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.

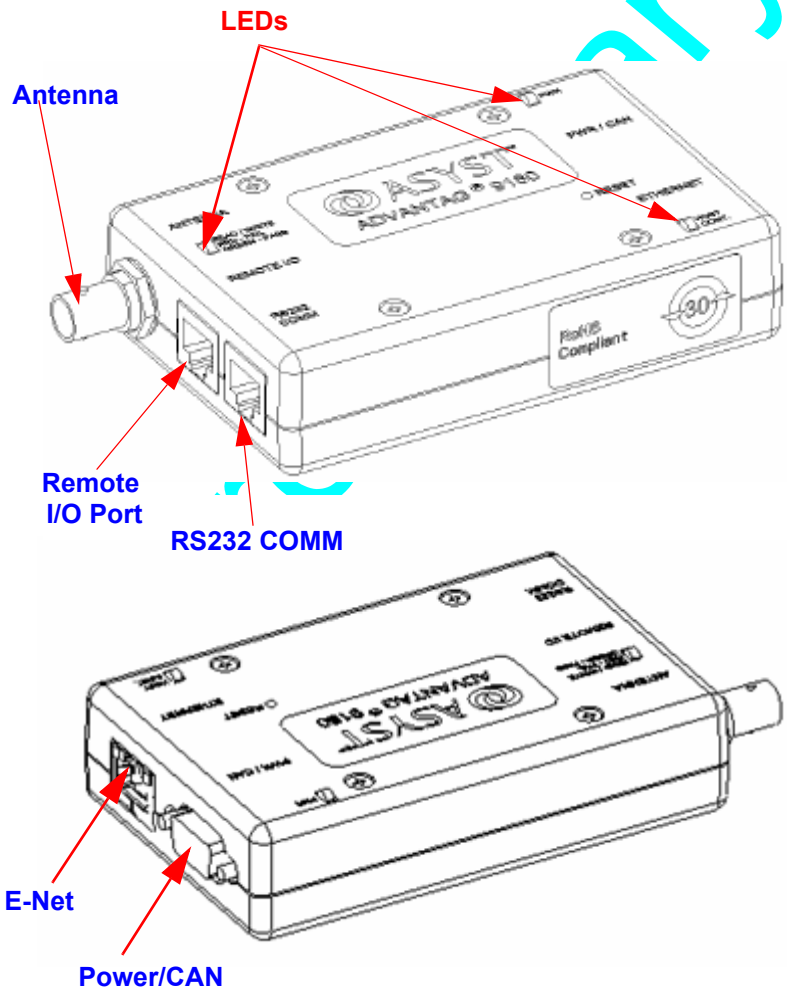

FIGURE 3 *AdvanTag 9180 Top Views*

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.

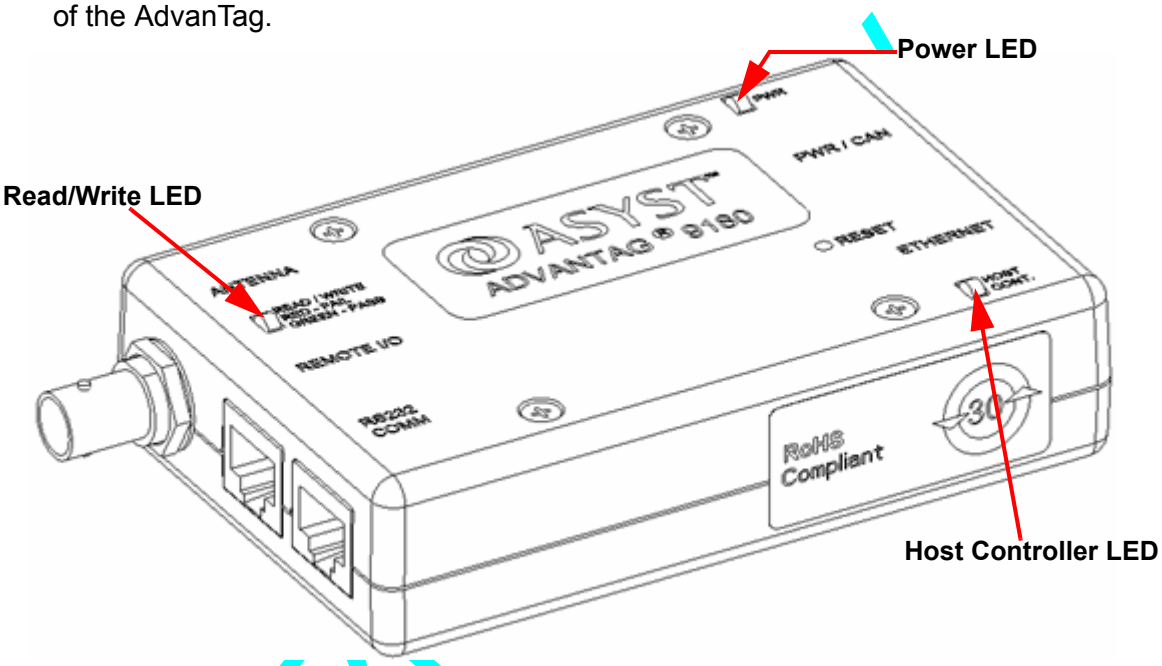

FIGURE 4 *AdvanTag 9180 Reader LEDs*

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.

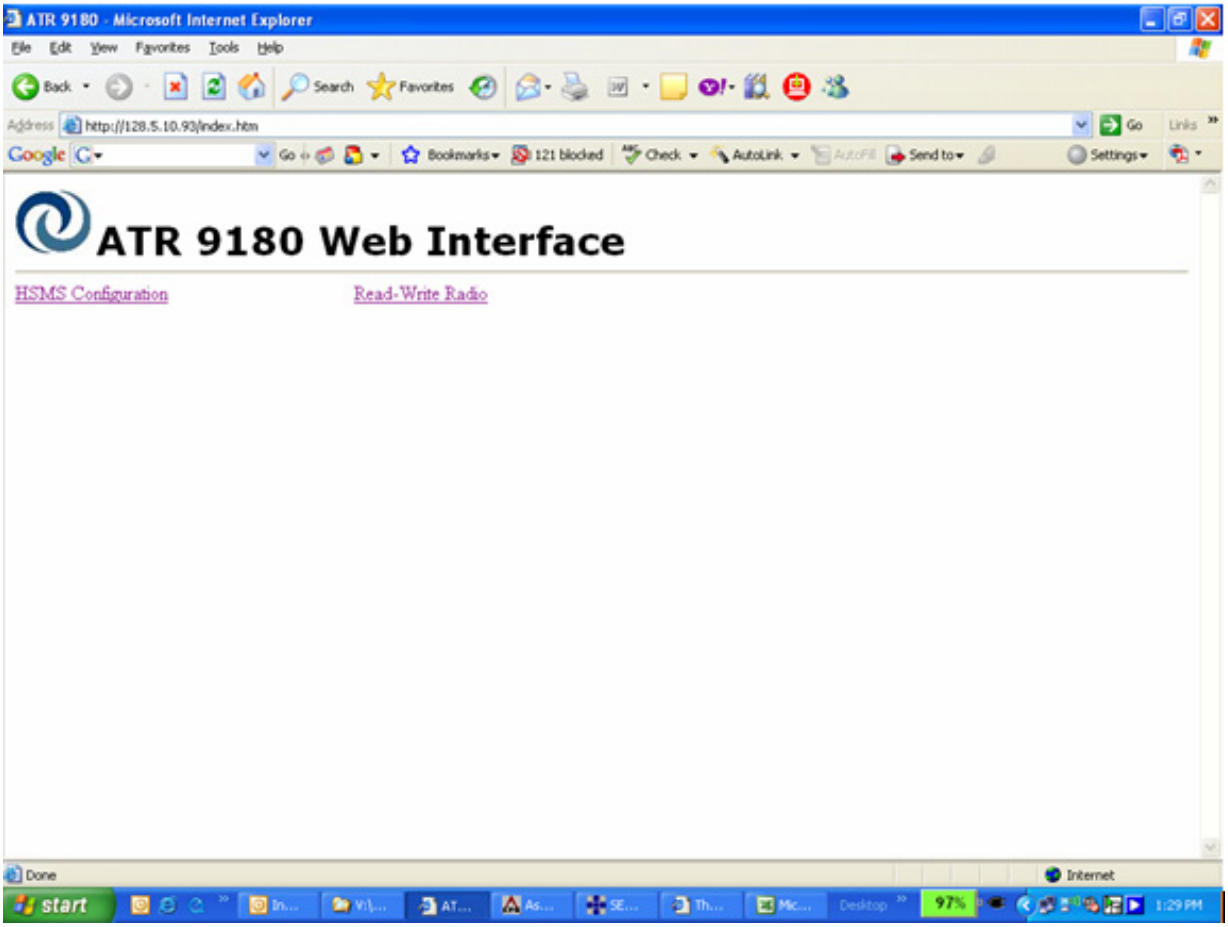

FIGURE 6 *ATR 9180 Web Interface - Home Page*

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.

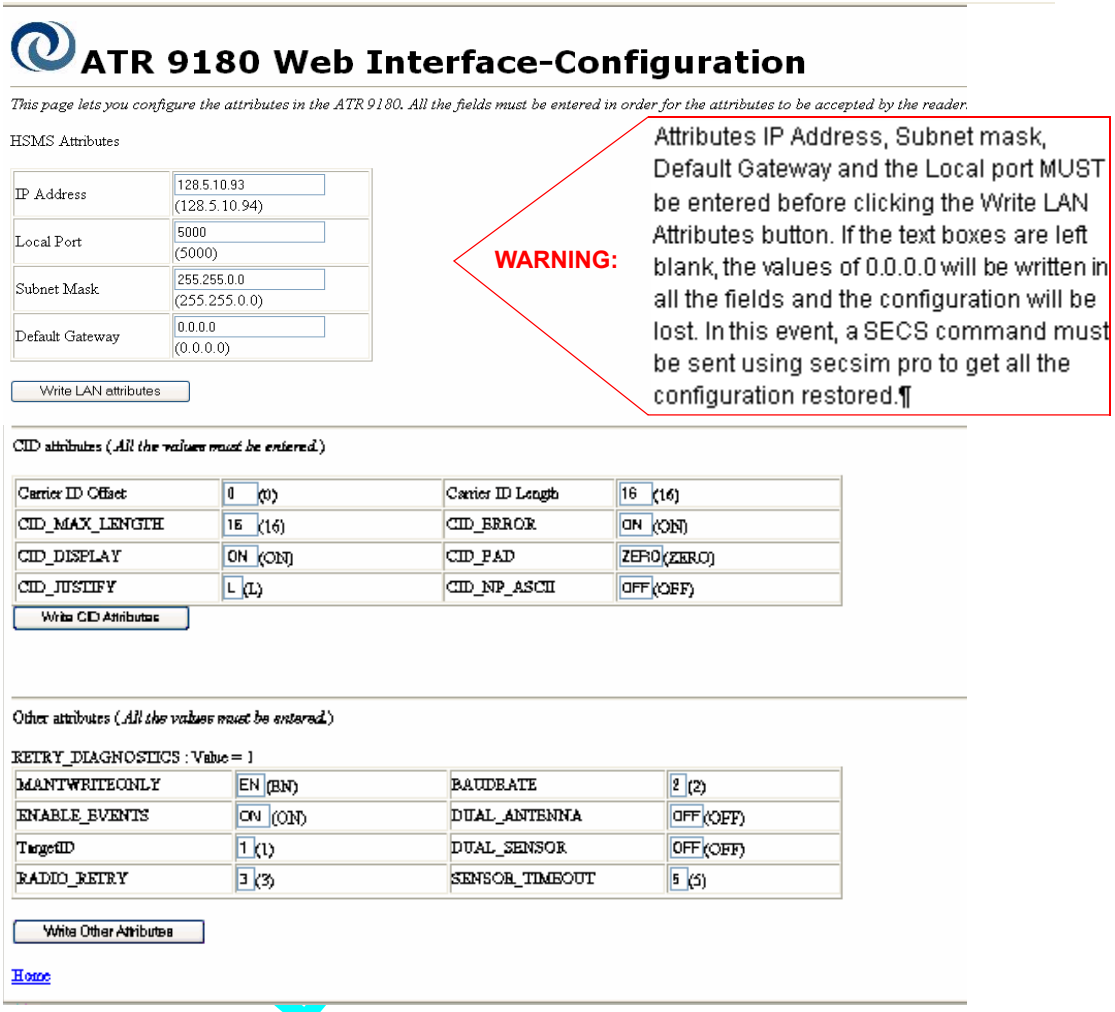

FIGURE 7 *Web Interface - Configuration Page*

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

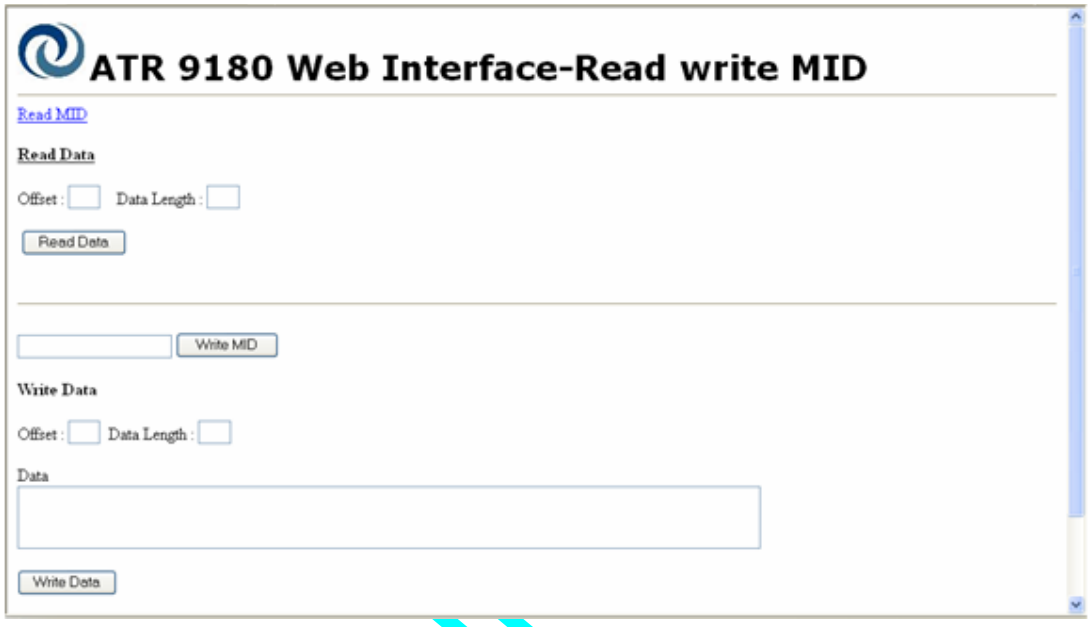

FIGURE 8 *Web Interface - Read Write Page*

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.

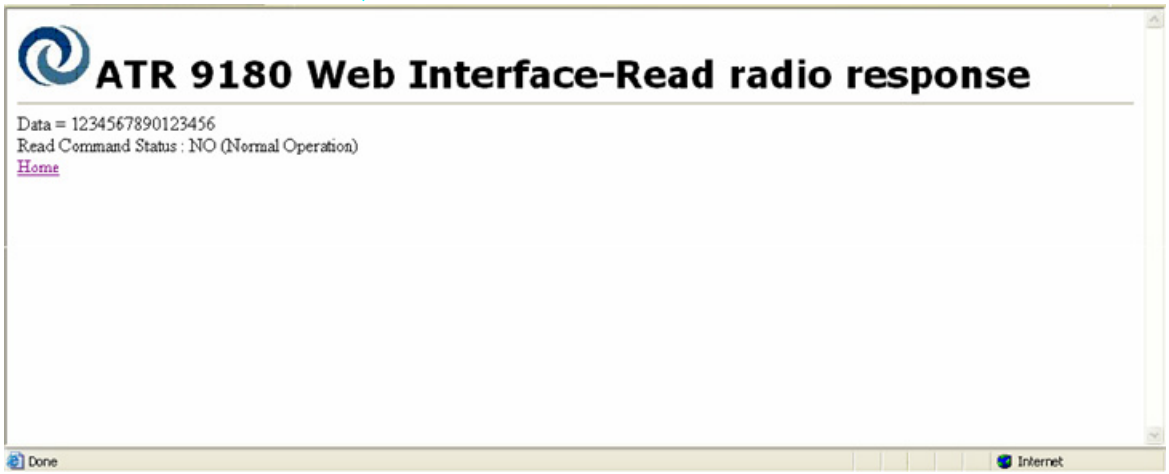

FIGURE 9 *Read MID Response*

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)

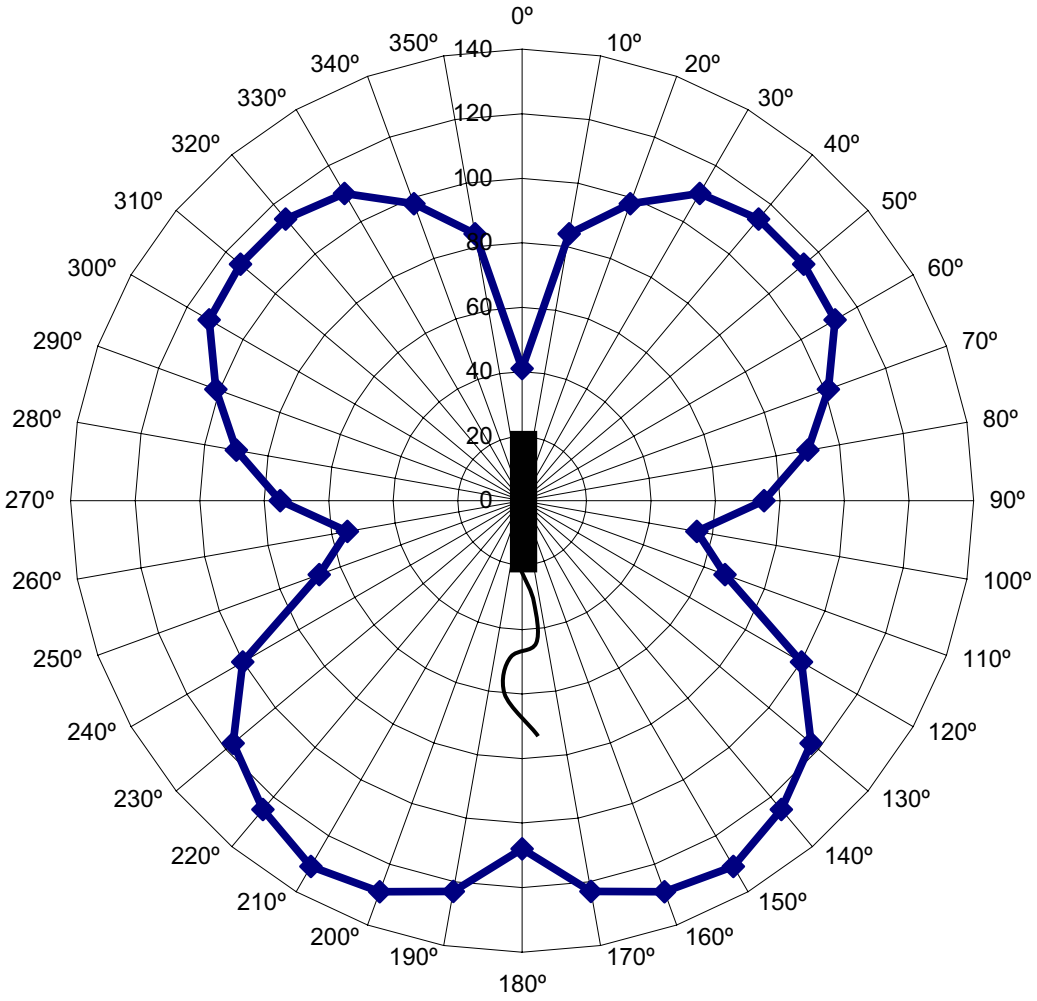

FIGURE 13 *Vertical Read Range*

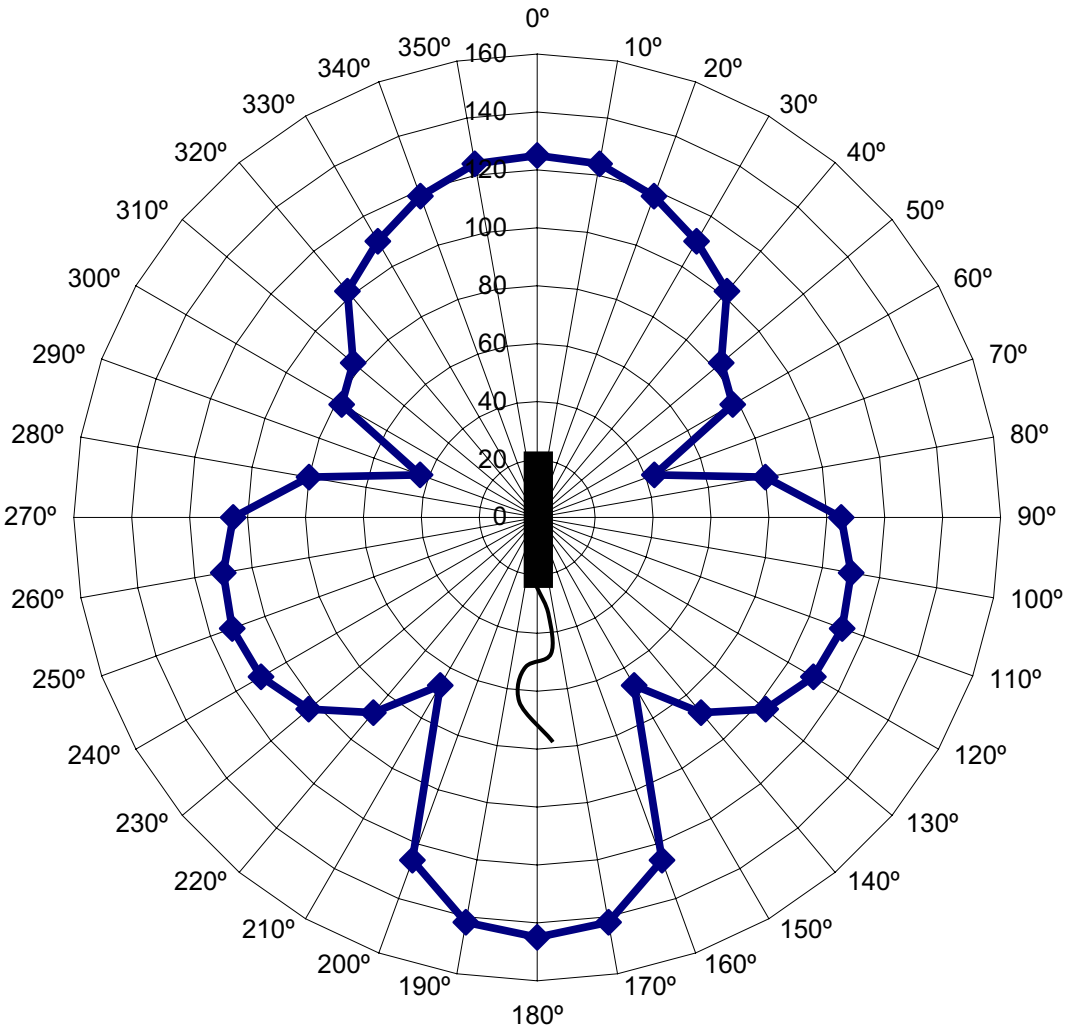

FIGURE 14 *Horizontal Read Range*