DLP-RFID2P

DLP Design

** PRELIMINARY DOCUMENT-SUBJECT TO CHANGE **

HF RFID READER WITH USB INTERFACE AND BUILT-IN ANTENNA

BASIC FEATURES

Built-In Antenna

USB Interface

Standalone Operation for ISO15693

FCC / IC / RED Certifications in Place

ISO14443A/B, Felica Capable via Host App

Optimized for Reading Very Small (3.5x3.5mm) / Hidden Tags

Backlit LCD Display for Standalone Mode

Keyboard Wedge Mode (Keyboard Emulation)

Powered from USB Port or USB Battery Pack

APPLICATIONS

Inventory Control

High-Value Asset Management

Product / Document Serialization

Data Storage for Collectable Items

Dental-Implant Tagging

Real-Time Security

Personal Identification

Pharmaceutical Tracking

Library / Book Management

Baggage Tagging

1.0 INTRODUCTION

The DLP-RFID2P was designed and optimized for reading small-format 13.56MHz RFID tags. The built-in antenna is designed for easily reaching small tags in tight spaces.

This reader is based on our popular DLP-RFID2 module, and it uses the same packet protocol for reading and writing tags as the DLP-RFID2, DLP-RFID2D and Texas Instruments TRF7970A EVM.

All operational power (~130mA @ 5V) is taken from the USB host or USB power pack via the provided 6-foot USB cable.

There are three basic operating modes for the DLP-RFID2P: Local, Remote and Keyboard Wedge.

2.0 OPERATING MODES

2.1 LOCAL MODE

At power up, selected ISO15693 tags that are presented to the DLP-RFID2P's antenna will be read and the contents displayed locally on its built-in 2x16 character LCD display. Both the tag's UID and its user memory (2 or 7 lines of 16 characters depending on the tag used) are read and presented as plain text. UP and DOWN scroll buttons are provided to allow for easily reading all tag data on the display. Local Mode does not require a host PC for its power source. In this mode, a simple USB power pack can be used to power the reader.

2.2 REMOTE MODE

From the powerup default Local Mode, Remote Mode is entered immediately when the DLP-RFID2P receives data from the host PC. Once in this mode, the DLP-RFID2P remains in Remote Mode until unplugged. In Remote Mode; the LCD display and scrolling buttons are disabled, and the DLP-RFID2P functions purely as a slave device, only responding to host commands from the PC. A Windows PC app is provided for writing text data to selected ISO15693 tags. The application software for the DLP-RFID2P is available for download from **www.dlpdesign.com/rf/rfid2p.php.**

USB communication with the DLP-RFID2P is via Virtual COM Port (VCP). The USB drivers are native to Windows 10. (Previous versions of Windows may require an internet connection to acquire the drivers automatically.)

In Remote Mode, a user-supplied host application can work with any of the supported tag types: ISO15693, ISO14443A, ISO14443B or Felica.

Refer to the DLP-RFID2 datasheet for additional information on host-application development.

2.3 KEYBOARD WEDGE MODE

At power up, the UP and DOWN scroll buttons are used to select the Keyboard Wedge Mode of operation. Using this keyboard-emulation feature, data read from RFID tags will appear at the cursor position within the app that is currently active on the PC.

To activate this feature, simply hold down either or both of the UP / DOWN (arrow) buttons as the USB cable is connected to a host PC USB port. There are three startup modes available:

UP Arrow Pressed at Power Up: Only the UID (serial number) of the RFID tag is returned to the host.

DOWN Arrow Pressed at Power Up: Only the user memory (text) is returned to the host.

Both UP and DOWN Arrows Pressed at Power Up: Both the UID and user memory contents are returned to the host.

3.0 QUICK-START GUIDE

This guide requires the use of a Windows PC that is equipped with at least one available USB port.

Connect the DLP-RFID2P to your PC via the provided USB cable. This action initiates loading of the USB drivers (which are part of the Windows 10 operating system). Previous versions of Windows may require an internet connection for the drivers to load the first time.

If operating in Local or Remote Mode, a Virtual COM Port will appear under Ports in Device Manager. If operating in Keyboard Wedge Mode, an additional keyboard will appear in Device Manager. At this point, the DLP-RFID2P is ready for use.
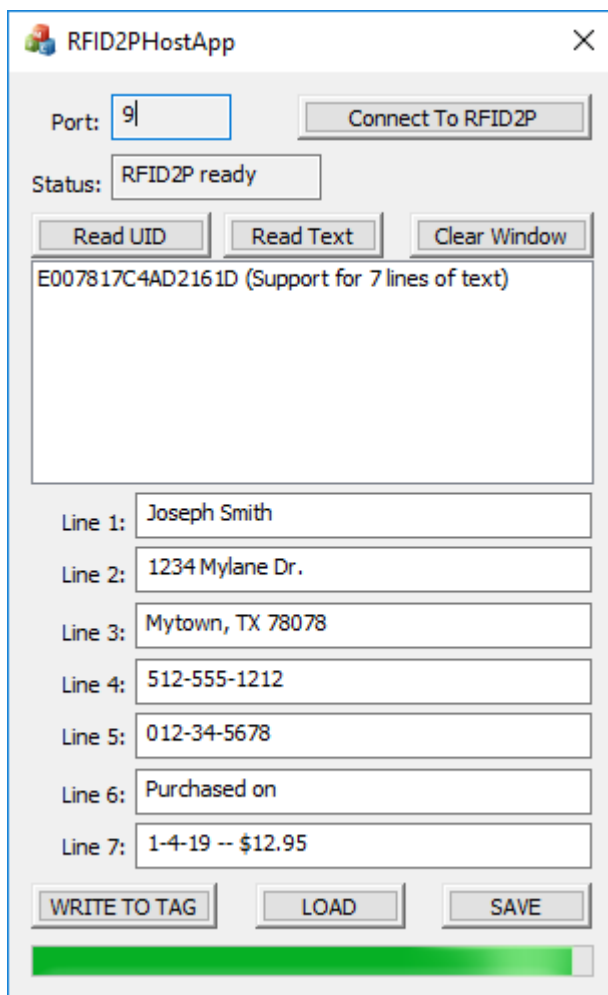

4.0 SPECIFICATIONS

Reader Frequency	13.56MHz
RF Transmit Power	200mW MAX
Range (Integral Antenna)	0.25-2.0 Inches, Depending Upon Tag Size
Tags/Protocols Supported	ISO15693, ISO14443A, ISO14443B, Felica
Communications Interface	USB 1.1/2.0 Compatible
Operational Power – Active	130mA
Operational Power – Idle	15mA
Antenna	Built-In, Small Format
USB Driver Support	Microsoft Windows
Physical Dimensions	See Mechanical Drawing, Section 8.0
Operating Temperature	0-70°C

5.0 DEMONSTRATION GUI

This GUI is provided for writing text information to selected ISO15693 tags.

This Windows software will automatically search all COM ports looking for the DLP-RFID2P, and it will open the port and connect to the reader when found:

```
RFID2PHostApp                                        ×

Port:  9|              Connect To RFID2P

Status:  RFID2P ready

  Read UID        Read Text        Clear Window

E007817C4AD2161D (Support for 7 lines of text)




Line 1:   Joseph Smith

Line 2:   1234 Mylane Dr.

Line 3:   Mytown, TX 78078

Line 4:   512-555-1212

Line 5:   012-34-5678

Line 6:   Purchased on

Line 7:   1-4-19 -- $12.95

  WRITE TO TAG        LOAD            SAVE
```

6.0 DLP-RFID2P-SPECIFIC COMMANDS

If developing a host app to talk to the reader, refer to the datasheet for the DLP-RFID2 module for a subset of available ISO15693-specific commands. The firmware in the DLP-RFID2P only has two DLP-RFID2P-specific commands. These commands allow the host app to reset the internal DLP-RFID2 module, and another to reset the DLP-RFID2P itself. (Note that these two commands do not follow the normal packet protocol used by the DLP-RFID2, and they are not forwarded to the DLP-RFID2.)
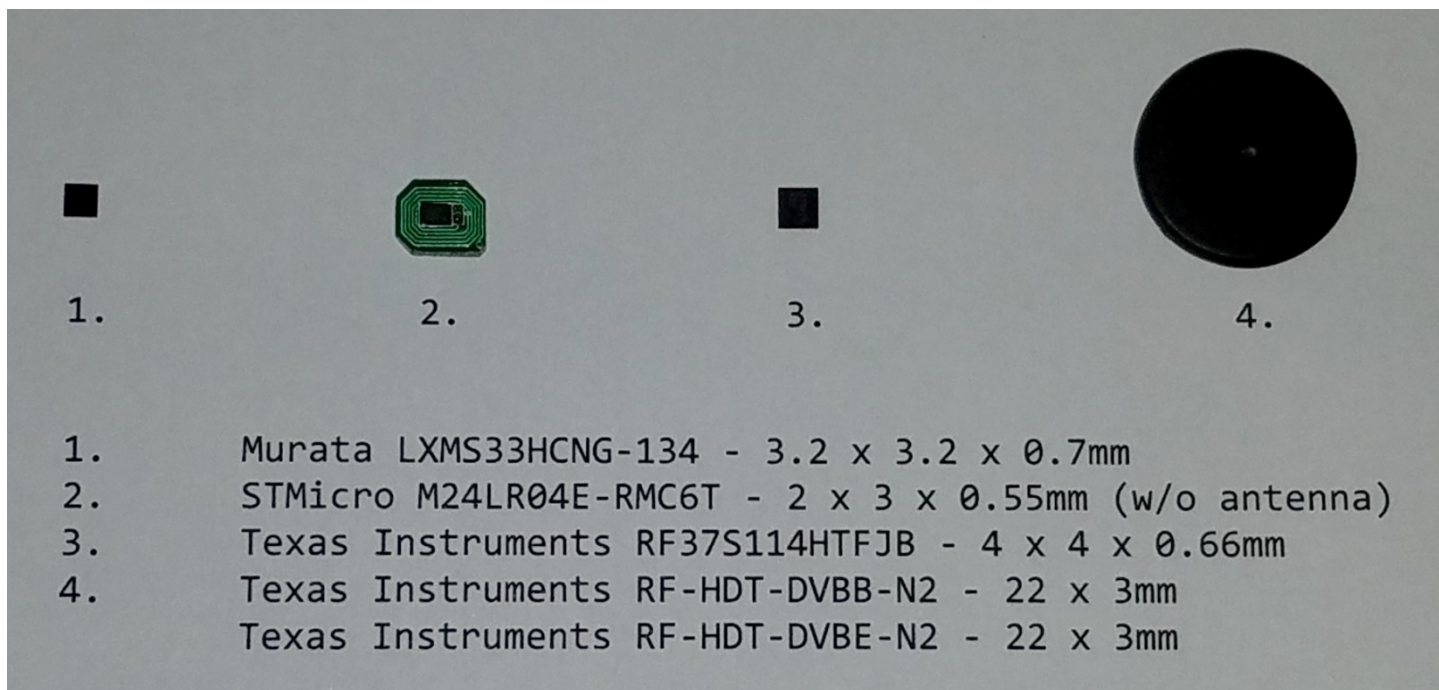
6.1 DLP-RFID2 RESET COMMAND

Command packets sent from the host PC to the DLP-RFID2P are forwarded without processing directly to the DLP-RFID2 module within the DLP-RFID2P. If an improperly-structured command packet is issued by the host, the DLP-RFID2 module firmware will not respond to the packet as expected and may lock up the firmware in the DLP-RFID2 module. The DLP-RFID2 module can be reset by the host PC app by sending a 6-byte string of six 9s to the DLP-RFID2P (EX: 0x39, 0x39, 0x39, 0x39, 0x39, 0x39). RESET is accomplished by taking the RESET pin on the DLP-RFID2 module first low then high. (Note that the host app will then have to send the command packet for selecting the built-in antenna before read/write operations with tags can continue: 01080003042B0000.)
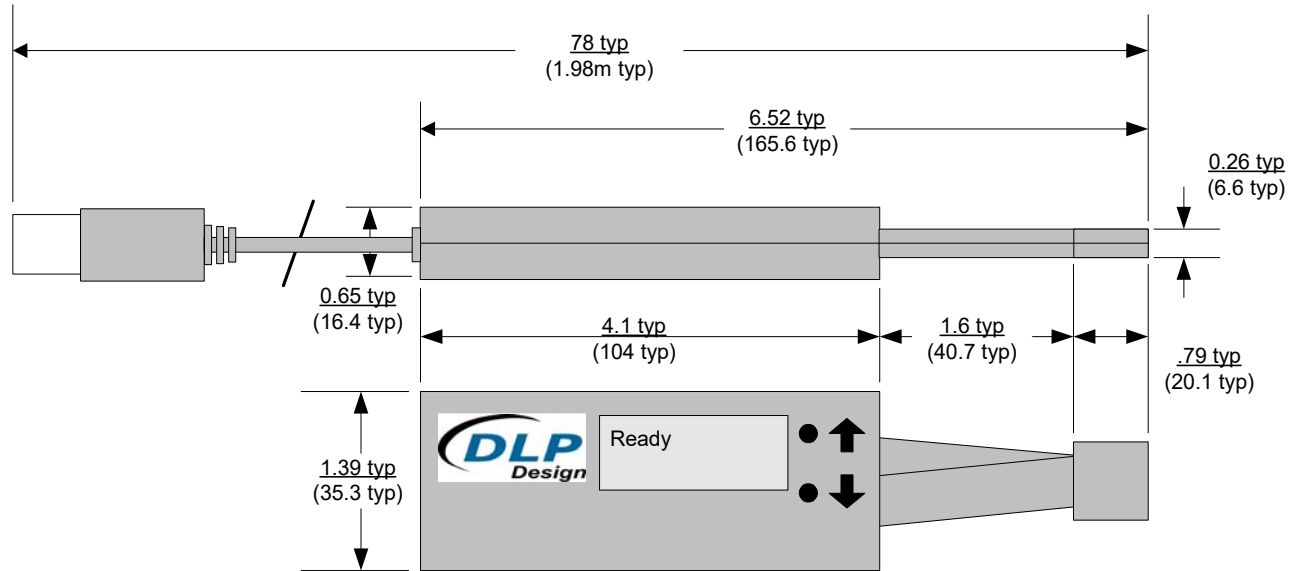
6.2 DLP-RFID2P RESET COMMAND

While in Local Mode of operation, any command packet received from the host PC will lock the DLP-RFID2P in Remote Mode whereby the DLP-RFID2P is purely a slave device under host control. The only way to return operation to Local Mode (other than by unplugging and re-plugging the USB cable) is to send a 6-byte string of six 5s to the DLP-RFID2P (EX: 0x35, 0x35, 0x35, 0x35, 0x35, 0x35). (Note that after issuing this packet the host COM port must be closed and reopened before read/write operations with tags can continue.) The built-in antenna is automatically selected by the DLP-RFID2P firmware at startup.

7.0 SUPPORTED RFID TAGS

When the DLP-RFID2P is in Local Mode, only selected ISO15693 tags from Murata (NXP silicon), ST Microelectronics and Texas Instruments can be used (see below). Note that the RF37S114HTFJB and RF-HDT-DVBE-N2 tags will only hold 2 lines (32 characters) of text. When a host PC is in control of the DLP-RFID2P in Remote Mode; ISO14443A, ISO14443B and Felica tags can be read and written to via a user-supplied host app.


```
1.          Murata LXMS33HCNG-134 - 3.2 x 3.2 x 0.7mm
2.          STMicro M24LR04E-RMC6T - 2 x 3 x 0.55mm (w/o antenna)
3.          Texas Instruments RF37S114HTFJB - 4 x 4 x 0.66mm
4.          Texas Instruments RF-HDT-DVBB-N2 - 22 x 3mm
            Texas Instruments RF-HDT-DVBE-N2 - 22 x 3mm
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8.0 MECHANICAL DIMENSIONS INCHES (mm)

9.0 REGULATORY AGENCY CONSIDERATIONS

9.1 AGENCY IDENTIFICATION NUMBERS

Compliance with the appropriate regulatory agencies is essential in the deployment of all transceiver devices. Corresponding agency identification numbers are listed below:

PART NUMBER	US/FCC	CAN/IC
DLP-RFID2	SX9RFID2	5675A-RFID2

9.2 WARNINGS

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 undesirable operation.

This device is intended for use under the following conditions:

1. The transmitter module may not be co-located with any other transmitter or antenna.

2. The module is approved using the FCC "unlicensed modular transmitter approval" method.

In the event that these conditions cannot be met (i.e. co-location with another transmitter), then the FCC authorization is no longer valid, and the corresponding FCC ID may not be used on the final product. Under these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.