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IntelliTrack Reader

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Contents

Introduction

The intelli*track* Reader is a portable handheld wireless data collection solution. For RailStress applications, the current rail stress, rail temperature, and SFT are read from nearby RailStress Modules and also a limited set of Module values can be updated.

The intelli*track* Reader kit consists of: an iPod Touch device that runs the intelli*track* Reader application (App), an intelli*track* *Communicator* device that acts as a wireless communications go-between, carrying case and charging cables for both devices.

Intelli*track* Reader kit includes:

1. iPod Touch device
2. intelli*track Communicator* device
3. Charging cable accessories
4. User Manual
5. Carrying Case

iPod Touch Device

The intelli*track* Reader App comes preloaded on the included iPod Touch and is ready for use with the intelli*track Communicator* device.   The Reader App can also run on most devices compatible with the Apple iOS operating system:

iPod Touch   iPhone   iPad

See the section called intelli*track* Reader App for details on how to use the Reader Application.

intelli*track Communicator* Device

The intelli*track Communicator* is a wireless device that acts as an iPod Touch to target device go-between; such as RailStress Modules. The *Communicator* user interface panel has an on/off switch, two status LEDs, a factory default reset, and a USB port primarily used for charging the devices internal lithium ion battery.

Wireless Communication

The intelli*track Communicator* contains two radios used for two-way data transmission between the iPod Touch and target devices (such as RailStress Modules). One of the radios is Bluetooth compatible for communications with the iPod Touch device. The other radio communicates with target devices and operates in the ISM 2.4GHz band using a proprietary Salient Systems protocol based on IEEE 802.15.4.

See the intelli*track* Reader App section called Comm for additional information about wireless Bluetooth Pairing and connection.

USB Connector

The intelli*track Communicator* has a Micro USB connector used to supply power when charging the device. See Slow/Fast Charge in the Power LED section about charging options.

Power Switch

When the Power switch is in the off ("O") position, the *Communicator* device will not communicate with the iPod Touch device. Also, when the switch is off, the power is not totally turned off to the internal circuits. This allows the *Communicator* device to charge its battery when the USB cable is plugged in to an active power source.

Power LED

The Power LED is used to indicate power and charge state.

Item	Power LED	Power State	Note
1	Not Illuminated	Off	Power switch is off or the battery is too low to operate normally
2	* Flashing Yellow	Charging	USB cable is plugged in
3	Solid Yellow	Charge Failure	USB cable is plugged in
4	Solid Green	Charged	USB cable is plugged in
5	Flashing Green	Charged/On	USB cable is unplugged

* See Slow/Fast Charge below

Note**:** When the Power LED is Yellow (flashing or Solid) or Solid Green, then the power switch could be either on or off.

Slow/Fast Charge
The intelli*track Communicator* has two charge modes: Slow Charge and Fast Charge.

Item	Power LED	Charge State	Flash Rate
1	Slow Flashing Yellow	Slow Charge	Once a second
2	* Fast Flashing Yellow	Fast Charge	Twice a second

* <u>Fast Flashing Yellow</u>**:** Fast Charge is significantly faster. Fast Charge can only be accomplished if the USB host device that is sourcing power (typically a PC in this case) has the capability of negotiating with the intelli*track Communicator* granting use of more power.

Link LED

The Link LED indicates the Bluetooth link status between the intelli*track Communicator* and your iPod Touch device.

Once the Power switch is in the on position, the Link LED will be Solid Red for about three seconds.

Item	Link LED	Link State	Note
1	Not Illuminated	Off	Power switch is off or the battery is too low to operate normally
2	Solid Red	Powering On	Lasts about three seconds after the power is switch on
3	* Flashing Red	Attempt Paring	Is not paired to an iPod Touch device. Seeking to pair
4	Flashing Green	Attempt Connection	Is paired to an iPod Touch and attempting connection
5	Solid Green	Connected	Is connected to an iPod Touch device

*<u>Flashing Red</u>**:** Indicates the *Communicator* is not paired and seeking to pair with an iPod Touch device. ~~See appendix on how to pair the~~ ~~*Communicator* with your iPod Touch device~~.

Note: Your intelli*track Communicator* and iPod Touch devices were already paired when they shipped from the factory.

See the intelli*track* Reader App section called Comm for additional information about wireless Bluetooth Paring and connection.

Reset to Factory Defaults

This feature should only be used when it is necessary for your intelli*track Communicator* to pair with another iPod Touch device. Pressing this hidden button will un-pair the *Communicator* with your iPod Touch.

See the intelli*track* Reader App section called Comm for additional information about wireless Bluetooth Pairing and connection.

RailStress Module

RailStress Modules are target devices. Modules communicate with intelli*track* Readers or Wayside Reader devices. Modules are wireless sensor devices attached to the rail web area. A sensor is micro-welded to the rail measuring strain and temperature. Combined, a value called Stress-Free-Temperature (SFT) is computed.

RailStress Modules are sealed from the environment and internally self-powered. Modules operate in the ISM 2.4GHz band using a proprietary Salient Systems protocol based on IEEE 802.15.4.

intelli*track* Reader App

The intelli*track* Reader App is used to read data from target devices, such as RailStress Modules, and update a limited set of values back into Modules.

To run the Reader App, find this application icon on your iPod Touch Device:

intelli*track* Reader Screen Elements

The intelli*track* Reader App always shows a navigation bar and tab bar.

Navigation Bar

The navigation bar is located at the top of the screen and contains view-

specific information. It typically contains a view title and buttons for view-specific operations.

Tab Bar

The tab bar contains four icons that are used to view and manage different aspects of operation. Tap an icon to view or manage that specific operation category.

- RSM – View and manage RailStress Module data

- Upload – Control uploading RailStress Module data to Stress-Net
- Comm – intelli*track Communicator* properties and connection status
- Settings – Change display units (temperature units of measure)

RSM

When the intelli*track* Reader App is first started, it begins focused on the RSM tab bar icon showing the Subdivisions view. Afterwards, if another tab bar function is selected and you reselect the RSM tab bar icon, then the last RSM view is presented.

Subdivisions

The Subdivisions view contains a list of module subdivisions each showing a total count of modules and the elapsed time since a module was read from that subdivision.

To see a list of modules in a subdivision, simply tap a Disclosure Indicator alongside each subdivision entry.

Subdivision Modules

The Subdivision Modules view displays a list of modules for the selected subdivision. Each module entry shows its last acquired temperature and SFT value.

To see details for a particular module, simply tap a Detail Disclosure Indicator alongside each module entry.
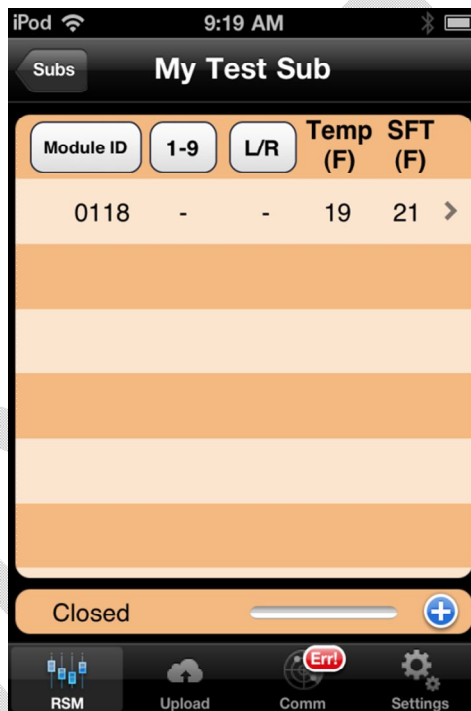
Module Sort Identifier

Tap the round rectangular button above the first data column. It will toggle between Module ID and Location. The list will be automatically resorted in ascending order.

Modules can be identified in the list by either a Module ID or Module Location. Location is a user defined value that can be set in each module. Module ID is a unique value permanently set at the factory.

Module Filter View

The module list can be separately filtered by Track Number and Left/Right Rail. Tap the round rectangular buttons above the second and third data columns to toggle through the various filter states.

Module Details

The Module Details view displays a list of values for the selected module. Module data values are shown in the list. Certain Module data values can be changed by tapping the navigation bar Install Button.
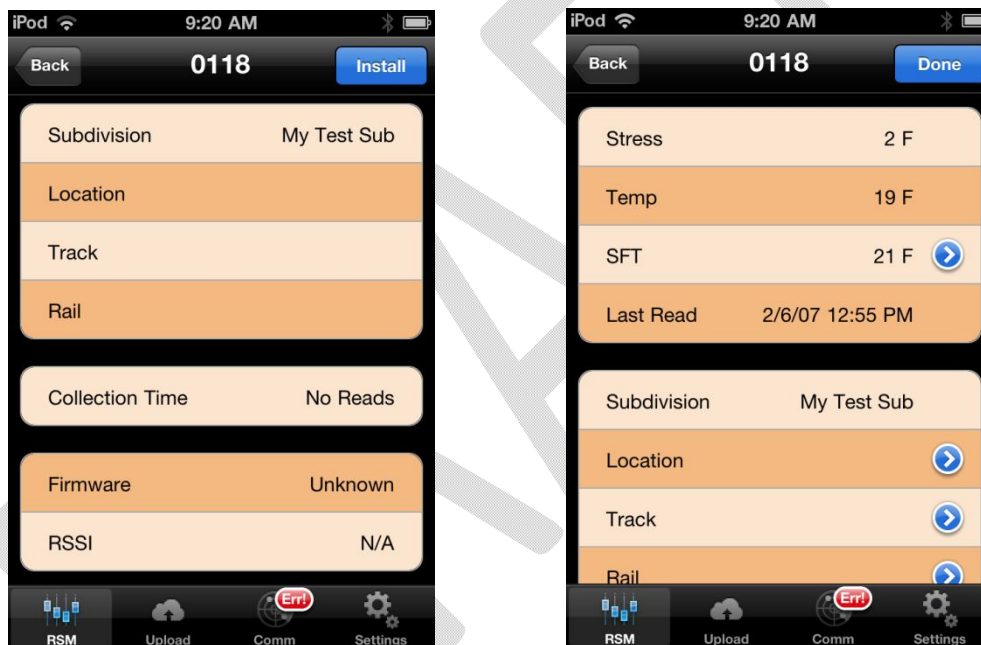
Tapping **Install** exposes detail disclosure buttons for certain listed module data items. Only those items are editable and set to update for the selected module.

     ▶ Detail disclosure buttons allow editing an indicated value.

Tapping **Done** hides the detail disclosure buttons.

Stress

Stress is a read-only value received from each module.

Temp

Temperature is a read-only value received from each module. The display units can be changed by tapping the tab bar settings icon.

SFT ⊙

SFT is the Stress Free Temperature of the rail at the module location. Tap the associated detail disclosure button to perform an SFT Calibration.

SFT Calibration

SFT Calibration can be performed by two different methods.
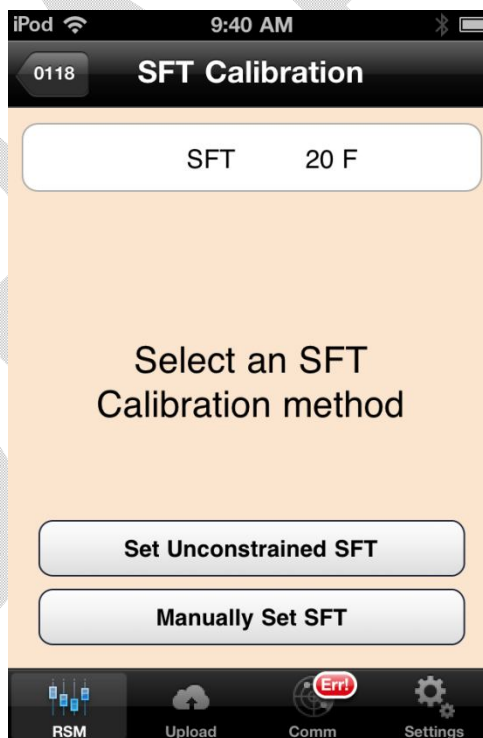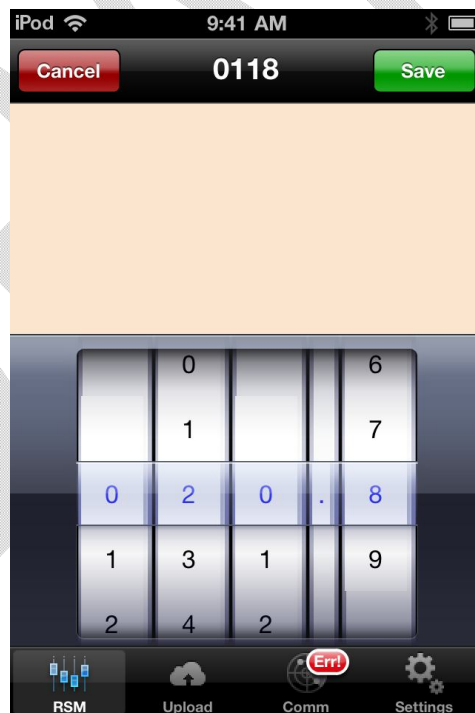
Set Unconstrained SFT

Once Set Unconstrained SFT is tapped, the following dialog appears:

Either tap Continue to commit or tap Abort to cancel the operation.

Manually set SFT

Once Manually Set SFT is tapped, the following dialog appears:

Enter the desired value and tap Save. Or, tap Cancel to discard changes.

Last Read

This is the last time the Stress, Temp, and SFT values were received from the Module.

Location ⊙

Here is where you enter the Mile Post; or, Kilometer if using the Metric System. Tap the associated detail disclosure button to edit the value.

Track ⊙

Track is a number used to identify one of more tracks alongside each other. Tap the associated detail disclosure button to edit the value.

Rail ⊙

This is one of the two rails that make up a track. Left, Right, or Unknown. Tap the associated detail disclosure button to edit the value.

Edit Location/Track/Rail

This dialog view is common for entry of Location, Track, and Rail. The scroll wheel value types will be different for each.
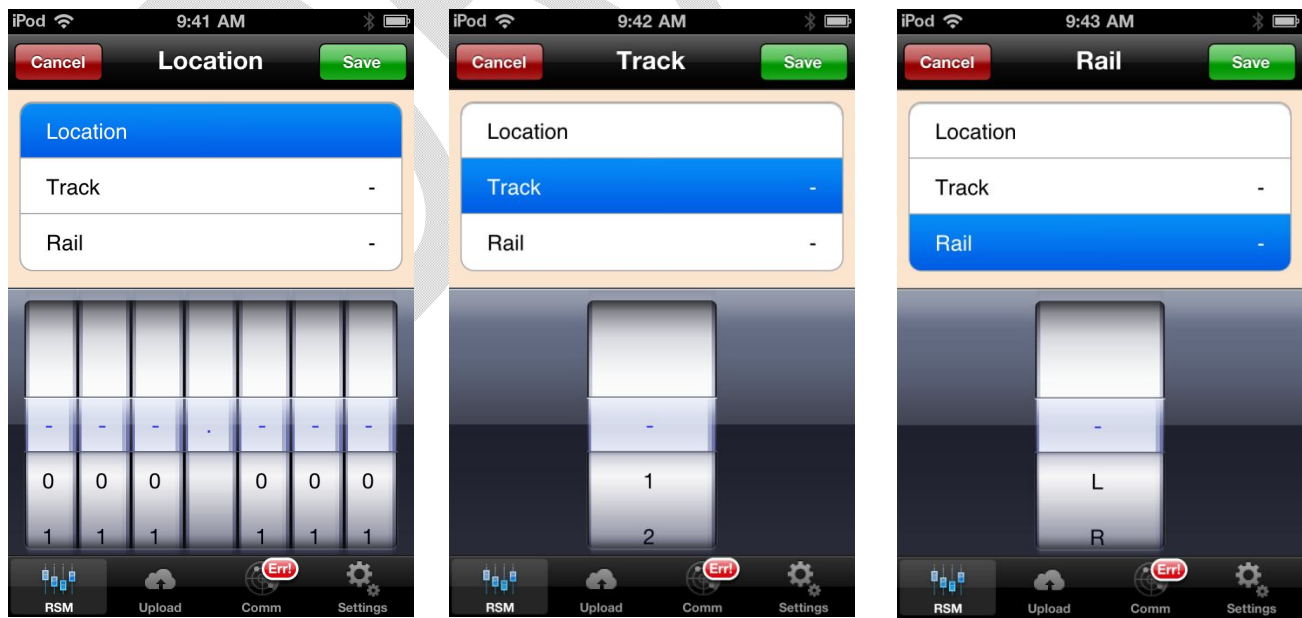
Collection Time
Collection time was the last time the module was read. If the time is unknown, then "No Reads" is displayed.

Firmware
This is the modules firmware version/revision number.

RSSI
RSSI means Relative Signal Strength Indicator. RSSI is a relative measure of RF energy received by the intelli*track Communicator* device. The units of measure are in dB.

Upload

Once your intelli*track* Reader App collects RailStress Module data, it will automatically send it to the Stress-Net Webserver. To temporarily disable Stress-Net Upload, tap "Pause". Or, tap "Allow" to enable Stress-Net Uploads.
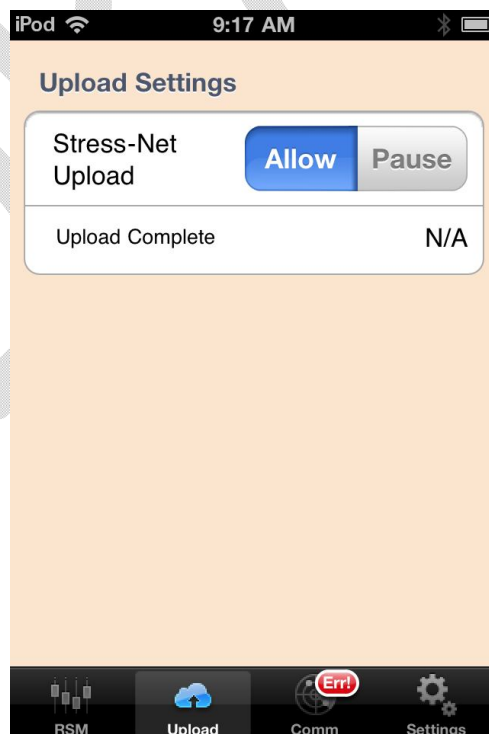
When the intelli*track* Reader App is closed, it will not remember if you set Stress-Net Upload to "Pause". Each time the intelli*track* Reader App is started, Stress-Net Upload is set to "Allow".

<u>Note</u>**:** When the intelli*track* Reader App first starts, it may inform you that it needs to upload data to Stress-Net. You can choose then to pause uploading.

Comm

The Comm view shows information about the intelli*track Communicator* device that is assumed paired to your iPod Touch.
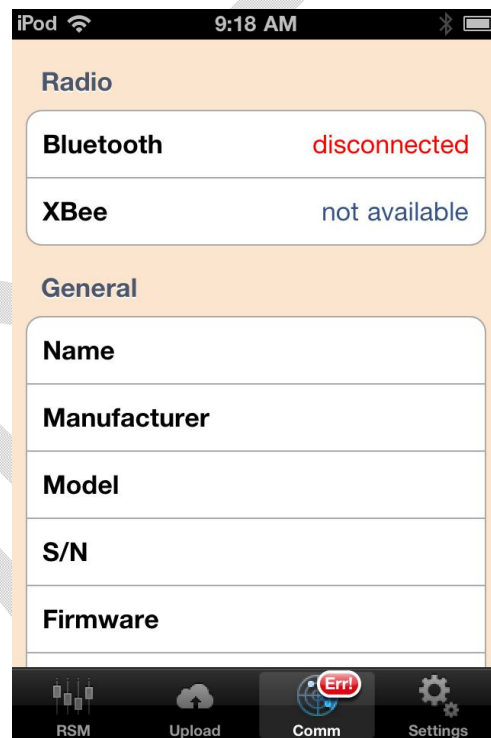
The Bluetooth Radio status indicates the connection status between your iPod Touch and intelli*track Communicator* device. If the Comm view Radio Bluetooth status indicates "disconnected", then your iPod Touch is either disconnected or is not paired to your *intellitrack Communicator* device. Also, the Comm view General details about the Communicator device will be blank.

Bluetooth Pairing

If you suspect the *intellitrack Communicator* is not paired to your iPod Touch device, then you may have to re-pair the Communicator to your iPod Touch.

Using a paper clip, press the hidden Factory Reset Button through the small hole located on the front panel of your *intellitrack Communicator* device*.*

Find and tap your iPod Touch main Settings icon (not the Reader App tab bar Settings icon).

Then tap General settings. Then tap Bluetooth.

Delete any entry you find for intelli*track Communicator.* Your iPod Touch will then try to discover your nearby *Communicator* device and create a valid pairing. Once paired, you can run your intellitrack Reader App and use your *Communicator* to access target devices (such as RailStress Modules).

Note**:** Pairing is different than being connected to your intelli*track Communicator.* Pair only means your iPod Touch device knows how to look for your specific your intelli*track Communicator* device. Your intelli*track* Reader App only knows if it has a valid connection or is disconnected. The Reader App is unaware if the *Communicator* has a valid pairing with your iPod Touch device.

Settings

Settings allow you to change temperature display units. You can select between Celsius and Fahrenheit by tapping the correct display units setting.
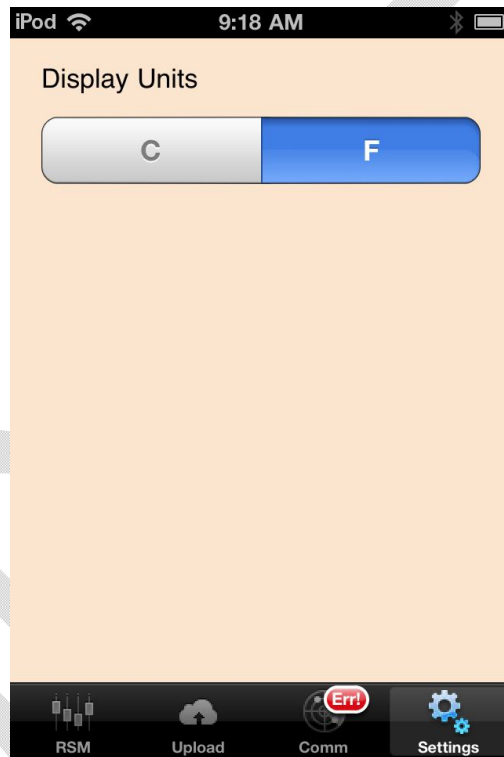
Appendix - FCC Compliance & Advisory Statement

<u>FCC Compliance</u>

The Intellitrack Communicator (device) has been tested and complies with part 15 of the CFR 47, subpart B:2007. The use of the Intellitrack Communicator is subject to the following two conditions:

> (1) This device may not cause harmful interference, and
>
> (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by Salient Systems for compliance could void the user's authority to operate the Intellitrack Communicator.

To comply with the FCC RF exposure compliance requirements, the Intellitrack Communicator must not be co-located or operating to conjunction with any other antenna or transmitter.

<u>FCC Advisory</u>

The Intellitrack Communicator has been fully tested and found to adhere fully to the interference limits and immunity for a Class B digital device, complying with FCC Part 15 rules. These specifications for these limits are designed to make certain the Intellitrack Communicator neither generates interference with other equipment, or is affected by interference from other sources in an unsafe manner. This testing is done to provide reasonable protection against harmful interference in normal usage in a railroad environment.

The Intellitrack Communicator uses and radiates radio frequency energy and is designed to comply fully with FCC Part 15 rules for Class B devices. However, if the user should modify or use this unit in an improper manner, interference could be produced that might cause interference with other devices. It should be noted that any modification to the Intellitrack Communicator will void the warranty of this unit.

However, as well designed as the Intellitrack Communicator is, there is no guarantee that interference will not occur in a particular installation. If the Intellitrack Communicator is suspected of causing harmful radio or television reception interference (simply turn the Intellitrack Communicator on and off to verify this), the user can try the following methods of solving the interference problem any (or all) of the following solutions listed below:

  • Reorient or relocate the receiving of the affected unit's antenna.
  • Increase the distance between the between the Intellitrack Communicator and the affected receiver.
  • Consult the Salient Systems or an experienced radio/TV technician for help.

The FCC ID for this unit is:
FCC ID: Y8S INTLITRKCOM

This unit contains the following:
   Transceiver Module FCC ID: PI4411B
   Transceiver Module FCC ID: OUR XBEEPRO