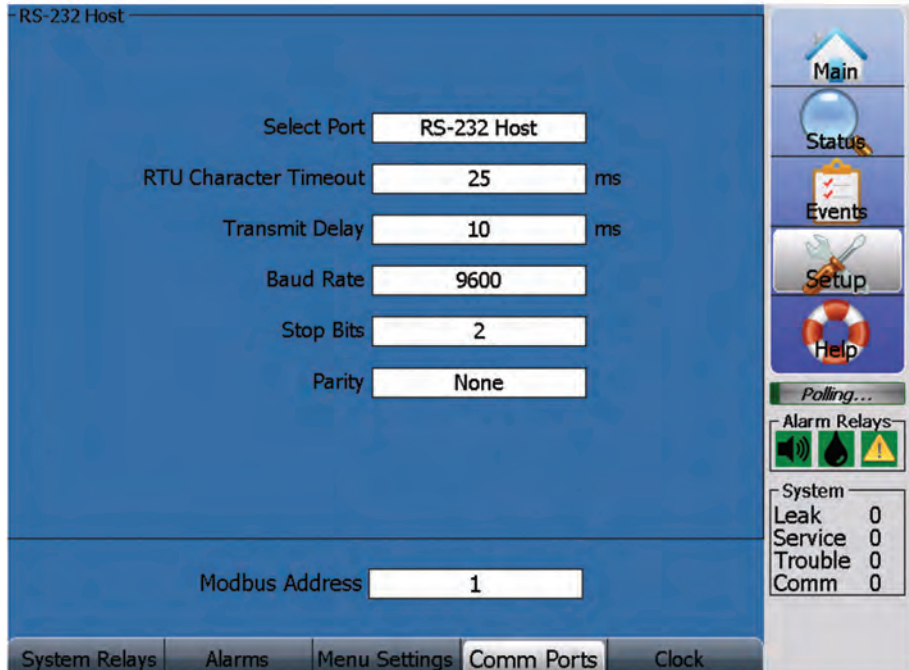
The **RTU Character Timeout** datafield is numeric, and is defined in milliseconds. It uses simulated keypad entry. A minimum value of 1 can be used. The maximum value is 2500. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes. A value of 25 ms is recommended.

The **Transmit Delay** datafield is numeric, and is defined in milliseconds. It uses simulated keypad entry. A minimum value of 0 can be used. The maximum value is 5000. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes. A value of 10 ms is recommended.

Use the **Baud Rate** datafield to select the Baud Rate of the external communications (host) serial port. Selectable values include 2400, 4800, 9600, 19200, 38400, 57600, 115200 and 128000. Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press Select. Press Cancel to leave the screen with no changes. Use of the 9600 Baud Rate is recommended.

The **Stop Bits** datafield is numeric. It uses simulated keypad entry. A minimum value of 1 can be used. The maximum value is 2. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes. A value of 2 is recommended.

The **Parity** datafield provides a choice between settings of None, Odd and Even. Use finger pressure to move the list of choices up and down. Move the desired value into the shaded region and press Select. Press Cancel to leave the screen with no changes. The setting of None is recommended.

The **Modbus Address** datafield is numeric. It uses simulated keypad entry. A minimum value of 1 can be used. The maximum value is 249. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes.

ETHERNET HOST 1 PARAMETERS:

When the Ethernet Host 1 port selection is made, the Comm Port screen shown below is displayed. The screen allows modification of Ethernet Host 1 parameters, including IP Address, Subnet Mask, Transmit Delay and Modbus Address.
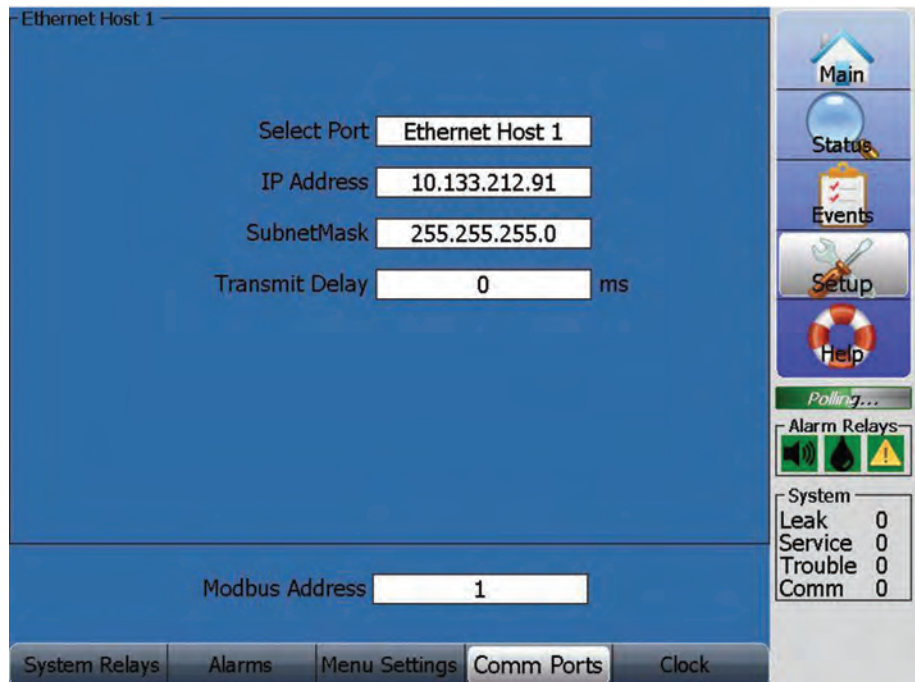
The **IP Address** datafield will typically display the assigned address from the host system when a new connection is made.

The **SubnetMask** datafield value displayed on the screen above is considered suitable for all installations.

The **Transmit Delay** datafield is numeric, and is defined in milliseconds. It uses simulated keypad entry. A minimum value of 0 can be used. The maximum value is 5000. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes. A value of 0 ms is recommended.

The **Modbus Address** datafield is numeric. It uses simulated keypad entry. A minimum value of 1 can be used. The maximum value is 249. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes.

ETHERNET HOST 2 PARAMETERS:

Ethernet Host 2 capabilities will be associated with future TT-TS12 software versions.

The software version described in this manual does not utilize Ethernet Host 2.

The screen below is displayed, but it has no functionality.
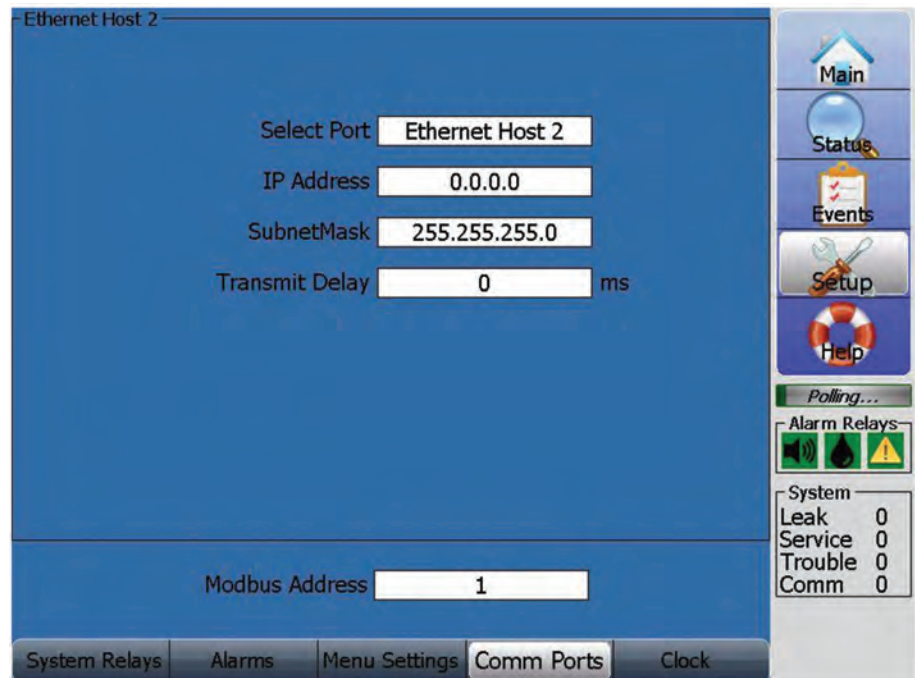
CLOCK SCREEN

Press the Clock tab to display the Clock Screen, shown below.

The Clock screen allows entry of Time and Date. The time is based on 24 hour per day system.
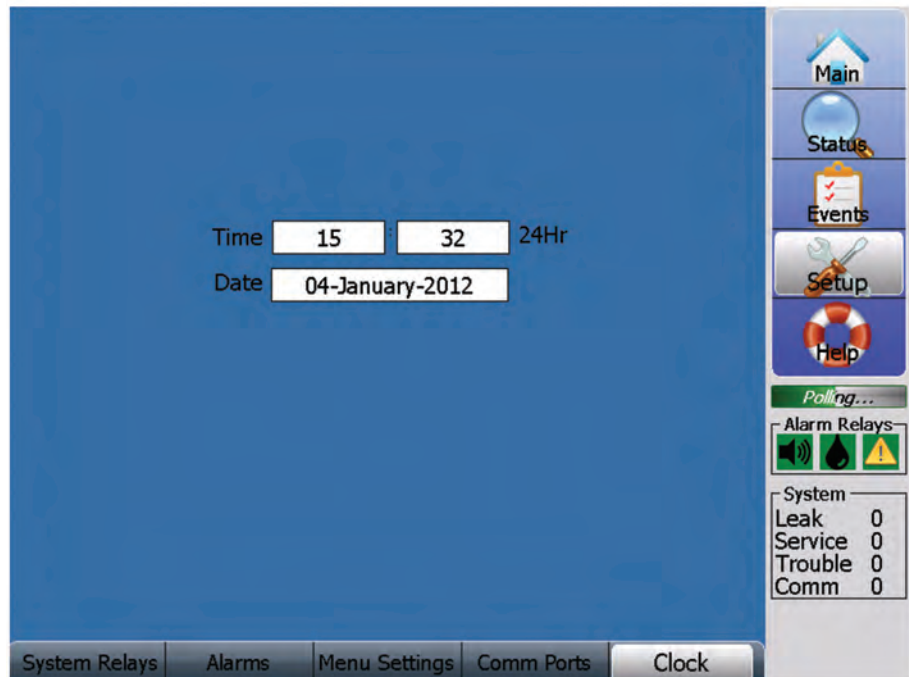
Hours are entered in the datafield on the left with simulated keypad entry. A minimum value of 0 can be used. The maximum value is 23. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes.

Minutes are entered in the datafield on the right with simulated keypad entry. A minimum value of 0 can be used. The maximum value is 59. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes.

Pressing the Date datafield brings up a calendar display, as shown below. Use the up or down arrows to change the displayed month. Touch the day of month to enter the date.
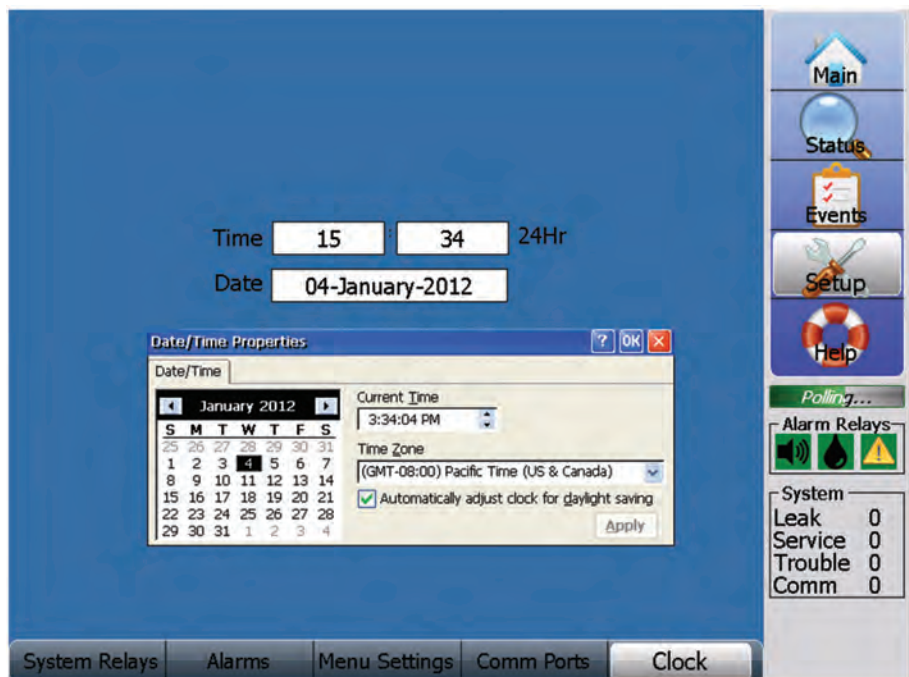
PASSWORD SCREEN

The tab for this screen is located to the right of the Clock tab. Use your finger to slide the Clock tab to the left to access the Password tab.

This screen has been deliberately made more difficult to access, to provide use only to very experienced personnel.

Press the Password tab to display the Password Screen, shown below.

The initial Level 1 Password for the TT-TS12 is the number 10.

The initial Level 2 Password for the TT-TS12 is the number 1234.

The TT-TS12 system allows the user to create custom passwords.

Allowable password length is 40 characters max, any combination of characters.

If desired, the Level 1 password can be blank to disable the password.

However, the Level 2 password requires at least one character.

NOTE: It is very important for the user to carefully record the Level 1 and Level 2 passwords being used on the system.

In case password information is lost/forgotten, recovery requires getting a special one-time-use password from the TraceTek factory via a phone call.

The Password screen allows modification of the Level 1 and Level 2 Passwords, and also displays the current Password level.

Password level 2 acts as a high level password.

Password level 1 provides access to most TT-TS12 features, but restricts the ability to Initialize the Network (see Device Network section of this manual), make the TT5DB and TT7000 Leak and TT5DB Service Sensitivity assignment and access the Advanced screen (see SIM Setup section of this manual), and access the Maint screen (see System section of this manual).

In order to change either the Level 1 or Level 2 Password, you are required to properly enter the Old Password and the desired New Password.

Touch the circle to the left of Level 1or Level 2 to identify what Password is being referenced, then press the Old Password datafield.

The Old Password keypad is now displayed.
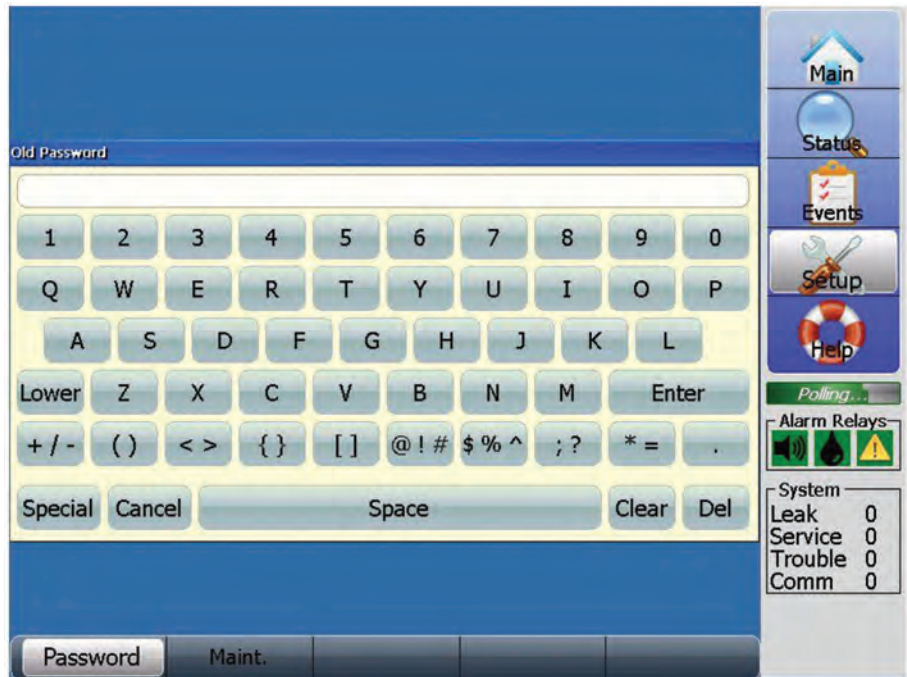
The Password field is alphanumeric, and uses simulated keypad entry. Be sure to press the Enter key to save any changes. Press Cancel to leave the screen with no changes.

Note the Upper and Lower case key, and how it changes the characters between upper and lower case.

The multifunction keys on the bottom row of the keypad require multiple quick touches to display the second or third function symbol.

Del is used to backspace one character.

Clear removes all characters.

Use the Cancel key to exit the Password entry screen.

After entering the Old Password, proceed with the entry of the New Password.

Press the New Password datafield to display the New Password keypad.

Type in the New Password and press Enter.

The Old and New Password datafields display the entered values. Verify the desired values have been entered. Press the Save New Password key.

If the Old Password value is correct, the New Password value will be accepted.

If the Old Password value is not correct, the Wrong Password message is displayed, as shown below.
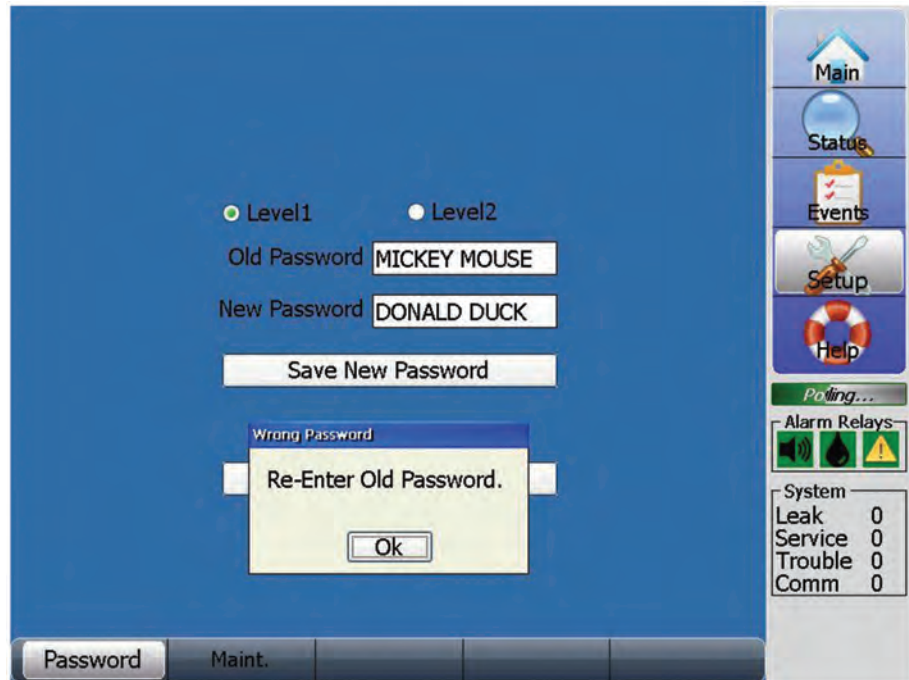
If you want to change the Password level from what is displayed near the screen bottom, press the Change Password Level key. Enter the correct Password and the corresponding Password level will be displayed. If you do not enter the correct Password, no Password level will be displayed.

MAINT SCREEN

The tab for the Maint screen is located to the right of the Clock tab. Use your finger to slide the Clock tab to the left to access the Maint tab.

This screen has been deliberately made more difficult to access, to provide use only to very experienced personnel.

Press the Maint tab.

NOTE: The Maint screen requires Password level 2. The Password entry keypad will be displayed if current Password level is not level 2.

If the correct Password is not entered, no error message is shown, and the previous screen continues to be displayed.

The Maint screen is shown below.
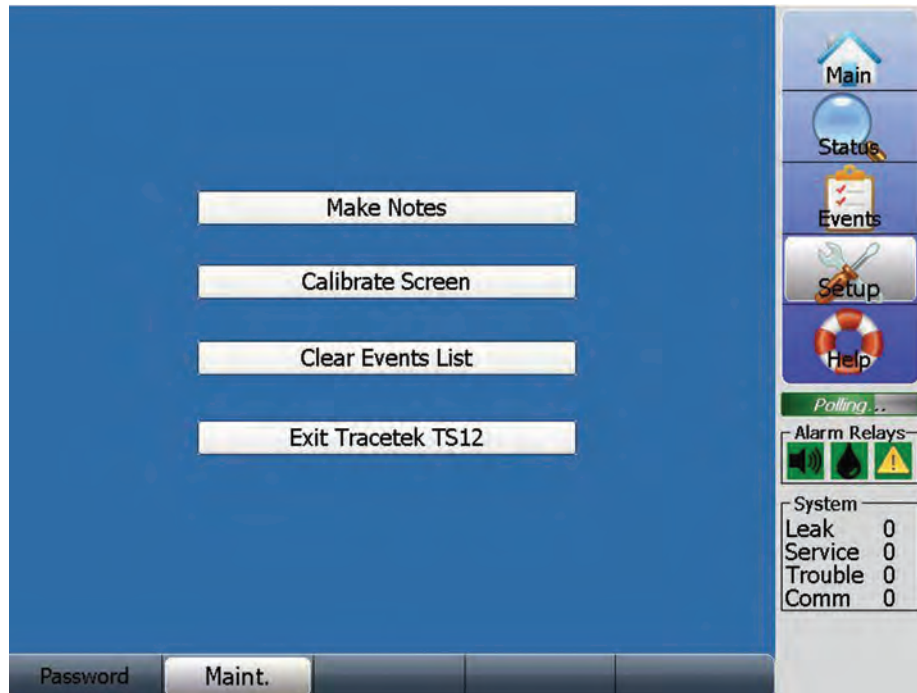
The Maint screen allows 4 different tasks to be performed: Make Notes, Calibrate Screen, Clear Events List and Exit TraceTek TS12 software.

The **Make Notes** key allows the user to edit the Notes file, which is maintained on the Hard Disk. Touch the key to bring up the Notes file, as shown below. The user can type in notes using the on screen keypad, or utilize an external keyboard.

NOTE: The Notes file can be read by anybody accessing the help screen.

NOTE: Connect the external keyboard to the USB port connection at the front of the TT-TS12-Panel enclosure.
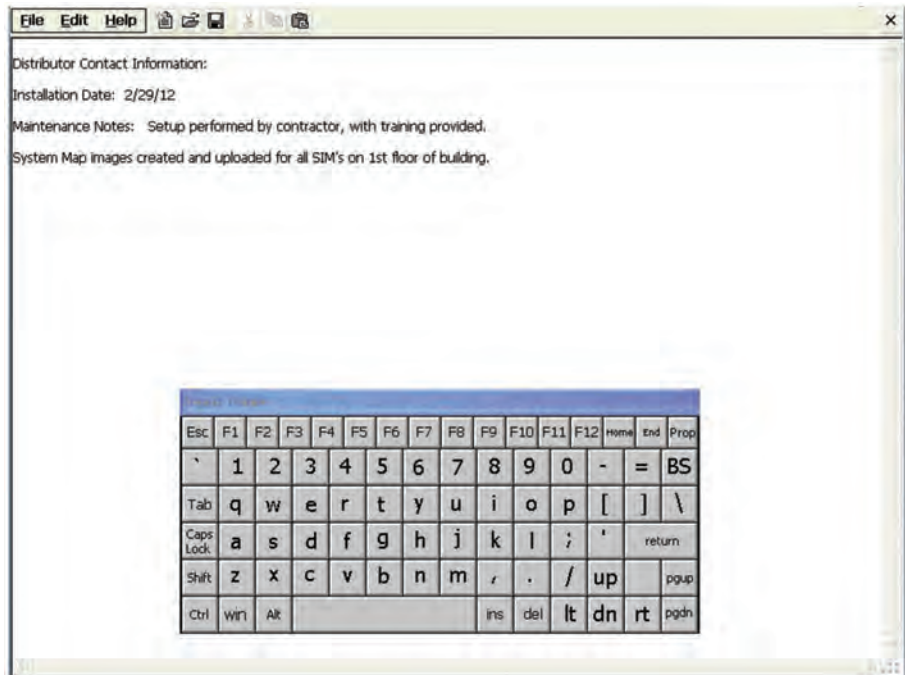
After typing the additional notes, navigate to the File menu at top left of screen, click on File to display the submenu choices, and select Save.

Then click on File again to display the submenu choices, and select Exit to return to TT-TS12 software.

The **Calibrate Screen** key allows the user to execute a procedure to improve touch screen performance. If you find the TT-TS12 not responding well to your finger touch position, the Calibrate Screen sequence should be performed.

Press the Calibrate Screen Key to display the screen below. Follow the steps defined on the screen.
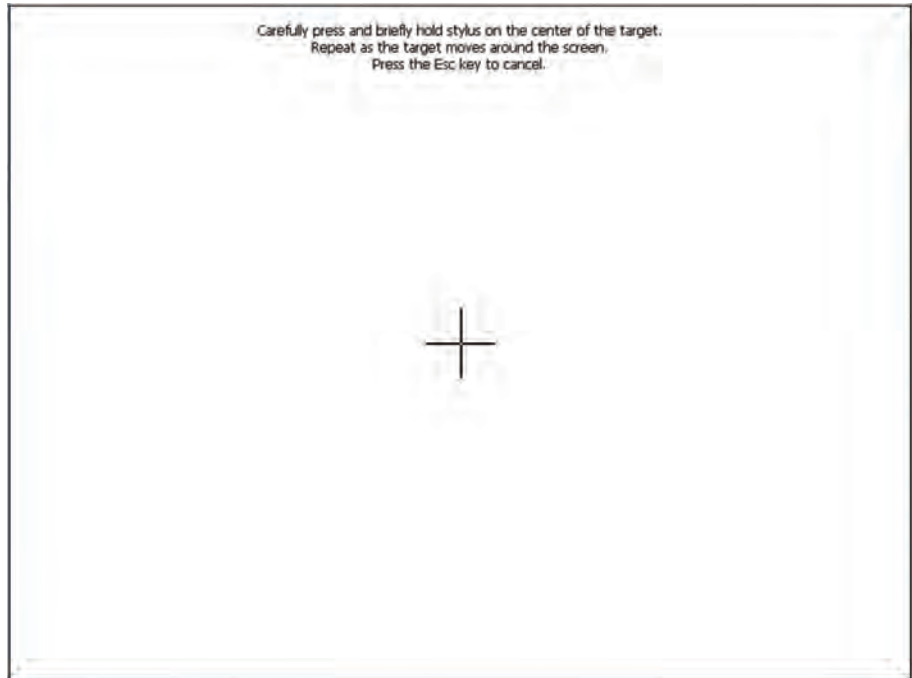
Carefully press and hold your finger on the center of the + for several seconds. The + will change position from the center of screen to the top left, bottom left, bottom right and finish at the top right of the screen. At the end of the calibration sequence the screen below appears.

Touch the screen to accept the new settings, or press the Enter key if using a keyboard.

The **Clear Events** List key provides the capability to clear the entire Events List, for each and every SIM in the system.

Touch the Clear Events List key, which results in the warning message on the screen below.
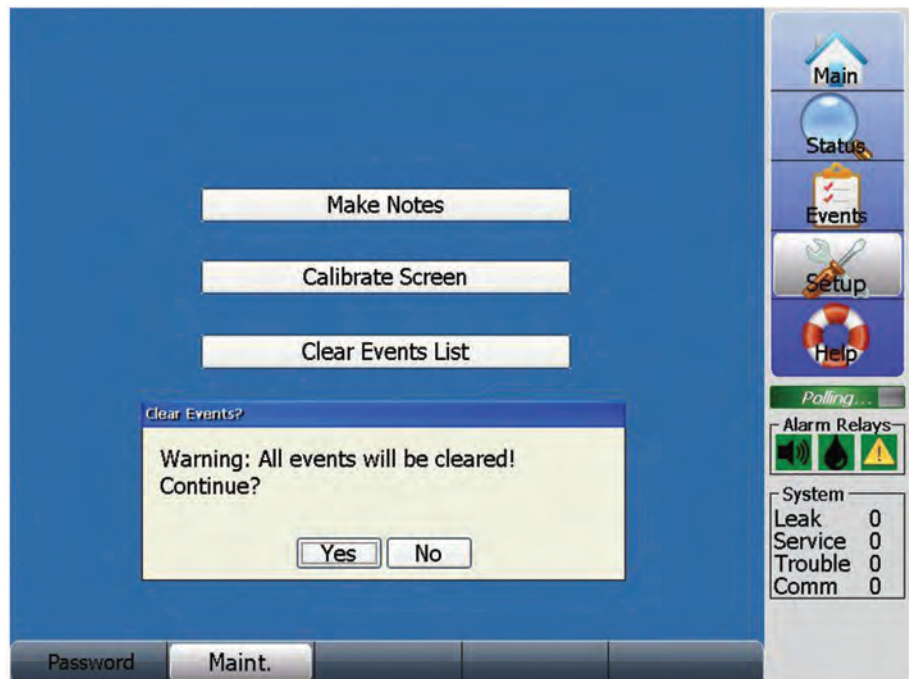
Due to the complete removal of the event history for each and every SIM in the system, the Clear Events List command requires response to the warning message. Note that once the Events List is cleared, there is no way to retrieve it.

Before Clearing the Event List, it is recommended to backup the TT-TS12 Database Files (which includes the Event List) to a USB device.

See the USB Options section of this manual for more information regarding this procedure.

Answer Yes to the warning message only after you have backed up the Database files, or have considered and decided to lose the Event List for the system.

The **Exit TraceTek** TS12 key allows the user to exit the TT-TS12 software package.

NOTE: This capability is provided to knowledgeable users who need to exit the TT-TS12 software.

Touch the Exit TraceTek TS12 key, which results in the warning message below.
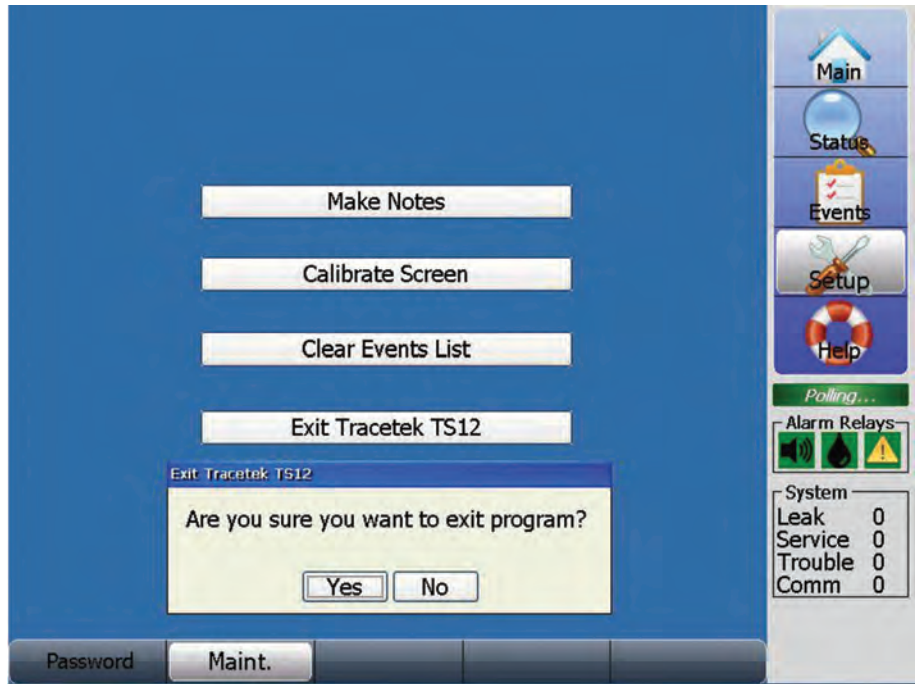
Press the No key to stay in TT-TS12 software.

Answer Yes to the warning message to exit the TT-TS12 software.

The screen below is displayed.

If the lower left corner area of the screen is touched, the Start utility can be accessed. See below:
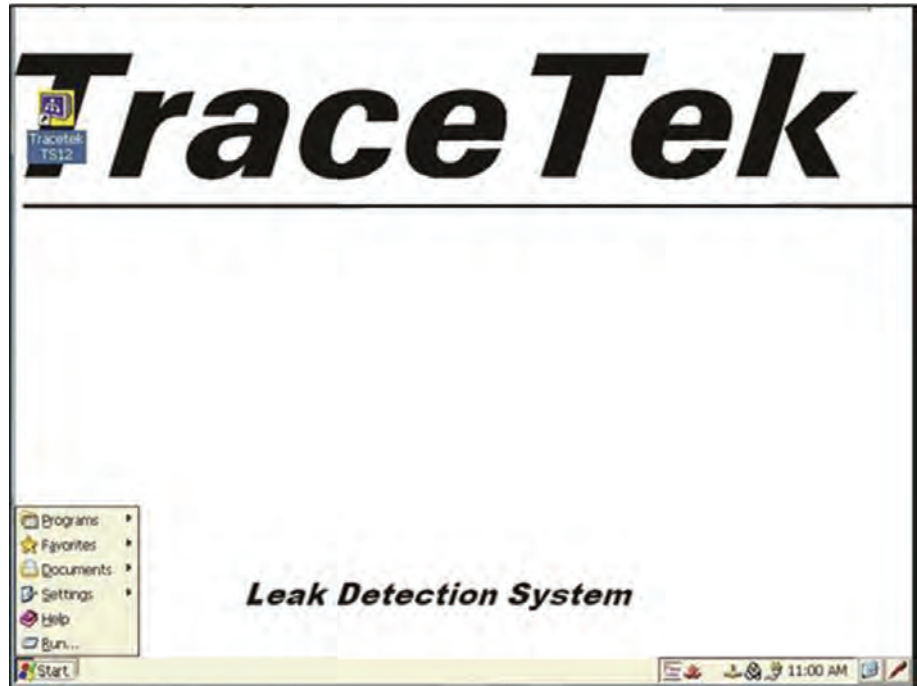
NOTE: After approximately 5 minutes the TT-TS12 software will automatically restart.

To restart the TT-TS12 software, double click the TT-TS12 icon in upper left area of screen.

MAIL/REMOTE DISPLAY SCREENS

Access Mail/Remote Display from the Setup screen.

There are 3 types of Mail/Remote Display screens. They are called Contact List, Account Settings and Remote Display.

The bottom row of each Mail/Remote display screen has 3 tabs (labeled Contact List, Account Settings and Remote Display). Press the tab to change from one screen type to another.

CONTACT LIST SCREEN

Press the Contact List tab to display the Contact List Screen. Enter a valid Email Address and indicate whether Leak, Service or Trouble will trigger the Alert for that specific address. See completed example screen below.

Click on the Email Address field to display the keypad, and use the displayed keypad to enter the desired information.
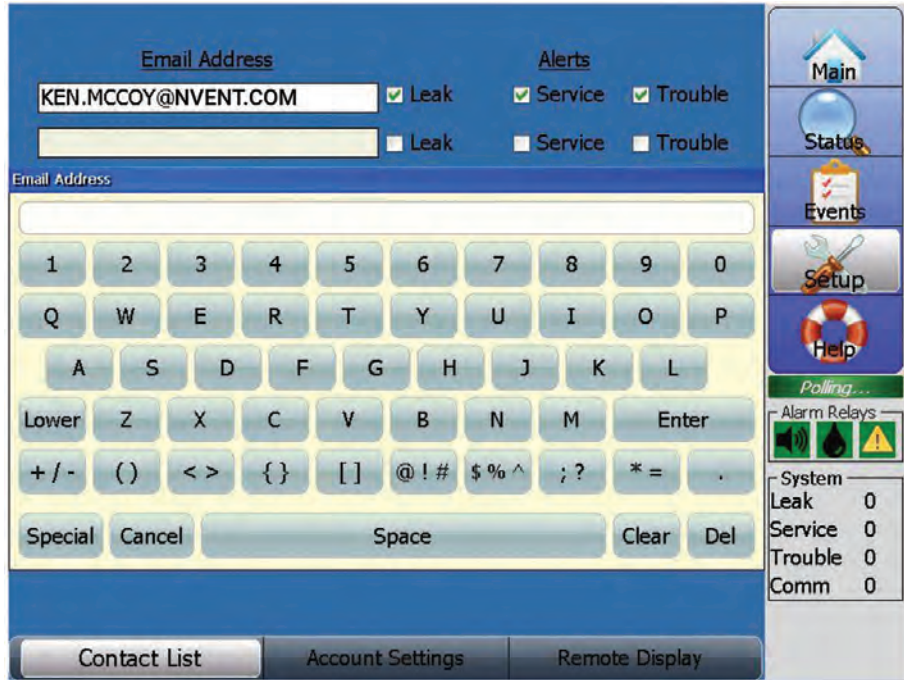
If an invalid Email Address is entered a warning message is displayed. Press OK and then enter a valid Address, or backspace to remove the incorrect information. See screen below.
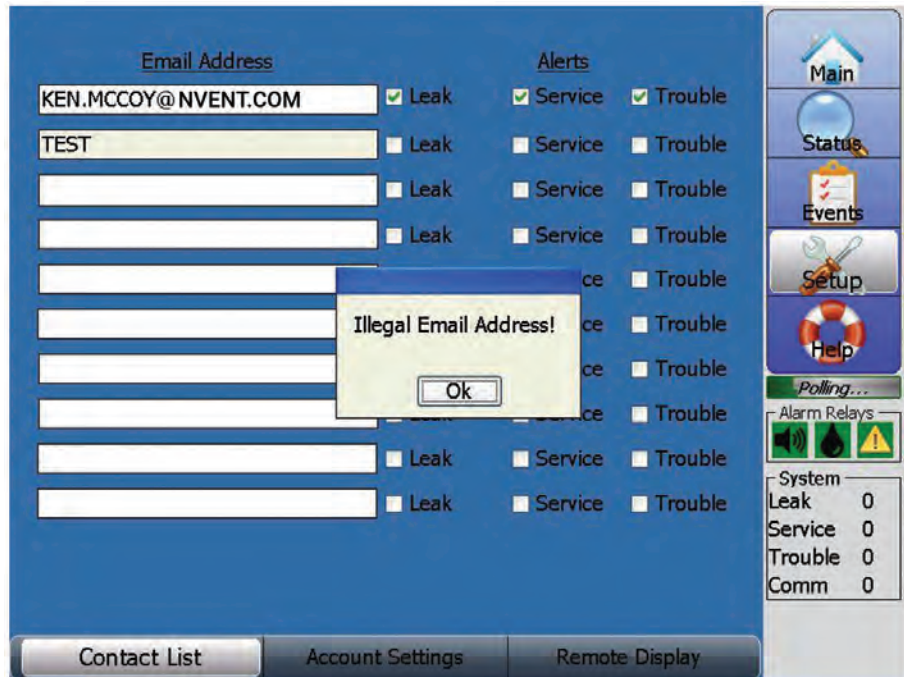
ACCOUNT SETTINGS SCREEN

Press the Account Settings tab to display the Account Settings Screen. See the completed example screen below.

Click on any of the top five datafields to display the keyboard for easy data entry. See screen below.

When entering data into the bottom section of screen (Message Template area), a different keyboard is used. See screen below.
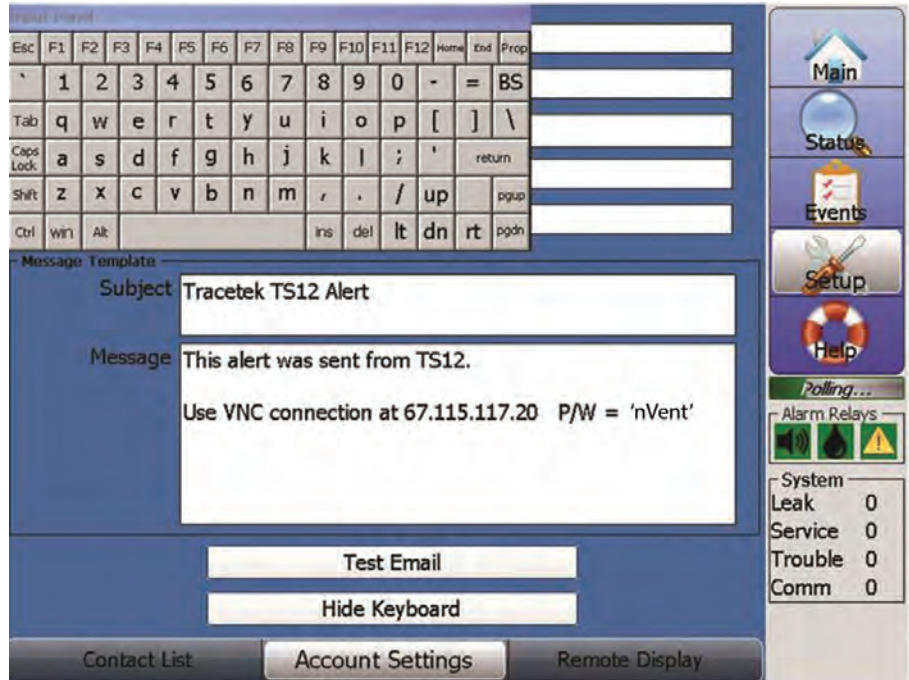
Click the Hide Keyboard key if an alternate keyboard will be used for data entry (for example- with USB port).

Click the Test Email key to send an email message to all the addresses identified on the Contact List.

If there is a problem with the SMTP server parameters, and an email cannot be sent – an error message is displayed briefly. See screen below.
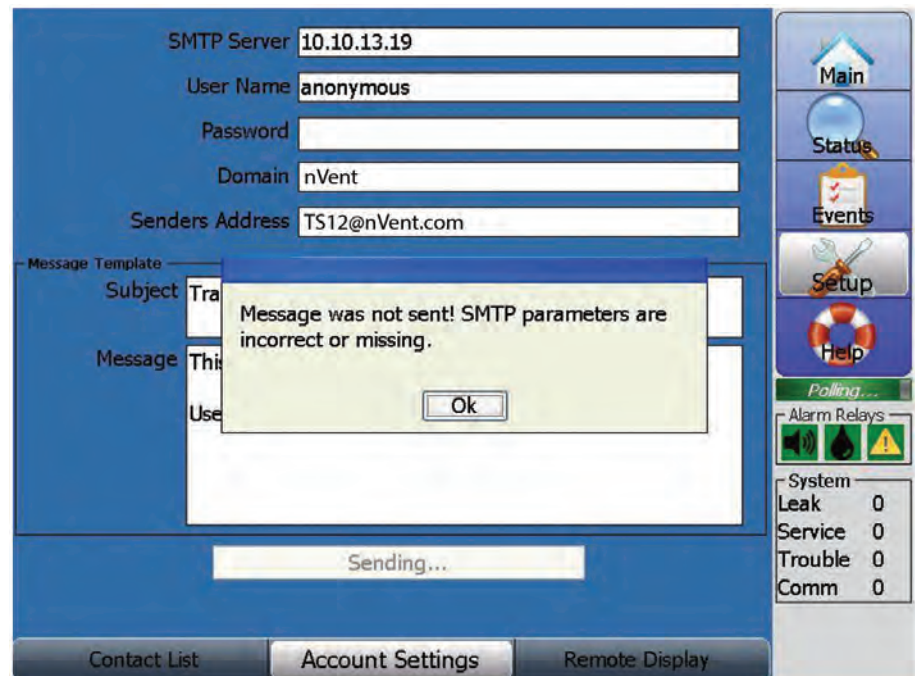
REMOTE DISPLAY SCREEN

Remote Display provides the capability to view/control the TT-TS12 software from a remote PC that is networked to the TT-TS12 computer.

The Remote Display state must be Enabled for this capability to work properly.

Also, the UltraVNC Viewer free software application must be present on the remote PC.

NOTE: The process of downloading and running the UltraVNC Viewer software is not discussed in this manual.

NOTE: When running the UltraVNC Viewer software, the IP address of the TT-TS12 computer is required. This IP address is identified in the lower area of the Remote Display screen.

IP address details are also displayed on the System/Comm Ports screen for the associated Ethernet host port. Make a note of the IP address, it is needed as part of the UltraVNC Viewer connection process.

Press the Remote display tab to display the Remote Display Screen, which includes IP Address 1 and IP Address 2 assignments if they have been made.

See the example screen below.
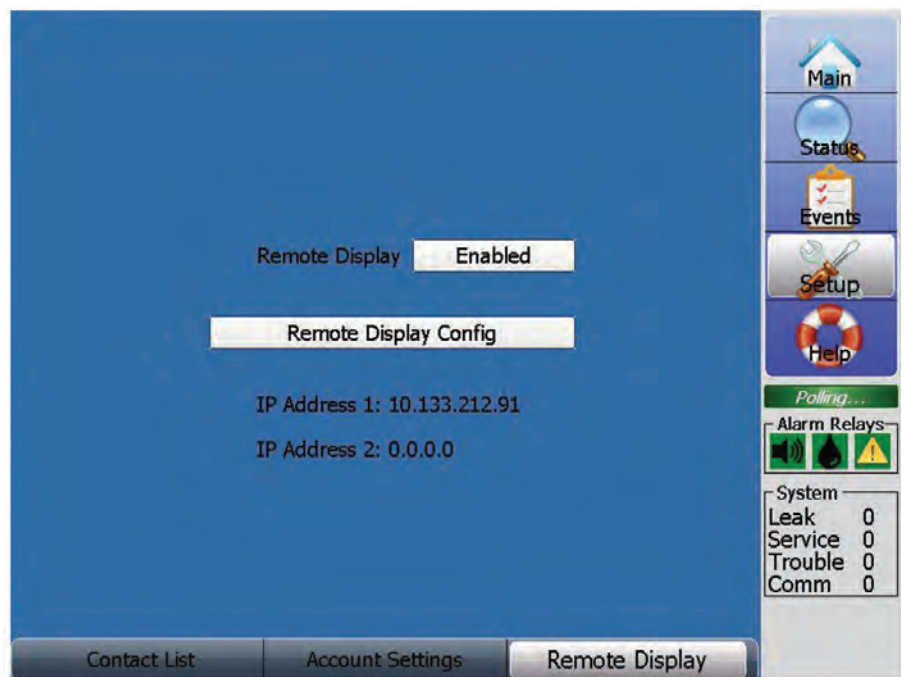
The Remote Display datafield has two states, Enabled or Disabled.

If the current state is Disabled, touch the datafield to change it to Enabled.

If the current state is Enabled, and the Remote Display capability is not desired, then touch the datafield to display the message below.

Answer Yes to Disable Remote Display.
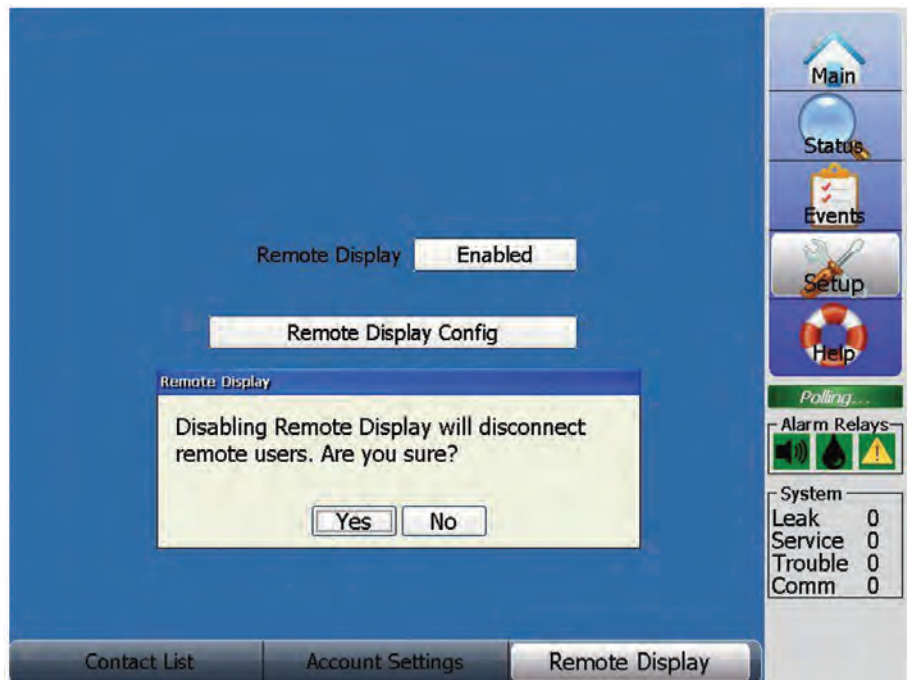
Touching the Remote Display Config field results in the VNC Server Properties screen being displayed. This screen has 6 tabs, labeled Authentication, Corrections, Inputs, Sharing, Desktop and Capture Method.

The Authentication screen is shown below:
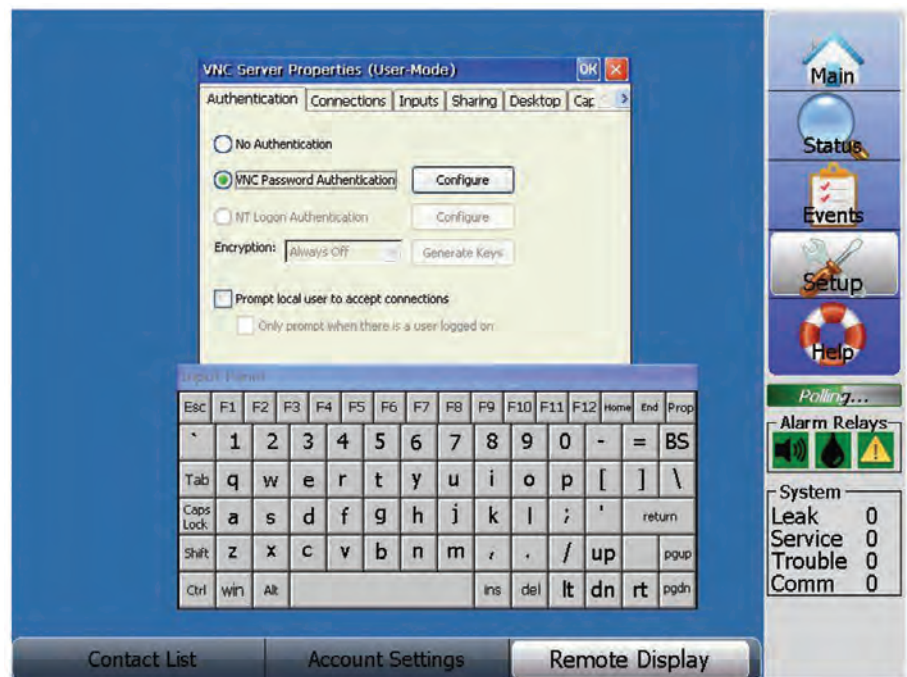
For security purposes, a password can be set up for authorized remote users. To create the password, select the VNC Password Authentication option, and then press Configure to display the VNC Server Password screen below.
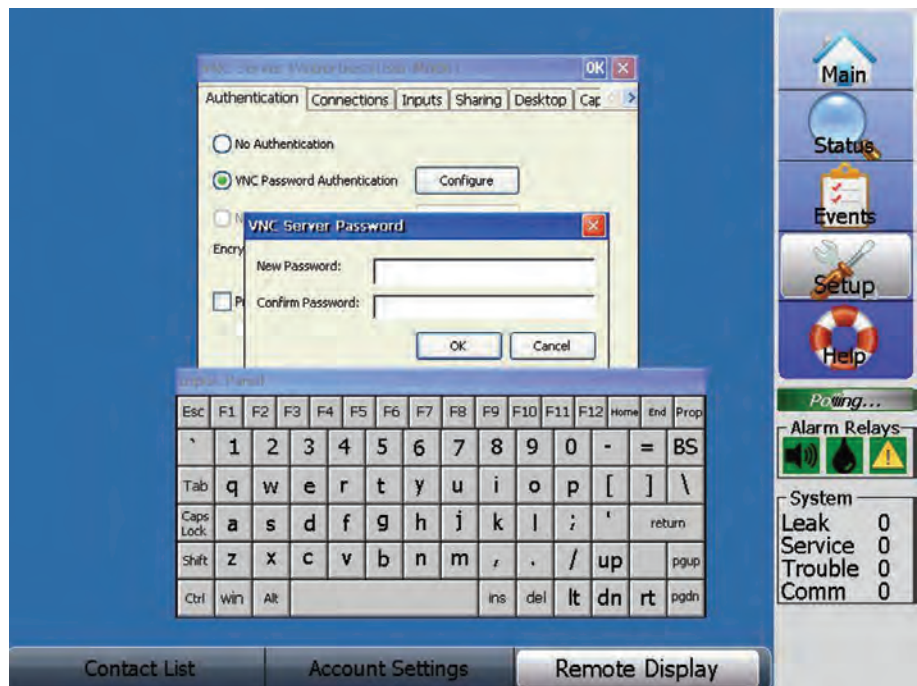
Use the Input Panel to enter the New Password, then Confirm the Password. Press OK to save the New Password.

If no security password is required, select the No Authentication option, which may result in the Warning screen below. Answer Yes or No depending on whether an old password value is to be maintained in the registry.
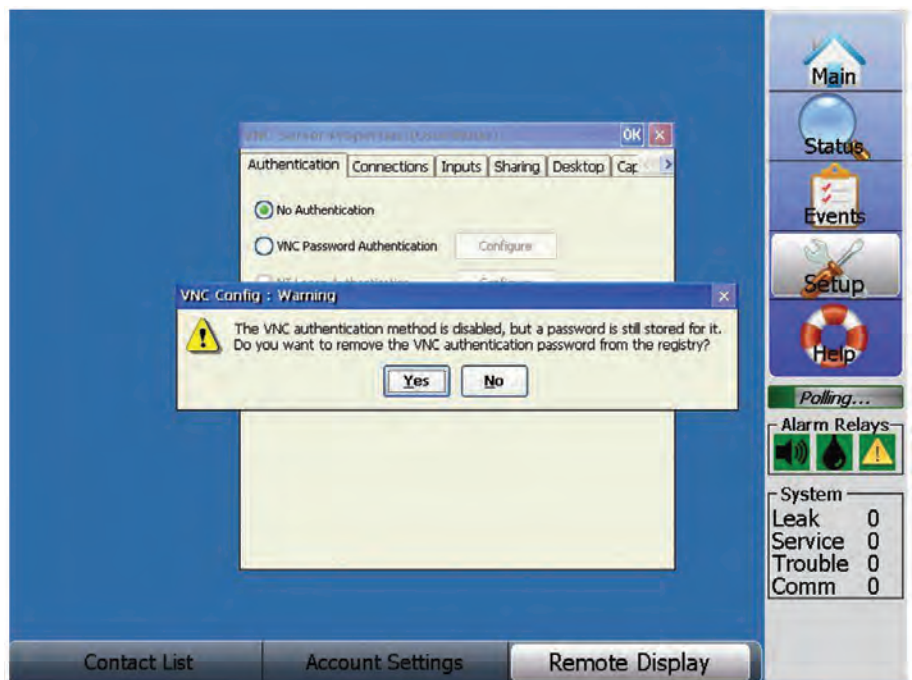
The Connections, Inputs, Sharing, Desktop and Capture Method screens are shown below for reference only. The selections and values displayed on the corresponding screens are generally recommended.
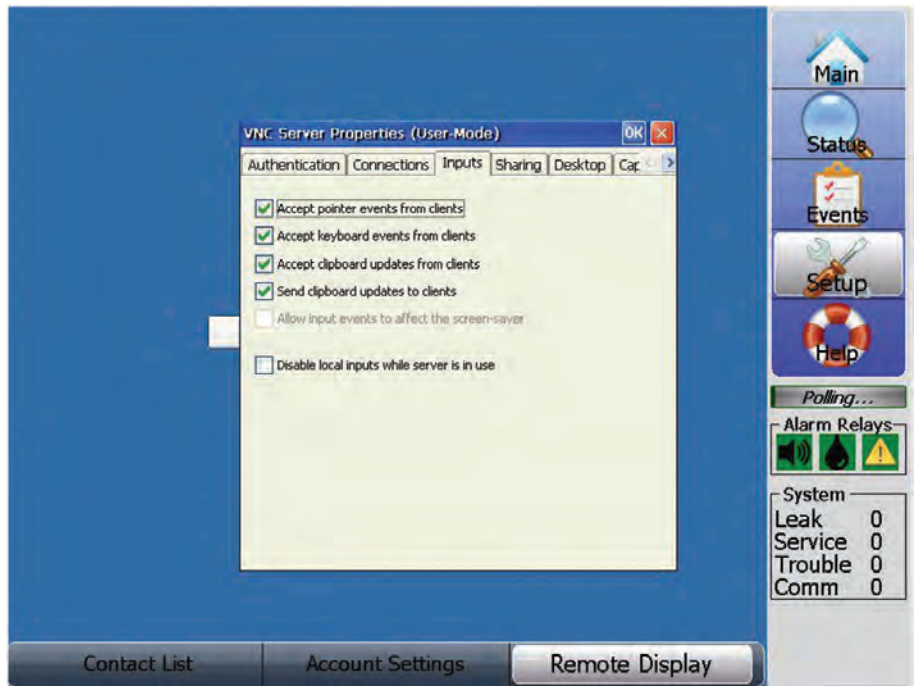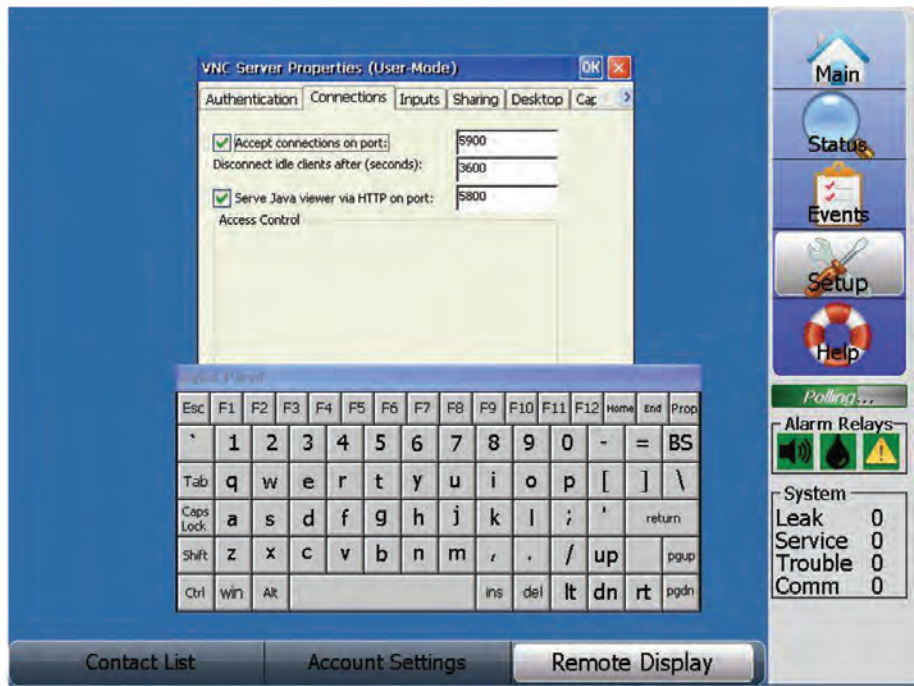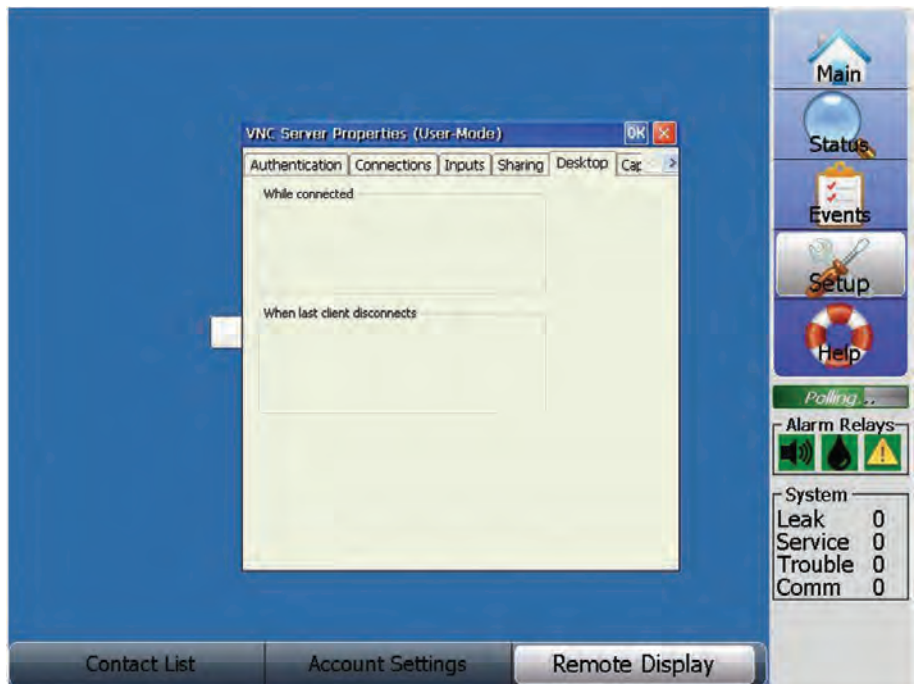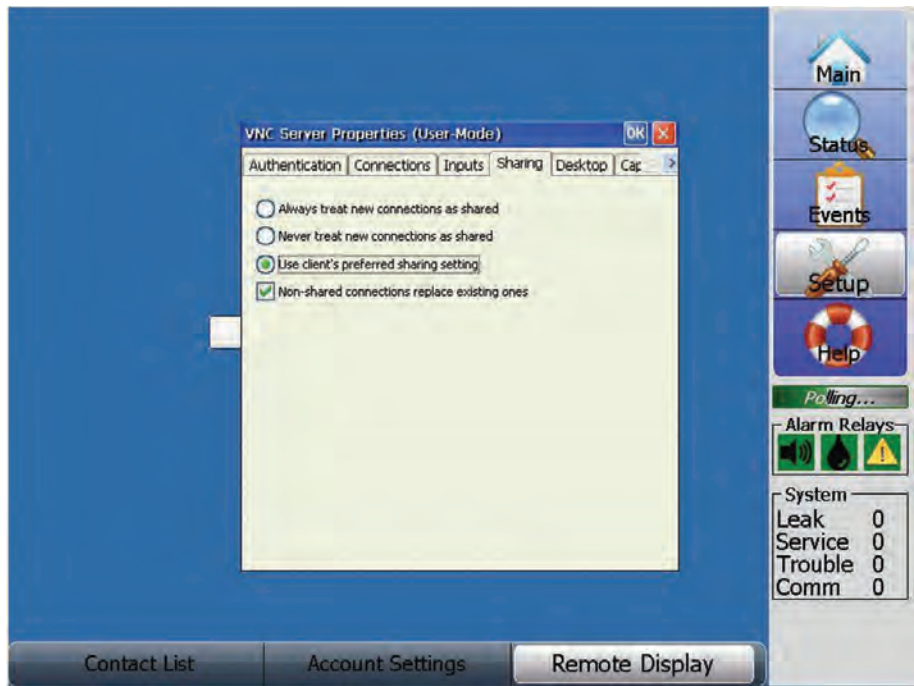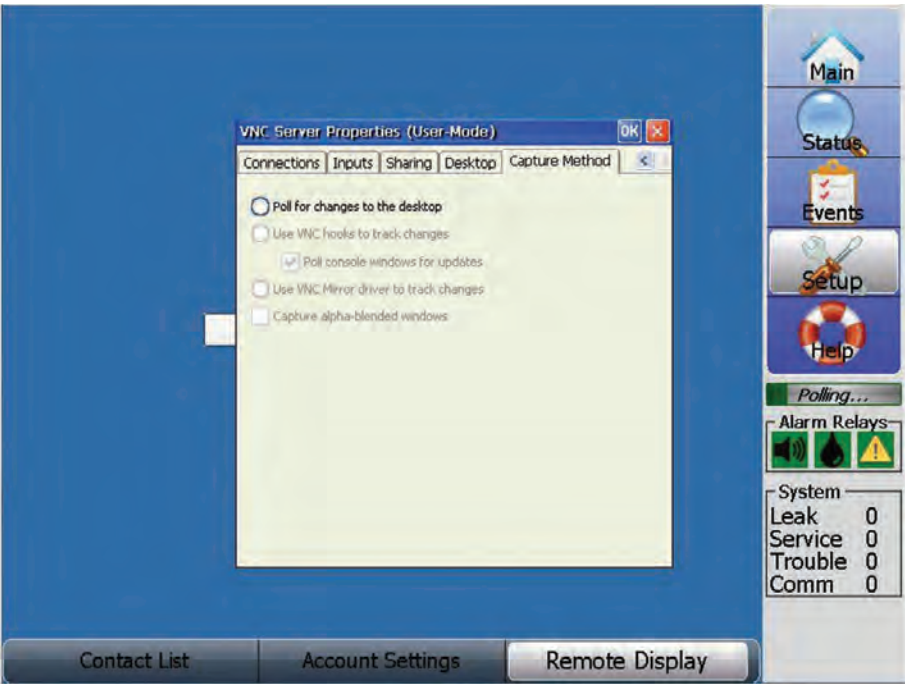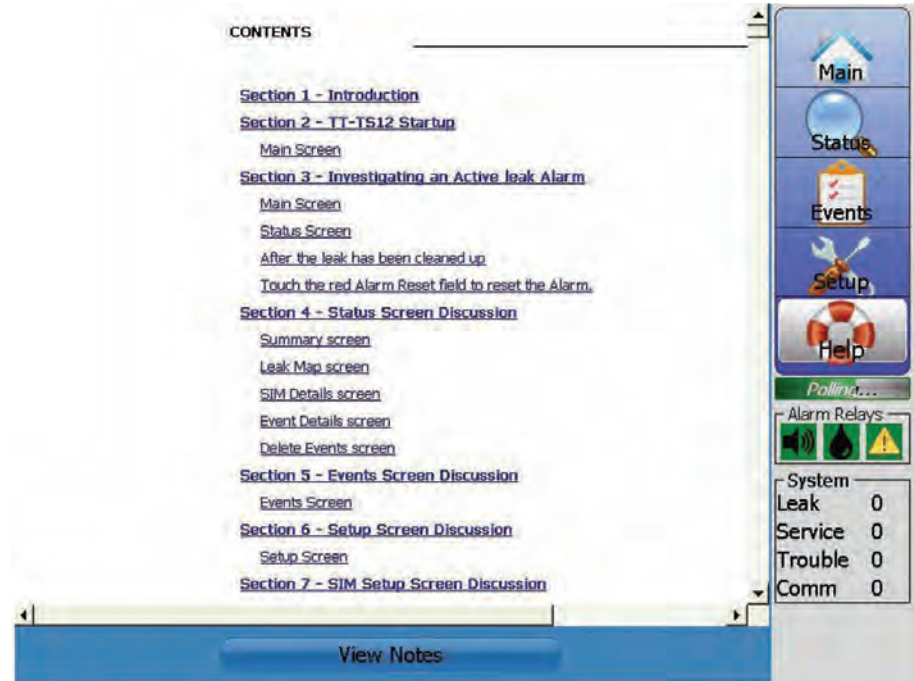
HELP SCREEN

When the Help key is pressed, an electronic copy of the TT-TS12 Operation Manual is accessed, starting with the Table of Contents.

See Screen Below:

Navigating the Help screen can be done in several ways.

Underlined headings of the Table of Contents are hyperlinked. Touch a hyperlinked Heading to go to the corresponding pages in the manual. Use the Green Arrow in lower left corner to return to the Table of Contents.

At the right edge of the Help screen you will find a cursor bar, along with an up arrow and down arrow.
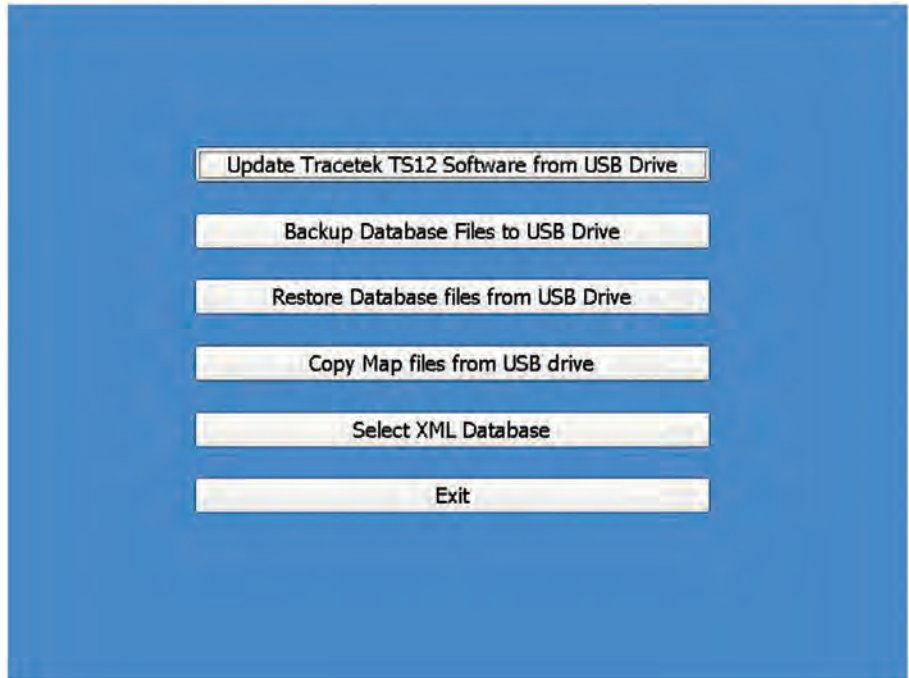
Touching the arrows moves you through the manual.

Touching and dragging the cursor bar moves you through the manual.

View notes is a feature that allows the user to read the notes file created from System/ Maint/ Make Notes screen.

USB OPTIONS

The TT-TS12 has been designed to respond to the presence of a USB drive. After a USB drive is connected, the screen below appears:

USB Options screen

UPDATE TRACETEK SOFTWARE FROM USB DRIVE

Future TT-TS12 software upgrades are distributed as ZIP files. Use a separate PC to extract the ZIP files to the USB drive /Setup folder.

The screen below demonstrates the preferred method of extracting the TraceTek TS12 software version ZIP file to the USB drive on the separate PC.

After opening the ZIP file, use the PC mouse to right click on the Setup folder icon, then select the Extract Files option, and specify the USB drive as the destination.

After the Extract Files step is complete, the USB drive /Setup folder can be automatically recognized by the TT-TS12 system.

When ready to update the TT-TS12 Software, connect the USB drive to the TT-TS12 USB port, which will result in the USB Drive Options screen above being displayed.

Verify that the top line displayed is **Update TraceTek Software from USB Drive**. If this line is not displayed, the USB Drive does not contain the correct /Setup folder structure. In this case, go back to the top of this section and repeat the preferred method of extracting the TraceTek TS12 software version ZIP file to the USB drive.

TOUCH THE 'UPDATE TRACETEK SOFTWARE FROM USB DRIVE' KEY

The TT-TS12 software will look for a different software version on the USB in the /Setup folder. If a different software version is found, a popup option will be displayed to overwrite the existing software. Note that the existing version of software (to be overwritten) is identified. See the screen below.
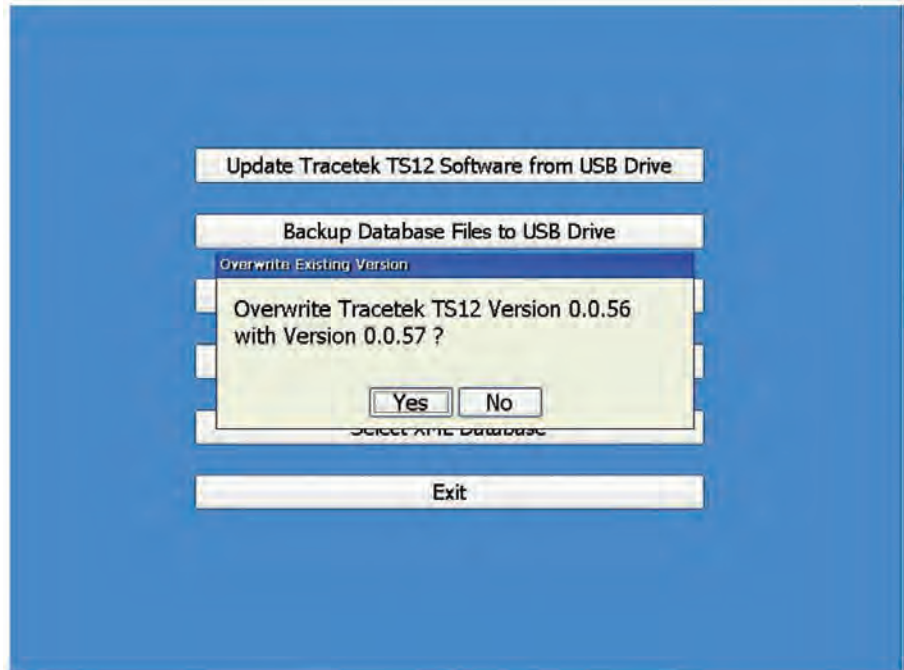
All existing SIM Setup and Leak Map information is retained during the software upgrade. Immediately after the software update is complete, remove the USB drive. The TT-TS12 will automatically restart with the updated software version.

NOTE: It is possible to make a mistake and load older software versions, so make sure that the desired software version is loaded on the USB drive before putting the drive into the USB port connection at the front of the TT-TS12 enclosure.

NOTE: The System/Menu Settings screen displays the current TT-TS12 software version in case you need to check.

BACKUP DATABASE FILES TO USB DRIVE

This capability provides backup of the TT-TS12 Database files. Touch the 'Backup Database Files to USB Drive' key to display the screen below.

A generic name for the Backup Directory is shown as a starting point. The user can modify the Backup Directory name as desired, using the displayed keypad.
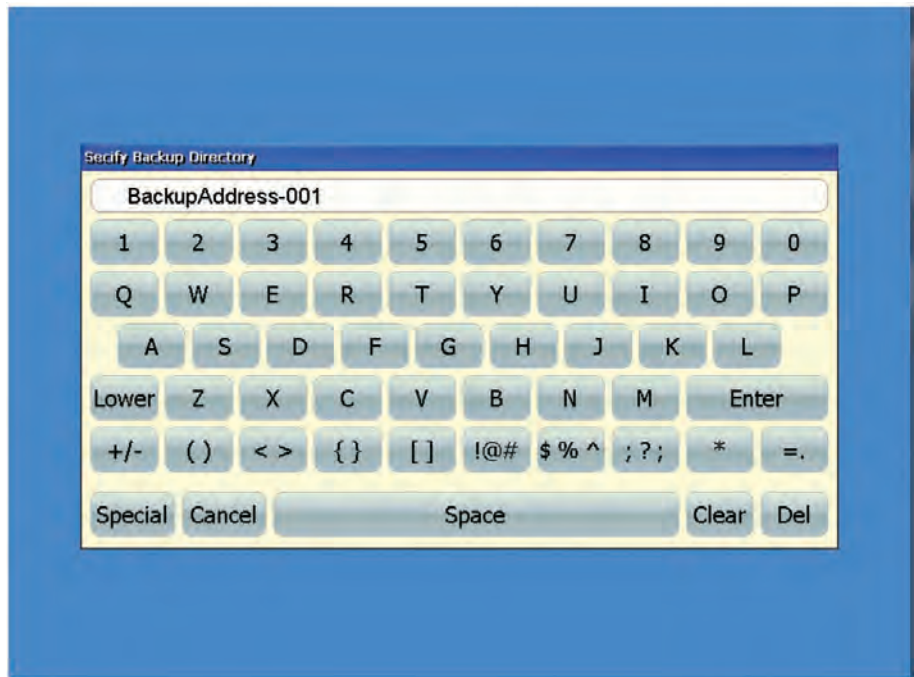
Press Enter when the desired name is identified. When the process is complete, remove the USB drive and press the Exit key. Downloaded Database files include Event History, Map Database, Network Database, Region Database and SIM Database.

RESTORE DATABASE FILES FROM USB DRIVE

This capability provides restoration of the TT-TS12 Database files. Touch the 'Restore Database Files from USB Drive' key to display the screen below, which shows the directory names found on the USB drive in the TraceTek folder.
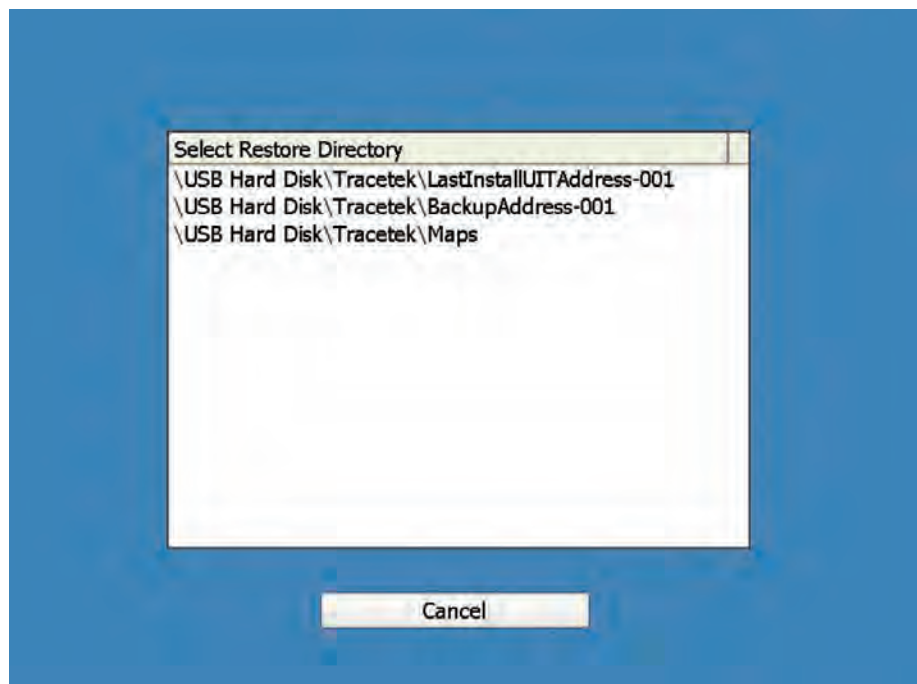
The actual contents of the user's USB TraceTek folder will be shown. It is likely that multiple choices are selectable, similar to the example screen shown above. Be careful to identify the desired source file for the Restore Directory.

Touch the screen to select the directory. You will be asked to confirm your selection using the screen below.
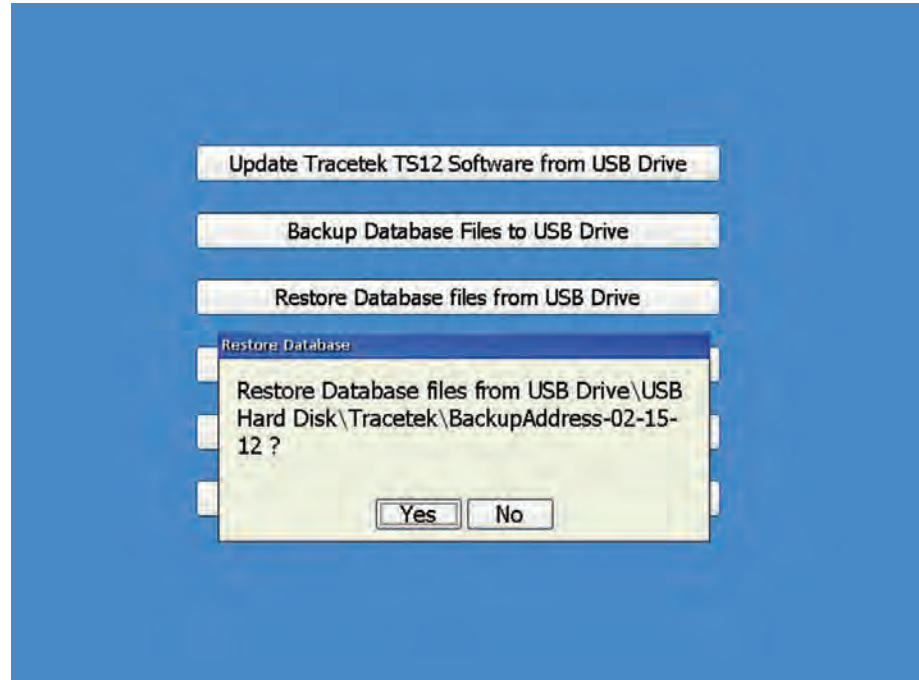
If an incorrect directory name is shown, then press No.

If the desired directory name is shown, press Yes to start the Restore process.

When the process is complete, remove the USB drive and press the Exit key.

Restored files include Event History, Map Database, Network Database, Region Database and SIM Database.

COPY MAP FILES FROM USB DRIVE ONTO THE TT-TS12 HARD DISK

The TT-TS12 has been designed for easy transferring of your System Map Image file from a portable USB drive to the TT-TS12 Hard Disk.

On the USB drive create a folder titled TraceTek.

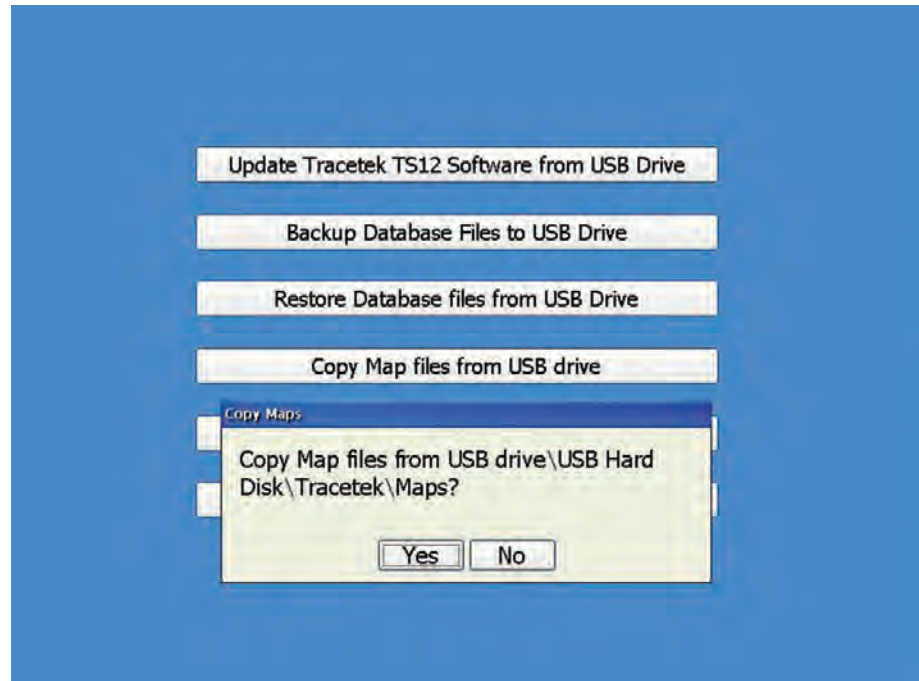Within the TraceTek folder create a folder titled Maps.
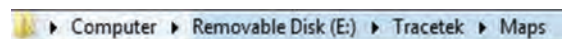
Verify your Image file has been loaded onto the USB drive in the TraceTek/Maps folder.

If not already done, load the Image file into the Maps folder.

Insert the USB drive into the TT-TS12-Panel port.

Touch the Copy Map files from USB drive field to display the screen below.

Answer YES to the prompt and all uniquely named JPG files in the TraceTek /Maps folder of the USB will be added to the Hard Disk/TraceTek /Maps folder of the TT-TS12.

You will briefly see the Copying Maps message displayed on the screen if any files are being copied.
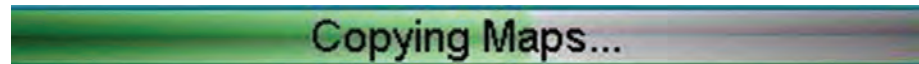
NOTE: File copying/overwriting is not performed if a file in the TraceTek /Maps folder of the USB shares the same name as an existing file in the TT-TS12 Hard Disk/TraceTek /Maps folder.

If you do not see the Copying Maps message, you might not have set up the proper TraceTek /Maps folder structure on the USB.

NOTE: All TT-TS12 Map Images are stored in the Hard Disk/TraceTek /Maps folder on the Hard Disk. The software defaults to this Maps folder during the Image Upload process.

Remove the USB drive after the Copy Map process is completed.

SELECT XML DATABASE

This capability provides uploading of a modified Database file, and results in overwriting of existing file information.

The utilization of this capability assumes:

- A high level user has already performed the Backup Database Files to USB Drive procedure.
- The USB Drive with backed up files has been taken to another computer, and specific database files modified with updated SIM names, or Region names, or other text blocks.
- The USB Drive with modified file information is now ready for upload.
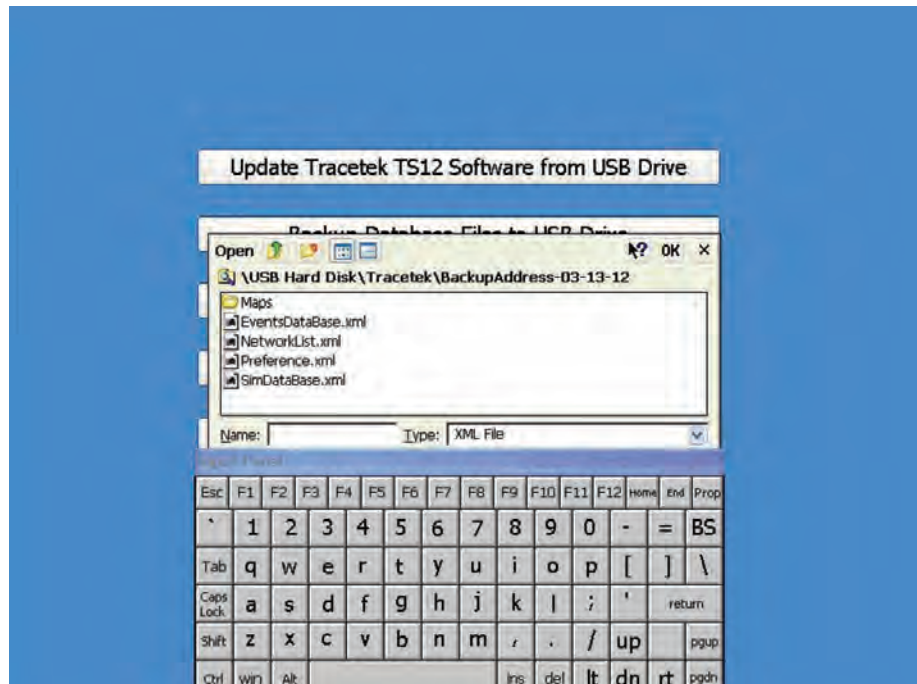
Touch the 'Select XML Database' key to display the screen below.
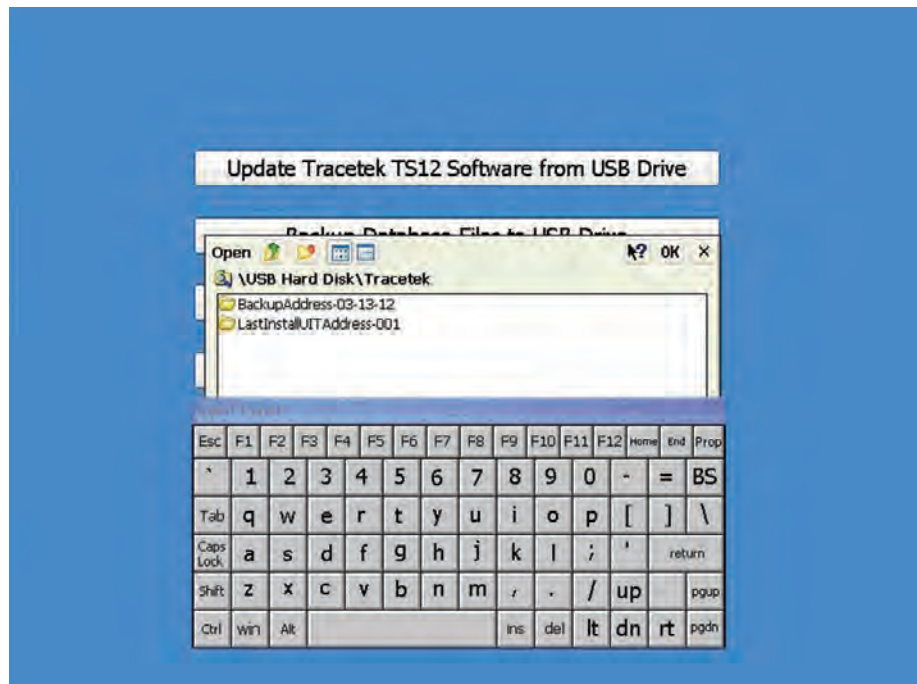
The contents of the USB Hard Disk\TraceTek directory are displayed. Select the directory that contains the modified file to be uploaded.
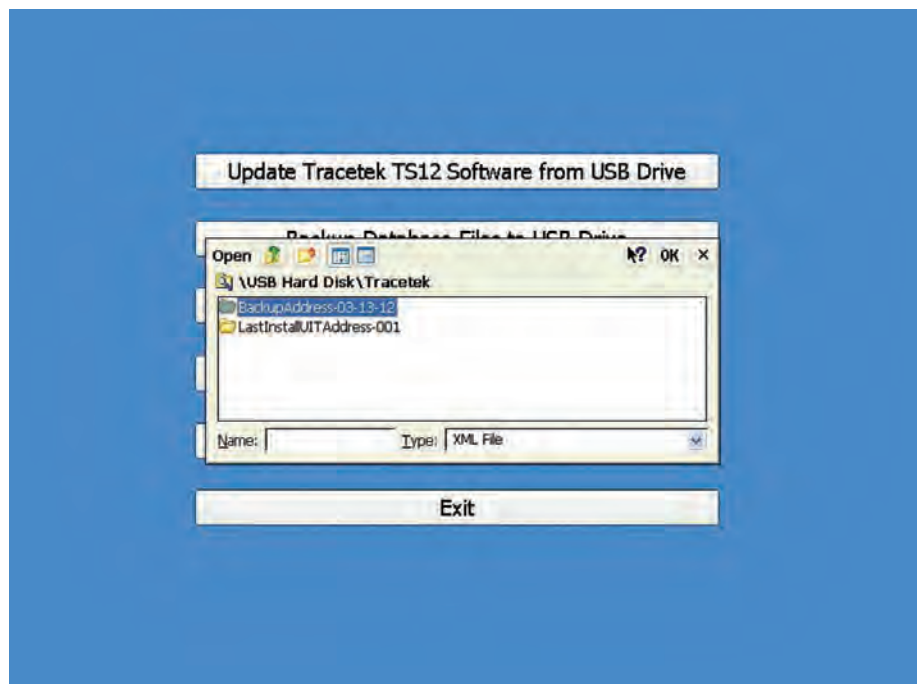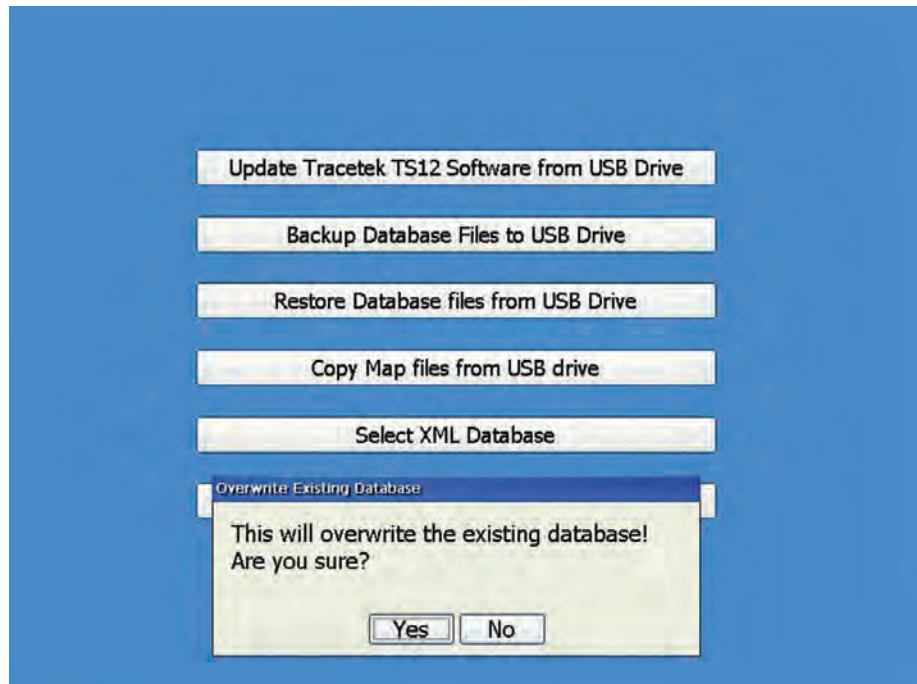
Double touch the directory name to display the contents. See screen below.

Select the modified file to be uploaded by touching the file name, or using the input panel keypad to type the file name. See screen below.
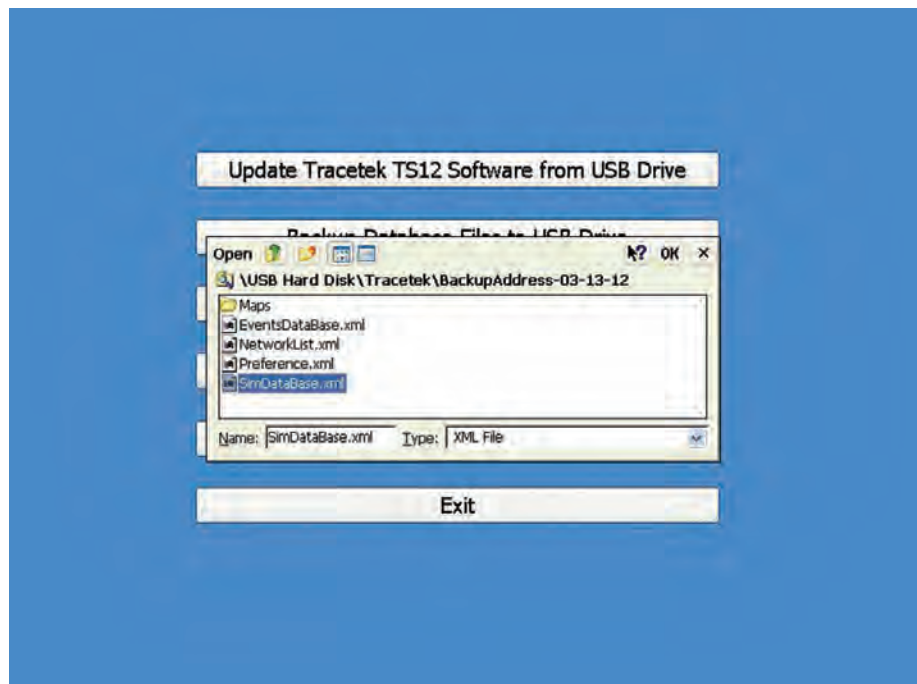
After the file name has been selected, the warning message below is displayed.

Press Yes to overwrite the file, or No to return to USB Drive Options screen.

EXIT

To Exit the USB Drive options screen, press the 'Exit' button.

SOFTWARE ERROR HANDLING

If the TT-TS12 software version you have installed demonstrates unexpected errors, try powering off the TT-TS12 computer and then restarting the system.

If you observe repeatable TT-TS12 software errors, and your system has the REMOTE DISPLAY capability enabled, contact your TraceTek representative to discuss the suspected problem.

The TraceTek representative may utilize the REMOTE DISPLAY capability to observe events in your TT-TS12 system.

TraceTek plans to issue periodic upgrades to the TT-TS12 software, and appreciates any feedback you can provide regarding software errors encountered in your application.

SECTION 14 - PERIODIC TEST OF TT-TS12 LEAK DETECTION SYSTEM

Verification of the proper Setup and Operation of the TraceTek Leak Detection system and System Map parameters used in the TT-TS12 system is periodically recommended.

Periodic controlled testing of the TT-TS12 and the leak detection system can familiarize new system users with the behaviors and messages related to a real leak event, and increase customer confidence that the system is properly setup and functional.

Consider the steps below for controlled periodic tests:

For every leak detection circuit, create a CABLE BREAK at a convenient location and verify that the TT-TS12 reports the event. This could include removing the end termination at the end of the circuit, or separating one portion of the circuit from another. Once the TT-TS12 reports the event, properly reconnect the circuit.

Verify the System Map Image and Map Setup procedure has been accurately defined, and nothing has changed in the leak detection circuit. At convenient points in the circuit, simulate a LEAK (using Mapping Cap or Mapping Brush or alternate method) and verify the leak distance is reported accurately for distance, and displayed at proper location on the System Map Image. If possible, include LEAK tests near the Start and End of the leak detection circuit. Once the TT-TS12 reports the leak event, correct the simulated leak.

If the System Map Image can be improved, or modification/optimization of Map Setup points is appropriate, these improvements should be made.

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