



**Installation and operating
Manual**

For
CAN Smart Antennas
Model 5100-SA and 5110-SA
Part Numbers here

Manual version 1.00

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Section 1 General information

1.1 Introduction

This Manual Provides information pertaining to the installation and operation of the model 51XX-SA under the following part numbers

Model 5100-SA

Part Number	Description
719-0013-14SA16	Hokey puck CAN 24V 16 characters M12 connector
719-0013-	Hokey puck CAN 24V 16 characters Pigtails

Model 5110-SA

Part Number	Description
719-0013-24-BAK	Yellow Threaded CAN 24V 16 characters M12 connector
719-0013-	Yellow Threaded CAN 24V 16 characters Pigtails

1.2 Description

The Model 51XX-SA series readers are a line of Smart Antennas (reader and antenna are combined in to a small package) they are intended for use with out line of 80X0 interfaces.

The Smart antennas operate both as a transmitter and receiver. They provide a low frequency electromagnetic field at 125 KHz to energize and activate an electronic transponder, or TAG. Once the tag it's energized it modulates its data back to the Smart Antenna. The reader detects and demodulates this data and relays it back to the Interface in digital form via CAN.

The Smart Antennas are easy to use and install. Their sturdy construction, industrial cabling options, and strong mounting make them ideal for rugged environments

1.3 Specifications

Protocol:	Controller Area Network (CAN)		
CAN Baud rate:	125K bps		
Processing speed:			
Data Storage:	1 reading		
Error Rate:	Less than 1 in 10 to the 14 th readings		
Connectors:	M12 Male A-coded	5 wire Pigtail	
Cabling distance:	500m – 1660ft		
Power requirements:	Min = 9V	Typ = 24V	Max = 24V
Temperature range:	Operating 0C to 70C		Non-Operating -20C to 125C
Dimensions:			
Weight:			

Section 2 Installation

2.1 Introduction

This section contains information for unpacking, inspecting, installing and configuring the device, including power and signal wiring as well as power supply ratings. Installation also includes matching and connecting the device to the host computer or terminal.

2.2 Unpacking and inspection

If the shipping carton is damaged or shows evidence of abusive handling, inspect the device for visible damage including dents, scratches, etc. If the unit appears damaged contact the carrier and RFID, Inc. Sales or customer service departments immediately. Keep the shipping and packaging materials for the carrier's inspection. RFID, Inc. will arrange for repair or replacement of the damaged unit without waiting for the claim settlement with the carrier.

2.3 Preparing for installation

Power and communication connections are made via the M12 Connector. The user must provide M12 terminated cables, Female to Male, drop down Tees, and termination resistors. All Smart antennas are shipped with address one, install only one for now. See the Issuing commands section 3.4 for more on smart antenna addressing.

Smart antennas are installed one at a time and reconfigured to the desired address from highest to lowest

2.4 Power requirements

The device must be powered from a DC source having the following characteristics:

	Min	Typical	Max	Unit
Supply voltage	9	24	24	V
Supply Current	125	150	200	mA

RFID Inc. can provide a power supply suitable for use with the Model XXXX.

2.5 Power connections

Power is provided to the smart antennas via their M12 network connection, the Physical layer is identical to that of a DeviceNet installation using thin media. A 24VDC power supply is placed on the network close to the center so that the distance in cable between it and the devices in both directions of the trunk are almost the same. Make sure the Power Supply's current rating is capable of handling all the devices on the network including the Interface. Use multiple supplies along the CAN trunk if necessary.

2.6 Communication protocol

The SmartAntennas communicate with the interface using CAN at 125K bps; the protocol is RFID, Inc.'s proprietary.

2.7 Communication cabling

M12 Pin out	1. Drain
	2. V+
	3. V-
	4. CAN High
	5. CAN Low

2.8 Communication connections

The SmartAntenna has built in EEPROM where it stores its assigned address; all Smart antennas are shipped with address #1. Using the addressing command on an interface, a new address can be stored in the antenna's EEPROM. Since all SmartAntennas are shipped with the same address they must be installed one at a time to assign their final address during set up.

2.9 Operating modes

SmartAntennas only have one mode of operation, Single Mode. The antenna field is always on and when a transponder with data that has not been read by the current antenna in the last 2 seconds enters the field the SmartAntenna will decode and send that data to the interface. That data will not be reported again unless it leaves the reading field for 2 seconds. New data is always reported immediately.

Although the SmartAntennas only operate in Single mode, they accept polling commands from the Interface allowing the user to check the antenna for transponder presence.

2.10 Completing installation

To complete the installation, of a SmartAntenna we must address it.

First connect the SmartAntenna to the network; the LED light will flash red, then issue the [3] command to the interface, the antenna address #1 should appear on your screen along with any other antennas you may have installed, the new antenna's LED is now solid Red.

Now issue the addressing command [2XX01] where XX is the intended address, finally issue the [3] command again to verify your settings.

WARNING: If an antenna with address number 01 is present on the network during installation of new antennas, configuration of the new antennas will fail and the current antenna at 01 may change address.

Section 3 Operation

3.1 Introduction

This section explains operation information for the device. It describes its theory of operation, timing, commands, operating modes, and responses.

3.2 Theory of operation

The SmartAntennas have 2 main functions

- a) Their First and most important function is to retrieve data from transponders
- b) Their secondary function is to write new data to the transponders

3.3 Data Protocol

The SmartAntennas are a means for the interface to communicate with the transponders, this transponders store 16 characters of data in ASCII format with some limitations.

1. Only the capital letters of the ASCII set are allowed, no lowercase
2. Symbols and numbers are permitted
3. No spaces are permitted.

See section 3.5.1 for more details

3.4 Issuing commands to the device

All commands must be issued in capitals. There are 7 commands by which the host can control the operation of the device. These commands are:

2NNOO	Assign Address
3	Scan for SmartAntennas
MAAXX	Set Write Mode
VAA	View Write Mode
TAA	Clear single mode buffer
IAA	Get SmartAntenna firmware version
WAADATA	Write Transponder

Assign Address - [2NNOO]

Format: 2 = command code, NN = New Address, OO = Current address

Valid Addresses: 01 to 32

Responses: OK, FAILED1, and FAILED2

Example command: [20801] Change antenna address from #01 to #08

Example Response 1: "OK"

Example Response 2: "FAILED1" This means target antenna is not present

Example Response 3: "FAILED2" This means destination address is in use

Antenna Scan - [3]

Format: 3 = command code

Response: <LF>Ant1 Ant2 Ant3 Antn... <CR>

The Interface will ignore any commands during the scan, when done <CR> is sent and new commands are accepted.

Example Response: 01 02 03 07 24 28

Set Write Mode - [MAAXX]

Format: M = command code, AA = Antenna Address, XX new write mode

Valid values: 00 08 10 18

Responses: OK

Example: [M0118] Set new write mode value of 18 to antenna #01

View Write Mode - [VAA]

Format: V = command code, AA = Antenna Address

Responses: AA VV where AA is antenna # and VV is write mode value

Example Response: 01 18

Clear single mode buffer - [TAA]

Format: T = command code, AA = Antenna Address

Responses: 'e' if no tag is present, transponder data if one is in reading range

Example: [T01]

Example Response 1: 01 0000000000000018 Data of transponder in range

Example Response 2: 01 e No transponder in range

Get firmware version - [IAA]

Format: I = command code, AA = Antenna Address

Responses: AA v.xx.xx Antenna firmware version

Example: [I01]

Example response: 01 v.1.01

Write Transponder - [WAADATA]

Format: W = command code, AA = Antenna Address, DATA = 1 to 16 characters

Response: PROGRAMMED

Example: [W01000000000000018] Write transponder

Example Response: PROGRAMMED

3.5 Device responses

3.5.1 Tag data

RFID Inc, tags can be programmed with 8, 16 and 32 characters, CAN SmartAntennas only use 16 characters format

A Tag will be report as <LF>AA DDDDDDDDDDDDDDDDD<CR> by the interface when a tag read is received from the smart antenna, where AA is the antenna address followed by space an 16 characters of data.

The interface is capable of interpreting and delivering this data as 4-byte integer ideal for use on most PLC memory maps. See the interface manual for more details.

Bellow is a table with the available character set for use on a 16 character transponder.

@	40	0	30	A	41	P	50
!	21	1	31	B	42	Q	51
“	22	2	32	C	43	R	52
#	23	3	33	D	44	S	53
\$	24	4	34	E	45	T	54
%	25	5	35	F	46	U	55
&	26	6	36	G	47	V	56
‘	27	7	37	G	48	W	57
(28	8	38	I	49	X	58
)	29	9	39	J	4A	Y	59
*	2A	:	3A	K	4B	Z	5A
+	2B	;	3B	L	4C	[5B
,	2C	<	3C	M	4D	\	5C
-	2D	=	3D	N	4E]	5D
.	2E	>	3E	O	4F	^	5E
/	2F	?	3F				

3.5.2 Error Messages

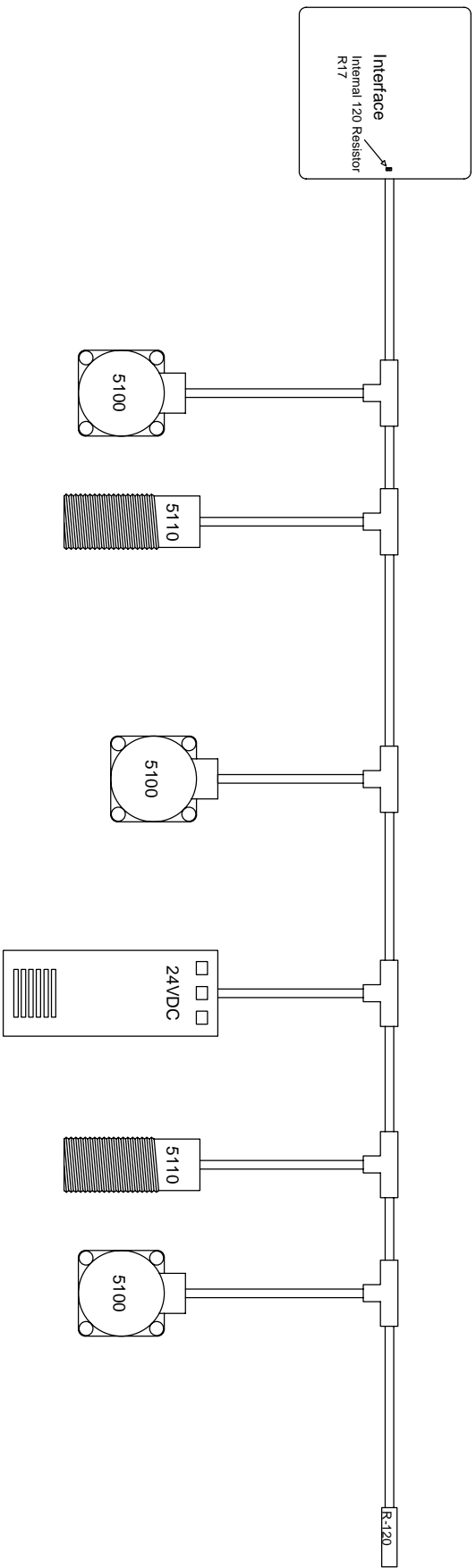
The communications between the user and CAN SmartAntennas are always done via an interface; see the interface manual for details.

3.6 Warranty

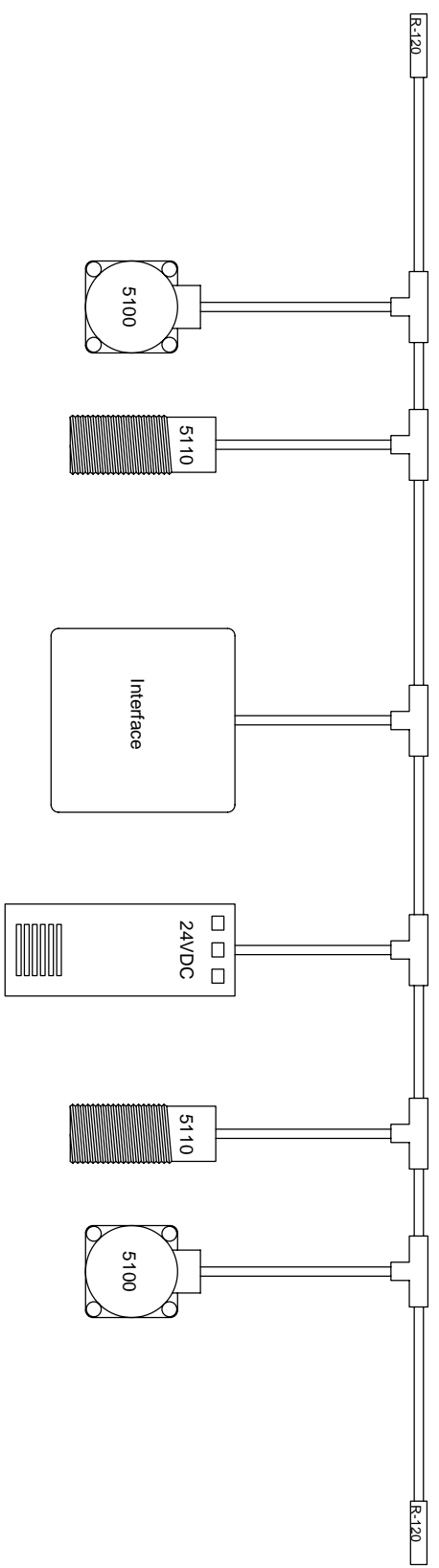
RFID, Inc. products are warranted against defects in materials and workmanship for (1) year from the date of shipment. RFID, Inc. shall, at its option, either repair or replace products that prove to be defective and are returned with freight prepaid to RFID, Inc.'s plant within the warranty period. The foregoing warranty shall not apply to defects resulting from abuse, misuse, accident, alteration, neglect or unauthorized repair or installation. RFID, Inc. shall have the right of final determination as to the existence and cause of the defect.

The warranty set forth above is exclusive and no other warranty, whether written or oral, is expressed or implemented. RFID, Inc. specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

The remedies provided herein are the buyer's sole and exclusive remedies. In no event shall RFID, Inc. be liable for direct, indirect, special, incidental or consequential damages, (including loss of profits) whether based on contract, tort, or any other legal theory.



Smart Antenna CAN Network where Interface has built in Terminating resistor



Smart Antenna CAN network where interface has no built in Terminating resistor