



# User Guide

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# CONTENTS

<b>Introduction</b>	<b>4</b>
<b>Product Overview</b>	<b>5</b>
MxEncoder .....	6
SRS Field Case.....	7
SRS Computer.....	7
Sideline Controller .....	7
Access Point.....	7
Alert System .....	8
SRS Software .....	9
RedZone .....	9
HIT Analyzer.....	9
Battery Charger.....	9
<b>Quickstart Guide</b>	<b>10</b>
Before Field Use.....	10
On the field.....	10
End of session.....	10
<b>Equipment Guide</b>	<b>11</b>
MxEncoder .....	11
Installation .....	11
Use.....	13
Service.....	13
Field Case.....	14
Sideline Controller .....	14
Access Point.....	14
SRS Computer.....	14
Alert System .....	15
Field Case Cabling .....	15
Battery Charger.....	16
<b>Software Guide</b>	<b>16</b>
Overview .....	17
Features .....	17
RedZone .....	17
Starting SRS software .....	17
Viewing, Creating, and Editing Sessions .....	19
RedZone .....	19
HIT Analyzer.....	23

Viewing, Creating, and Editing Players .....	26
RedZone .....	26
HIT Analyzer.....	30
Warnings .....	33
Monitoring Head Impact Exposure (HIT Analyzer Only) .....	35
Viewing Impacts In Real-Time .....	38
Viewing Impact History .....	39
Session Summary (HIT Analyzer Only) .....	40
Data Review Functions Available Using RedZone .....	41
Charting.....	41
Player Report.....	43
Administration.....	44
User Settings.....	44
<b>Maintenance</b> .....	<b>46</b>
Maintenance Intervals.....	46
Cleaning MxEncoders .....	46
Reconditioning .....	47
<b>Troubleshooting</b> .....	<b>47</b>
<b>Frequently Asked questions</b> .....	<b>50</b>
Hardware – Field Case .....	50
Hardware – Battery Charger .....	51
Hardware – MxEncoder.....	52
Software - RedZone .....	53
Software – HIT Analyzer .....	53
General.....	54
<b>SRS Best Practices</b> .....	<b>54</b>
SRS Synchronization .....	54
Weekly Diagnostic Check .....	55
<b>Contact Information</b> .....	<b>56</b>
<b>Compliance Information</b> .....	<b>57</b>
Federal Communications Commission (FCC).....	57
Industry Canada (IC) .....	57
<b>Warranty</b> .....	<b>58</b>

## INTRODUCTION

For over 80 years, Riddell has been the recognized leader in helmet technology and innovation. Founded with the mission to make sports equipment safer, better, and easier to use, Riddell continues to address the evolving protective equipment needs of the athlete. Today, Riddell equipment is seen on football fields from coast-to-coast, protecting every level of player—from youth athletes to NFL professionals.

Our commitment to the Sideline Response System™ (SRS™) is a natural extension of our intimate involvement with team sports and our core competence in player protection. SRS is an interconnected matrix of advanced technologies that together define the next generation in head impact exposure monitoring.

Concussions and other MTBI's are sometimes called “invisible injuries” because symptoms may not appear for 24 hours (or later) after a head injury. The athlete may not immediately have impaired motor skills nor be aware of the injury, making detection and evaluation extremely difficult for sideline personnel.

The Sideline Response System monitors and records head impact exposure during play and alerts sideline personnel that an atypical exposure has occurred. It improves the efficiency and effectiveness of all sideline staff, and it encourages the consistent application of appropriate practices by qualified personnel.

You must read this User Guide completely before set-up and use of the Sideline Response System. If you need assistance with use of the system, please contact Riddell SRS Customer Support at (800) 275-5338.

## PRODUCT OVERVIEW

The Sideline Response System is composed of the following components:

1. **MxEncoder** (Figure 1): Installed in players' helmets to record head impact data and transmit to the Sideline.



Figure 1: Revo Speed MxEncoder installed in Revo Speed helmet (Overliner removed for clarity).

2. **SRS Field Case** (Figure 2): Holds all required components of the SRS (excluding MxEncoders and Battery Charger).



Figure 2: SRS Field Case

3. **SRS Computer:** Pre-loaded with all required software to use the SRS.

4. **Sideline Controller** (Figure 3): Communication link between all active 900MHz MxEncoders and SRS Computer



Figure 3: Sideline Controller

5. **Access Point** (Figure 4) Communication link between all active WiFi MxEncoders and SRS Computer

Figure 4: Access Point (need picture)

6. **Alert System** (Figure 5): Alerts sideline staff of any player sustaining an impact above a threshold. Users may select from several pre-defined thresholds, or define their own.



Figure 5: Alert pager (part of the Alert System).

7. **SRS Software:** Suite of custom software to setup, manage, and use the SRS hardware in the field.

8. **Battery Charger** (Figure 6): 40 position charging station for MxEncoder battery packs.



Figure 6: Battery charger

## MxEncoder

The MxEncoder, Figure 7, is the impact sensor and wireless radio worn by the athlete. Each MxEncoder is installed in a player's helmet and contains six single-axis  $\pm 250g$  accelerometers that record head impacts as they occur and transmit that information in near real-time to the Sideline Controller. MxEncoders are designed to fit comfortably within the helmet with no modifications needed, and to retain the NOCSAE certification as installed.



Figure 7: Revo Speed MxEncoder

A 3.6V rechargeable NiMH Battery Pack, Figure 8, is used in each MxEncoder and typically holds a charge for one week during normal use.

**IMPORTANT: Only SRS MxEncoder Battery Packs should be used to power MxEncoders**

The MxEncoder has an automatic On/Off switch that turns on once the helmet is placed on the player's head and shuts off when the helmet is removed. The switch uses proximity based sensing that determines when there is a head in the helmet. A hand may also be used to turn the switch on. The switch automatically turns off the unit after it no longer senses the presence of a head in the helmet.



Figure 8: MxEncoder battery pack

MxEncoders must be installed in the appropriate model/size helmet according to the chart below.

Helmet Model	Size	Mx Encoder Model		
		Revolution IQ	Revo Speed	Speed Flex
Revolution	M/L/XL	●		
Revo IQ	M/L/XL	●		
Revo Speed	S/M/L/XL		●	
Revo Speed Classic	S/M/L/XL		●	
Speed Flex	S/M/L/XL			●

## SRS Field Case

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The SRS Field Case, Figure 9, is a protective carrier designed to provide convenient storage for all system components, protect electronics from adverse weather conditions, and make the SRS easy to use on and off the field.

The Field Case is configured with internal power outlets and data transfer connections. Power is provided to the case via an external plug on the left side of the case. External 120v AC power is required while collecting data on the field.

The Field Case is water resistant and contains a ventilation system. This means that the lid of the case can be closed while it is raining and still collect data and transmit alerts.

Depending on the system purchased, the SRS Field Case is one of three models: 900MHz only, WiFi only, or Dual Mode (900MHz & WiFi).



Figure 9: SRS Field Case  
(900MHz only model  
shown here).

## SRS Computer

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The SRS Computer is a laptop computer that is configured for a specific SRS team to record all head impact data and allow system setup and maintenance. The computer uses a Windows 7 operating system.

## Sideline Controller

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The Sideline Controller, Figure 10, transmits and receives information to each 900MHz MxEncoder. The Sideline Controller relays this information to the SRS Computer. The Sideline Controller can simultaneously communicate with up to 100 MxEncoders up to 150 yards away. Power is supplied through a waterproof USB connection on the outside of the Field Case. The Sideline Controller is water resistant and can remain in operation during all weather conditions. Available in 900MHz only and Dual Mode Field Case models.



Figure 10: Sideline Controller

## Access Point

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The Access Point, Figure 11, transmits and receives information to each WiFi MxEncoder. The Access Point relays this information to the SRS Computer. The Access Point can simultaneously communicate with up to 100 MxEncoders up to 150 yards away. Power is supplied through a waterproof USB connection on the outside of the Field Case. The Access Point is water resistant and can remain in operation during all weather conditions. Available in WiFi only and Dual Mode Field Case models.

Figure 11: Access Point  
(need picture)

## Alert System

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The Alert System consists of two parts:

- **Alert Pager:** This is carried by sideline staff and displays the player number, impact magnitude, alert type and impact time for any impact that is above a player's customizable alert threshold. Multiple Alert Pagers can be used with the same SRS. The Alert Pagers have a communication range of 1/8<sup>th</sup> of a mile.
- **Alert Pager Transmitter:** This is housed in the base of the Field Case and transmits valuable alert information to all available Alert Pagers.



*Figure 12: Alert Pager*



## SRS Software

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The SRS comes with two software applications, RedZone and HIT Analyzer. These software applications work together to allow you to create sessions, manage roster lists, collect impact data, monitor system performance, and analyze player and team impact data.

### RedZone

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- Used off the field (web based)
- Manage roster list and equipment assignments
- Manage sessions
- View head impact exposure data for every player
- Create detailed summary Player Reports



Figure 13: Example of RedZone charting

### HIT Analyzer

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- Used on the field
- Collect head impact data in real time from all active players
- Make roster and session adjustments as needed while on the field
- Provides system functionality status and session summary statistics

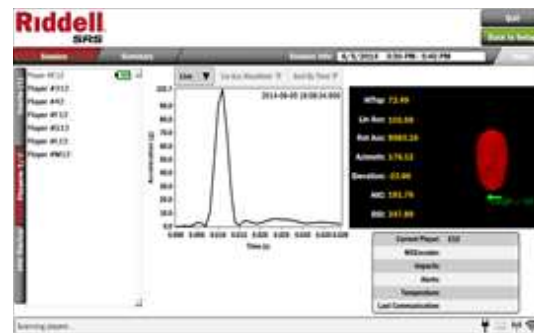


Figure 14: Example of HIT Analyzer data collection.

## Battery Charger

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The Battery Charger is capable of recharging up to 40 MxEncoder battery packs simultaneously. Typical charging time is 4 -6 hours for a drained battery. The charger has a built in protection circuit that automatically shuts off the charging cycle once a battery has been fully charged to prevent damage. There are two ventilation fans that turn on when the charger is powered on to prevent the charger from over-heating, and the charger also has an over-temperature sensor to shut off the charging cycle if a battery is damaged. The charger should **only be used indoors with the lid open** to prevent from over-heating. **The charger is only to be used with corresponding Riddell SRS NiMH battery packs (P/N R64207).**

## QUICKSTART GUIDE

In order to ensure successful operation of the SRS, the following steps must be completed:

### Before Field Use

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1. Install MxEncoders in each player's helmet using supplied Velcro.

NOTE: See the Equipment Guide for help on MxEncoder installation and the MxEncoder/Helmet compatibility chart.

2. Install charged battery pack into each MxEncoder.
3. Install the overliner if the helmet is supplied with one.
4. Edit/verify that all player profiles have the correct MxEncoder serial number and helmet model/size.

### On the field

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1. Setup Field Case in a central location of the sideline and away from large metal objects.
2. Plug in power cable to side of Field Case and then into power outlet/extension cord.
3. Attach Sideline Controller Mast to side of Field Case.
4. Screw Sideline Controller onto Mast.
5. Attach Antenna to Sideline Controller connector.
6. Adjust Mast height so Sideline Controller is ~5' off the ground.
7. Plug Sideline Controller USB Cable into side of Field Case.
8. Start SRS Computer and start the HIT Analyzer program.
9. Enter your Session or create a new session within the Session Manager.
10. Begin collecting data by entering session.

### End of session

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1. Close out of SRS Software and shutdown the computer.
2. Unplug Sideline Controller, unscrew Antenna, unscrew from Mast, and store components back in Field Case.
3. Unplug power cable and store in Field Case.
4. Close Field Case.

### MxEncoder

#### Installation

To install **Revolution IQ** and **Revolution Speed** MxEncoders in a helmet:

1. Separate the Velcro strips attached to the back of the MxEncoder.
2. Remove the adhesive backings from the loop side.
3. Adhere to corresponding location on the inside of the helmet (Figure 15)



Figure 15: Position of MxEncoder Velcro strips inside of helmet.

4. Position the MxEncoder in the helmet as shown in Figure 16.



Figure 16: Initial position of the MxEncoder prior to inserting it fully.

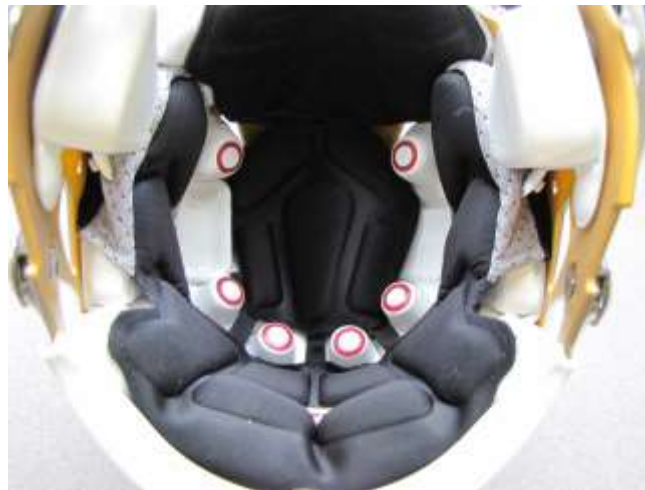
5. Press the center of the MxEncoder firmly down into the gap between helmet pads.

6. Keeping the center of the U-shape MxEncoder lined up with the center of the helmet pads, gently work the front sections of the MxEncoder into each front area of the helmet firmly pressing the MxEncoder all the way down into the gap in the helmet (see Figure 17).



*Figure 17: Final position of the MxEncoder.*

7. Install the HITs overliner (see Figure 18).



*Figure 18: Installation of the HITs overliner.*

## Use

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Each MxEncoder requires a Battery Pack to operate. Be sure the power cable is routed as shown in Figure 19 to prevent any damage to the wires.

MxEncoders need to have routine battery changes in order to ensure proper function. It is recommended that the MxEncoder battery be replaced once a week during typical use. Follow the Best Practices Guide (Page 54) for help on performing battery changes. Changing a battery pack **does not** erase stored events on the MxEncoder's on-board memory.

During use, an MxEncoder Battery Pack may fall below a full charge in which case a Low Battery Warning will be displayed in the HIT Analyzer software (Page 16). Under typical conditions, an MxEncoder will function for 1-2 hours after this initial warning.

NOTE: To ensure continuous head impact exposure monitoring, recharging or replacing the battery is recommended after a warning is received.

All MxEncoders have an automatic On/Off switch that helps conserve battery life. The switch is a "proximity sensor" that senses the presence of a head in the helmet. When not in use on the field, the MxEncoder can be activated by placing a hand directly over the proximity sensor as indicated in Figure 20.

MxEncoders can be used on the field without the presence of the Field Case. However, there is only on-board memory storage for 100 events. **Once the on-board memory for the MxEncoder is full, no more events can be stored, and all subsequent events will not be recorded.** The typical number of recorded events per player, per session is 20-40, however during certain types of play this can be much higher, so it is recommended the Field Case always be in use during data collection.



*Figure 19: Wire position when installing MxEncoder battery.*



*Figure 20: Proximity sensor location*

## Service

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MxEncoders may be removed for routine cleaning as needed. A mild soapy solution can be used to remove dirt from the MxEncoder surfaces. **MxEncoders are not water resistant** and should never be submerged in liquid. This will cause permanent damage to the internal electronics and will render the MxEncoder non-functional. MxEncoders have no serviceable parts. If an MxEncoder is suspected of not working, please follow the Troubleshooting Guide (Page 47) for assistance with a non-functional MxEncoder.

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## Field Case

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### Sideline Controller

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(Only applicable to 900MHz only and Dual Mode Field Case models) The SRS Sideline Controller should be stored in the Field Case when not in use. The Sideline Controller is water resistant and can remain in use during inclement weather.

To use the Sideline Controller follow the steps below:

1. Screw the bottom of Sideline Controller onto the Sideline Controller Mast.
2. Screw the Antenna onto the top of the Sideline Controller.
3. Plug in the waterproof USB cable to the side of the Field Case.
4. Screw on waterproof connector.
5. Adjust the height of the Mast so the Sideline Controller is ~5 ft. from the ground.
6. Verify the Sideline Controller is working by seeing players turn active on the SRS Software
7. A green indicator light is also visible on the underside of the Sideline Controller when the unit is working correctly.



Figure 21: Sideline Controller.

**Note:** Sideline Controllers may experience interference in communication if placed next to large metal objects.

If the Sideline Controller is not working, follow the Troubleshooting Guide (Page 47). There are no serviceable parts on the Sideline Controller.

### Access Point

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(Only applicable to WiFi only and Dual Mode Field Case models) The SRS Access Point should be stored in the Field Case when not in use. The Access Point is water resistant and can remain in use during inclement weather.

To use the Access Point follow the steps below:

1. Secure Access Point to mast with push pin.
2. Screw the two antennas onto the top of the Access Point.
3. Plug in the waterproof ethernet cable to the side of the Field Case.
4. Adjust the height of the Mast so the Access Point is ~5 ft. from the ground.
5. Verify the Access Point is working by seeing players turn active on the SRS Software
6. The array of green/orange/red lights on the front face of the Access Point are active when the unit is working correctly.

Figure 22: Access Point (need picture).

**Note:** Access Points may experience interference in communication if placed next to large metal objects.

If the Access Point is not working, follow the Troubleshooting Guide (Page 47). There are no serviceable parts on the Access Point.

### SRS Computer

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The SRS Computer comes pre-loaded with all of the software necessary to use the SRS. Verify all connections on the back of the SRS computer are securely plugged in (AC power adaptor and USB) before use. Turn on the computer and after the standard Windows startup, you will see your computer desktop with shortcuts for the SRS software applications.

SRS Data Synchronization is a process in which all impact data are automatically backed-up onto a remote SRS Data Server in the event there is damage to the SRS Computer hard drive. **Daily data synchronization is strongly recommended.** Synchronization only requires an active internet connection. To setup a wireless internet connection, follow the Windows Network Settings guide. Due to some network security settings it may be necessary to have your Network Administrator **allow traffic through port 2440 to RedZone.riddell.com.**

The **SRS computer is not water resistant** and should be covered in the event of inclement weather. The computer may remain in use during inclement weather by closing the laptop lid and then closing the Field Case lid to protect the computer from water damage.

## Alert System

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The SRS Alert System consists of the Alert Pager that is carried by sideline staff and the Alert Pager Transmitter that is housed inside the Field Case.

**IMPORTANT:** To use the Alert System, ensure the Field Case has external 120V AC power and each Alert Pager is turned on.

To turn on the Alert Pager, press and hold the top button. The Alert Pagers can have audible, vibration, or silent alert methods and can store up to 25 alerts. The Alert Pager requires 1 AAA battery. The typical battery life of an Alert Pager is one month. Alert Pagers will “chirp” to indicate a low battery.

Test Alerts can be sent to the Alert Pagers by utilizing the “Send Test Alert” feature through the SRS Software. Refer to the SRS Software Guide for more information.

If the Alert Pager or Alert Pager Transmitter becomes unresponsive refer to the Troubleshooting Guide (page 47).

There are no serviceable parts to the Alert System.

## Field Case Cabling

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The SRS Field Case comes fully configured. However, cabling may become unplugged during shipment or travel. The following Cabling Diagram may be used for reference in the event something becomes unplugged.

NOTE: Care should be taken when lifting out the layers of the Field Case foam to access the SRS cabling.



Figure 23: SRS Field Case cabling diagram

## Battery Charger

### Use

The SRS Battery Charger is capable of charging 40 MxEncoder Battery Packs simultaneously. To use the Battery Charger, follow these steps:

1. Plug in the power cable to the side of the Charger and then into a 120V AC power outlet.
2. Confirm that all charger lights turn green momentarily then turn to red (this is a self-test).
3. Plug in MxEncoder Battery Packs into each of the charging ports.
4. Once a Battery Pack is fully charged, its corresponding light will turn green.

NOTE: Typical charging time is 4-6 hours for a full charge.

**IMPORTANT:** Do not close the charger lid while in use. Battery Charger should only be used indoors in a well-ventilated area. Only charge Riddell SRS MxEncoder Battery Packs using the SRS Battery Charger.

### Service

The SRS Battery Charger has no serviceable parts. If one or more of the charging lights becomes damaged, see the Troubleshooting Guide (Page 47) to arrange for repair.

## SOFTWARE GUIDE

**Note:** The Riddell SRS Software has been pre-loaded and customized for your specific team. There are no user adjustments/settings to any of the pre-loaded applications. Removal or installation of additional



*software on the SRS computer may cause the SRS Software to become non-functional and may void system warranty.*

## Overview

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The SRS comes with two software applications: RedZone and HIT Analyzer. These complementary applications work together to allow you to create sessions, manage roster lists, collect impact data, monitor system performance, and analyze player and team impact data. The RedZone website can be accessed from your SRS laptop or from any other computer when an Internet connection is available. The HIT Analyzer program is available only on your SRS laptop.

RedZone and HIT Analyzer share data through a synchronization process. HIT Analyzer will automatically try to synchronize on startup and shutdown if an Internet connection is available. **To ensure data accuracy and integrity it is important that HIT Analyzer is able to synchronize on a regular basis.**

## Features

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### RedZone

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The RedZone web application is the main administration tool for managing the SRS. The features of RedZone include:

1. Remote roster, session, and user management
2. Charting tools for team wide or individual impact data
3. Detailed individual player reports for custom date ranges

### HIT Analyzer

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The HIT Analyzer program is used to collect and store data on the field. The features of HIT Analyzer include:

1. Real-time communication to active MxEncoders on the field
2. Processing impact data downloaded by the Sideline Controller and/or Access Point
3. Real-time alerting of any impact above user defined thresholds
4. Displaying daily impact history by player
5. Providing detailed player information (last communication time, current battery voltage, current helmet temperature and total number of impacts recorded for that session)
6. Calculating session summary statistics such as the number of impacts, impact location by percentage, and a top 10 impact list
7. Providing system hardware diagnostic information

## Starting SRS software

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The following sections describe how to access the SRS software applications.

### RedZone

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The RedZone website can be accessed from almost any Internet browser.

1. Go to the website [www.redzone.riddell.com](http://www.redzone.riddell.com), and you will be presented with the screen shown in Figure 24. Alternately you can use the RedZone shortcut on your SRS laptop.
2. Log onto RedZone by using your Riddell username and password. (This is the same username and password you provided when you ordered your SRS system).



Figure 24: RedZone login screen.

## HIT Analyzer

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To start the HIT Analyzer application:

1. After you turn on your SRS computer the HIT Analyzer software will start automatically. If you have closed HIT Analyzer and need to restart it, double-click on the HIT Analyzer icon on the desktop of your SRS laptop.
2. If your organization has multiple teams using SRS systems, you will be presented with the screen shown in Figure 25. Select the team you wish to use and click ok to proceed. If your organization only has one team, you will not see this screen.
3. If an Internet connection is available the HIT Analyzer program will attempt to synchronize its local database with the Riddell SRS Data Management Server (Figure 26).
4. Once the synchronization attempt is complete, you will be informed if the process was successful. The process should take less than 1 minute.
5. You will now see the HIT Analyzer Session Manager (Figure 30)

*NOTE: If the synchronization fails you can still continue to use the HIT Analyzer program.*



Figure 25: HIT Analyzer screen shown when you have more than one team using an SRS system.



Figure 26: The HIT Analyzer in the process of synchronizing to the central database.

## Viewing, Creating, and Editing Sessions

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Both RedZone and HIT Analyzer allow you to create and edit Sessions. A Session is how you are able to associate events with a specific team activity (a practice, a game, etc.). By identifying a session's date, time range, and participating players before a session begins, all impacts that occur within that time range will be identified with a software generated session identifier. Using the session parameters that you define the SRS system will be able to automatically disregard acceleration events that may occur outside of on-field activities. For example, an MxEncoder may be inadvertently turned on and impacted while equipment is transferred in the locker room. By defining a session, the SRS will know these events are not head impacts and, in turn, will not display them in HIT Analyzer or RedZone. **You must create a session before collecting data with the HIT Analyzer application.** Sessions may be setup ahead of time if the date and times are known.

**NOTE:** While both RedZone and HIT Analyzer allow you to create Sessions, to ensure data integrity it is highly recommended that you do not create sessions with overlapping time periods.

## RedZone

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### Viewing Sessions

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To view a full list of your Sessions in RedZone, click on the option labeled "Session" in the left hand column under TEAM MANAGEMENT (Figure 27). The session list can be sorted by clicking on any of the category headings, and the list can be filtered using the options under the title "Session Filters". In addition you can change how the session information is displayed using the Session Display Mode pull-down menu. Setting the display mode to "List" presents the sessions as shown in Figure 27. Changing the display mode to "Calendar" displays the Sessions on a calendar.

After changing the session filters or the session display mode you must click on the "Refresh" button to update the information displayed on the screen.

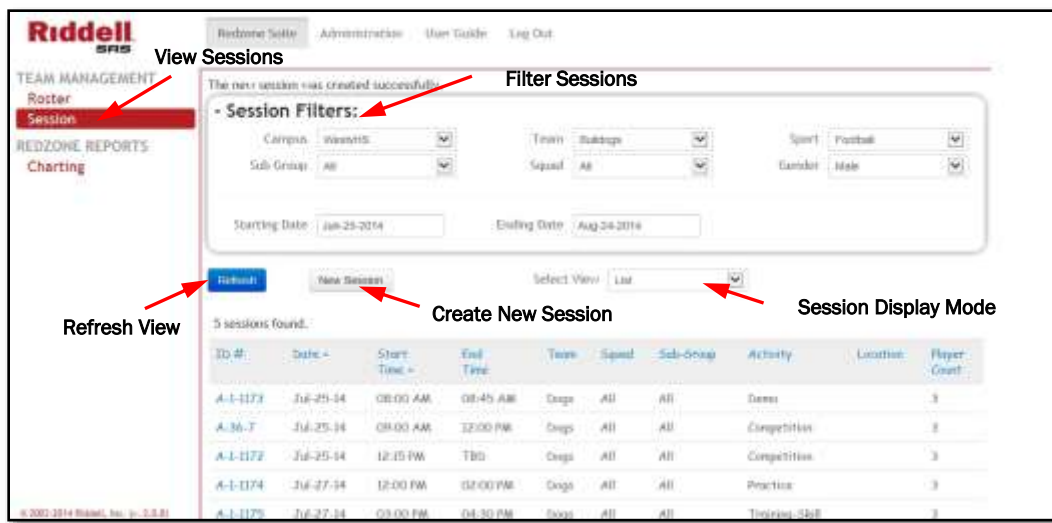


Figure 27: RedZone Session Manager.

The following information is given for each session:

1. ID#: This is an alphanumeric code automatically generated by HIT Analyzer or RedZone. Each ID# is unique and cannot be changed
2. Date: This is the date on which the session occurs
3. Team: This is the name of your team
4. Squad: All, Varsity or Jr. Varsity
5. Sub-Group: All, Defense, Offense or Special Teams
6. Start time: Time at which the session starts
7. End Time: Time at which the session is expected to end

**NOTE:** If this field contains “TBD” it means that the end time for the session was not defined. If this field says “Session Ended” it means that the software forced the session to end. This is done to prevent a session from overrunning other sessions previously defined

8. Activity: This is the type of activity your team will be participating in for the session (practice, game, etc.)
9. Location: Team location (not applicable to all users)
10. Player Count: Number of players that are assigned to the session

## Creating and Editing Sections

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To create a new session in RedZone, click on the “New Session” button shown in Figure 27. To edit an existing session, click on the ID# of the session you wish to edit (e.g. A-1-1173). Once you complete setting all desired parameters for the session, you may save your session by clicking the Save button on the top right of the screen, as shown in Figure 28.

For creating or editing a session, there are four tabs: session, players, staff, and weather. While not all fields are required, it is recommended that you fill in as much information as possible.

### Session Tab

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Under this tab, you are able to set all session parameters. A detailed list describing each parameter in RedZone is given below.

1. Start Date: The date on which the session occurs
2. Start Time: The time at which the session starts  
*NOTE: If you are creating a new session by default the time is set to the closest 5-minute interval in the future*
3. End Time: The time at which the session ends. If you are not sure what time the session ends, you can set the end time to “TBD”  
*NOTE: If you are creating a new session, by default the end time is set to two hours after the start time*
4. Activity: The activity the team is participating in for the session (practice, game, etc.)  
*NOTE: If the system is being used for a session outside of typical on-field activities that will result in false impacts (ex. Product demonstration, equipment testing, etc.), select “demo”. All data collected in a demo session will be invalidated, and, therefore, not shown in any future data reporting*
5. Level: The session can be designated as organized or recreational
6. Sub-Group: The type of group(s) that will be participating in the session (offense only, defense only, special teams only or all)
7. Squad: Select the groups participating from the available dropdown list
8. Opponent: A descriptive label of whom your team is playing against
9. Home or Away: Use this field to designate whether this session is occurring on your home field or at another location
10. Season: A description of the time when the session will take place
11. Campus: The campus associated with the team having a session
12. Team: Name of the team
13. Sport: Type of sport the team is participating in
14. Gender: The team’s gender

Figure 28: Session Tab in the RedZone Session Editor. These fields define the session parameters.

## PLAYERS TAB

Under this tab, you are able to select which players will be participating in your session. A list of all players in your roster is provided in this tab, and all players are marked as participating in the session by default. If you wish to exclude any players from the session, deselect the checkbox next to their name. Once deselected, you will be prompted for a reason why this player is being excluded via a drop down menu entitled "Inactive Reason". It is not necessary to provide a reason.

Active	ID	Name	Jersey Number	Name	Speed	Sub Group	Position	Inactive Reason
<input checked="" type="checkbox"/>	10	glover, dwayne	44		44	Defense	DB	Ready
<input checked="" type="checkbox"/>	25	Johnson, Devin	44		44			
<input checked="" type="checkbox"/>	24	Smith, Duke	44		44			
<input checked="" type="checkbox"/>	10	Wright, Andy	44		44			
<input checked="" type="checkbox"/>	23	Smith, Player	44		44	Offense	C	
<input type="checkbox"/>	8	Smith, Player	44		44	Special Teams	K	

Figure 29: Players Tab in the RedZone Session Editor. Use this to select which players are participating in your session.

## Staff and Weather Tabs

These are two additional tabs that are only provided in RedZone. The fields under these tabs allow you to pick staff members to associate with your session and to enter information about the weather on the day of your session.

## Viewing Sessions

Click on the “Session Manager” option on the toolbar to view your session as shown in Figure 30.

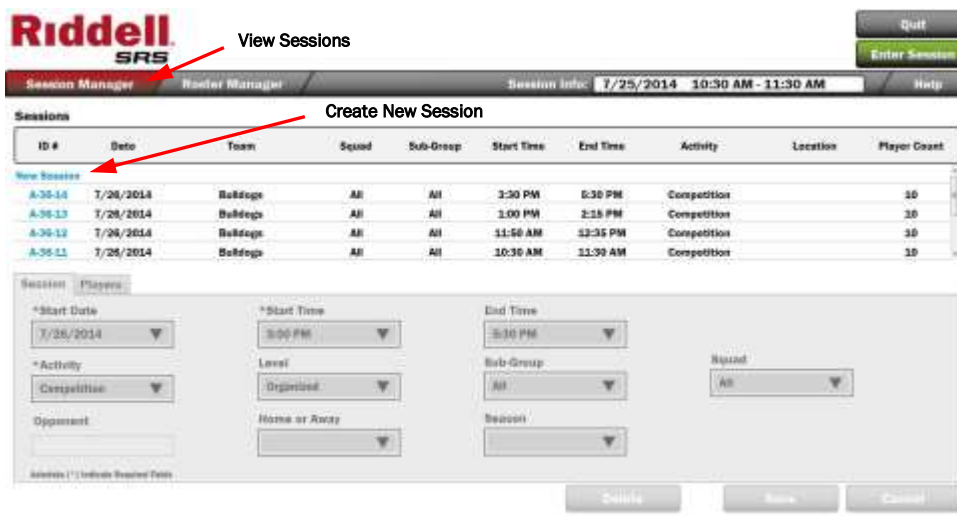


Figure 30: HIT Analyzer Session Manager. To get to the Session Manager click on the “Session Manager” item on the toolbar.

The session list can be sorted by clicking on any of the category headings. The HIT Analyzer session list cannot be filtered.

**NOTE: The session list in HIT Analyzer is limited to a 72 hour period – 24 hours prior to the current time and 48 hours ahead of the current time. Use RedZone to view your entire session history.**

The following information is given for each session:

1. ID#: This is an alphanumeric code automatically generated by HIT Analyzer or RedZone. Each ID# is unique and cannot be changed
2. Date: This is the date on which the session occurs
3. Team: This is the name of your team
4. Squad: All, Varsity or Jr. Varsity
5. Sub-Group: All, Defense, Offense or Special Teams
6. Start time: Time at which the session starts
7. End Time: Time at which the session is expected to end

**NOTE: If this field contains “TBD” it means that the end time for the session was not defined. If this field says “Session Ended” it means that the software forced the session to end. This is done to prevent a session from overrunning other sessions previously defined**

8. Activity: This is the type of activity your team will be participating in for the session (practice, game, etc.)
9. Location: Team location (not applicable to all users)
10. Player Count: Number of players that are assigned to the session

## Creating and Editing Sessions

---

To create a new session in HIT Analyzer, click on the “New Session” link on top of the session list as shown in Figure 30. To edit an existing session, click on the ID# of the session you wish to edit. Once you complete setting all desired parameters for the session, you may save your session by clicking the Save button on the bottom right of the screen, as shown in Figure 31.

**IMPORTANT: You cannot edit a session in the HIT Analyzer once it has started.**

For creating or editing a session, there are two tabs: session and players.

### Session Tab

---

Under this tab, you are able to set all session parameters. While not all fields are required, it is recommended that you fill in as much information as possible. A detailed list describing each parameter in the HIT Analyzer is given below.

1. Start Date: The date on which the session occurs
2. Start Time: The time at which the session starts  
***NOTE:** If you are creating a new session by default the time is set to the closest 5-minute interval in the future*
3. End Time: The time at which the session ends. If you are not sure what time the session ends, you can set the end time to “TBD”  
***NOTE:** If you are creating a new session, by default the end time is set to two hours after the start time*
4. Activity: The activity the team is participating in for the session (practice, game, etc.)  
***NOTE:** If the system is being used for a session outside of typical on-field activities that will result in false impacts (ex. Product demonstration, equipment testing, etc.), select “demo”. All data collected in a demo session will be invalidated, and, therefore, not shown in any future data reporting*
5. Level: The session can be designated as organized or recreational
6. Sub-Group: The type of group(s) that will be participating in the session (offense only, defense only, special teams only or all)
7. Squad: Select the groups participating from the available dropdown list
8. Opponent: A descriptive label of whom your team is playing against
9. Home or Away: Use this field to designate whether this session is occurring on your home field or at another location
10. Season: A description of the time when the session will take place



**Riddell SRS**

Session Manager Roster Manager Session Info: 7/25/2014 10:30 AM - 11:30 AM

**Sessions**

ID #	Date	Team	Squad	Sub-Group	Start Time	End Time	Activity	Location	Player Count
A-99-14	7/25/2014	Varsity	40	40	3:00 PM	4:00 PM	Competition		20
A-99-13	7/24/2014	Varsity	40	40	3:00 PM	4:00 PM	Competition		20
A-99-12	7/24/2014	Varsity	40	40	11:30 AM	12:30 PM	Competition		20
A-99-11	7/24/2014	Varsity	40	40	10:30 AM	11:30 AM	Competition		20

**Session Parameters:**

\*Start Date: 7/27/2014 \*Start Time: 1:35 PM End Time: 2:40 PM

\*Activity: Competition Level: Organized Sub-Group: All

Opponent: Home or Away: Season:

Buttons: Save, Cancel

Figure 31: Session Tab in the Session Editor in HIT Analyzer. The fields shown define your Session's parameters.

## Players Tab

Under this tab, you are able to determine which players will be participating in your selected session. A list of all players on your roster is provided in this tab; all players are marked as participating in the session by default. If you wish to exclude any players from the session, deselect the checkbox next to their name. Once deselected, you will be prompted for a reason why this player is being excluded via a drop down menu entitled "Inactive Reason". It is not necessary to provide a reason.

**Riddell SRS**

Session Manager Roster Manager Session Info: 7/25/2014 10:30 AM - 11:30 AM

**Players**

Active	Jersey Number	Name	Squad	Sub-Group	Position	Inactive Reason
<input checked="" type="checkbox"/>	17	Brown, Josh	Varsity	Offense	OL	
<input checked="" type="checkbox"/>	24	Davis, Jake	Varsity	Defense	DL	
<input checked="" type="checkbox"/>	15	Johnson, Chris	Varsity	Offense	QB	
<input checked="" type="checkbox"/>	38	Jones, Tyler	Jr. Varsity	Offense	0	
<input checked="" type="checkbox"/>	32	Martinez, Andy	All	Offense	OL	
<input checked="" type="checkbox"/>	36	Miller, Brandon	Jr. Varsity	Special Teams	IL	

Buttons: Save, Cancel

Figure 32: Players Tab in the HIT Analyzer Session Editor. Here you can select which players are participating in your session.

## Viewing, Creating, and Editing Players

Both RedZone and HIT Analyzer allow you to view, create, and edit players. By creating a profile for each player you will be able to track impact data by position, alert type, etc.

### RedZone

#### Viewing Players

In RedZone click on the “Roster” option on the left hand side of the screen to view your roster as shown in Figure 33. The RedZone roster can include a complete history of all active and inactive players. The roster can be sorted by clicking on any of the category headings, and the roster can be filtered using the options under the title “Roster Filters”.

After changing the roster filters you must click on the “Refresh” button to update the information displayed on the screen.

The screenshot displays the RedZone Roster Manager interface. On the left sidebar, the 'Roster' option is selected. The main area features a 'Roster Filters' section with dropdowns for Campus, Team, Sport, Squad, Sub Group, Position, Player Status, and Gender. Below the filters is a 'Refresh View' button. To the right of the filters is a 'Create New Player' button. The main table lists 10 players with columns for Name, Jersey Number, Displayed Player ID, Squad, Sub Group, Position, Available, Gender, and MxEncoder. Red arrows point to the 'View Roster' link, the 'Filter Roster' section, the 'Refresh View' button, and the 'Create New Player' button.

Name	Jersey Number	Displayed Player ID	Squad	Sub Group	Position	Available	Gender	MxEncoder
Beck, John	24	24	AS			Y	M	MSV014-012B
Johnson, Chris	15	15	AS			Y	M	MSV014-080D
Zane, Tyler	18	18	AS			Y	M	
East, Brian	17	17	AS			Y	M	
Martinez, Andy	22	22	AS			Y	M	MSV014-141D
Miller, Brandon	36	36	AS			Y	M	
Robinson, Dan	22	22	AS			Y	M	
Smith, Matt	14	14	AS			Y	M	
Williams, Matt	16	16	AS			Y	M	
Wilson, Matt	10	10	AS			Y	M	

Figure 33: RedZone Roster Manager. This is a full list of all of your players.

The following categories are provided for each player: Name, Jersey Number, Displayed Player ID, Squad, Sub-Group, Position, Available To Play, Gender, MxEncoder S/N. By default the roster is sorted by the players' last names. The Displayed Player ID is the identification used by the HIT Analyzer program to identify a player when collecting impact data.

## Creating and Editing Players

---

To create a new player in RedZone, click on the “New Player” button shown in Figure 33. To edit an existing player, click on the player’s name.

For creating or editing a player, there are four tabs for entering information: General, Team Membership, HIT System, and Emergency Info. Although only some fields are required, it is recommended that you fill in as much information as possible. When you have completed entering the player’s information, click on the “Save” button in the upper right corner. You will be prompted if you are missing required information or if you have made an invalid entry. A detailed description of each field is provided below.

The screenshot shows the RedZone roster editor interface. The top navigation bar includes 'RedZone Suite', 'Administration', 'User Guide', and 'Log Out'. The left sidebar shows 'TEAM MANAGEMENT' with 'Roster' selected, and 'REDZONE REPORTS' with 'Charting'. The main content area is titled 'Campus: WestvH5 Sport: Football' and has 'Create' and 'Cancel' buttons. Below the title are four tabs: 'General', 'Team Membership', 'HIT System', and 'Emergency Info'. The 'General' tab is active, showing a form with the following fields: 'First Name', 'Middle Initial', 'Last Name', 'Unique ID', 'Gender' (with a dropdown menu), 'Available To Play' (with a dropdown menu), 'Date of Birth', 'Graduating', 'Address', 'Address 2', 'City', 'State', 'Zip Code', 'Email', 'Home Phone', 'Work Phone', 'Mobile Phone', 'Website User' (with a dropdown menu), 'User Name', 'Password', and 'Confirm'. A legend at the bottom right indicates that fields with an asterisk (\*) are required.

Figure 34: RedZone roster editor. The screen shot above shows the fields available under the “General” tab.

### General Tab

---

Under this tab you define a player’s basic personal information. A description of all fields for this tab is provided below.

1. First Name, Middle Initial, Last Name: Player’s name (for documentation only; impact/injury data will never be associated with a player’s name)
2. Unique ID: A unique identifier that will only be associated with this player (up to 4 alpha-numeric characters). This unique organizational ID **should not** be a number that will be repeated from year to year or from team to team (i.e. uniform number)
3. Address, Address2, City, State/Province, Zip Code, Country, Email Address, Home Phone, Work Phone, Mobile Phone: The player’s contact information
4. Gender: The player’s gender
5. Date of Birth: The player’s date of birth
6. Graduating Year: The year the player is expected to graduate (if applicable)

7. Website User, Username, Password, Confirm Password: If you want your player to have access to RedZone website, set the Website User option to “Yes” and enter a username and password for the player

## Team Membership Tab

---

Under this tab you define a player’s team related information (jersey number, position, etc.). A description of all fields for this tab is provided below.

1. Team Membership Start Date: This is the date the player was added to your roster
2. Jersey Number: The player’s jersey number (for documentation only; impact/injury data will never be associated with a player’s name)
3. Team Based Unique ID: The number that will be displayed on the HIT Impact Analyzer Player List (see Section 6.7). This will also be the identifier associated with data when necessary. If you wish for the player’s jersey number to be shown on the Player List, simply duplicate the Jersey Number in the Team-based Unique ID area
4. Primary Position, Secondary Position, Tertiary Position: Select the position from a defined list that most closely matches the position that the player normally plays. (Note: It is recommended that secondary and tertiary positions also be entered to allow for more detailed charting of data)
5. Squad: A player can be assigned to varsity, junior varsity or all

## HIT System Tab

---

Under this tab you can enter what type of helmet the player will use and assign the player a specific MxEncoder. You can also select the type of head impact severity metric used in determining when an impact alert is issued for that player. Below is a list of all of the fields available under this tab.

1. Equipment Assignment Date – This is the date of the player’s latest equipment assignment. You can edit this field for current or future equipment assignment in RedZone
2. Equipment – This is the Riddell helmet type that the MxEncoder will be installed into. The HIT Analyzer processing algorithms utilize sensor location to accurately measure the magnitude and location of an impact. Because sensor location is dependent on helmet size, **measurement inaccuracies may occur if the actual helmet type and size do not match the helmet indicated**
3. MxEncoder Serial Number – This is a list of all of the MxEncoders that are assigned to your team. Assign a specific MxEncoder to a player. MxEncoders are identified by a serial number label located in the battery compartment. To ensure proper data reporting, the serial number selected **MUST** match the unit in the player’s helmet
4. **Alarm Type** – There are several impact metrics to choose from as alarm indicators for a given player. The impact metric selected will be used by the SRS to send alarms via the Alert Pager system. Changes to this category will apply **ONLY** to the player being created. The possible alert types are:
  - **Linear Acceleration:** Peak linear acceleration of the head center of gravity. Defined in units of gravity (g) where  $1\text{ g} = 9.8\text{ m/s}^2$
  - **Rotational Acceleration:** Peak rotational acceleration of the head center of gravity. Defined in  $\text{rad/s}^2$
  - **Gadd Severity Index (GSI):** Head impact severity metric that relates injury to head acceleration over time. GSI is unit-less

- **Head Injury Criteria (HIC):** Head impact severity metric that relates injury to head acceleration over time for a discrete time frame (15 ms). HIC is unit-less
- **HIT SeverityProfile (HITsp):** A weighted combination of biomechanical inputs (peak linear acceleration, GSI, HIC, and impact location) used as a single impact metric to better quantify head impact severity. HITsp is unit-less
- **InSite Alert Protocol:** InSite Alert Protocol has two types of impact Alerts, “Single Impact” and “Multiple Impact”. Both Alert types indicate that atypically high head-impact exposure has been experienced by the player, and that clinical best practices should be used to conduct an assessment for potential head injury (concussion). Alert thresholds are customized based on level of play and playing position on the field. Alerts report atypically high exposure relative to other players of similar level of play at the same playing position. (**See Warnings** - p.32)
  - **Single Impact Alerts** - Alerts impacts whose severities are above the predetermined threshold for the player position and play level as assigned using InSite Player Management software. Single event Alerts exceed the 99<sup>th</sup> percentile HITsp value for that skill level and playing position (i.e. the top 1%) based on field data collected using the Riddell Sideline Response System
  - **Multiple Impact Alerts** - are a proprietary cumulative exposure Alert created by a combination of:
    - Cumulative Impact Exposure Score – all impacts exceeding the 95<sup>th</sup> percentile (i.e. top 5%) are added to a time-weighted rolling 7-day index
    - Magnitude of the most recent received impact

When the sum of the cumulative index and the most recent received impact exceeds a pre-determined cumulative exposure threshold, a Multiple Impact Alert is generated. If a Player has a high cumulative score, relatively small single impacts may result in over-exposure and generation of a Multiple Impact Alert.

5. **Alarm Threshold** – The Alert Pager system will page sideline personnel if the user selected alarm type exceeds this threshold. A default for all alarm types is provided, however this can be modified for individual players. If InSite is selected as the alarm type, the threshold cannot be changed.

## Emergency Info Tab

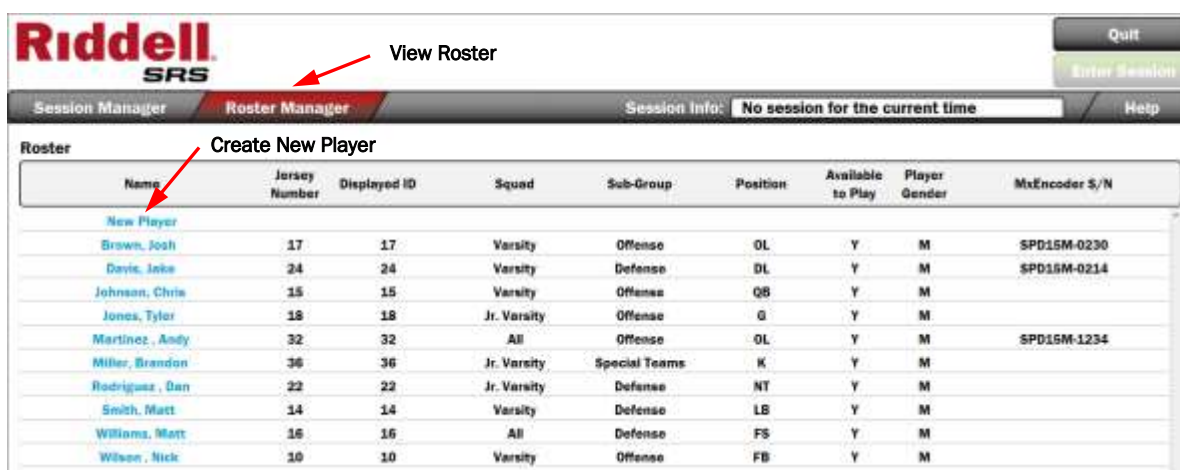
---

The fields under the Emergency Info tab are used to enter emergency contact information for the player. In addition to the contact information, you can enter basic medical information about the player (blood type, medical bracelet information, etc.).

### Viewing Players

To view your current roster, click on the “Roster Manager” option on in the menu bar. You will be presented with a screen like the one shown in Figure 35. By default the roster is sorted by the players’ last names. The roster list is capable of being sorted by any of the category headings as shown in Figure 35. The HIT Analyzer roster list cannot be filtered, and the list only displays currently active players (i.e. players who have not left the team). If you wish to have a complete roster history, you must use the RedZone website.

The following categories are provided for each player: Name, Jersey Number, Team Unique ID, Squad, Sub-Group, Position, Available To Play, Gender, MxEncoder S/N. The Displayed ID is the identification shown by HIT Analyzer when you are collecting impact data.



Name	Jersey Number	Displayed ID	Squad	Sub-Group	Position	Available to Play	Player Gender	MxEncoder S/N
<a href="#">New Player</a>								
<a href="#">Brown, Josh</a>	17	17	Varsity	Offense	OL	Y	M	SPD15M-0230
<a href="#">Davis, Jake</a>	24	24	Varsity	Defense	DL	Y	M	SPD15M-0214
<a href="#">Johnson, Chris</a>	15	15	Varsity	Offense	QB	Y	M	
<a href="#">Jones, Tyler</a>	18	18	Jr. Varsity	Offense	G	Y	M	
<a href="#">Martinez, Andy</a>	32	32	All	Offense	OL	Y	M	SPD15M-1234
<a href="#">Miller, Brandon</a>	36	36	Jr. Varsity	Special Teams	K	Y	M	
<a href="#">Rodriguez, Dan</a>	22	22	Jr. Varsity	Defense	NT	Y	M	
<a href="#">Smith, Matt</a>	14	14	Varsity	Defense	LB	Y	M	
<a href="#">Williams, Matt</a>	16	16	All	Defense	FS	Y	M	
<a href="#">Wilson, Nick</a>	10	10	Varsity	Offense	FB	Y	M	

Figure 35: HIT Analyzer Roster Manager. This shows all of the active players on your roster. To see a complete roster history use the RedZone website.

### Creating and Editing Players

To create a new player in HIT Analyzer, click on “New Player” at the top of the roster shown in Figure 35. To edit an existing player, click on the player’s name.

For creating or editing a player, there are four tabs for entering information: General, Team Membership, HIT System, and Emergency Info. Although only some fields are required, it is recommended that you fill in as much information as possible. When you have completed entering the player’s information, click on the “Save” button in the lower right side of the screen. You will be prompted if you are missing required information or if you have made an invalid entry. A detailed description of each field is provided below.

NOTE: In HIT Analyzer you can create a new player during an active session and the player will be added to the currently running session ONLY. The player WILL NOT be added to other sessions you have created. The player must be added to these sessions manually.

The screenshot shows the 'Riddell SRS' logo at the top left. Below it is a navigation bar with 'Session Manager', 'Roster Manager' (selected), and 'Session Info: No session for the current time'. The 'General' tab is active, showing a form with various input fields for player data. Required fields are marked with an asterisk (\*). The form includes sections for personal details, contact information, and website access. A 'Quit' button is located in the top right corner, and 'Delete', 'Save', and 'Cancel' buttons are at the bottom right.

Figure 36: HIT Analyzer Roster Editor showing the fields available under the General tab.

## General Tab

Under this tab you define a player's basic personal information. A description of all fields under this tab is provided below.

1. First Name, Middle Initial, Last Name: Player's name (for documentation only; impact/injury data will never be associated with a player's name)
2. Unique ID: A unique identifier that will only be associated with this player (up to 4 alpha-numeric characters). Organization ID **should not** be a number that will be repeated from year to year or from team to team (i.e. uniform number).
3. Address, Address2, City, State/Province, Zip Code, Country, Email Address, Home Phone, Work Phone, Mobile Phone: The player's contact information.
4. Gender: The player's gender
5. Date of Birth: The player's date of birth
6. Graduating Year: The year the player is expected to graduate (if applicable)
7. Website User, Username, Password, Confirm Password: If you want your player to have access to RedZone website, set the Website User option to "Yes" and enter a username and password for the player.

## Team Membership Tab

---

Under this tab you define a player's team related information (jersey number, position, etc.). A description of all fields for this tab is provided below.

1. **Team Membership Start Date:** This is the date the player was added to your roster. This field is automatically populated in the HIT Analyzer. If you are creating a new player the field will be blank.  
  
NOTE: If you wish to create or edit a future player, you must use RedZone.
2. **Jersey Number:** The player's jersey number (for documentation only, impact/injury data will never be associated with a player's name)
3. **Team Based Unique ID:** The number that will be displayed on the HIT Impact Analyzer Player List (see Section 6.7). This will also be the identifier associated with data when necessary. If you wish for the player's jersey number to be shown on the Player List, simply duplicate the Jersey Number in the Team-based Unique ID area.
4. **Primary Position, Secondary Position, Tertiary Position:** Select the position from a defined list that most closely matches the position that the player normally plays. (Note: It is recommended that secondary and tertiary positions also be entered to allow for more detailed charting of data)
5. **Squad:** A player can be assigned to varsity, junior varsity, or all.

## HIT System Tab

---

Under this tab you can enter what type of helmet the player will use and assign the player a specific MxEncoder. You can also select the type of head impact severity metric used in determining when an impact alert is issued for that player. Below is a list of all of the fields available under this tab.

1. **Equipment Assignment Date:** This is the date of the player's latest equipment assignment. This field is automatically populated in the HIT Analyzer.
2. **Equipment:** This is the Riddell helmet type that the MxEncoder will be installed into. The HIT Analyzer processing algorithms utilize sensor location to accurately measure the magnitude and location of an impact. Because sensor location is dependent on helmet size, **measurement inaccuracies may occur if the actual helmet type and size do not match the helmet indicated.**
3. **MxEncoder Serial Number:** This is a list of all of the MxEncoders that are assigned to your team. Assign a specific MxEncoder to a player. MxEncoders are identified by a serial number label located in the battery compartment. To ensure proper data reporting, the serial number selected **MUST** match the unit in the player's helmet.
4. **Alarm Type:** There are several impact metrics to choose from as alarm indicators for a given player. The impact metric selected will be used by the SRS to send alarms via the Alert Pager system. Changes to this category will apply **ONLY** to the player being created. The possible alert types are:
  - **Linear Acceleration:** Peak linear acceleration of the head center of gravity. Defined in units of gravity (g) where  $1\text{ g} = 9.8\text{ m/s}^2$
  - **Rotational Acceleration:** Peak rotational acceleration of the head center of gravity. Defined in  $\text{rad/s}^2$
  - **Gadd Severity Index (GSI):** Head impact severity metric that relates injury to head acceleration over time. GSI is unit-less
  - **Head Injury Criteria (HIC):** Head impact severity metric that relates injury to head acceleration over time for a discrete time frame (15 ms). HIC is unit-less



- **HIT SeverityProfile (HITsp):** A weighted combination of biomechanical inputs (peak linear acceleration, GSI, HIC, and impact location) used as a single impact metric to better quantify head impact severity. HITsp is unit-less
- **InSite Alert Protocol:** InSite Alert Protocol has two types of impact Alerts, “Single Impact” and “Multiple Impact”. Both Alert types indicate that atypically high head-impact exposure has been experienced by the player, and that clinical best practices should be used to conduct an assessment for potential head injury (concussion). Alert thresholds are customized based on level of play and playing position on the field. Alerts report atypically high exposure relative to other players of similar level of play at the same playing position. (**See Warnings** - p.32)
  - **Single Impact Alerts:** Alerts impacts whose severities are above the predetermined threshold for the player position and play level as assigned using InSite Player Management software. Single event Alerts exceed the 99<sup>th</sup> percentile HITsp value for that skill level and playing position (i.e. the top 1%) based on field data collected using the Riddell Sideline Response System
  - **Multiple Impact Alerts:** A proprietary cumulative exposure Alert created by a combination of:
    - Cumulative Impact Exposure Score – all impacts exceeding the 95<sup>th</sup> percentile (i.e. top 5%) are added to a time-weighted rolling 7-day index
    - Magnitude of the most recent received impact

When the sum of the cumulative index and the most recent received impact exceeds a pre-determined cumulative exposure threshold, a Multiple Impact Alert is generated. If a Player has a high cumulative score, relatively small single impacts may result in over-exposure and generation of a Multiple Impact Alert.
- 5. **Alarm Threshold:** The Alert Pager system will page sideline personnel if the user selected alarm type exceeds this threshold. A default for all alarm types is provided, however this can be modified for individual players. If InSite is selected as the alarm type, the threshold cannot be changed.
- 6. **Suspect Temperature:** The Alert Pager system will page sideline personnel if the temperature inside the associated player’s helmet exceeds this threshold. Default for all players is 105 F but can be modified for individual players.

## Emergency Info Tab

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The fields under the Emergency Info tab are used to enter emergency contact information for the player. In addition to the contact information, you can enter basic medical information about the player (blood type, medical bracelet information, etc.).

## Warnings

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- Contact in football may result in CONCUSSION-BRAIN INJURY which no helmet can prevent. Symptoms include: loss of consciousness or memory, dizziness, headache, nausea or confusion. If you have symptoms, immediately stop playing and report them to your coach, trainer, and parents. Do not return to a game or practice until all symptoms are gone and you have received MEDICAL CLEARANCE. Ignoring this warning may lead to another more serious or fatal brain injury.

- Do not use your helmet to butt, ram or spear an opposing player. This is in violation of the football rules, and such use can result in severe head or neck injuries, paralysis, or death to you and possible injury to your opponent.
- **NO HELMET CAN PREVENT HEAD OR NECK INJURIES A PLAYER MIGHT RECEIVE WHILE PARTICIPATING IN FOOTBALL.**
- Riddell SRS alerts the sideline to significant, single or multiple impacts that **MAY** result in a concussion or other head injury.
- Riddell SRS is **NOT** a medical device.
- Riddell SRS is **NOT** a protective device.
- **RIDDELL SRS DOES NOT DIAGNOSE CONCUSSIONS OR OTHER HEAD INJURIES AND IS NOT INTENDED TO BE USED AS A DIAGNOSTIC DEVICE.**
- Serious injury and/or concussion may occur even if no alert is reported. Riddell SRS transmits alerts at research-based thresholds; however, concussion may occur at impacts below these thresholds.
- Riddell SRS is intended to be used as a supplement to a team's concussion protocol. Riddell SRS should not be used to replace the existing Safety Plans and Concussion protocols the team, school or organization has in place.
- In all instances when the Alert System signals an Alert, staff should execute its concussion assessment protocol. The Centers for Disease Control (CDC, [www.cdc.gov/concussion](http://www.cdc.gov/concussion)) and USA Football (<http://usafootball.com/health-safety/concussion-awareness>) offer concussion management guidelines.
- Riddell SRS must be properly installed and configured by the user to allow for correct function and transmission of impact Alerts
- **DO NOT MODIFY, CHANGE, OR ALTER THE DEVICE IN ANY WAY.**
- MxEncoders and the SRS Field Case should be reconditioned annually to ensure proper performance.
- The SRS was developed specifically for on-field head impact exposure monitoring, and, any use outside of that purpose may result in measurement error, potential communication/classification error and could void warranty.
- For questions regarding Riddell SRS or reconditioning:
  - Call **1 (800) 275-5338** between 8 a.m. and 6 p.m. C.S.T.
  - On the web, go to: <http://www.riddell.com/>

## Monitoring Head Impact Exposure (HIT Analyzer Only)

When you have a session defined and players assigned MxEncoders, you are ready to start collecting impact data. The following sections describe the process of collecting and viewing data and the viewing options available.

### Data Collection Overview

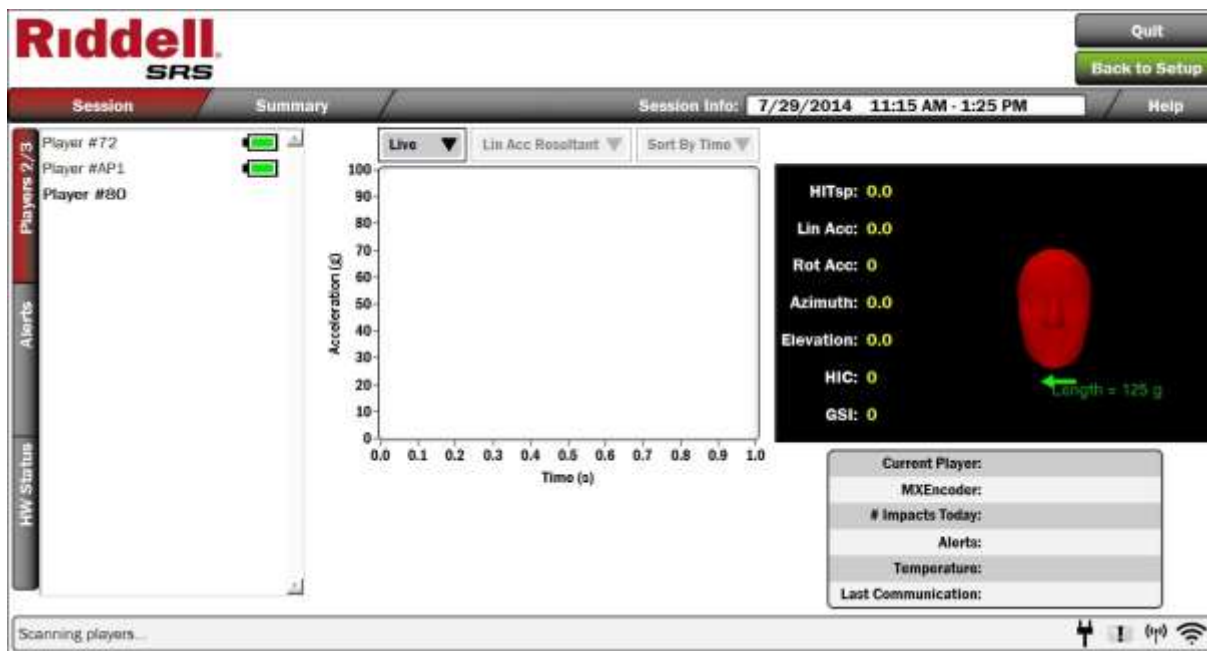


Figure 37: HIT Analyzer data collection screen prior to downloading any impact data.

The following steps outline the process of collecting impact data using HIT Analyzer.

1. Start the HIT Analyzer program and enter your session by clicking on the “Enter Session” button in the upper right hand corner of the screen. If this button is inoperable, check your session list to verify that you have a session defined for that time. Once you enter the session you will be presented with a screen similar to the one shown in Figure 37.

**NOTE:** You can enter a session before the start of the session. If you enter a session prior to the start time, your SRS laptop will download and store the data but it will not be considered valid session data. To include this data in your session at a later point in time, use the RedZone application (see section 6.4.1).

Check the message in the bottom left hand side of the screen.

The message should say “Scanning Players”. This means that the Sideline Controller and/or Access Point is/are active and trying to communicate with MxEncoders in the field.

**NOTE:** If you get a persistent error message, unplug the Sideline Controller and/or Access Point from the field case and then reconnect it. If you continue to get an error message refer to the Troubleshooting section of this manual.

2. Verify that the players are communicating with the system (Sideline Controller and/or Access Point).

On the Player's tab, two numbers are shown. The top number is the number of players who have communicated with the system and the bottom number is the total number of players that have been instrumented with MxEncoders. For example if the tab reads "Players 15/20" this means that there are 20 players assigned MxEncoders and the MxEncoders of 15 of these players have communicated with the system. The IDs of Players that have not communicated with the system are shown in bold text. When the Sideline Controller and/or Access Point first detects an MxEncoder, a battery icon will appear next to the player's ID (see Figure 37).

3. When a Player experiences an impact, the Sideline Controller will download the data and you will be informed by the Sideline Controller message that the system is "Processing Impacts". When the processing is complete the screen will be updated with the processed impact data (see Figure 38).

**NOTE:** The time between a player receiving an impact and the data being downloaded and displayed depends on many factors. You can determine whether your download time is within a normal range by clicking on "Status" on the menu bar and checking the "Download Time" (see section 6.8).

4. If a player's impact exceeds the critical threshold for that player, an alert will be issued via the paging system. Additionally, a message will appear under the Alerts tab, and a number will appear on the Alerts tab indicating that you have an unread alert.

The following are the primary elements of the main data collection screen (please refer to Figure 38).

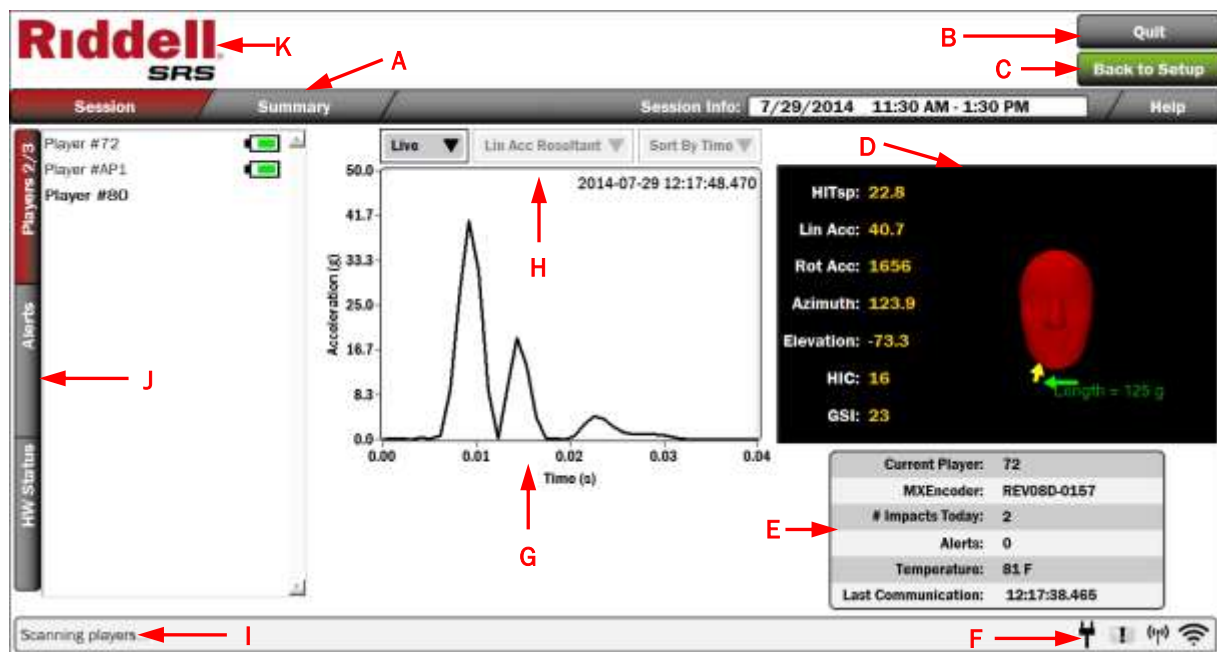


Figure 38: The primary data collection screen in HIT Analyzer. In this example the MxEncoder for two players out of three has communicated with the Sideline Controller. The battery strength for both players is at near full strength. The data display is in the real-time mode and the resultant time series for the player #72's latest impact is shown on the impact graph.

A. Tool Bar: Use these controls to navigate through the screens related to data collection.

1. Players: This is the main data collection screen where you can view data being downloaded in real time, a specific player's impact history, hardware alerts, etc.
2. Summary: This screen will allow you to review your current session summary statistics (see Section 6.8)
3. Session Info: The date and the time range of the session (item cannot be clicked)

4. Help: This will open a copy of this manual

B. Quit: Closes the HIT Analyzer program. If you choose to end the program before the end of the session you will be prompted with a choice to end the session. If you choose “Yes” the program will automatically overwrite your previously defined end time with a new end time.

C. Back to Setup: Clicking on this button returns you to the Session Manager. If you return to the Session Manager during a Session, the MxEncoders will continue to record impact data but the Sideline Controller will not download the data. When you re-enter the Session the data stored on the MxEncoders will be downloaded.

D. Impact Display: This display contains a 360° rotatable 3-D head form with impact indicator. The head form can be rotated by left-clicking on the head form and while holding down the mouse button, dragging the mouse to put the head form in the desired position.

E. Player Summary: When a player is selected in the player list on the left side of the screen, these fields are populated with information about that player.

1. Current Player: The selected player’s unique identification code.
2. MxEncoder: The serial of the player’s MxEncoder.
3. Impacts: The number of impacts the player has sustained during the previous 24 hours.
4. Alerts: Any hardware alerts associated with the player’s MxEncoder.
5. Temperature: The temperature (°F) inside of the player’s helmet.
6. Last Communication – The last date and time the player’s MxEncoder communicated with the Sideline Controller during the current session.

F. System Status Icons: This group of icons gives you a snapshot of the system’s status. If you hover your mouse pointer over an icon you will see a small tooltip message describing the status the icon currently represents.

1. AC Power Present – The plug shaped icon indicate whether or not you have the SRS system plugged into AC power
2. Pager System Present – Indicates whether or not the pager system is connected and turned on. If the pager system is present you can left click on the icon to send a test page
3. Sideline Controller Present – Indicates whether or not the Sideline Controller is connected to your system
4. Access Point Present – Indicates whether or not the Access Point is connected to your system. Clicking this icon will allow you to change communication channel.
5. Internet Available – Indicates whether or not you have an Internet connection available (wireless or Ethernet)

G. Impact Graph: This graphing area can show you either latest impact or a player’s impact history, depending on the display mode you have selected (see *Viewing Impacts*, page 37-39).

H. Graph Display Controls: These pull down menus control which impact data is displayed on the Impact Graph and how the data is presented. See *Viewing Impacts*, page 37-39 for further details.

I. System Communication and Impact Processing Status Messages: This field informs you of the current status of the Sideline Controller and/or Access Point and once an impact has been downloaded, the status of processing this impact.

J. Tab Controls: Click on these controls to view information about instrumented players, impact alarms or hardware alerts.

1. Players: Under the Players tab is a list of all players who have been assigned MxEncoders. Once a player's MxEncoder has communicated with the system, the player's identifier will no longer be displayed in bold text. In addition a battery icon will appear next to the name. The icon indicates the charge remaining in the player's MxEncoder battery.
2. Alerts: Under this tab is a list of all of the impact alerts that have occurred during the current session.
3. HW Status: Under this tab is a list of hardware notifications for the current session.

K. Riddell Icon: Click on the icon to get information about the HIT Analyzer software.

## Viewing Impacts In Real-Time

---

By default the HIT Analyzer will display impacts in real-time. This means that as soon as an impact is downloaded and processed, information on the Impact Graph and the Impact Display is updated. The Impact Graph will show a single curve which represents the **resultant** linear acceleration time series. The date and time at which the impact occurred is displayed at the top of the graph. In addition, the Impact Display will show the magnitudes of multiple head impact severity metrics along with an estimate of impact direction. The direction estimate is represented by a yellow arrow next to the head form. The length of the arrow is proportional to the magnitude of the impact. The head form can be rotated to get a better view of the arrow.

If an impact exceeds the alerting threshold you have set for the player, an alert will be added under the Alert tab and an alert will be sent via the paging system. To view the specifics of an alert, click on the Alert tab and then click on the alert of interest (see Figure 39 for an example). Information about the selected impact will be shown on the Impact Graph, Impact Display and the Player Summary. In the Impact Display, the type of impact measurement you selected for your alerting metric is shown in red. To switch to viewing impacts in real-time when you are viewing a player's impact history, change the Graph Display control from "History" to "Live".

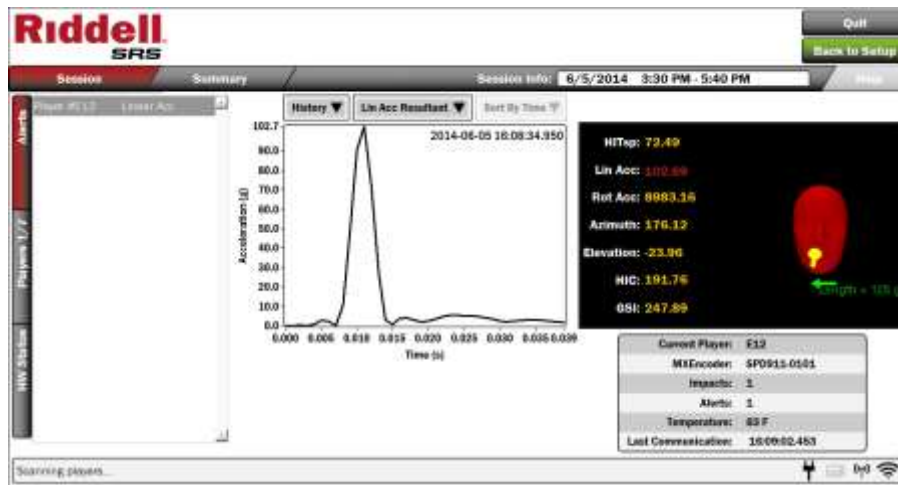


Figure 39: Type of screen displayed when you select an impact alert from the Alerts list. In this example the player was configured so that when the linear acceleration of an impact exceeded a threshold, an alert is issued.

## Viewing Impact History

A player's impact history for the current day can be viewed by clicking on the player's ID or by switching the graph control from "Live" to "History". When you make this switch you will see a screen similar to that shown in Figure 40. In impact history mode you can view impacts organized based on different head impact severity metrics or you can view a single resultant time series. When viewing historical impacts by magnitudes, the impacts can be sorted by time or severity using the graph controls. Clicking on one of the previous impacts will allow you to view relevant data about that impact. The data for the selected impact is shown in the Impact Display area and the Player Summary area. The color of the impact vector corresponding to the impact you selected will change from gray to yellow. You can scroll through the impact graph by using your left or right arrow key. When viewing historical impacts by time series, only one impact at a time is displayed. However you can still scroll through the impacts using your arrow keys.

While viewing data in history mode, the system will continue to download data for all players.

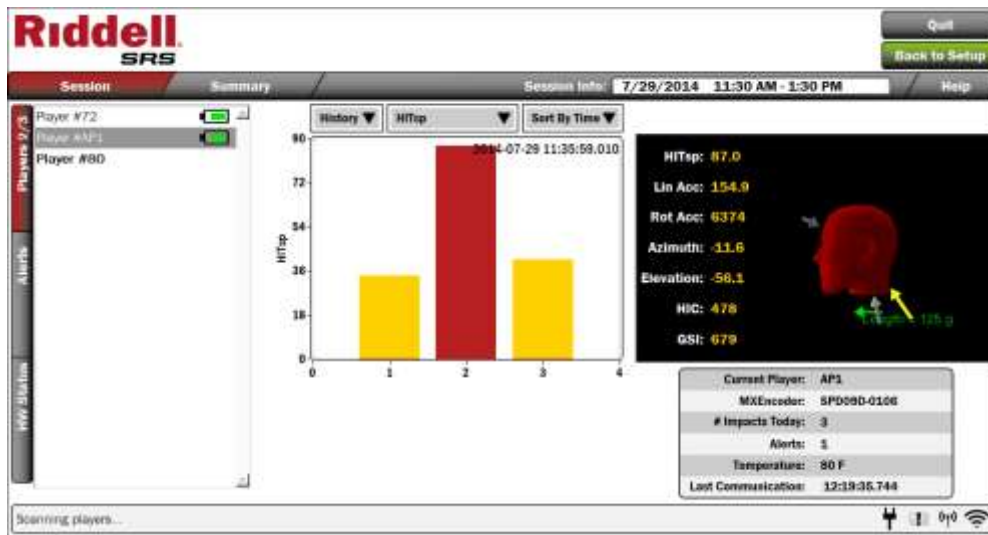


Figure 40: Viewing a player's impact history. In this example the player has had three impacts during the past 24 hours. The impacts are sorted by their HITsp severity and the second impact is selected. Note that the Impact Display shows the impact vectors for all three impacts but only one vector is highlighted.

## Session Summary (HIT Analyzer Only)

The session summary screen, shown in Figure 41, gives you an overview of your current session. On the right side of the screen is a general overview of your current session. The information contained in this overview applies to the entire team. In the middle of the screen is a list of the top ten impacts that occurred that day. On the right hand side of the screen are session statistics. These statistics can be filtered by position type.

**NOTE:** Some statistics require several impacts to occur before they are calculated.

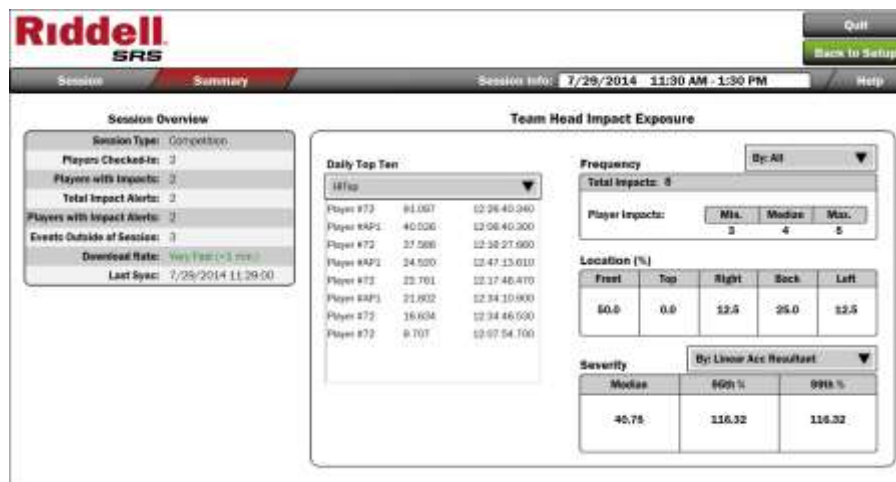


Figure 41: Example of the Session Summary screen in HIT Analyzer.



The following are the fields shown under the Session Summary:

1. Session type: How the session was categorized when it was created (practice, competition, etc.)
2. Players Checked-In: The number of players who have been assigned MxEncoders and whose MxEncoders have communicated with the system.
3. Players with Impacts: The number of players who have had impacts downloaded by the system.
4. Total Impact Alerts: The total number of impacts that have resulted in alerts being sent to the pager
5. Active Players With Impact Alerts: The number of players who have communicated with the system and who have experienced an alertable impact
6. Events Outside Of Session: The number of times that the MxEncoder was activated outside of a defined session period
7. Download Rate: This is an indication of the average delay between impacts occurring on the field and data being downloaded by the system. An exact number is not given, instead a time range is shown. A range in green indicates a short delay and a range in red indicates a long delay
8. Last Sync: The date and time when your SRS laptop last sync'd with the main database

The following are the statistics shown under the Team Head Impact Exposure heading:

1. Daily Top Ten List: This is a list of the ten most severe impacts that day. The list is populated based on the head impact severity metric you select (linear acceleration, HITsp, etc.) The selected metric is controlled by the pull-down menu above the Top Ten List
2. Frequency: This category of session summary statistics tells you the total number of impacts a group of your players have experienced along with the fewest number of impacts a player in that group has experienced, the median number of impacts for that group and the largest number of impacts experienced by a player in that group
3. Location: These statistics show you where on the helmet the impacts occurred by percentage for your selected group of players
4. Severity: These statistics show you the median, the 95<sup>th</sup> percentile and the 99<sup>th</sup> percentile impact magnitude for your selected group of players. The head impact severity metrics is selected using the pull-down menu just above the statistics

## **Data Review Functions Available Using RedZone**

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While RedZone is your primary tool for administrating your session and roster lists, it is also where you can create summaries of impact data over customizable time ranges and manage your SRS user settings.

### **Charting**

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Through the RedZone Charting Page (Figure 42), you can view data for team sub-groups or individual players in a variety of charting formats: column, bar, line, area, pie and scatter. The Baseline, Time Period and Chart Parameter fields allow you to control how impact data is organized and presented. For both the linear acceleration histogram and impact location graphs, you can view impacts by team, offense, or defense only (baseline data) or compare individual players and positions to the whole team, offense, or defense. In addition to data charts, the top 10 impacts (by linear or rotational acceleration) can be listed over any desired data range. When you have set your charting parameters click on the "Plot chart" button to generate your chart.

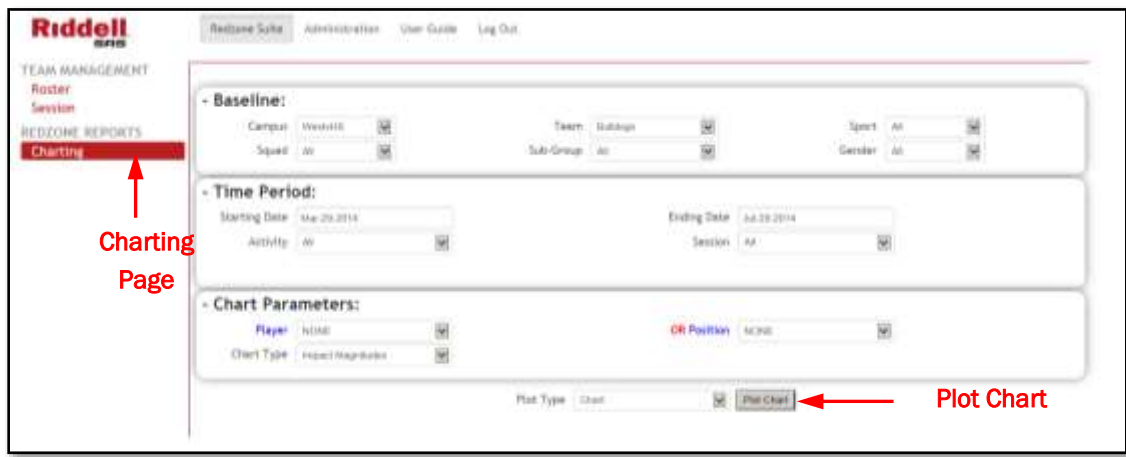


Figure 42: RedZone charting page showing the charting options available.

Descriptions of the charting options are listed below:

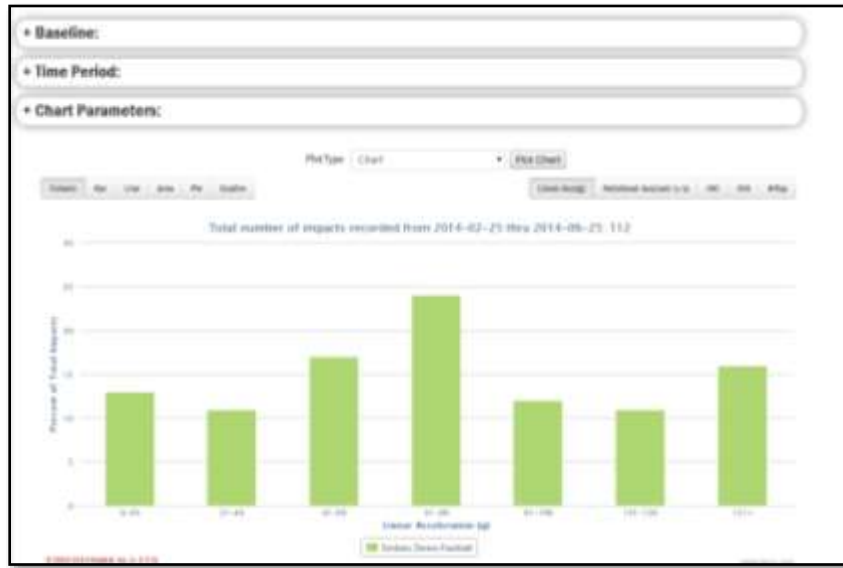
1. Baseline:
  - Campus: The campus from which baseline data will be shown
  - Sport: The sport from which baseline data will be shown
  - Team: The team from which baseline data will be shown
  - Squad: The squad (All, Varsity, or Junior Varsity) from which baseline data will be shown
  - Sub-Group: The subgroup (All, Offense, Defense, or Special Teams) from which baseline data will be shown
  - Gender: The gender from which baseline data will be shown
2. Time Period:
  - Starting Date and Ending Date: The date range over which data will be shown. If no date is selected, all data for the specified parameters will be shown
  - Activity: The type of session (practice, competition, etc.)
  - Session: A list of all sessions within the defined time period
3. Chart Parameters:
  - Player or Position: Select from a dropdown list to either compare an individual player or a specific position to the baseline data. If neither is selected, only baseline data will be shown
  - Chart Type: Select from a list of chart options to view the data
    - Impact Magnitudes (Linear Acceleration Histogram)
    - Impact Location (Percentage of impacts recorded in different helmet regions)
    - Individual Player (Individual impact magnitudes along with time stamps)

**NOTE:** When Individual Player is selected from Chart Data, no baseline data will be shown.

    - Top 10 Impacts Linear (List of top impacts by peak linear acceleration)
    - Impact Count (Total number of impacts)

#### 4. Plot Chart:

- Chart: Creates charts within web browser
- Player Report: Creates detailed player report within Adobe Reader



(a)



(b)

Figure 43: Examples of the types of charts available through RedZone (a) column (b) bar.

## Player Report

The player report function gives in-depth analysis of an individual player's impact history over a user-selectable period of time. **It is advisable to synchronize your HIT Analyzer database BEFORE creating a player report.** This will insure the data contained in the exported report is complete.

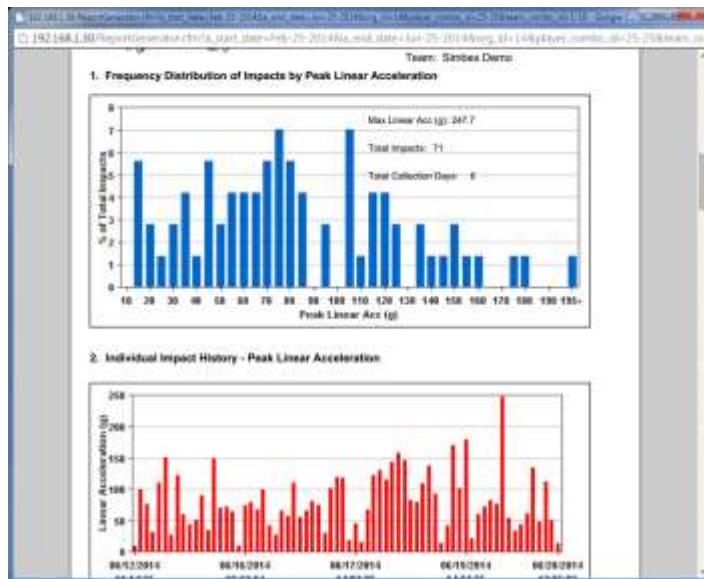


Figure 44: Example page from a player report.

Data displayed in each report includes:

1. Frequency distribution of impacts by peak linear acceleration
2. Individual impact history by peak linear acceleration
3. Top Ten recorded impacts by peak linear acceleration
4. Impact distribution by location
5. Cumulative impacts by date
6. Graphical summary of impact locations
7. List of all impacts exceeding alert threshold
8. Historical Top Ten – top ten impacts to the player over recorded history

To create a player report:

1. Select the following on the “Charting” screen
2. Select date range of choice (in green “Baseline” section of screen)
3. Select Player from drop down list (in green “Player or Position” section of screen)
4. Click “Create Player Report” – RedZone will generate a report in .pdf format for the selected player

**NOTE:** Your computer’s security software may block Player Reports. If you experience problems, either disable your computer’s pop-up blocker or hold down the CTRL key while selecting the “Create Player Report” button

## Administration

### User Settings

Due to the personal nature of the information contained in the RedZone database, it is recommended that all Usernames and Passwords be changed from the default and that the SRS Administrator assign all user access privileges after initial login. User access can be modified by selecting Administration in the

RedZone Command Menu and User Settings in the Administration menu located on the left side of the screen (Figure 45).



Figure 45: User administration page.

To select a current user, click on the desired last name (underlined and highlighted in blue) in the list of users. If multiple users are in the system, locating a specific person can be made easier by searching the user list for specific Username, Last Name, Website User Flag, and/or User Type. To search the list, enter the desired search parameter(s) into the list provided at the top of the screen and select Search. Also, if an administrator wishes to allow access to a new user, select the New User icon under the Search Parameters heading.

After selecting a user (or when entering a new user), the User Login Settings screen will appear.

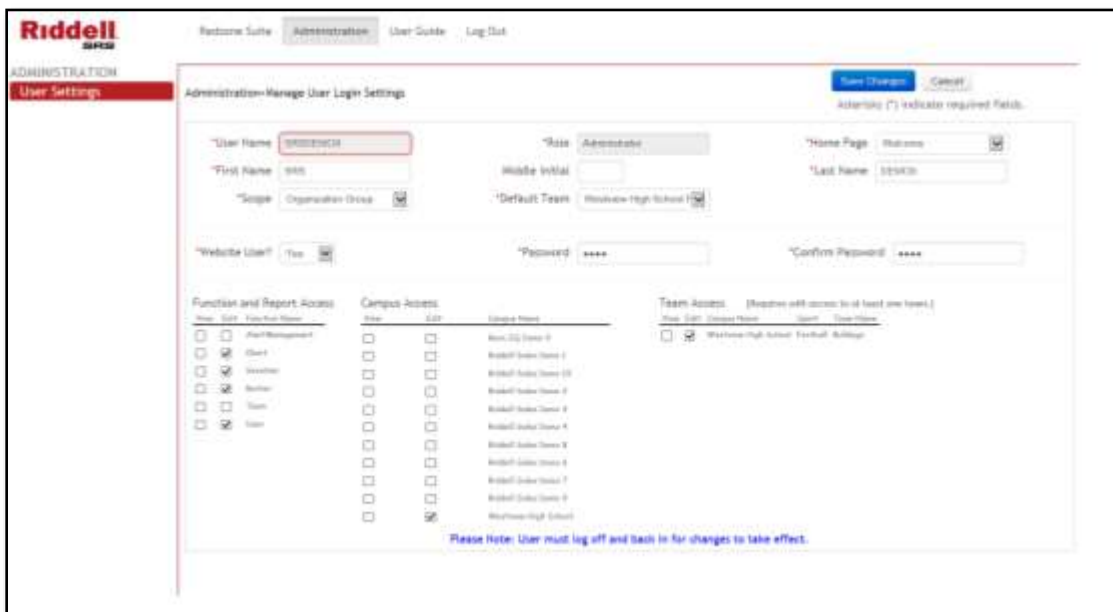


Figure 46: Administration – User Settings – Modify/New User page.

The following information should be entered for each user:

1. User Name (required): Used to login to the SRS RedZone Software
2. Password (required): Unique password provided by the user. Password is not case sensitive and can contain up to 20 alpha-numeric characters

3. First Name and Last Name (required)
4. Role (required): Identifier of the user (administrator, player, etc.) that is defined when a new user is created and cannot be changed after initial setup. Role is only an identifier and does not limit or allow access to the database
5. Scope (required): Indicates the affiliation the user has with the overall system use: Team (uses the system only for a single group within an organization), Organization (uses the system for multiple teams within an organization), and Organization Group (uses the system for multiple organizations)
6. Default Team (required): Main group that the user is affiliated with (selected from a defined group)
7. Default Function (required): Defines the area of the RedZone database that the user will be directed to upon logging into the system
8. Website User Flag (required): Allows the user to access the database through the internet. If “No” is selected, the user will only be allowed to log on to the local database contained on the SRS computer
9. Function and Report Access: The area where the administrator assigns access privileges for an individual user. Provided is a list of current and future features in the RedZone database. Administrators can allow a user to view a specific area by placing a check mark in the View box next to a feature or give editing privileges by checking the Edit box. **If no box is selected, the user will be denied access to that area.**
10. Campus Access and Team Access: Administrators must define which teams and campuses the user has access to View/Edit

To save changes select the Save Changes icon located either at the top or bottom of the Manage User Login Settings screen. To exit without saving the changes made, select Cancel.

## MAINTENANCE

### Maintenance Intervals

To keep your equipment in peak operating condition, perform these maintenance procedures at periodic intervals.

- |                                  |   |
|----------------------------------|---|
| 1. MxEncoder Battery Change:     | <i>Weekly</i>                             |
| 2. Battery Charge:               | <i>Weekly</i>                             |
| 3. SRS Computer Synchronization: | <i>Daily or as frequently as possible</i> |
| 4. Demo Session / System Test:   | <i>Weekly, during battery change</i>      |
| 5. Clean MxEncoders:             | <i>As needed</i>                          |
| 6. Reconditioning:               | <i>Annually</i>                           |

### Cleaning MxEncoders

MxEncoders can be wiped down using a mild cleaning solution. MxEncoders **SHOULD NOT** be submerged in liquid. Thorough cleaning of MxEncoders will also occur at end of season Reconditioning.

## Reconditioning

Riddell offers SRS Reconditioning services at the end of a season. It is highly recommended that all SRS equipment be returned to the SRS Service Center for annual reconditioning. During this process the following occurs:

1. Thorough cleaning and inspection of all SRS components
2. Full system level functional testing and updates as necessary
3. Equipment repair for all equipment covered under warranty
  - Quotes will be provided for damaged equipment that is not covered under warranty

## TROUBLESHOOTING

The following troubleshooting guide can be used to help diagnose any problems that arise while using the SRS.

SYMPTOM	POSSIBLE SOLUTION
<b>SRS COMPUTER</b>	
Laptop will not turn on	<ul style="list-style-type: none"><li>• Check AC Power cable is plugged in</li><li>• Repair damaged laptop</li></ul>
No image on screen	<ul style="list-style-type: none"><li>• Repair damaged laptop</li></ul>
<b>SIDELINE CONTROLLER</b>	
Cannot screw Antenna onto Sideline Controller	<ul style="list-style-type: none"><li>• Repair damaged antenna connector</li></ul>
Cannot screw Sideline Controller onto Sideline Controller Mast	<ul style="list-style-type: none"><li>• Repair damaged Sideline Controller Mast</li></ul>
Sideline Controller Has No Power (No green light)	<ul style="list-style-type: none"><li>• Check USB connection to side of Field Case</li><li>• Check USB connection to back of Laptop</li><li>• Check USB connections in bottom of Field Case. All should be plugged in (i.e. no loose wires).</li><li>• Repair damaged Sideline Controller</li><li>• Repair damaged USB Hub</li></ul>
Sideline Controller has power but is not working within HIT Analyzer	<ul style="list-style-type: none"><li>• Unplug Sideline Controller from side of Field Case, wait 1 minute, plug back into side of Field Case. Sideline Controller should reset.</li><li>• Restart Laptop</li><li>• Check COM Port Settings</li><li>• Repair damaged Sideline Controller</li></ul>

SYMPTOM	POSSIBLE SOLUTION
Sideline Controller is slow to download data	<ul style="list-style-type: none"> <li>• Make sure Sideline Controller Antenna is securely connected to the Sideline Controller.</li> <li>• Make sure the Sideline Controller is approximately 5 feet off the ground and is not near any large metal objects</li> <li>• Check to see if other wireless communication equipment is present on the field - there may be interference issues</li> </ul>
ACCESS POINT	
TBD	• TBD
ALERT SYSTEM	
Alert System is not found	<ul style="list-style-type: none"> <li>• Check AC Power connection on side of Field Case</li> <li>• Check cable connections in bottom of Field Case</li> <li>• Restart Laptop</li> <li>• Repair damaged Alert System Transmitter</li> </ul>
Alert System will not send Test Page	<ul style="list-style-type: none"> <li>• Check the Alert System is functioning within HIT Analyzer</li> <li>• Check Alert Pagers are turned on and within range (&lt;1/8th mile)</li> <li>• Check the antenna on the Alert System Transmitter is securely plugged in</li> <li>• Change Alert Pager battery</li> <li>• Repair damaged Transmitter and/or Pagers</li> </ul>
Jumbled text on Alert Pager	<ul style="list-style-type: none"> <li>• Change battery</li> <li>• Repair damaged Alert Pager</li> </ul>
FIELD CASE	
No power supplied to Field Case when power cord plugged in	<ul style="list-style-type: none"> <li>• Replace fuse in power entry module</li> </ul>
Cooling fan(s) not functional	<ul style="list-style-type: none"> <li>• Check USB connections in bottom of Field Case</li> </ul>
Handle unable to retract	<ul style="list-style-type: none"> <li>• Push release button back into place</li> </ul>
Missing/Damaged Waterproof cap for USB/Ethernet	<ul style="list-style-type: none"> <li>• Repair damaged caps</li> </ul>
Antenna clips do not hold Antenna	<ul style="list-style-type: none"> <li>• Replace damaged clips</li> </ul>



SYMPTOM	POSSIBLE SOLUTION
<b>MXENCODER</b>	
MxEncoder will not fit into helmet	<ul style="list-style-type: none"> <li>• Verify MxEncoder model is compatible with helmet model</li> <li>• Replace stock helmet Overliner (if equipped) with MxEncoder Overliner</li> </ul>
Player complains about MxEncoder comfort	<ul style="list-style-type: none"> <li>• Verify MxEncoder model is compatible with helmet model</li> <li>• Verify helmet is properly fit with MxEncoder installed</li> <li>• Verify Battery is properly installed within pouch</li> </ul>
MxEncoder not showing up in Active Player List	<ul style="list-style-type: none"> <li>• Turn MxEncoder on by placing hand inside helmet near On/Off proximity switch</li> <li>• Verify Player Hardware settings - proper helmet model and MxEncoder Serial Number</li> <li>• Verify MxEncoder is installed in helmet</li> <li>• Verify Battery is fully charged (place known Active Player's Battery into non-functional MxEncoder)</li> <li>• Verify Sideline Controller is functional (Are other players active?)</li> <li>• Verify Player is within range (&lt;150 yds.)</li> <li>• Check MxEncoder power cable for damage, arrange for repair if damaged</li> <li>• Repair/replace defective MxEncoder</li> </ul>
MxEncoder/Player is Active but does not record test impacts	<ul style="list-style-type: none"> <li>• Arrange for repair/replacement of defective MxEncoder</li> </ul>
MxEncoder constant low battery warning	<ul style="list-style-type: none"> <li>• Charge battery</li> <li>• Arrange for repair/replacement of defective MxEncoder</li> </ul>
<b>BATTERY</b>	
Battery will not hold a charge	<ul style="list-style-type: none"> <li>• Battery is beyond useful lifecycle</li> </ul>
Battery will not charge	<ul style="list-style-type: none"> <li>• Repair Battery/Charger connector</li> </ul>
<b>BATTERY CHARGER</b>	
No lights turn on	<ul style="list-style-type: none"> <li>• Plug in power cord to side of Charger</li> <li>• Replace fuse in power entry module</li> <li>• Repair Charger</li> </ul>
Light never changes to green	<ul style="list-style-type: none"> <li>• Repair charger</li> </ul>

SYMPTOM	POSSIBLE SOLUTION
<b>REDZONE</b>	
Unable to Synchronize	<ul style="list-style-type: none"> <li>• No internet connection</li> <li>• Network settings are blocking communication to Riddell Server <ul style="list-style-type: none"> <li>– Ensure Port 2440 is OPEN for SRS</li> </ul> </li> <li>• No need for Synchronization - system up to date</li> </ul>
Limited or no access to features (Roster/Session/Charting)	<ul style="list-style-type: none"> <li>• User not authorized for view/edit access</li> </ul>
Cannot create Player Report	<ul style="list-style-type: none"> <li>• Must be performed through RedZone.riddell.com website</li> </ul>
Charting does not show impact data	<ul style="list-style-type: none"> <li>• Synchronize SRS computer</li> <li>• Verify/edit session type</li> <li>• Verify stored data has downloaded from MxEncoder</li> <li>• Wait until following day for automated database checks to run</li> </ul>
<b>HIT ANALYZER</b>	
Impacts are not visible when downloaded	<ul style="list-style-type: none"> <li>• Change to "Live Mode"</li> </ul>
No players are Active	<ul style="list-style-type: none"> <li>• Check Sideline Controller</li> <li>• Check Roster/Session settings</li> </ul>
Impacts are not being displayed	<ul style="list-style-type: none"> <li>• Not a "real" head impact - being filtered out by algorithm</li> </ul>
Alerts are not being sent	<ul style="list-style-type: none"> <li>• Outside of session</li> <li>• Not a "real" head impact</li> </ul>

## FREQUENTLY ASKED QUESTIONS

### Hardware – Field Case

#### Q: WHERE SHOULD I SETUP THE FIELD CASE?

The Field Case should be setup in a safe location on the sidelines, preferably near mid-field. An AC power source should also be close by.

#### Q: CAN THE FIELD CASE BE USED IN A BUILDING SUCH AS AN EQUIPMENT SHED?

Yes, as long as the Field Case has line-of-sight to the field. The Field Case should not be used in a metal building as this will limit communication range. Communication can go through windows; however this may decrease communication range.

**Q: WHAT IF IT RAINS? CAN I STILL USE THE SRS?**

Yes, the Field Case can be closed while keeping the Sideline Controller and/or Access Point plugged in and attached to the Mast. The Field Case has an internal cooling system to keep the laptop operating without overheating if the lid is closed.

**Q: DO I HAVE TO SETUP THE SRS DURING EVERY PRACTICE/GAME?**

Yes, it is recommended that the SRS always be setup when using the MxEncoders to prevent potential discontinuity within recorded head impact data. MxEncoders are capable of storing up to 100 events in non-volatile memory; however, after reaching capacity, they will no longer record head impacts. Habitual use of MxEncoders without the SRS can also lead to delayed communication, latency in identifying non-functioning hardware (e.g. dead batteries), and inaccurate alerting.

**Q: HOW FAR AWAY CAN THE FIELD CASE BE AND STILL COMMUNICATE TO THE MXENCODERS?**

The maximum communication range between the Field Case and MxEncoders is 150 yards, line-of-sight. Other RF devices in the area may cause interference with the SRS and this range may be reduced. Simply moving the SRS to another location may resolve this.

**Q: DO I HAVE TO PLUG THE FIELD CASE INTO A POWER OUTLET? WHAT IF THERE IS NO POWER AT MY LOCATION?**

Most features of the SRS will function without AC power. The Alert System is the only system that requires AC power, all other systems can run off the computer battery. **HOWEVER**, for optimum performance and operation time it is recommended that the system be given AC power whenever possible. Several factors influence how long the system can run off of the computer's battery so it is not possible to accurately estimate how long the system can operate without AC power.

If there is no power at your location, other users have found it handy to purchase a small generator or use a DC to AC power inverter from a car.

**Q: WHAT ARE THE POWER REQUIREMENTS OF THE SRS?**

The Field Case operates off a standard 110V AC wall outlet. The SRS uses approximately 110W (peak). If using a generator, one which supplies a steady 1000W or greater should be more than sufficient.

## **Hardware – Battery Charger**

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**Q: HOW LONG DOES IT TAKE TO CHARGE THE BATTERIES?**

Typical charging time takes between 4 and 6 hours. This will depend on the number of batteries being charged as well as their current level of charge.

**Q: HOW OFTEN DO I NEED TO CHARGE THE BATTERIES?**

The typical life of a battery pack is one week of normal in-season use. This can be reduced if the batteries are older (>2 years) or if the MxEncoders are being used during two-a-days during pre-season. **It is recommended to schedule a routine battery change once a week.** See the Best Practices Guide for more information.

**Hardware – MxEncoder**

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**Q: HOW MANY EVENTS CAN THE MXENCODER STORE IN MEMORY?**

The MxEncoder can store up to 100 events in on-board memory. After 100 events are recorded future events will be lost.

**Q: I SAW A PLAYER HIT HIS HEAD BUT NO IMPACT CAME THROUGH TO THE SRS. WHAT HAPPENED?**

There are several reasons why this could occur (time delay in downloading and processing impact data, the measured acceleration did not exceed the data collection threshold. The measured acceleration was not consistent with characteristics typical for head impacts, etc.). If this appears to happen consistently for a particular player, perform a diagnostic check on the player's MxEncoder (see Section 10).

**Q: I SAW AN IMPACT ABOVE THE ALERT THRESHOLD DOWNLOADED TO THE SRS BUT NO ALERT WAS RECEIVED ON THE PAGER, WHY?**

Most likely that specific impact event was from a previous session or the current session has not started or already ended. Alert pages are only sent during defined session times. Impacts that are stored from previous sessions and downloaded at a later time do not cause alert pages to be sent as those events have already happened.

**Q: A PLAYER JUST RECEIVED A LOW BATTERY WARNING. DO I NEED TO CHANGE THE BATTERY RIGHT AWAY?**

No. The battery should last another 1 - 2 hours after an initial low battery warning occurs. The battery should be replaced as soon as possible after this warning is received.

**Q: PLAYER X'S MXENCODER NEVER SEEMS TO TURN ON. HOW CAN I FIX THIS?**

Check the player in question by getting the helmet/MxEncoder and testing using a demo session. See Best Practices Guide for more information.

## Software - RedZone

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### Q: WHAT IS THE DIFFERENCE BETWEEN DEMO, PRACTICE AND COMPETITION SESSION TYPES?

A **Demo** session can be used for routine battery changes, performing demonstrations and system testing. All events recorded by MxEncoders during Demo sessions are invalidated and are not displayed using the Charting feature.

**Practice** sessions must have a start and end time defined.

**Competitions** must have an end time assigned at the conclusion of the competition.

### Q: CAN I SETUP SESSION AHEAD OF TIME IF I KNOW THE SEASON SCHEDULE?

Yes. It is often much easier to setup all known practices and games prior to getting on the field for that session. HOWEVER, make sure your SRS laptop has synchronized so that it contains the most recent session information.

### Q: I CHANGED THE TIMES OF A SESSION AFTER IT WAS OVER AND NOW ALL THE IMPACT DATA ARE NOT VISIBLE USING CHARTING.

Anytime a change is made to the defined session time all impacts within that time range are re-assigned retroactively on the SRS Data Server by an automated process that runs every night. This reassignment only happens after the SRS Computer has synchronized with the Riddell SRS Server. The reassigned data will be available the following day, again, after synchronization with the Riddell SRS Server.

## Software – HIT Analyzer

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### Q: HIT ANALYZER SAYS IT KEEPS PROCESSING IMPACTS FROM A PLAYER BUT NOTHING IS SHOWING UP ON THE SCREEN. WHAT DOES THIS MEAN?

This is common. HIT Analyzer performs data qualification in real time and only displays events that meet head impact criteria. Some acceleration events recorded by the MxEncoder are not true head impacts but rather artifacts of the helmet interacting with the head. These events are not displayed or included in any charting reports.

### Q: DOES HIT ANALYZER HAVE TO ALWAYS BE RUNNING? WHAT IF I NEED TO MAKE A ROSTER/EQUIPMENT CHANGE DURING A SESSION?

Head impact data are only downloaded from MxEncoders when HIT Analyzer is running. If a roster change is required you can return to the Session or Roster editor, make appropriate changes and then re-enter the session to resume downloading data.

### Q: WHAT IS THE DIFFERENCE BETWEEN SINGLE AND MULTIPLE ALERTS?

A Single Alert is any impact that is above a threshold (peak linear acceleration, rotational, HIC, GSI, HITsp, InSite).

Multiple Alerts (InSite alerting only) occur after a series of impacts have added up to be above a position and skill level specific threshold. See the Software Guide for more information.

## Q: WHAT IS THE TOP 10 LIST?

The Top 10 List displays the highest impact magnitudes for all players for that day.

## Q: CAN I EXPORT ALL IMPACTS RECORDED DURING A SESSION?

Yes. There is an additional software tool that can export out all head impacts for various ranges.

## General

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## Q: WHAT IS THE COORDINATE SYSTEM THE SRS USES TO DEFINE IMPACT LOCATION?

The SRS uses a spherical coordinate system where azimuth is the angle around the circumference of the head and elevation is the angle from the neck to the top of the head. 0° azimuth is the back of the head and 90° azimuth is the right side of the head. 90° elevation is the top of the head. -90° elevation is up through the neck.

## Q: WHY IS THERE AN ARROW INDICATING AN IMPACT WENT UP THROUGH THE PLAYERS NECK WHEN REALLY HE HIT THE TOP OF HIS HEAD?

Sometimes certain head impact data are such that the estimated impact location can look like it came through the neck instead of the top of the head. This is an artifact of the impact location estimation processing the SRS uses.

## SRS BEST PRACTICES

The following is a list of Best Practices to be used as a guide to ensure that your Sideline Response System functions as well as it can throughout the upcoming season. This list was created from past SRS user comments, our experience with troubleshooting problems, and a detailed evaluation of data quality during the off-season. This list outlines key areas where small attention to details can significantly improve the overall system performance.

1. Due to improved diagnostic techniques and the implementation of a processing threshold, **daily synchronization** of the SRS is recommended. The system **MUST** be synchronized at least once a week during the season.
2. A diagnostic check of HIT System functionality is recommended during the weekly changing of batteries.

## SRS Synchronization

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Frequent synchronization of your local SRS database (located on your SRS laptop) with the SRS data server helps ensure quality data collection throughout the season. If an Internet connection is available, the HIT Analyzer program will automatically try to synchronize to the SRS Data Server when it starts and when it is closed down.

The synchronization process provides key services:

1. Preservation and Back-Up of Information: All incoming impact data is stored within a local database on your SRS laptop computer. **In the event of damage to your local computer that information may be**

**unrecoverable.** Frequent synchronization will limit your potential for data loss since all information is backed up on the SRS Data Server.

2. **System Performance Evaluation:** Frequent synchronization allows for regular monitoring of incoming data. Algorithms designed to evaluate data quality and SRS performance, are executed daily for all data contained on the SRS Data Server. These evaluations enable the SRS Customer Service team to identify potentially malfunctioning hardware or problems with use of the system. With daily synchronization, these errors can be caught and corrected quickly, thus improving the overall quality of data collection.

Due to the reasons stated above, it is recommended that synchronization of SRS data be performed following **EVERY** data collection session. During occasions where daily synchronization is not feasible, weekly synchronization is **REQUIRED**.

## Weekly Diagnostic Check

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While every effort is made to ensure the SRS hardware (MxEncoders, Sideline Controller, Access Point, Alert Pager System, Field Case) is functioning properly, over the course of a season, damage or excessive wear may occur. The absolute worst time to identify equipment problems is during competition as this can lead to missed data. The good news, however, is the vast majority of problems can be caught using a few simple diagnostic techniques.

Follow the procedure below to verify that your equipment is working correctly. If the equipment is not working as expected this procedure will walk you through basic troubleshooting steps.

1. **Remove Batteries:** Remove all batteries from the MxEncoders after 1 week of use.
2. **Demo Session:** Setup the SRS in the location where the battery change is occurring using your typical setup procedure. Create a demo session. (You can either create the demo session in RedZone and then synchronize your local database or you can create the session through HIT Analyzer.) Remember that any impacts that are created during a demo session will be invalidated, so if a helmet is accidentally dropped or impacted, the recorded impact will be safely eliminated from future analyses. (Note: HIT Analyzer should be launched after all old batteries have been removed)
3. **Install Batteries:** Install charged batteries into all MxEncoders.
4. **MxEncoder Communication:** Enter your session and make sure that all MxEncoders have successfully communicated with the system. If communication has not occurred (i.e. a helmet is still listed as 'inactive'), check for the following:
  - **Installed MxEncoder:** First check to see if an MxEncoder is installed within the player's helmet. Players have been known to remove MxEncoders without notification to team personnel
  - **MxEncoder Turns On:** Place your hand inside the non-communicating helmet at the location of the on/off sensor. This should be sufficient to turn the unit on
  - **Re-Install Battery:** Check to see if a battery was installed in the helmet. Frequently MxEncoders are 'missed' during the battery changing procedure, especially when replacing batteries for a large group of helmets
  - **Charged Battery:** Was the battery fully charged? Try replacing with another battery that is known to be charged. Note: Over time and frequent recharging, batteries may no longer respond to recharging. If this occurs, contact Riddell Customer Service to arrange replacement

- Correct Player Assignment: Is the correct MxEncoder assigned to the correct player? Occasionally when MxEncoders are removed from helmets and replaced, the serial number of the MxEncoder does not get assigned to the correct player. Verify in RedZone (within the Roster page) that the serial number of the MxEncoder within the helmet is accurately assigned to the player
- Damaged MxEncoder: If damage to the MxEncoder (ex. battery connector broken) is causing no communication, please contact Riddell Customer Service to arrange repair
- Fully Charged Batteries: One potential source of error is inserting an uncharged battery into an MxEncoder. In this case, the unit may communicate with the Sideline Controller initially but, over the course of a week, may lose its charge. Insure that all batteries start the week at full capacity.
- In HIT Analyzer, check if you have received a low battery warning for a player

In addition to catching possible hardware malfunctions this diagnostic procedure may reduce your data download time. Setting up the Field Case during battery changing allows for any impacts stored on the helmet to download. Many times a small number of events are recorded during the time between the end of practice and a player going into the locker room. These impacts as well as any events created by accident during changing batteries will be downloaded outside of a true contact session, thus enabling actual events to download in real time at the start of the next session.

This simple weekly diagnostic check will add very little to your overall set up time but can prevent most errors that have occurred during data collection. In addition, you will ensure that any problems are caught quickly which will lead to improved data collection.

## CONTACT INFORMATION

For Sales & Customer Service support, please contact:

Riddell – Customer Support Group  
 9801 W. Higgins Rd, Suite 800  
 Rosemont, IL 60018  
 P: (800) 275-5338  
[www.riddell.com](http://www.riddell.com)



## COMPLIANCE INFORMATION

### Federal Communications Commission (FCC)

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The following statements apply to the Sideline Receiver and MxEncoder, as required by the Federal Communications Commission (FCC):

#### Compliance Statement (Part 15.19)

This device complies with part 15 of the FCC Rules. Operation 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.

#### Warning (Part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### Information to User (Part 15.105)

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

#### Sideline Receiver

##### RF Exposure (OET Bulletin 65)

To comply with FCC's RF exposure limits for general population / uncontrolled exposure, the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

#### SRS 900MHz MxEncoder (FCC ID: SUN-0226000)

This device and its antenna has shown compliance with FCC's SAR limits for general population / uncontrolled exposure for a portable device. The maximum listed SAR level is 1.27 W/kg (head). The antenna used for this device must not be co-located or operating in conjunction with any other antenna or transmitter.

### Industry Canada (IC)

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The term "IC" before the certification/registration number only signifies that the Industry Canada technical specifications were met.

#### Sideline Receiver

##### Section 5.5 of RSS-210

This device has been designed to operate with an antenna having a maximum gain of 5 dBi using an omni directional antenna. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

##### Section 5.11 of RSS-210

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

## **MxEncoder**

### **Section 14 of RSS-210**

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population.

Consult Safety Code 6, obtainable from Health Canada's website: [www.hc-sc.gc.ca/rpb](http://www.hc-sc.gc.ca/rpb).

## **WARRANTY**

- Riddell warrants SRS to be free from defects in materials and workmanship for a period of one (2) years from the date of purchase provided there has been normal use and proper maintenance.
- To the extent permitted by law and not otherwise, this warranty is in lieu of all other warranties, express or implied, whether Statutory or otherwise, including any implied warranties of merchantability or fitness for any particular purpose.
- Manufacturer shall not be liable for any consequential damages resulting from the use of its products.
- The device covered by this warranty should be returned to Riddell, along with proof of purchase.