

Technical Reference

Long-Range Readers – Assuring Good Data Flow to System

Change History

Version	Date	Author	Comments
1.0	22 July 2009	L. Hickcox	First release.

AWID's long-range readers are interfaced to the host system using either Wiegand or RS-232 protocol. Usually the readers' data are fully compatible with the system's requirements and ready for use. Occasionally the system requires attention to special conditions. We describe these conditions in the sections below. We suggest an electric relay, a downloadable AWID program, the system's applications software, or a check of good installation practices to ensure perfect data processing in the system. These techniques apply to both LR-2000 and LR-911 readers.

A. To Prevent Data Repetition – Transmit One Code into the System's Data Register for Each Vehicle

The long-range reader's default repetition rate is about 3 reads per second. While a vehicle moves past a reader, the code of its tag may be transmitted 3 times or more before the vehicle moves the tag out of the reader's RF field. If the system does not tolerate repeated transmission of the same code, or if the reports show many repeated events, the repeats can be reduced or eliminated.

Test: Force the reader to transmit a single event to the system, by touching the yellow wire to the black wire long enough for 1 read. Or flash a hand-held tag into the reader's field quickly enough to generate a single read. Observe a single read for each code.

Corrections: 1. Program the system to reject repeated codes within a preset time period (if this feature is available). This may be incorporated in the system's Anti-Passback feature, either as timed APB or logical APB. Or –

2. Wire the reader's yellow wire (the arming circuit control line) to a timed relay that is triggered by the panel's gate motor control contacts. To disable the reader's RF field after the first valid code input, open the timed relay's contacts so that the yellow wire is disconnected from the reader's black wire long enough for the vehicle to move its tag out of the reader's reading zone. The timed relay's contact then reconnects yellow to black, and the reader is re-armed. Or –

3. Change the reader's repetition rate from the default 3 reads per second, to 1 read every 1 second or 3 seconds or 5 seconds or 10 seconds or 15 seconds or 20 seconds. The slower rate gives the vehicle time to move its tag out of the reader's field before the reader transmits its next code to the system. (See Note 1.)

B. To Prevent Input Blocking from Data Boxcar – Slow Down Read Repetition Rate

If the host system's data processing circuits are not able to process one code input before the next code input arrives from the reader, "data boxcar" may occur. "Data boxcar" happens when the system's input data register adds the second string of bits at the end of the first string, like boxcars in a train. The result is a change in the number of bits that the system counts. The new count doesn't match the programmed code format, so the system rejects this input.

Test: Force the reader to transmit a single event to the system, by touching the yellow wire to the black wire long enough for 1 read. Or flash a hand-held tag into the reader's field quickly enough to generate a single read. Observe a valid read for each event.

Correction: Change the reader's repetition rate from default 3 reads per second, to 1 read every 1 second or 3 seconds or 5 seconds or 10 seconds or 15 seconds or 20 seconds. The slower rate gives the vehicle time to move its tag out of the reader's field before the reader transmits its next code to the system. (See Note 1.)

C. To Prevent Data Corruption – Maintain Clean Transmitted Data

A generator of electrical noise near the reader, or near the data cable to the system, or near the system's panel may induce pulses in the cable. Another source of data corruption is cross-talk between the Wiegand data lines if they share the same twisted-pair in the cable. In either case random pulses may be inserted in the data stream from the reader to the system. These random pulses change the number of bits in the transmission, and cause the data to be in error. Wrong reads will typically have different codes for each event.

Test: Move the reader to the panel; disconnect the cable from the reader input port, and wire the reader directly to that port. Or use a dual-trace oscilloscope to inspect the Wiegand data lines; the total number of pulses should equal the bits in the tags' data format. Or remove power from all neighboring devices that can generate RF or electrical noise, including fluorescent lights. Observe accurate reads for each event.

Corrections: 1. Study AWID's specifications for the cables that connect the reader to the power supply and the panel. Please note the need for overall-shielded cables. This is important. Also –

2. Study the wiring instructions. This is important. The wiring is different from the typical proximity reader's. Also –

3. The reader's drain (bare silver) wire *must* be connected to the shield of the power and data cable(s). But the cable shield *must not* be grounded anywhere – not to the panel, nor to electrical ground, nor to earth-ground. It must float. Also –

4. Run the cable for door-lock or gate-motor control through a separate shielded and grounded cable – never through the same cable as the reader's power or data. If possible, locate the lock or gate cable away from the reader cable, or in a different conduit.

D. To Prevent Data Collision – Have Just One Tag in the Reader's Field

If more than one tag is present in the reader's effective RF field at any time, the tags may transmit their codes to the reader at the same time, that is, with their data streams overlapping. Or, if two readers feed code data into the same reader port at the same time, the bits intermingle to create bad data. In either case the system will reject this input because the number of bits does not match the programmed code format, or because the combined code does not match the valid codes that were programmed into the system earlier.

Test: Force the reader to transmit a single event to the system, by touching the yellow wire to the black wire long enough for 1 read. Or flash a hand-held tag into the reader's field quickly enough to generate a single read. Observe a separate read for each event.

Corrections: 1. Always allow just a single tag to be present in the reader's field at any time. (Note: If the two tags are read with sufficient time between the reads so that the reader sees each tag's data separately, the reader will transmit the two codes to the host system separately, where the data will be processed as two inputs.) (See Note 2.) Or –

2. Connect only one reader to each reader input port on the panel. Do not connect readers in parallel on the same data terminals.

E. To Prevent Field Overlap or Tag Cross-Talk – Reduce the Reader's RF Power Level

1. "Field Overlap" refers to the interaction of neighboring readers, affecting read range. Download Technical Reference "LR-2000 Reader Application – Preventing RF Field Overlap".

2. "Tag Cross-Talk" refers to a tag on a vehicle in one lane that is read by a reader in a neighboring lane. Download "Technical Reference "LR-2000 Reader Application – Preventing Cross-Lane Tag Reading".

Test: 1. Remove power from neighboring readers. Observe return of normal read range.

2. Shield the tag in the neighboring lane, or aim the reader away from the neighboring lane. Observe absence of unintended reads.

Correction: For either field overlap or tag cross-talk, use AWID's program to reduce the reader's power level. (See Note 1.)

Notes

1. To download AWID's program:

- Connect a PC to the reader using the RS-232 adapter cable in the LR-2000KIT or LR-911KIT Installation Kit.
- From www.awid.com/support, click on the link for "FTP website", log on the site, click on "Access Control" > "Downloads" > LR.
- Get the LR program. Select "Save" or "Run".
- For Sections A and B: In the program, select one of the slower repetition rates, and save this selection.
- For Section E: In the program, reduce the reader's RF power level enough to eliminate false reads, but not so much as to reduce performance of the reader measurably for tags in the reader's own lane.
- Test the reader's new setting by observing reads in the program's data listing column. Each tag read appears as a line of 18 hexadecimal characters that represent the reader's RS-232 output.

2. Toll tags have no effect on the operation of AWID's vehicle tags. AWID's readers do not recognize toll tags' data protocol.