



***Intellitag<sup>®</sup> 500 SmartPass<sup>®</sup> Reader System  
Modifications***





***This appendix describes the changes made to the AI1620 SmartPass® Reader to make the system guide usable for the Intellitag® 500 SmartPass Reader system.***

## ***Introduction***

---

This addendum to the *AI1620 SmartPass® System Guide* provides information about hardware and software modifications for the Intellitag 500 SmartPass Reader system.

---

### ***Audience***

This document is intended to be used by authorized SmartPass dealers, installers, and service personnel. Because SmartPass has no operator- or end-user-serviceable components or features, no end-user manual or operator guide exists. Once the system is set up and tested by the **authorized** installer, SmartPass operations requires no end-user intervention.

## ***Reader Modifications***

---

The following sections describe the proposed modification and reason for each of the Intellitag 500 SmartPass Reader system changes. Each section lists the modification, the background of the reason for the change (if provided), and the firmware commands affected by the change (if applicable).

---

### ***Reading of Mixed Population Tags***

#### ***Modification***

The Intellitag 500 SmartPass Reader reads the American Trucking Association (ATA) or International Organization for Standardization (ISO) read-only type tags, whether battery or beam powered, or Intellitag 500 asynchronous integrated circuit (ASIC)-based tags. The reader can read the ATA or ISO read-only tags in the presence of Intellitag 500-based tags; however, *attempting to read a Intellitag 500-based tag in the presence of an ATA or ISO read-only tag might provide indeterminate results.* At present, Amtech is aware that the performance under these conditions is strongly determined by physical and geometrical factors.

#### ***Background***

The traditional Amtech read-only tags are continuously modulating regardless of the state of the reader or Intellitag 500 tags. Therefore, when a polling request signal is sent from the reader to the Intellitag 500 tags, it is probable that the read-only tags can interfere with the backscatter response from the Intellitag 500 tag. This creates

difficulty for the reader in reading the response from the Intellitag 500 tag, or can cause the reader to miss the response from the Intellitag 500 tag altogether.

The Intellitag 500 SmartPass Reader system can read either a read-only ATA or ISO type tag, or a Intellitag 500 tag in a given vehicle, but not both simultaneously. If a vehicle is equipped with both tag types, it is probable that the read-only tag will be read; however, it is very possible that the Intellitag 500 tag will not be read, depending on a number of factors. The factors that influence the readability include, but are not limited to, physical orientation and configuration; the type of read-only tag; the ratio of backscatter cross-section of the tags; and whether the tag is battery or beam powered.

**Commands**

No direct impact on commands.

---

**Programmable Attenuation Control Added**

**Modification**

Replacing the range control function gives the Intellitag 500 SmartPass Reader a programmable attenuation control for the output radio frequency (RF) power. This feature simplifies the design and streamlines the testing during manufacturing and installation processes. Valid settings for attenuation are in 1.0 dB increments over a range of 10-dB attenuation, from the maximum power setting of 2 watts at 0-dB attenuation to a minimum power level of 200 milliwatts at 10-dB attenuation.

**Commands**

This modification introduces the following command:

644NN

Set RF attenuation (new command)

Table F-1 lists the Set RF attenuation command variable (NN) and attenuation settings.

**Table F-1 Set RF Attenuation Command Settings and Variables**

Variable (NN)	Attenuation Setting (dB)
00	0
01	1
02	2
03	3
04	4
05	5

**Table F-1 Set RF Attenuation Command Settings and Variables**

06	6
07	7
08	8
09	9
0A	10

---

## ***Real-Time Clock, Time/Date Stamping Removed***

***Modification***

The Intellitag 500 SmartPass Reader design eliminates the real-time clock, thereby eliminating all functions associated with setting the time and date. This change reduces the recurring cost of the reader, and might alleviate concerns associated with maintenance, environmental, and shipping issues because the battery is being eliminated. The reader responds to set time and date commands with an error message, except for the `Disable time/date append` command. For this command, the Intellitag 500 SmartPass Reader responds with `Done`.

***Commands***

This modification affects the following commands:

20S...S	Set time
21S...S	Set date
22	Display time and date
300	Disable time and date append
302	Enable time and date append
524	Display appended info status
661	Display diagnostics results
664	Test real-time clock

---

## ***Tag Data Buffering and Storage Reduced***

***Modification***

The Intellitag 500 SmartPass Reader does not provide tag memory storage beyond the quantity required for data buffering from the tag to the host. The Intellitag 500 SmartPass Reader responds with an error message to commands associated with this function, except for the `Disable buffer control mode` when a `Done` response is returned.

### **Commands**

This modification affects the following commands:

06	Transmit buffer entry
43	Buffer all IDs
530	Display RF0 filter status
535	Display buffer control status
613	Select data inquiry protocol
6160	Disable buffer control mode
6161	Enable buffer control mode

---

## **Check Tag Function Removed**

### **Modification**

The Intellitag 500 SmartPass Reader design eliminates the Self-test Check Tag function. The reader responds with an error message to all commands associated with this function, except for `Disable periodic check tag` when the reader returns a Done response. Additional alternate diagnostics functions may be investigated for feasibility to integrate into the reader.

### **Commands**

This modification affects the following commands:

550	Display periodic check tag status
551	Display selected check tag option
810	Disable periodic check tag
8110	Invoke check tag
8120	Enable periodic check tag
8160	Select internal check tag

---

## **Baud Rates Below 2400 Bits Per Second Removed**

### **Modification**

The Intellitag 500 SmartPass Reader design eliminates baud rates below 2400 bits per second. The reader responds with an error message to commands associated with these baud rates.

### **Commands**

This modification affects the following commands:

522	Display comm port parameters
1000	Set baud rate = 110 baud



1001 Set baud rate = 300 baud  
1002 Set baud rate = 1200 baud

---

## ***No Dual-Frame Capability***

### ***Modification***

The Intellitag 500 SmartPass Reader cannot read more than one frame per tag in the ATA read-only mode. The reader responds with an error message to commands associated with this function.

### ***Commands***

This modification affects the following commands:

48N Select dual-frame processing mode  
536 Display dual-frame processing mode

---

## ***No AAR or ATA Tag Data Translation Mode***

### ***Modification***

The Intellitag 500 SmartPass Reader cannot parse and translate the fields defined in the American Association of Railroads (AAR) or ATA specification. The reader responds with an error message to commands associated with this function.

### ***Commands***

This modification affects the following commands:

452 Disable tag translation mode  
453 Enable tag translation mode  
534 Display tag translation mode

---

## ***Range Control Removed***

### ***Modification***

The Intellitag 500 SmartPass Reader design does not include the range control function. The range control function is replaced by the programmable output RF power control. This simplifies the design and streamlines the testing during manufacturing and installation. For backward compatibility with the AI1620 SmartPass Reader, the Intellitag 500 SmartPass Reader responds to a command for maximum range (1F Hex) with a DONE response.

### ***Commands***

This modification affects the following command:

643NN Select RF operating range (distance)

---

## ***Enable Diagnostic RF Continuous Wave Command Added***

### ***Modification***

For diagnostic and testing purposes, a new additional command lets the user test the system while continuous wave (CW) RF is being transmitted. This command lets the reader transmit a CW RF signal at the output frequency and attenuation level as specified in the associated commands. Output CW RF is sustained until one of the following commands are received by the reader:

- 6400 Turn RF off
- 6401 Turn RF on
- 641 Select RF by input control

There is no data associated with the Enable diagnostic RF continuous wave command.

### ***Commands***

This modification introduces the following command:

- 6402 Enable diagnostic RF continuous wave (new command)