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Creating identities for all

USER MANUAL

IF9A

UHF Integrated RFID Reader

Mounting, network set-up, everyday use with Identium ReaderSense, Auto Mode, the C# FASTag demo and a developer quick start for the IF9A, IF9A-2P, IF9A-4G and IF9A-Wifi



THIS MANUAL COVERS	VERSION	PLATFORM
IF9A reader family (IF9A, IF9A-2P, IF9A-4G, IF9A-Wifi)	–	Fixed UHF reader, 865–868 MHz
Identium ReaderSense	4.0.0	Windows 10/11 (64-bit), macOS 10.15 or later
Identium IF9A SDK	1.0	Windows 10/11: C# (.NET Framework 4.8), Java 8 or later
C# FASTag Reader Demo	1.1.0	Windows, .NET Framework 4.8 (x86)

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Creating identities for all

The IF9A is Identium's fixed UHF RFID reader with a 9 dBi antenna built into the housing. One unit on a pole or wall covers a vehicle gate, dock door or parking lane without separate antennas or coaxial cable. This manual takes you from mounting and powering the reader to reading tags with Identium ReaderSense, sending reads to a server with no PC attached, and building your own application from the SDK and the C# FASTag Reader Demo on the Identium Resource Hub.

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01/ The IF9A Family

All IF9A models put an Impinj reader chip and a built-in 9 dBi antenna in one case, show reads on the same multi-function LED and work with the same software. They differ in how they connect.

Model	What it adds
IF9A	Base model: one built-in antenna; USB, RS232, Wiegand, RJ45 Ethernet and PoE
IF9A-2P	A second port for one external UHF antenna, to cover a second zone
IF9A-4G	Built-in 4G with a micro SIM slot; pushes reads straight to your cloud server
IF9A-Wifi	Built-in Wi-Fi; posts reads to your server by HTTP

Full specifications for each model are in section 16.

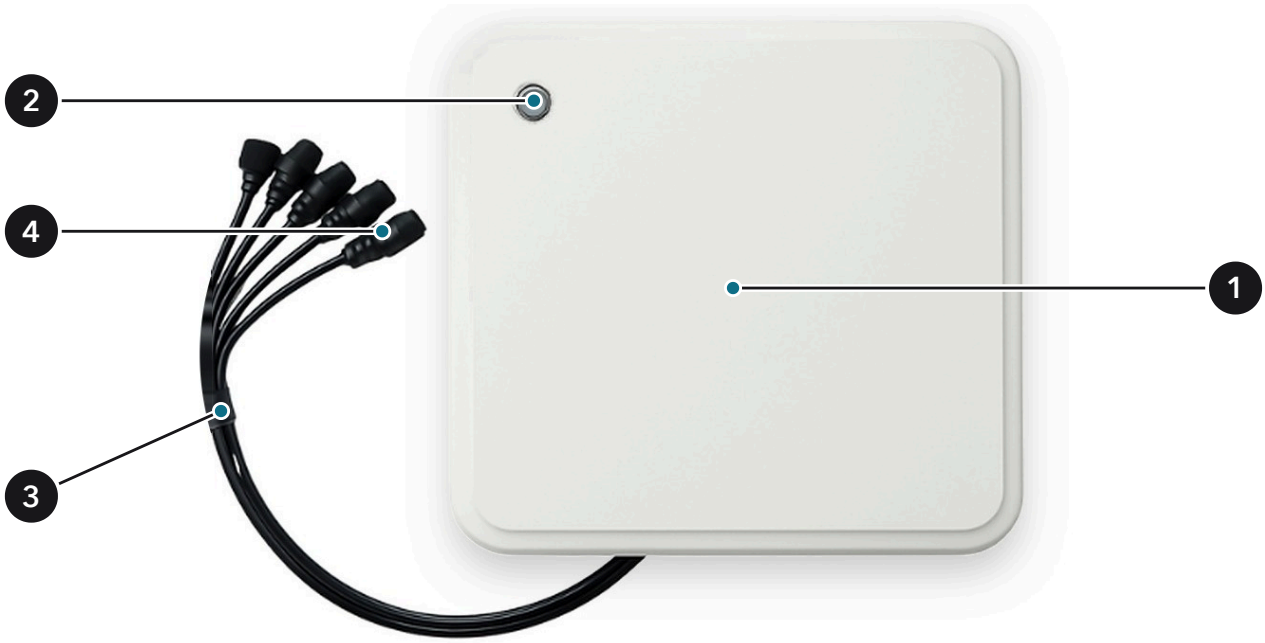
Evaluation kit and accessories

- **IF9A-EVK fixed reader evaluation kit:** an IF9A single-port reader, a sample pack of UHF RFID labels (the mix is confirmed with your order) and Identium ReaderSense desktop software for Windows and macOS (free, no licence fee).
- **Wall / pole mounting bracket:** a steel bracket for IF9A-size readers. It fixes to a wall or gantry with screws, or to a pole with U-bolts sized to the pole; the tilt is set and locked at installation.
- **PoE injector:** powers the reader over its network cable where the switch has no PoE port.

NOTE

This manual uses **Identium ReaderSense**, Identium's free desktop app for Windows and macOS, for set-up, reading and Auto Mode on the IF9A. The **IF9A SDK** package adds the C# and Java SDKs, protocol documents and Auto Mode example servers for your own software. For an antenna check or a firmware update, contact Identium support.

02/ Equipment Diagram



IF9A, front view

1. Front face – the 9 dBi UHF antenna sits behind it. Aim this face at the read zone.
2. Multi-function LED – red = power, green = tag read.
3. Cable breakout, where the cable from the housing splits into the connector leads.
4. Connector leads for power, Ethernet/PoE and the reader's I/O (such as Wiegand, RS232 or relay). The leads fitted depend on the model and options ordered.

03/ Power On/Off

The IF9A and IF9A-Wifi, and an IF9A-2P ordered with PoE, take their power over Ethernet (PoE) on the RJ45 lead, so one network cable carries both power and data.

1. Plug the reader's RJ45 lead into a PoE switch port, or into the PoE port of a PoE injector.
2. Connect the injector's data port (or the switch) to your network or PC.
3. Switch on the PoE supply. The LED lights **red** when the reader has power.
4. To power the reader off, switch off the PoE supply or unplug the network cable.

CAUTION
Keep the PoE injector indoors. Only the reader and its cable belong outside, with the cable exit protected from rain.

IF9A-4G: fit a micro SIM with an active data plan, then power the reader from the supply Identium specifies for it. Check that the 4G signal is strong at the gate or pole itself, not at the site office.

04/ Indicators

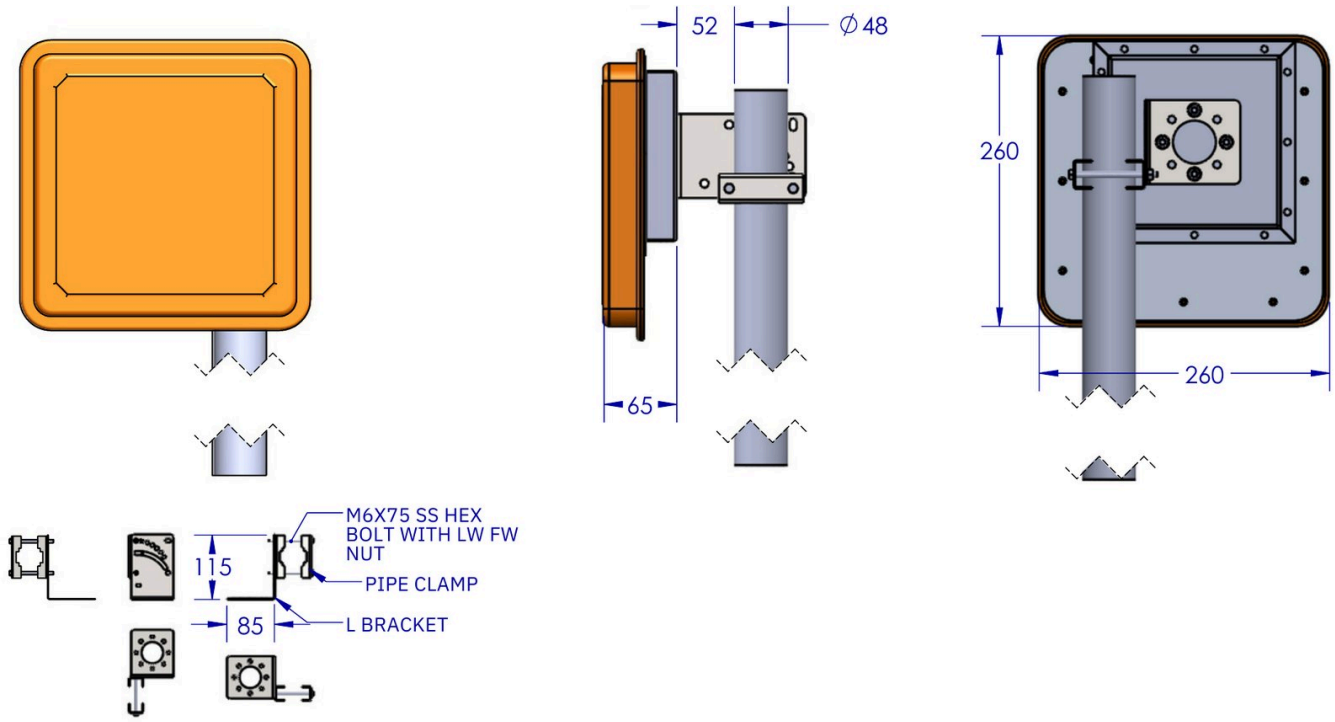
Indicator	State	Meaning
Multi-function LED	Red	The reader has power
Multi-function LED	Green	A tag has been read (green on each read)
Buzzer (output GPO 5)	Sounds while the output is on	Driven by ReaderSense, your software, the demos or Auto Mode, for example a beep on each read

TIP
Use the green LED when aiming the reader. With an inventory running (click **Start Inventory** in ReaderSense, or with the reader in Auto Mode), hold a tag where it will pass and adjust the angle until the LED turns green on every pass.

05/ Mounting the Reader

1. Choose the read point. The IF9A reads tags in front of its face, so mount it where tags pass through that zone: a lane, gate, dock door or conveyor.
2. Fix the bracket to the wall or gantry with screws, or to the pole with the pipe clamp or U-bolts sized to the pole diameter.
3. Fit the reader to the bracket and leave the fixings hand-tight while you aim.
4. For vehicle lanes, mount the reader high enough to look down at the windshield without being hit, usually on a pole beside the barrier, with the face looking slightly down the lane towards the point where vehicles stop.
5. Power the reader, start an inventory (section 09) and pass a tagged item or vehicle through the zone. Adjust the tilt until reads are steady, then tighten and lock the bracket.
6. Dress the cable so the cable exit is protected from rain.

TIP
Up to 25 m is possible with a good long-range tag on an open site. Small labels, tags on metal or liquids and crowded surroundings read closer, so test with the tags you will use before you fix the final position.



IF9A mounting drawing (dimensions in mm): 260 × 260 mm face, 65 mm deep, shown on a Ø 48 mm pole. Bottom left: the L bracket and the pipe clamp, which closes round the pole with M6 × 75 stainless-steel hex bolts, lock washers, flat washers and nuts.

IF9A-2P: connect an external UHF antenna to the second port to cover a second zone, for example the far side of a wide gate. Confirm the antenna connector and cable length with Identium when you order.

06/ Network Set-up

Reader IP address	`192.168.1.100`
Subnet mask	`255.255.255.0`
Gateway	`192.168.1.254`
SDK connection	TCP port `8999` must be reachable from the PC

Factory network settings (Ethernet).

1. Give your PC's network adapter a fixed address in the same network as the reader, for example `192.168.1.10` with subnet mask `255.255.255.0`.
2. Connect the PC and the reader to the same switch, or the PC to the injector's data port.
3. Open a Command Prompt and type `ping 192.168.1.100 -t`. Replies mean the network link works. Press Ctrl+C to stop.
4. No reply? Check the cable and the PC's address, type `arp -d` to clear the PC's address list, and ping again.

Change the reader's IP address

Connect with ReaderSense (section 08), open **Settings › Network**, enter the new IP address, subnet mask and gateway – all three must belong to the same network – and click **Set**. The reader then answers on the new address: reconnect from the **Connect** page. If you no longer know a reader's address, the search button next to the address box on the

Connect page lists every reader on the network with its IP and MAC address.

IF9A-Wifi and IF9A-4G

Set both up from a PC first, from ReaderSense's **Auto Mode** page (section 12). Connect the IF9A-Wifi to the PC over its RJ45 lead; for the IF9A-4G, use the set-up connection Identium gives with your reader. Type the reader's address in **IP/Serial Port**, click **Get Parameters** and open **Static Parameter Configuration**, where **Wireless Settings** and **4G Settings** appear on readers fitted with them. Then click **Set Parameters** with **Restart the device** ticked; the reader answers again after about 20 seconds.

- **IF9A-Wifi:** under **Wireless Settings** set **Work Pattern** to **STA Pattern** (the reader joins your Wi-Fi network), enter the network name in **SSID** and its **Password**, then enable **DHCP** or enter a fixed IP address, subnet mask and gateway. To send reads over Wi-Fi, choose **WIFI** as the hardware interface in Auto Mode.
- **IF9A-4G:** fit a micro SIM with an active data plan. Under **4G Settings** tick **APN › Enable**, then enter the **APN Name** your mobile operator gives for the SIM, plus the **APN UserName**, **APN Pwd** and **APN AuthenticationMode** (None, PAP or CHAP) if the operator uses them. **SignalStrength** shows the 4G signal: 25–31 is good, 20–25 is fair and below 20 is poor. Then choose **4G** as the hardware interface in Auto Mode and enter your server address.

07/ Install the Software

Download the IF9A files from the Identium Resource Hub, **www.identiumone.com/resourcehub/**:

Resource Hub item	File	What it contains
Identium ReaderSense	`Identium ReaderSense Client Setup 4.0.0.exe`, plus a portable .exe and two macOS .dmg files	Identium's desktop app for the IF9A, used in sections 08–12
IF9A – SDK	Identium-IF9A-SDK-1.0.zip (6.6 MB)	C# and Java SDKs, protocol documents and Auto Mode example servers
IF9A – C# FASTag Reader Demo	Identium-IF9A-CSharp-Fastag-Reader-Demo-v1.1.0.zip (751 KB)	A small C# reader app as source code, plus a ready-built copy and the SDK library it uses; section 13 shows how to build it for India

Install ReaderSense on Windows

1. Download `Identium ReaderSense Client Setup 4.0.0.exe` from the Resource Hub and double-click it. If Windows SmartScreen shows **Windows protected your PC**, click **More info › Run anyway**.
2. Choose the install folder (or keep the default) and click **Install**.
3. Start **Identium ReaderSense** from the desktop or the Start menu. It opens on the **Connect** page.

The portable .exe runs without installing. On a Mac, use the `-arm64.dmg` file (Apple Silicon) or the `-x64.dmg` file (Intel); the Mac version connects over the network and needs one extra free runtime, described with every page of the app in the Identium ReaderSense User Manual. The screens in sections 08–12 are ReaderSense 4.0.0 set up for an IF9A, shown with sample tag data.

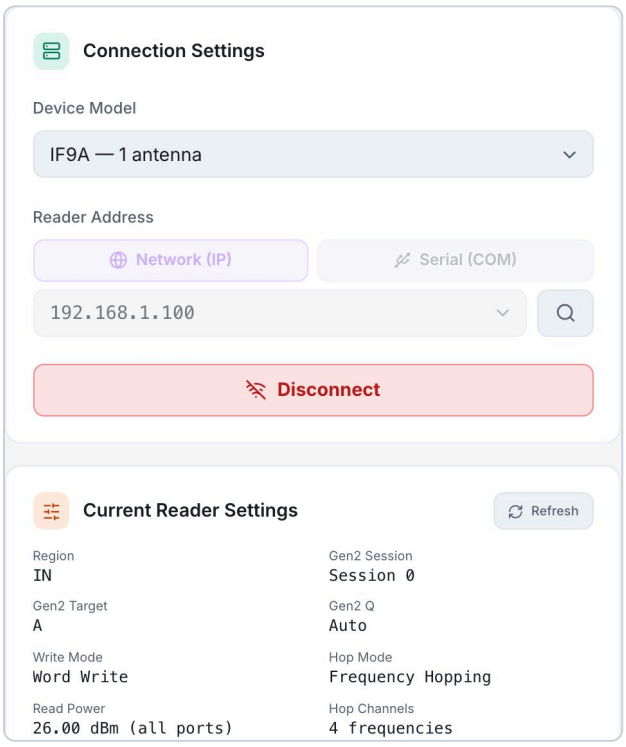
What is in the IF9A SDK package

Item in Identium-IF9A-SDK-1.0.zip	What it is
`README.md`	Start here: requirements, the first C# steps, Auto Mode and the India region setting
`CSharp-SDK/`	The C# SDK library (`lib/ModuleAPI.dll`) and its HTML guide (open `API-Reference/index.html`): life cycle, parameters, inventory, tag access, GPI/GPO and errors.
`Java-SDK/`	Java SDK for Windows: the SDK .jar and x86/x64 JNI libraries (`libs/`), four Eclipse demo projects (`demos/`) and a 66-page developer manual (`docs/`, PDF)
`Samples/`	Example servers that receive the reader's Auto Mode HTTP posts: `HTTP-Python` (Python) and `Tag-Web-Server` (Node.js, with a browser tag list)
`Docs/`	Reference documents: module command protocol, Auto Mode TCP frames and HTTP data format, and the Modbus protocol (section 14)

The main items in the package. Section 14 shows how to use them.

08/ Connect to the Reader

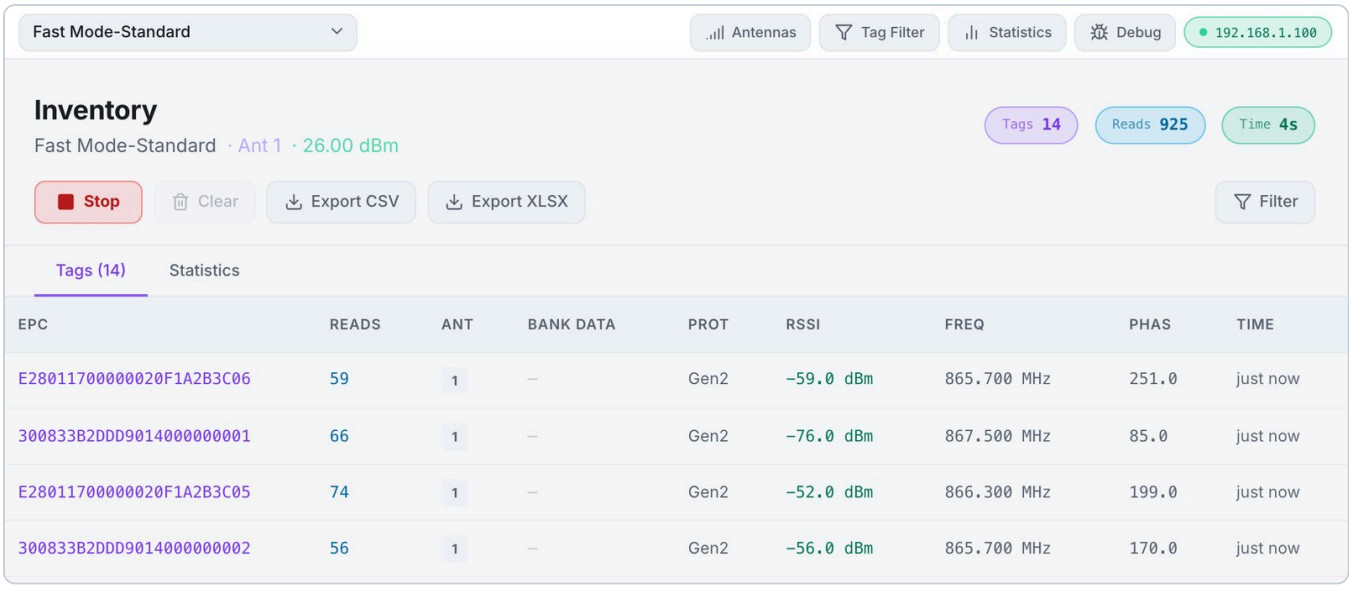
> **NOTE**
> **Before you start:** power the reader and connect it to the same network as the computer (section 06). Close any other reader software, because the reader accepts one control connection at a time.



ReaderSense › Connect with the IF9A selected. Current Reader Settings shows the region, read power and channels the reader is using (sample values).

1. Open **Connect** and choose **IF9A** in **Device Model**. It sets the one antenna port of the IF9A. For an IF9A-2P, ask Identium which setting to use with your reader.
2. Under **Reader Address** keep **Network (IP)** and click the address box. ReaderSense lists the readers it finds on your network; click one, or type the IP address (factory setting `192.168.1.100`). The magnifier button gives a full list with each reader's MAC address and work state; **active** means the reader is in Auto Mode.
3. For a serial cable (Windows), install the USB-to-serial driver and choose **Serial (COM)**. ReaderSense checks the COM ports and fills in the one the reader answers on.
4. Click **Connect**. The status card turns green and shows **Connected** with the address.
5. **Current Reader Settings** shows the region, Gen2 settings, read power and hop channels the reader is running (a reader set up for India shows Region **IN**). Click **Disconnect** before you connect to a different reader.

09/ Read Tags (Inventory)



Inventory on the IF9A. The line under the title shows the read mode, antenna 1 and the read power; the counters show unique tags, total reads and time (sample values).

1. Connect the reader (section 08) and open **Inventory**.
2. Click **Start Inventory**. Each tag appears once in the table, and its **Reads** count rises every time it is seen.
3. Click **Stop** when you have finished.
4. Click **Export CSV** or **Export XLSX** to save the list. **Clear** empties the table for a new count.

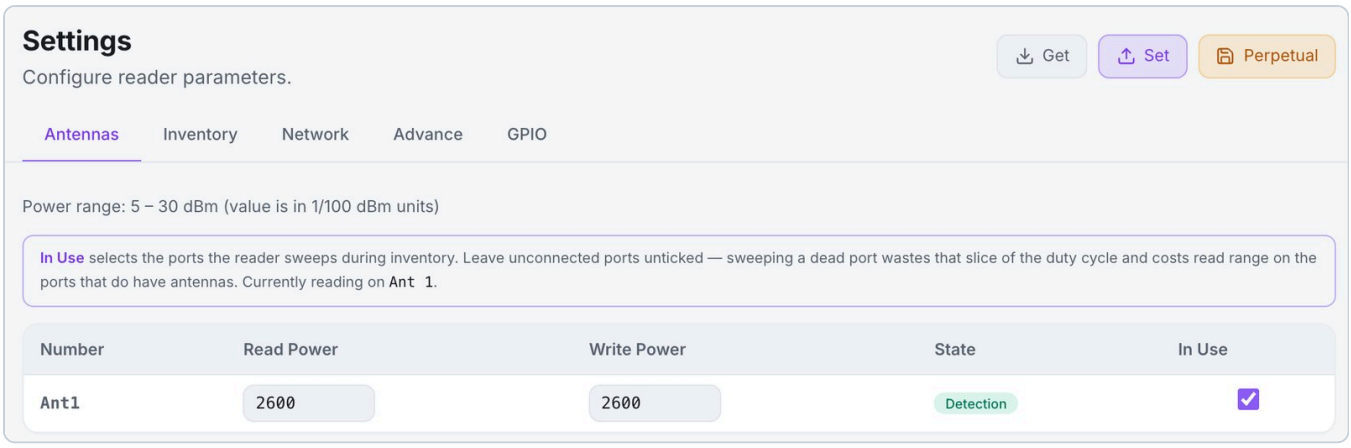
RSSI is the signal strength in dBm (closer to 0 is stronger), **Freq** the channel and **Bank Data** the extra memory read when Additional Data is on (section 10).

- **Read mode** (top left): **Fast Mode-Standard** is the default. Try **Normal Mode** if a fast mode reads nothing.
- **Filter** (right of the table) narrows the list: type the start of the EPCs you want, for example `E280, 3008`. Export saves the tags the filter shows.
- **Tag Filter** (top bar) filters inside the reader, so tags that do not match are never reported (tick **Enable in Inventory** to use it). The **Statistics** tab shows reads per antenna and per frequency channel.

> **TIP**
> If nothing is read for 20 seconds, ReaderSense says so and offers **Retry in Normal mode**. First check that a tag is in front of the reader and that antenna 1 is ticked **In Use** (section 10).

10/ Reader Settings

Settings holds the reader's own parameters, grouped in tabs. **Get** reads the current values from the reader; **Set** writes the values on the tab you are looking at. **Perpetual** also asks the reader to keep them after a power cut; the values it keeps are the antenna power, the Gen2 inventory parameters (Session, Profile, Target and Q) and the region and channels. After **Perpetual**, switch the reader off and on and click **Get** to confirm.



Settings › Antennas on the IF9A: one port, read and write power in hundredths of a dBm, detection state and In Use (sample values).

Tab	What you set there
Antennas	Read and write power of the antenna port, in hundredths of a dBm (for example `2600` = 26.00 dBm), and **In Use**. Keep antenna 1 ticked.
Inventory	**Fast Mode Type**; **Read Duration** and **Read Interval** for Normal mode; Gen2 **Session**, **Target**, **Q Value** and **Link Profile**; **Additional Data** 1–3 (extra memory-bank words returned with every tag) and the shared access password.
Network	The reader's IP address, subnet mask and gateway (section 06).
Advance	**Hop Mode**, **Max Dwell Time of Ant**, **Gen2 Write Mode** (Word or Block write), tag data cache options and **Working Region**. In India keep the region set to **IN** (India, 865–868 MHz); change it only when Identium support asks you to.
GPIO	**GPI Trigger Operation** starts and stops inventory from an input such as a photo-eye. **Tag Read GPO Trigger** switches an output on each read; GPO 5 is the buzzer.

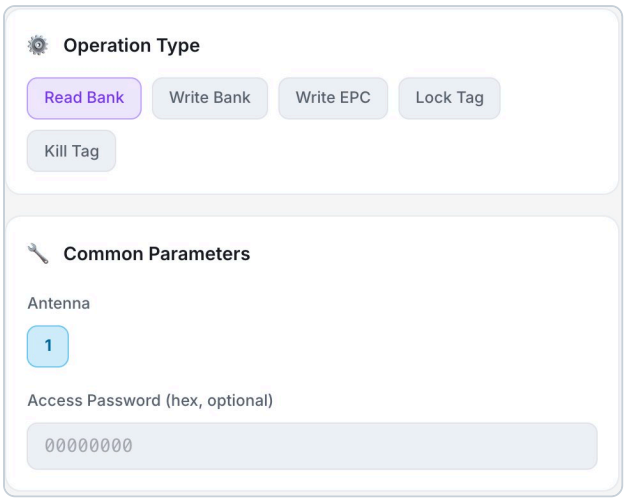
CAUTION

India's licence-exempt rules allow an RFID reader at most 2 W e.r.p., and the IF9A's built-in antenna adds 9 dBi of gain to the power set here. Ask Identium support for the read power to use at your site in India before you change it.

11/ Read, Write and Lock Tags

Tag Access works on one tag at a time. Hold only the tag you want in front of the reader, or narrow the choice with the EPC filter.

1. Open **Tag Access** and pick an **Operation Type**: **Read Bank**, **Write Bank**, **Write EPC**, **Lock Tag** or **Kill Tag**.
2. Under **Antenna** pick **1**, the IF9A antenna.
3. Enter the **Access Password** (8 hex characters) if the tag is locked; leave it blank otherwise.
4. Optionally type the start of the tag's EPC in **EPC Filter** so only that tag answers.
5. Fill in the parameters for the operation (table below) and click **Execute**. The result appears under the button.



Tag Access: operation type, antenna and access password. The EPC filter is below, the bank parameters to the right.

CAUTION

Permanent lock and **Kill** cannot be undone, with any password. Try them on a spare tag first.

Before you lock a bank, write a non-zero access password to the Reserved bank (words 2–3) and enter it in **Access Password**: a lock with password 0 leaves the tag unprotected.

A tag whose kill password is still 0 cannot be killed. Write a kill password to the Reserved bank (words 0–1) first.

Operation	Parameters
Read Bank	**Bank** (Reserved, EPC, TID or User), **Start Address** and **Block Count** in words. In the EPC bank, word 0 is the CRC, word 1 the PC and the EPC number starts at word 2.
Write Bank	Bank, start address and the data in hex. Data must be whole words: a multiple of 4 hex characters. The TID bank is programmed at the factory and is read-only.
Write EPC	The new EPC in hex, whole words; a standard 96-bit EPC is 24 characters. ReaderSense updates the PC word for you.
Lock Tag	**Lock Target** (EPC, TID, User, Kill password or Access password) and **Lock Type** (Unlock, Lock or Permanent).
Kill Tag	The tag's kill password (hex).

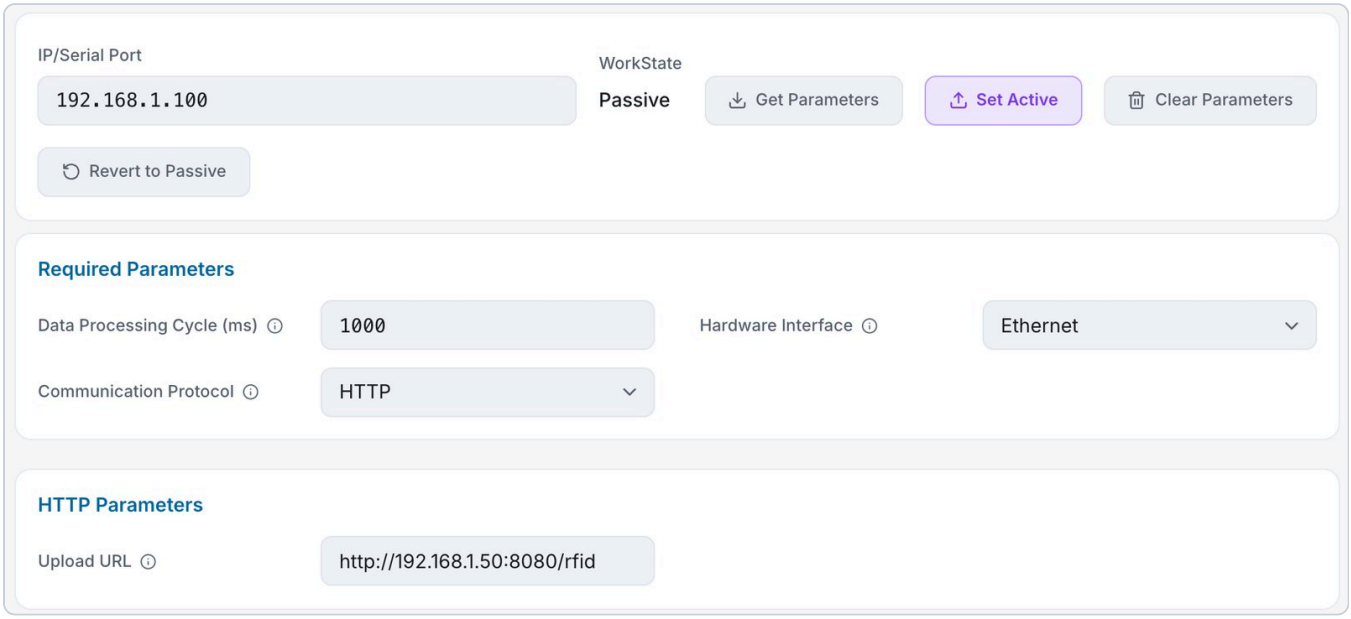
12/ Auto Mode: Send Reads Without a PC

The IF9A has two working modes. In **Answer mode** (shown as **Passive** in the software) it waits for commands from your PC or application. In **Active mode**, set up from the **Auto Mode** page, it starts reading by itself at power-up and sends the reads to your server over HTTP, TCP or MQTT, so no PC is needed at the read point.

Example: send tag reads to your server over HTTP

1. Open **Auto Mode**, type the reader's address in **IP/Serial Port** and click **Get Parameters**.
2. On **Static Parameter Configuration**, check the network settings, **Ant Power**, **Working Region** (**India**), **Working Antenna** and **Device Type** (**1 Antenna** for the IF9A). Click **Set Parameters**; tick **Restart the device** if you changed network settings.
3. Open **Advanced Parameter Configuration** and click **Get Parameters**.
4. Under **Required Parameters**, choose the **Hardware Interface**: **Ethernet**, **WIFI** (IF9A-Wifi) or **4G** (IF9A-4G). Set **Communication Protocol** to **HTTP** and the **Data Processing Cycle**, for example `1000` ms to send buffered reads once a second.
5. Under **HTTP Parameters**, enter your server's **Upload URL**.

6. Under **Event Subscription**, tick **Tag Data** (or **Tag Enter**), and **Heartbeat** for a regular sign of life. Without a tag event the reader sends no tag data.
7. Under **Additional Parameters**, give the reader a **Reader Logical Name** (it is sent as `reader_name`) and set **Initial Count Condition** to **Inventory**. Without it the reader enters Active mode but never starts reading.
8. Click **Set Active**. The reader restarts; when **WorkState** shows **Active**, it is reading and sending.



Auto Mode › Advanced Parameter Configuration: WorkState and the mode buttons at the top, then the required parameters and the HTTP upload URL.

Hardware interface	What to fill in
Ethernet, WIFI or 4G	**HTTP**: the **Upload URL**; your server must answer each upload with HTTP 200. **TCP**: the **Server Address** and **Port Number**. **MQTT**: **Host Address**, **Port Number** (usually 1883), **Publish Topic** and QoS, plus user name, password and TLS if used.
Wiegand or RS232 Serial Port	No network protocol: set the Wiegand type (Wiegand 26, 34 or 66) and pulse timing, or the serial parameters, instead.

Taking the reader out of Auto Mode

Read **WorkState**, click **Revert to Passive**, then check that **WorkState** now reads **Passive**. The button switches the work state either way, so pressed on a reader that is already passive it turns Active mode back on. **Clear Parameters** erases the Auto Mode settings. Return the reader to Passive before you use the other ReaderSense pages, the SDK or the FASTag demo.

What your server receives over HTTP

Each upload is an HTTP POST with a JSON body (`Content-Type: application/json; charset=utf-8`) holding three keys: `reader_name`, `event_type` and `event_data`. Always reply with HTTP 200, even when you reject the data; any other reply makes the reader treat the upload as failed and send it again.

```
{
  "reader_name": "IF9A-GATE-01",
  "event_type": "tag_coming",
  "event_data": [
    { "ep": "E28068940000502352B2B8B4", "bd": "", "at": 1, "rc": 1,
      "fq": 865700, "pt": 5, "ri": -29, "rv": 183831284,
      "ft": 1754985600000, "lt": 1754985600000 }
  ]
}
```

A Tag Enter event with every tag field selected (new format)

Key	Meaning	Key	Meaning
`ep`	EPC in hex (always sent; length varies)	`pt`	Tag protocol
`bd`	Additional (bank) data	`ri`	RSSI in dBm
`at`	Antenna number	`rv`	Reserve field
`rc`	Read count	`ft`	First seen, ms since 1970
`fq`	Frequency in kHz	`lt`	Last seen, ms since 1970

- Event types: `tag_read` (the batch sent every Data Processing Cycle, **Tag Data**), `tag_coming` (first sighting of a tag, **Tag Enter**), `heart_beat` (a counter, **Heartbeat**), `gpi_changed` (the state of every input and a timestamp, **GPI Change**) and `sync_time_req` (**Time Synchronization**).
- The tag fields you tick decide which keys are sent. `tag_read` often carries only `ep`, `bd`, `at` and `rc`, and `ep` is not always 24 characters. **Format Type** picks the new format (the fields you tick) or the old compact format (`ep`, `rc` and `lt` only).
- Timestamps are milliseconds since 1 January 1970 (13 digits). The reader's clock starts from zero at every power-up, so subscribe to **Time Synchronization** when you need real times and answer the reader's `sync_time_req`.
- Your 200 reply may carry one command for the reader as `{ "command_type": …, "command_data": … }`: `sync_time` (set the clock), `set_gpo` (switch outputs, for example a barrier relay), `pause_inventory` or `resume_inventory`.
- The IF9A SDK package has example servers that receive these posts: `Samples/HTTP-Python` and `Samples/Tag-Web-Server`.

13/ C# FASTag Reader Demo

A small Windows app, supplied as C# source code, that shows the core reader jobs in readable code: connect, read (continuously or once), read EPC, TID and User memory, drive the buzzer and outputs, and change the network and power settings the reader starts up with. It reads the EPC and TID of every tag in the field, for example vehicle windshield tags at a gate.

CAUTION

Always use the demo built for India (`Region.IN`), as below. The ready-built copy in the package's `app` folder opens the reader with the North America region setting (`Region.NA`).

Build and run the demo for India

1. Download **Identium-IF9A-CSharp-Fastag-Reader-Demo-v1.1.0.zip** from the Resource Hub and extract it on a Windows PC.
2. Install the .NET Framework 4.8 Developer Pack, plus either the .NET SDK (to build with `dotnet build`) or Visual Studio with the .NET desktop workload.
3. Open `source/RFID_Reader_Demo/ReaderService.cs` and, in the `Connect` method, change `Region.NA` in the `Reader.Create(…)` call to `Region.IN`.
4. In the `source` folder run `dotnet build -c Release`, or open `RFID_Reader_Demo.sln` in Visual Studio and build.
5. Run `RFID_Reader_Demo\bin\Release\RFID_Reader_Demo.exe`. The build puts the two .dll files it needs beside it; keep all three files together.
6. Make sure the reader is in Answer (Passive) mode and TCP port 8999 is reachable, then enter the reader address, pick antenna **1**, click **Connect** and click **Start** or **Read once**.

> **NOTE**
> The project is built as 32-bit (x86) because the SDK library is 32-bit; an AnyCPU or x64 build can stop with a `BadImageFormatException`. All reader calls are in `ReaderService.cs` and `MainForm.cs` is only the user interface, so you can reuse the service in a console app or Windows service unchanged.

Panel	Controls	What it does
1 Connection	IP / COM, Antenna, Connect, Disconnect	Opens the reader at an IP address (default `192.168.1.100`) or a serial port such as `com3:115200`. The Antenna box picks the port used for reading: 1 on the IF9A.
2 Read mode	EPC only (fastest) · EPC + TID · EPC + TID + User	What is read for each new tag. EPC only skips the extra memory reads, so it is the fastest.
3 Read	Start, Read once, Stop; Buzzer (GPO5) + GPO4 on while reading	Start reads continuously and lists each tag once; Read once does one 0.5 s read of every tag in the field.
4 Buzzer + GPIO	Beep 300ms, Read GPI, GPO 4+5 ON / OFF	Tests the buzzer (GPO 5) and the spare output GPO 4 (lamp or relay), and reads the inputs.
5 Saved reader settings	IP address, Subnet mask, Gateway, DNS, Power (dBm, all antennas); Restart reader after saving; Load, Save to reader	**Load** reads the settings the reader starts up with; **Save to reader** writes these five values and keeps everything else stored on the reader. It works on the address in box 1, with no connection needed. With **Restart reader after saving** ticked (the default) the reader restarts, which takes about 20 seconds. Load and Save use TCP port 8080.
Tag list and log	#, Time, Ant, RSSI, EPC, TID, User; Clear	One row per tag, and each read as text in the log.

Change the reader's saved IP address or power

1. Type the reader's address in box 1 (you do not need to connect) and click **Load**.
2. Edit the IP address, subnet mask, gateway, DNS or power. Before you change the power, read the caution in section 10.

3. Click **Save to reader** and confirm. Leave **Restart reader after saving** ticked and wait about 20 seconds; if the IP address changed, box 1 is updated to the new address.
4. Click **Load** again to check what the reader kept.

> **TIP**
> If you move the reader to another subnet, the demo warns you before saving. Afterwards, put the PC on that subnet (or use the serial port) to reach the reader again.

14/ For Developers: SDK Quick Start

Integrate the IF9A in five steps (C#)

1. Reference `CSharp-SDK/lib/ModuleAPI.dll` from the SDK package in your project and build for **x86**.
2. Create the reader with `Reader.Create(address, Region.IN, antennaPorts)`. The address is an IP or a COM port; the port count must match the reader (1 for the IF9A).
3. Set the read plan: `ParamSet("ReadPlan", new SimpleReadPlan(new[] { 1 }))`. Before tag operations, also set `TagopAntenna` and `TagopProtocol` (`TagProtocol.GEN2`).
4. Read: `Read(500)` returns every tag seen in 500 ms with its EPC, antenna and RSSI. To read TID or User memory, call `ReadTagMemWords` with an EPC filter for that tag.
5. Drive outputs with `GPOSet(pin, state)` (GPO 5 = buzzer), read inputs with `GPIGet()`, and call `Disconnect()` when you are finished.

```
// type Reader and let Visual Studio add the SDK's using directive (Ctrl+.)

int ports = 1;                                  // 1 for the IF9A
Reader rdr = Reader.Create("192.168.1.100", Region.IN, ports);
rdr.ParamSet("ReadPlan", new SimpleReadPlan(new[] { 1 }));

TagReadData[] tags = rdr.Read(500);             // one 500 ms inventory
foreach (TagReadData t in tags)
    Console.WriteLine($"{t.EPCString}  ant {t.Antenna}  {t.Rssi} dBm");

rdr.GPOSet(5, true);                            // buzzer on
rdr.GPOSet(5, false);                           // buzzer off
rdr.Disconnect();
```

Minimal inventory with the IF9A C# SDK

Other ways in

- **Auto Mode (HTTP, TCP or MQTT):** no SDK needed on the PC. Set it up as in section 12 and parse the posts on your server.
- **Java:** `Java-SDK/` in the SDK package holds the SDK .jar with its 32- and 64-bit JNI libraries, four Eclipse demo projects and the developer manual; its `README.md` shows how to build and run a demo. Set the region with `Region_Conf.RG_IN`.
- **Modbus:** read the tag list from register `0xB00` (125 registers). Modbus over TCP/IP uses port 8080; the default Modbus serial address is 2. See `Docs/Identium-IF9A-Modbus-Protocol.pdf` in the SDK package.

- **Low-level protocols:** `Docs/Identium-IF9A-TCP-Protocol.pdf` (Auto Mode TCP frames) and `Docs/Identium-IF9A-Module-Protocol.pdf` (module command set) in the SDK package.
- **Other platforms:** Identium also provides SDKs for Linux, Python, Arduino and Raspberry Pi. They are not in the Resource Hub package; ask Identium support for the one you need.

> **TIP**
> Full API reference: `CSharp-SDK/API-Reference/index.html` (C#) and `Java-SDK/docs/Identium-IF9A-Java-SDK-Manual.pdf` (Java) in the SDK package.

15/ Precautions

- Use the reader only in India's 865–868 MHz UHF band, which is licence-exempt under G.S.R. 853(E), 2021, at no more than 2 W e.r.p. Keep the region set to **India** in ReaderSense and in your own code (`Region.IN` in C#, `Region_Conf.RG_IN` in Java).
- Keep the PoE injector indoors and protect the cable exit from rain.
- Mount the reader firmly. A loose bracket changes the aim and the read zone.
- Nearby metal, liquids and crowded surroundings shorten the read range. Test the final position with your own tags.
- Keep the housing closed. It is sealed at the factory to keep water and dust out.
- For a firmware update, contact Identium support. Load only firmware from Identium, update over Ethernet or serial rather than Wi-Fi, and never remove power during an update.
- Kill and permanent lock cannot be undone. Try tag operations on a spare tag first.
- Before you connect ReaderSense, the SDK or the FASTag demo to a reader that is in Auto Mode, return it to Passive mode (section 12).

16/ Parameters

The first three tables describe the single-port **IF9A**, which is also the reader in the **IF9A-EVK** evaluation kit. The IF9A-2P, IF9A-4G and IF9A-Wifi follow, each in its own table; all three use an Impinj reader chip.

IF9A: radio and reading

Frequency	865–868 MHz (India UHF band)
Reader chip	Impinj reader chip
Antenna	Built-in 9 dBi (single-port model)
Read range	Up to 25 m effective (depends on tag, mounting and environment)
Read speed	Bulk read (many tags at once)
Memory	Reads EPC, TID and User memory
Work modes	Active (plug and play), Answer (command)

IF9A: connections, housing and approvals

Interfaces	USB, RS232, Wiegand, RJ45 Ethernet, PoE
Outputs	Relay (optional); buzzer on GPO 5
Indicator	Multi-function LED: red for power, green for tag read
Power	PoE on the RJ45 port
Factory IP address	192.168.1.100 (mask 255.255.255.0, gateway 192.168.1.254)

Dimensions	260 × 260 × 65 mm (housing, from the mounting drawing)
Material	Die-cast aluminium case
Ingress protection	IP68: dust-tight, and tested immersed at 1 m for 30 minutes
SDK	.NET, Java, Linux, Python, Arduino, Raspberry Pi (.NET and Java are in the IF9A SDK package on the Resource Hub; ask Identium support for the others)
Certification	BIS and WPC approved

IF9A-2P (2 ports)

Antenna	9 dBi built-in, plus 1 external antenna port (2 ports in all)
Read range	Up to 25 m effective (tag and environment dependent)
Interfaces	USB, RS232, Wiegand, RJ45, Wi-Fi, PoE, 4G (options)
Work modes	Active (plug and play), Answer (function call)
Outputs	Relay (optional)
Indicator	Multi-function LED: red for power, green for tag read
SDK	.NET, Java, Linux, Python, Arduino, Raspberry Pi

IF9A-4G

Antenna	9 dBi built-in
Read range	Up to 25 m effective (tag and environment dependent)
Interface	Built-in 4G with micro SIM slot; direct push to a cloud server
Outputs	Relay (optional)
Indicator	Multi-function LED: red for power, green for tag read
Material	Die-cast aluminium housing

IF9A-Wifi

Antenna	Built-in 9 dBi
Read range	Up to 25 m effective (depends on tag, mounting and environment)
Memory	Reads EPC, TID and User memory
Wireless	Built-in Wi-Fi with direct HTTP POST
Interfaces	Wi-Fi, USB, RS232, Wiegand, RJ45 Ethernet, PoE
Work modes	Active (plug and play), Answer (command)
Outputs	Relay (optional)
Indicator	Multi-function LED: red for power, green for tag read
SDK	.NET, Java, Linux, Python, Arduino, Raspberry Pi
Material	Die-cast aluminium case

Specifications may change without notice; confirm details in your quotation.

17/ Troubleshooting

Power, network and reading

Problem	Likely cause	What to do
LED does not light	No power reaching the reader	Check that the PoE switch port or injector is on and the RJ45 plug is fully seated; try another cable. On an IF9A-4G, check its power supply.
No reply to ping	PC in a different network, cable fault, or the reader's IP was changed	Give the PC an address in 192.168.1.x with mask 255.255.255.0, check the cable, run `arp –d` and ping again. If the address is unknown, use the search button on the ReaderSense **Connect** page; if the reader still does not appear, contact Identium support.
Connected but no tags are read	Antenna not in use, a tag filter is on, or the tag is out of the zone	Tick **In Use** for antenna 1 (Settings › Antennas) and click **Set**; turn off the Tag Filter; hold the tag in front of the reader.
Short read range	Tag type, nearby metal or liquid, aim, antenna mismatch	Try a long-range tag, re-aim the reader and remove metal from directly in front of it. If the range stays short, contact Identium support for an antenna check.

Auto Mode, software and demos

Problem	Likely cause	What to do
Server receives nothing in Auto Mode	Tag Data not subscribed, Initial Count Condition not Inventory, wrong URL or interface, no 200 reply, no signal	Tick **Tag Data**, set **Initial Count Condition** to **Inventory**, check the Upload URL and Hardware Interface, make the server reply HTTP 200, check the Wi-Fi or 4G signal and SIM data plan.
Ping works but the software will not connect	Another program is connected, reader in Auto Mode, wrong Device Model, or a port blocked	Close the other program: the reader accepts one connection at a time. Return the reader to Passive mode. Choose **IF9A** in **Device Model** (ReaderSense **Connect**). Allow TCP port 8999 through the firewall, and TCP port 8080 for the FASTag demo's Load and Save.
Write fails	Bank locked or wrong data length	Enter the access password; write hex in multiples of 4 characters. Some older tags need **Block write** (Settings › Advance › Gen2 Write Mode).
FASTag demo stops with BadImageFormatException	Built as AnyCPU or x64	Build for x86 and keep the SDK .dll next to the .exe.
The TID column shows 'TID failed: 0x…', or the User column shows '(no User bank)'	Tag left the field, bank locked (0x420), or the tag has no (or a smaller) User bank	Hold the tag still in the field. A locked bank needs the access password; the demo shrinks the User read size by itself.

18/ Support

For help with installation, integration or a fault that the steps above do not clear, contact Identium. Please keep the product model, the software version shown in the app and a short description (or screenshot) of the problem ready.

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WhatsApp	+91 82877 32647
Email	info@identium.in
Software and documents	www.identiumone.com/resourcehub/
Buy hardware and tags	www.indiarfidstore.com

This product and its software are updated from time to time; screens and specifications may change without notice. Check the Resource Hub for the latest version of this manual.