



MJO #: SN9B-003.1
FCC ID: C4PDS2805AD

OPERATION MANUAL

*** SEE SEPARATE ENCLOSURE FOR THE OPERATION MANUAL.**

The enclosed manual is for the Dual Mode Reader. As you will notice, page iv of this manual is the FCC WARNING about radio and television interference as per the requirement set forth in Part 15 of the FCC rules.

Dual Mode Reader DS2805AD

(Digital/Analog)

INSTALLATION and OPERATION

WSE

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P/N 6600032, Rev. A

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LIMITED WARRANTY

WSE warrants to the original user the equipment manufactured by WSE as described herein to be free from defects in material and workmanship for a period of one year from the date of purchase by such user or fifteen (15) months from the date of shipment from the factory, whichever is sooner (command key / magnetic stripe card warranties differ—see below *), provided:

- I WSE has been notified within such period by return of any alleged defective equipment, free and clear of any liens and encumbrances to WSE or its authorized dealer at the address specified, transportation prepaid; and
- II the equipment has not been abused, misused or improperly maintained and/or repaired during such period; and
- III such defect has not been caused by ordinary wear and tear; and
- IV such defect is not a result of voltage surges/brownouts, lightning, water damage/flooding, fire, explosion, earthquakes, tornadoes, acts of aggression/war, or similar phenomena; and
- V accessories used as integral to WSE systems have been approved by WSE (e.g., coaxial cables, batteries, etc.); and
- VI the equipment has been installed, the installation supervised or installation tested by an authorized WSE dealer.

WSE shall at its option, either repair or replace, free of charge, the equipment found, upon WSE's inspection to be so defective, or if agreed upon, refund the purchase price, less a reasonable allowance for depreciation, in exchange for the equipment.

WSE makes no other warranty, and all implied warranties including any warranty of merchantability or fitness for a particular purpose are limited to the duration of the expressed warranty as set forth above.

WSE's maximum liability hereunder is limited to the purchase price of the equipment. In no event shall WSE be liable for any consequential, indirect, incidental or special damages of any nature arising from the sale or use of the equipment.

Some states do not allow limitations on incidental or consequential damages or how long an implied warranty lasts, so the above limitations may not apply. This warranty gives specific legal rights; however, other rights which vary from state to state, may pertain.

* Analog command keys are warranted for 5 years; digital command key / magnetic stripe card warranties vary — see product literature.

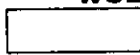
The information in this manual is believed to be accurate and reliable. However, WSE assumes no responsibility for any errors that may appear. Possession of this manual does not imply the granting of licenses to make or sell equipment or software constructed according to descriptions provided.

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

WARNING: This equipment has been tested and found to comply with the limits for the Class: **Low Power Transmitter below 30 MHz** in accordance with the specifications in Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference to radio communications.

If necessary, consult the dealer or an experienced radio/television technician for additional suggestions. The user may find helpful the following booklet, prepared by the Federal Communications Commission: *How to Identify and Resolve Radio/TV Interference Problems*.

This booklet is available from the US Government Printing Office, Washington DC 20402, by ordering stock number: 004-000-00345-4.

FCC ID: C4PDS2805AD This device complies with Part 15, Subpart C of the FCC rules. Operation is subject to the following two conditions: 1) This device may not cause harmful interference, and 2) This device must accept any interference received, including interference that may cause undesired operation.	 Made in USA	 Listed 5627	MODEL DS2805AD UL 294 Access Control Accessory See Installation Instructions	WSE  Outdoor Use
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This manual, Part # 6600032, is for the newly configured Dual Mode Reader (Model DS2805AD), which has the capabilities of both a digital and an analog reader.

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INTRODUCTION

The DS2805AD Reader reads digital and analog command keys at ranges of up to 2 inches. The unit is bidirectional, that is, a command key can be read from either side of the sensor. The DS2805AD has both an analog sensor and a digital reader built into one enclosure and is used only with the SE 818SC ACU. Connection between the DS2805AD Reader and the ACU is over WSE proprietary S-Net. Electrical interface to the digital and the analog portions of this reader are separately defined below in the Basic Operation sections.

1. Read this manual carefully before attempting to install a DS2805AD Reader. The warranty is void if damage occurs to the unit as a result of incorrect wiring.
2. The information in this manual is not intended to conflict with building codes, electrical codes, fire codes, or safety codes required for any given installation.

SPECIFICATIONS

Table 1-1: DS2805AD Specifications

Parameter	DS2805AD	DS2805
Supply Voltage	+16 to +28 Volts DC	N/A
Supply Current	50 to 80 mA	N/A
Transmit Frequency	140kHz	2-27 MHz
Receive Frequency	70kHz	Selected Resonant Frequencies
Operating Temperature	-31°F to 150°F or -35°C to 66°C	
Operating Humidity	10% to 100% (condensing)	
Weight	6.8oz. Or 193gm	
Dimensions	7.5" wide x 7.5" high x 1.06" thick or 19.05 cm. Wide x 19.05 cm. High x 2.69 cm. Thick	
Operating Range	2" or 5 cm.	N/A
Power Supply	2" or 5 cm.	N/A
Power Supply	2" or 5 cm.	N/A
Antenna Connector	*Sensor signal is generated by 818SC	2" or 5 cm.

BASIC DIGITAL OPERATION

DS2805AD Readers emit a low-level 140-kHz field. When a digital command key card is placed in this field, a digital chip embedded in the key uses the field's energy to become activated. Once activated, the key responds by broadcasting a 70-kHz signal, modulated with a key-specific code sequence, back to the reader. The reader receives this signal and converts it to a digital code which is then sent to the ACU. The ACU identifies the digital command key according to its code and makes an access granted / denied decision.

BASIC ANALOG OPERATION

The Alto 818SC ACU generates low level RF in the range of 2 to 27 MHz. This frequency range is swept from high to low and applied to the reader ports. When an analog proximity sensor is connected to one of the sensor ports via a coax cable, the sensor will emit a low power RF field from its surface which is concentrated in region the distance of which depends upon the read range of the reader.

When a command key is placed in the region of this RF field, L/C tank circuits in the key will modulate the RF field emitted by the reader. The precise frequency of this modulated signal is a function of the tank circuits in each key. The key reader circuitry in the Alto 818 has the ability to detect this key-specific frequency and thereby to discriminate between key codes. The ACU then makes an access decision based on database parameters for each door and key code.

ENCLOSURE DIMENSIONS

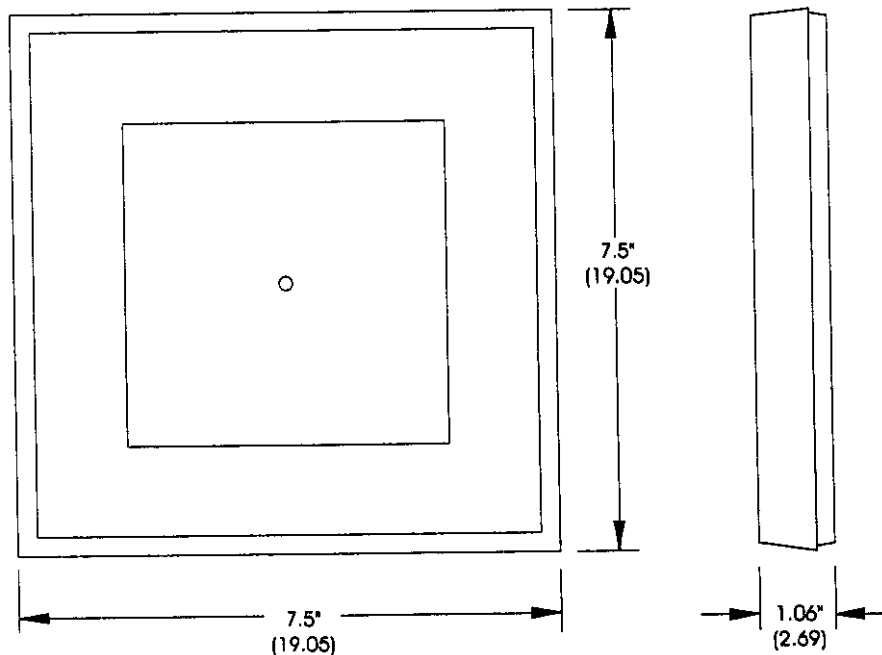


Figure 1-1. Dimensions of the DS2805AD Enclosure

DIGITAL INTERFACE S-NET CONNECTIONS

S-Net is a serial network for communication between the ACU and node devices. Typically, the cable used is two twisted pairs with an overall shield; one pair is for data, the other pair is for DC power. Terminate the S-Net with 120-ohm, ¼ watt resistors as shown in Figure 1-2. The maximum S-Net length is 4000 feet (1200 meters).

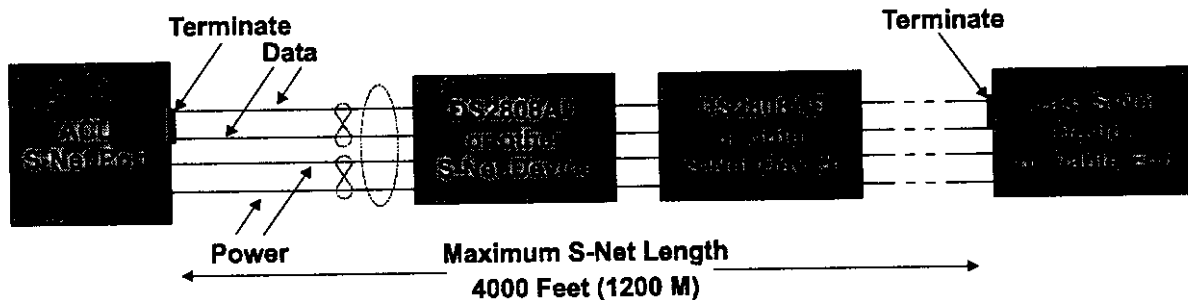


Figure 1-2: S-Net Wiring

S-Net cable should be installed as a single cable; splices should be soldered or secured with crimp lugs. Drop-lines to a S-Net devices should not exceed 6 feet (1.85 meters) in length (Figure 1-3). The DR 4305 NexStar RS-485 Multiplexer may be used to simplify wiring and extend a network.

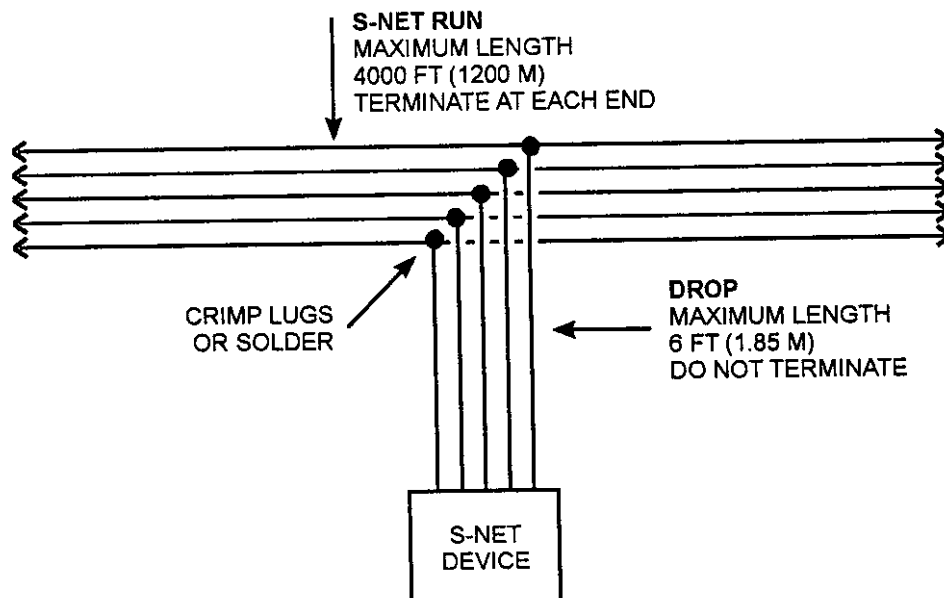


Figure 1-3: Drop Wiring

PHYSICAL DESCRIPTION

Figure 1-2 indicates the location of certain components in the DS2805AD with the enclosure opened. These components are described below.

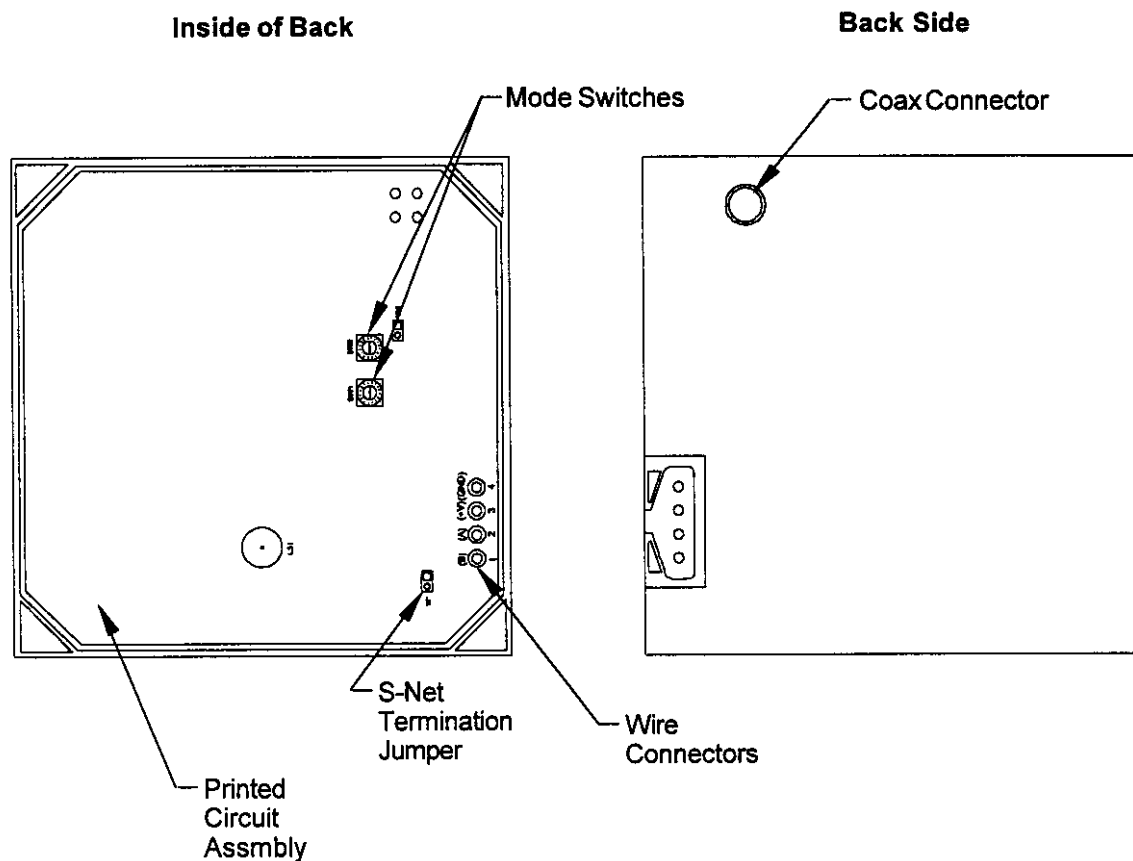


Figure 1-4: DS2805AD Printed Circuit Assembly

LED (S-NET) OPERATION

The DS2805AD has a single three color LED that can be controlled by the ACU. When the DS2805AD is online, the LED is red during the ready state. The TUNE command is used to specify LED and beeper behavior when a valid key is presented.

If power is applied to the unit when not connected to an ACU, or if improperly configured at the ACU, the LED will act as follows: Each minute, first the unit will beep and flash amber the number of times reflecting the address, (example: address = 5, there will be 5 beeps and 5 amber flashes); then, it will flash red for four seconds, change to steady amber for four seconds and finally turn off for 52 seconds.

When a Credential is presented, the sensor will beep four times, and the LED will flash amber until the key is moved out of range. The flashing red, steady amber, off cycle will all then resume and repeat indefinitely while power is supplied.

JUMPER W1, 120-OHM TERMINATION

This jumper is only used in S-Net mode when the DS2805AD is the last device on the cable, (for 120 ohms of resistance between Data A and Data B).

INTERFACE CABLE

The type of cable used for the S-Net will depend on the total length and the number of devices connected. Separate twisted-pair cables should be used for data and power when the S-Net exceeds 500 feet (152 meters). Table 1-4 lists WSE recommended cables.

Termination label	Function	Comments
GN2	DC Return	N/A
+V	+16 to +28 VDC	N/A
A	S-Net A	For use with WSE access control panels
B	70kHz	For use with WSE access control panels
	Signal Shield	Tie to DC Return

* Terminate shield at ACU end

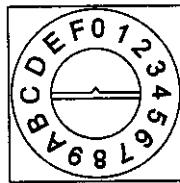
Table 1-2: Internal Interface Cable

DIGITAL / ANALOG READER ADDRESS

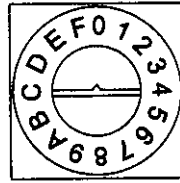
The Digital / Analog Reader serial address is set by hex switches, SW1 and SW2. Each Reader must have a unique address.

Factory default settings: SW2 = 2 SW2 should remain 0.

SW1 = 1 SW1 may be set to an address between 1 and 8 (F).



SW1



SW2

Figure 1-5: Address Switches

SW 2	SW 1	Assignments
0	1	Reader # 1
0	2	Reader # 2
0	3	Reader # 3
0	4	Reader # 4
0	5	Reader # 5
0	6	Reader # 6
0	7	Reader # 7
0	8	Reader # 8
F	E	Demo Mode
F	F	Test Mode

Table 1-3: Valid Switch Settings for Switches 1 and 2

RECOMMENDED S-NET CABLE

The type of cable used for the S-Net will depend on the total length and the number of devices connected. Separate twisted-pair cables should be used for data and power when the S-Net exceeds 500 feet (152 meters), (unless using Southwest SW 179 / Gray). Table 1-4 lists WSE recommended cables.

	Type	Description	Gauge
Data and Power S-Net Length < 4000 ft	SW 179 / Gray *	2 Conductor: Data 2 Conductor: Power	22 AWG 16 AWG
Data and Power S-Net Length < 500 ft	Belden 9552 Belden 1069	2-Pair	18 AWG 16 AWG
Data Only S-Net Length > 500 ft	Belden 9841	1-Pair	24 AWG
Power Only S-Net Length > 500 ft	Belden 9341 Belden 9342 Belden 9343	2-Conductor	18 AWG 16 AWG 14 AWG

* Southwest Wire & Cable

Table 1-4: Recommended S-Net Cable

MOUNTING LOCATION

Use care when choosing the installation site to avoid possible external sources of RF interference (interference can cause reduced performance or possible damage to the unit). Do not locate the unit near motors, pumps, generators, DC-AC converters, AC switching relays, light dimmers, etc. Do not locate the unit within 10 feet (3 m) of a computer terminal. If you suspect the presence of RF interference, follow the procedures in *Troubleshooting* in this section.

Metal in the vicinity of the device can reduce the read range. In general, as the amount of metal in proximity to the device increases, the reliable maximum read range decreases.

Use the method appropriate to the mounting surface material; if required, use sealing compound to maintain water-resistance.

INSTALLATION

Caution:

The board within the DS2805AD can be damaged by electrostatic discharge; handle by the edges only.

1. Open the DS2805AD enclosure, separating the cover from the PCA and enclosure.
2. Use template to locate the 4 mounting holes on the wall.
3. Connect the S-NET cable to the terminals on the rear of the enclosure..
4. Drill holes in corners of enclosure.
5. Mount the enclosure to the wall using #6 screws or equivalent.
6. Verify that SW2 is set to 0 and set SW1 to the desired address. If a VIP is used in conjunction with the digital reader, they will both be set to the same address.
7. Push the excess cable into the wall.
8. Install the enclosure cover.

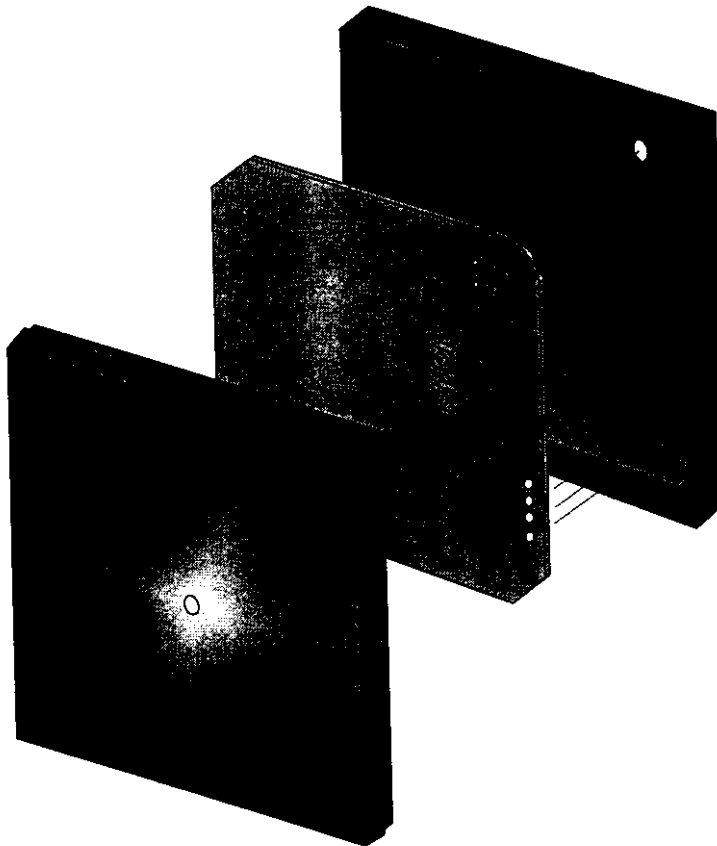


Figure 1-6: DS2805AD Installation

ENABLING — 818SC

The DS2805AD is configured for use with the SE818SC by the DOOR command. Entries from a terminal are described below. See Section 3 of the DR4203, PN#660012 for configuration from a host computer.

DOOR COMMAND

1. At the command prompt, type **DOOR** and press ENTER. The screen displays:

DOOR (1-8)? 1

2. Type the desired door number and press ENTER. The screen displays:

GO TO (1-19)? 8

3. Type **8** and press ENTER. The screen displays:

8. SELECT READER TYPE
8A. SENSOR ENABLE (Y/N): N?

4. Type **N** and press ENTER. The screen displays:

8C. SNET READER TYPE (NONE/DKR/SCR): DKR?

5. Type **DKR** and press ENTER. The screen displays:

8D. SNET READER FAIL REPORT (0-32): 1?

6. Type the report number you would like to be associated with a failure of the DKR and press ENTER. The screen displays:

8E. DIGITAL KEY READER RANGE (0-255): 254?

Select a value to enter (253₁₀ or 254₁₀ or 255₁₀) according to the discussion in the **Read Range** subsection of section **DR4203 Parameters**, above and press ENTER.

7. Type selection and press ENTER.

Repeat the procedure for other doors which will use a DR 4203.

TUNE COMMAND

A sample of the screen prompts for the TUNE command are shown in Figure 2-4. See the description of TUNE parameters and recommended settings in Section 2.1. Set field 3, **NUMBER OF VERIFICATION READS**, to 0 for fastest card reading, (or 1 for a noisy environment).

YOUR COMMAND?: TUNE	
DOOR (1-8)?	
1. DIGITAL KEY READER RANGE (0-255): 254 ?	
2. SEND KEY TO ACU ONCE (Y/N): Y ?	
3. NUMBER OF VERIFICATION READS (0-255): 0 ? 0	Set to 0 or 1
4. VERIFICATION TIME WINDOW (0000-FFFF): 20 ?	Set to 20
5. BEEPER BEHAVIOR WITH A VALID KEY	
ON DURATION (0000-FFFF): 0010 ?	
OFF DURATION (0000-FFFF): 0010?	
DURATION OF ON/OFF DURATION (0000-FFFF): 0020 ?	
6. RED LED BEHAVIOR WITH A VALID KEY	
ON DURATION (0000-FFFF): 0 ?	
OFF DURATION (0000-FFFF): 0 ?	
DURATION OF ON/OFF DURATION (0000-FFFF):0?	
7. GREEN LED BEHAVIOR WITH A VALID KEY	
ON DURATION (0000-FFFF): 0 ?	
OFF DURATION (0000-FFFF): 0 ?	
DURATION OF ON/OFF DURATION (0000-FFFF):0?	

Figure 1-7: SE 818SC TUNE Prompts

TROUBLESHOOTING

DigiReaders can be affected by RF interference (see *Mounting Location* in this section) and, if present, the device may respond in one of two ways:

1. The unit may beep and the amber LED illuminates as if a command key had been presented.
2. Key reads may be inaccurate or slow.

If one of the above occurs, reposition the DigiReader to minimize the interference using the following procedure:

1. Set the SW1 and SW2 hex address switches to **FF** (test mode). Connect only the wires which provide power. Hold the DigiReader against the installation surface. Without presenting a command card to the reader, listen for beeps indicating RF interference (make sure you do not have a command card in your pocket or elsewhere where it might be detected). The greater the number of beeps, the noisier the reader's environment.
2. Once a quiet location has been identified, present a command key to the unit. Verify that the command key can be read from the expected distance. The DigiReader may again be moved to optimize the read-range. If trouble persists, verify S-Net wiring and grounding.
3. Repeat steps 1 and 2 as necessary to identify the optimum installation location.
4. When the optimum installation location has been identified, set SW1 to **0** and SW2 to the desired address. Make remaining wire connections to the S-Net. Present a command key to verify read range and speed.

ACU connection is nominally 24 Vdc. Power loss due to cable attenuation is a function of gauge and cable length. Plan the installation so that cable loss does not exceed 8 volts.

MOUNTING TEMPLATE

TO BE ADDED....

OFFSITE SUPPORT EQUIPMENT

Equipment Type: ACU

Model Number: Alto 818SX

Serial Number: 818SX-77501

FCC ID Number: C4P818SX-814SX

Manufacturer: WSE

Power Line Cord Type: Unshielded

I/O PORT TYPE

Sensor (×8)

TERMINATED TO

1-EUT/7-Unterminated

Note: This device was used to load the sensor port of the EUT.

OFFSITE SUPPORT EQUIPMENT

Equipment Type: DC Power Supply

Model Number: 3018S

Serial Number: None

FCC ID Number: None

Manufacturer: Schlage Electronics

Power Line Cord Type: Unshielded

I/O PORT TYPE

Output

TERMINATED TO

ACU

Note: This device was used to supply power to the ACU.

OFFSITE SUPPORT EQUIPMENT

Equipment Type: DC Power Supply

Model Number: 902-P1

Serial Number: None

FCC ID Number: None

Manufacturer: WSE

Power Line Cord Type: Unshielded

I/O PORT TYPE

Output

TERMINATED TO

ACU

Note: This device was used to supply power to the ACU.

PRODUCT CABLING INFORMATION

Equipment Under Test (EUT): Dual Mode Reader

Cable: Coax	Shielded
Used	From: Coax
	Port On: EUT
	To: Sensor 1
	Port On: ACU
Connector Type: F Connector	Length: 50 ft (15.3 meters)
Cable used during test was unshielded.	

Cable: RS485	Shielded
Used	From: Terminal Block
	Port On: EUT
	To: Terminal Block
	Port On: ACU
Connector Type: Terminal Block	Length: 50 ft (15.3 meters)
Cable used during test was unbundled.	

SUMMARY**Company:** WSE**Equipment Under Test:** Dual Mode Reader **Model Number:** DS2805AD**Test Specification:** CFR 47, Part 15.209, Subpart C**Test Type:** Line Conducted**Location:** Lab #1**Tested By:** Dominic Griego**Assisted By:** Jose Aguirre

EUT was scanned in the following setup(s): Mode: Two: (1) Analog 3 MHz to 30 MHz
(2) Digital 70 kHz to 140 kHz **Configuration:** Two: (1) Coaxial (2) SNET and Coaxial
Note: Both configurations and modes were scanned simultaneously. For Line Conducted, the
(1) Schlage Electronics Power Supply, Model #3018S, and (2) Security Electronics Power
Supply, Model #902-P1, were tested separately.

The highest emissions recorded were in test setup #1 above.

Offsite Support Equipment: ACU (Access Control Unit), DC Power Supply (×2)

EUT Power: 120 VAC/60 Hz**Power Cord:** Unshielded**Modification(s) made to EUT:** None**Test Results:** Passed

(The chart below shows the six highest readings taken from the final data)

FREQ MHz	CORR'D dBµV	SITE CF	LIMIT		MARGIN		LINE
			QP	AVG	QP	AVG	
11.690	31.5 PK	6.0	48.0		-16.5		L1
22.100	35.2 QP	6.0	48.0		-12.8		L1
28.160	36.0 PK	6.0	48.0		-12.0		L1
11.600	31.3 PK	6.0	48.0		-16.7		L2
22.100	34.8 QP	6.0	48.0		-13.2		L2
28.150	34.9 PK	6.0	48.0		-13.1		L2

L1 = Line One (hot side)/L2 = Line Two (neutral side)

SUMMARY

Company: WSE

Equipment Under Test: Dual Mode Reader **Model Number:** DS2805AD

Test Specification: CFR 47, Part 15.209, Subpart C

Test Type: Radiated

Location: 3 Meter Test Site #4

Tested By: Dominic Griego

Assisted By: Richard Garcia

EUT was scanned in the following setup(s): Mode: Two: (1) Analog 3 MHz to 30 MHz
(2) Digital 70 kHz to 140 kHz Configuration: Two: (1) Coaxial (2) SNET and Coaxial
Note: Both configurations and modes were scanned simultaneously.

The highest emissions recorded were in test setup #1 above.

Offsite Support Equipment: ACU (Access Control Unit), DC Power Supply (×2)

EUT Power: 120 VAC/60 Hz

Power Cord: Unshielded

Modification(s) made to EUT: None

Test Results: Passed

(The chart below shows the six highest readings taken from the final data)

FREQ MHz	CORR'D dBμV	SITE CF	LIMIT		MARGIN		NOTE
			QP	AVG	QP	AVG	
3.01	43.0 PK	20.3	49.5		-6.5		Rod/Antenna
6.01	42.8 PK	20.3	49.5		-6.7		Rod/Antenna
9.00	44.4 PK	20.3	49.5		-5.1		Rod/Antenna
66.36	34.7 QP	+8.9	40.0		-5.3		Vertical
77.41	35.6 QP	+7.1	40.0		-4.4		Vertical
420.27	39.9 PK	+18.9	46.0		-6.1		Vertical

APPENDIX A

PHOTOGRAPHS