APPLIED WIRELESS ID

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Technical Reference

Proximity Readers

Preventing Reset or Amber LED

After a proximity reader reads a credential (encoded card, keytag or wafer), the reader's LED normally returns to the standby-red color, and the reader is ready for the next credential that is presented to it. Unusual conditions outside the reader may cause the reader to show an amber LED after a credential is read. The lists below suggest ways to correct these conditions.

There are four conditions that may cause a proximity reader to show a recurring amber LED color:

1. Power interruption: (a) Power that is removed from the reader and then restored resets the reader. Even a momentary flicker in the DC power that feeds the reader may cause "reset".
   (b) If DC voltage to the proximity reader dips below the design minimum of 4.5 volts, the reader may reset even though the LED remains on (amber color). (See Note a.)
2. Noise induction in the reader's cable: If the cable that connects the reader to the controller panel is not correctly shielded or grounded, noise that feeds back to the reader may cause "reset" in the reader.
3. Reader mounting on a metal surface that is not earth-grounded: When the reader is fastened to a metal surface (plate, cabinet, door frame), or even *near* metal (electric utility box, wall stud, building frame), that is not correctly earth-grounded, the reader may reset. All metal near the reader must be earth-grounded. Also both the AC electricity that feeds power to the system and the reader's cable shield must be earth-grounded. This assures safety for people at the site, and good performance for the system.
4. Wiring problem in the SR-2400 reader: The orange, blue and violet wires of the SR-2400 reader must be taped off separately when the reader is installed, so that these wires do not touch each other or anything else. If there is a short-circuit between the orange and blue wires, or between the violet and blue wires, the LED will show a continuing amber color. The reader reads cards correctly while the LED is amber. But eventually the reader may fail because of this short-circuit.

1. Power Interruption

Check	Settings / Observations / Tests	Notes
Unsteady DC or AC power:	*Test*: Substitute a back-up battery (12 volts, 7.5 ampere-hours, fully charged) clipped directly to the reader's black and red wires. (Note c.)	Disconnect the reader's red and black wires from the cable to the system's DC power supply. This isolates the reader's power.
" "	For long-term improvement, use a DC power supply with battery back-up on all readers.	
" "	Heavy electrical equipment near the reader may cause AC voltage variations. *Test 1*: Turn off the electrical devices. *Test 2*: Move the reader to a remote site temporarily. *Test 3*: Use a battery to power the reader temporarily.	If the tests remove the problem, use separate AC power sources for the reader's DC power supply and for the other equipment.
Separate power supplies for reader and for door lock:	Power the door lock and other peripherals from a *separate* DC power supply, with no tie between the power supplies except ground or common.	Voltage surges or spikes caused by the door lock may affect the reader.
Voltage at the reader:	Nominal voltage = between 5 and 12 volts DC. Tolerated voltage = between 4.5 and 13.2 volts DC.	Measure voltage at the reader's black and red wires.
" "	For MR-1824 and MR-1824MC, limit voltage to **12.0** volts *maximum* for best read range.	RF power of MR-1824 readers actually drops if voltage at reader exceeds 12.0 volts.

Check	Settings / Observations / Tests	Notes
No-load voltage at power source (negative and positive terminals):	*Test*: Disconnect power cable at the power supply. No-load voltage at power supply should be about 0.2 to 0.4 volt more than voltage at the reader's wires.	If voltage drop is more than several tenths of a volt, replace power supply, or power cable to reader, or reader if it tests bad.
" "	" " " "	For test, substitute a 12 volt battery clipped to the reader's black and red wires.
Voltage at reader's wires when reading a card repeatedly:	Voltage should remain constant whether reader is processing code or sitting idle.	Use any AWID proximity credential (card, keytag or wafer) for tests.
Excess current rating for reader's DC power supply:	Reader's DC power supply should be rated linear and regulated, with current capacity at least 50% more than the reader's current load.	In California, use a *switching*, regulated DC power supply with current rating at least double the reader's current load. See Note a.
Cable specification correct for current load:	For the MR-1824 reader family, power cable should be 18 gauge. For all other AWID proximity readers, 22 gauge is OK for both power and data..	For the MR-1824 reader family, power and data may be split between 2 cables – 18 gauge for power, and 22 gauge for data.

2. Noise Induction

Check	Settings / Observations / Tests	Notes
Separate power supplies for reader and for door lock:	Power the door lock and other peripheral devices from a *separate* DC power supply, with no tie between the power supplies except ground or common. *Test*: Substitute a back-up battery in place of the reader's power supply.	If power supplies were shared, electrical noise or voltage spikes from the door lock or other device could feed through cables to the reader.
Shielded cables:	Use separate shielded cables for the reader and for other devices like a door lock.	Cable shields *must* be tied together and earth-grounded. Tie all shields together.
Grounded cables:	Connect the shields of all cables to true earth-ground – *not* to the DC electrical ground on the controller. Ground the cable shield at the panel-end of the cable.	The reader's drain wire (bare silver wire) also *must* be earth-grounded, by connecting the drain wire to the cable's shield.
Physically separated cables:	Put space between the cables for the reader and all other peripheral devices, especially the door strike.	If possible, run the door lock's cable in a separate metal conduit. In a plenum cable tray, spread these cables far apart.
Arc-type lighting (including fluorescent):	Keep proximity readers away from sodium-vapor and mercury-vapor lighting. *Test*: Turn off lights, or move reader to a remote location.	Even the ballasts in fluorescent fixtures can generate noise that interferes with RF-type readers. If so, ground or shield the ballast.

3. Reader Mounting

Check	Settings / Observations / Tests	Notes
Reader location near a "noise" generator:	Inspect the reader installation area for sources of electrical noise.	Read AWID's Installation Sheet for cable specifications, shielding and grounding.
Surface for mounting reader – metal or non-metal:	Reader may be fastened to any surface. If metal, surface *must* be earth-grounded (same as reader cable's shield). *Test*: Pull reader away from metal surface by several inches. If reader then works OK, check earth-grounding of surface and cable.	On a large metal surface, use the metal-compensated MR-1824*MC*. (All other AWID proximity reader models are metal-compensated.)

4. Wiring Problem in SR-2400 Reader

Check	Settings / Observations / Tests	Notes
Recurring amber LED color when reader is initialized and reading cards:	Orange and blue wires, or violet and blue wires, are connected together in error.	Orange, blue and violet wires must be separated, insulated from each other and from ground and other wires.
" "	Orange, blue and violet wires have developed a short-circuit to each other.	Check insulation of these 3 unused wires. If wires were cut, probe the remaining wires to prevent wire strands touching each other.

NOTES:

(a) *"Reset"* refers to the normal self-diagnostic condition of all AWID proximity readers when power to a reader is removed and then restored, or when an event outside a reader produces this condition in the reader.

- When "reset" occurs, there is nothing wrong with the reader. It can continue to read credentials normally.
- The amber LED during "reset" tells the access control system's administrator that a special condition has occurred. The administrator can then check the entire system to be sure that no other part of the system has been affected by the condition.
- The next cardholder who presents a valid credential to this reader will do two things in one "swipe" of the credential – (1) re-initialize the reader to standby mode, and then (2) read that credential's code.
- There may be no need for the system's administrator to call for repair service. The condition that causes "reset" is usually random and rare.
- When "reset" occurs, the users may be surprised to see the amber LED instead of the usual standby-red color. If service is requested, the technician will find the correction in the check lists (above).

(b) A *switching*-type DC power supply may interfere with any proximity reader by generating radio-frequency voltage pulses. For the MR-1824 reader family, use a *linear*-type regulated DC power supply. With a switching power supply, select a current rating 2 or 3 times the reader's peak load, and locate the power supply at least 8 feet from the reader. Both the length of power cable and the straight-line distance between reader and switching-type power supply should be more than 8 feet.

(c) When using a battery for DC power testing, a small 9 volt battery is a simple way to power all AWID readers except the MR-1824 family. For the MR-1824 readers, use a 12 volt back-up battery.

(d) References: Product sheets and Installation Sheets for the reader models.
Technical Reference "Basic Tests".