Mercury Installation Manual

This document is a guide to successful integration of Mercury panels with Brivo Onair in two steps: a set of pre-installation procedures and associating the panel with Onair. If you have Mercury panels currently integrated with a legacy access control system, instructions on how to convert a panel can be found in Appendix C.

brivo®
simply better security

BEFORE YOU BEGIN...

What are the minimum requirements for a Mercury Panel?

- Ethernet / LAN
- Internet Connectivity to LAN
- Port 443 on firewall open for outbound HTTPS traffic
- Hub set to Ethernet 10Mbps; half duplex or auto-negotiate
- Proxy server allows outbound HTTPS traffic

If using DHCP...

The panel's MAC address is printed on the label that came with the control panel

If using Static IP...

Be prepared with the following:

- Assigned device IP address
- Network Mask (AKA Subnet Mask)
- Broadcast IP
- Gateway IP
- DNS Server IP address

If changing other Network Parameters...

- Ethernet cable is required
- Default IP address (See the Factory Default Communication Parameters section)
- Default username and password (See the Pre-Configuration Steps section)

How many panels will I need?

To determine the number of panels you need, count the number of doors in your facility and divide by 2. This is the total number of Mercury panels (combination of System Control Processors (SCPs) and Serial Input/Output boards (SIOs)) you will need to manage these doors.

Note: For installations where the panels are connected to a legacy access control system, this may involve adding new panels. For more information on adjusting the connections between existing panels and readers, see the Door/Reader Capacity section.

If you need assistance, contact Brivo Customer Care at customercare@brivo.com or 1.866.274.8648

Site Assessment & Other Planning Information

The first step is to evaluate and fully document the current installation.

Characteristics that should be recorded are:

- Doors
- Inputs
- Outputs
- Access Groups
- Access Permissions
- Time Schedules
- Holiday Schedules
- Elevator cab and floor configuration
- Wiegand card data format(s)
- Anti-Passback Settings
- Number of SIOs connected to each SCP
- Location of all SCPs and SIOs

Brivo Customer Care maintains documents to assist in the documentation of existing installations. The forms shown in Appendix A can be used to help document the existing installation.

Card Readers

Card readers designed for use with the Wiegand electrical interface protocol standard are generally supported. However, approval by Brivo Customer Care is required to ensure system compatibility and support. No RS-485 readers are currently supported.

Note: Refer to Appendix B to assist with compiling the information needed by Brivo Customer Care for a reader evaluation.

Door/Reader Capacity

When associating with a Brivo Onair account, SCPs can only accommodate 14 downstream SIOs at a time. Setups with 15+ SIOs will require additional controllers. Figure 1 below shows the proper method for modifying the wiring for the panel to support this configuration change.

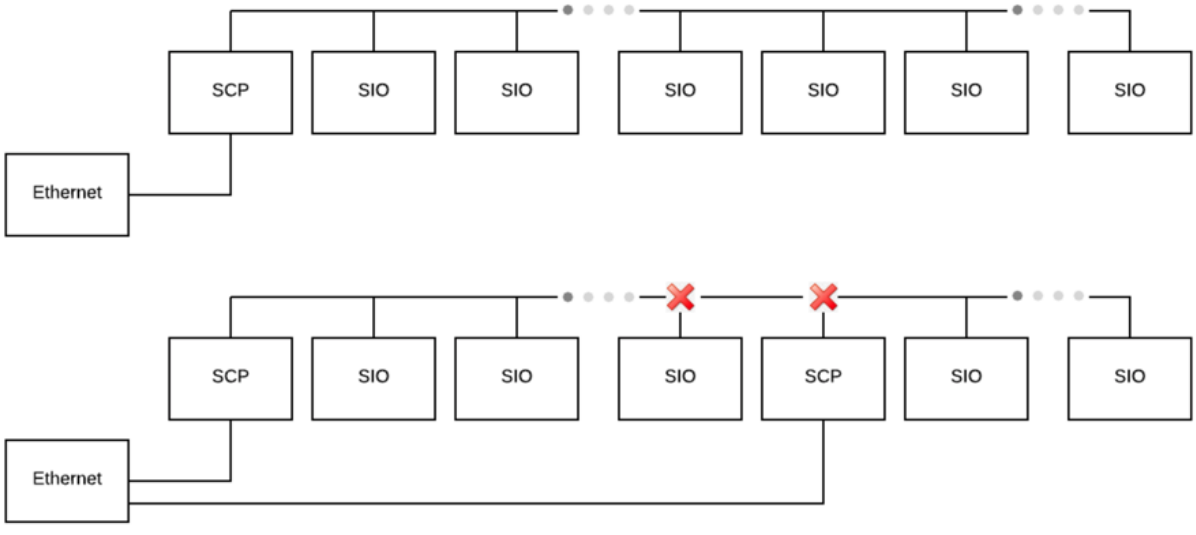


Figure 1 - SIO Panel Replacement

Both the SIO and the SCP have been designed with the same mounting layout, but different cable termination

layouts. When replacing an SIO panel with an SCP controller, the same mounting hardware can be used to mount the SCP, but modifications to wiring harnesses used with the SIO are likely. The RS-485 communication cable with the uplink controller must be severed at the new SCP location and the previous SIO panel in the communication path must have its termination set, as well as the downlink cable severed and preferably removed between the new SCP and the previous SIO as illustrated in Figure 1 (previous page).

Once the new SCP controller(s) are wired to the SIO panels, all downstream panels must be configured with new link addresses starting at Address 1. In addition, a new Internet ready Ethernet cable must also be installed at the new SCP controller location.

If more than 4 outputs are being used by the selected SIO, a new SCP controller must be inserted as opposed to replacing the SIO. Alternatively, a different SIO configured with 4 outputs or less up the link must be selected instead. For instance, if SIO panel 15 is configured to use 5 outputs, and panel 14 is only using 4 outputs, SIO panel 14 would be a good candidate for an SCP replacement. In this circumstance, the severed RS-485 cable will be between SIO panel 13 and panel 14 (the new SCP location).

Systems using the Mercury MUX8, 8-port multi-device interface modules must ensure there are no more than 14 SIO panels connected to any one SCP controller. RS-485 networks using MUX8 modules can be complex, therefore care must be taken to ensure a proper configuration of each SCP and connected SIOs. Proper insertion or replacement of SIOs with SCPs is critical to ensure correct configuration.

Input Supervision

While Mercury SCPs have the ability to utilize custom resistance values, Brivo Onair currently only accepts dual 1K end of line value, or no supervision at all.

A thorough assessment of all existing input connections should be completed to mitigate any issues that might arise during the transformation from the existing system. The diagram at right illustrates an example of proper wiring on an SCP controller for both supervised and unsupervised inputs. Wiring for an SIO dual reader board follows similarly (Figure 2).

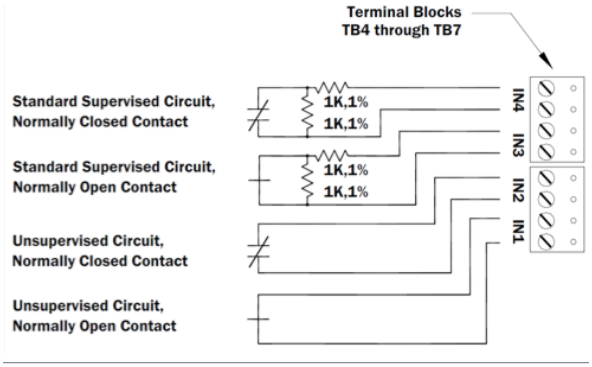


Figure 2 - Input Wiring, Supervised and Unsupervised

Credential Structures

Existing installations using an SCP controller require a thorough assessment of all card formats in use, and a mandatory verification of compatibility with existing Onair formats through Brivo Customer Care. While the Mercury SCP controller will only support card values up to 64-bits in length, combinations of other card database fields may allow for card structures up to or exceeding 128-bits. Although these constraints will affect new installations with higher security requirements, migrating to the Brivo Onair platform using the same credential criterium may fit within the credential binary ranges compatible with Onair.

Formats currently supported are as follows:

- Wiegand standard 26-bit
- Wiegand 37-bit HID
- Corporate 1000 35-bit and 48-bit

Note: Formats not compatible with Brivo Onair require custom implementation from Brivo Customer Care.

Importing Credential Database

Most systems provide import/export utilities that are typically used for connections to HR or other authoritative or backup sources. Collaboration with Brivo Customer Care will provide the necessary assistance and guidance with credential data transformations.

Elevator Control

The Brivo Onair Mercury SCP integration supports the capability to control up to 88 floors. Sites with floors greater than 88 will require a second reader in the cab connected to a second SCP with the appropriate number of SIOs to access another (typically higher) range of floors.

Alarm Panel Interface

Direct communication with an Intrusion Alarm Panel is not supported, although a hardwired interface is possible as illustrated in Figure 3.

Outputs energized on the Mercury hardware cause input activations on the Alarm Panel, providing a level of automation necessary to achieve the desired results. Additionally, output activations on an alarm panel can provide input signals to Brivo Onair allowing for a greater level of automation.

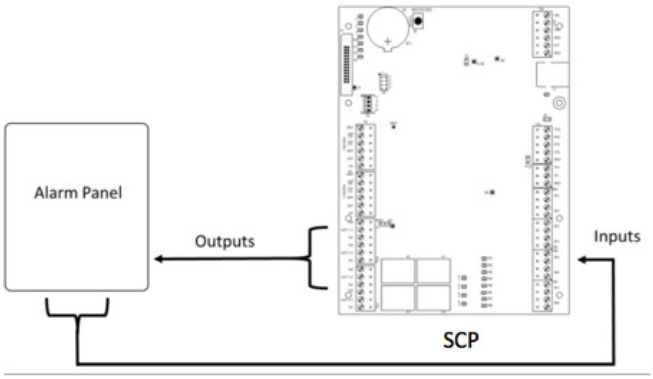


Figure 3 - Alarm Panel Interface

Pre-Installation Procedures

Before you begin installing the Mercury panel, perform the following tasks to ensure a safe, speedy, and successful installation.

Hardware Setup and Wiring

The following section will walk through the hardware setup process. These steps are required prior to getting the Mercury panels associated with an Onair account.

Hardware Setup

Input Power, Cabinet Tamper and UPS Fault Input Wiring (see Figure 4):

- The SCP requires 12 to 24 VDC power. Locate power source as close to the unit as possible. Connect power with minimum of 18 AWG wire. Observe POLARITY on 12 to 24 VDC input.
- Connect the GND signal to earth ground in ONE LOCATION within the system! Multiple earth ground connections may cause ground loop problems and is not advised.

There are two dedicated inputs for cabinet tamper and UPS fault monitoring. Normal (safe) condition is a closed contact. If these inputs are not used, install a jumper wire.

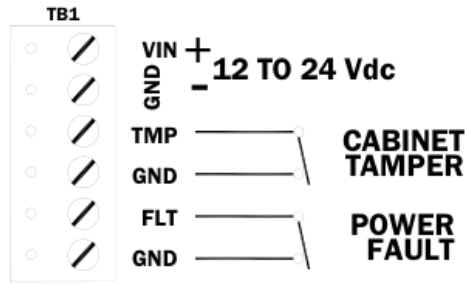


Figure 4

Wiring Recommendations

Wiring recommendations are in the table below.

Signal	Belden #orEquivalent	AWG	Twisted Pair	Conductor	Shielded?	Max Length
RS-485 Comm, two wire	9841	24	Yes		Yes	4000 ft
Power (22 Gauge)	5504FE	22	Yes		Yes	600 ft
Power (18 Gauge)	6300FE	18	Yes		Yes	1500 ft
R145-Ethernet	N/A	Cat5	Yes		Yes	330 ft
Request-to-Exit	5520FE/6300FE	22/18	Yes		Yes	1500 ft
Door Contact	5500FE	22	Yes		Yes	1500 ft
Reader Option 1 (22 AWG)	5504FE	22		Yes	Yes	250 ft
Reader Option 2 (20 AWG)	5400FE	20		Yes	Yes	300 ft
Reader Option 3 (18 AWG)	6300FE	18		Yes	Yes	500 ft

Communication Wiring

Mercury SCP controllers communicate to the host via the on-board 10-BaseT/100Base-TX Ethernet interface J2 (port 0). The serial I/O device communication port (TB3) is a 2-wire RS-485 interface (see Figure 5), which can be used to connect additional I/O panels. The interface allows multi-drop communication on a single bus of up to 4,000 feet (1,219 m). Use twisted pairs (minimum 24 AWG) with drain wire and shield for communication.

Note: Install the termination jumper ONLY on the panel at each end of the RS-485 bus. Failure to do so will compromise the proper operation of the communication channel.

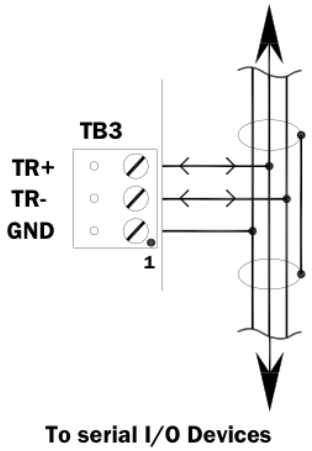


Figure 5 - RS-485 2-Wire Connection Diagram

Reader Wiring

Each reader port supports a reader with Wiegand (D1/D0) or Magnetic Stripe (Clock/Data) TTL signaling. Power to the readers is selectable: 12 VDC (VIN must be greater than 20 VDC), or power is passed-through (PASS) from the input voltage of the SCP (TB1-VIN). Readers that require different voltage or have high current requirements must be powered separately. Refer to the manufacturer's specifications for cabling requirements for your readers. In the 2-wire LED mode the buzzer output is used to drive the second LED. Reader port configuration is set via the host software.

To fully utilize each reader port: TTL signaling requires a shielded 6-conductor cable (18 AWG), see Figure 6 below. If the input voltage to the SCP is 12 VDC, jumper J7 MUST be in the PASS position, see Figure 7 below.

12V PASS	READER POWER
▪ ▪ ▪	12 Vdc IS AVAILABLE ON READER PORTS (VIN≥20 Vdc)
▪ ▪ ▪	VIN POWER IS "PASSED THROUGH" TO READER PORTS

Figure 6

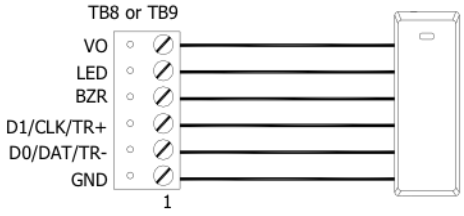


Figure 7

Input Circuit Wiring

Typically, these inputs are used to monitor door position, request to exit, or alarm contacts. Input circuits can be configured as unsupervised or supervised. When unsupervised, reporting consists of only the open or closed states. When configured as supervised, the input circuit will report not only open and closed, but also open circuit, shorted, grounded, and foreign voltage.

A supervised input circuit requires two resistors be added to the circuit to facilitate proper reporting. The standard supervised circuit requires 1k ohm, 1% resistors and should be located as close to the sensor as possible. Custom end of line (EOL) resistances may be configured via the host software. The input circuit wiring configurations shown in Figure 8 are supported but may not be typical.

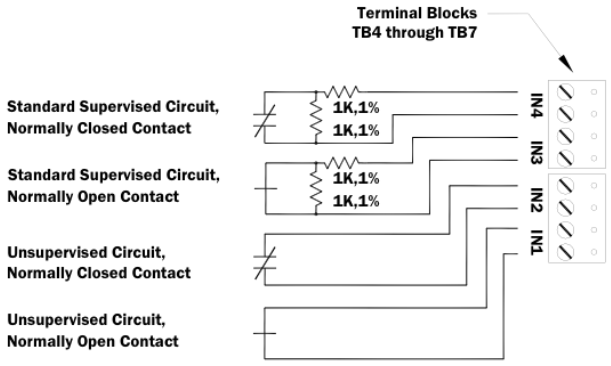


Figure 8 - RS-485 2-Wire Connection Diagram

Relay Circuit Wiring

Four relays with Form-C contacts are provided for controlling door lock mechanisms or alarm signaling. The relay contacts are rated at 5 A @ 30 VDC, dry contact configuration. Each relay has a Common pole (C), a Normally Open pole (NO) and a Normally Closed pole (NC). When you are controlling the delivery of power to the door strike, the Normally Open and Common poles are used. When momentarily removing power to unlock the door, as with a mag lock, the Normally Closed and Common poles are used. Check with local building codes for proper egress door installation.

Door lock mechanisms can generate feedback to the relay circuit that can cause damage and premature failure of the relay. For this reason, it is recommended that a diode be used to protect the relay. Wire should be of sufficient gauge to avoid voltage loss.

Diode Selection (Figure 9)

Diode current rating: 1x strike current
Diode breakdown voltage: 4x strike voltage
For 12 VDC or 24 VDC strike, diode 1N4002 (100V/1A) typical.

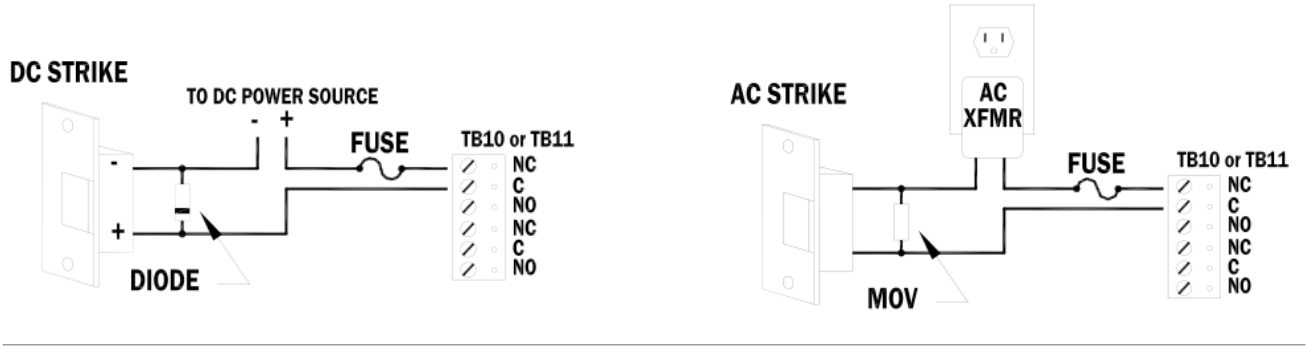


Figure 9

Memory and Real Time Clock Backup Battery

The static RAM and the real time clock are backed up by a lithium battery when input power is removed. This battery should be replaced annually. If data in the static RAM is determined to be corrupt after power up, all data, including flash memory, is considered invalid and is erased All configuration data must be re-downloaded. Remove the insulator from the battery holder after installation. Battery type: BR2325, BR2330, or CR2330.

Panel Setup

After you have the Mercury hardware set up, it is recommended to factory default the panel before configuration.

Bulk Erase Configuration Memory

The bulk erase function can be used for the following purposes:

- Erase all configuration and cardholder database (sanitize board)
- Update OEM default parameters after OEM code has been changed
- Recover from database corruption causing SCP board to continuously reboot

If clearing the memory does not correct the initialization problem, contact Brivo Customer Care.

Bulk Erase Steps

Do not remove power during steps 1-8.

1. Set S1 DIP switches to: 1 & 2 “ON”, 3 & 4 “OFF”.
2. Apply power to the SCP board.
3. Watch for LEDs 1 & 2 and 3 & 4 to alternately flash at a 0.5 second rate.
4. Within 10 seconds of powering up, change switches 1 or 2 to “OFF”. If these switches are not changed, the SCP board will power up using the OEM default communication parameters.
5. LED 2 will flash indicating that the configuration memory is being erased.
6. Full memory erase takes up to 60 seconds.
7. When complete, only LEDs 1 & 4 will flash for 8 seconds.
8. The SCP board will reboot 8 seconds after LEDs 1 & 4 stop flashing (no LEDs are on during this time).

Factory Default Communication Parameters

After you have factory defaulted the panel, the following is the default network parameters.

Network: static IP address: 192.168.0.251
Subnet Mask: 255.255.0.0
Default Gateway: 192.168.0.1
DNS Server: 192.168.0.1
Primary Host port: IP server, no encryption, port 3001, communication address: 0
Alternate Host Port 1: RS-232, 38,400 baud, no encryption, no flow control.

Pre-Configuration Steps

Once you have reached the panel...

1. Set DIP switch 1 to ON and login into the panel using the default username and password. You will have 5 minutes after setting DIP switch 1 on to login.

   Username: admin
   Password: password

2. Once logged in, it is recommended to add a new user. In order to maintain a high degree of security, the default account and password MUST be changed. Click on the user tab, add a new user and password, then click save.
3. Set the panel to desired network parameters either DHCP or a specific Static IP under the network tab.
4. Go to device info and write down MAC address and FW revision. This information will be needed shortly.
5. Go to apply settings and the panel will reboot.
6. Connect a properly terminated Ethernet cable (Category 5 or higher) to the SCP Ethernet port, with the other end connected to a network switch that has connectivity to the Internet.

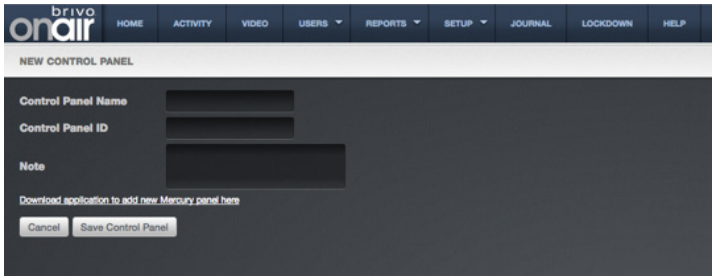
What if I have existing panels?

If you have an existing panel, see Appendix C for steps that must be executed prior to associating the panel with Onair.

Associating the Panel with Onair

Adding a New Control Panel

1. Login to your Onair account.
2. Navigate to the Setup tab and down to Setup → Sites/Doors → New Control Panel



3. Type in the desired name for the control panel
4. Insert the Control Panel ID. This will be the panel's MAC address with the prefix "SCP-." (Ex. SCP-1234567890)
5. Input any notes and then click Save Control Panel

The panel has now been associated to the Onair account. Ensure that the panel is now communicating and continue with configuring your Onair account. For additional notes on Onair configuration, please read the *Brivo Onair Administrator's Manual.*

Appendix A: Site Assessment Worksheets

Reader Installation Worksheet

COMPANY NAME | MASTER ADMIN. | DATE

SITE NAME | TECHNICIAN | DEALER REF. #

PANEL DESCRIPTION	KEYPAD	RS-485?	WIEGAND?	LED	BUZZ	NOTES
ex. North Entrance	KP123	Yes (No)	(Yes) No	(2-Wire) 1-Wire	Yes (No)	
1				2-Wire 1-Wire	Yes No	
2				2-Wire 1-Wire	Yes No	
3				2-Wire 1-Wire	Yes No	
4				2-Wire 1-Wire	Yes No	
5				2-Wire 1-Wire	Yes No	
6				2-Wire 1-Wire	Yes No	
7				2-Wire 1-Wire	Yes No	
8				2-Wire 1-Wire	Yes No	
9				2-Wire 1-Wire	Yes No	
10				2-Wire 1-Wire	Yes No	
11				2-Wire 1-Wire	Yes No	
12				2-Wire 1-Wire	Yes No	
13				2-Wire 1-Wire	Yes No	
14				2-Wire 1-Wire	Yes No	
15				2-Wire 1-Wire	Yes No	
16				2-Wire 1-Wire	Yes No	
17				2-Wire 1-Wire	Yes No	
18				2-Wire 1-Wire	Yes No	
19				2-Wire 1-Wire	Yes No	
20				2-Wire 1-Wire	Yes No	
21				2-Wire 1-Wire	Yes No	
22				2-Wire 1-Wire	Yes No	
23				2-Wire 1-Wire	Yes No	
24				2-Wire 1-Wire	Yes No	
25				2-Wire 1-Wire	Yes No	
26				2-Wire 1-Wire	Yes No	
27				2-Wire 1-Wire	Yes No	
28				2-Wire 1-Wire	Yes No	
29				2-Wire 1-Wire	Yes No	
30				2-Wire 1-Wire	Yes No	

Door Installation Worksheet

COMPANY NAME | MASTER ADMIN. | DATE

SITE NAME | TECHNICIAN | DEALER REF. #

DOOR NAME	CONTROL PANEL ID #	BOARD #	DOOR NODE (1-2)	READER TYPE*	HAS REX**	DOOR AJAR THRESHOLD (30-600 SECS.)	INVALID PINS THRESHOLD (1-10 PINS, 10-600 SECS.	PASS THROUGH PERIOD (1-600 SECS)	ALARM SHUNT DELAY (1-240 SECS)
ex. Lobby Door	CP123456	8	1	(C) K D B	Yes (No)	☒ 123	3 / 120	10	1
1				C K D B	Yes No	☐	/		
2				C K D B	Yes No	☐	/		
3				C K D B	Yes No	☐	/		
4				C K D B	Yes No	☐	/		
5				C K D B	Yes No	☐	/		
6				C K D B	Yes No	☐	/		
7				C K D B	Yes No	☐	/		
8				C K D B	Yes No	☐	/		
9				C K D B	Yes No	☐	/		
10				C K D B	Yes No	☐	/		
11				C K D B	Yes No	☐	/		
12				C K D B	Yes No	☐	/		
13				C K D B	Yes No	☐	/		
14				C K D B	Yes No	☐	/		
15				C K D B	Yes No	☐	/		
16				C K D B	Yes No	☐	/		
17				C K D B	Yes No	☐	/		
18				C K D B	Yes No	☐	/		
19				C K D B	Yes No	☐	/		
20				C K D B	Yes No	☐	/		

* Reader Types: C - Card Reader; K - Keypad; D - Dual Reader (Card Reader & Keypad); B - Biometric ** REX - Request-to-Exit Switch / Sensor

CARDS

- ☐ Standard 26-Bit
- ☐ HID Corporate 1000
- ☐ HID Corporate 1000 48-Bit
- ☐ HID 37-Bit
- ☐ HID 37-Bit with Facility Code
- ☐ Generic 34-Bit (Even Parity)
- ☐ Generic 34-Bit (Odd Parity)
- ☐ Casi Rusco 40-Bit
- ☐ 128-Bit PIV
- ☐ 64-Bit BCD PIV for pivCLASS
- ☐ 64-Bit Reverse RCD PIV for pivCLASS
- ☐ 75-Bit PIV
- ☐ Allegion 34-Bit Wiegand
- ☐ FASC-N
- ☐ HID 33-Bit
- ☐ HID 33 D10202-Bit

FACILITY CODE | COMPANY ID CODE

Input/Output Board Installation Worksheet

COMPANY NAME | MASTER ADMIN. | DATE

SITE NAME | TECHNICIAN | DEALER REF. #

DEVICE NAME	CONTROL PANEL ID #	BOARD # (2-16)	IO TYPE*	INPUT (1-8)	OUTPUT (1-8)	OUTPUT BEHAVIOR **
ex. Motion Sensor Switch	CP123456	8	(I) NO/NC	6	7	(L) U F P
1			I NO/NC			L U F P
2			I NO/NC			L U F P
3			I NO/NC			L U F P
4			I NO/NC			L U F P
5			I NO/NC			L U F P
6			I NO/NC			L U F P
7			I NO/NC			L U F P
8			I NO/NC			L U F P
9			I NO/NC			L U F P
10			I NO/NC			L U F P
11			I NO/NC			L U F P
12			I NO/NC			L U F P
13			I NO/NC			L U F P
14			I NO/NC			L U F P
15			I NO/NC			L U F P
16			I NO/NC			L U F P
17			I NO/NC			L U F P
18			I NO/NC			L U F P
19			I NO/NC			L U F P
20			I NO/NC			L U F P
21			I NO/NC			L U F P
22			I NO/NC			L U F P
23			I NO/NC			L U F P
24			I NO/NC			L U F P
25			I NO/NC			L U F P
26			I NO/NC			L U F P
27			I NO/NC			L U F P
28			I NO/NC			L U F P
29			I NO/NC			L U F P
30			I NO/NC			L U F P

* I = Input; NO = Normally Open; NC = Normally Closed ** L = Latch; U = Unlatch; F = Follow; P = Pulse

Appendix B: Reader Evaluation Requests

Brivo will evaluate and qualify a reader for installation with the Mercury SCP. All we ask is that you provide us with a reader and the credentials required for operation. Evaluation of a reader may take up to two weeks to complete. Any reader sent to Brivo must be in "like new" condition and free of defects.

Include the following in an email to customercare@brivo.com to get started.

Contact Information

- Your Full Name
- Phone Number (direct to you, if possible)
- Email Address
- Company Name and Full Address

Reader Type

Indicate what type of reader you need to have evaluated (select from the following).

- Prox 125KHz
- SC 13.56MHz
- RF
- Multi-Tech
- Barcode / Magstripe

Note: if your reader type is not included in this list, indicate what type of reader it is to the best of your understanding

Requirements for your Reader

More than one may apply. Indicate whether or not your reader…

- must operate at 500 feet
- will be used in an elevator
- requires power
- must operate with specific credentials

Comments

In your email, include any additional information Brivo Customer Care might need to help with the evaluation.

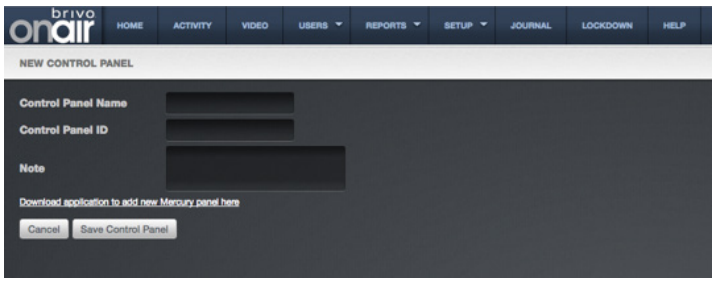
Appendix C: Converting the Panel to Communicate with Brivo

Mercury controllers are added to the Brivo Onair system using a process which mutually authenticates the hardware to the Brivo account in order to securely register the panel. The process involves downloading a zip file from the Brivo Onair site, which includes a Java application that is used to generate the required X.509 certificates, and properly register the controller into the Brivo system. Once downloaded, the application is extracted and launched from a client computer.

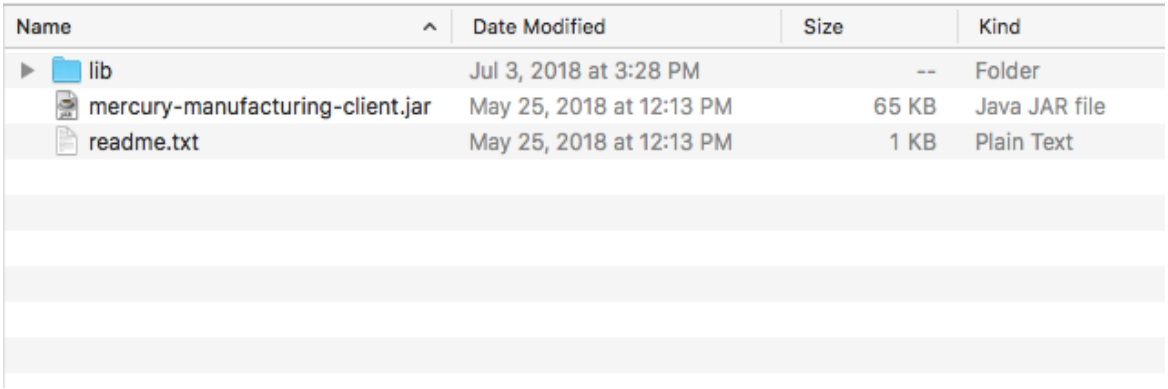
Follow the steps below after completing the Site Assessment and Pre-Installation Procedures described in this document. Once you have completed these steps you will need to associate the panel with Onair as described in the Associating a Panel with Onair section.

Manufacturing Client

1. Log into to the Brivo Onair account using the appropriate credentials previously provided.
2. Navigate to the Setup tab and down to Setup → Sites/Doors → New Control Panel. The Control Panels List page displays.
3. Click on the 'New Control Panel' button; the New Control Panel page will be displayed.

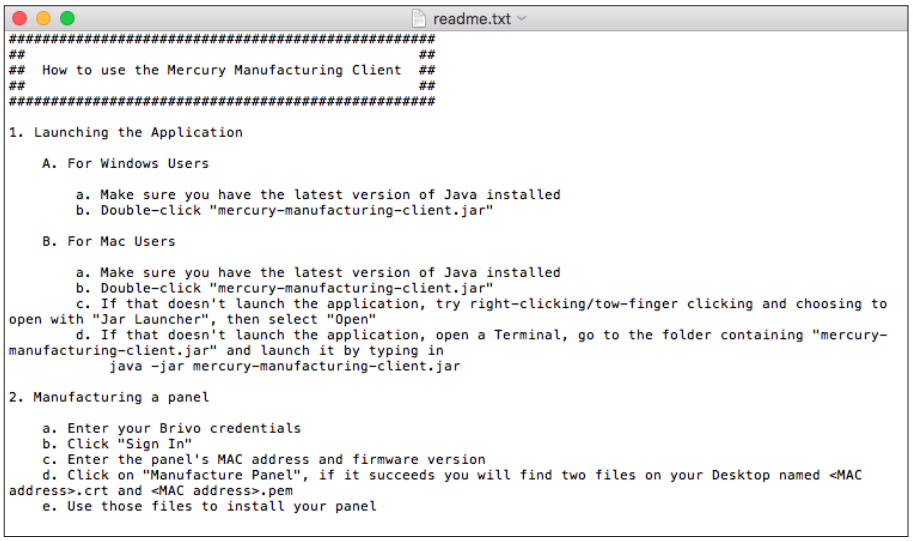


4. Below the Notes field, click on the "Download application to add new Mercury panel here" link.
5. The Mercury manufacturing client zip file will download. You only need to download this file once. It can be used on any Mercury SCP panel.



6. Expand the zip file which will display the contents of the mercury-manufacturing-client-1.0.0 folder: a .jar file that contains the information necessary to run the manufacturing client on the local computer and a readme.txt file.

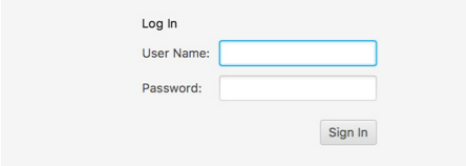
7. Open the readme.txt file and follow the instructions within.



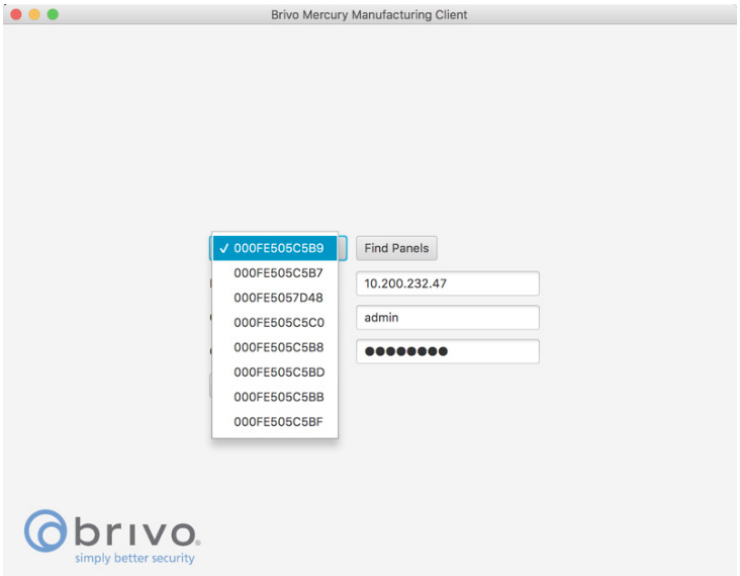
8. Once you have clicked on the mercury-manufacturing-client.jar file, the Brivo Mercury Manufacturing Client window appears.

9. Enter your Brivo Onair User Name and Password and click Sign In.

   Note: Only Master, Super, Senior, and Installer admin accounts will work.



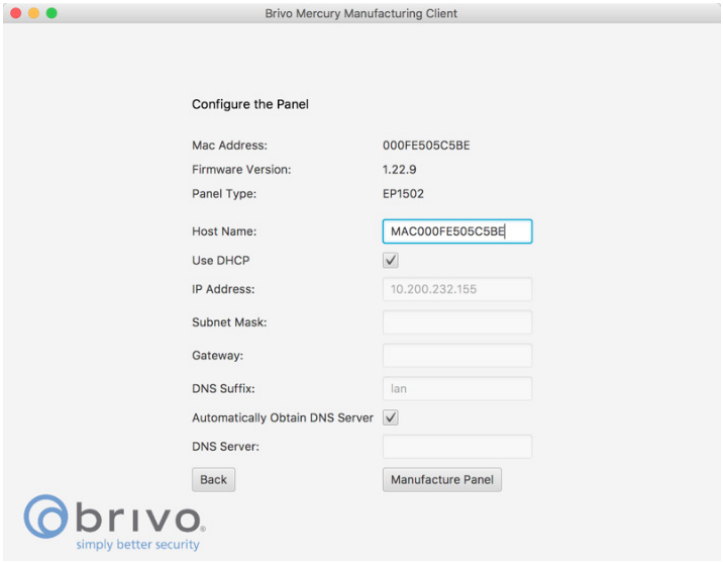
10. The manufacturing client will search for panels on your network. Once it has done that, it will display the IP address(es) of the panel(s) found on your network. Select the panel you want to manufacture from the dropdown list and click on the Panel Settings button.



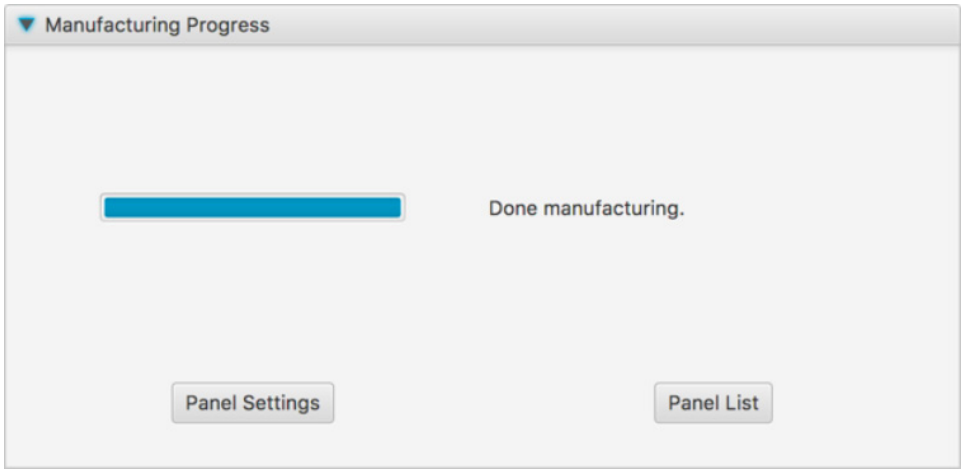
11. The Configure Panel page displays where you may view and/or change the Host Name and IP settings of the Mercury Panel.

    Note: The Control Panel ID number of the Mercury panels in Brivo Onair is the panel's MAC address with the prefix SCP.

    For example, SCP-1234567890.



12. Make any changes that are needed and click the Manufacture Panel button which will run the manufacturing client.



13. Once the manufacturing process is complete, the Mercury panel can be associated with your Brivo Onair account.

Appendix D: EP1502 Technical Information

EP1502 Board Specifications

Primary Power	12 to 24 VDC ± 10 %, 500 mA maximum (reader current not included)
Memory and Clock Backup Battery:	3 Volt Lithium, type BR2325, BR2330 or CR2330
Host Communication:	Ethernet: 10-BaseT/100Base-TX, and RS-232: 9,600 to 115,200 bps
Serial I/O Device	2-wire RS-485: 2,400 to 115,200 bps
Inputs:	Eight unsupervised/supervised, standard EOL: 1k/1k ohm, 1%, ¼ watt Two unsupervised dedicated for cabinet tamper and UPS fault monitoring
Outputs:	Four relays: Form-C, 5 A @ 30 VDC, resistive
READER INTERFACE:	
Power: (jumper selectable)	12 VDC ± 10 % regulated, 180 mA maximum each reader (input voltage (VIN) must be greater than 20 VDC) or 12 to 24 VDC ± 10 % (input voltage passed through), 180 mA maximum each reader
Data Inputs:	TTL compatible
LED Output:	TTL levels, high>3 V, low<0.5 V, 5 mA source/sink maximum
Buzzer Output:	Open collector, 12 VDC open circuit maximum, 40 mA sink maximum
CABLE REQUIREMENTS:	
Power:	1 twisted pair, 18 AWG
Ethernet:	CAT-5, minimum
RS-485:	1 twisted pair with drain wire and shield, 24 AWG, 4,000 ft. (1,219 m) max.
(I/O Device Port) (Reader Port)	1 twisted pair with drain wire and shield, 24 AWG, 2,000 ft. (610 m) max.
Alarm Input:	1 twisted pair, 30 ohms maximum
MECHANICAL:	
Dimension:	8 in. (203.2 mm) W x 6 in. (152.4 mm) L x 1 in. (25 mm) H
Weight:	9 oz. (255 g) nominal, board only
ENVIRONMENTAL:	
Temperature:	-55 to +85 °C, storage 0 to +70 °C, operating
Humidity:	5 to 95 % RHNC
SECURITY:	
Host Communication Security Profile:	HTTPS/TLS1.2+, with AES256 encryption. Panel to host mutual authentication with X.509 digital certificates

EP1502 Terminal Block Connections

The table below shows the terminal block connections for TB1 through TB11.

CONNECTION			CONNECTION		
TB1-1	GND	Power Fault	TB8-1	GND: Ground	Reader 1
TB1-2	FLT	Input	TB8-2	DAT/D0: Data/Data 0	
TB1-3	GND	Cabinet	TB8-3	CLK/D1: Clock/Data 1	
TB1-4	TMP	Tamper Input	TB8-4	BZR: Reader Buzzer	
TB1-5	GND	Power Input	TB8-5	LED: Reader LED	
TB1-6	VIN	12 to 24 VDC	TB8-6	VO: Reader Power	
TB2-1	GND	Host Port 1	TB9-1	GND: Ground	Reader 2
TB2-2	CTS	(RS-232)	TB9-2	DAT/D0: Data/Data 0	
TB2-3	RTS		TB9-3	CLK/D1: Clock/Data 1	
TB2-4	RXD		TB9-4	BZR: Reader Buzzer	
TB2-5	TXD		TB9-5	LED: Reader LED	
TB3-1	GND	SIO Port	TB9-6	VO: Reader Power	
TB3-2	TR-	(2-wire RS-485)	TB10-1	NO: Normally Open Contact	Out 1
TB3-3	TR+		TB10-2	C: Common	
TB4-1	IN2-	Input 2	TB10-3	NC: Normally Closed Contact	
TB4-2	IN2+		TB10-4	NO: Normally Open Contact	Out 2
TB4-3	IN1-	Input 1	TB10-5	C: Common	
TB4-4	IN1+		TB10-6	NC: Normally Closed Contact	
TB5-1	IN4-	Input 4	TB11-1	NO: Normally Open Contact	Out 3
TB5-2	IN4+		TB11-2	C: Common	
TB5-3	IN3-	Input 3	TB11-3	NC: Normally Closed Contact	
TB5-4	IN3+		TB11-4	NO: Normally Open Contact	Out 4
TB6-1	IN6-	Input 6	TB11-5	C: Common	
TB6-2	IN6+		TB11-6	NC: Normally Closed Contact	
TB6-3	IN5-	Input 5			
TB6-4	IN5+				
TB7-1	IN8-	Input 8			
TB7-2	IN8+				
TB7-3	IN7-	Input 7			
TB7-4	IN7+				

EP1502 Jumpers

The EP1502 processor hardware interface is configured using jumpers to setup the port interface and end of line termination.

JUMPER	SET AT	DESCRIPTION
J1	N/A	Factory Use Only
J2	N/A	10-Base-T/100Base-Tx Ethernet Connection (Port 0)
J3	N/A	Factory Use Only
J4	N/A	Factory Use Only
J5	OFF	Port 2 RS-485 EOL Terminator is Off
	ON	Port 2 RS-485 EOL Terminator is On
J6	N/A	Factory Use Only
J7		Reader Power Select. See Note 1
12V	Internal 12 VDC at Reader Ports	
PASS	VIN "Pass Through" to Reader Ports	
J8-1	N/A	Remote Status LED #1. See Note 2
J8-2	N/A	Remote Status LED #2. See Note 2
J8-3	N/A	Remote Status LED #3. See Note 2
J8-4	N/A	Remote Status LED #4. See Note 2

Note 1: The input power (VIN) must be 20 VDC minimum if the 12V selection is to be used.

Note 2: Observe polarity connection to LED. External current limiting is not required.

EP1502 DIP Switches

The four switches on S1 DIP switch configure the operating mode of the EP1502 processor. DIP switches are read on power-up except where noted. Pressing switch S2 causes the EP1502 to reboot.

1	2	3	4	DEFINITIONS
OFF	OFF	OFF	OFF	Normal operating mode.
ON	X	X	X	After initialization, enable default User Name (admin) and Password (password). The switch is read on the fly, no need to re-boot. See IT Security section for additional information.
OFF	ON	X	OFF	Use factory default communication parameters.
ON	ON	X	OFF	Use OEM default communication parameters. Contact system manufacture for details. See Bulk Erase below.
X	X	ON	X	Disable TLS secure link. Switch is read only when logging on.
ON	ON	OFF	OFF	Bulk Erase prompt mode at power up.

All other switch settings for unassigned and are reserved for future use. X = don't care.

In the factory or OEM default modes, downloaded configuration/database is not saved to flash memory.

Appendix E: LP1502 Technical Information

LP1502 Board Specifications

Primary Power	12 to 24 Vdc ± 10 %, 500 mA maximum (reader and USB ports not included)
Reader Ports	600 mA maximum (add 600 mA to primary power current)
Micro USB Port	5 Vdc, 500 mA maximum (add 270 mA to primary power current)
Memory and Clock Backup Battery:	3 Volt Lithium, type BR2330 or CR2330
microSD Card	Format: microSD or microSDHC; 2GB to 8GB
Host Communication:	Ethernet: 10-BaseT/100Base-TX and Micro USB port (2.0) with optional adapter: pluggable model USB2-OTGE100
Serial I/O Device	One each: 2-wire RS-485, 2,400 to 115,200 bps, asynchronous, half-duplex, 1 start bit, 8 data bits, and 1 stop bit
Inputs:	Eight unsupervised/supervised, standard EOL: 1k/1k ohm, 1%, ¼ watt Two unsupervised dedicated for cabinet tamper and UPS fault monitoring
Outputs:	Four relays, Form-C with dry contacts Normally open contact (NO) contact: 5 A @ 30 Vdc resistive Normally closed contact (NC) contact: 3 A @ 30 Vdc resistive
READER INTERFACE:	
Power: (jumper selectable)	12 VDC ± 10 % regulated, 300 mA maximum each reader (input voltage (VIN) must be greater than 20 VDC) or 12 to 24 VDC ± 10 % (input voltage passed through), 300 mA maximum each reader
Data Inputs:	TTL compatible, F/2F or 2-wire RS-485
RS-485 Mode	9,600 to 115,200 bps, asynchronous, half-duplex, 1 start bit, 8 data bits, and 1 stop bit. Maximum cable length: 2000 ft. (609.6 m)
LED Output:	TTL levels, high>3 V, low<0.5 V, 5 mA source/sink maximum
Buzzer Output:	Open collector, 12 VDC open circuit maximum, 40 mA sink maximum
CABLE REQUIREMENTS:	
Power:	1 twisted pair, 18 AWG
Ethernet:	CAT-5, minimum
RS-485:	1 twisted pair with drain wire and shield, 24 AWG, 4,000 ft. (1,219 m) max.
(I/O Device Port) (Reader Port)	1 twisted pair with drain wire and shield, 24 AWG, 2,000 ft. (610 m) max.
Alarm Input:	1 twisted pair, 30 ohms maximum
MECHANICAL:	
Dimension:	8 in. (203.2 mm) W x 6 in. (152.4 mm) L x 1 in. (25 mm) H
Weight:	9 oz. (255 g) nominal, board only
ENVIRONMENTAL:	
Temperature:	-55 to +85 °C, storage 0 to +70 °C, operating
Humidity:	5 to 95 % RHNC
SECURITY:	
Host Communication Security Profile:	HTTPS/TLS1.2+, with AES256 encryption. Panel to host mutual authentication with X.509 digital certificates

LP1502 Terminal Block Connections

The table below shows the terminal block connections for TB1 through TB11.

CONNECTION					CONNECTION
TB1-1	GND	Power Fault	TB8-1	GND: Ground	Reader 1
TB1-2	FLT	Input	TB8-2	DAT/D0: Data/Data 0/TR- (A) See Note 1	
TB1-3	GND	Cabinet	TB8-3	CLK/D1: Clock/Data 1/TR+ (B) See Note 1	
TB1-4	TMP	Tamper Input	TB8-4	BZR: Reader Buzzer	
TB1-5	GND	Power Input	TB8-5	LED: Reader LED	
TB1-6	VIN	12 to 24 VDC	TB8-6	VO: Reader Power	
TB2	N/A	Not Used	TB9-1	GND: Ground	Reader 2
TB3-1	GND	SIO Port	TB9-2	DAT/D0: Data/Data 0/TR- (A) See Note 1	
TB3-2	TR- (B)	(2-wire RS-485)	TB9-3	CLK/D1: Clock/Data 1/TR+ (B) See Note 1	
TB3-3	TR+ (A)	See Note 1	TB9-4	BZR: Reader Buzzer	
TB4-1	IN2	Input 2	TB9-5	LED: Reader LED	
TB4-2	IN2		TB9-6	VO: Reader Power	
TB4-3	IN1	Input 1	TB10-1	NO: Normally Open Contact	Out 1
TB4-4	IN1		TB10-2	C: Common	
TB5-1	IN4	Input 4	TB10-3	NC: Normally Closed Contact	
TB5-2	IN4		TB10-4	NO: Normally Open Contact	Out 2
TB5-3	IN3	Input 3	TB10-5	C: Common	
TB5-4	IN3		TB10-6	NC: Normally Closed Contact	
TB6-1	IN6	Input 6	TB11-1	NO: Normally Open Contact	Out 3
TB6-2	IN6		TB11-2	C: Common	
TB6-3	IN5	Input 5	TB11-3	NC: Normally Closed Contact	
TB6-4	IN5		TB11-4	NO: Normally Open Contact	Out 4
TB7-1	IN8	Input 8	TB11-5	C: Common	
TB7-2	IN8		TB11-6	NC: Normally Closed Contact	
TB7-3	IN7	Input 7			
TB7-4	IN7				

Note 1: Terms A & B are from the RS-485 standard.

LP1502 Jumpers

The LP1502 processor hardware interface is configured using jumpers to setup the port interface and end of line termination.

JUMPER	SET AT	DESCRIPTION
J1	N/A	Factory Use Only
J2	N/A	10-Base-T/100Base-Tx Ethernet Connection (Port 0)
J3	N/A	Factory Use Only
J4	N/A	N/A
J5	OFF	Port 2 RS-485 EOL Terminator is Off
	ON	Port 2 RS-485 EOL Terminator is On
J6	N/A	MicroUSB Port (2.0)
J7		Reader Power Select. See Note 2
	12V	12 VDC at Reader Ports
	PASS	VIN "Pass Through" to Reader Ports
J8	N/A	microSD Card

*Note 2: Install jumper J7 in the 12V position **ONLY** if the input voltage (VIN) is greater than 20 VDC! Failure to do so may damage the reader or LP1502!*

LP1502 DIP Switches

The four switches on S1 DIP switch configure the operating mode of the LP1502 processor. DIP switches are read on power-up except where noted. Pressing switch S2 causes the LP1502 to reboot.

1	2	3	4	DEFINITIONS
OFF	OFF	OFF	OFF	Normal operating mode.
ON	X	OFF	OFF	After initialization, enable default User Name (admin) and Password (password). The switch is read on the fly, no need to re-boot. See IT Security section for additional information.
OFF	ON	OFF	OFF	Use factory default communication parameters.
ON	ON	OFF	OFF	Use OEM default communication parameters. Contact system manufacture for details. See Bulk Erase below.
ON	ON	OFF	OFF	Bulk Erase prompt mode at power up. See Bulk Erase below.
X	X	X	ON	Makes the LP1502 report and function like an EP1502. To be used in situations where the host software has not been updated to support the LP series product line

All other switch settings for unassigned and are reserved for future use. X = don't care.

In the factory or OEM default modes, downloaded configuration/database is not saved to flash memory.

Appendix F: MR52 Technical Information

MR52 Board Specifications

Primary Power	12 to 24 VDC ± 10 %, 550 mA maximum (reader current not included)
Outputs:	Six relays: Form-C, 5 A @ 30 VDC, resistive
Inputs:	Eight unsupervised/supervised, standard EOL: 1k/1k ohm, 1%, 1⁄4 watt Two unsupervised, dedicated for cabinet tamper and UPS fault monitoring
READER INTERFACE:	
Power: (jumper selectable)	12 VDC ± 10 % regulated, 180 mA maximum each reader (input voltage (VIN) must be greater than 20 VDC) or 12 to 24 VDC ± 10 % (input voltage passed through), 180 mA maximum each reader
Data Inputs:	TTL compatible, F/2F or 2-wire RS-485
LED Output:	TTL compatible, high > 3 V, low < 0.5 V, 5 mA source/sink maximum
Buzzer Output:	Open collector, 12 VDC open circuit maximum, 40 mA sink maximum
Communication	2-wire RS-485: 9600, 19200, 38400 or 115200 bps
CABLE REQUIREMENTS:	
Power:	1 twisted pair, 18 AWG
RS-485 I/O Devices:	1 twisted pair with drain wire and shield, 24 AWG, 120 ohm impedance, 4,000 feet (1,200 m) maximum
Alarm inputs:	One twisted pair per input, 30 ohms maximum
Outputs:	As required for the load
Reader data (TTL):	6-conductor, 18 AWG, 500 feet (150 m) maximum
Reader data (F/2F):	4-conductor, 18 AWG, 500 feet (150 m) maximum
Reader data (RS-485):	1 twisted pair with drain wire and shield, 24 AWG, 120 ohm impedance, 2,000 feet (610 m) maximum
MECHANICAL:	
Dimension:	6 in. (15 2mm) W x 8 in. (203 mm) L x 1 in. (25 mm) H
Weight:	11 oz. (312 g) nominal
ENVIRONMENTAL:	
Temperature:	-55 to +85 °C, storage 0 to +70 °C, operating
Humidity:	5 to 95 % RHNC

MR52 Jumpers

JUMPER	DESCRIPTION
J2	Reader Power Select 12V = 12 VDC at reader ports. *** See note below *** PT = VIN "Passed Through" to reader ports
J3	2-Wire/4-Wire Select, install in 2W position only
J5	RS-485 Termination, install in first and last units only
J6	Factory use only
J7	Factory use only
J8	Factory use only
J9	Factory use only
J10	Factory use only
J11	Factory use only
J12	Factory use only
J13	Factory use only
J14	Factory use only
J15	Factory use only

Note: The input power (VIN) must be 20 VDC minimum if the 12 VDC selection is to be used.

MR52 DIP Switch

S8	S7	S6	S5	S4	S3	S2	S1	SELECTION
.	.	.	OFF	OFF	OFF	OFF	OFF	Address 0
.	.	.	OFF	OFF	OFF	OFF	ON	Address 1
.	.	.	OFF	OFF	OFF	ON	OFF	Address 2
.	.	.	OFF	OFF	OFF	ON	ON	Address 3
.	.	.	OFF	OFF	ON	OFF	OFF	Address 4
.	.	.	OFF	OFF	ON	OFF	ON	Address 5
.	.	.	OFF	OFF	ON	ON	OFF	Address 6
.	.	.	OFF	OFF	ON	ON	ON	Address 7
.	.	.	OFF	ON	OFF	OFF	OFF	Address 8

Documentation Disclaimer and Restrictions

Information in this document is subject to change without notice and does not represent a commitment on the part of Brivo Systems LLC. For the most up-to-date information, visit www.brivo.com.

This document and the data herein shall not be duplicated, used or disclosed to others for procurement or manufacturing, except as authorized with the written permission of Brivo Systems LLC. The information contained within this document or within the product itself is considered the exclusive property of Brivo Systems LLC. All information in this document or within the hardware and software product themselves is protected by the copyright and/or other intellectual property laws of the United States.

Revision List

Date	Revision Number	Description
April 10, 2018	1.0	Initial Draft
August 20, 2018	1.1	Updated Mercury client instructions; typographical edits
September 17, 2018	1.2	Content adjustments
April 6, 2020	1.3	Content adjustments

Product Support

All support for this product is provided by the third-party dealer. Please contact the dealer who installed the product with questions and support requests.