AdvanTag 9180
Technical Manual

ASYST™

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Disclaimers

If this manual is marked “Preliminary” or “Draft,” then Asyst has not yet released a final version of the manual and the manual is likely to be incomplete and will be revised. Contact Asyst at the address below to obtain a final copy of the manual.

Manual Information

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Trademarks

Equipment Modification

Any change, alteration, or modification to this equipment, as well as use of this equipment in a manner inconsistent with its intended use will void this equipment’s warranty and may render this equipment unsafe for use or unfit for its intended purposes.

Training and Languages

User training for equipment operation and maintenance is conducted in English. Translators are available on an as needed basis. English versions of the manuals and other technical materials are provided and reviewed during the training. Please contact the Asyst Training department or http://www.asyst.com for the training schedule and signup requirements.

Warranty

For warranty information, see Asyst’s Standard Terms and Conditions.

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Thank you for helping to improve the manuals and to maintain accuracy.

Acronym List

AMHS	Automated Material Handling System
ASCII	American Standard Coding for Information Interchange
ATR	AdvanTag Reader
CIDRW	Carrier IDentification Read Write
CIM	Computer-Integrated Manufacturing
EMF	Electromagnetic Field
EMI	Electromagnetic Interference
EMO	Emergency (Machine) Off
ESD	Electrostatic Discharge
FOUP	Front Opening Unified Pod
HSMS	High Speed Messaging System
LSB	Least Significant Bit
MIDS	Material IDentification Station
MSB	Most Significant Bit
OEM	Original Equipment Manufacturer
PN or P/N	Part Number
RFID	Radio Frequency IDentification
SECS	Semiconductor Equipment Communication Standard
SEMI	Semiconductor Equipment and Materials International
SMIF	Standard Mechanical Interface

Revision History

Date	Author	Version	Revision Information
6/3/2008	Catherine Day	A	Initial Release - ECN 09697
11/4/2008	Catherine Day	Bx1	Made changes to Environmental, Antenna Requirements and CE Mark Compliance in Chapter 1, per T. Vang. Clarified Product Description in Chapter 2 per T. Vang.

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Purpose and Audience

This manual describes the Asyst AdvanTag 9180 Reader, also referred to as the ATR 9180, which is part of Asyst's radio-frequency auto ID system, AdvanTag. The AdvanTag Reader is an Asyst OEM, SEMI-standard device that reads and writes to tags embedded in wafer cassettes, pods, FOUPs, reticle boxes, and other assets.

This document is intended for user of the AdvanTag system and the ATR 9180. Service is not applicable to the ATR 9180; see "Servicing" on page 7.

About this Manual

The AdvanTag 9180 Reader Manual is organized as follows:

Chapter 1, "General Information" on page 5, provides specifications and describes safety considerations and labeling for the AdvanTag 9180 Reader.

Chapter 2, "Theory of Operation" on page 11, provides an operational overview of the AdvanTag 9180 Reader.

Chapter 3, "Troubleshooting" on page 41, provides troubleshooting information for common problems when using the AdvanTag 9180 Reader.

An Index is also provided in the back of the manual.

References

This manual uses information from several sources, including application notes and other internal documentation.

Conventions

The following keyboard conventions and terminology are used.

Example	Meaning
Bold	User action on keyboard keys or other objects are **bold**.
Choose	The word choose is used for menu choices. Submenus are separated by a >. For example: Choose File > Import > File...
Click	Refers to mouse actions. For example: Click the hand icon.
`Courier New Font`	Text displayed on the screen uses Courier New. DOS and windows path names are displayed in Courier New. For example: Use the `C:\Folder\SubFolder\SubFolder2` to access this file. Source code or DOS commands use courier new. Hexidecimal streams and examples.
Double quotes	Used when discussing or describing an action, functional word, or definition.
Folder	Used instead of Directory, unless discussing DOS movement commands.
Italic	Italics are used to show computer entry from the users keyboard or Teach Pendant.
Press	Shows action by a user on a key or physical button. For example: Press PF1, then type the file name.
Select	Used if the user is to pick from several choices. For example: Select the lot number from the list supplies.
Type	Shows entry. For example: Type the *Product Name* and *Model Number* at the top of the page. Press **Enter**.

Safety Tags

Special tags are used in this document to alert technicians to personal and equipment safety hazards.

Before using this document, personnel should have a thorough understanding of AdvanTag safety issues detailed in the AdvanTag Reader ATR 9180 Manual.

The following types of safety tags appear in this document. Note that the following are only examples; they do not indicate a specific hazard associated with the AdvanTag.

DANGER

CORROSION HAZARD

DANGERS ALERT PERSONNEL TO POTENTIALLY HAZARDOUS SITUATIONS WHICH, IF NOT AVOIDED, WILL RESULT IN SERIOUS INJURY OR DEATH.

WARNING

CORROSION HAZARD

WARNINGS ALERT PERSONNEL TO POTENTIALLY HAZARDOUS SITUATIONS WHICH, IF NOT AVOIDED, MAY RESULT IN SERIOUS INJURY OR DEATH.

CAUTION

GENERAL HAZARD

STANDARD CAUTIONS—AS OPPOSED TO EQUIPMENT-DAMAGE CAUTIONS SHOWN BELOW—ALERT PERSONNEL TO POTENTIALLY HAZARDOUS SITUATIONS WHICH, IF NOT AVOIDED, MAY RESULT IN INJURY.

THESE CAUTIONS ALERT PERSONNEL TO SITUATIONS THAT MAY LEAD TO EQUIPMENT DAMAGE. FAILURE TO FOLLOW DIRECTIONS WILL RESULT IN DAMAGE TO THE EQUIPMENT AND/OR DAMAGE TO RELATED PRODUCTS (E.G., WAFERS) AND VOIDING OF WARRANTY.

NOTE . . .

NOTES EMPHASIZE, OR EXPAND UPON, THE PRESENTED INFORMATION.

Specifications

TABLE 1 *AdvanTag 9180 Specifications*

Width	116.5 mm (4.60 inches)
Depth	75.0 mm (3.0 inches)
Height	27.9 mm (1.1 inches)
Weight	163.3g (0.36 pounds)
Communications	Serial RS-232, Ethernet • Host Protocols supported: ASCII, CIDRW SECS, HSMS
Power	Reader: 24 VDC (± 10%); 70mA (current draw in normal condition—no read or write) 350mA maximum (long range, write mode), 250mA maximum (long range, read mode)
Environmental	Operating Temperature 0°to 30° C (non-condensing) Operating Humidity 30%- 95% (non-condensing) Storage Temperature 0° to +55° C Storage Humidity 5%- 90%
Mounting	Four M3 threaded inserts

Outline Drawing

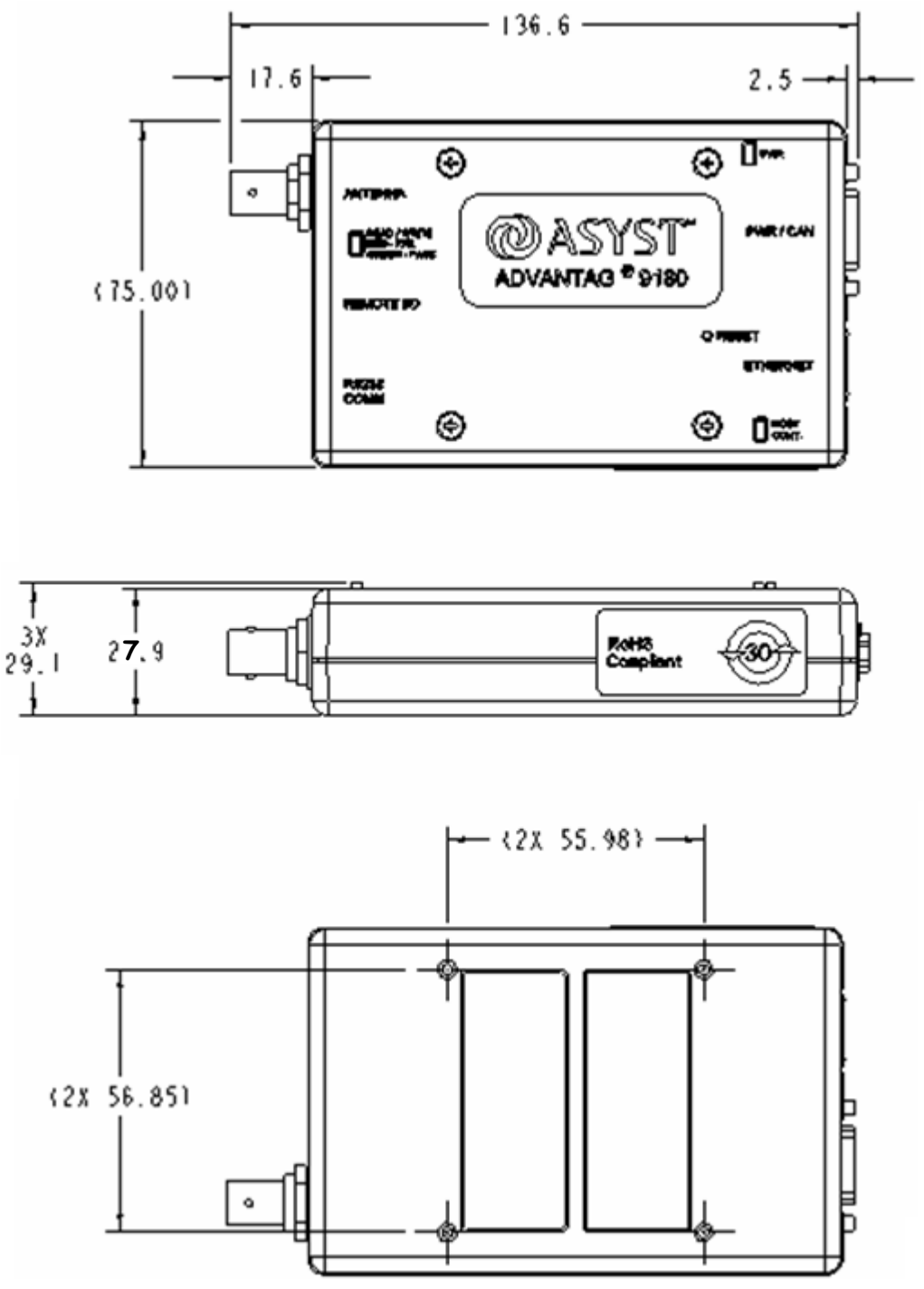


FIGURE 1 *Outline Drawing, AdvanTag 9180 Reader*

Safety

Before attempting any operation or service, it is essential that the information presented in this section be read and thoroughly understood. Important information is provided regarding safety hazards that may be encountered while working with these systems.

General Requirements

Warnings and cautions are used throughout this manual to identify potential hazards to personnel and equipment, respectively.

All warnings and cautions immediately precede the step or operation in which the hazardous condition may be encountered. All personnel operating or performing service on Asyst equipment must fully understand warnings, cautions, and all general safety regulations associated with electromechanical equipment.

Personnel should become thoroughly familiar with all aspects of safety for individuals and equipment prior to operating or performing service on this equipment.

Servicing

Refer all service to qualified personnel. There are no user-serviceable parts located inside the chassis. Return defective units to Asyst Technologies.

ESD / EMI Precautions

The AdvanTag is a certified Radiated EMI Class A product.

CAUTION

GENERAL HAZARD

FOR ESD AND EMI CONSIDERATIONS AND POWER SUPPLY PROTECTION, THE GROUND CABLE **MUST** BE PROPERLY INSTALLED.

Electrical Power/Input Power Requirements

Electrical power for the AdvanTag is supplied by the host tool. Electrical power required for the AdvanTag is 24V DC (±10%). In the event of an emergency, all power can be removed from the AdvanTag by turning off the power to the Host equipment chassis if the AdvanTag is connected to the EMO of the Host equipment.

Environmental

The AdvanTag uses no chemicals or combustibles, and creates no hazardous waste.

The AdvanTag is compliant to 2002/95/EC RoHS Directive.

Warranty and Liability

See “Warranty” on page iii.

NOTE . . .

CHANGES OR MODIFICATIONS TO THE ADVANTAG 9180 NOT EXPRESSLY APPROVED BY ASYST COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

FCC Compliance

Definition

Class A digital device. A digital device that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.

Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Antenna Requirements

The AdvanTag 9180 antenna is removable and does not employ a unique connector; however, the ATR-9180 is professionally installed and maintained by Asyst trained engineers and technicians. Therefore, the AdvanTag 9180 complies with FCC 15.203. In addition, the antenna is design by Asyst Technologies, Inc specifically for the AdvanTag 9180 and substituting a different antenna will cause the AdvanTag 9180 to not function and will violate FCC rules.

CAUTION

GENERAL HAZARD

ANY CHANGES OR MODIFICATIONS TO THE ATR-9180, WITHOUT SPECIFIC WRITTEN APPROVAL FROM ASYST TECHNOLOGIES, WILL VOID FCC COMPLIANCE.

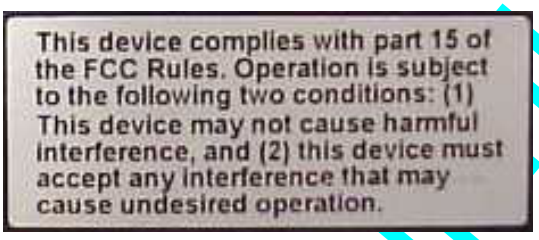
CE Mark Compliance

The AdvanTag 9180 complies with the following directives:

- 2006/95/EC Low Voltage Directive
- 2004/108/EC EMC Directive
- 99/5/EC Radio & Telecommunication Terminal Equipment

Labeling

TABLE 2 *Labels*

No.	Label	Description/Location
1	Serial Number Label (9180 Reader) 	The model and serial number label for the AdvanTag 9180 Reader is located on the bottom of the unit. See Figure 2 on page 11. These numbers are required when contacting Asyst Technologies for any matter concerning the equipment.
2	FCC Label 	The FCC label for the AdvanTag 9180 Reader is located on the bottom of the unit. See Figure 2 on page 11.
3	RoHS 	The presence of this label indicates compliance with regulations regarding Restriction of Hazardous Substances (RoHS). The label is located on the bottom of the unit. See Figure 2 on page 11.

Location of Labels used on the AdvanTag

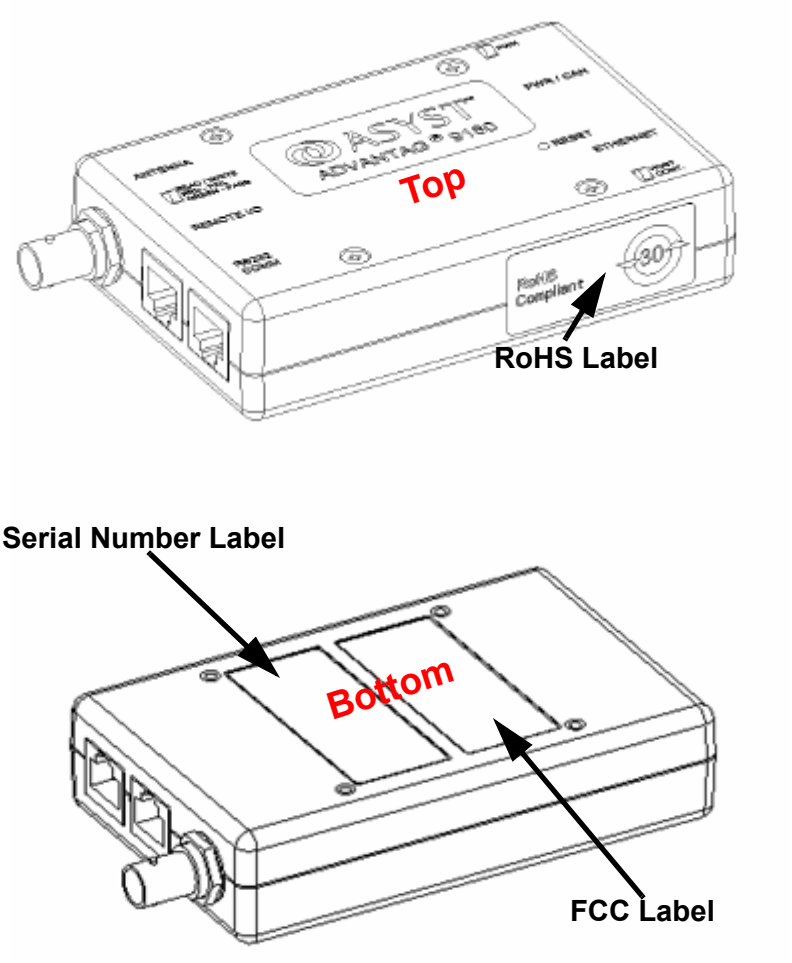


FIGURE 2 *Label Locations, AdvanTag 9180 Reader*

Product Description

The AdvanTag 9180 is a single Antenna Reader that reads and writes to the MicroTag embedded in wafer cassettes, pods, FOUPs, reticle boxes, probe cards, photoresist bottles, etc. The AdvanTag 9180 automatically communicates detailed lot information to a process tool and fab CIM system when the lot arrives at a load port or during transport in the AMHS.

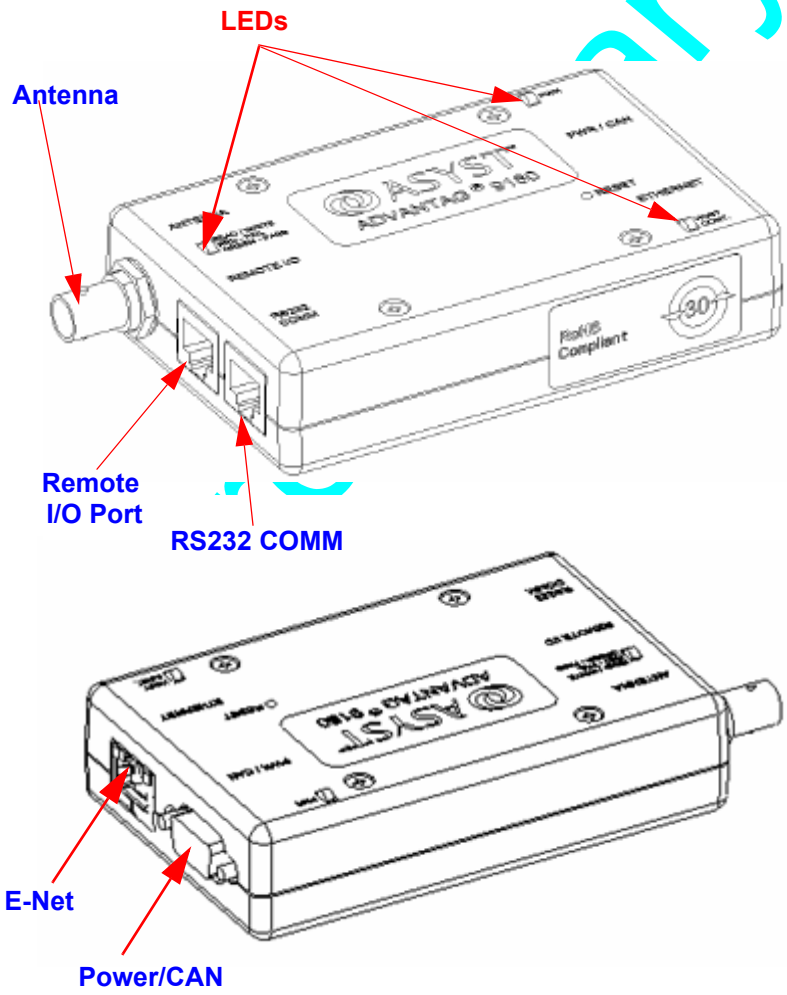


FIGURE 3 *AdvanTag 9180 Top Views*

The main component of this unit is a transmitter that generates radio waves through an antenna. This TIRIS1 compatible, low-frequency (134.2 kHz), low-power RF energy is used to read from or write to a transponder near the antenna. The 134.2 kHz carrier from the RFID-ASIC is amplified to the proper levels to drive the dual MOSFET power amplifier. This provides a 12V p-p low impedance drive to the antenna circuit. The antenna is a series resonant LC circuit resonated at 134.2 kHz to achieve maximum voltage on the antenna. The RFID Reader/Writer provides serial communication with a host through an RS-232 port, using SECS protocol. It also supports HSMS protocol on its LAN Port. Power is supplied by an external source. The Operating program is field upgradeable using PICkit 2.

The AdvanTag 9180 is designed for versatile installation in many different situations. It can be installed within OEM tools, within load ports, inside stockers, on WIP racks, in storage cabinets, etc. Once a power source, an external antenna, and a communication cable have been connected and the reader's address (TargetID and DeviceID as described in “ Communications” on page 31) has been set, it is possible to communicate using Stream 18 SECS messages or ASCII messages (depending on the host protocol being used).

The software and hardware provide integrated self-test and diagnostics. A watchdog timer and non-volatile memory provide power-failure recovery.

The AdvanTag 9180 operates on 24V DC (±10%) supplied by an external power source. Communication is through a RS232 port, CAN Bus port (only for communicating with an AdvanTag Gateway), or the Ethernet port.

TargetID

TargetID of the ATR9180 is configurable through the S18F3 command; default value = 1, range = 1–99. The Remote I/O and the Antenna have the same ID.

Using HSMS Protocol as Host

The HSMS supported by the ATR 9180 is derived from the SEMI E 37.1-96 single session HSMS Standard.

The HSMS protocol can only be used in PASSIVE mode. The ATR 9180 would be used as a PASSIVE device. In this mode of operation, the ATR 9180 opens up a socket that listens for an incoming connection request from an ACTIVE HSMS host. After the initial handshake, a connection between the Host and the ATR 9180 is established. Once a connection had been established, the host and ATR 9180 can exchange messages between each other.

To establish a connection with an ATR 9180, the following specific information must be present with the host:

- ATR 9180 IP Address: The IP address of the ATR 9180 must be known to the host so that a connection request could be made on that address. Please note that HSMS is an IP address associated protocol thus for HSMS communication IP address of the Passive entity must be known to the Active entity.
- ATR 9180 Port Number: The ATR 9180 opens a listening socket as mentioned earlier but the connection is opened on an ETHERNET PORT. This number also must be used by the Active entity (the host) to establish a connection.

> ***NOTE . . .***
>
> IT MIGHT BE NOTED THAT THE IP ADDRESS ASSIGNED TO THE ATR 9180 WOULD BE A STATIC IP ADDRESS AND NOT ONE OBTAINED VIA DHCP SERVER. THE REASON FOR THIS IS THAT HSMS IS AN IP ADDRESS BASED PROTOCOL.

Message Format and Translation

The messages as described in Section 1.1 have to be of the CIDRW SECS and ASCII standard. The host could communicate with the ATR 9180 on either the RS-232 port or the ethernet port. On the RS-232 port, the host could communicate over SECS or ASCII version. When the host communicates over the ethernet, the communication would happen over the HSMS protocol.

Each CIDRW SECS message (either on the SECS or HSMS port) would have a target ID in its message body as an item. For example, the command Read MID (S18F9) has the format

S18F9: 'S18F9' W

<A '##'>. * Target ID.

The item ## represents the Target ID of the node which the host wants to access.

Assuming the host needs to read the MID from node '01', following is the sequence of operations that would take place:

1. Host sends S18F9 command to the ATR 9180.
2. ATR 9180 parses the message for validity of data and format, extracts the Target ID out of the data stream and then routes it to the correct antenna port.

   S18F10

   <L[4]

   <A '01'> *Target ID

   <A 'NO'> *SSACK

   <A 'ABCDE'> *MID (Assuming ABCDE was the MID in MicroTag)

   <L[4]

   < A 'NE' >

   < A 'O' >

   < A 'IDLE' >

   < A 'IDLE' >

   >

   >.

Messages Supported

The ATR 9180 supports only CIDRW ASCII and CIDRW SECS messages as described in the message set documents P/N 2000-1455-01 and 2000-1442-01.

For any other message, the ATR sends back an error message saying that the command is not supported.

Only one message at a time can be sent to the antennas. The host has to receive the reply of a previous message before sending another message to the same node.

Specifications

- Firmware of the ATR9180 can be upgraded using PICkit 2.
- Can connect to a host on serial port at baud rates of 9600 and 19200.
- Supports a 10 Base-T ethernet connection for HSMS communication.

Integration of Parts

Mounting

CAUTION

GENERAL HAZARD

ALL MOUNTING OPERATIONS SHOULD BE PERFORMED WITH THE POWER CORD TO THE ADVANTAG DISCONNECTED. ALSO, BE SURE THE 24 VDC POWER CONNECTOR IS DISCONNECTED. FAILURE TO DISCONNECT BOTH COULD RESULT IN DAMAGE TO THE ADVANTAG AND PERSONAL INJURY FROM MECHANICAL AND/OR ELECTRICAL HAZARDS WITHIN THE FRONT-LOAD ENCLOSURE.

IF REMOVAL OF THE LOAD PORT FROM THE HOST TOOL IS REQUIRED, ENSURE THAT THE POWER TO THE HOST TOOL IS REMOVED AND THE POWER DISCONNECT DEVICE IS LOCKED OUT IN THE OFF POSITION.

On the back of the AdvanTag reader, there are four M3 X .5 inserts that can be used for mounting.

Other details:

- Install the AdvanTag reader in a dry and clean environment.
- The AdvanTag reader should be mounted to a grounded panel.
- The AdvanTag reader should be located as close as possible to the physical center of the devices that will be connected to it (the maximum recommended serial cable length is 10 meters).

For more details, consult instructions for the appropriate installation kit.

Ports

For details on the AdvanTag reader's ports, see " Connectors" on page 27.

Data Storage—AdvanTag Reader

Memory

The 9180 can read/write up to 136 bytes of data from/to the transponder (MicroTag). This memory is divided into two sections. The first is for Material Identification (MID), which is configurable using the attribute set and can be up to 136 bytes long (range: 8-136, standard: 16). The second (Notepad) is for the balance of the memory. The amount of available MID and Notepad memory is dependent upon the MicroTag used. Two types of MicroTags are available, single page and seventeen page versions. Each page contains 64 bits, resulting in eight bytes of memory per page. MicroTags are available as read/write or read only.

MicroTags

The AdvanTag reader can interact with MicroTags with regard to the following information:

SECS communication:

- Are You There - This message is used to perform the heartbeat between the host and the connected device.
- Read Attribute Request - This message requests the current values of ECID or SVID of the subsystem component indicated in TargetID.
- Write Attribute Request - This message requests the subsystem to set the value of ECID of the component specified in TargetID to configure desired behavior. Only applicable write-able attributes (like ECID) may be used in this message.
- Read Data Request - This message reads the “NOTEPAD” (Linear Memory) section of the subsystem component indicated in TargetID.
- Write Data Request - This message writes data to the NOTEPAD section of the subsystem component indicted in TargetID.
- Read Material ID Request - This message is used to request the subsystem indicated by TargetID to read an MID.
- Write Material ID Request - This message is used to request the subsystem indicated by TargetID to write a Material identifier.
- Subsystem Command Request - This message is used to request the subsystem indicated in TargetID to perform a specific action. Included in this set are the following commands: SSCMD 04 - LED BLINK/ON/OFF on Node Device; SSCMD 07 - Perform Diagnostics; SSCMD 13 - Reset; SSCMD 15 - Change State; SSCMD GetStatus.
- Event Report Send - This message is used to send events to the host. Included in this set are the following commands: CEID 01 - Material (Pod/Cassette) Arrival Event; CEID 02 Material (pod/Cassette) Removal Event; CEID 08 - AdvanTag/LinkManager Power up.
- Read STATE Request - This message will query the CIDRW state of the transition model.

Retry Count Feature

The attribute RETRY_DIAGNOSTICS is a feature new to the AdvanTag family of readers. This read-only attribute supports a diagnostic capability which allows the reader to provide the number of retries performed in the last radio read/write command. Please note that the information returned is the count for the previous read only.

Dual-Sensor Functionality

Dual-Sensor Host communicates with ATR9180 over serial port on SECS protocol.

New attributes added:

1. HOST_CONT_PORT1_LED (Value = ON/OFF)

Default value OFF. Set above attribute to ON using S18F3 commands Dual-Sensor Functionality, HOST can control LED through S18F13 commands.

2. DUAL_SENSOR (Value = ON/OFF)

Default value OFF. Set above attribute to ON using S18F3 commands Dual-Sensor Functionality.

Button 1 will produce Arrival Event (S18F71) with MID of the PILL. LED 1 stays ON during read.

Button 2 will produce Removal Event (S18F75) with MID of the PILL. LED 2 stays ON during read.

3. During Radio Operation on the Antenna port both LEDs on the port turn ON.

4. LED 1 corresponds to Button 1 and LED 2 corresponds to Button 2.

Led 1 and 2 can be addressable using Sub system command (S18F13) and can be turned ON, OFF or BLINK.

Case 1. Button 1 press produces POD Arrival Event with S18F71 Message. LED 1 turns ON till ATR reads the TAG and then turns OFF. LED ON Time should not be less than 1 Sec.

Case 2. Button 1 release doesn't produce any event.

Case 3. Button 2 press produces POD Removal Event with S18F75 Message. LED 2 turns ON till ATR reads the TAG and then turns OFF. LED ON Time should not be less than 1 Sec.

Case 4. Button 2 release doesn't produce any event.

Case 5. LEDs are ON due to previous command (S18F13) and Radio is not busy in Read/Write operation.

New command from the Host is executed right away.

Case 6. LEDs are ON and Radio is BUSY in Read/Write operation.

New command from the Host is queued.

Case 7. LEDs are ON and Radio is busy in Read/Write operation button press should be ignored.

Case 8. While Host is accessing the TAG LED 1,2 should turn ON and OFF once the access is finished.

LED ON Time should not be less than 1 Sec.

Message Structure for S18F71 and S18F75 on Button Press is described below.

S18F71<L,4

<TargetID>

<SSACK> * SSACK STATUS -->NO/CE

<01> * CEID POD ARRIVAL Event

<L,2

<”AUTOREADDATA”>

<MID>

>

>

S18F75<L,4

<TargetID>

<SSACK> * SSACK STATUS -->NO/CE

<02> * CEID POD REMOVAL Event

<L,2

<”AUTOREADDATA”>

<MID>

>

>

TABLE 3 *ATR9180 Configuration for Dual-Sensor Operation*

ATTRIBUTE	VALUE
SECS_T1	5
SECS_T2	8
MANTWRITEONLY	DI
CID_ERROR	OFF
CID_PAD	NUL
HOST_CONT_PORT1_LED	ON
DUAL_SENSOR	ON

HSMS Functionality

Single session HSMS protocol derived from the SEMI E37.1-96 standard over TCP/IP. The unit only communicates over 10Mbps Ethernet speed. The HSMS support is based on static IP address mechanism. The unit defaults to the following settings on HSMS.

LOCAL_IP_ADDRESS: 128.5.10.93
LOCAL_PORT: 5000
DEFAULT_GATEWAY: 0.0.0.0
SUBNET_MASK: 255.255.0.0

Only the settings shown above are required for establishing and maintaining the HSMS connection on the ATR 9180.

The ATR 9180 support only the PASSIVE mode of HSMS communication. The host or the remote entity should be always in the ACTIVE mode of HSMS in order to communicate with the ATR 9180.

The HSMS functionality of the ATR 9180 is always enabled on the reader. The same unit can work on HSMS without the need of downloading a different software.

> ***NOTE . . .***
>
> THE ATR 9180 ALWAYS DEFAULTS TO THE SECS1 PROTOCOL OVER RS-232 WHEN SHIPPED FROM THE FACTORY.

Power Up Sequence of HSMS

When moving on to communicating over HSMS, the user needs to send the S18F3 (Write Attribute Request) command on the RS-232 port over SECS1 protocol to set the LAN settings to the required values and power cycle the unit.

The first time when the protocol is switched from SECS1 to HSMS, the power up event S18F71 – CEID 8 will not be sent to the host. After this point, the software switches to the

HSMS mode and every subsequent power cycle will result into a power up event sent to the host after HSMS is connected.

To establish the connection, the host must send a Select.Req message to the ATR 9180 and in response to that, the ATR 9180 will send back a Select.Rsp message to declare acceptance and HSMS CONNECTION establishment. Any of the CIDRW commands can be sent after this stage.

HSMS Connection Management

Once the remote entity has dropped the connection, the ATR 9180 detects the break right away to open up a new socket and get ready to accept a new connection from the remote entity. The ATR 9180 generates its own Link Test request. It still replies back to the LinkTest.Req message sent by the remote entity with a LinkTest.Rsp message. All the CIDRW commands are supported as in the case of the RS-232 mode.

After being IDLE for LinkTest Frequency defined time the ATR 9180 sends a LinkTest.Req message and starts a T6 timer to wait for LinkTest.Rsp from the remote entity. If the response is not received during this timeout, the ATR9180 closes the previous socket and opens a new one. The Host must reconnect on the same port.A similar socket disconnect will take place when the LAN cable is removed from the ATR or the hub to which the ATR is connected.

Event-Change Functionality

Event-Change Host communicates with ATR9180 over LAN port on HSMS protocol.

Event-Change functionality supports single sensor per port.

New attributes added:

1. HP_EVENT (Value = ON/OFF). Default value OFF. Set above attributes to ON using S18F3 commands for HP functionality.
2. On Power up once HSMS is connected to the Host, all the Antenna ports are read and respective MIDs are stored in the memory.
3. POD Arrival Event read respective Antenna port and MID read is stored in memory and Event displays MID.
4. POD Removal Event returns MID read from last Arrival Event.

TABLE 4 *ATR9180 Configuration for Event-Change operation*

ATTRIBUTE	VALUE
HOST_CONT_PORT1_LED	OFF
DUAL_SENSOR	OFF

S18F71<L,4

<TargetID>

<SSACK> * SSACK STATUS -->NO/CE

```
                    <01>            * CEID POD ARRIVAL Event
                    <L,2
                                <”AUTOREADDATA”>
                                <MID>
                    >
          >
S18F71<L,4
                    <TargetID>
                    <SSACK>         * SSACK STATUS -->NO/CE
                    <02>            * CEID POD REMOVAL Event
                    <L,2
                                <”AUTOREADDATA”>
                                <MID>
                    >
          >
```

Default Values of R/W ATTRIBUTES

TABLE 5 *Attribute Values (ECID and SVID)*

Attribute	Type	Description and Limits or Values
AlarmStatus	RO	The Alarm Status Value = 0 or 1
ASCII_T1 (ASCII only)	RW	Inter-byte timeout Default = 100
BAUDRATE	RW	SECS and ASCII Baud rate 9600, 19200, 28800, and 57600 Default = 9600
CarrierIDOffset	RW	0 to CID_MAX_LENGTH-1 CarrierIDOffset + CarrierIDLength <= CID_MAX_LENGTH Default = 0
CarrierIDLength	RW	1 to CID_MAX_LENGTH CarrierIDOffset + CarrierIDLength <= CID_MAX_LENGTH Default = 16
CID_MAX_LENGTH	RW	(8*N) N = Page1 to 17 Default = 16
CID_DISPLAY	RW	ON = Enable OFF= Disable Default = ON

TABLE 5 *Attribute Values (ECID and SVID)*

Attribute	Type	Description and Limits or Values
CID_NP_ASCII	RW	ON = Enable OFF= Disable Default = OFF
CID_ERROR	RW	ON = Enable OFF= Disable Default = ON
CID_JUSTIFY	RW	R = Right L= Left Default = L
CID_PAD	RW	NUL = 0x00 ZERO = 0x30 Default = ZERO
CID_E99_PAD	RW	ON = Enable OFF= Disable Default = OFF
CHECKSUM (ASCII only)	RW	Checksum enabled or disabled. EN = Enabled DI = Disabled
Configuration	RO	01 through 31
DEFAULT_GATEWAY (HSMS only)	RW	Default Gateway address for ATR9180. Default: 0.0.0.0
DEVICEID (SECS only)	RW	DeviceID of the Target, used in the SECS1 Header
DUAL_SENSOR	RW	Dual Sensor operation enable/disable Default = OFF
ENABLE_TIMEOUTS (ASCII only)	RW	Enable Communication Timeouts ON = Timeout events will be generated. OFF = Timeout events will not be generated. Default = ON
ENABLE_EVENTS	RW	Enable Events (Pod or Operator arrival/removal, and powerup. ON = Event will be generated. OFF = Events will not be generated. Default = ON
EXTENDEDSSACK	RW	Enables the extended error codes in SSACK. The SEMI standard specifies only five codes (NO, EE, CE, HE, and TE). When this option is ON, up to 100 error codes might be generated. Please see SSACK for all error code. ON = All error codes generated. OFF= Only SEMI standard error codes generated
HeadID	RO	Returns the HeadID or TargetID Two digits

TABLE 5 *Attribute Values (ECID and SVID)*

Attribute	Type	Description and Limits or Values
HeadStatus	RO	IDLE or MANT
HOST_CONT_PORT1_LED	RW	LED controlled by Host on Remote I/O Port 1 Default = OFF
HSMS_T5 (HSMS only)	RW	T5 Timeout in HSMS (1 - 240 sec.) Default = 10
HSMS_T6 (HSMS only)	RW	T6 Timeout in HSMS (1 - 240 sec.) Default = 10
HSMS_T7 (HSMS only)	RW	T7 Timeout in HSMS (1 - 240 sec.) Default = 10
HSMS_T8 (HSMS only)	RW	T8 Timeout in HSMS (1-120 sec.) Default = 10
LOCAL_IP_ADDRESS (HSMS only)	RW	Local IP Address. Default: 128.5.10.93
LOCAL_PORT (HSMS only)	RW	Local port on which the ATR 9180 would listen Default: 5000
LinkTestFrequency (HSMS only)	RW	This timer is used to send periodic link test messages. If a response is not received the connection is dropped. Default: 20 seconds
Manufacturer (Applicable only to version 21A and later)	RO	Returns “Asyst”
MANTWRITEONLY	RW	If this attribute is enabled, then MID (CID) and Data is read and written according to the E99 standard EN = Enable DI = Disable Default = EN
MDLN	RO	Asyst Model designation of Upstream Controller OR Head (as applicable) Up to 6 bytes
ModelNumber (Applicable only to version 21A and later)	RO	Same as MDLN
OperationalStatus	RW	IDLE or MANT Note: Set through only Subsystem commands

TABLE 5 *Attribute Values (ECID and SVID)*

Attribute	Type	Description and Limits or Values
PIP_AUTOREAD	RW	Auto read On or OFF ON = On OFF = Off Default = ON
PIP_AUTOREAD_DATA	RW	The memory type to read upon Pod-In-Place Event: (Offset, or MID) Note: Offset applies only to NOTEPAD. Note: This attribute should be modified with respect to PIP_AUTOREAD_LENGTH Default = MID
PIP_AUTOREAD_LENGTH	RW	Length of NOTEPAD data to read upon Pod arrival. Note: Applicable only if data type is NOTEPAD Note: This attribute should be modified with respect to PIP_AUTOREAD_DATA Default = 16
PIP_SENSOR_POLARITY	RW	PIP Sensor Polarity. HI = Active-High. When Sensor goes high, Pod Arrival event is generated LO = Active-Low. When Sensor goes low, Pod Arrival event is generated Default = LO
RETRY_DIAGNOSTICS	R	Returns number of retries that occurred during last radio read/write operation.
RADIO_RETRY	RW	Retry Count for Radio operation in case of failure Default: 3
RDA	RW	AdvanTag returns either RD or RDA in response to the ASCII RD command. EN = Enabled, returns RDA DI = Disabled, returns RD Default = EN
SENSOR_TIMEOUT	RW	Value 1 - 20 Default 10
SCAN_ENABLE	RW	Value = ON/OFF Default = OFF
SECS_T1 (SECS only)	RW	SECS T1 timeout Default = 5
SECS_T2 (SECS only) (Host port on LM)	RW	SECS T2 timeout Default = 50

TABLE 5 *Attribute Values (ECID and SVID)*

Attribute	Type	Description and Limits or Values
SECS_T3 (SECS only) (Host port on LM)	RW	SECS T3 timeout Default = 45
SECS_T4 (SECS only) (Host port on LM)	RW	SECS T4 timeout Default = 45
SECS_RETRY (SECS only) (Host port on LM)	RW	SECS-1 Protocol Retry limit Default = 3
SOFTREV	RO	Subsystem Software Rev. of Upstream Controller OR Head (as applicable) 6 bytes
SoftwareRevisionLevel	RO	Same as SOFTREV
SELF_TEST_RESULT	RO	Last self test result P = Pass F = Fail
STATUS_ENABLE	RW	If set to Enable communicates Status information of the Head. Default “EN”.
SUBNET_MASK (HSMS only)	RW	Default Subnet Mask for ATR 9180. Default: 255.255.0.0
TARGETID	RW	The TargetID of the device

Please refer to the Asyst CIDRW Messages SECS protocol manual (Asyst part number 2000-1442-01) and Asyst CIDRW Messages ASCII protocol manual (Asyst part number 2000-1455-01) for more detailed information on communication with the AdvanTag.

Interfaces

There are three LEDs to signify activity, a RESET button, and a switch panel for specifying the unit's address (TargetID). See below for more details.

LEDs

The LEDs located on the top of the reader (see Figure 4) indicate the operational status of the AdvanTag.

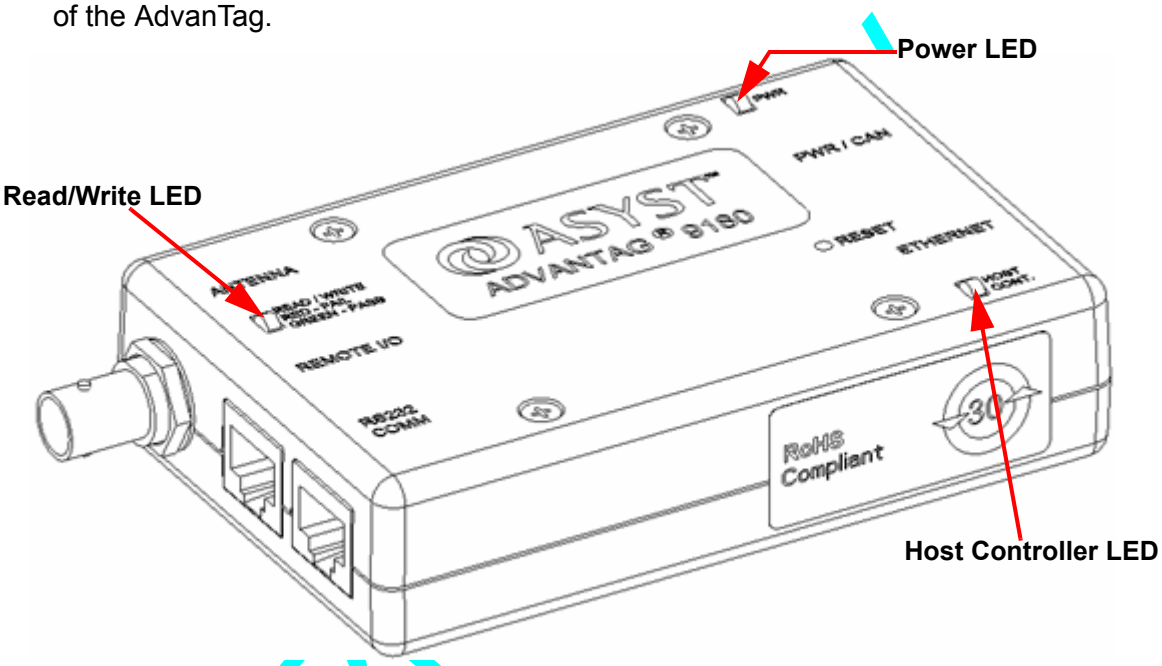


FIGURE 4 *AdvanTag 9180 Reader LEDs*

Power Indicator LED

The POWER indicator, when lit, indicates that power is applied to the AdvanTag.

Light Status	Power
Off	No power
Green	Power on

Host Controller LED

Green, controllable by host command (on/off/blinking).

Read/Write LED

The Read/Write LED indicates communication status:

Light	Communication Status
Off	Radio off
Green	Successful read/write
Red	Read/Write failure (details below)

Read/Write failures occur as a result of one of the following:

- Attempted to read multiple pages of a single-page MicroTag
- Multiple MicroTags are in range
- No MicroTags are in range
- Attempted a write operation on a read-only MicroTag or a looked page

For read/write ranges, see “ Antenna Performance” on page 38.

Connectors

The AdvanTag reader features four external ports.

Power

The port labeled PWR is for a power supply of 24VDC. Asyst can supply a 120-220V adapter (Asyst P/N 6200-6210-01) or the OEM can supply this power.
This is a DB9 male receptacle, 24 VDC (+/- 10%), 70mA typical, 350mA maximum. See Table 1, “AdvanTag 9180 Specifications,” on page 5 for further details. The following table shows the pin outs.

TABLE 6 *Power Cable Pin Outs*

Pin	Signal
1	Not Used
2	CAN Low
3	Signal Ground
4	Not Used
5	Power Ground
6	Signal Ground
7	CAN High
8	Not Used
9	+24VDC

Communication

The port labeled RS232 COMM is for RS232 communication.
This is a shielded RJ45 socket. A cable which connects the Reader to a PC is available from Asyst.

TABLE 7 *Serial Port Pin Usage*

Pin Number	Name	Serial Comm (SECS/ASCII) RJ45
1	(N/C)	not used
2	(N/C)	not used
3	(N/C)	not used
4	Ground	X
5	TX	X
6	RX	X
7	(N/C)	not used
8	(N/C)	not used

CAUTION

ELECTRICAL HAZARD

DO NOT TOUCH THE INSIDE OF THE ANTENNA CONNECTOR. FAILURE TO COMPLY MAY RESULT IN INJURY.

Antenna

CAUTION

ANTENNAS SHOULD ONLY BE INSTALLED BY QUALIFIED PERSONNEL. FAILURE TO COMPLY MAY RESULT IN MALFUNCTION OR DAMAGE TO THE UNIT AND/OR ANTENNA.

The port labeled REMOTE ANTENNA is for an external antenna. Contact Asyst for available antennas.
This is a BNC socket; use with Asyst antennas is required.

CAUTION

GENERAL HAZARD

NEVER USE A NON-ASYST ANTENNA WITH THE ADVANTAG 9180. FAILURE TO COMPLY WILL VOID FCC AND CE CERTIFICATION.

External Presence

The port labeled REMOTE I/O is for an external presence sensor that detects events such as pod arrival and pod removal.
The REMOTE I/O port is a shielded RJ45 socket used for the external presence sensor.

Pin	Signal	Input/Output
1	+5 or +12 VDC	Output
2	Sensor 1	Input
3	LED 1	Output
4	Ground	
5	LED 2	Output
6	NC	
7	Sensor 2	Input
8	NC	

NOTE . . .

POWER OUTPUT IS CONFIGURABLE AND SELECTED BY USE OF JUMPERS APPLIED TO THE PRESENCE SENSOR. JUMPER PINS 1&2 FOR +12VDC AND JUMPER PINS 2&3 FOR +5VDC.

Ethernet

The Ethernet port is a shielded RJ45 socket used for communication to a host using HSMS.

Use a standard CAT5 Ethernet straight cable when connecting the ATR9180 to a 10/100 Mbps hub or switch. A shielded ethernet cable is preferred.

> ***NOTE . . .***
>
> FOR INFORMATION ON COMMUNICATION THROUGH ALL PORTS, PLEASE REFER TO THE SOFTWARE MANUAL.

Buttons/Switches

Reset

Press this button (see Figure 5) to reset the unit. The default baud rate is 9600.

> ***NOTE . . .***
>
> THE ATR9180 WILL TAKE 10 SECONDS TO BOOT UP AND RUN THE SOFTWARE.

FIGURE 5 *Locating the Reset Switch*

Code Upgrade

Code Upgrade of the ATR9180 can be performed using PICkit 2. The Procedure can be found in the ATR9180 Upgrade Procedure P/N 2000-6779-01.

Communications

To Host

The AdvanTag reader communicates to the host via RS-232 or LAN ports.

> ***NOTE . . .***
>
> THE ATR9180 REMEMBERS THE LAST PROTOCOL USED TO COMMUNICATE. THE DEFAULT PROTOCOL IS SECS WITH 4 RETRIES.

Read Range

Typical read range of the AdvanTag reader is 10-12 cm. Read range is dependent on the antenna design and the operational environment in which the antenna is installed. See “ Antenna Performance” on page 38 for further details.

SECS

Refer to the specific protocol documentation concerning Stream 18 SECS messages for details. The basic functions available are to read and write attributes, read and write material IDs (MIDs), read and write data, and various subsystem commands such as turning an LED on or off. Note that the single-page transponders hold an 8 byte MID only and the multi-page transponders hold a 16-byte MID and 120 bytes of data.

The TargetID (as described in the SEMI E99 and E5 standards) can be set with the S18F3 command; default value is 1. The SECS I DeviceID can be set through an attribute. The baud rate can also be set through an attribute setting. Byte format is 8 data bits, 1 stop bit and no parity. The SECS I timeouts and retries can be set through attribute settings; defaults are T1 = 0.5 secs, T2 = 10 secs, T3 = 45 secs, T4 = 45 secs, Retries = 3.

Serial Communications Interface

The AdvanTag has one port for serial-computer-communications interface (Asyst P/N 9701-2914-XX). It is an RJ45 RS232 interface. It has a transmit (TX) and a receive (RX) line and ground. See Table 7 on page 28.

Ethernet Communications

The ATR 9180 has an Ethernet port, which is an RJ45 socket. Communication protocol is single session HSMS.

Software

For more software information, please refer to the Asyst CIDRW Messages SECS protocol Manual (Asyst part number 2000-1442-01) and the Asyst CIDRW Messages ASCII protocol Manual (Asyst part number 2000-1455-01).

Web Configurator

The ATR 9180 supports a web configurator on ethernet using HTTP Protocol. See Figure 6 for Web Interface Home Page.

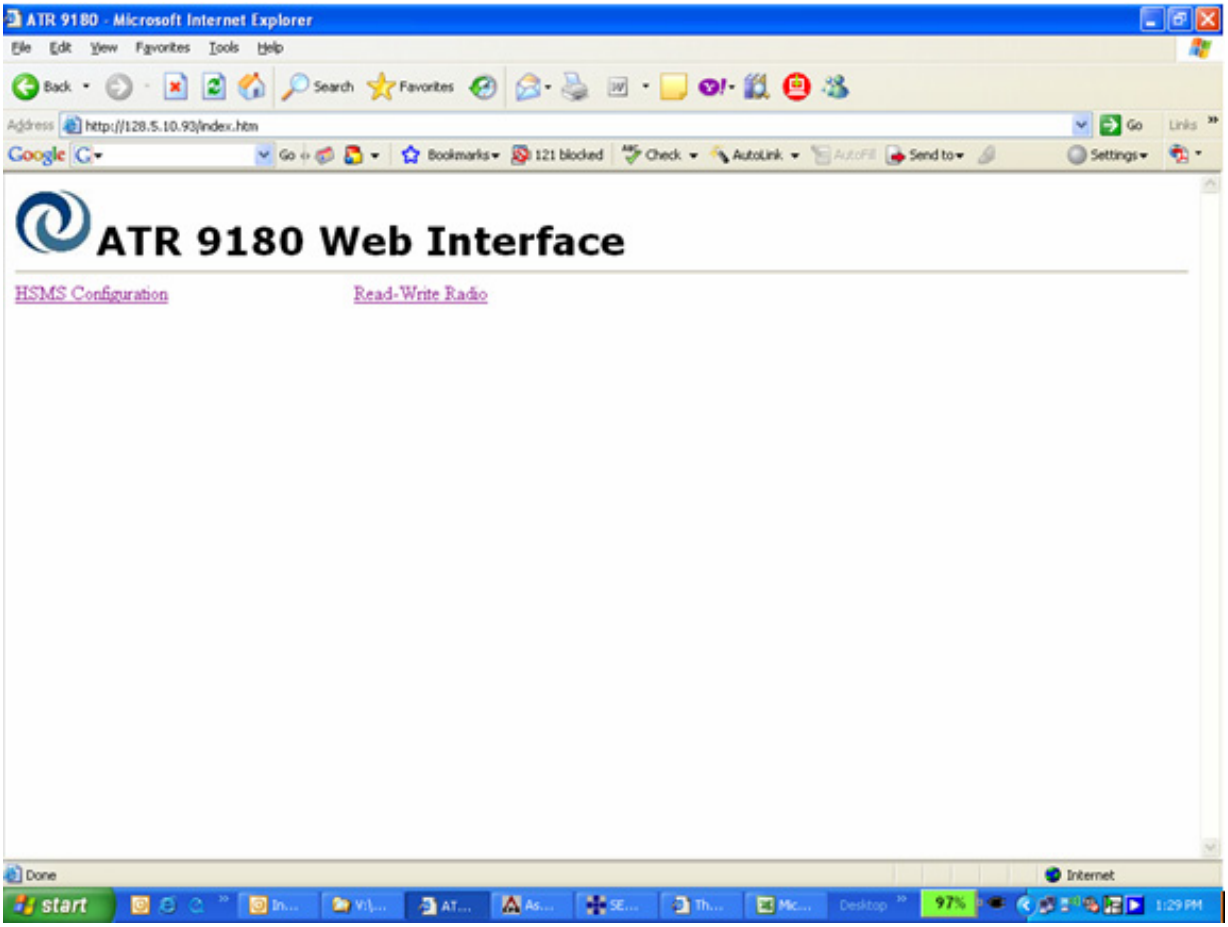


FIGURE 6 *ATR 9180 Web Interface - Home Page*

HSMS Configuration

Upon clicking HSMS Configuration link on the main page, the configuration page is displayed. The configuration page takes a few seconds to load as it reads all the necessary configuration attributes from the flash and displays the values against the name in a tabular format as shown in Figure 7 on page 34.

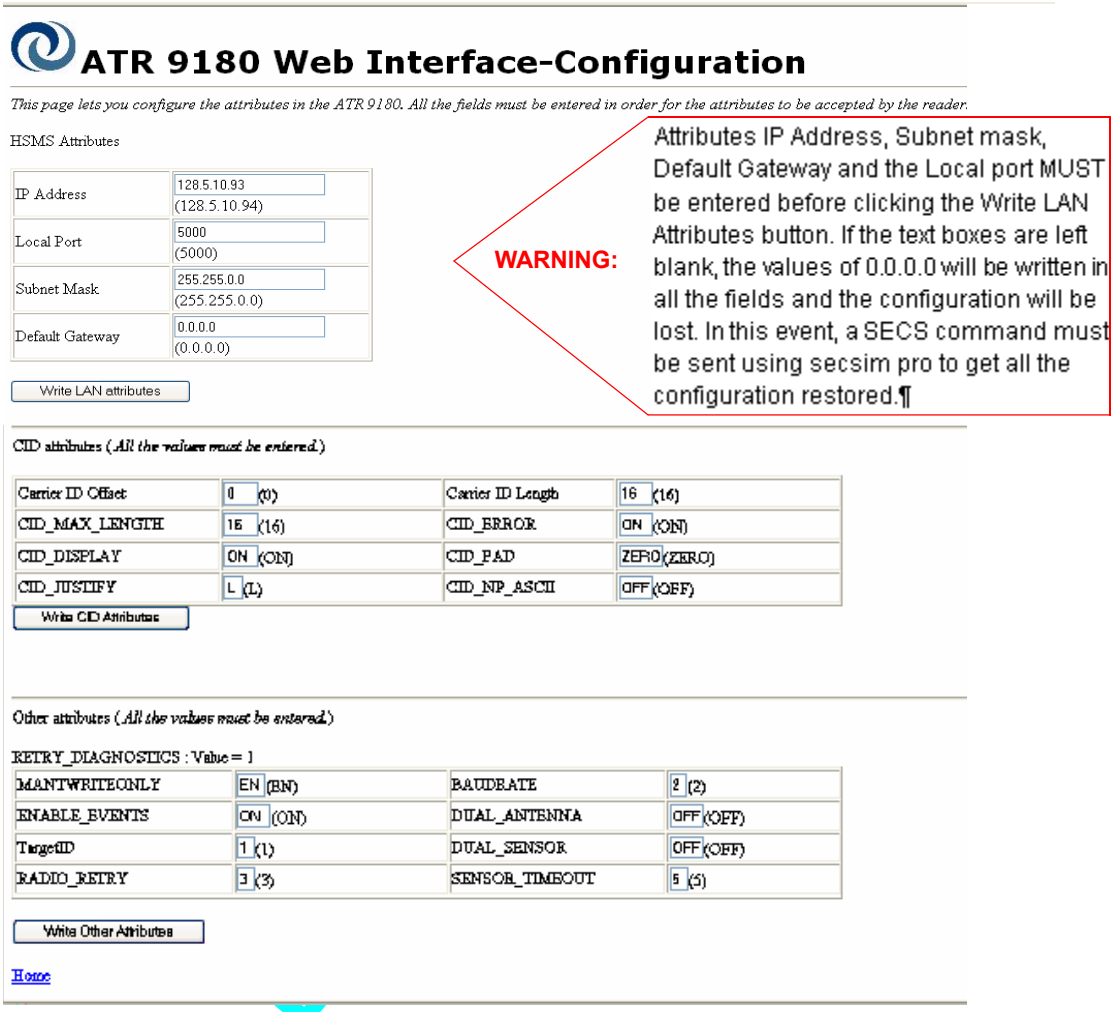


FIGURE 7 *Web Interface - Configuration Page*

NOTE . . .

THE VALUES IN TEXT BOXES ARE THE DEFAULT VALUES FOR THE ATTRIBUTE. THE ACTUAL (CURRENT) VALUE OF THE SAME ATTRIBUTE IS DISPLAYED IN THE BRACKET NEXT TO THE TEXT BOX. EXAMPLE: IN FIG THE ATTRIBUTE CARRIERIDOFFSET HAS THE CURRENT VALUE AS 0 AND THE DEFAULT VALUE IS ALSO 0.

To change the value of any of the attributes, the new value must be entered in the text box (which always shows the default value). Once the new value has been entered, click on the **Write ___ Attributes** button to write the attributes to the flash memory.

Read-Write Radio

Upon clicking Read-Write Radio link on the main page, the Read Write page is displayed. See Figure 8. The Read Write page is divided in two parts Read and Write. The read commands are Read MID and Read Data. The write commands are Write MID and Write Data

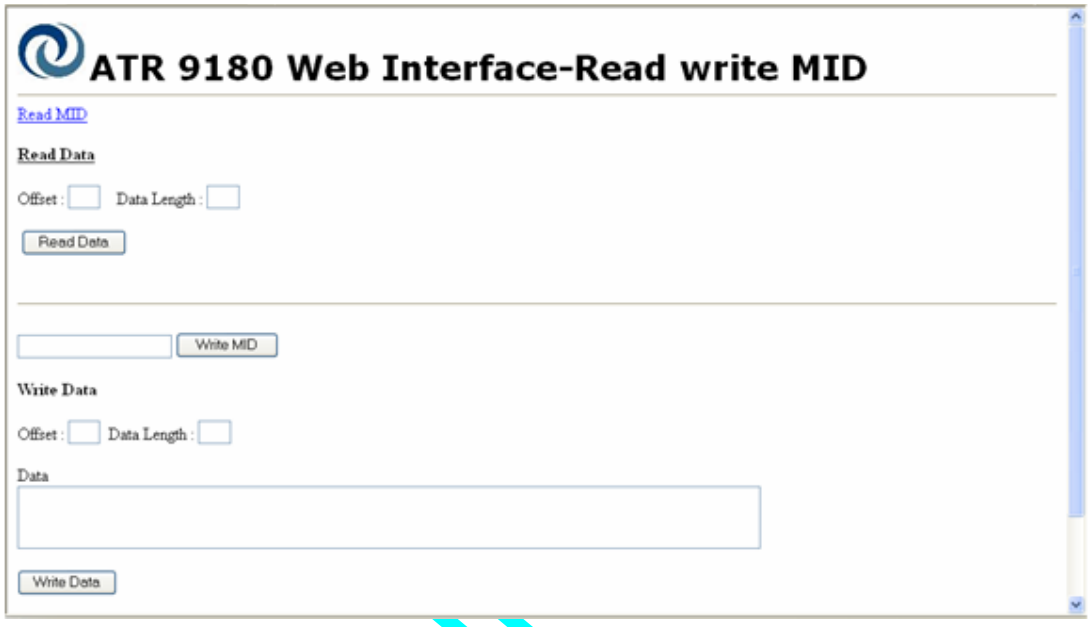


FIGURE 8 *Web Interface - Read Write Page*

Read

Read MID is a simple HTML link which executes a ReadMID command on the reader and returns the ID on the web page along with the Error/Success code. The Read MID command would be executed by clicking the Read MID button on the read/write page. See Figure 9 for sample response.

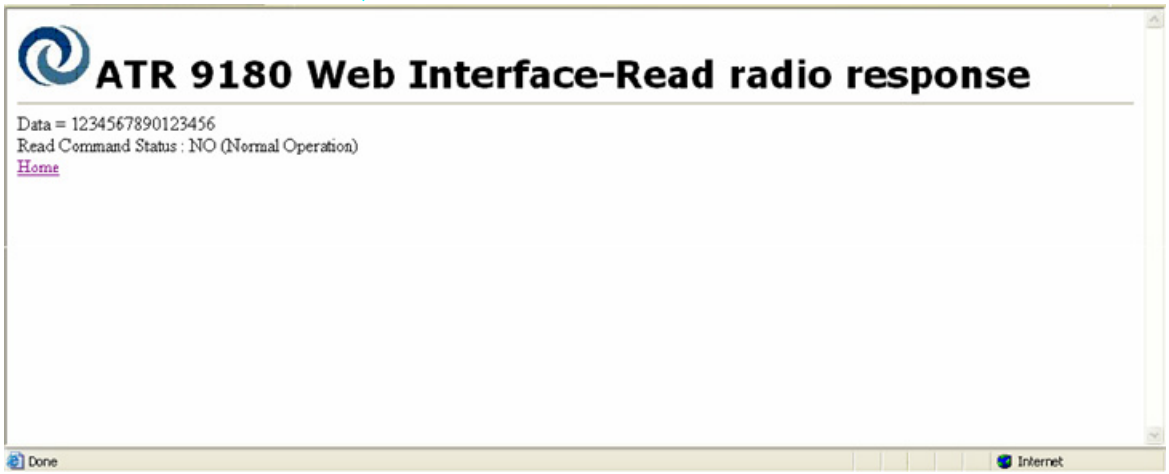


FIGURE 9 *Read MID Response*

A Read Data command would be executed by entering Offset and Data length in the fields provided and clicking the Read Data button on the read/write page. See Figure 10 for sample response.

> ***NOTE . . .***
>
> OFFSET AND DATA LENGTH MUST BE ENTERED IN ORDER TO READ THE NOTEPAD DATA FROM THE TAG.

The maximum data that could be read through the web read data interface is 45 bytes.

FIGURE 10 *Read Data Response*

Write

The Write MID button writes the MID entered in the text box in front of the Write MID button to the MID area of the tag. Enter the MID to be written in the text box in front of the Write MID button then click on the Write MID button. Figure 11 displays a sample response.

FIGURE 11 *Write MID Response*

The Write Data button writes the data entered in the data field of the page to the Notepad area of the tag.Enter the Data to be written in the text box in front of the Write Data button then click on the Write Data button. Figure 12 displays a sample response.

NOTE . . .

OFFSET AND DATA LENGTH MUST BE ENTERED IN ORDER TO WRITE THE NOTEPAD DATA TO THE TAG.

FIGURE 12 *Write Data Response*

Antenna Performance

The AdvanTag antennas work in conjunction with the AdvanTag Reader ATR9180 to read and write the MicroTag. Communications occur between the antenna and the MicroTag using very low radio frequency (134.2khz). Performance of these antennas (read and write distance as well as speed) is affected by the presence of metal and RF generators, such as color monitors in the antenna communication field.

Read/Write Performance Factors

Factors that influence tag read and write performance:

- Proximity of the tag and antenna
- Length of cable between the AdvanTag Reader and the antenna (including extension cables)
- Orientation of the tag to the antenna
- Amount of metal adjacent to either the tag or the antenna
- Amount of background EMF in the environment

> ***NOTE . . .***
>
> IF AN ANTENNA IS POSITIONED AGAINST A MICROTAG, THE ANTENNA WILL NOT READ IN MOST CASES. ALL OF THE RESULTS LISTED WERE TESTED IN AN OFFICE ENVIRONMENT.

RF Field Diagrams

The diagrams accompanying the types of antenna for reference only. Note the following conditions for each diagram:

- The coil of micro-tag must be completely contained in write area.
- The shaded area in center is a non-write area (null).
- Write ranges are approximately 50% of read ranges.
- The read and write distances cited are for reference only. Ranges are dependent upon actual installed environment.
- It may not be possible to replicate the same results outside of lab environments due to a variety of environmental conditions.

Stick Antennas

The stick antenna 9701-2879-03 is designed to be attached to the external antenna connector of the ATR 9180 and optimized for use in a variety of applications. The average read range is 10-12 cm. This stick antenna diagram refers to a stick antenna as being flat on the YZ axis, centered at 0,0,0.

Read Pattern using 9701-2879-03 antenna in air
Transponder in vertical position relative to antenna
(distance units in mm)

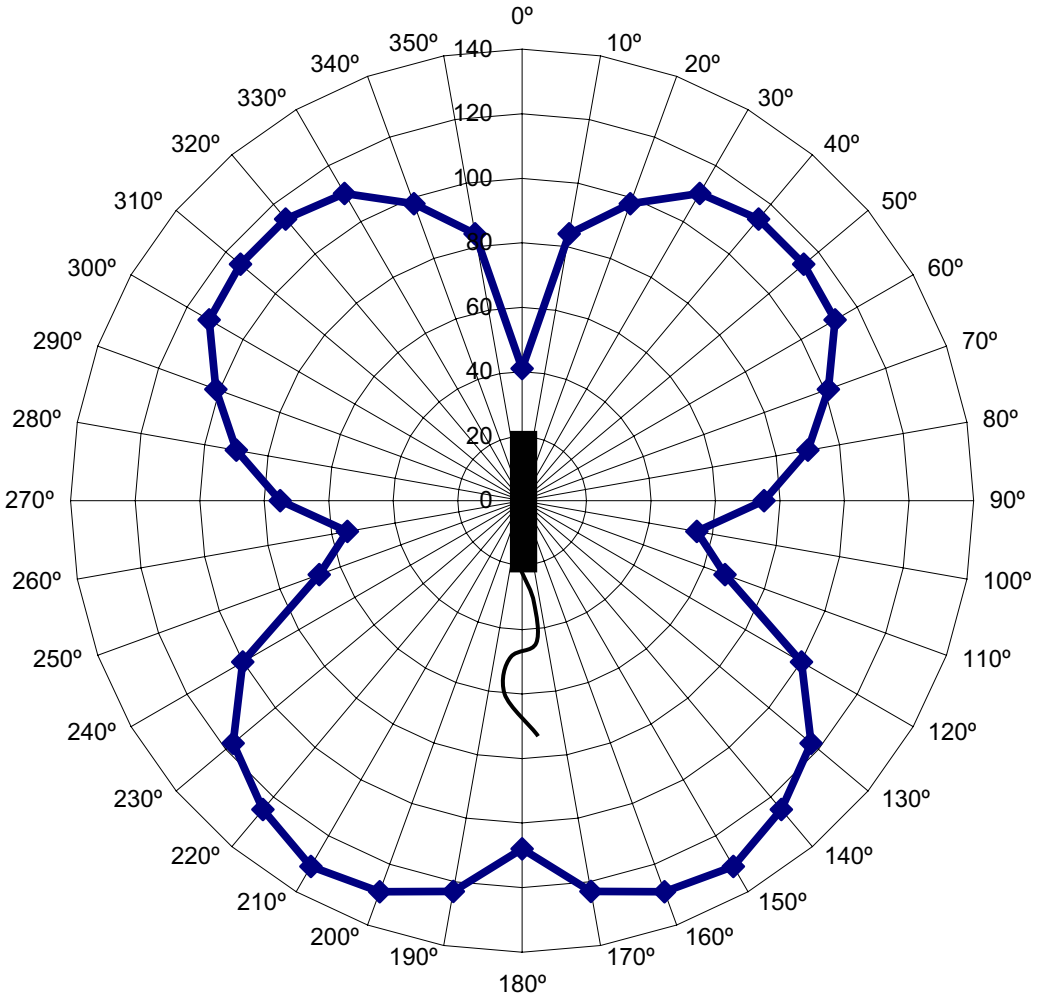


FIGURE 13 *Vertical Read Range*

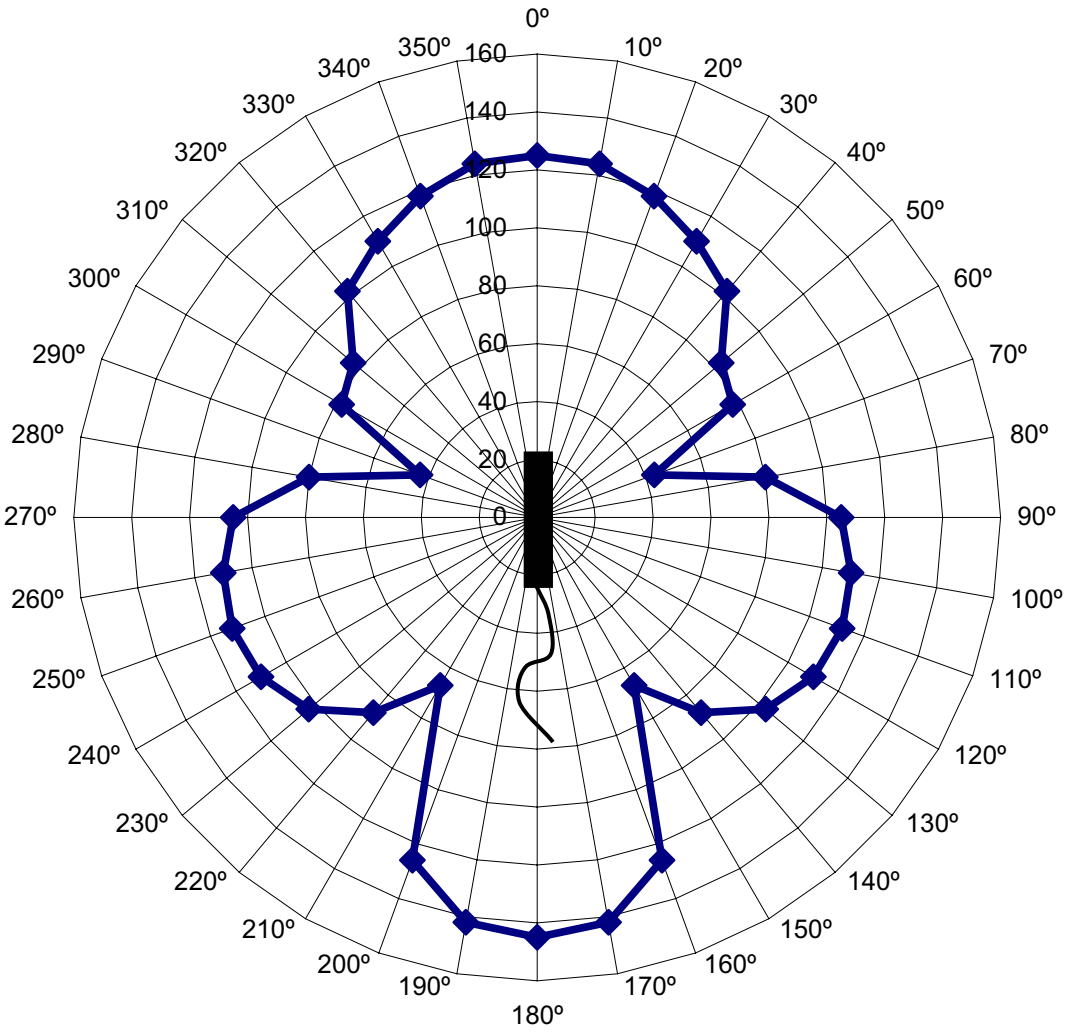


FIGURE 14 *Horizontal Read Range*

Chapter 3: Troubleshooting

This chapter identifies common problems that may occur when using the AdvanTag 9180 unit and provides a step-by-step process to identify the root cause for reader failure/malfunction and common solutions.

It includes:

Troubleshooting Chart

If there are any other problems, or if none of the corrective actions/solutions shown in this chapter clears the problem, replace the AdvanTag 9180.

TABLE 8 *ATR 9180 Common Errors and Solutions*

Error or Symptom	Likely Cause(s)	Corrective Action
Unit not functioning properly	No Power - LEDs on the front of the unit are not illuminated.	Check connection for power cables. Make sure the power is connected and then verify the Power LED is lit. Check the power supply being used. Swap with another power supply to make sure that the power supply is functioning properly.
	Communication cables loose or disconnected.	Check serial cables for loose connector. Check connector for bent pin(s).
During read and write programs, the READ/WRITE LED turns red.	MicroTag or antenna is not installed correctly.	Install MicroTag correctly. The READ/WRITE LED should turn green only. Refer to ATR magnetic field pattern diagram.
During read and write programs, the READ/WRITE LED turns red instead of green.	MicroTag is not present or out of range. The antenna cable is loose. The antenna is bad.	Install MicroTag or antenna properly. The READ/WRITE LED should turn green. Tighten the antenna cable. Replace the antenna. Adjust the location of the antenna.
During read and write programs, the READ/WRITE LED does not blink.	The RS232 cable is loose. The RS232 cable is bad. The ATR is bad. Host command is wrong.	Tighten the RS232 cable. Replace the RS232 cable. Replace the ATR. Check Host command and target ID.

Troubleshooting for RS232

Problem
ATR9180 P/N 9701-3651-01 fails to follow normal power up sequence.

1. Turn the ATR9180 power on and observe the Host Controller LED.

   It should turn **ON** for a second and then it should turn **OFF**. This verifies power-on sequence and that the software is running.

   If the ATR9180 does not follow this power on process then the unit may be defective or the software is not functioning.

Solution

Upgrade the software using PICkit 2 (refer to upgrade procedure document, PN 2000-6779-01), restart the ATR9180, and observe the power-on sequence.

A successful power-on sequence at this time means that there was no software in the unit. A failed power-on sequence at this time means that the hardware in the unit may have been damaged.

- For further information, refer to the SW Release Notes (PN 2000-6719-01).

Problem
No RS232 Communication

Solution

Check for loose connectors and cables.

Use only the cable recommended by Asyst Technologies, Inc. Asyst part number 9700-4859-XX (non-ROHS)/ 9701-2914-XX (RoHS).

NOTE . . .

THE ATR9180 MUST BE RESTARTED AFTER CHANGING TARGET ID USING A WRITE ATTRIBUTE S18F3 COMMAND.

Problem
No Communications After a Hard Reset

Solution

A brand new ATR9180 on hard reset (see Asyst document 2000-1442-01 for details) communicates power up event to the Host in SECS protocol. If the host is not present ATR9180 will go in to retry mode and retry 3 more times before finally timing out. Timeout is approximately 45 seconds. If you are using ASCII protocol, wait until SECS has finished retrying. Then send the ASCII message.

> ***NOTE . . .***
>
> THE ATR9180 REMEMBERS THE PREVIOUS SUCCESSFUL PROTOCOL IT COMMUNICATED ON AND WILL CONTINUE TO COMMUNICATE WITH THAT MESSAGE SET.

Troubleshooting for HSMS ATR9180

Troubleshooting guide for the 9701-3651-01 ATR 9180

> ***NOTE . . .***
>
> THIS ATR WORKS AT ONLY 10 MBPS SPEED.

Problem
ATR 9180 does not respond to ping command

Solution

1. Check the IP address, subnet mask and default gateway settings of the ATR. The IP address must be unique for every ATR. The subnet mask of the PC and that of the ATR should be same. The default gateway entry should also be the same.
2. To ensure that the proper software is installed, observe the ethernet LED on the LAN connector.
3. Try changing the IP address to some other value. If an ATR is used with one address and another one is connected after disconnecting the first from the network, the new ATR will not be able to use the same IP address. In this case the new ATR must be set to a new address.
4. Try clearing the arpcache from the PC.

Refer to the Software Release Notes (2000-6719-01) on how to configure the IP address.

Problem
The LED on the hub does not turn ON

Solution

1. Check the LAN cable used. When connected to a hub, a straight CAT 5 cable must be used to connect the ATR 9180.
2. The port on which the ATR is connected is bad. Move the ATR cable to some other port on the hub, and try again.

Problem
No Communication with Tag

Solution

1. Make sure a TIRIS tag is present and positioned in the correct orientation and position relative to the antenna. See the antenna read/write range graphs for details on the correction locations.
2. Verify the Antenna is connected properly to ATR9180.
3. Check the orientation of the antenna.
4. Make sure there are no metallic objects within 30mm of the antenna or the TIRIS Tag.
5. Check to ensure that only one TIRIS tag is within the read range of the antenna. Multiple tags in the read range of the antenna will prohibit reading of any tag.

For Additional Troubleshooting Assistance

If you continue to have problems working with the ATR 9180, please collect the following information and contact Asyst Technical Support at 1-800-342-SMIF (7643), enter 2 then 3 or e-mail techsupport@asyst.com for assistance.

1. Part Number and Serial Number of ATR9180
2. Part Number of RS232 cable connected
3. Part Number of the power supply
4. Part Number of the Antenna
5. Software Revision Level
6. Note the type of Presence Sensor connected, if any
7. List of responses to troubleshooting steps listed in this chapter

To Determine Software Revision

While Observing the power up event on the Host side, send a S1F1 SECS command with AConfig and note the software revision in the return message from the ATR9180.

If there are any other problems, or if none of the above corrective actions clears the problem, replace the AdvanTag. Other considerations to assure proper ATR functioning:

- The baud rate is to be the same between Host and ATR.
- The target ID is to be correct in the SECS message that gets sent to the ATR.
- The MicroTag is to be in the proper range and relative location to the antenna.

5/4/2007 10:58:20 AM - RECEIVED PRIMARY MESSAGE: S18F71
<L
<A 01>
<A NO>
<A 8> <== Power Up Event
<L
>
>.

10:58:20 AM - PRIMARY MESSAGE SENT:
S1F1
.

10:58:20 AM - RECEIVED SECONDARY REPLY: S1F2
<L
< A AT9180 >
< A R10B > <== R U There
>

READ MID CMD

10:58:36 AM - PRIMARY MESSAGE SENT:
S18F9
< A 1 > <== Read MID
10:58:37 AM - RECEIVED SECONDARY REPLY: S18F10
<L
<A 01>
<A NO>
<A Antenna Port --8>
<L <== Read MID Response
<A NE>
<A 0>
<A IDLE>
<A IDLE>
>
>.

WRITE 120 Bytes

11:00:11 AM - PRIMARY MESSAGE SENT:
S18F7
<L
<A 1>
<A 00>
<A 120> <== Write 120 bytes Data
<A

test 120 bytes write using ATR9180.test 120 bytes write using ATR9180.test 120 bytes write using ATR9180.end of the data
>.
11:00:16 AM - RECEIVED SECONDARY REPLY: S18F8
<L
    <A 01>
    <A NO>   <== Write Data Request Success
    <L
        <A NE>
        <A 0>
        <A IDLE>
        <A IDLE>
    >
>.

READ 120 bytes

11:00:28 AM - PRIMARY MESSAGE SENT:
S18F5
<L
    <A 1>
    <A 00>
    <A 120>   <== Read 120 Bytes Data
>.
11:00:30 AM - RECEIVED SECONDARY REPLY: S18F6
<L
    <A 01>
    <A NO>   <== Read 120 Bytes Data Success
    <A
test 120 bytes write using ATR9180.test 120 bytes write using ATR9180.test 120 bytes write using ATR9180.end of the data
>.

11:02:03 AM - PRIMARY MESSAGE SENT:
S18F13
<L
    <A 1>
    <A 15>
    <A M>   <== MANT Mode ON
>.
11:02:03 AM - RECEIVED SECONDARY REPLY: S18F14
<L
    <A 01>
    <A NO>
    <L

```
        <A  NE>
        <A  0>
        <A  MANT>
        <A  IDLE>
    >
>.
```

WMID:

```
11:02:42 AM - PRIMARY MESSAGE SENT:
S18F11
<L
    <A  1>
    <A  ATR9180--PORT001><== Write MID CMD
>.

11:02:43 AM - RECEIVED SECONDARY REPLY: S18F12
<L
    <A  01>
    <A  NO>             <== Write MID Success
    <L
        <A  NE>
        <A  0>
        <A  MANT>
        <A  IDLE>
    >
>.
```

READ:

```
11:02:50 AM - PRIMARY MESSAGE SENT:
S18F9
< A  1 >                <== Read MID

11:02:50 AM - RECEIVED SECONDARY REPLY: S18F10
<L
    <A  01>
    <A  NO>             <== Read MID Success
    <A  ATR9180--PORT001>
    <L
        <A  NE>
        <A  0>
        <A  MANT>
        <A  IDLE>
    >
>.
```

SUB SYSTEM CMD - LED ON

```
11:04:06 AM - PRIMARY MESSAGE SENT:
S18F13
<L
    <A  1>
    <A  04>             <== Sub System CMD Turn LED 1 of Port 1 ON
    <L
        <A  1>
        <A  10>
        <A  1>
    >
>.

11:04:06 AM - RECEIVED SECONDARY REPLY: S18F14
<L
    <A  01>
    <A  NO>             <== Sub System CMD Success
    <L
        <A  NE>
        <A  0>
        <A  MANT>
        <A  IDLE>
    >
>.
```

SET DUAL SENSOR ON FOR DUAL SENSOR FUNCTIONALITY

```
11:08:14 AM - PRIMARY MESSAGE SENT:
S18F3
<L
    <A  1>
    <L
        <L
            <A  DUAL_SENSOR><== Turn Dual Sensor ON
            <A  ON>
        >
    >
>.

11:08:14 AM - RECEIVED SECONDARY REPLY: S18F4
<L
    <A  01>
    <A  NO>             <== Write attribute success
    <L
        <A  NE>
        <A  0>
        <A  MANT>
        <A  IDLE>
    >
>.
```

ARRIVAL /REMOVAL EVENT

```
5/4/2007 11:08:22 AM  - RECEIVED PRIMARY MESSAGE: S18F71
<L
    <A  05>
    <A  NO>            <== Port 5 Button 1 is pressed
    <A  1>
    <L
        <A  AutoReadData>
        <A  1234567890123456><== MID read
    >
>.

5/4/2007 11:08:26 AM  - RECEIVED PRIMARY MESSAGE: S18F75
<L
    <A  05>
    <A  NO>            <== Port 5 Button 2 is pressed
    <A  2>
    <L
        <A  AutoReadData>
        <A  1234567890123456><== MID read
    >
>.
```


Cycle Testing

Cycle Testing Setup

Host :	Secsim Pro 3.0.4
Communication Port :	RS-232 , 9600 baud rate
Result :	PASS

Appendix B: HSMS Test Log

This Appendix consists of a sample test log of HSMS Communications.

Sample Log

```
Primary message : RUTHERE, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S1F1 W>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 81 01 00 00 00 05 16 9C
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 01 02 00 00 00 05 16 9C 01 02 41 06 41 54 39 31 38 30
(0) HSMS:           41 06 41 31 30 41 62 38
(0) Received Reply Message...
    <S1F2
    <L[2/1]
        <A[6/1] "AT9180">
        <A[6/1] "A10Ab8"><-- This value will be A10A for the release.
    >
>
Received Stream : 1, Expected Stream : 1
Received Function : 2, Expected Function : 2
Received Items : <L[2/1]
    <A[6/1] "AT9180">
    <A[6/1] "A10Ab8">
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
----------------------------------------------------------------------
Primary message : GETSWPART, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F1 W
    <L[2/1]
        <A[2/1] "01">
        <L[1/1]
            <A[13/1] "SW_PARTNUMBER">
        >
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 01 00 00 00 05 16 9E 01 02 41 02 30 31 01 01 41 0D
(0) HSMS:           53 57 5F 50 41 52 54 4E 55 4D 42 45 52
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 02 00 00 00 05 16 9E 01 04 41 02 30 31 41 02 4E 4F
(0) HSMS:          01 01 41 11 35 30 30 33 2D 38 36 31 30 2D 30 30 30 30 2D 42
(0) HSMS:          38 01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44
(0) HSMS:           4C 45
(0) Received Reply Message...
```

```
    <S18F2
    <L[4/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[1/1]
            <A[17/1] "5003-8610-0000-B8">
        >
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 2, Expected Function : 2
Received Items : <L[4/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[1/1]
        <A[17/1] "5003-8610-0000-B8">
    >
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
NOTE : Normal operation, Test Passed, but some Text in response did not Match.
------------------------------------------------------------------
Primary message : GETSWREV, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F1 W
    <L[2/1]
        <A[2/1] "01">
        <L[1/1]
            <A[7/1] "SOFTREV">
        >
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 01 00 00 00 05 16 A0 01 02 41 02 30 31 01 01 41 07
(0) HSMS:           53 4F 46 54 52 45 56
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 02 00 00 00 05 16 A0 01 04 41 02 30 31 41 02 4E 4F
(0) HSMS:          01 01 41 06 41 31 30 41 62 38 01 04 41 02 4E 45 41 01 30 41
(0) HSMS:           04 49 44 4C 45 41 04 49 44 4C 45
(0) Received Reply Message...
    <S18F2
    <L[4/1]
```

```
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[1/1]
            <A[6/1] "A10Ab8">
        >
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 2, Expected Function : 2
Received Items : <L[4/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[1/1]
        <A[6/1] "A10Ab8">
    >
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
NOTE : Normal operation, Test Passed, but some Text in response did not Match.
------------------------------------------------------------------
Primary message : RD40Data_Offset10, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F5 W
    <L[3/1]
        <A[2/1] "01">
        <A[3/1] "010">
        <A[2/1] "40">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 05 00 00 00 05 16 A2 01 03 41 02 30 31 41 03 30 31
(0) HSMS:           30 41 02 34 30
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 06 00 00 00 05 16 A2 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:          41 28 48 69 21 20 49 74 20 69 73 20 61 20 74 65 73 74 2E 20
(0) HSMS:          48 69 21 20 49 74 20 69 73 20 61 20 74 65 73 74 2E 2E 2E 2E
(0) HSMS:           2E 48
(0) Received Reply Message...
    <S18F6
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
```

```
        <A[40/1] "Hi! It is a test. Hi! It is a test.....H">
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 6, Expected Function : 6
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <A[40/1] "Hi! It is a test. Hi! It is a test.....H">
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
NOTE : Normal operation, Test Passed, but some Text in response did not Match.
------------------------------------------------------------------
Primary message : RD_MID, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F9 W
    <A[2/1] "01">
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 09 00 00 00 05 16 A4 41 02 30 31
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 0A 00 00 00 05 16 A4 01 04 41 02 30 31 41 02 4E 4F
(0) HSMS:           41 10 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 01 04
(0) HSMS:           41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C 45
(0) Received Reply Message...
    <S18F10
    <L[4/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <A[16/1] "1234567890123456">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 10, Expected Function : 10
Received Items : <L[4/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <A[16/1] "1234567890123456">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
```

```
------------------------------------------------------------------
Primary message : GetStatus, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F13 W
    <L[3/1]
        <A[2/1] "01">
        <A[9/1] "GetStatus">
        <L[0/1]>
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 0D 00 00 00 05 16 A6 01 03 41 02 30 31 41 09 47 65
(0) HSMS:           74 53 74 61 74 75 73 01 00
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 0E 00 00 00 05 16 A6 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:          01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:           45
(0) Received Reply Message...
    <S18F14
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 14, Expected Function : 14
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
------------------------------------------------------------------
Primary message : WR_Data_90bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F7 W
    <L[4/1]
        <A[2/1] "01">
        <A[2/1] "00">
        <A[2/1] "90">
        <A[90/1] "VIVEK JAINHi! It is a test. Hi! It is a test.....Hi! It "
                 "is a test. Hi! It is a test. End..">
```

```
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 07 00 00 00 05 16 A8 01 04 41 02 30 31 41 02 30 30
(0) HSMS:           41 02 39 30 41 5A 56 49 56 45 4B 20 4A 41 49 4E 48 69 21 20
(0) HSMS:           49 74 20 69 73 20 61 20 74 65 73 74 2E 20 48 69 21 20 49 74
(0) HSMS:           20 69 73 20 61 20 74 65 73 74 2E 2E 2E 2E 2E 48 69 21 20 49
(0) HSMS:           74 20 69 73 20 61 20 74 65 73 74 2E 20 48 69 21 20 49 74 20
(0) HSMS:           69 73 20 61 20 74 65 73 74 2E 20 45 6E 64 2E 2E
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 08 00 00 00 05 16 A8 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:           01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:           45
(0) Received Reply Message...
    <S18F8
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 8, Expected Function : 8
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
------------------------------------------------------------------------
Primary message : RD_Data_120bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F5 W
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "00">
        <A[3/1] "120">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 05 00 00 00 05 16 AA 01 03 41 02 30 31 41 02 30 30
(0) HSMS:           41 03 31 32 30
(0) HSMS: Received SECS Message from 128.5.10.93
```

```
(0) HSMS: Message = 00 01 12 06 00 00 00 05 16 AA 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:           41 78 56 49 56 45 4B 20 4A 41 49 4E 48 69 21 20 49 74 20 69
(0) HSMS:           73 20 61 20 74 65 73 74 2E 20 48 69 21 20 49 74 20 69 73 20
(0) HSMS:           61 20 74 65 73 74 2E 2E 2E 2E 2E 48 69 21 20 49 74 20 69 73
(0) HSMS:           20 61 20 74 65 73 74 2E 20 48 69 21 20 49 74 20 69 73 20 61
(0) HSMS:           20 74 65 73 74 2E 20 45 6E 64 2E 2E 36 37 38 39 30 31 32 33
(0) HSMS:           34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39 30 45 6E 64
(0) HSMS:            2E 2E
(0) Received Reply Message...
    <S18F6
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <A[120/1] "VIVEK JAINHi! It is a test. Hi! It is a test.....Hi! It"
                  " is a test. Hi! It is a test. End..678901234567890123456789"
                  "67890End..">
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 6, Expected Function : 6
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <A[120/1] "VIVEK JAINHi! It is a test. Hi! It is a test.....Hi! It is "
              "a test. Hi! It is a test. End..678901234567890123456789End"
              "..">
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
NOTE : Normal operation, Test Passed, but some Text in response did not Match.
------------------------------------------------------------------
Primary message : WR_Data_120bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F7 W
    <L[4/1]
        <A[2/1] "01">
        <A[2/1] "00">
        <A[3/1] "120">
        <A[120/1] "VIVEK JAINHi! It is a test. Hi! It is a test.....Hi! It"
                  " is a test. Hi! It is a test. 123456789012345678901234567"
                  "67890End..">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 07 00 00 00 05 16 AC 01 04 41 02 30 31 41 02 30 30
(0) HSMS:           41 03 31 32 30 41 78 56 49 56 45 4B 20 4A 41 49 4E 48 69 21
(0) HSMS:           20 49 74 20 69 73 20 61 20 74 65 73 74 2E 20 48 69 21 20 49
(0) HSMS:           74 20 69 73 20 61 20 74 65 73 74 2E 2E 2E 2E 2E 48 69 21 20
(0) HSMS:           49 74 20 69 73 20 61 20 74 65 73 74 2E 20 48 69 21 20 49 74
(0) HSMS:           20 69 73 20 61 20 74 65 73 74 2E 20 31 32 33 34 35 36 37 38
(0) HSMS:           39 30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38
(0) HSMS:            39 30 45 6E 64 2E 2E
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 08 00 00 00 05 16 AC 01 03 41 02 30 31 41 02 4E 4F
```

```
(0) HSMS:           01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:            45
(0) Received Reply Message...
    <S18F8
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream :
Received Function : 8, Expected Function :
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 05 00 00 00 05 16 AE 01 03 41 02 30 31 41 02 30 30
(0) HSMS:            41 03 31 32 30
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 06 00 00 00 05 16 AE 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:           41 78 56 49 56 45 4B 20 4A 41 49 4E 48 69 21 20 49 74 20 69
(0) HSMS:           73 20 61 20 74 65 73 74 2E 20 48 69 21 20 49 74 20 69 73 20
(0) HSMS:           61 20 74 65 73 74 2E 2E 2E 2E 2E 48 69 21 20 49 74 20 69 73
(0) HSMS:           20 61 20 74 65 73 74 2E 20 48 69 21 20 49 74 20 69 73 20 61
(0) HSMS:           20 74 65 73 74 2E 20 31 32 33 34 35 36 37 38 39 30 31 32 33
(0) HSMS:           34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39 30 45 6E 64
(0) HSMS:            2E 2E
(0) Received Reply Message...
    <S18F6
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <A[120/1] "VIVEK JAINHi! It is a test. Hi! It is a test.....Hi! It"
                  " is a test. Hi! It is a test. 123456789012345678901234567"
                  "67890End..">
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 6, Expected Function : 6
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
```

```
    <A[120/1] "VIVEK JAINHi! It is a test. Hi! It is a test.....Hi! It is "
              "a test. Hi! It is a test. 12345678901234567890123456789OEnd"
              "..">
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
NOTE : Normal operation, Test Passed, but some Text in response did not Match.
----------------------------------------------------------------------
Primary message : WR_Data_10bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F7 W
    <L[4/1]
        <A[2/1] "01">
        <A[2/1] "00">
        <A[2/1] "10">
        <A[10/1] "1234567890">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 07 00 00 00 05 16 B0 01 04 41 02 30 31 41 02 30 30
(0) HSMS:           41 02 31 30 41 0A 31 32 33 34 35 36 37 38 39 30
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 08 00 00 00 05 16 B0 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:           01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:           45
(0) Received Reply Message...
    <S18F8
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 8, Expected Function : 8
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
----------------------------------------------------------------------
Primary message : WR_MID_16bytes, Send to Dev ID  : 1
```

```
(0) Sending Primary Message...
    <S18F11 W
    <L[2/1]
        <A[2/1] "01">
        <A[16/1] "1234567890123456">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 0B 00 00 00 05 16 B2 01 02 41 02 30 31 41 10 31 32
(0) HSMS:           33 34 35 36 37 38 39 30 31 32 33 34 35 36
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 0C 00 00 00 05 16 B2 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:          01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:           45
(0) Received Reply Message...
    <S18F12
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 12, Expected Function : 12
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
------------------------------------------------------------------------
Primary message : RD_MID, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F9 W
    <A[2/1] "01">
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 09 00 00 00 05 16 B4 41 02 30 31
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 0A 00 00 00 05 16 B4 01 04 41 02 30 31 41 02 4E 4F
(0) HSMS:          41 10 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 01 04
(0) HSMS:           41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C 45
(0) Received Reply Message...
```

```
    <S18F10
    <L[4/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <A[16/1] "1234567890123456">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 10, Expected Function : 10
Received Items : <L[4/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <A[16/1] "1234567890123456">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
------------------------------------------------------------------
Primary message : GetStatus, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F13 W
    <L[3/1]
        <A[2/1] "01">
        <A[9/1] "GetStatus">
        <L[0/1]>
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 0D 00 00 00 05 16 B6 01 03 41 02 30 31 41 09 47 65
(0) HSMS:           74 53 74 61 74 75 73 01 00
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 0E 00 00 00 05 16 B6 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:          01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:           45
(0) Received Reply Message...
    <S18F14
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
```

```
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 14, Expected Function : 14
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
------------------------------------------------------------------------
Primary message : WR_Data_10bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F7 W
    <L[4/1]
        <A[2/1] "01">
        <A[2/1] "00">
        <A[2/1] "10">
        <A[10/1] "1234567890">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 07 00 00 00 05 16 B8 01 04 41 02 30 31 41 02 30 30
(0) HSMS:           41 02 31 30 41 0A 31 32 33 34 35 36 37 38 39 30
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 08 00 00 00 05 16 B8 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:           01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:            45
(0) Received Reply Message...
    <S18F8
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 8, Expected Function : 8
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
```

```
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
----------------------------------------------------------------------
Primary message : RD_Data_10bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F5 W
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "00">
        <A[2/1] "10">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 05 00 00 00 05 16 BA 01 03 41 02 30 31 41 02 30 30
(0) HSMS:           41 02 31 30
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 06 00 00 00 05 16 BA 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:           41 0A 31 32 33 34 35 36 37 38 39 30
(0) Received Reply Message...
    <S18F6
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <A[10/1] "1234567890">
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 6, Expected Function : 6
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <A[10/1] "1234567890">
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
NOTE : Normal operation, Test Passed, but some Text in response did not Match.
----------------------------------------------------------------------
Primary message : WR_MID_16bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F11 W
    <L[2/1]
        <A[2/1] "01">
        <A[16/1] "1234567890123456">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 0B 00 00 00 05 16 BC 01 02 41 02 30 31 41 10 31 32
```

```
(0) HSMS:           33 34 35 36 37 38 39 30 31 32 33 34 35 36
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 0C 00 00 00 05 16 BC 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:           01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:           45
(0) Received Reply Message...
    <S18F12
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 12, Expected Function : 12
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
------------------------------------------------------------------------
Primary message : RD_MID, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F9 W
    <A[2/1] "01">
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 09 00 00 00 05 16 BE 41 02 30 31
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 0A 00 00 00 05 16 BE 01 04 41 02 30 31 41 02 4E 4F
(0) HSMS:           41 10 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 01 04
(0) HSMS:           41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C 45
(0) Received Reply Message...
    <S18F10
    <L[4/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <A[16/1] "1234567890123456">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
```

```
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 10, Expected Function : 10
Received Items : <L[4/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <A[16/1] "1234567890123456">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
------------------------------------------------------------------------
Primary message : WR_MID_16bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F11 W
    <L[2/1]
        <A[2/1] "01">
        <A[16/1] "1234567890123456">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 0B 00 00 00 05 16 C0 01 02 41 02 30 31 41 10 31 32
(0) HSMS:           33 34 35 36 37 38 39 30 31 32 33 34 35 36
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 0C 00 00 00 05 16 C0 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:          01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:           45
(0) Received Reply Message...
    <S18F12
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 12, Expected Function : 12
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[4/1]
```

```
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
----------------------------------------------------------------------
Primary message : WR_Data_10bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F7 W
    <L[4/1]
        <A[2/1] "01">
        <A[2/1] "00">
        <A[2/1] "10">
        <A[10/1] "1234567890">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 07 00 00 00 05 16 C2 01 04 41 02 30 31 41 02 30 30
(0) HSMS:           41 02 31 30 41 0A 31 32 33 34 35 36 37 38 39 30
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 08 00 00 00 05 16 C2 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:           01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:           45
(0) Received Reply Message...
    <S18F8
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 8, Expected Function : 8
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
----------------------------------------------------------------------
```

```
Primary message : RD_Data_10bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F5 W
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "00">
        <A[2/1] "10">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 05 00 00 00 05 16 C4 01 03 41 02 30 31 41 02 30 30
(0) HSMS:           41 02 31 30
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 06 00 00 00 05 16 C4 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:           41 0A 31 32 33 34 35 36 37 38 39 30
(0) Received Reply Message...
    <S18F6
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <A[10/1] "1234567890">
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 6, Expected Function : 6
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <A[10/1] "1234567890">
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
NOTE : Normal operation, Test Passed, but some Text in response did not Match.
------------------------------------------------------------------
Primary message : WR_Data_10bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F7 W
    <L[4/1]
        <A[2/1] "01">
        <A[2/1] "00">
        <A[2/1] "10">
        <A[10/1] "1234567890">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 07 00 00 00 05 16 C6 01 04 41 02 30 31 41 02 30 30
(0) HSMS:           41 02 31 30 41 0A 31 32 33 34 35 36 37 38 39 30
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 08 00 00 00 05 16 C6 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:          01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:           45
(0) Received Reply Message...
    <S18F8
    <L[3/1]
```

```
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 8, Expected Function : 8
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
-------------------------------------------------------------------
Primary message : WR_MID_16bytes, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F11 W
    <L[2/1]
        <A[2/1] "01">
        <A[16/1] "1234567890123456">
    >
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 0B 00 00 00 05 16 C8 01 02 41 02 30 31 41 10 31 32
(0) HSMS:           33 34 35 36 37 38 39 30 31 32 33 34 35 36
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 0C 00 00 00 05 16 C8 01 03 41 02 30 31 41 02 4E 4F
(0) HSMS:           01 04 41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C
(0) HSMS:           45
(0) Received Reply Message...
    <S18F12
    <L[3/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
```

```
Received Function : 12, Expected Function : 12
Received Items : <L[3/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
----------------------------------------------------------------------
Primary message : RD_MID, Send to Dev ID  : 1
(0) Sending Primary Message...
    <S18F9 W
    <A[2/1] "01">
>
(0) HSMS: Sending SECS Message to 128.5.10.93
(0) HSMS: Message = 00 01 92 09 00 00 00 05 16 CA 41 02 30 31
(0) HSMS: Received SECS Message from 128.5.10.93
(0) HSMS: Message = 00 01 12 0A 00 00 00 05 16 CA 01 04 41 02 30 31 41 02 4E 4F
(0) HSMS:           41 10 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 01 04
(0) HSMS:           41 02 4E 45 41 01 30 41 04 49 44 4C 45 41 04 49 44 4C 45
(0) Received Reply Message...
    <S18F10
    <L[4/1]
        <A[2/1] "01">
        <A[2/1] "NO">
        <A[16/1] "1234567890123456">
        <L[4/1]
            <A[2/1] "NE">
            <A[1/1] "0">
            <A[4/1] "IDLE">
            <A[4/1] "IDLE">
        >
    >
>
Received Stream : 18, Expected Stream : 18
Received Function : 10, Expected Function : 10
Received Items : <L[4/1]
    <A[2/1] "01">
    <A[2/1] "NO">
    <A[16/1] "1234567890123456">
    <L[4/1]
        <A[2/1] "NE">
        <A[1/1] "0">
        <A[4/1] "IDLE">
        <A[4/1] "IDLE">
    >
>
Status : S_DONE : Normal Completion of Primary sent, Received correct Reply,
      W-Bit=1
```

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