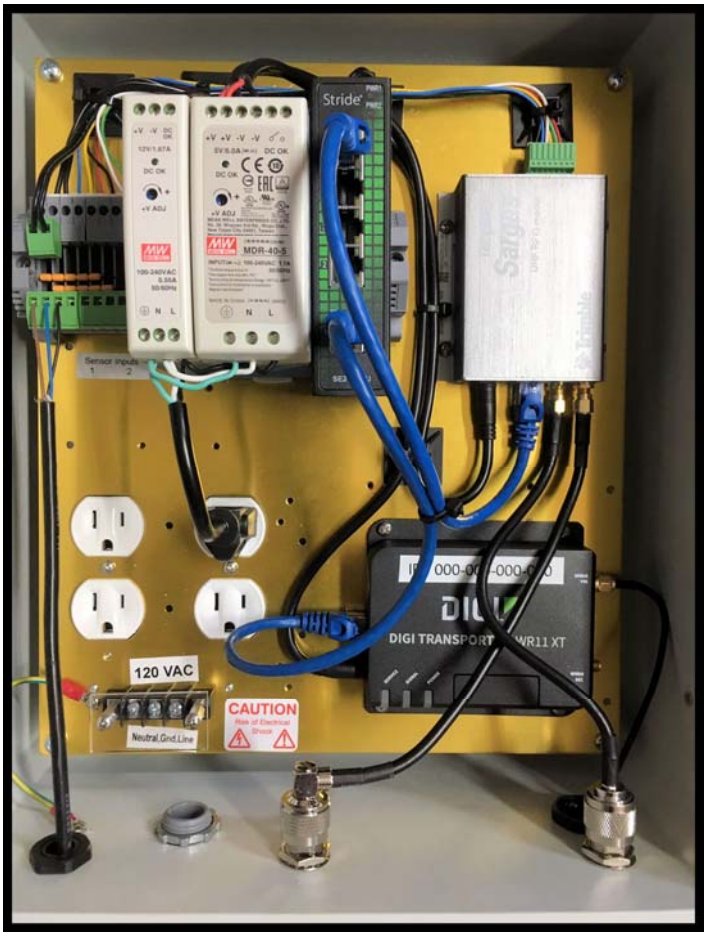
Softrail's Spartan AEI Reader System

August 11, 2020



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1. BRIEF OVERVIEW

Softrail's Spartan AEI Reader System was designed to be a low cost alternative to the much higher priced AEI reader systems used on railroads' mainlines. The Spartan AEI Reader System was developed primarily for industrial rail shippers and short line railroads looking for economical ways to automatically identify railcars on low speed tracks (less than 40 miles per hour) or as they enter their yards.

The guiding philosophy was to reduce the amount of equipment needed in the field, thereby decreasing overall costs, increasing reliability and maintainability.

The Spartan AEI Reader consists of only an AEI RF reader (ThingMagic's Sargas) with two antennas, a cellular modem and a presence detector. All processing of data is performed by a central AEI Reader Server located in Softrail's office, which retrieves the raw AEI tag and sensor data, creates a train consist and distributes this data to multiple FTP servers and email addresses in various file formats including the Association of American Railroads S-9203 (T94).

2. BACKGROUND

Since 2005 Softrail has been trying to find ways to reduce the cost and complexity of AEI reader systems. The first goal was to eliminate wheel detectors. Because wheel detectors are mounted on the rails and are subject to physical damage, they are the components that most often fail in an AEI reader system.

2.1. Elimination of Wheel Detectors

Wheel detectors are used to detect untagged rail vehicles and determine the speed and direction of a train as it passes an AEI reader site. . Softrail eliminated the need for wheel detectors by using a Doppler radar system to compute this information.

2.2. Remote Processing of Data

Previously all of Softrail's wayside reader systems included a Windows mobile computer to retrieve information from the RF tag reader, Doppler radar, and a presence sensor to create a train consist. A train consist file would then be sent to an FTP server or attached to an email. This file could be in the Association of American Railroad S-9203 (T94) format, a coma delimited file that could be imported into a spreadsheet, or an EDI type file.

The Spartan AEI Reader System is a totally new concept. It does not generate or transmit train consists locally. Instead raw AEI tag reader and sensor data are stored at the site and later retrieved by a computer system housed in our office. Our office computer (AEI Reader Server) creates a train consist from this raw data and sends it to multiple FTP servers and email addresses in the various formats. This eliminates the need of having a processor or some type of computer at each site.

This approach only became feasible when Softrail had ThingMagic modify their Sargas RF reader to store and timestamp AEI tag and sensor data.

Softrail's AEI Reader Server periodically connects over the internet to a Spartan AEI Reader, retrieves its data, generates a train consist and distributes it. A single AEI Reader Server can handle several hundred sites.

2.3. Inclusion of a Cellular Modem

The standard Spartan AEI Reader includes a cellular modem with a static IP. Softrail's AEI Reader Server uses this cellular connection to retrieve data from the Spartan AEI Reader and obtain its status. A connection can also be made through a customer's network, which would further lower the cost by eliminating the cellular modem and the associated service charges.

We have often found it very difficult, however, to connect our equipment through a customer's network due to firewalls and security concerns. Therefore, we prefer to use a cellular modem connection rather than connecting to the internet through a customer's network.

3. Limitations

The Spartan AEI Reader System is designed for speeds less than 40 mph. The Spartan's Sargas RF reader is capable of reading at speeds up to 100 mph, but only when it is reading from a single antenna. The Spartan's Sargas reader multiplexes between two antennas which reduce its speed capability.

The standard Spartan reader also does not detect untagged rail vehicles. Softrail has developed a laser coupler detector, which will allow untagged rail vehicles to be detected. This capability is not included in the standard Spartan AEI Reader System, but is available as an option.

Since the second generation AEI tags were introduced in 2005, it has become extremely rare to see a rail vehicle with two defective or missing tags. For this reason we question the cost effectiveness of adding this capability, and that is why it is not part of the standard package.

4. Components

The standard Spartan Network Yard Reader System consists of five main components. These components are:

- A Sargas AEI RF Reader
- Cellular Modem with Antenna
- An Ethernet Switch
- Two external antennas
- A Presence Sensor

Spartan AEI Reader System

Figure 1 is a block diagram of the AEI reader system.

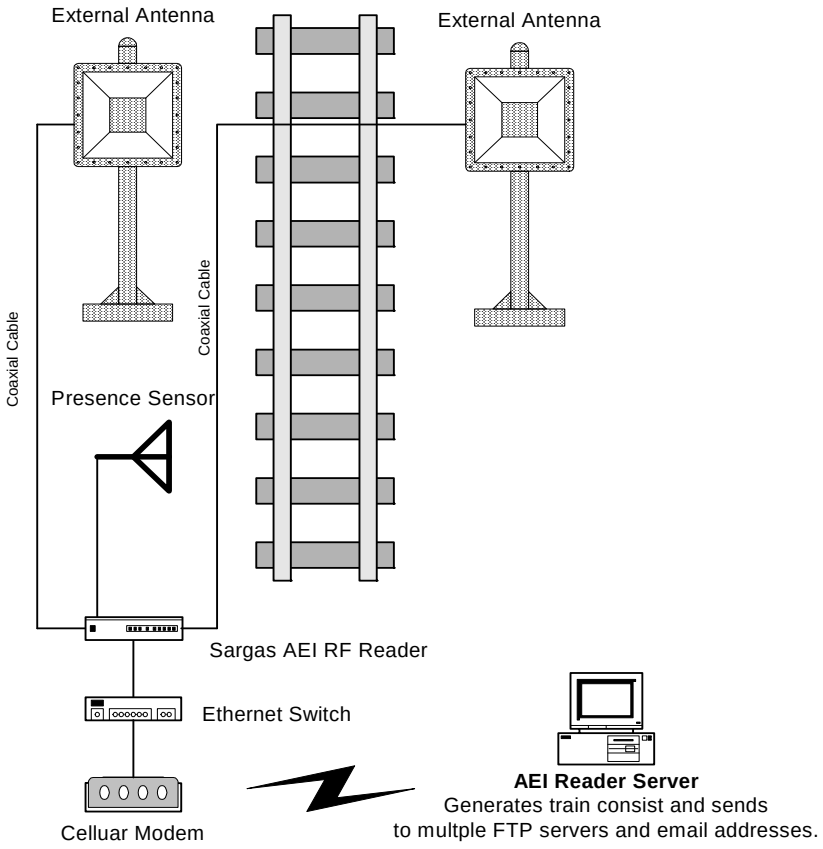

Figure 1 - AEI Reader System Block Diagram

The Spartan AEI Reader uses the Sargas AEI RF reader. The Sargas AEI RF reader is connected to the two external antennas and the presence sensor

The two external antennas are mounted on each side of the track. The antenna mounted closest to the enclosure should be connected to the Antenna 1 coaxial connector on the bottom of the enclosure. The Sargas reader multiplexes between the two antennas. The Sargas reader has a network interface and is connected directly to the Ethernet switch.

The Sargas AEI RF reader, the Ethernet switch and the cellular modem are housed in a weatherproof enclosure. Appropriate surge protection components are also located in this enclosure. See Figure 2.

Figure 2 - Inside the Weatherproof Enclosure

5. EQUIPMENT INSTALLATION WIRED

Go to Paragraph 6 for installing the solar version.

5.1. Deliverables

The Spartan Reader System shipment contains the following items:

- Two external antennas and pole mounting brackets (one has a M-Gage presence sensor attached)
- One Controller (which includes the Sargas AEI RF reader, cellular modem, Ethernet switch and power supplies) housed in a fiberglass weatherproof enclosure
- One cellular modem antenna
- One mounting bracket for the fiberglass weatherproof enclosure
- One 10 foot and one 40 foot coaxial cable
- Two test AEI tags

5.2. Spartan Reader Antenna Installation

The two external antennas should be mounted on poles on opposite sides of the track. They should be mounted across from each other (+/- 5 feet) and 11 feet from the center of the rail. The center of each reader antenna should be 3 ½ feet above the top of the rail. The antennas should be pointing toward the track.

Please note for train speeds less than 25 mph there is a great deal of tolerance in the placement of the antennas. They can be mounted vertically from one foot to 6 feet above the top of the rail and can be positioned 8 to 12 feet from the center of the rail.

A minimum of a 1 inch diameter conduit should be placed under the rail for the coaxial cable running from the controller to the antenna on the opposite side of the track.

Please note that the tags and antennas are linear polarized in the horizontal plane. The "HOR UP" on the back of the antenna must be pointed at the sky (see Figure 3). If not the system will not be able to read the AEI tags.

One of the antennas has an M-Gage magnetic field sensor which is used to detect train presence (see Figure 4). This antenna should be mounted closest to the enclosure and is connected to the Antenna 1 connector (see Figure 7). The M-Gage must be initialized when there a no railcars are present. Softrail will send a signal to initialize the M-Gage detector. If the antenna is ever moved, Softrail will have to re-initialize the sensor.

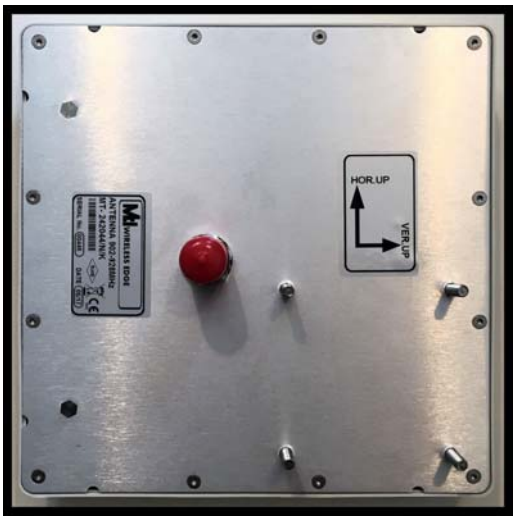

Figure 3 - Back of the Antenna

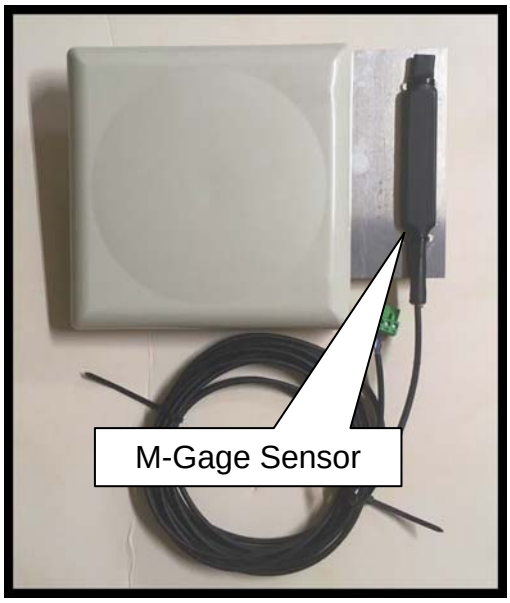

Figure 4 - Near Antenna with M-Gage Presence Detector

5.3. Controller Installation

There are seven main components in the controller's enclosure. These are:

- Sargas AEI RF Reader
- Cellular Modem
- Ethernet Switch
- Terminal Block
- 12 VDC Power Supply or 24 VDC to 12 VDC converter
- 5 VDC Power Supply or 24 VDC to 5 VDC converter

The 120/240 VAC version of the system uses the 12 VDC and 5 VDC power supplies. Figure 5 shows the layout of the 120/240 VAC version of the controller.

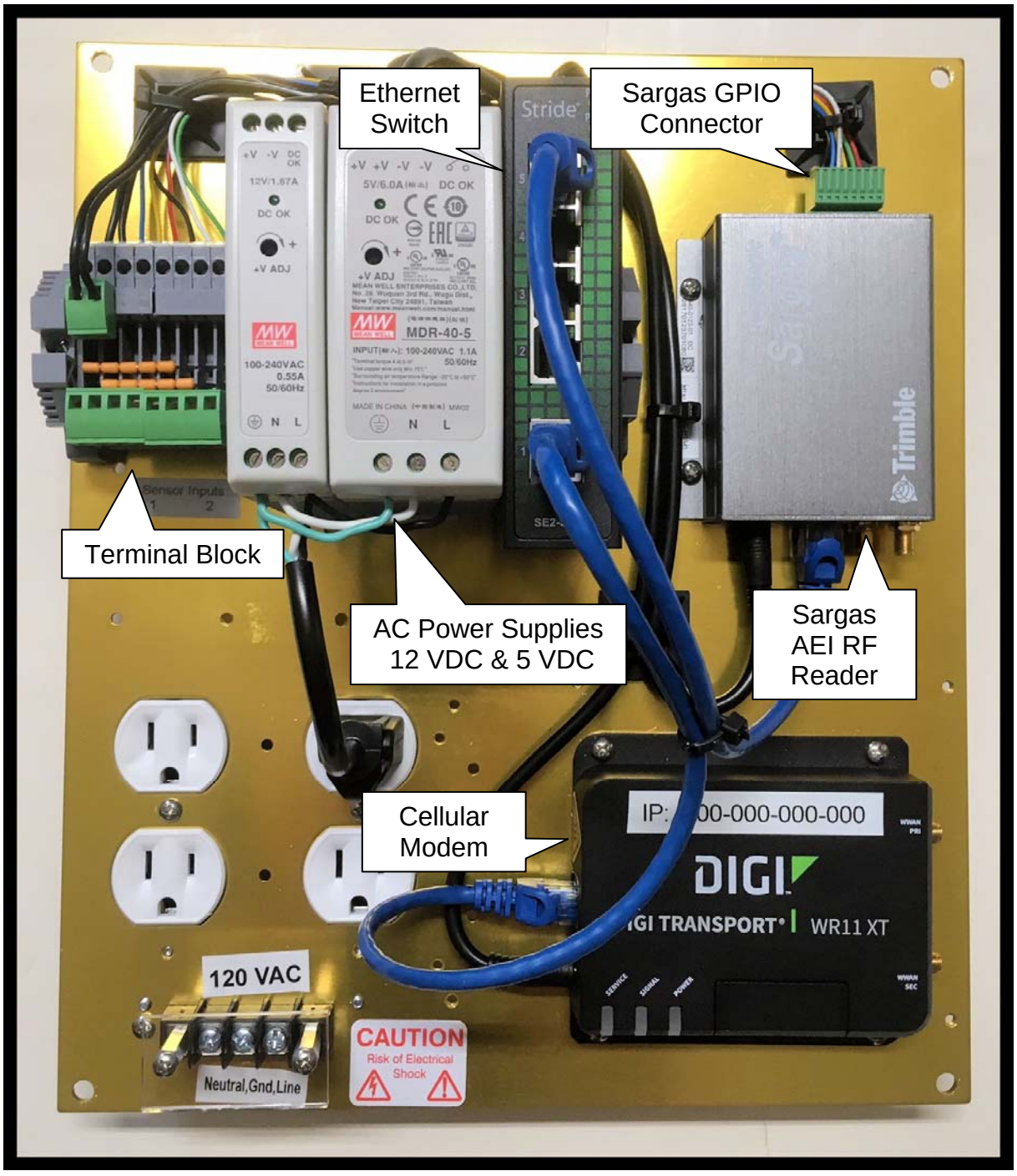

Figure 5 - 120/240 VAC Controller Layout

There are six cable connections that must be made with the Controller (see Figure 7). The following is the list of connections:

- Near antenna 1 coaxial cable (connector is N-Female)
- Far antenna 2 coaxial cable (connector is N-Female)
- Ground stud
- 120 VAC power cable
- M-Gage presence sensor four wires to terminal block
- Cellular modem antenna

Figure 6 - Controller Enclosure

Figure 7 - Controller Enclosure Bottom View

Power is connected to the three terminals located under a clear plastic protective cover near the bottom left side of the mounting plate in the controller's enclosure (see Figure 5).

When power is applied, the green lights on the power supplies and the Ethernet switch should come on.

A ground rod and strap must be connected to the grounding stud located on the left side of the bottom of the controller's enclosure.

There are 8 terminals on the terminal block (see Figure 8). Terminals 1, 2 , 3 and 4 connect to the M-gage cable.

Terminals 5 through 8 can be used to connect to a second optional sensor such as a switch position monitor or the laser coupler detector.

The M-Gage cable is shipped with a plug-in connector attached. This can be removed to pull the cables through holes in the enclosure.

The Spartan AEI reader system can sense a dry contact closure. Sensor 1 contact closure is connected to Terminals 1 and 3; and Sensor 2 to Terminals 5 and 7.

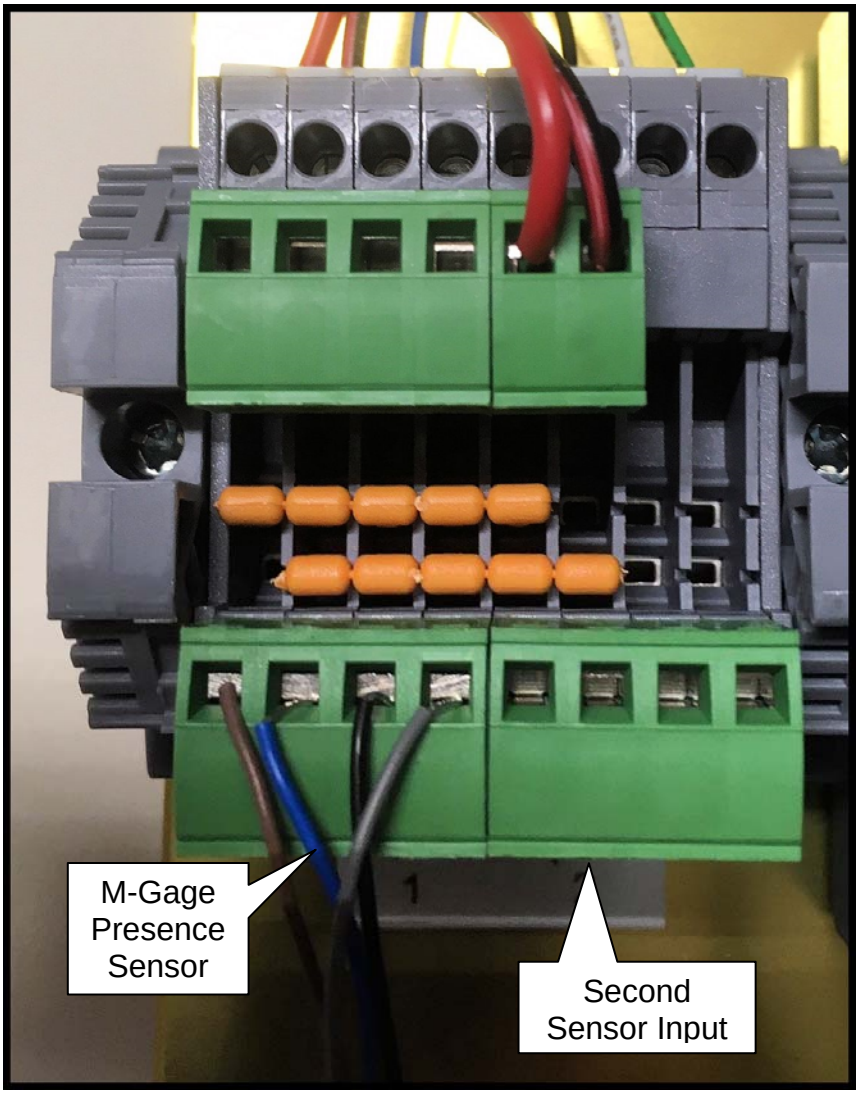

Figure 8 - Terminal Block

The following are the cable assignments for the terminal block:

Terminal Assignments

Terminals are numbered from left to right. GPIO references the connector on the Sargas reader.

Description System Side	Wire Color Top	Terminal Number	Wire Color Bottom	Description Device Side	Cable Pin Assignments
+12 VDC		1	Brown	+12 VDC	M-Gage Pin 1 (presence)
Ground		2	Blue	Radar Power Ground	M-Gage Pin 3 (presence)
Sagas Digital Input 0	Jump to GPIO 6 Blue	3	Black	Digital Input Positive	M-Gage Pin 4 (presence)
Sagas Digital Output 0	Jump to GPIO 4 Yellow	4	Gray	Digital Output	M-Gage Pin 5 (presence)
+12 VDC	Jump to GPIO 2 Red	5			
Ground	Jump to GPIO 7 Black	6			
Sagas Digital Input 1	Jump to GPIO 5 White	7			
Sagas Digital Output 1	Jump to GPIO 3 Green	8			

Figure 9 - Terminal Assignments

6. EQUIPMENT INSTALLATION FOR SOLAR SYSTEM

6.1. Deliverables

The Spartan Reader Solar System shipment contains the following items:

- Two external antennas and pole mounting brackets (one has a M-Gage presence sensor attached)
- One Spartan Reader Board mounted in the SunWize enclosure (which includes the Sargas AEI RF reader, cellular modem, 12 VDC to 5 VDC converter)
- One cellular modem antenna
- One 10 foot and one 40 foot coaxial cable
- Two test AEI tags
- SunWize Solar System (which includes enclosure, battery, solar panel, control panel and mounting hardware)

6.2. Spartan Reader Antenna Installation

The two external antennas should be mounted on poles on opposite sides of the track. They should be mounted across from each other (+/- 5 feet) and 11 feet from the center of the rail. The center of each reader antenna should be 3 ½ feet above the top of the rail. The antennas should be pointing toward the track.

Please note for train speeds less than 25 mph there is a great deal of tolerance in the placement of the antennas. They can be mounted vertically from one foot to 6 feet above the top of the rail and can be positioned 8 to 12 feet from the center of the rail.

A minimum of a 1 inch diameter conduit should be placed under the rail for the coaxial cable running from the controller to the antenna on the opposite side of the track.

Please note that the tags and antennas are linear polarized in the horizontal plane. The “HOR UP” on the back of the antenna must be pointed at the sky (see Figure 10). If not the system will not be able to read the AEI tags.

One of the antennas has an M-Gage magnetic field sensor which is used to detect train presence (see Figure 11). This antenna should be mounted closest to the enclosure and is connected to the Antenna 1 connector (see Figure 14). The M-Gage must be initialized when there a no railcars are present. Softrail will send a signal to initialize the M-Gage detector senor. If the antenna is ever moved, Softrail will have to re-initialize the sensor.

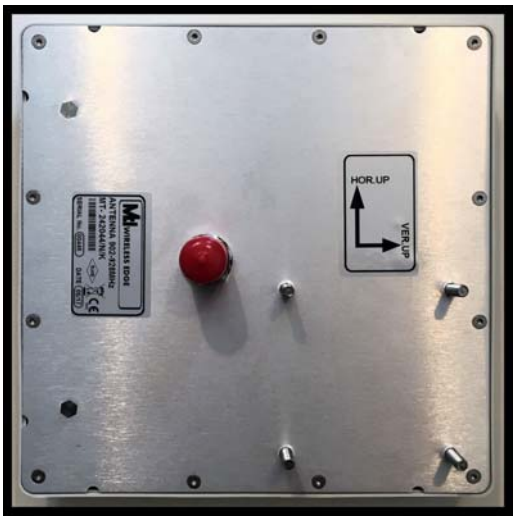

Figure 10 - Back of the Antenna

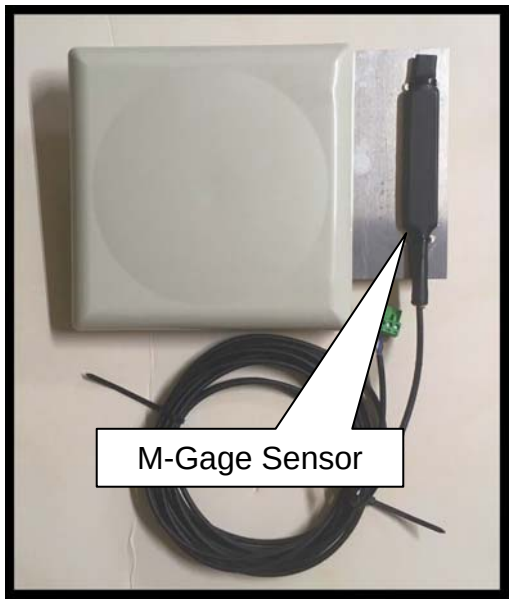

Figure 11 - Near Antenna with M-Gage Presence Detector

6.3. Spartan Reader Board

The Spartan Reader Board is mounted inside the SunWize enclosure (see Figure 12).

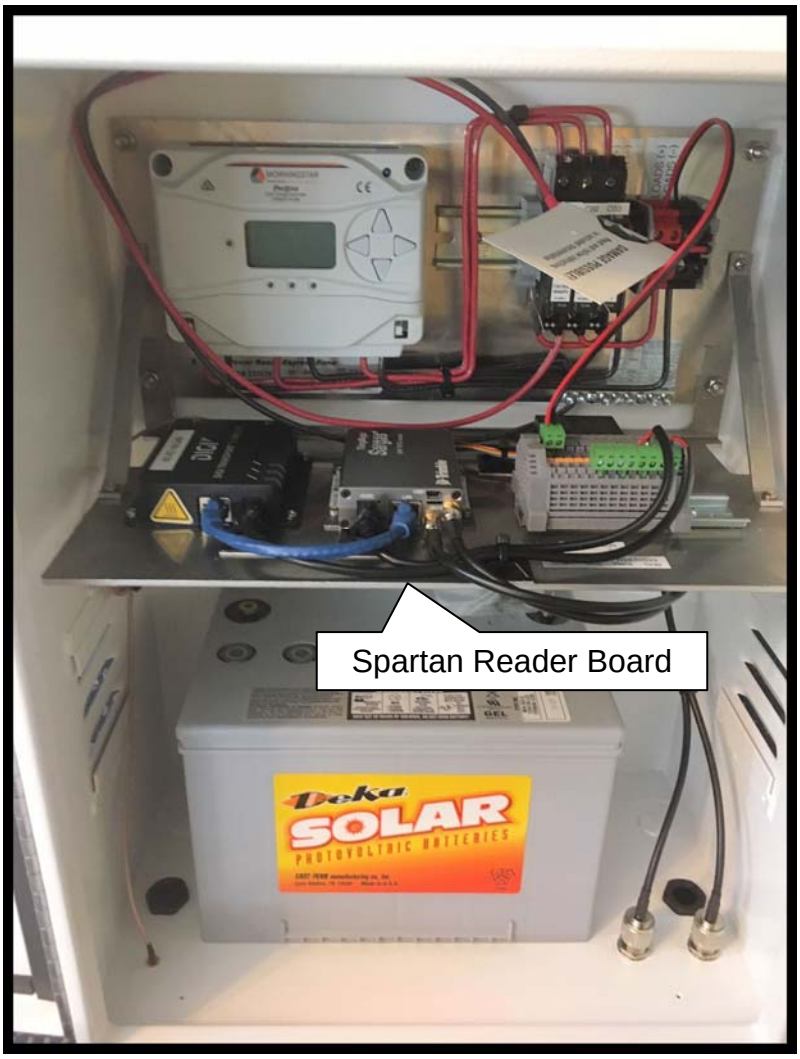

Figure 12 - Inside the SunWize Enclosure

Spartan AEI Reader System

There are four main components on the Spartan Reader Board (see Figure 13). These are:

- Sargas AEI RF Reader
- Cellular Modem
- 12 VDC to 5 VDC Converter
- Terminal Block

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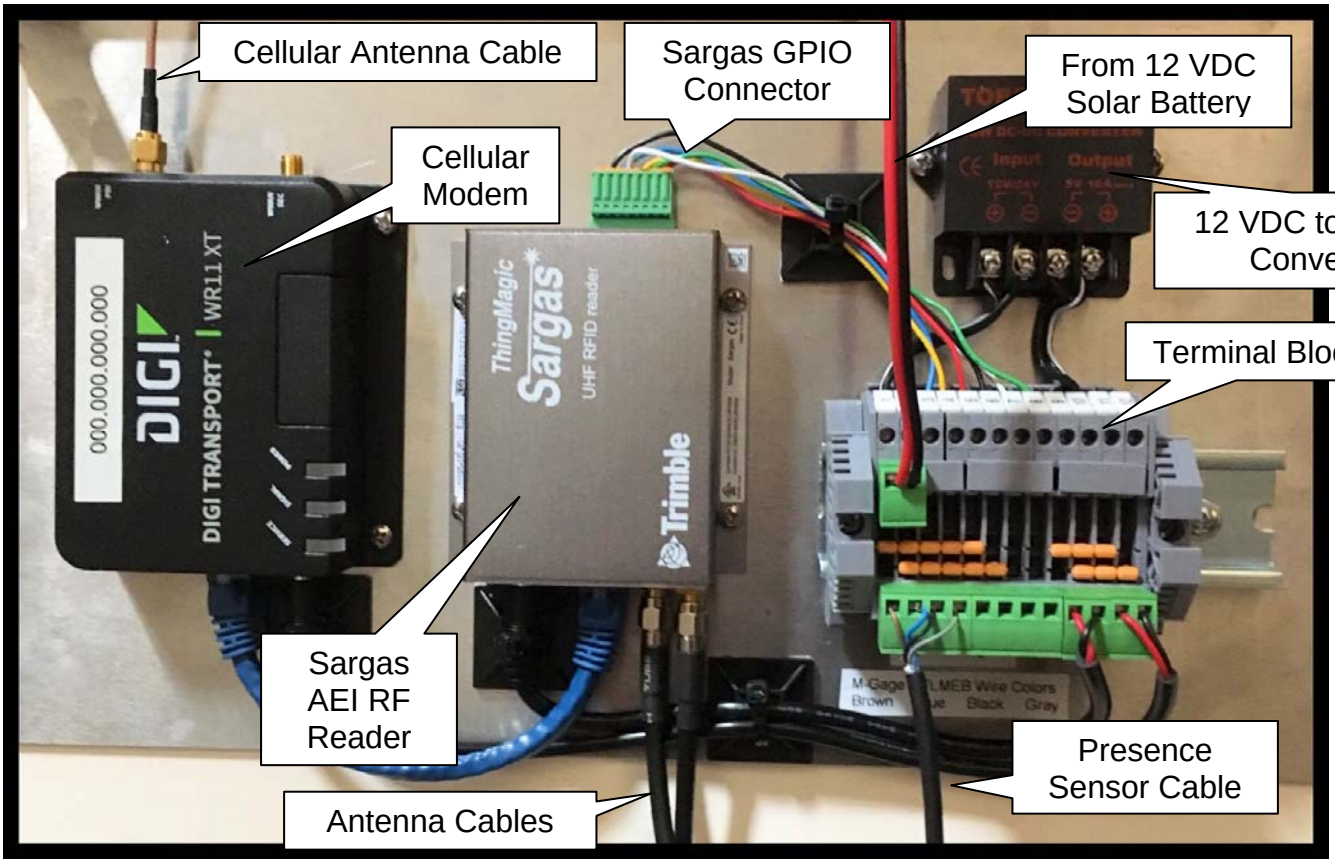


Figure 13 - Spartan Reader Board Layout

There are five external cable connections that must be made with the SunWize enclosure (see Figure 14). The following is the list of connections:

- Near antenna 1 coaxial cable (connector is N-Female)
- Far antenna 2 coaxial cable (connector is N-Female)
- Presence sensor four wires to terminal block
- Cellular modem antenna
- Solar panel cable (see the enclosed Sun-Wize Quick Start Manual)

Figure 14 - SunWize Enclosure Bottom View

There are 12 terminals on the terminal block (see Figure 15). Terminals 1, 2, 3 and 4 connect to the M-Gage sensor cable. Terminals 5 through 8 can be used to connect to a second optional sensor such as a switch position monitor or the laser coupler detector.

The M-Gage sensor cable is shipped with a plug-in connector attached. This can be removed to pull the cables through holes in the enclosure.

The Spartan AEI reader system can sense a dry contact closure. Sensor 1 contact closure is connected to Terminals 1 and 3; and Sensor 2 to Terminals 5 and 7.

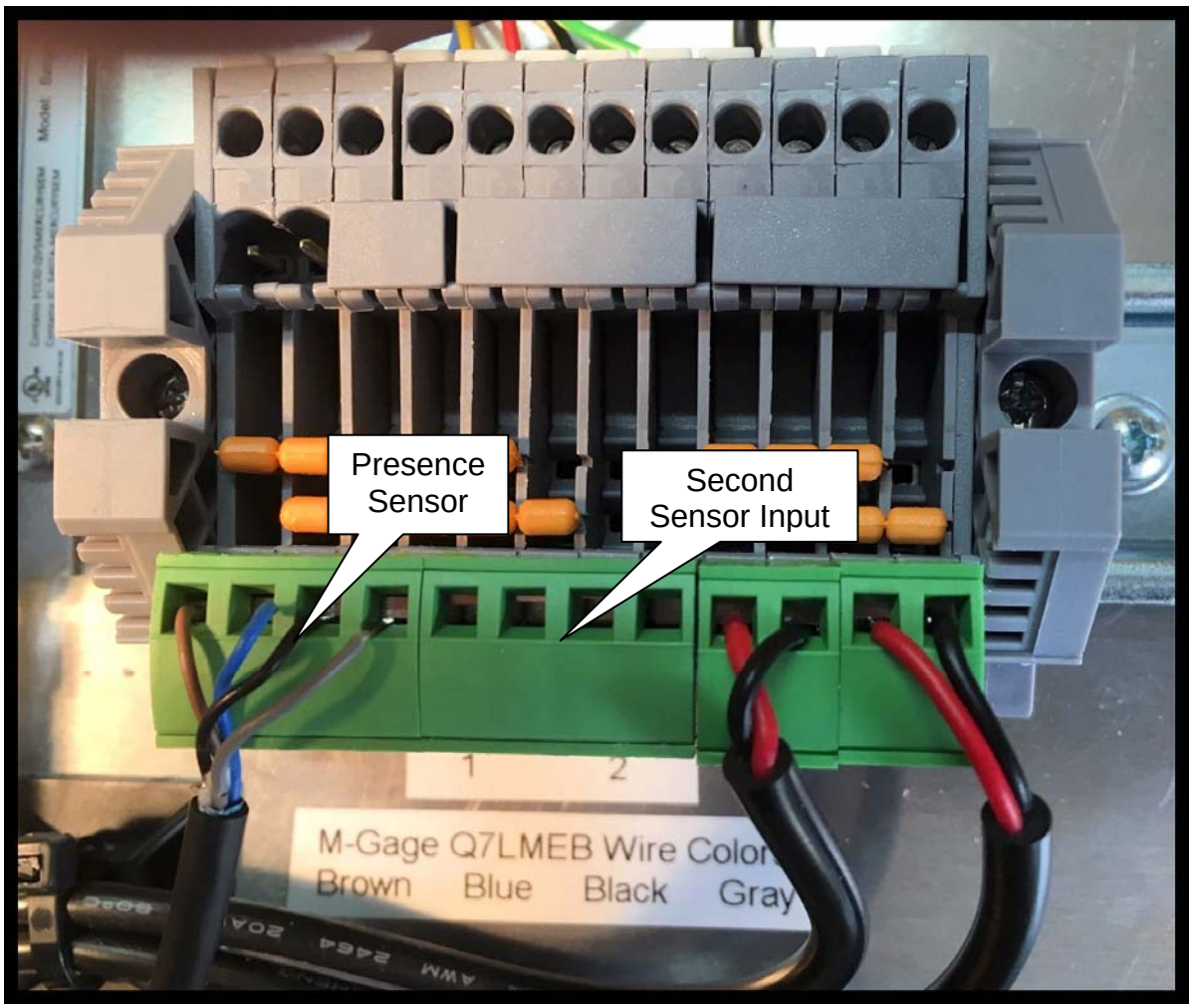


Figure 15 - Spartan Reader Board Terminal Block

The following are the cable assignments for the terminal block:

Terminal Assignments

Terminals are numbered from left to right. GPIO references the connector on the Sargas reader.

Description System Side	Wire Color Top	Terminal Number	Wire Color Bottom	Description Device Side	Cable Pin Assignments
+12 VDC From Solar Battery	Red	1	Brown	+12 VDC	M-Gage Pin 1 (presence)
Ground From Solar Battery	Black	2	Blue	Radar Power Ground	M-Gage Pin 3 (presence)
Sagas Digital Input 0	Jump to GPIO 6 Blue	3	Black	Digital Input Positive	M-Gage Pin 4 (presence)
Sagas Digital Output 0	Jump to GPIO 4 Yellow	4	Gray	Digital Output	M-Gage Pin 5 (presence)
+12 VDC	Jump to GPIO 2 Red	5			
Ground	Jump to GPIO 7 Black	6			
Sagas Digital Input 1	Jump to GPIO 5 White	7			
Sagas Digital Output 1	Jump to GPIO 3 Green	8			
+ 5 VDC From 12 VDC to 5 VDC Converter	Black with White Strip	9	Red	Sargas Power Plug	
Ground	Black	10	Black	Sargas Power Plug	
+ 5 VDC From 12 VDC to 5 VDC Converter	Black with White Strip	11	Red	Cellular Modem Power Plug	
Ground	Black	12	Black	Cellular Modem Power Plug	

Figure 16 - Solar Board Terminal Assignments

7. CONFIGURATION PARAMETERS

The Spartan AEI Reader has a number of configuration parameters that need to be set up. Most of the configuration parameters are for identifying the AEI Reader Site and communicating with other systems via email or FTP servers. These configuration parameters are entered in Softrail's AEI Reader Server.

At the end of this manual is a form for entering this information. This form can also be downloaded by going to http://www.signalcc.com/aei/Spartan%20Config%20Form.pdf.

The following is a list of some of the customer provided configuration parameters:

- Train movement email file type (comma delimited text, EDI or S-9203)
- Train movement email addresses (up to eight email addresses)
- Maintenance email addresses (up to eight email addresses)
- Tag maintenance email addresses (up to four email addresses)
- Orientation alarm email addresses (up to four email addresses)
- FTP server information (up to eight FTP servers)

8. MESSAGES (EMAIL and FTP)

The Spartan AEI Reader System sends messages via emails or via file transfers to FTP servers. There are two basic types of messages. These are:

- Train Reporting messages with information about rail vehicle movements past the reader. An example can be found in Figure 17.
- Alarm messages with information about the health of the Spartan Reader System, AEI tags on individual rail vehicles, orientation issues. An example can be found in Figure 18.

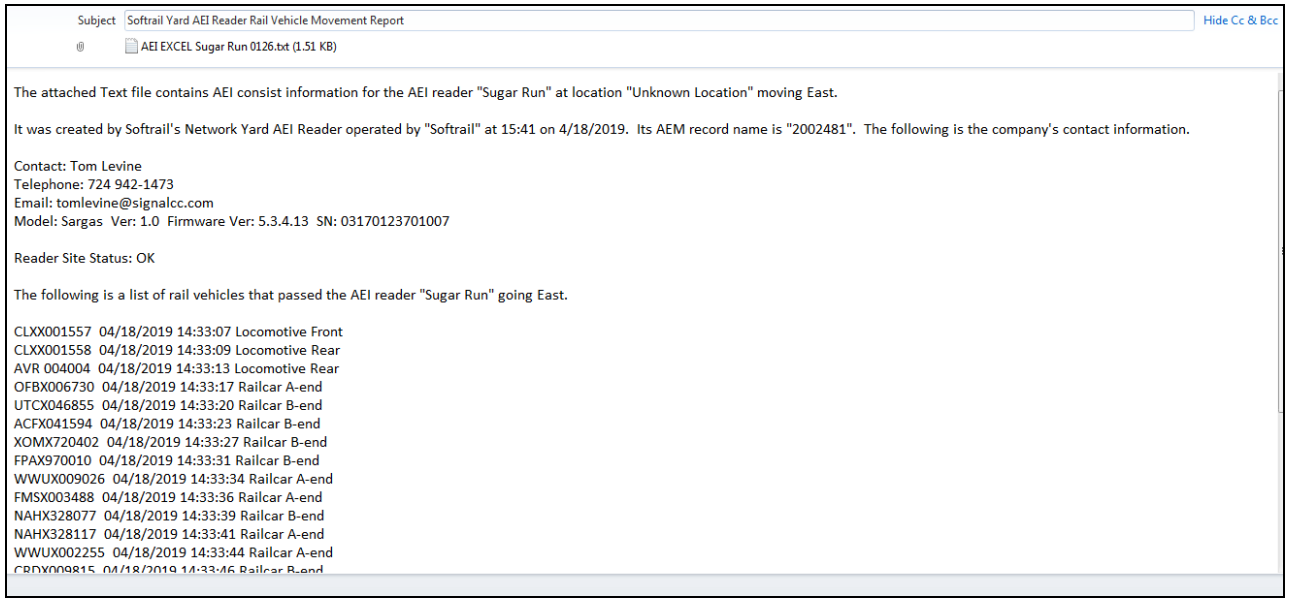
Orientation alarms are for rail cars that go through a rotary dumper (get turned upside down). These rail cars have a rotary coupler only one end of the rail car. The system will send an alarm when it sees two adjacent rail cars connected by their fixed couplers instead of a rotary coupler connected to a fixed coupler.

8.1. Train Reporting Messages

Train reporting messages are placed in files that can be sent as attachments to an email and/or directly to FTP servers. The files can either be in a comma delimited text format (CSV), EDI or formatted with the S-9203 (T94) protocol.

Information about the layouts of these files can be found in Paragraph 9.

The following is the email body text of a Train Movement message:



Subject Softrail Yard AEI Reader Rail Vehicle Movement Report Hide Cc & Bcc

AEI EXCEL Sugar Run 0126.txt (1.51 KB)

The attached Text file contains AEI consist information for the AEI reader "Sugar Run" at location "Unknown Location" moving East.

It was created by Softrail's Network Yard AEI Reader operated by "Softrail" at 15:41 on 4/18/2019. Its AEM record name is "2002481". The following is the company's contact information.

Contact: Tom Levine
Telephone: 724 942-1473
Email: tomlevine@signalcc.com
Model: Sargas Ver: 1.0 Firmware Ver: 5.3.4.13 SN: 03170123701007

Reader Site Status: OK

The following is a list of rail vehicles that passed the AEI reader "Sugar Run" going East.

CLXX001557 04/18/2019 14:33:07 Locomotive Front
CLXX001558 04/18/2019 14:33:09 Locomotive Rear
AVR 004004 04/18/2019 14:33:13 Locomotive Rear
OFBX006730 04/18/2019 14:33:17 Railcar A-end
UTCX046855 04/18/2019 14:33:20 Railcar B-end
ACFX041594 04/18/2019 14:33:23 Railcar B-end
XOMX720402 04/18/2019 14:33:27 Railcar B-end
FPAX970010 04/18/2019 14:33:31 Railcar B-end
WWUX009026 04/18/2019 14:33:34 Railcar A-end
FMSX003488 04/18/2019 14:33:36 Railcar A-end
NAHX328077 04/18/2019 14:33:39 Railcar B-end
NAHX328117 04/18/2019 14:33:41 Railcar A-end
WWUX002255 04/18/2019 14:33:44 Railcar A-end
CRDX009815 04/18/2019 14:33:46 Railcar B-end

Figure 17 - Train Reporting Email

8.2. Alarm Messages

All maintenance messages are sent via email. No maintenance messages are sent to FTP servers.

The following is an example of a maintenance message email:

Figure 18 - Alarm Email

9. FILE FORMATS

The Spartan AEI Reader System can send AEI rail vehicle movement information in three types of file formats.

These are referred to as the comma delimited text (CSV), EDI and S-9203 (T94) file formats.

- The comma delimited text file format (CSV) was designed so that data in this file type could be easily imported into most commercial word processing, spreadsheet and database programs.
- The EDI format uses Electronic Data Interchange (EDI) type records. This file has many different types of records and is generally used for computer-to-computer communications.
- The S-9203 (T94) is the Association of American Railroads' standard for sending information from wayside to readers to the railroads' computer systems.

The following describes these formats:

9.1. Comma Delimited Text File (CSV)

The comma delimited text file consists of a header record and data records. The first record in the file is the header record, which gives a description of data in each field of the data records.

Each record is terminated with a carriage return character (hex 0D) and line feed character (hex 0A).

The following is an example of the header record:

"Time","Type","Vehicle ID","Orientation","Direction","Position",
"Side Indicator","Length","Axles","Bearing Code","Platform"

Data Record

Field Number	Data Name	Data Format	Description
1	Time	MM/DD/YYYY<space> HH:MM:SS	Date and time the vehicle was moved to the track MM = month DD = day of month YYYY = year HH = hour MM = minute SS = second
2	Type	Numeric 1 to 2 digits	Type of vehicle 5 = locomotive 19 = railcar
3	Vehicle ID	Alpha 4 characters Numeric 1 to 6 digits AAAANNNNNN	Vehicle initial and number The initial is filled with spaces if the vehicle initial is less than four characters
4	Orientation	A, B, F, R, U	Orientation of vehicle For railcars A or B end is the first end to pass the reader For locomotives F or R end is the first end to pass the reader U = Unknown orientation
5	Direction	North South East West	The direction of rail vehicle movement past the reader
6	Position	Numeric 1 to 3 digits 1 to 200	Position vehicle is in from end of the track
7	Tag Side	Left Right Both	Side indicator reported by AEI tag
8	Tag Length	Numeric 1 to 4 digits	Vehicle's length (in decimeters) reported by AEI tag
9	Tag Axle	Numeric 2 digits	Vehicle's axle count reported by AEI tag

10	Tag Bearing Code	Numeric 1 digit	Vehicle's bearing code reported by AEI tag
11	Tag Platform Code	Numeric 1 to 2 digits or blank if locomotive	Platform code reported by tag

Example:

”01/17/2008 10:41:54","5”,NS 1526","F”,”West","1”,"Both","183","6","1",""”
”01/17/2008 10:41:56","19”,UP 651424","A”,”West","2”,"Both","175","4","1","0”
”01/17/2008 10:42:03","19”,CSX 152431","B”,”West","3”,"Left","160","4","1","0”

9.2. EDI File Format

The EDI text file consists of a number of segment records, which are each terminated with a carriage return character (hex 0D) and line feed character (hex 0A).

The train inventory text file consists of a number of segment records, which are each terminated with a carriage return character (hex 0D) and line feed character (hex 0A).

There are four segment record types. The following defines the segment types and their associated codes:

Segment Code	Maximum Number in File	Description
START	1	Message header segment
READER	1	Track segment – contains the track name and the orientation of the vehicle inventory
RAIL	200	Rail segment – contains time on the track, the rail vehicle’s tag data, and system defined fields
END	1	Message trailer segment

A segment code is at the beginning of each segment. A comma follows the segment code and commas separate the remaining fields in the segment, which are enclosed in quotes. The following is the general layout of all types of segments:

Segment code,”field 1”,”field 2”,”field 3”,……,<carriage return character><line feed character>

The segments are written in the following order:

START
READER
RAIL

RAIL
RAIL
RAIL
RAIL
RAIL
.
.
END

The following is the layout of each segment record:

START Segment

Field Number	Data Name	Data Format	Description
ST1	Segment Code	START	Segment code
ST2	Version	Numeric 4 digits	Version number of the file format
ST3	Date/Time	MM/DD/YYYY<space> HH:MM	Date and time the file was created MM = month DD = day of month YYYY = year HH = hour SS = second
ST4	Sequence Number	Numeric 4 digits	The sequence number of the file from 0 to 9999. This sequence number is incremented each time a new file is created. When it reached 10,000, it is reset to 0
ST5	Reader Type	YARD	Indicates if the message was generated by the Spartan AEI Reader System

Example: START,”0001”,”12/19/2005 12:11”,”0021”,”YARD”

READER Segment

Field Number	Data Name	Data Format	Description
RDR1	Segment Code	READER	Segment code
RDR2	Reader Name	Alpha/Numeric 1 to 20 characters	The name of the Spartan Reader
RDR3	Direction	North South East West	The direction of rail vehicle movement past the reader
RDR4	Switch Position	Normal / Reverse	Position of the switch (This field will only appear in systems that have been equipped with the optional Switch Position Monitoring function)

Example: READER,”Softrail Test”,”West”

READER,”Softrail Test”,”West”,“Normal”

RAIL Segment

Field Number	Data Name	Data Format	Description
RAIL01	Segment Code	RAIL	Segment code
RAIL02	Position	Numeric 1 to 3 digits 1 to 200	Position vehicle is in from end of the track
RAIL03	Equipment Code	Numeric 1 to 2 digits	Type of vehicle 5 = locomotive 19 = railcar
RAIL04	Vehicle Initial	Alpha 4 characters	Vehicle initial (reporting marks) The field is filled with spaces if the vehicle initial is less than four characters
RAIL05	Vehicle Number	Numeric 1 to 6 digits	Vehicle number

RAIL06	Date/Time	MM/DD/YYYY<space> HH:MM:SS	Date and time the vehicle was moved to the track MM = month DD = day of month YYYY = year HH = hour MM = minute SS = second
RAIL07	Orientation	A, B, F, R, U	Orientation of vehicle For railcars A or B end is the first end to pass the reader For locomotives F or R end is the first end to pass the reader U = Unknown orientation
RAIL08	Tag Side	Left Right Both	Side indicator reported by AEI tag
RAIL09	Tag Length	Numeric 1 to 4 digits	Vehicle's length (in decimeters) reported by AEI tag
RAIL10	Tag Axle	Numeric 2 digits	Vehicle's axle count reported by AEI tag
RAIL11	Tag Bearing Code	Numeric 1 digit	Vehicle's bearing code reported by AEI tag
RAIL12	Tag Platform Code	Numeric 1 to 2 digits or blank if locomotive	Platform code reported by tag

Example: RAIL,"1","5","NS ","1526","01/17/2006 10:41:54","F","Left","183","4","1"

END Segment

Field Number	Data Name	Data Format	Description
END1	Segment Code	END	Segment code
END2	Segment count	Numeric 0 to 4 digits	Number of segment records in the file not including the END segments

Example: END,"11"

The following is an example of a track inventory text file:

```
START,"0001","01/17/2006 13:21:55","0002"
READER,"201","WEST"
RAIL,"1","5","NS  ","1526","01/17/2006 10:41:54","Both","183","4","1","
RAIL,"2","19","UP  ","123456","01/17/2006 10:42:06","Both","161","4","1","0"
RAIL,"3","19","CSX ","987654","01/17/2006 10:42:08","Right","193""6","1","0"
RAIL,"4","19","DEFX","112344","01/17/2006 10:42:10","Left","185","4","1","0"
END,"7"
```

9.3. S-9203 (T94)

The Association of America Railroads publishes the S-9203 Automatic Equipment Identification Standard and can be purchased from them.

To purchase this standard go to https://aar.com/standards/publications.html and select "Section K Part III Wayside Electronics and Mobile Worker Communications Architecture".

10. TECHNICAL SUPPORT AND UPDATES

Periodically Softrail issues maintenance releases and new versions of this program. Maintenance releases are free and correct problems found with the program and/or provide minor enhancements to the program. Before contacting us with problems we suggest that you check our web page at www.aeitag.com to insure that you have the latest maintenance release of the program.

Technical support is free for the first year after purchase. A maintenance agreement can be purchased to extend the period of technical support.

For technical support or more information on the maintenance agreement contact Softrail at:

Softrail, Inc.
1098 Venetia Road
Eighty Four, PA 15330

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