micros® Systems, Inc.

MICROS Tablet and Base Station R-Series Setup Guide

Part Number **100016-179 (2nd Edition)**

Declarations

Warranties

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Printing History

New editions of this manual incorporate new and changed material since the previous edition. Minor corrections and updates may be incorporated into reprints of the current edition without changing the date or edition number.

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Preface

In this preface, you'll find information about this manual. Refer to the preface if you have questions about the organization, conventions, or contents of this manual.

In this section

Why Read This Manual?

Purpose

This guide is intended for those who will be setting up, installing and operating the MICROS mTablet and mStation and is not specific to a particular software application.

How This Manual is Organized

This manual is divided into four Chapters, briefly discussed below.

Chapter 1 describes the mTablet, the companion mStation and the optional accessories available. It also contains complete product specifications and approvals.

Chapter 2 goes inside the mTablet and mStation. Topics include how to open the each unit and identify components as well as technical overviews of each unit.

Chapter 3 starts with the care and handling of each device, then goes on to cover the installation and operational aspects of the mTablet from using the power button and mag stripe reader to arranging cables at the mStation IO panel. A detailed description of the start-up screens and a discussion of how to use the Client Application Loader to connect to the system.

Chapter 4 provides an overview of the built-in mTablet and mStation Diagnostics utility.

A Reference section consisting of Equipment Dimensions, Connector/ Cable Diagrams, and FCC Statement can be found at the end of this document.

SHOCK HAZARD

No user serviceable parts inside.
Refer servicing to qualified personnel.

Notation Conventions

Symbols

NOTE

This symbol brings special attention to a related item.

WARNING

This symbol indicates that specific handling instructions or procedures are required to prevent damage to the hardware or loss of data.

SHOCK HAZARD

This symbol calls attention to a potential hazard that requires correct procedures in order to avoid personal injury.

STATIC SENSITIVE DEVICES

This symbol indicates that specific ESD handling procedures are required.

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Chapter 3 - Installation and Operation

Chapter 1

What is the mTablet and mStation

In this chapter

mTablet and mStation Introduction and Overview

The MICROS mTablet is an all new tablet designed for harsh POS environments. Featuring a 10.1” display with a projected capacitive touchscreen, the mTablet utilizes the latest technologies, including a cutting edge dual core processor.

A modular design allows mTablet to feature a secure, integrated magnetic card reader that is capable of hardware encryption of track data. The modular integrated magnetic card reader can be quickly replaced with future additional peripheral devices such as scanners/imagers and RFID readers as they become available.

To meet the needs of the hospitality environment, including both indoor and outdoor operation, the mTablet features an extremely wide operating temperature range, robust casework, and hardened touch screen for a superior level of durability and drop protection, and tight construction to withstand spills and weather.

When the mTablet is combined with the mStation, the result is a complete POS client featuring a full range of peripheral and connectivity options. mStation allows customers to use existing peripherals, from printers to cash drawers and customer displays, scanners and more. Additionally, when wireless networks are not available or experiencing gaps in coverage, the mStation allows customers to take advantage of traditional wired networks, with the included 10/100/1000 Ethernet interface.

The mTablet and mStation provide customers a tailored solution for their business needs. Unlike consumer products, these devices are tailored to the hospitality and retail environments, providing a clean, secure, integrated device, hardened to withstand the day-to-day abuse found in these environments.

Each mTablet ships with the MICROS Client Application Loader (CAL) installed. CAL is the key to the highly intuitive installation and configuration of mTablet, and provides ongoing monitoring and updating of the device.

The MICROS CAL on mTablet allows for device configuration to occur through either a wired network (when installed on mStation) or wireless. In a wired network, the Client Application Loader takes care of assigning an IP address, and downloads the correct database for the mTablet, so it is quickly up and running. If platform updates are available, the CAL will download and install those as well, including new drivers, firmware and OS updates.

Part Numbers and pricing can be found in PMA 13-1061. The Figure below displays the contents of the mTablet (top) and mStation (bottom) shipping contents.

Figure 1-1: mTablet and mStation Loose Parts Kit

mTablet R-Series

The figure below points out the main operating feature of the MICROS mTablet.

Figure 1-2: mTablet Features

10.1” LCD and Touchscreen

The Liquid Crystal Display is 10.1”, with a resolution of 1024x600.

The touchscreen sensor utilizes projected capacitive technology with multi-touch and gesture support. The sensor is made of hardened Dragontail® glass for superior scratch and shatter resistance.

Two LCD options are available; standard 10.1” LED backlit TFT LCD and a daylight readable TFT based on adaptive LCD technology.

The adaptive display automatic transitions from a transmissive color LCD panel to a monochrome reflective panel that does not require backlights. It conserves power and increases battery life. The type of display installed is indicated by the color of the mTablet logo.

Figure 1-3: Daylight Readable Display (Left) and Standard Display (Right)

Processor

The Freescale processor, the i.MX6, was selected to meet the balance of high performance and low power consumption. The new processor is based on the ARM Cortex A9 architecture and is part of a family of processors offering a range of performance options. The 1GHz dual core model selected for mTablet provides excellent performance with maximum battery life.

Persistent Storage

The mTablet utilizes both fixed and removable storage devices.

For fixed storage, the mTablet main board includes a 4GB eMMC flash device, designated ‘BOOT’. This device contains multiple partitions including boot and recovery. The boot partition contains the WEC7 operating system and platform files.

The mTablet removable storage is a microSD Card, chosen for its small form factor, and relative low cost per GB. Designated ‘STORE’, it holds the mTablet registry, application files and off-line totals.

The mTablet is shipped with the microSD installed; *it is required for the mTablet to start* and used by all MICROS applications. The removable nature of the microSD card supports the Personality Module feature.

The microSD card is located behind the MSR assembly, secured by four 1.5mm hex head screws. Each mTablet is supplied with a compatible hex wrench.

Magnetic Card Reader

The ultra thin, modular, encryption ready 3-track magnetic stripe reader (MSR) is attached to the mTablet with four 1.5mm hex screws. The perm alloy head material (~80% nickel, 20% iron) features excellent wear characteristics, and is capable providing more than 2 million read operations.

Behind the MSR module is the removable microSD card. The seam between the MSR assembly and main body of mTablet is fully gasketed, providing high levels of protection against spills.

Coming soon is a new optional mTablet accessory that combines the MSR with a scanner and NFC/RFID Reader.

Encryption Ready MSR

The MSR is capable of encryption at the swipe using a Triple Data Encryption (TDES or 3DES) algorithm with Derived Unique Key Per Transaction (DUKPT) key rotation algorithm. The MSR is currently injected with a Merchantlink key and shipped in non-encrypting mode. MICROS applications that support encryption will enable encryption at the start of POS operations.

Power Button

The multi-function power button is located at the upper left corner of the portrait mTablet. It is used to turn on and off the tablet, and enter/exit the suspend power state. The power button can also be used to activate the MICROS Factory Recovery.

Battery LED

A three-color LED at the right corner of the LCD in portrait mode indicates the mTablet battery charge or discharge status. Detailed behavior of the Battery LED is provided in Chapter 3.

Ambient Light Sensor

The Ambient Light Sensor (ALS) provides automatic adjustment of the LCD brightness. The ambient light adjustments behave differently based on the panel type installed. With the standard LCD, the backlight brightness increases as ambient lighting increases. With the daylight viewable adaptive LCD, the backlight brightness decreases when a set ambient light level is reached; and turned off in high bright/outdoor conditions.

Charging/Communications Connectors

The lower half of Figure 1-2 highlights the three connectors on mTablet, working from left to right. The connectors are gasketed and electrically isolated, ensuring that there are no issues if liquids come in contact with this area.

On the left side, the Multi-Bay Charger pins line up with the ‘pogo’ pins in the Charging Tray and are used only for charging. See Figure 1-6 for an illustration of the pogo pins.

At the center is a MICROS specific high density high speed connector used for interfacing with mStation. The Multi-Function Docking Connector provides Ethernet, USB, Serial and +5V to operate and charge the mTablet battery.

The right most connector is a USB On The Go (OTG) port. The optional mTablet OTG Charger Kit, MICROS P/N 700351-031 uses this connector. The connector is also a data port used for MCU firmware programing and diagnostics purposes.

Double Molded Casework with Integrated Gasket

The rear casework of mTablet is constructed of highly durable PC-ABS plastic and uses a unique double-mold process which allows for the permanent integration of a soft gasket material around the perimeter of the case. This process makes the mTablet impervious to spills, rain, snow and able to withstand periods of time in standing liquids. An example of the soft gasket material is shown in the Figure below.

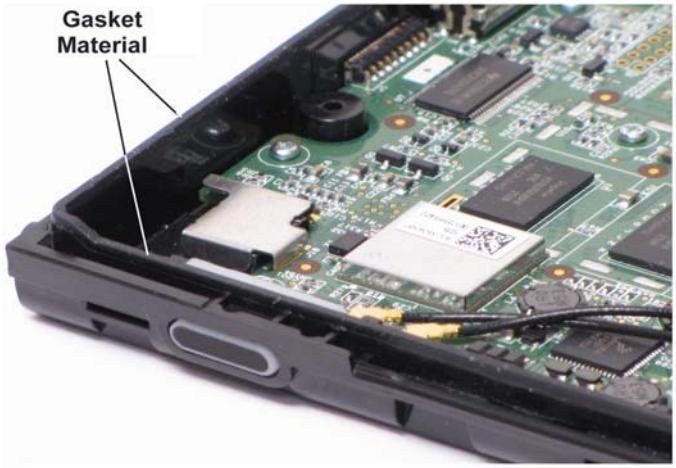


Figure 1-4: Integrated Soft Gasket

Factory Recovery

The mTablet implements recovery through a password protected utility accessed by either pressing and holding the power button for a specified period of time, or by executing a shortcut located in the BOOT\Utilities folder. Factory Recovery causes the mTablet to reload its original Windows Embedded Compact 7 operating system image, drivers, and CAL Client, then format the microSD card, making it ready to be rotated into a depot inventory. If the integrated magnetic stripe reader has been set to encrypting mode, factory recovery will reset the factory default of non-encrypting.

Operating System and Platform Software

The mTablet comes pre installed with the latest embedded operating system from Microsoft, Windows Embedded Compact 7 (WEC7). By taking advantage of its modular nature, MICROS is able to taylor the OS image specifically for the mTablet, ensuring that it contains only the components and drivers relevant to the hardware, reducing the OS size and resource requirements.

The strict control of the modular operating system also allows MICROS to improve the security of the mTablet. By choosing not to include an e-mail client, drive letters, scripting components, and other components often targeted by developers of malware, MICROS has reduced the chances of the mTablet being afflicted by a virus, spyware, or other destructive programs.

Using Windows Embedded Compact 7 provides a number of other advantages to the mTablet, including:

- *Lower Operating System licensing cost* - Windows Embedded Compact 7 is dramatically less expensive than Windows 7 or POSReady 7 and future upgrade costs are lower as well.
- *Reduced Maintenance* - Since the mTablet operating system is tightly controlled by MICROS, there is no need to monitor and install the upgrades and hot fixes issued by Microsoft on a weekly basis.
- *Registry Hive* - Key to the functionality of the Personality Module, WEC 7 has the ability to ‘hive’ the registry on the microSD card, while the operating system itself resides on the eMMC. This makes the registry portable, enabling the ability to swap it from a failed unit into a new mTablet.
- *OS Upgrades via CAL* - The small foot print of the Windows EC7 operating system makes it possible for CAL to download and upgrade the operating system on an mTablet in a completely unattended manner.
- *Long Term Operating System Support* - Microsoft has extended support for Windows EC7, ensuring at least 10 years of on-going support.

mTablet Platform Software

The mTablet platform software consists of not only the Windows Embedded Compact 7 operating system, but several other components the MICROS has developed specially for the device. All of the following components come pre installed on mTablet, including:

- A boot loader customized for mTablet, providing pre-boot functionality such as Factory Recovery and Auto Flash Upgrade.
- Hardware Device drivers, specific to the unique capabilities of the mTablet and mStation.
- The mTablet API, to allow application programs to access the mTablet and mStation point of sale hardware.
- A Diagnostics Utility, to validate the software versions of both the mTablet and mStation platform as well as a resource for testing peripherals. The Diagnostics Utility provides the ability to fully test peripheral components such as magnetic card reader (including those with encryption enabled), cash drawers, customer displays, printers, bar code scanner, and more.

MICROS Client Application Loader

The mTablet is pre-loaded with the MICROS Client Application Loader (CAL). CAL is an intelligent software agent designed to remotely manage the software on mTablet. The CAL is open in design and can be used with both MICROS and non-MICROS applications.

MICROS Application Support

The mTablet and mStation are currently supported by the following MICROS Applications:

- Simphony V1.6 MR4.
- RES v5.2.

mTablet Multi-Bay Charger Kit

The mTablet Multi-Bay Charger kit consists of a Charging Rail and Four Charging Trays, shown in the Figure below.

The Charging Rail can be placed on a counter surface with the supplied brackets, or if counter space is limited, placed on a wall surface with customer supplied hardware.

Figure 1-5: mTablet Multi-Bay Charger /with Four Charging Trays

The Charging Rail can be expanded to a total of eight charging stations with the addition of four Charging Trays. Each Charging Tray includes a LED to indicate the charge status.

The Figure below shows an example of the Charging Tray pogo pins.

Figure 1-6: Charging Tray Pogo Pins

The eight bay charger can simultaneously charge eight mTablets with fully depleted batteries in as little as 4 hours.

mStation

The MICROS mStation provides peripheral and wired ethernet connectivity as well as charging the mTablet battery.

mStation is AC powered and features an internal universal power supply. mStation is shipped Battery Ready; capable of using the same optional Totex smart battery as the KW270. When equipped with this battery, mStation can provide several hours of portable operation of both the mTablet and peripherals.

mStation is not stand alone intelligent and relies on mTablet for all peripheral functionality. When connected to AC power, or powered from the optional internal battery, mStation remains in a sleep mode until mTablet is installed. When mTablet is removed, mStation returns to sleep after a brief period of time.

The mStation casework provides mounting locations for a new series of integrated peripherals including text and graphics based customer displays, a 2 inch thermal printer and wireless bar code scanner. To avoid using external power adapters, mStation includes two powered DB9 COM Ports and one 12V auxiliary power jack. See page 1-21 for more information about powering peripheral devices.

Each mStation is assigned a unique identifier by the MICROS application, allowing mTablet to identify key attributes of the mStation, including cash drawer assignments by employee.

When mobility is not required, a special Concessions mTablet configuration is available. This version of mTablet does not contain a battery or WiFi radio and must reside on mStation at all times, powered from AC or the optional mStation battery.

Peripheral Support

The mStation IO Panel features the following connectors.

- 2 MICROS Series 2 Cash Drawer Ports.
- 10/100/1000 Wired Ethernet.
- 4 USB 2.0.
- 4 Serial Ports.
    - 1 RS232 DB9 /w Software Selectable 5V/9V/12V Power
    - 1 RS232 DB9 /w 12V Power (Recommended for the Mini Printer)
    - 1 IDN - Switchable RS422/RS232
    - 1 RJ45 Serial /w full handshake support.
- 1 Customer Display Port
- 1 MICROS Powered USB (12V, and 5V), reserved for Protege
- +12V Auxiliary Power Jack

Indicators

Figure 1-7 points out the indicator LEDs on the mStation tray and the captive screws used to secure mTablet to mStation.

Figure 1-7: mStation LED Indicators

mTablet Rotation

The Rotate Button releases the mStation tilt and rotate mechanism. Figure 1-8 presents examples of portrait orientation with the mag card reader at the top and landscape orientation with the mag card reader positioned on the left or right.

Figure 1-8: Changing the mTablet Orientation

Features

Figure 1-9 points out the features located on the underside of the mStation.

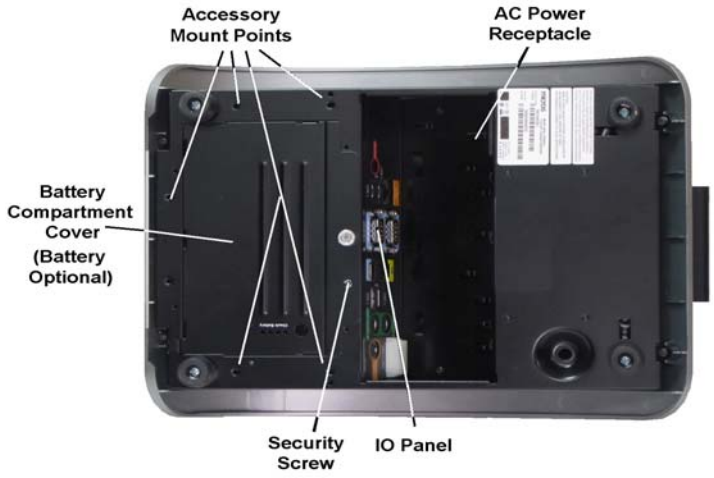


Figure 1-9: mStation Features

mStation Accessories

Customer Displays

mStation introduces new integrated and pole customer displays designed to match mStation styling.

Integrated

On the left of Figure 1-10 is the 240x64 Graphics LCD with redesigned casework. On the right, is a lower cost 2x20 text LCD. Each shares a new fixed angle mounting bracket that attaches to the mStation with thumbscrews, shown at the bottom of the illustration.

Figure 1-10: mStation Integrated 240x64 and 2x20 Customer Displays

Also in the future is a 240x64 LCD Customer Display with NFC/RFID support.

Pole

The Figure below shows front and side views of the mStation 240x64 Pole Display. The 18” version is available at release, followed by the 2x20 text based LCD.

Figure 1-11: mStation 240x64 Pole Display

The new mStation pole and base are ‘oval’ shaped, and the hole centers are compatible with the current pole display base, shown below.

Figure 1-12: Pole Display Bases

Consult the mTablet and mStation Product Marketing Announcement (PMA13-1061) for the latest on pricing and availability.

The Integrated Mini Printer

The Integrated Mini-Printer is a compact thermal printer designed to attach to a fixed location on the right side of mStation. The Integrated Mini Printer is based on a Fujitsu print mechanism and firmware and is not Epson compatible.

The left side of the Figure below highlights the custom printer mounting bracket. At the lower half is a channel that attaches near the IO panel and in the upper half, a pair of tabs that attach to an mStation ventilation slot.

Figure 1-13: Integrated Mini-Printer Bracket and Location on mStation

The printer is RS232 based and supplied with an interface cable and DB9F connector to facilitate connection to COM2. The Mini Printer receives 12V through the interface cable, eliminating the need for an AC adapter. Another view of the printer is shown below with optional integrated 240x64 LCD Customer Display.

Figure 1-14: Integrated Mini Printer and 240x64 LCD Customer Display

The mStation Wireless Scanner

The mStation Wireless Scanner consists of a compact battery powered wireless scanner and a dock/cradle attached to one of two pre-defined locations on mStation. The figure below shows an example of the Wireless Scanner installed on the left rear of mStation.

Figure 1-15: Wireless Scanner and Dock

MD0023-003 provides instructions for installing the scanner. It is provided with the kit or on the HSG portal.

The Dock receives power through its USB interface cable to operate the wireless scanner in presentation mode or to charge the internal batteries for portable operation.

For fixed operation in presentation mode the Wireless Scanner can be secured to the Dock with a screw. About six inches clearance in front of the scan window is required and most items will scan when placed within two to three inches from the window.

The mStation Wireless Scanner contains a SE4500 Scan Engine and PL3307 Image Decoder.

The Scan Engine is composed of an CCD imager, lens, motion sensor, plus illumination and target LEDs housed in small cube shaped package that attaches to the top of the scanner housing with a custom bracket.

The Scan Engine is coupled to a PL3307 multi-chip processing system, located on the scanner board. The PL3307 configures the imager through an I2C interface, acquires the image through its Camera Sensor Interface (CSI) interface, then decodes the 1D or 2D bar code symbologies.

Once decoded, the PL3307 sends the scanned data over a Symbol Simple Serial Interface (SSI) to the scanner Bluetooth Module. The Dock contains a Bluetooth Module to receive scanned data, where it converts it to a COM Port over USB.

The Wireless Scanner supports the following bar code symbologies by default.

1D Symbologies	2D Symbologies	Postal Codes
UPC/EAN	PDF417	US Postnet
Bookland EAN	MicroPDF417	US Planet
UCC Coupon Code	Data Matrix	UK Postal
ISSN EAN	Data Matrix Inverse	Japan Postal
Code 128	Maxicode	Australian Postal
GS1-128	QR Code	Netherlands KIX Code
ISBT 128	MicroQR	USPS 4CB/One Code/Intelligent Mail
Code 39	QR Inverse	UPU FICS Postal
Trioptic Code 39	Aztec	
Code 32	Aztec Inverse	
Code 93		
Code 11		
Interleaved 2 of 5		
Discreet 2 of 5		
Codabar		
MSI		
Chinese 2 of 5		
Matrix 2 of 5		
Korean 3 of 5		
Inverse 1D		
GS1 DataBar		
Composite Codes		

Figure 1-16: mStation Scanner - Supported Bar Codes

mTablet General Specifications

The following table provides details about the Display, Network and I/O capabilities of the mTablet.

Specification	Parameters
Processor	Freescale i.MX6 Dual Core Processor > ARM Cortex A9 Architecture > 1GHz, 1MB L2 Cache
Display	10.1” WVGA (1024x600) TFT LCD Portrait or Landscape orientation, Auto Rotating.
Touchscreen	Truly Projected Capacitive Touch Sensor. (Supports multi-touch and gesturing)
Backlight	LED backlights with three intensity settings, controlled by the Automatic Light Sensor or programmable through the API.
Memory	1GB DDR3 SDRAM
Storage	>4GB eMMC (BOOT) >8GB microSD Card (STORE)
Mag Stripe Reader	Modular Integrated 3-Track card reader capable of encryption at the swipe.
External IO	One USB OTG /w Micro A-B connector. Multi-Function Docking Connector.
Network	> 802.11 a/b/g/n WiFi with WPA WPA2, TKIP, AES support. > Bluetooth V2.01.
Battery	Embedded Lithium Ion 21.8Wh
Input Power	5 VDC @ 2.5A
Storage Temperature	**With Battery** -20°C (-4°F) to 60°C (140°F) **Without Battery** -25°C (-13°F) to 80°C (176°F)
Operating Temperature	-10°C (14°F) to 60°C (140°F) **When Charging Battery** 0°C (32°F) to 45°C (113°F)
Weight	830 grams (1.8lb)
Case Material	Magnesium Alloy, PC-ABD and Nylon materials. Spill and Drop Resistant Enclosure
Certifications	FCC Class A, UL, CE, TUV, RoHS, China RoHS.
Physical Dimensions	See Appendix A

mStation General Specifications

Specification	Parameters
Processor	NXP LPC1751
Memory	On-Board 32K Flash, 8K SRAM
LAN Interface	10/100/1000 Mb LAN /w Modular Connectors
Serial Ports	2 DB9 Powered RS232 Serial /w handshake COM1 - user selectable 5V/9V/12 options COM2 - 12V available 1 Modular RS232 Serial /w handshake 1 Modular IDN Serial (RS422 or RS232) Refer to the Peripheral Power Specifications Table on the next page
Optional Battery	79Wh Lithium Ion
Input Power	25 Watts
Storage Temperature	**Without Battery** -25°C (-13°F) to 80°C (176°F) **With Optional Totex Battery** -20°C (-4°F) to 60°C (140°F)
Operating Temperature	-10°C (14°F) to 60°C (140°F) **When Charging the mTablet and or optional mStation Battery** 0°C (32°F) to 45°C (113°F)
Weight	2.60 kg (5.75 lb) /w Optional Battery 3.08 kg (6.80lb)
Case Material	PC-ABS Plastic
Physical Dimensions	See Appendix A

mStation Peripheral Power Specifications

The mStation IO Panel includes two powered RS232 ports, one MICROS powered USB port, and a 12V power jack, in addition to four USB ports and two customer display ports. The table below specifies the port voltage, current and power in watts and should be used when considering peripherals.

Port or Connector	Power Bus	Available Power
COM1 DB9	VCC12 VCC9 VCC5	+12V @ 1.5A (18W) or +9V @ 1.5A (13.5W) or +5V @ 1.5A (7.5W)
COM2 DB9	VCC12	+12V @ 1.5A (18W)
USB 5 (12V) (Protege Only)	VCC12 VCC5	+12V @ 1.5A (18W) and +5V @ 0.5A (2.5W)
+12V Out	VCC12	+12V @ 1.5A (18W)
Customer Display(s)	VCC5	+5V @ 0.1A (0.5W)
USB 1 - USB 4	VCC5	4 x +5V @ 0.5A (10W)
Multi-function Connector to mTablet	VCC5	+5V @ 1.25A (6.25W when Charging mTablet - Typical)
Cash Drawers	VCC24 VCC12	+24V @ 0.021A (0.5W) +12V @ 0.042A (0.5W)

Figure 1-17: mStation Port Power Specifications

mStation has four primary power busses, VCC24, VCC12, VCC9, and VCC5 with a fixed amount of power available for each. Each is listed below.

VCC24

VCC24 is used only if mStation is configured to use +24V Cash Drawers.

VCC12

VCC12 is available at COM1, COM2, USB 5, and the 12V Out Jack. Each output provides 1.5A or 18 Watts (12V x 1.5A).

VCC9

VCC9 is available at the COM1 connector for use with some small form factor printers. A total of 13.5 Watts is available.

VCC5

VCC5 is available at COM1, USB ports 1 through 5 and for one or two customer displays. It also powers mTablet and charges the battery. A total of 30 Watts is available.

As shown in the table, approximately 6.25 Watts is consumed charging the mTablet battery, with the remainder available for USB5 (Protege), IO Panel USB Ports and Protege on USB5.

Examples

- A MICROS Protege Customer Display is connected to USB 5. It consumes 12 Watts from VCC12 and 2.5 Watts from VCC5. This leaves approximately 30 Watts available on VCC12 and 27.5 Watts on VCC5 available at the IO Panel USB ports and Customer Display port as well as charging mTablet.
- A thermal printer such as the MICROS Integrated Mini-Printer consumes 15 Watts from VCC12. COM2 is the recommended port for the Integrated Mini Printer.

Approvals

The mTablet and mStation meet the following safety and environmental certifications.

mTablet

Directive	Specification	Year
Safety	EN 60950-1:2006+A11+A1+A12	2011
(2006/95/EC)	IEC 60950-1:2005+A1	2010
R&TTE	EN 300 328 V1.8.1	2012
(1999/5/EC)	EN 301 489 V1.9.2	2011
	EN 301 489-17 V2.2.1	2012

mStation

Directive	Specification	Year
Safety	EN 60950-1:2006+A11+A1+A12	2011
(2006/95/EC)	IEC 60950-1:2005+A1	2010
EMC:	EN 55022:2010	2010
(2004/108/EC)	EN 55024:2010	2010
	EN 61000-3-2:2006+A1+A2	2009
	EN 61000-3-3:2008	2008

Chapter 2

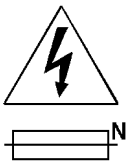
What's Inside?

This chapter describes how to open both the mTablet and mStation, identify the internal components, and provides brief technical description and block diagram.

In this chapter

Disassembling the mStation

The following procedure describes how to disassemble the unit and access the system board and peripheral components.



CAUTION: DOUBLE POLE/NEUTRAL FILTERING

The mStation Power Supply contains a permanently connected fuse in the neutral line. After fuse operation, parts of the power supply remain energized and present a shock hazard as long as the AC Power Cord is connected.
Always disconnect the AC power cord before opening the unit for service or configuration.

1. Remove all cables from the IO Panel including the AC Power cable before disassembling the unit.
2. Place the mStation face down and remove the screws shown in Figure 2-1.

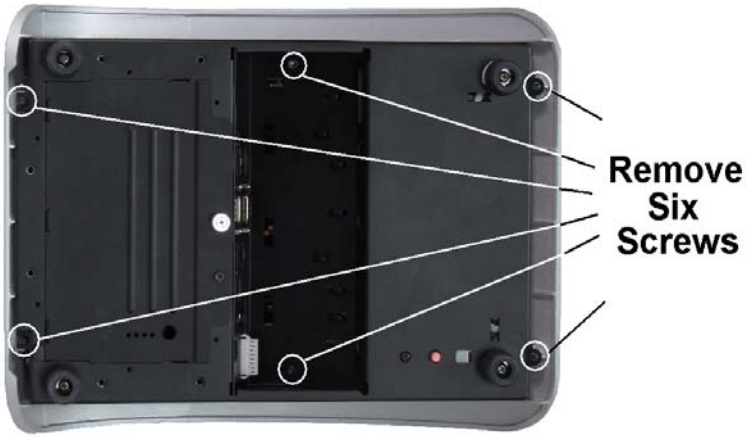


Figure 2-1: Removing the mStation Screws

3. Return the unit to the normal operating position. Lift and tilt the cover to the right, but remove LVDS Cable Bundle from CN8 and the 5V cable from CN11 to avoid straining the connectors.

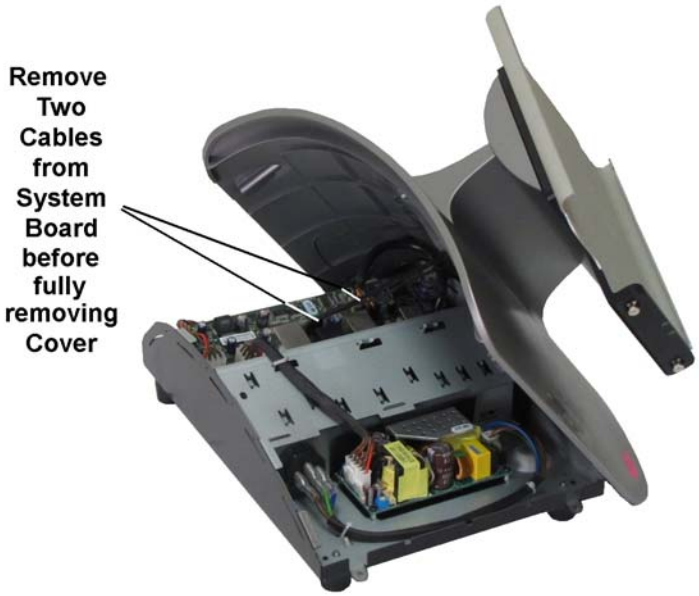


Figure 2-2: Removing the mStation Cover

4. Figure 2-3 points out the mStation components.

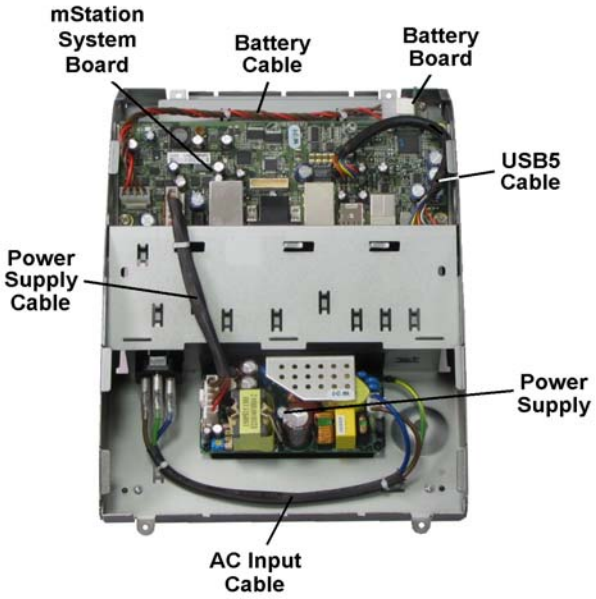


Figure 2-3: mStation Cables and Internal Components

mStation Main Board Description

This section provides more detail about the mStation Main or System Board. Figure 2-4 displays a block diagram.

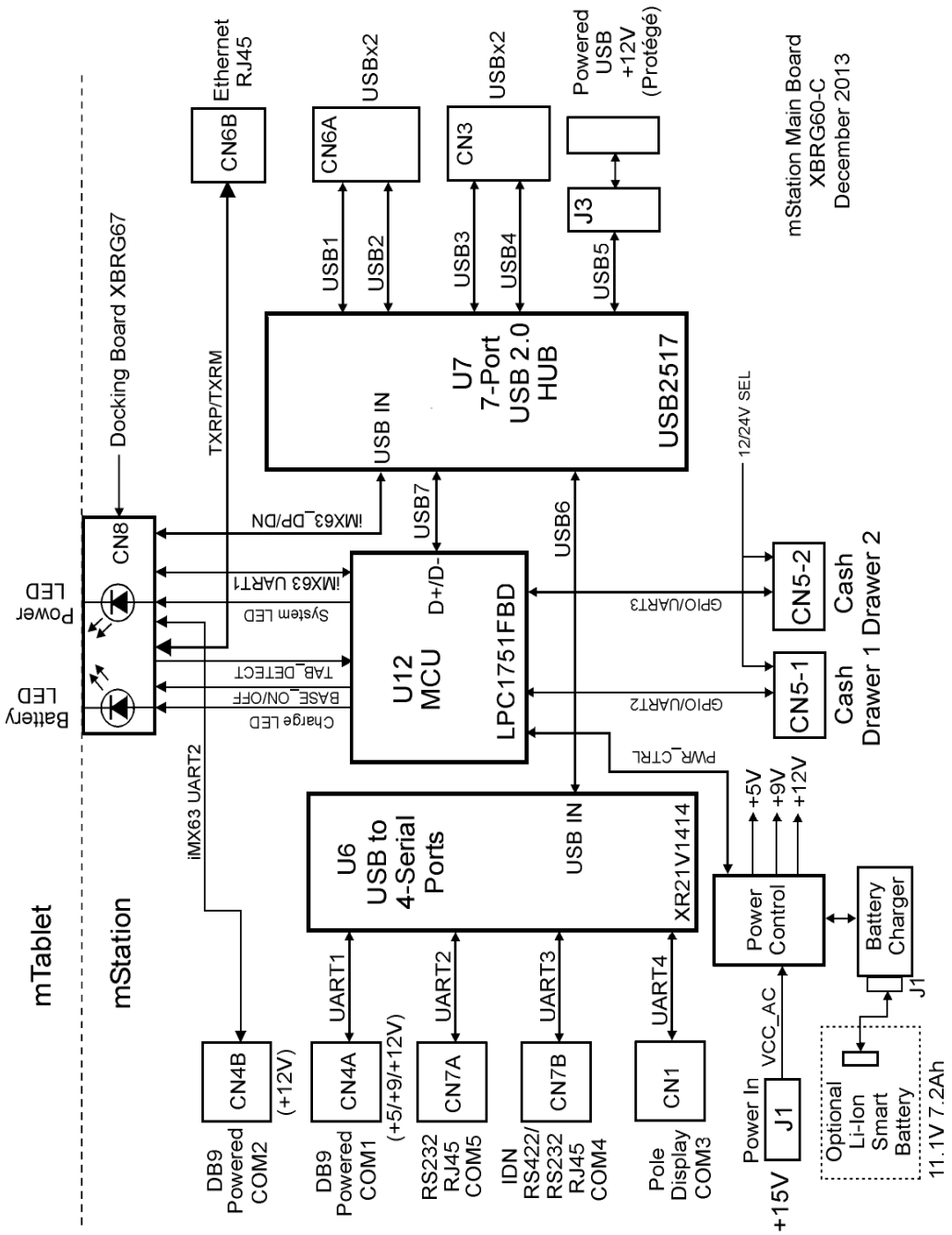


Figure 2-4: mStation Block Diagram

The figures below point out the components and connectors referenced in the block diagram.

mStation System Board - Connectors

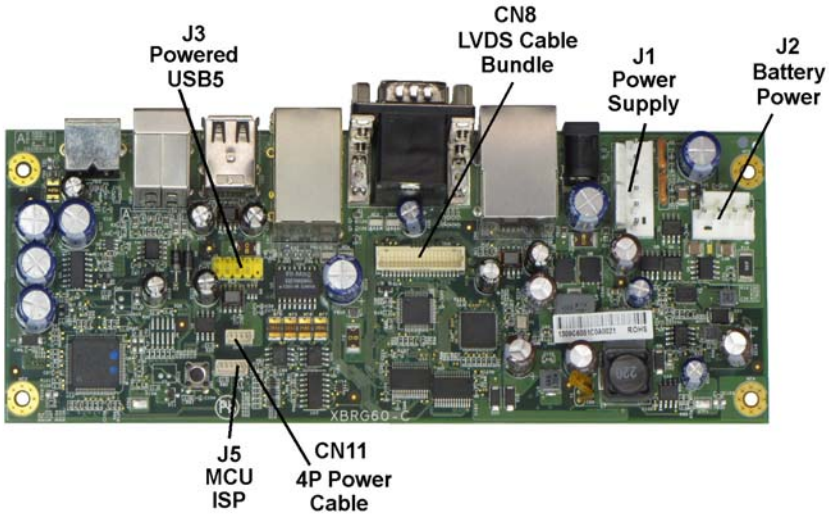


Figure 2-5: mStation System Board - Connectors

mStation System Board - Components

Figure 2-6 shows the mStation System Board components

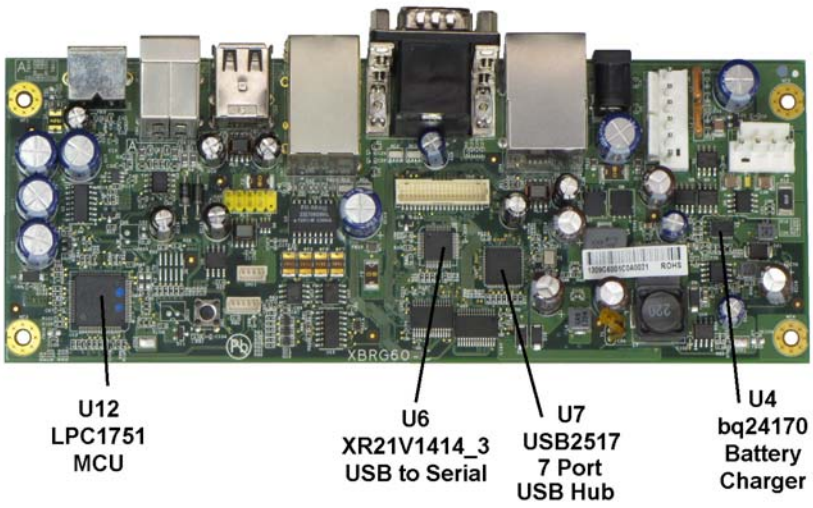


Figure 2-6: mStation System Board - Components

A brief description of the System Board components shown above can be found on the next page.

mStation MCU

The mStation MCU is a NXP LPC1751 containing an ARM Cortex-M3 Processor /w 32kB Flash and 8kB SRAM on board. The ARM Cortex M3 is a general purpose 32-bit microprocessor, offering high performance and very low power consumption. Features include:

- In-System Programming (ISP) and In-Application Programming (IAP)
- USB 2.0 full speed controller

  The USB controller is connected to the mTablet Freescale Processor.
- Four UARTs with fractional baud rate generation

  UART0 is dedicated to MCU In System Programming

  UART1 is connected to the mTablet i.MX6 Processor and is used for In Application Programming.

  UART2 and UART3 are dedicated to the smart cash drawer interfaces.
- Two I2C-bus interfaces supporting fast mode with a data rate of 400 kbit/s

  One IC2 interface is dedicated to the optional smart battery.

  The second IC2 interface is dedicated to the on-board EEPROM, U23. The EEPROM is used to store application data such as cash drawer assignments.
- 52 General Purpose I/O (GPIO) pins with configurable pull-up/down resistors.

  mStation Battery and Power LEDs

  Powered COM Port voltage control and monitoring.

  mTablet Presence Detect

  RS422/RS232 Mode Select for the IDN COM4 interface.

  Cash Drawer Open/Closed

  mStation Board Revision

  12V/24V Cash Drawer Voltage Select
- 12-bit Analog-to-Digital Converter (ADC) with conversion rates up to 200 kHz

  All on-board and DSUB voltages are monitored by the ADC and displayed in the mStation MCU API selection from mTablet/mStation Diagnostics.
- Integrated PMU (Power Management Unit) with four reduced power modes.

The following is a description of how the Presence Detect feature operates when mTablet is installed in mStation. As shown in the block diagram, Presence Detect is composed of two signals, the **TAB_DETECT** input and **BASE_ONOFF** output.

- **TAB_DETECT** is an input to mStation that is forced low when mTablet is installed. This wakes the mStation MCU from sleep mode and it responds by driving the **PWR_CTRL** line high.

  PWR_CTRL enables all of the mStation Board voltages including 3.3V, 5V, 9V and 12V, a process that can take several seconds.

- When mTablet is removed from mStation, the MCU waits for several seconds, shuts down the mStation power supplies and Power LED, then enters sleep mode.

USB 7-Port HUB USB2517i-JZX

The SMSC USB2517 7-port hub is part of a family of low-power, OEM configurable, MTT (Multi-Transaction translator) hub controller ICs. The USB2517 provides 7 downstream ports for mStation. The SMSC hub supports low-speed, full-speed and hi-speed downstream devices on all downstream ports. Other features include:

- Full power management with individual or ganged power control of each downstream port.
- Fully integrated USB termination and pull-up/pull-down resistors.
- Onboard 24MHz crystal driver, ceramic resonator, or external 24/48 MHz clock input.
- Unique vendor ID, product ID, and device ID.
- Industrial Temperature range of -40°C to +85°C.

The downstream ports are configured as follows:

- USB1 through USB4 - mStation IO Panel USB Ports
- USB5 - MICROS Powered USB Port (for Protege)
- USB6 - USB to 4 Channel UART (used to create the mStation DB9 and Modular COM Ports)
- USB7 - mStation MCU.

TI Charger IC bq24170

The bq24170 is highly integrated stand-alone single cell Li-Ion switch mode battery charger with two integrated N-channel power MOSFETs. It provides battery detection, pre-conditioning, charge monitoring and charge termination. It also closely monitors battery pack temperature to allow charging in a preset window.

The charger is configured to charge the three-cell mStation Li-Ion battery pack in three phases, preconditioning, constant current, and constant voltage.

TI Fuel Gauge IC bq20z80

The Fuel Gauge resides in the optional Totex Smart Battery Pack.

The fuel gauge uses TI's Impedance Track™ technology to provide information on remaining battery capacity (mAh), state of charge (%), run-time to empty (mins), battery voltage (mV) and battery temperature (°C).

To determine the battery state of charge (SOC), the fuel gauge measures cell voltage, temperature and current. Current is measured by sensing the voltage drop across a small-value resistor in series with the battery. The fuel gauge accurately predicts the battery capacity and other operational characteristics such as state-of-charge (SOC), time-to-empty (TTE), time-to-full (TTF), as well as an SOC interrupt signal to the MCU. Both the mTablet and optional mStation battery State of Charge is available at the WEC7 power properties icon located in the system tray.

The mStation Battery Status page of the mTablet Diagnostics Utility displays many of the fields available in the fuel gauge.

XR21V1414 High Speed USB to Four Channel UART

The XR21V1414 is attached to USB6 from the USB Hub and converts it into four serial Universal Asynchronous Receiver Transmitters (UARTS). The USB interface is fully compliant with Full Speed USB 2.0 Specification.

Each UART contains a large transmit and receive FIFO to optimize data throughput. Each UART contains the following:

- Data rates up to 12 Mbps
- Fractional Baud Rates up to 12 Mbps
- 128 byte TX FIFO
- 384 byte RX FIFO
- 7, 8, or 9 data bits - 1 or 2 stop bits - Odd, even, mark, space, or no parity

- Automatic Hardware Flow Control - (RTS/CTS or DTR/DSR)
- Automatic Software Flow Control (Xon/Xoff)
- Multi-drop and Half-Duplex Modes

On the mStation System Board, the four channel UART drives the following ports.

UART1

COM1- RS232 Powered DB9

UART2

COM5 - RS232 Modular (full handshake)

UART3

COM3- Customer Display Port

UART4

COM4 - IDN (Modular RS422/RS232 multi-function port)

A WEC7 driver running on mTablet enables the virtual COM ports used by the mStation COM ports.

Reassembling mStation

The following procedure describes how to connect the cables and reassemble the mStation.

1. Place the top cover to the right of the base as shown in Figure 2-2 and connect the multi-function cable bundle to CN8, and the 5V cable to CN11 before closing the cover.
2. Place the mStation face down to access the cover screws. Install 6 screws to assemble the mStation as shown in Figure 2-1.

Disassembling the mTablet

The following procedure describes how remove the MSR module to access the microSD card then goes on to open the mTablet cover.

Remove or Replace the MSR Module

Removing the mTablet MSR module is described in the Figure below.

Figure 2-7: Removing the MSR Module

1. Remove the four 1.5x9mm hex screws with the tool provided, as shown in the upper half of the figure above.
2. To remove the microSD card push once to release it from the socket. Note: The microSD card must be installed in order for mTablet to start.
3. When reinstalling the module, make sure pins projecting from the mTablet line up with J2 on the MSR interface board, shown the Figure below.

Figure 2-8: Installing the MSR Module

Opening the mTablet

This section describes how to open the mTablet and points out the major components. Removing the MSR module is not required to open the cover.

1. Remove the cosmetic cover from the mTablet.
2. Remove twelve 1.5x6mm hex screws from the locations shown in Figure 2-9 with the hex wrench.

Figure 2-9: Removing the mTablet Rear Cover screws

3. After removing the screws, orient the unit LCD up as shown and carefully open the case as shown in upper half of Figure 2-10.
   - The ALS Board Cable at J5 and the Touch Sensor Cable at J11 can become disconnected when you open the cover.
   - The lower half of Figure 2-10 displays the connector designations.

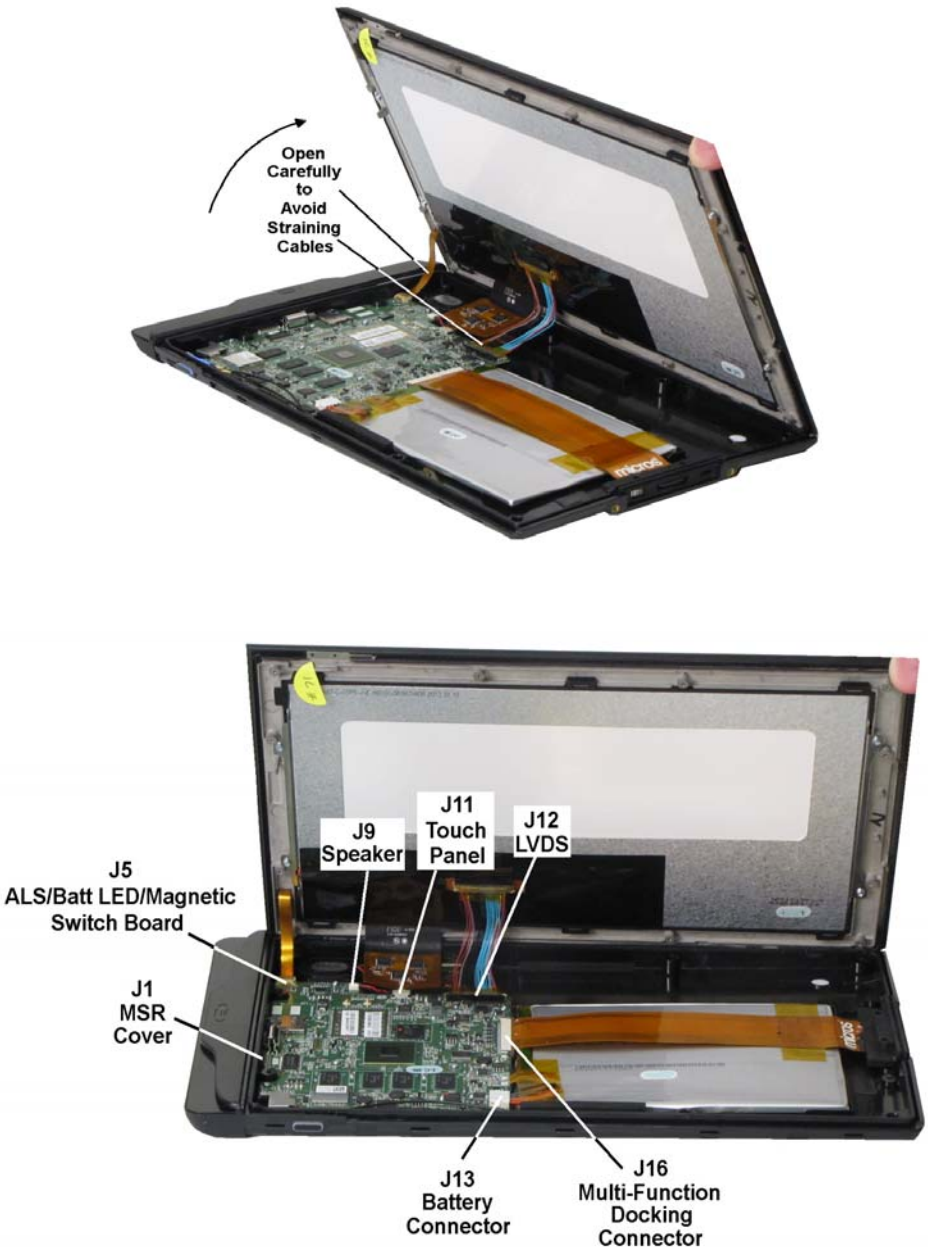


Figure 2-10: Opening the mTablet

Figure 2-11 displays the mTablet base with the display and touch sensor removed to show mTablet battery, System Board, Multi-Function Docking Connector, Speaker and WiFi/Bluetooth antennas.

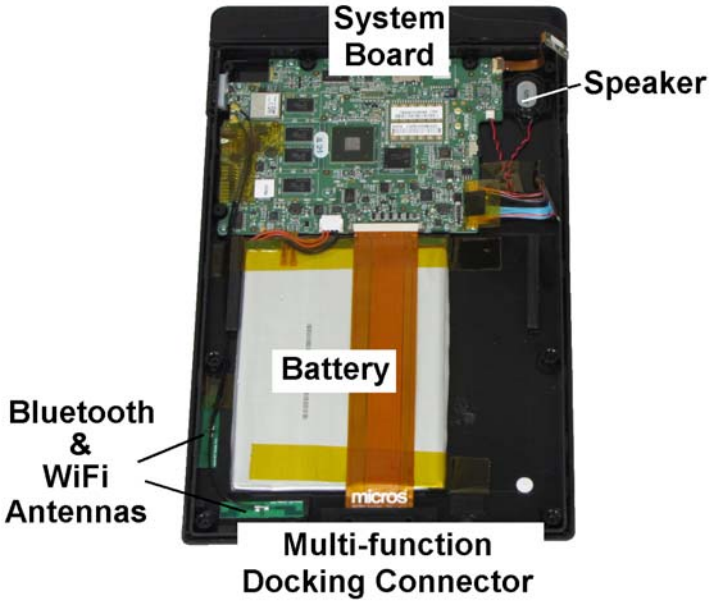


Figure 2-11: mTablet Components and System Board

The Concessions mTablet does not include the Battery, or WiFi/Bluetooth Antennas.

mTablet Block Diagram

The Figure below displays the mTablet System Board Block Diagram.

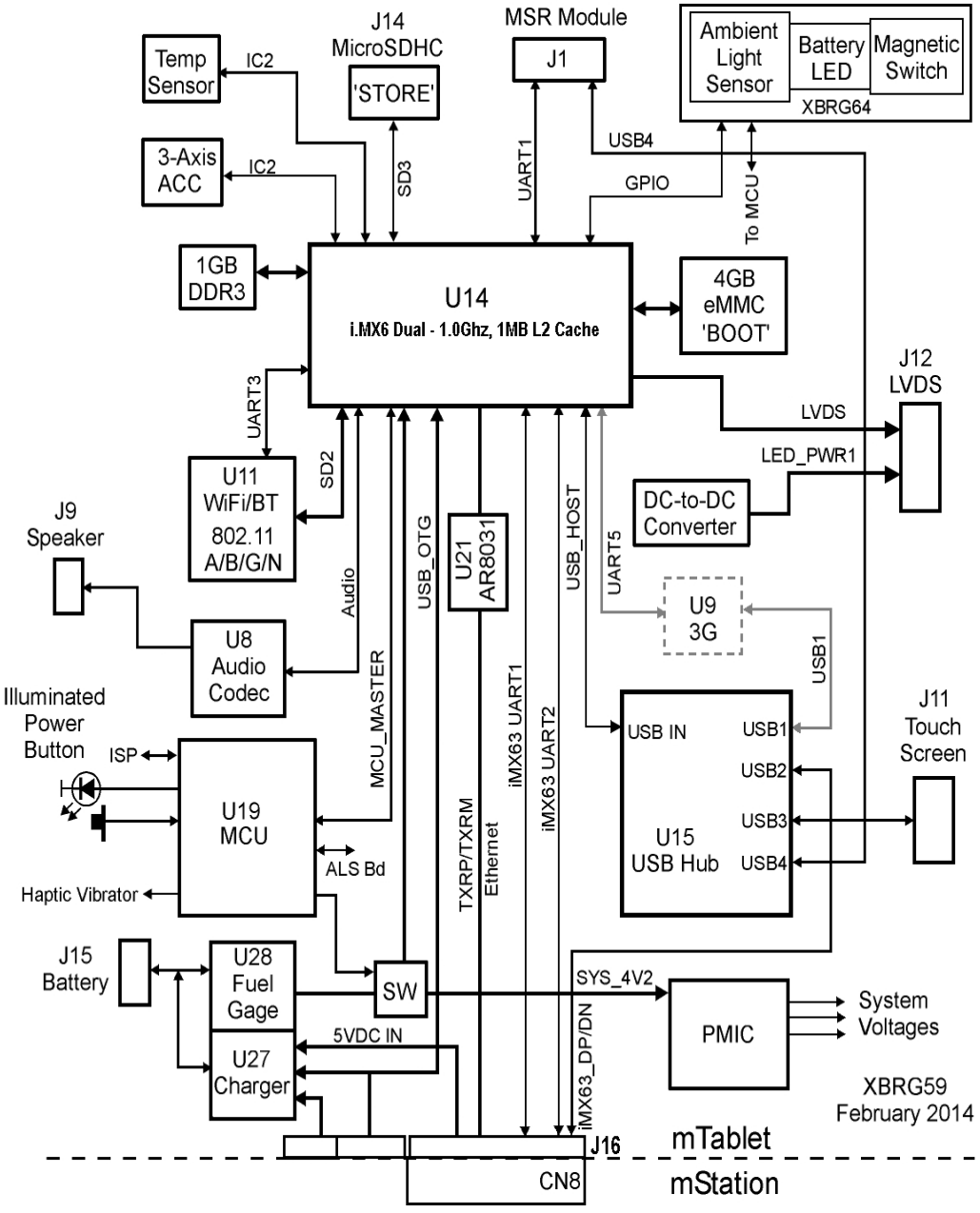


Figure 2-12: mTablet Block Diagram

mTablet System Board Components

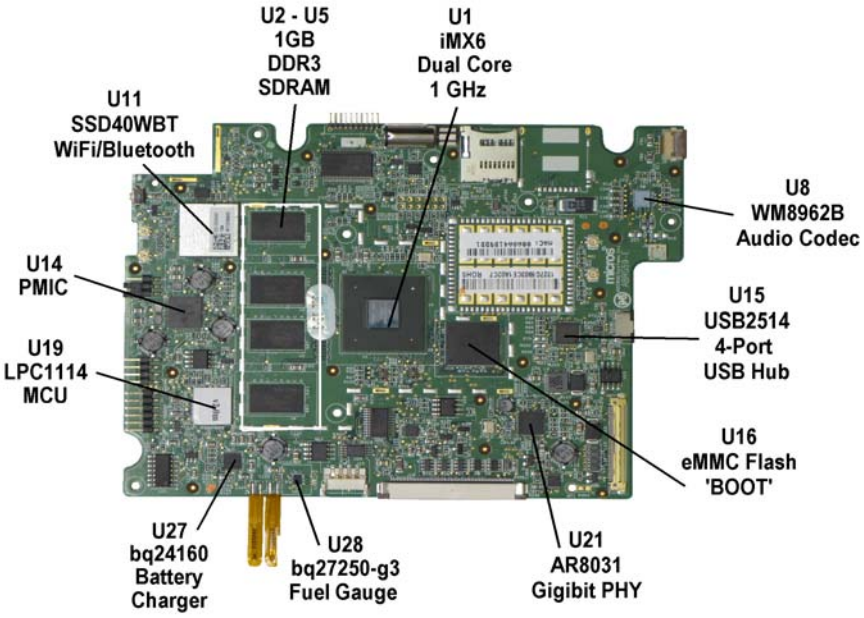


Figure 2-13: mTablet System Board Components

mTablet System Board Connectors

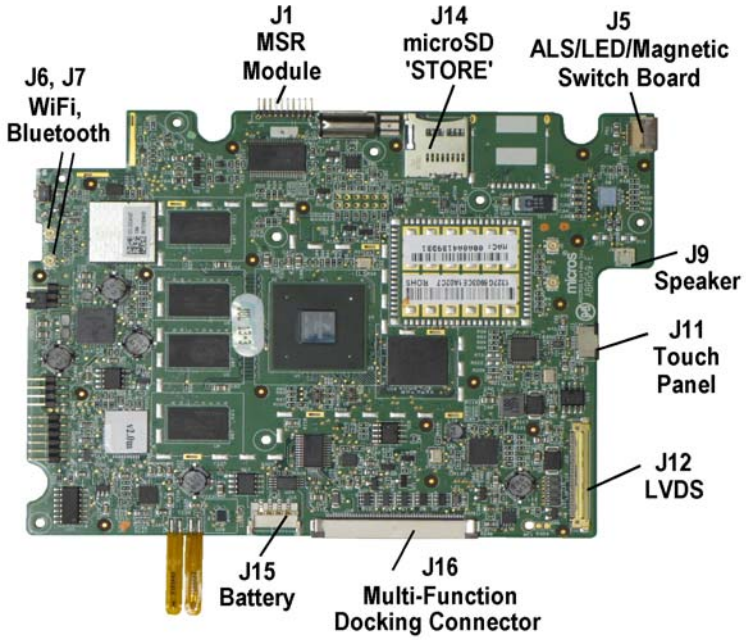


Figure 2-14: mTablet System Board Connectors

mTablet System Board Switches and Sensors

System Board switches are sensors are shown in Figure 2-15, below.

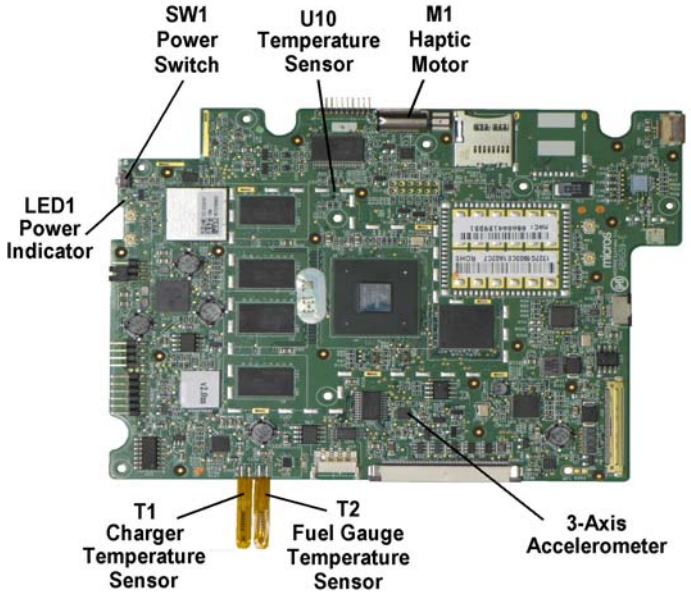


Figure 2-15: mTablet System Board Components

mTablet Concessions Workstation System Board

The Concessions mTablet System Board depopulates the WiFi/ Bluetooth module and other components as shown in the Figure below.

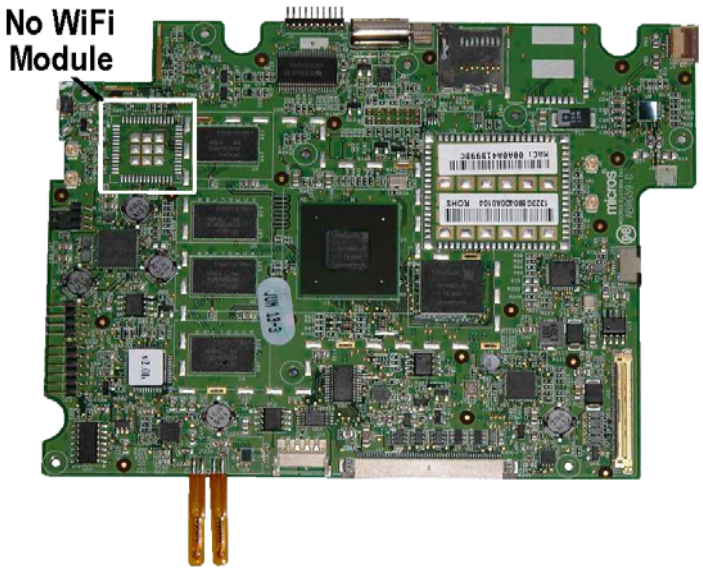


Figure 2-16: mTablet Concessions Workstation System Board

mTablet Board Description

The following is a description of several major components located on the system board.

Freescale ARM i.MX6 Family Processor

The MICROS mTablet uses a processor from the Freescale i.MX6 Dual/Quad Core family. Specifically, it uses the i.MX6 Dual Core Processor at 1.0 GHz and 1M of L2 Cache. The pin compatible i.MX6 family consists of dual and quad core processors and others may be used in the future.

The i.MX 6 processor family is a SOC based on ARM Cortex-A9 MPCore™ Platform, which has the following features:

- ARM Cortex-A9 MPCore processor (with TrustZone)
- The core configuration is symmetric, where each core includes
  - 32 Kbyte L1 Instruction Cache
  - 32 Kbyte L1 Data Cache
- Cortex-A9 NEON MPE (Media Processing Engine)
- The ARM Cortex-A9 MPCore complex includes:
- General Interrupt Controller (GIC) with 128 interrupt support
- 1 MB unified L2 cache, shared by two / four cores
- Two Master AXI (64-bit) bus interfaces output of L2 cache
- NEON MPE coprocessor
- SIMD Media Processing Architecture
- NEON register file with 32x64-bit general-purpose registers
- NEON Integer execute pipeline (ALU, Shift, MAC)
- NEON dual, single-precision floating point execute pipeline (FADD, FMUL)
- NEON load/store and permute pipeline
- The memory system consists of the following components:
- Level 1 Cache – 32 KB instruction, 32 KB Data cache per core
- Level 2 Cache – Unified instruction and data (1 MByte)

On-Chip Memory

- Boot ROM, including HAB (96KB)
- Internal multimedia / shared, fast access (OCRAM, 256KB)
- Secure/ non-secure RAM (16KB)

External memory interfaces:

- 16-bit, 32bit and 64-bit DDR3-1066, LVDDR3-1066, and 1/2 LPDDR2-1066 channels, supporting DDR interleaving mode, for 2x32 LPDDR2-1066.
- 8-bit NAND-Flash, including support for Raw MLC/SLC, 2 KB, 4 KB, and 8 KB page size, BA-NAND, PBA-NAND, LBA-NAND, OneNAND™ and others.
- 16/32-bit NOR Flash. All WEIMv2 pins are muxed on other interfaces.
- 16/32-bit PSRAM, Cellular RAM

Display

- One LVDS port up to 165 Mpixels/sec or two ports up to 85 MP/sec (for example, WUXGA at 60 Hz) each.

USB

- USB 2.0 OTG (Up to 480 Mbps), with integrated HS USB Phy.
- Three USB 2.0 (480 Mbps) hosts:

  One High Speed host with integrated High Speed Phy; Two HS hosts with integrated HS-IC USB (High Speed Inter-Chip USB) Phy.

System Board Description

System Memory

1GB DDR3 SDRAM, with 4 x 2Gb DDR3 SDRAM.

Storage

Like other MICROS Windows CE based workstations, the mTablet storage architecture utilizes both fixed and removable storage devices.

The 4GB eMMC device (BOOT) provides a permanent means storing the boot loader, operating system, platform drivers, factory recovery files, and system utilities such as CAL or Diagnostics Utilities.

The removable microSD card (STORE) contains the application files, as well as the system registry and serves as the mTablet 'personality.' STORE is accessed by removing the MSR Module.

Display

The mTablet system board supports a Truly TFT LCD or optional daylight readable LCD Display.

Touch Screen

Truly Projected Capacitive Touch Screen technology with USB interface. Supports dual-touch and gesturing.

Network Interface

The mTablet features the following interfaces

802.11 a/b/g/n

BlueTooth v2.01

mStation adds a wired 10/100/1000 BaseT interface.

Audio

1W at 8 Ohms

MSR

3 Track Magnetic Stripe Reader, capable of encryption at the swipe. mTablets are shipped with encryption disabled. Encryption is enabled by the application software.

Sensors

The following sensors are located on the System Board. Each can be accessed through the 'Sensors' page of the mTablet Diagnostics Utility. All sensors use an I2C interface.

Accelerometer

The Accelerometer is utilized by the system display driver to change the orientation of the screen as the mTablet orientation changes from portrait to landscape.

Ambient Light Sensor (ALS)

The ALS senses ambient light levels and adjusts the LCD backlights to best suit the situation and extend battery life. In PV1.2 and later, the ALS sensor is enabled and overrides the API.

Temperature Sensor

This sensor, an TI TMP103 low-power digital temperature sensor is located on the System Board (Figure 2-15). It reports the 'System' temperature in mTablet Diagnostics Sensors page.

Battery

A single cell Li-Ion polymer battery is embedded in mTablet. Type 3997132, voltage 3.7V, capacity 5900mAh.

External IO

The mTablet contains four external connectors, described below.

microSD socket

The microSD socket is located behind the MSR module. Designated 'STORE', it contains the application software and persistent registry. DVT and MVT mTablets shipped with a 2GB microSD card, production units currently ship with a 8GB microSD card.

MSR connector

The MSR Connector is shown in Figures 2-7 and 2-8. It includes one RS232 interface and one USB interface. The standard MSR module uses the RS232 port. A future combination MSR/Imager/NFC and RFID module will utilize the USB Interface in addition to the RS232 interface.

Multi-Function Docking Connector

This 60-pin, 0.5mm pitch connector is the primary connection between mTablet and mStation.

USB OTG

This Micro-AB connector provides a USB2.0 connection when attached to a PC and is used for managing mTablet MCU firmware. This port can also be used to charge the unit when the optional OTG charger kit is used.

mTablet MCU

In addition to the ARM based Freescale Application Processor, mTablet includes an NXP LPC1114FBD48 Micro Controller Unit (MCU) to manage mTablet features including:

- Power Button - ON/OFF, Suspend,/Resume and Factory Recovery.
- Battery Charging, Fuel Gauging, and Battery LED operation.
- Haptic Feedback. For each touch, the MCU receives an interrupt from the touch controller and pulses the haptic motor to provide tactile feedback for each touch.
- Communicates with the mStation MCU to establish the Presence Detect feature.

TI Charger IC bq24160

The bq24160 is a stand-alone highly integrated single cell Li-Ion battery charger and system power path management device. The single cell charger chip has dual power inputs that permit charging from the mTablet OTG port or a higher current power supply such as the mStation or the available Multi-Bay Charger. The source of input power is selected by the MCU using the I2C interface.

For charging, the bq24160 offers a constant-frequency synchronous PWM controller with accurate regulation of input current, charge current, and voltage. Thermistor T1, in contact with the battery case (Figure 2-15) monitors the battery temperature and permits charging when the temperature is between 0°C and 45°C. It also provides battery detection, pre-conditioning, charge monitoring and termination. The bq24160 charges the battery in three phases: pre-conditioning, constant current, and constant voltage.

TI Fuel Gauge IC bq27520-G3

The fuel gauge uses TI's Impedance Track™ technology to provide predicted data on remaining battery capacity (mAh), state of charge (%), run-time to empty (mins), battery voltage (mV) and battery temperature (°C). Cell information is stored in non-volatile flash memory.

To determine the battery State Of Charge (SOC), the fuel gauge measures cell voltage, temperature and current. Current is measured by sensing the voltage drop across a small-value resistor in series with the battery. Battery temperature is measured by T2, a thermistor in contact with the battery case.

The fuel gauge accurately predicts the battery capacity and other operational characteristics such as State Of Charge (SOC), time-to-empty (TTE), time-to-full (TTF), as well as Battery Low interrupt signal to the MCU.

The battery SOC is displayed in the WEC7 power properties icon located in the system tray. The battery SOC is monitored by WEC7 in order to provide low battery warning messages to application software.

The mTablet Battery Status page of the mTablet Diagnostics Utility displays many of the fields available in the fuel gauge, including charge or discharge current, voltage and temperature.

Starting with mTablet Diagnostics Utility Version 3.7 or later, a battery 'State of Health' field has been added to assist in tracking battery life. See Chapter 4 for more information.

Reassembling the mTablet

The following procedure describes how to connect the system board cables and reassemble the casework.

1. Refer to Figure 2-10, make sure all system board cables are attached including:
   - J16 - Multi-Function Docking Connector
   - J15 - Battery Connector
   - J6, J7 - WiFi/Bluetooth antennas
   - J12 - LVDS Connector
   - J11 - Touch Sensor
   - J5 - ALS Board Cable.
2. Before closing, make sure the ALS Board Cable and Touch Sensor cables are installed properly.
3. Replace rear cover by installing all screws distributed along the edge of the case as shown in Figure 2-9.
4. Re-install the MSR Assembly if required.
5. Reinstall the Cosmetic Cover.

Chapter 3

Installing and Operating the mTablet/mStation

This chapter describes the environmental requirements for the workstation, describes the IO Panel, and covers the basic operational procedures.

In this Chapter

Care and Handling

Tips for placing the mStation in an environmentally sound location and instructions for cleaning the cabinet are presented in this section.

Equipment Placement

The following pages present considerations for placement of the mStation and related peripheral equipment.

Location

- Appendix A contains dimensional data for mStation and peripheral devices. Before you decide on the space each piece of equipment will occupy, take measurements and compare them to ours.
- Locate all equipment so that it is accessible to service personnel.
- Tile is the recommended floor surface for areas surrounding the equipment. If the floor covering adjacent to the equipment is carpeted, an anti-static grade of carpeting is recommended. If the carpeting surrounding the area housing the equipment is not composed of anti-static material, the use of static discharge mats is recommended. Anti-static mats incorporate a grounding clip with a cable for attachment to earth ground.

Proximity to Foreign Materials

Spilled liquids can cause damage to the circuits in MICROS equipment.

- Do not place equipment near food preparation areas, glass racks, or water stations.

Another source of potential hazards to the equipment are foreign objects, including paper clips, staples, and any other metallic objects.

- Safeguards should be taken to prevent the accidental dropping of such materials into the equipment.

Noise Induction

In addition to the AC Power Requirements outlined in Chapter 3 of the MICROS Hardware Site Preparation Guide, PN 100134-601, other sources of electromagnetic interference must be eliminated to ensure trouble-free operation of the equipment.

- Noise radiating from AC power lines throughout the site can be absorbed by MICROS AC power and communications lines and induced into the equipment. Consequently, no exposed cable dedicated to the MICROS equipment should be run in the vicinity of any AC power lines.
- Devices that emit RF energy, such as cordless phones, and walkie-talkies should be kept at least 8 inches from the equipment or cable during operation.

Electrostatic Discharge (ESD)

The occurrence of electrostatic discharge (ESD) usually takes the form of a discharge from the operator's hand to cash drawers, the workstation, the magnetic stripe card reader or other peripherals. ESD is more common in dry climates during the winter, and less common in moist climates. The workstation has excellent built-in immunity to ESD in most environments. However, tile or anti-static carpet is recommended in areas near the mStation.

Operating Temperature

- The mTablet and mStation operating temperature range is -10°C (14°F) to 60°C (140°F)
    - When charging the mTablet or optional mStation battery, the temperature range is 0°C (32°F) to 45°C (113°F).

AC Power and Data Cabling Requirements

AC Power, Ethernet and MICROS IDN data cabling should be installed in accordance with the MICROS Hardware Site Preparation Guide, PN 100134-601.

Cleaning the mTablet Display, Cabinet, and Magnetic Stripe Reader

Recommendations for cleaning the Cabinet, Magnetic Stripe Reader and LCD cover are described below.

SHOCK HAZARD

Before performing preventive maintenance or cleaning the workstation, use the power button to turn the unit off.

mTablet LCD/Touchscreen Glass

The LCD/Touchscreen can be cleaned using any common household cleaner applied with a clean cotton cloth. Always spray the cloth with the cleaner first, then use the cloth to clean the screen.

mStation and mTablet Cabinet

Always use a chamois or clean lint-free cloth to clean the cabinet and screen surface. Do not use chemical, alcohol, or petroleum based cleaners that are not recommended for plastics.

mTablet Magnetic Card Reader

Depending on how much they are used, magnetic card readers may require periodic cleaning. MICROS recommends cleaning the heads as often as once a day if the reader is subjected to heavy usage.

A cleaning kit is available with PN 600439-004 and box of 50 cleaning cards available with PN 600439-003.

mTablet

This section describes the operational aspects of the mTablet and mStation. This includes using the Power Button to turn the unit ON/OFF, enter suspend mode or recovery mode.

The Figure below points out the operator features of the mTablet.

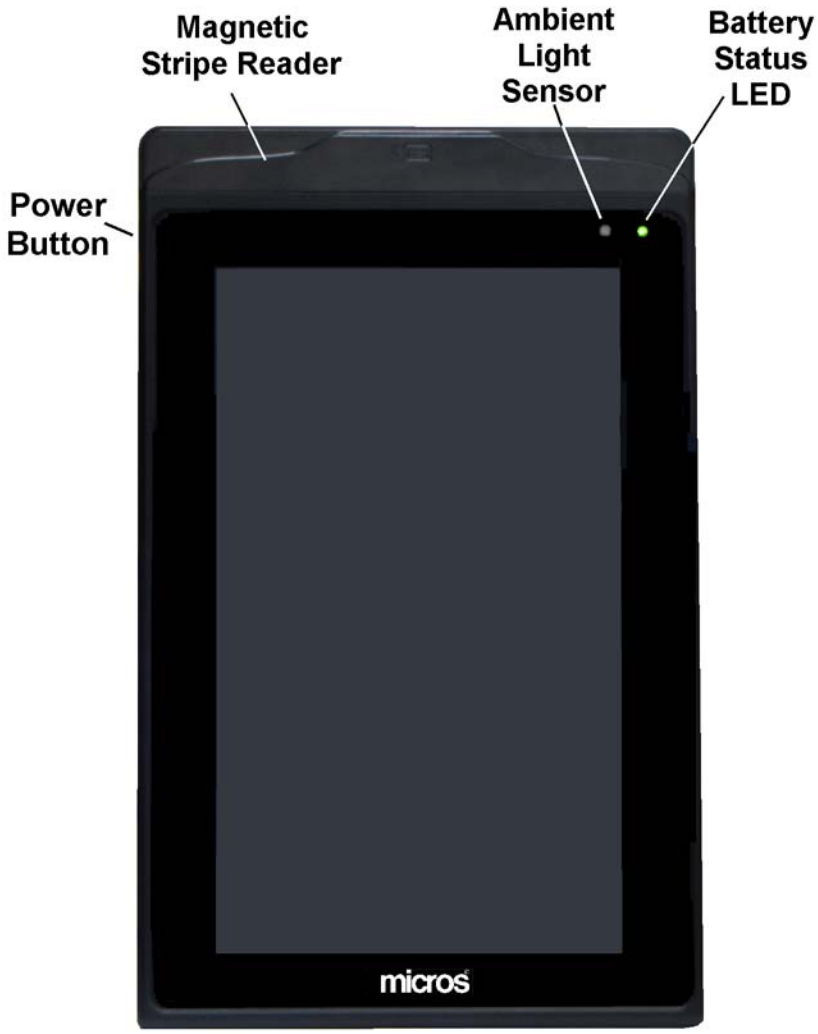


Figure 3-1: mTablet Operator Features

Using the Power Button

Depending on how long it is pressed and released, the mTablet power button turns the unit On or Off, enters/exits the Suspend mode, or starts WEC 7 Factory Recovery. The mTablet Power Button behaves in the same manner when installed on mStation with the exception of Suspend.

The mTablet is configured to provide a brief haptic ‘pulse’ to indicate when the Power Button is released.

Turning the unit ON and OFF

To turn the unit ON from the OFF State, press and release the power button.

- The unit powers up. The Power Button starts blinking once per second, and Battery LED indicates the battery charge condition.
  - The Battery LED blinks when mTablet is running on the internal battery. See Figure 3-5 or Figure 3-6 on Page 3-8.
- After a few seconds a MICROS splash screen appears displaying a countdown as the NK.BIN file loads.

Figure 3-2: mTablet Boot Splash Screen

- After several seconds, the screen clears and the Windows Embedded Compact 7 (WEC7) desktop appears displaying the Platform Version.

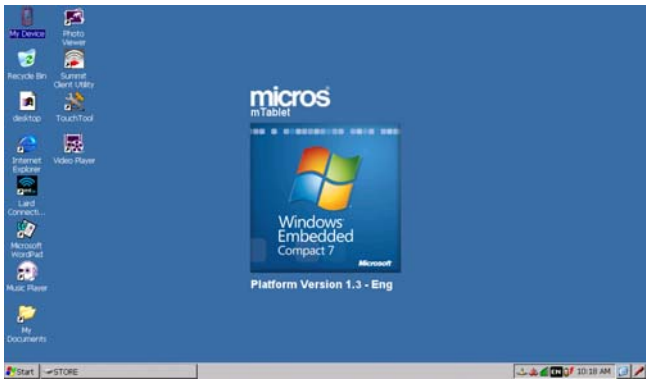


Figure 3-3: WEC7 Desktop with Platform Version

- The Power Button stops blinking and turns solid blue.
- The MICROS CAL starts if previously installed.
  - To install CAL, tap My Device -> BOOT -> McrsCAL -> McrsCAL.exe.
- The Application starts if installed.

Turning the unit Off from the On state

1. Press and hold the Power Button until you feel the haptic pulse, then release.
   - mTablet powers off.

Enter/Exit Suspend Mode from the ON State

For the mobile mTablet (not installed on mStation) with PV 1.2 or later, the power button is used to enter/exit the suspend mode as described below.

In addition, default power properties settings in Platform Version 1.2 or later place mTablet in Suspend after five minutes of inactivity. Press the Power Button once to exit suspend mode, resuming operation.

When mTablet is installed on mStation, suspend mode is disabled.

Note: Suspend mode may not be supported by all application software.

1. To enter Suspend from the ON state, press the power button for one second and release.
   - The LCD, Battery LED, and illuminated Power Button turn off.

2. To resume operation from Suspend mode, press the power button for less than two seconds. When the display resumes, or you feel the haptic pulse, release the button.
   - The LCD, Battery LED, and illuminated Power Button are restored to the previous state.

3. To turn off mTablet from Suspend, press and hold the power button for more than 5 seconds. When you feel the haptic ‘pulse’, release the power button.

Factory Recovery

Assuming the Platform Version 1.2 or later is installed, this section describes how to start mTablet WEC7 Recovery using the Power Button or from a shortcut located in the BOOT\ Utilities folder.

Power Button

1. When mTablet is OFF, press and hold the power button while observing the Battery LED. When it starts blinking Red after about 10 seconds, release the Power Button.
   - The unit restarts and displays the splash screen with MICROS logo, followed by the 'Unlock' keypad, shown on the right side of the Figure below. To exit, press [Reboot] or [Cancel].

Utilities Folder

1. From the Desktop, double tap My Device, then navigate to the BOOT\ Utilities Folder.
2. Double tap the 'Recovery' icon.
   - The 'Unlock' Keypad appears, shown on the left, below.

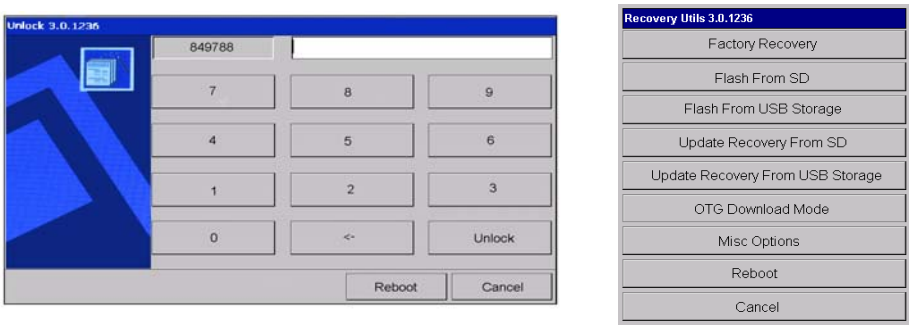


Figure 3-4: Unlock Keypad and Recovery Utilities Menu Details

3. Apply the following formula to the six digit number that appears at the top of the dialog box. Press [Unlock] when complete.

   Digit 1 x Digit 2 + Digit 4 + Digit 6 = Password

   In this example, the 6 digit number is 849788. The password is 8x4+7+8 = 47. Enter the password and tap the [Unlock] button.

   - The 'Recovery Utils' Menu shown on the right side of Figure 3-4 appears.
4. Tap [Factory Recovery] to proceed, or [Reboot]/[Cancel] to exit and restart mTablet.
   - After Factory Recovery is complete, the unit reboots.

mTablet Battery LED

Starting with Platform Version 1.2 the mTablet and mStation Battery LEDs behave in a uniform manner.

When the mTablet battery is discharging, the Battery LED blinks Green, Amber and then Red. When charging, the Battery LED displays solid colors, Red, Amber and Green.

The tables below link the Battery LED color to a State of Charge (SOC) range based on the MCU Firmware Version. Figure 3-5 shows the mTablet Battery LED behavior when the MCU firmware version is V2.0m or earlier.

Charging	Discharging	Battery LED
Solid Green	Blinking Green Twice per second.	Battery is greater than 20% capacity.
Solid Amber	Blinking Amber Twice per second.	Battery is between 5% and 20% of capacity.
Solid Red	Blinking Red Twice per second.	Battery is less than 5% of capacity. Windows CE Main Battery Low Message Appears when remaining capacity is near 5%.
OFF	OFF	Battery Discharged < 1%

Figure 3-5: mTablet Battery LED

Figure 3-6 shows the mTablet Battery LED behavior when mTablet Platform Version 1.2 or later is installed.

Charging	Discharging	Battery LED
Solid Green	Blinking Green Every 5 seconds.	Battery is greater than 20% capacity.
Solid Amber	Blinking Amber Twice per second.	Battery is between 5% and 20% of capacity.
Solid Red	Blinking Red Twice per second.	Battery is less than 5% of capacity. Windows CE Main Battery Low Message Appears when remaining capacity is near 5%.
OFF	OFF	Battery Discharged < 1%

Figure 3-6: mTablet Battery LED (PV1.2 or later)

Calibrating The mTablet Touchscreen

Calibrating the touchscreen is the process of aligning the touchscreen glass with the underlying video display.

When to Calibrate the Touchscreen

- Any time the cursor does not follow the movement of your finger, or does not reach the edges of the touchscreen.
- If the LCD panel or touch screen have been replaced.
- After performing a Personality Swap.

Tips for Calibrating the Touchscreen

- Perform the calibration procedure in the position (sitting or standing) that the workstation is normally used.
- Face the Touchscreen directly. If mTablet is installed in mStation, adjust it to the optimum viewing angle.
- To start, double-tap the ‘TouchTool’ icon located on the desktop.
  - The ILITEK Touch Tool window appears
- Tap [Calibration] to start.
  - When complete, the ‘Success’ window appears. Tap [OK] to continue.

Ambient Light Sensor

The Ambient Light Sensor (ALS) provides automatic adjustment of the LCD brightness, based on ambient lighting conditions.

In Platform Version 1.2 and later the ALS sensor is enabled. To disable the ALS sensor and control the backlights manually, see the procedure below.

1. Touch Start -> Settings -> Control Panel -> Display.
   - The Display Properties window appears.
2. Touch the Backlight Tab, then touch the [Advanced] button.
   - The Advanced Backlight Options window appears. The 'Enable Auto Brightness Control' check box enables the ALS sensor control as shown in the Figure below.

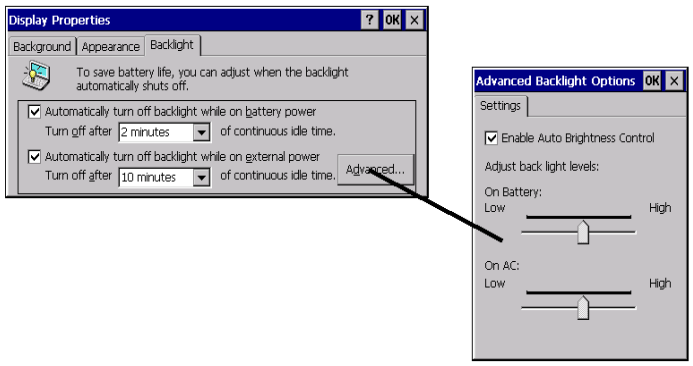


Figure 3-7: Controlling the Backlights Manually

3. To manually control the backlight brightness, remove the checkbox from 'Enable Auto Brightness Control' and adjust the sliders for Battery and AC Operation.

Power Management Settings

This section describes the mTablet default backlight and power properties settings.

Power Properties

The Figure below shows the default power management settings for both battery and AC operation.

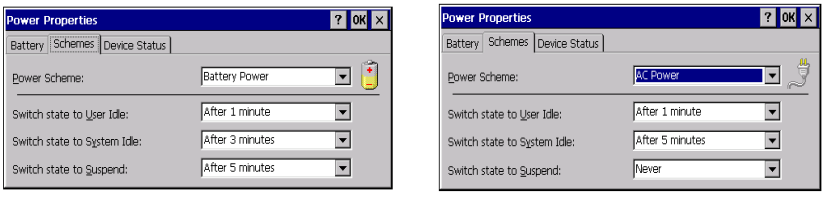


Figure 3-8: mTablet Power Properties Configuration

- To access Power Properties, tap Start - Settings - Control Panel - Power - Schemes Tab.
- To modify a setting, touch the drop down selection and select a new value.
- Touch [OK] when complete.

Backlights

The default backlight settings for mTablet when running on the internal battery or connected to mStation are shown in the Figure below.

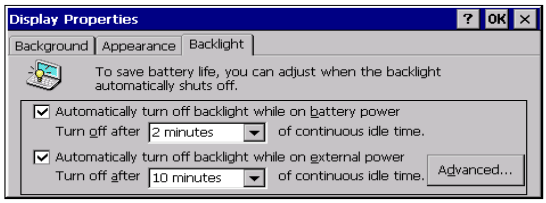


Figure 3-9: mTablet Backlight Control

- To access these settings, touch Start - Settings - Control Panel. When the control Panel appears, touch the ‘Display’ icon, and the Backlight tab.
- To modify a setting, touch the drop down selection and select a new value.
- Touch [OK] when complete.

Configuring mTablet WiFi Interface

In Platform Version 1.3, the Laird Connection Manager (LCM) replaces the Summit Client Utility for configuring mTablet WiFi. The LCM icon is located on the desktop and Summit Client Utility icon moves to the Control Panel, but resembles the LCM icon. For reference, the Summit Client Utility procedure can be found on page 3-13.

Laird Communications Manager (LCM)

This section describes how to use the Laird Connection Manager to configure the mTablet WiFi Interface.

1. Double tap the LCM (Laird Communications Manager) icon the desktop.
   - The Laird Connection Manager window appears.
     - Bluetooth configuration is not available in this version of the driver. Bluetooth can be configured in the Control Panel.
2. To scan for available access points, tap the Configuration Tab, then tap the [SCAN] button.

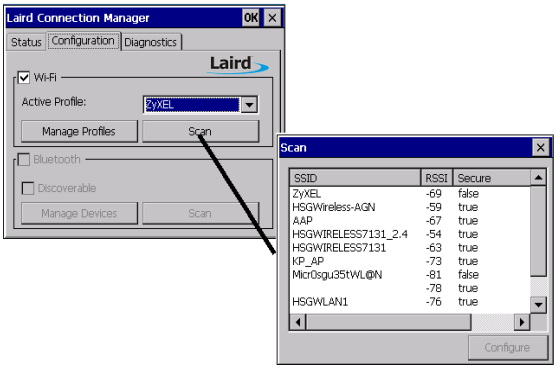


Figure 3-10: Scanning for Access Points

- The SSID field lists the available Access Points. Multiple entries on a single SSID are normal - one for the 2.4 GHz band and a second for the 5 GHz band. The RSSI values will likely be different, based on the differences in the propagation characteristics between the two bands.
- The RSSI field is the Received Signal Strength Indication, in arbitrary units. The higher the number relative to zero, the stronger the signal. The Secure field indicates if passwords are required. ‘False’ indicates the Access Point is open and does not require authentication.

3. Select the Access Point and tap [Configure]. Tap Y to create a new profile.

4. Continue to configure AP Profile. Profile Tab.
5. When ready, touch 'Commit' to save the profile.

Summit Connection Manager

This section provides a generic procedure describes how to use the Summit Client Utility to configure the mTablet WiFi.

1. Double Tap the 'Summit Client Utility' icon from the desktop or the 'SCU' icon in the Control Panel or Windows folder.
   - The Summit Client Utility window appears.
2. Tap the Profile Tab, then the [Scan] button to start.
   - An hour-glass appears, then a Scan Window displaying SSID, RSSI, and Security fields, shown in the example below.

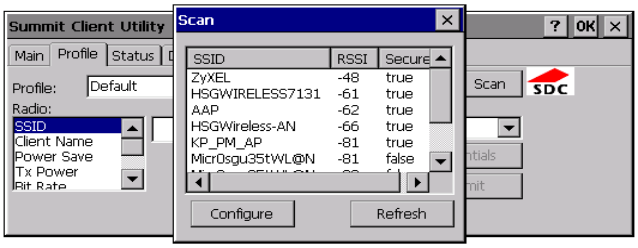


Figure 3-11: Scanning for Access Points

   - The SSID field lists the available Access Points. Multiple entries on a single SSID are normal - one for the 2.4 GHz band and a second for the 5 GHz band. The RSSI values will likely be different, based on the differences in the propagation characteristics between the two bands.
   - The RSSI field is Received Signal Strength Indication, in arbitrary units. The higher the number relative to zero, the stronger the signal. The Security field indicates if passwords are required. 'False' indicates the Access Point is open and does not require authentication.
3. Select the Access Point in the Scan window.
4. Tap the Pen located in the lower right corner of the System Tray to bring up the soft keyboard for entering any required password(s).
5. Tap the [Configure] Button to save the configuration. Tap the Main Tab.
6. Tap the Profile pull-down and select the Access Point just configured.
   - The system tray wireless icon turns Green to indicate an active WiFi connection.

Using the Wipe Store Utility

Wipe Store performs the same functions as Wipe CF, available on current MICROS Windows CE based workstations such as the Workstation 5A.

1. From the Desktop, double tap My Device, then navigate to the BOOT/ Utilities Folder.
2. Double tap the WipeStore icon file to start.
   - The Wipe Store Utility shown below appears.

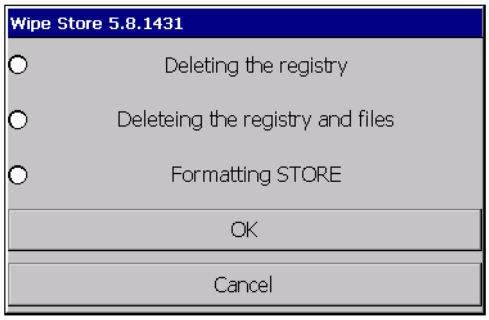


Figure 3-12: Wipe Store Utility

   - 'Deleting the Registry' removes the persistent registry from STORE.
   - 'Deleting the Registry and files' removes the persistent registry and all files and folders on STORE.
   - 'Formatting STORE' formats the microSD Card, deleting everything on the card.
3. After making any selection, a window appears asking if you want to shutdown or reboot after the operation is complete.
   - To cancel, tap the [Cancel] button.
   - To shutdown mTablet after performing the selected operation, tap [Yes].
   - To shutdown and restart mTablet after performing the selected operation, tap [No].

mStation

The figure below points out the mStation features.

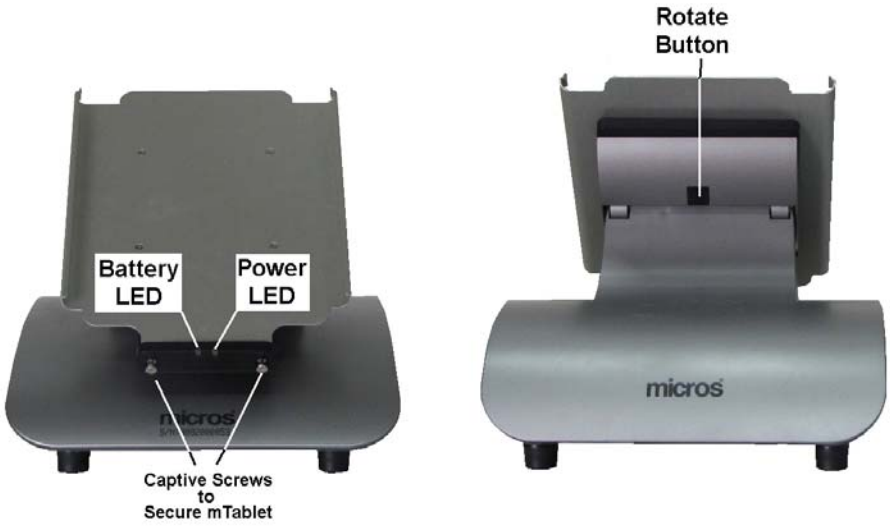


Figure 3-13: mStation LED Indicators

mStation includes two LEDs located on the base of the tray and shown in the Figure above. The mStation Battery LED displays the charge/discharge status of the optional battery as indicated in Figure 3-18 and Figure 3-19. The Power LED remains off unless mTablet is installed.

The rear view of mStation on the right of the Figure shows the Rotate Button. Pressing and holding this button allows mTablet to rotate to the portrait or landscape orientation.

The mStation does not include an AC power switch. When connected to AC Power, it remains in a low power sleep mode until the mTablet is installed.

Installing mTablet ‘wakes up’ mStation through the multi-function docking connector, a feature called Presence Detect. The mStation Power LED turns Green to indicate mStation is on.

When installed in mStation, the mTablet Power Button controls both devices.

When the mTablet is removed, mStation shuts down within 5 seconds unless the optional mStation battery is charging. In this case, the Power LED turns off, but the Battery LED remains on to indicate the charge level. When the battery is fully charged, the Battery LED turns off.

Installing the optional mStation Smart Battery

The optional mStation smart battery is a 11.1V, 7200mAH Li-Ion battery pack, the Totex DR202I. The pack consists of nine rechargeable 18650 form factor Li-Ion cells arranged in a 3S3P (3-Serial, 3-Parallel) configuration.

The battery pack complies with the Smart Battery Data Specification SBS 1.1 communicating with the mStation MCU over the System Management Bus (SMBus).

1. Remove the thumbscrew that hold the battery compartment cover.
2. Install the battery as shown in the Figure below.

Figure 3-14: Installing the optional mStation Battery Pack

3. Reinstall the battery compartment cover.

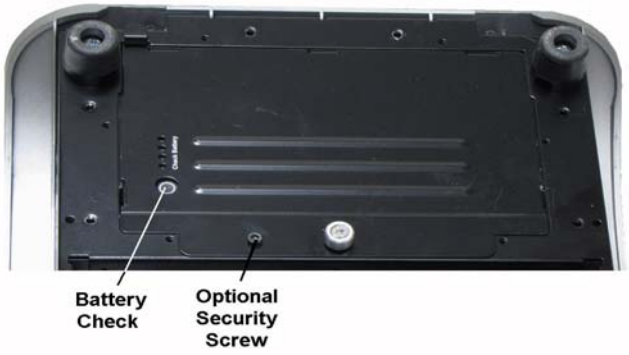


Figure 3-15: Securing the Battery Compartment Door and Battery Check

- Optionally, install a 2mm hex head screw as shown to secure the battery compartment cover.
- The Battery Check button provides a quick indication of the charge level. Four LEDs indicate the battery charge as shown on the next page.

1 LED	2 LEDs	3 LEDs	4 LEDs
0% - 25%	26% - 50%	51% - 75%	76% - 100%

Figure 3-16: mStation Battery Check Button

To charge the battery, connect an AC Power cable to mStation. mTablet does not need to be installed to charge the optional battery. Refer to Figures 3-18 or 3-19 to determine the mStation battery SOC.

Installing the mTablet in mStation

This section shows how to install mTablet in the mStation tray. mTablet can be installed in portrait or landscape mode, this example shows portrait mode.

Figure 3-17: Installing the mTablet in mStation - Portrait Mode

Rails formed by the mStation tray engage channels along each side of the mTablet, allowing for quick installation or removal.

1. Line up the channels along each side of mTablet with the rails formed by the tray and guide it down until it makes contact with the multi-function docking connector.
2. Hold on to mTablet until it makes contact with the multi-function docking connector. Allowing mTablet to fall on to the multi-function connector could damage it.
3. If required, secure the mTablet to mStation by turning the pair of captive screws in the docking tray.
4. When the mTablet is installed in the mStation with AC power available, the following occurs.
    - The mStation MCU turns the Power LED Green within three seconds to indicate it has powered up.
    - It can take up to one minute before the mStation IO Panel USB Ports become active.
    - If the optional battery pack is not installed, the Battery LED remains off. If the optional battery is installed, see Figure 3-18 and Figure 3-19.
    - When mTablet is removed from mStation, it returns to the sleep mode in about 10 seconds and the Power LED turns off.
        - If the optional smart battery is charging, it will continue to charge until it is full as indicated by the Battery LED. When the battery reaches full charge, mStation enters sleep mode and turns off the Battery LED.

mStation Battery LED

In general, when the optional mStation battery is discharging, the Battery LED blinks Green, Amber and then Red, with the blink rate increasing with each change in color. When the mStation battery is charging from the discharged state, the Battery LED starts at solid Red, turns Amber, then Green as the charge increases.

The tables shown below link the Battery LED color to the battery State of Charge (SOC) percentage based on the MCU Firmware Version.

Figure 3-18 shows the mStation Battery LED behavior when the Platform Version 1.2 or later is installed.

Charging	Discharging	Battery LED
Solid Green	Blinking Green Twice per second.	Battery is greater than 20% capacity.
Solid Amber	Blinking Amber Twice per second.	Battery is between 5% and 20% of capacity.
Solid Red	Blinking Red Twice per second	Battery is less than 5% of capacity. Windows CE Base Battery Low Message Appears when remaining capacity is near 5%.
OFF	OFF	Battery not installed.

Figure 3-18: mStation Battery LED (Pre-release firmware)

Figure 3-18 shows the mStation Battery LED behavior when Platform Version 1.2 or later is installed.

Charging	Discharging	Battery LED
Solid Green	Blinking Green Every 5 seconds.	Battery is greater than 20% capacity.
Solid Amber	Blinking Amber Twice per second.	Battery is between 5% and 20% of capacity.
Solid Red	Blinking Red Twice per second.	Battery is less than 5% of capacity. Windows CE Base Battery Low Message Appears when remaining capacity is near 5%.
OFF	OFF	Battery not installed.

Figure 3-19: m Station Battery LED (PV1.2 or later)

mStation Battery Pack Storage Considerations

The optional Lithium-Ion Smart Battery pack capacity will degrade over time. The mechanisms for capacity loss do not require the battery to be charged or discharged; a capacity decrease can also occur during storage.

In general, capacity loss during storage can be minimized by storing the battery pack at room temperature or less for the shortest time.

In all cases, the battery pack should be removed from mStation and stored in an environment with low humidity, and free from corrosive gases.

- If storing the battery pack for less than 30 days, the ideal temperature is between -10°C (14°F) and 20°C (68°F).
- If storing the battery pack for less than one year, the ideal temperature is -5°C (23°F) and 20°C (68°F).
- When removed from mStation and stored at 20°C (68°F) or less, the battery pack should have a minimum shelf life of six months. Should the storage temperature exceed 20°C (68°F) over a six month period, the shelf life can be reduced and we recommend that the battery pack be recharged every sixty days.
- Avoid storing the battery pack for extended periods of time when the temperatures are greater than 45°C (113°F). If the battery is stored at temperatures exceeding 45°C (113°F) for six months, capacity loss can be as great as 10%.

Battery Pack Warnings - Risk of fire, explosion, or burns

- Do not reverse the positive (+) and negative (-) terminals.
- Do not disassemble the battery pack.
- Charge or discharge the battery pack only when installed in mStation.
- Do not place the battery pack in temperatures exceeding 100°C (212°F). Examples include direct sunlight, or in a closed vehicle in hot weather.
- Do not discard the battery pack in a fire.
- Do not subject the battery pack to mechanical shock.

If the battery pack gives off an odor, generates heat, the case becomes discolored or deformed, or in any way appears abnormal during use or storage, immediately remove it from mStation and stop using it.

Installing the mStation Pole Display Kit

The mStation LCD Pole Display Kit consists of an 18” pole and base, rubber spacer, LCD Customer Display, and Customer Display Extension Cable. Refer to Figure 3-20 for the steps below. After installation, the display can be tested using mTablet Diagnostics.

1. Use the base as a template to locate the mounting holes.
2. Install the rubber spacer on the LCD assembly cable so that it fits between the pole bracket and pole.
3. After mounting the pole and base to the counter surface, route the extension cable through the pole and connect it to the LCD assembly cable.
4. Attach the LCD assembly to the pole, position the head in the desired position and lock in place with a 1.5mm hex wrench.
5. Remove AC Power from the mStation and connect the keyed 4-pin DIN connector to the port labeled Customer Display.

Figure 3-20: Assembling the mStation Pole Display

Installing the mStation Integrated Customer Displays

The mStation Integrated 2x20 LCD (left) and 240x64 LCD (right) are shown in the figure below. The mStation Integrated Customer Displays share a new integrated mounting bracket, interface cable and installation procedure.

Figure 3-21: Integrated Customer Display Assembly

1. Before installing any mStation peripheral, remove mTablet and the AC power cable from mStation.
2. Place the mStation face down and locate the accessory mounting holes at the rear of the base. Refer to Figure 3-22.
3. Attach the mStation Customer Display bracket and turn the thumbscrews to secure the bracket as shown on the left side of the Figure below.
4. The cable can be routed to either side of the IO Panel. The example below shows the cable routed on the right side of the mStation chassis. Remove the appropriate rear foot, place the cable in the slot, then reinstall the foot.
5. Add the cable guide and screw supplied with in the kit to keep the cable close to the chassis.

6. Attach the keyed 4-pin mini-DIN to the IO panel connector marked ‘Customer Display.’

Figure 3-22: Installing the mStation Integrated Customer Display

MICROS Integrated Mini Printer

This section describes how to install the Integrated Mini Printer.

1. Before installing any mStation peripheral, remove the mTablet, AC power cable and optional smart battery if installed. Do not connect the Mini Printer to mStation when it is powered-up.
2. Figure 3-23 below, consists of four panels, each representing an installation step.

   1) The Integrated Mini Printer can only be installed on the right side of the mStation chassis, the mTablet is not installed, the AC Power Cable is disconnected, and the optional battery is not installed.

   2) Attach the printer bracket so that it is flush with the edge of the IO Panel and facing the rear of mStation.

   3) Connect the Mini Printer to COM2. 12V is enabled by default.

4) Attach the mini printer bracket to the ventilation slot.

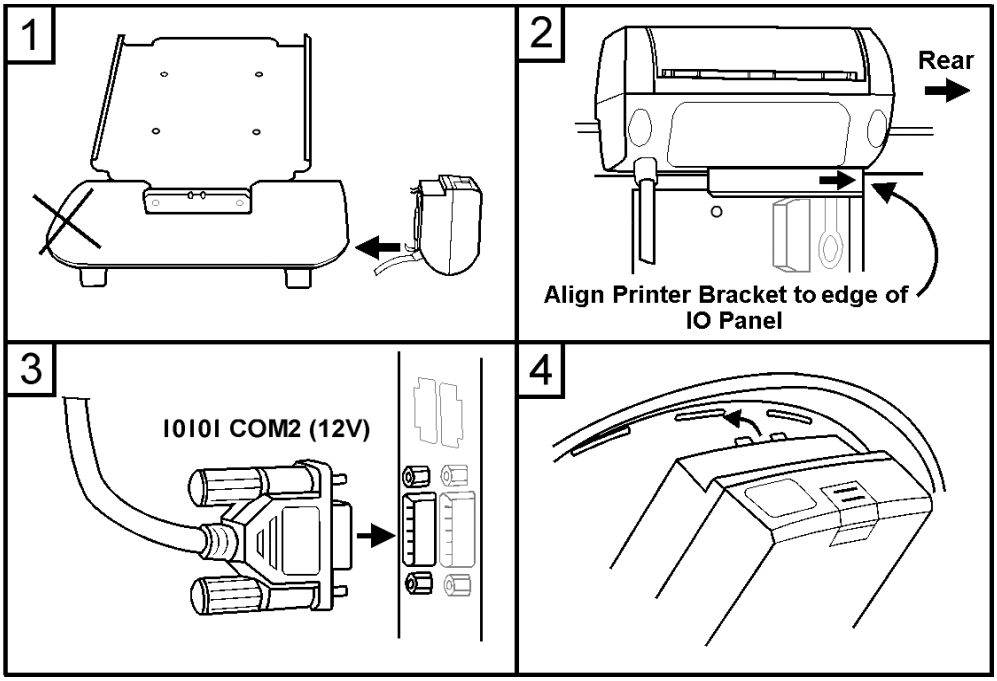


Figure 3-23: Installing the Integrated Mini Printer on mStation

Figure 3-24 on the next page, shows a completed Integrated Mini Printer Installation.

Figure 3-24: Integrated Mini Printer Installation on mStation

Testing the Integrated Mini Printer

mTablet Diagnostics Version 3.7 or later is required to test the Integrated Mini Printer. The Integrated Mini Printer is not Epson compatible; therefore the RS232 Print/Loopback tests do not function. See the ‘Device’ selection in mTablet/mStation Diagnostics for more information.

mStation Wireless Scanner

Instructions for installation are provided with the scanner or on the HSG Portal. The Scanner and Dock are paired at the factory and ready to go out of the box.

mTablet Shoulder Strap

The mTablet casework includes four attachment points shown at the left of Figure 3-25. Shown on the right side are examples of using the mTablet Shoulder Strap in portrait or landscape modes.

Figure 3-25: mTablet Shoulder Straps

The mTablet Shoulder Strap is available with PN 600540-034.

IO Panel

The mStation IO Panel is shown in the Figure below.

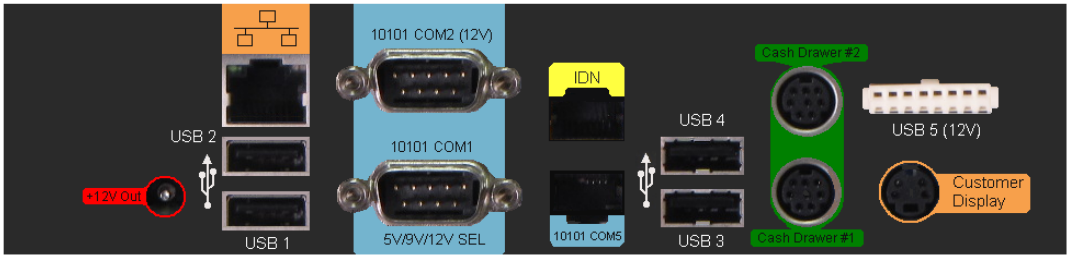


Figure 3-26: mStation IO Panel

For more information about the power available at each port, see pages 1-19 and 1-20.

+12V Out

Auxiliary Power connector for a peripheral device.

Ethernet

The mStation includes a 10/100/1000 Ethernet Controller with a UTP Modular connector. The modular connector features an integrated isolation transformer as well as link and status indicator LEDs. Note: The Ethernet controller resides in the mTablet and the signals are fed through the multi-function connector to the mStation IO Panel.

USB1 - USB4

In addition to a MICROS powered USB port, the mStation IO Panel includes four standard USB 2.0 Type A ports, labeled USB1 through USB4. Note: when mTablet is installed, it can take up to one minute before mStation USB ports become active.

10101 COM2 (12V)

COM2 is a DB9 serial port with 12V available on Pin-9 (RI) of the connector. The MICROS Integrated Mini Printer for mStation is designed for this port. 10101 COM1 5V/9V/12V SEL

COM1 is a DB9 serial port with user selectable voltages of 0V, 5V, 9V, or 12V on Pin-9 (RI) of the connector. The voltage is selected through the Diagnostics Utility.

IDN

The IDN port can be configured as a full-duplex RS422 port to support IDN Printing devices. It can also be configured as a simple 2-wire TX/RX RS232 Interface to support a number of peripheral devices.

The IDN Port is functionally identical to those on all current MICROS workstations including the Workstation 5A, Workstation 2015, and KW270.

10101 COM5

COM5 is a full featured modular RS232 Interface. Use RJ45 to RS232 DB9 Adapter Cable, PN 300319-102.

Cash Drawer #1 - Cash Drawer #2

mStation introduces new cash drawer connectors, based on 8-pin Mini-DIN connectors. Two of the additional pins are used to establish a serial interface between mStation and a future APG Smart Cash Drawer.

To support existing MICROS cash drawers with the 4-Pin DIN connector, use adapter cable PN 300290-020.

USB5 (12V)

USB5 is a MICROS powered USB that supplies USB data in addition to 12V and 5V for the Protege Customer Display System.

Customer Display

The mStation customer display port supports one integrated or pole mount customer facing display detailed in Chapter 1. To connect two customer displays to mStation, use ‘Y’ cable PN 300107-030.

Chapter 4

mTablet/mStation Diagnostics

This chapter includes basic troubleshooting procedures for the unit and describes how to use the Diagnostics Utilities.

In this chapter

mTablet/mStation Diagnostics Utility

The Diagnostics Utility provides a great deal of information about the platform hardware and software in addition to a set of comprehensive tests of the hardware and supported peripherals.

This edition covers Version 3.7 of the mTablet/mStation Diagnostics Utility, which adds support for mStation peripherals such as the Integrated Mini Printer and mStation Scanner.

Running the mTablet and mStation Diagnostics Utility

1. From the Desktop, go to MyDevice > Boot > Utilities folder.
2. Double tap Diagutility_Vienna.exe.
   - The Figure below shows the Diagnostics Utility menu when the mTablet is Undocked (background) or when the mTablet is installed in mStation (foreground).

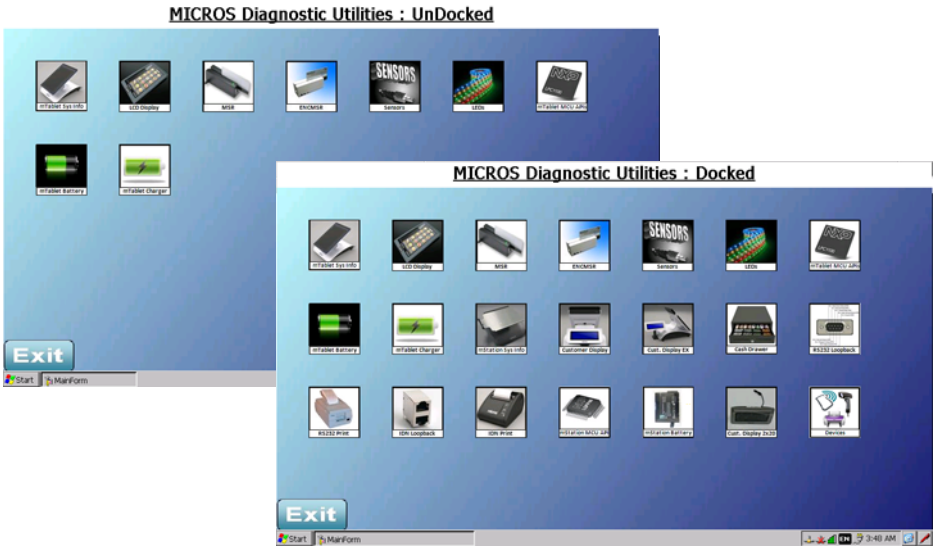


Figure 4-1: Diagnostics Main Menu (Docked and Un-Docked)

- Touch the icon to start a particular test.
- To exit an individual test, tap [Home].
- To exit the Diagnostics Utility, touch [Exit].

mTablet System Info

System Information groups the mTablet software platform in a single location.

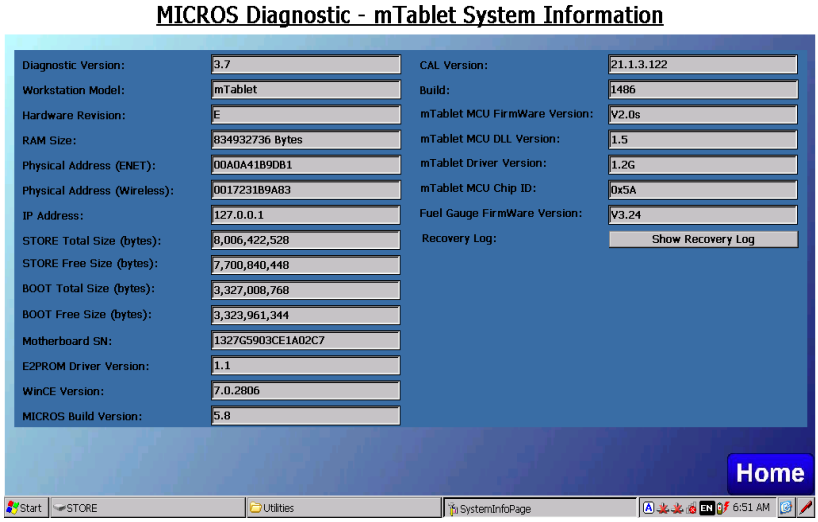


Figure 4-2: mTablet System Information Screen (PV 1.3)

Diagnostics Version

Displays the mTablet Diagnostics Version. The 2nd edition covers Diagnostics Version 3.7, part of Platform Version 1.3.

Platform Version 1.3 is required to test peripherals such as the mStation Scanner and the Integrated Mini Printer.

Workstation Model

Displays the workstation model, in this case, mTablet.

Hardware Revision

Displays the Hardware Revision of the mTablet System Board.

RAM Size

Displays the total RAM capacity of the mTablet.

Physical Address (ENET)

This field displays the network Media Access Control (MAC) number assigned to the Ethernet port available in mStation.

Physical Address (Wireless)

Displays the WiFi module physical address.

IP Address

The mTablet defaults to DHCP IP mode. This field displays the IP Address assigned to the mTablet.

STORE Total Size

This field displays the total size of STORE in bytes. STORE is a microSD card installed behind the Mag Stripe Reader. Currently, each mTablet ships with an 8GB microSD card.

STORE Free Size

This field displays the remaining capacity of STORE, in bytes, of the microSD card installed in mTablet. STORE contains application software and the Windows CE Registry.

BOOT Total Size

This field displays the total size of BOOT, in bytes. BOOT is composed of a 4GB MMC Flash Memory Device installed on the mTablet main board. The total size includes all partitions.

BOOT Free Size

This field displays the remaining capacity of BOOT, in bytes, of the MMC Memory Device installed mTablet. BOOT contains the mTablet Platform files including the operating system, drivers and diagnostics and firmware update utilities.

Motherboard SN

Displays the mTablet System Board serial number.

E2PROM Driver Version

This driver provides access to a mTablet system board serial EEPROM used to store information such as the motherboard serial number.

WINCE Version

Displays the operating system version.

MICROS Build Version

The MICROS Build Version represents the combination of the Windows Embedded Compact 7 image components and internal drivers. An internal driver is included in the image and not accessible on \BOOT. Should an internal driver be changed, added or removed, or a new component added or removed from the WEC7 image, a new build is generated and the MICROS Build Version increments.

CAL Version

Displays the current MICROS Client Application Loader version.

Build

Displays the Microsoft Windows Compact Embedded Build Version.

mTablet MCU Firmware Version

Displays the mTablet MCU firmware version. The MCU manages many aspects of mTablet including battery management, and sensors including the Accelerometer, Automatic Light Sensor, Haptic Motor and internal temperature sensor.

mTablet MCU DLL Version

The MCU DLL provides a software interface between the MCU and the mTablet Driver.

mTablet Driver Version

The mTablet Driver is a software interface between the MCU DLL and Windows Embedded Compact 7.

mTablet MCU Chip ID:

Displays the mTablet MCU Chip ID.

Fuel Gauge Firmware Version

The Fuel Gauge is an intelligent microprocessor based device from Texas Instruments that resides on the mTablet Main Board and runs internal firmware. It uses a proprietary algorithm that tracks cell voltage, temperature, and current to determine the mTablet battery State of Charge (SOC).

All information is stored in the fuel gauge flash memory and accessed by the mTablet MCU using a sequence of data-flash access commands. An additional 32-byte data area, called the Manufacturer Info Block stores information specific to the mTablet battery such as ***Design Capacity*** and ***Max Load Current***.

The fuel gauge measures charge/discharge current by monitoring the voltage across a small value resistor in series with the battery and mTablet Main Board. Battery temperature is determined by thermistor (T2) in physical contact with the battery.

Recovery Log

Tapping the [Show Recovery Log] button displays a log of all Platform Updates performed including date, time, and the files that were updated.

Tap the [Home] button to return to the main menu.

LCD Display

From the LCD Display Screen, you can adjust mTablet LCD intensity, color, and backlight brightness.

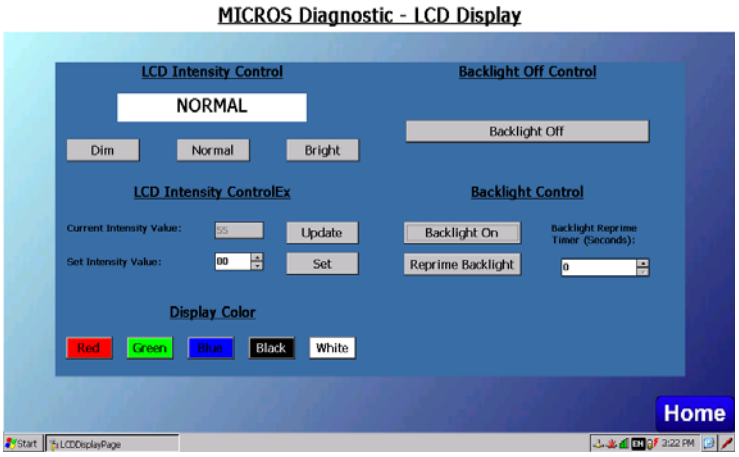


Figure 4-3: mTablet LCD Display Diagnostics

MSR

This selection is used to test non-encrypted magnetic cards.

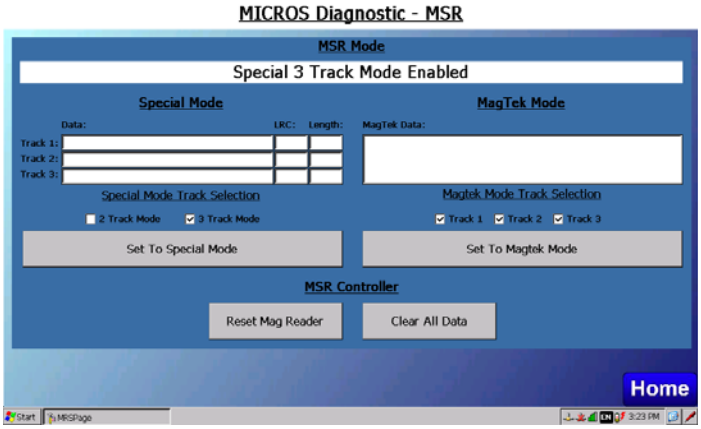


Figure 4-4: Mag Stripe Reader Test - non Encrypted

Encrypted MSR

This selection is used to test mag cards when encrypted is enabled. It displays the encrypted mag card reader serial number and model number.

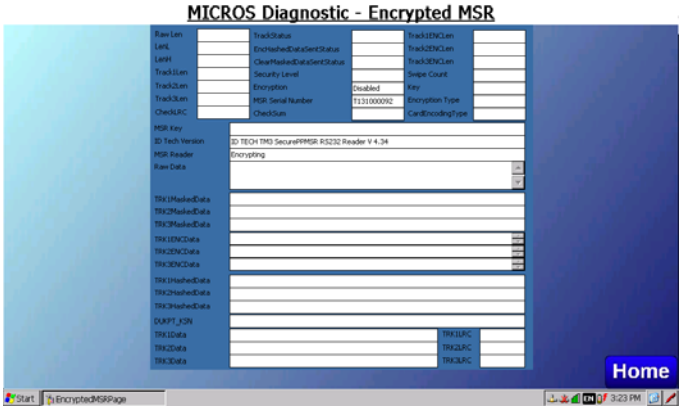


Figure 4-5: Encrypted Mag Card Reader Screen

Sensors

Allows testing of the mTablet Accelerometer, Ambient Light Sensor, System Board Temperature as well as haptic strength and duration.

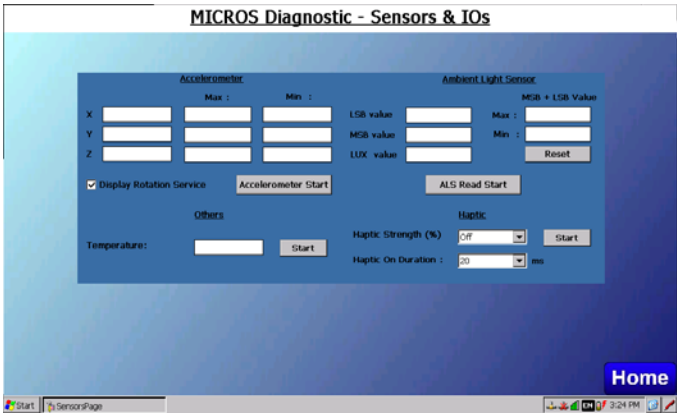


Figure 4-6: mTablet Sensors and IO

Accelerometer

The Accelerometer detects the orientation of mTablet and is used to rotate the display as the orientation is changed from portrait to landscape modes and back. Tap [Accelerometer Start] to begin.

Automatic Light Sensor

The Ambient Light Sensor detects the amount of ambient light and adjusts the backlight brightness. The sensor is located just to the left of the mTablet Battery LED when in portrait mode.

Tap the [ALS Read Start] button to begin.

To ensure the Automatic Light Sensor is functioning properly, check the 'Lux value' field under various lighting conditions. The table below displays typical Lux values for various indoor and outdoor lighting conditions. Please note that the Lux values are approximate and intended to show the relative differences between indoor and outdoor lighting conditions.

Lighting Conditions	Typical Lux value
Indoors - Low Light	0x16
Indoors - Medium Light	0x73
Indoors - Bright Light	0x1B2
Outdoors - Cloudy	0x635
Outdoors - Cloudy/Bright	0x8FA
Outdoors - Sunny	0x19D3

Figure 4-7: Typical ALS Lux values for Indoor and Outdoor Lighting

Temperature

This field reports the mTablet internal temperature. The sensor location is shown in the Figure below. Tap [Start] to monitor the system temperature.

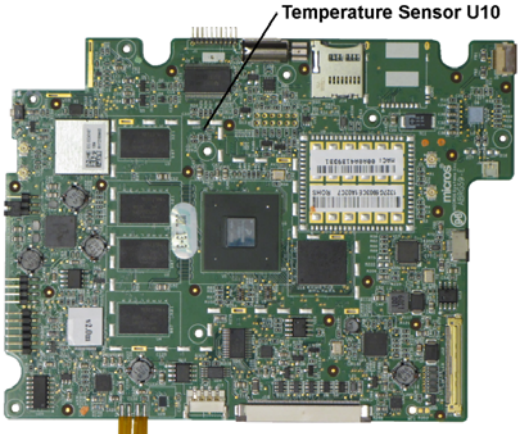


Figure 4-8: mTablet Internal Temperature Sensor

LEDs

From this screen, you can test the mTablet Battery LED or mStation System LED by entering the Manufacturing Mode.

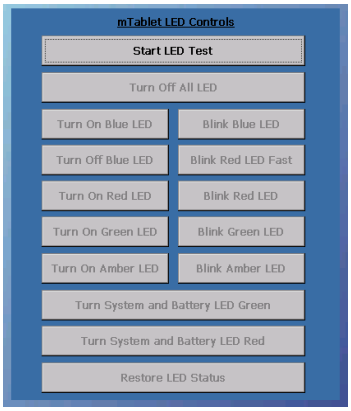


Figure 4-9: Testing the mStation and mTablet LEDs

To begin, touch [Start LED Test].

The message ‘In Manufacturing Mode. Press ‘Restore LED Status’ Button to return to normal’ appears. The Blue LED is not yet available. When finished, be sure to tap the [Restore LED Status] button.

MCU APIs

From this screen, you can set the voltage on COM1, and enable/disable the mStation IO Panel USB Ports.

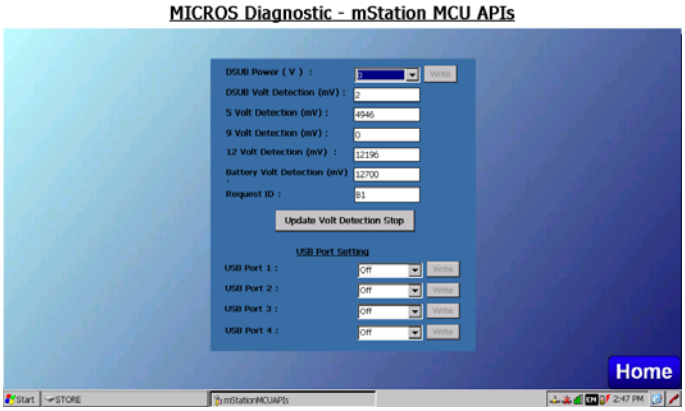


Figure 4-10: mTablet Hardware Monitor - Voltages

mTablet Battery Status

This status screen displays detailed real-time mTablet battery information. All fields in the Battery Status screen originate from U28, a TI bq27520-G3, a micro-controller peripheral that provides fuel gauging for the embedded mTablet Li-Ion Battery. The Fuel Gauge and U27 a TI bq24160 Dual-Input, Single Cell Switch-Mode Li-Ion Battery Charger with Power Path Management and I2C Interface. The mTablet MCU manages both devices through its I2C interface.

mTablet Battery Status includes the charge/discharge status, voltage, temperature, current, available capacity, time to charge, and cycle count. Version 3.7 of mTablet Diagnostics (part of the PV1.3 Platform) adds a battery State Of Health (SOH) field. Each field is detailed below.

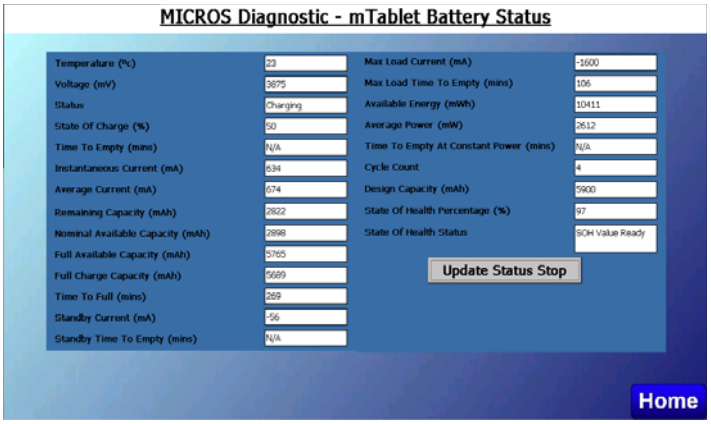


Figure 4-11: mTablet Battery Status

Temperature (°c)

Displays the mTablet Battery temperature in degrees Celsius. The temperature originates from a thermistor in contact with the mTablet battery case. Battery temperature is used by the fuel gauging algorithm and charger-control sections of the fuel gauge.

Voltage (mV)

Displays the measured battery voltage in millivolts with a range of 0 to 6000mv. Example: 3831mv = 3.831V.

Status

The Status field indicates Charge, Discharge or Full.

State of Charge (%)

Displays the predicted remaining battery capacity expressed as a percentage of ***Full Charge Capacity*** with a range of 0 to 100%. The SOC originates from TI's proprietary fuel gauging algorithm - based on cell measurements, characteristics, and properties to create predictions that can achieve an accuracy of less than 1% over the lifetime of the battery.

Time to Empty (mins)

Displays the predicted remaining battery life at the present rate of discharge, in minutes.

'N/A' is displayed when the battery is charging.

Instantaneous Current (mA)

Displays the instantaneous current flow through the sense resistor, in milliamperes. The conversion time is 125ms, and updates occur every one second.

When the battery is discharging, this field displays the instantaneous load current of mTablet. When the battery is charging, this field displays the instantaneous charge current to the battery.

Average Current (mA)

Displays the average current flow through the sense resistor, in milliamperes. The ***Average Current*** is calculated by dividing the one second change in coulomb counter data by one second. When charging, a positive value is displayed. When discharging, a negative value is displayed.

When the battery is discharging, this field displays the average load current presented by mTablet. When the battery is charging, this field displays the average charge current to the battery.

Remaining Capacity (mAh)

Displays the predicted remaining battery capacity, in milliampere-hours, with compensation for the present conditions of load, temperature and battery age. ***Remaining Capacity*** is typically lower than the uncompensated ***Nominal Available Capacity*** field.

Nominal Available Capacity (mAh)

Displays the uncompensated remaining battery capacity in milliampere-hours.

Full Available Capacity (mAh)

Displays the uncompensated battery capacity when fully charged, in milliampere-hours. This field updates about once per second.

Full Charge Capacity (mAh)

Displays the battery capacity when fully charged with compensation for the battery temperature and age, in milliampere-hours. ***Full Charge Capacity*** is updated once per second and is typically lower than the uncompensated ***Full Available Capacity*** field.

Time to Full (mins)

Displays the predicted remaining time until the battery reaches full charge, in minutes, based on ***Average Current***. The computation accounts for the taper current timer extension from the linear ***Time To Full*** calculation based on a fixed ***Average Current*** rate of charge accumulation.

'N/A' is displayed when the battery is discharging.

Standby Current (mA)

Displays the measured current through the sense resistor when mTablet is in Standby mode, in milliamperes. The ***Standby Current*** field is adaptive. Initially, it reports the standby current programmed in the Initial Standby value field. After mTablet spends several seconds in suspend however, the field reports the measured standby current, a negative value ranging from -20 to -60 milliamperes.

'N/A' is displayed when the when the battery is charging.

Standby Time to Empty (mins)

Displays the predicted remaining battery life at the ***Standby Current*** rate of discharge, in minutes. ***Nominal Available Capacity***, the uncompensated remaining capacity, is used for this computation.

'N/A' is displayed when the battery is charging.

Max Load Current (mA)

Displays the maximum load current, in milliamperes. Initially, this field reports the maximum load current programed in the *Max Load Current* register. If the measured current is greater than initial *Max Load Current*, then ***Max Load Current*** updates to the new current value.

To prevent unusually high values, ***Max Load Current*** is reduced to the average of the previous value and ***Initial Max Load Current*** whenever the battery is fully charged after a previous discharge.

'N/A' is displayed when the battery is charging.

Max Load Time to Empty (mins)

Displays the predicted remaining battery life at the ***Maximum Load Current*** discharge rate, in minutes.

'N/A' is displayed when the battery is charging.

Available Energy (mWh)

Displays the predicted charge or energy remaining in the battery, in milliwatt-hours.

Average Power (mW)

Displays the average power during battery charging or discharging, in milliwatts. When the battery is charging, a positive value is displayed.

A negative value is displayed when the battery is discharging.

Time To Empty At Constant Power (mins)

Displays the predicted remaining operating time, in minutes, if the battery is discharged at ***Average Power***. The fuel gauge updates ***Time To Empty At Constant Power*** based on the ***Average Power*** value every 1 second.

'N/A' indicates the battery is charging.

Cycle Count

Displays the number of charge/discharge cycles that the mTablet battery has experienced in the range of 0 to 65535. ***Cycle Count*** increments by one when the accumulated discharge is greater than or equal to the *Cycle Count Threshold* register located in the Fuel Gauge.

Cycle Count resets to zero when a new battery is installed, or if the Fuel Gauge Firmware is updated.

Design Capacity (mAh)

Displays the value stored in the ***Design Capacity*** field of the Fuel Gauge Manufacturer Info Block. Taken from the mTablet battery data sheet, 5900 mAh is the nominal capacity of the mTablet battery when new. ***Design Capacity*** is part of the ***State Of Health*** computation, described on the next page.

State of Health Percentage (%)

Displays the battery State Of Health percentage, expressed as a ratio of the predicted ***Full Charge Capacity*** (at 25°C, SOH Load) over the ***Design Capacity***. The State Of Health Status field, indicates how the SOH percentage is calculated when a new battery is installed and undergoes one or more charge/discharge cycles.

FCC(25°C, SOH Load) is the calculated ***Full Charge Capacity*** at 25°C ambient, and the ***State Of Health*** Load value, specified in the data flash area.

The State of Health (SOH) percentage is an indication of the mTablet's battery condition compared to its ideal conditions, reported in percent points. When a new battery is installed at the factory or replaced in the field, the SOH = 100%.

Therefore, the SOH percentage is not physical characteristic of the battery; it is an arbitrary value calculated by the fuel gauge using the battery impedance, capacity, voltage, temperature, self-discharge characteristics, and the number of charge/discharge cycles.

State of Heath Status

The State Of Health Status field indicates the status of the SOH percentage. The meaning of the returned values are detailed below. Note: Some SOH values appear only when the battery is installed.

- *Instant SOH Value Ready*

  The Instant SOH Value reflects a new battery.

- *Initial SOH Value Ready*

  The Initial SOH Value is based on an uncompensated *Qmax* value and updated on the first discharge after the battery is installed.

- *SOH Value Ready*

  When the status is SOH Value Ready, it is based on a compensated Qmax value. The updated *Qmax* value is obtained after the first charge/discharge cycle.

  Qmax is the chemical state of charge or ***Design Capacity*** of the battery initially taken from battery specification sheet.

  The updated Qmax value is based on the battery Open Circuit Voltage and charge integration measurements performed by the fuel gauge.

mTablet Battery Charger

This selection provides complete control over the Texas Instruments battery charger IC used in mTablet.

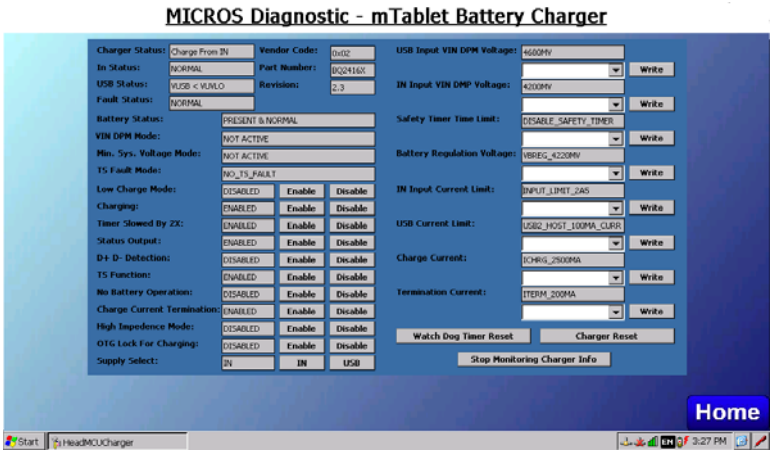


Figure 4-12: mTablet Battery Charger

The following tests appear only when mTablet is installed on mStation.

mStation System Information

The mStation System Information screen displays the MCU firmware and Base.DLL versions, and indicates if the optional mStation smart battery is installed.

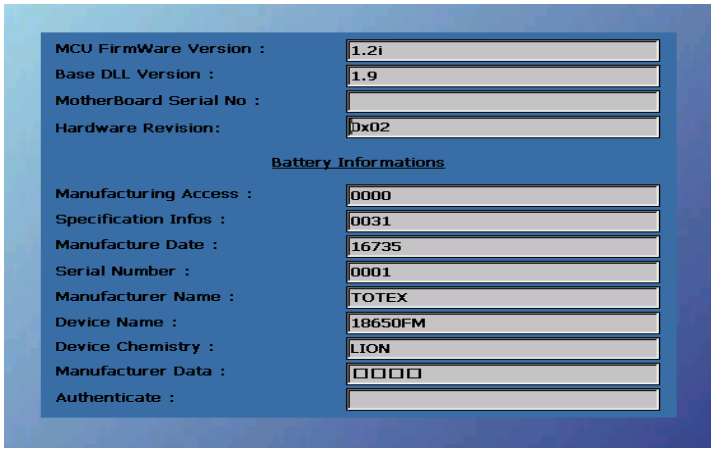


Figure 4-13: mStation System Information

MCU Firmware Version

This field displays the mStation MCU Firmware Version. Version 1.2i is considered part of Platform Version 1.3.

Base DLL Version

This field displays the Base.DLL Version. This file resides on mTablet and is considered part of Platform Version 1.3.

Customer Display

This screen lets you test an integrated or pole 240x64 Customer Display by sending a message, display alternate character sets and enter raw mode to send commands directly to the Customer Display MCU.

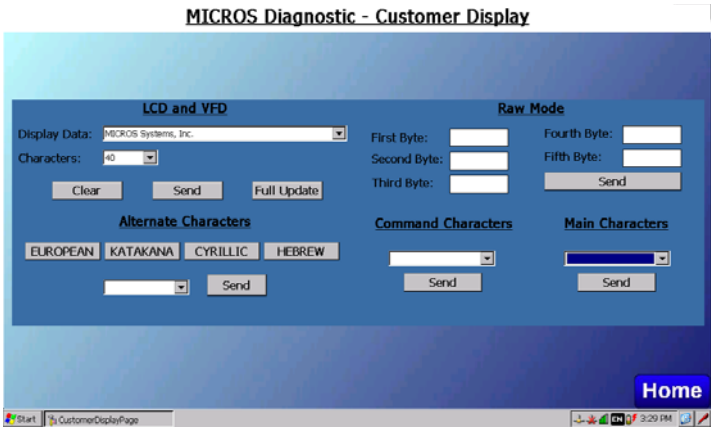


Figure 4-14: mStation 240x64 Customer Display Testing

Customer Display EX

This screen EXtends the 240x64 Customer Display test by exercising its graphics capabilities. In addition, this screen displays the customer display firmware version, if required.

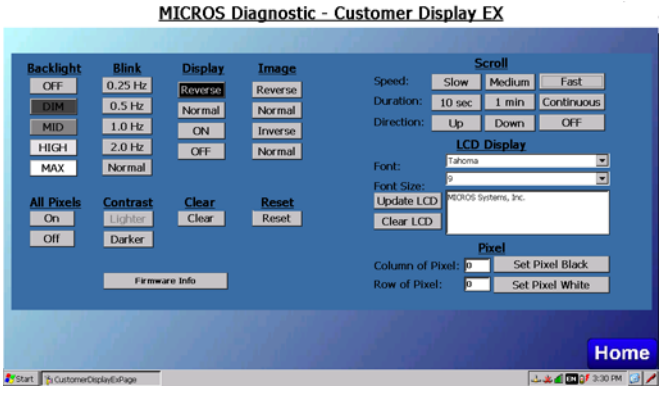


Figure 4-15: mStation Customer Display EXtended

To view the 240x64 Customer Display firmware version, press the [Firmware Info] button.

Cash Drawer

When you tap the Cash Drawer icon, the Cash Drawer Password Verification window appears.

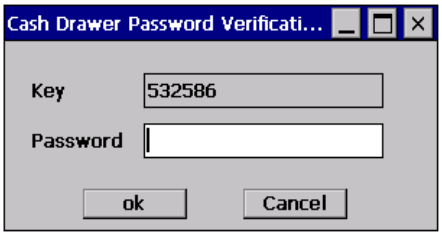


Figure 4-16: Entering a Password for the Cash Drawer Test

Apply the following formula to the six-digit number that appears in the Key field.

Digit 1 x Digit 2 + Digit 4 + Digit 6 = Password

In the example above, the Key is 532586, the password is 26. (5x3+5+6 = 26). Enter the password with the CE input panel, and the Cash Drawer test appears.

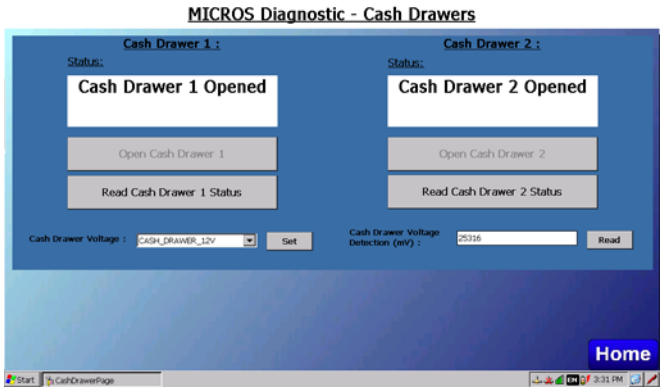


Figure 4-17: mStation Cash Drawer Test

RS232 Loopback

The RS232 Loopback screen tests mStation RS232 ports using a Loopback connector connected to an individual port, or a loopback cable connected between two COM ports.

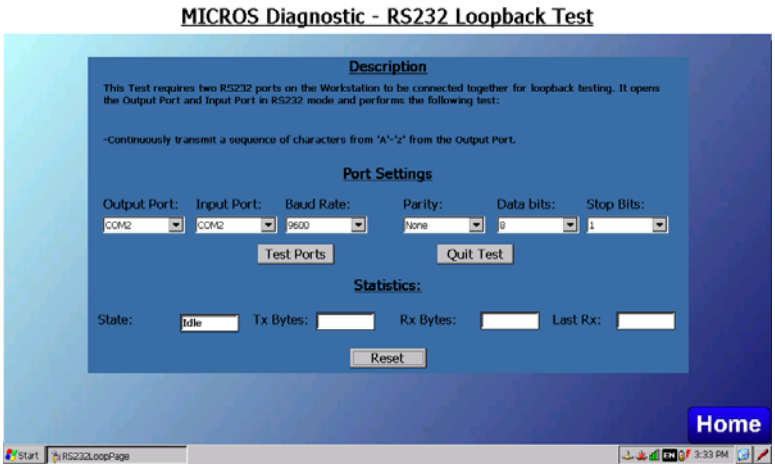


Figure 4-18: RS232 Loopback Test

The RS232 Ports are COM1, COM2, COM4 and COM5.

RS232 Print

The RS232 Print Test prints directly to an Epson compatible RS232 printer on the selected COM Port. *The RS232 Print test is not compatible with the MICROS Integrated Mini Printer, see the Device selection.*

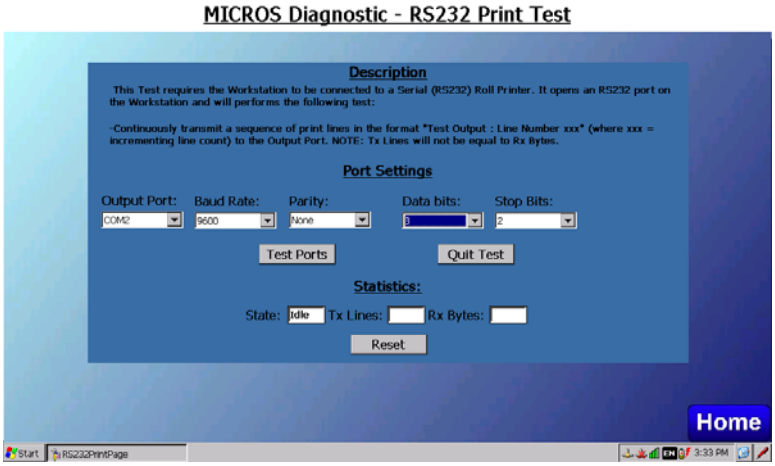


Figure 4-19: RS232 Print Test

IDN Loopback

The IDN Loopback screen allows testing of the mStation IDN Port using a modular loopback connector.

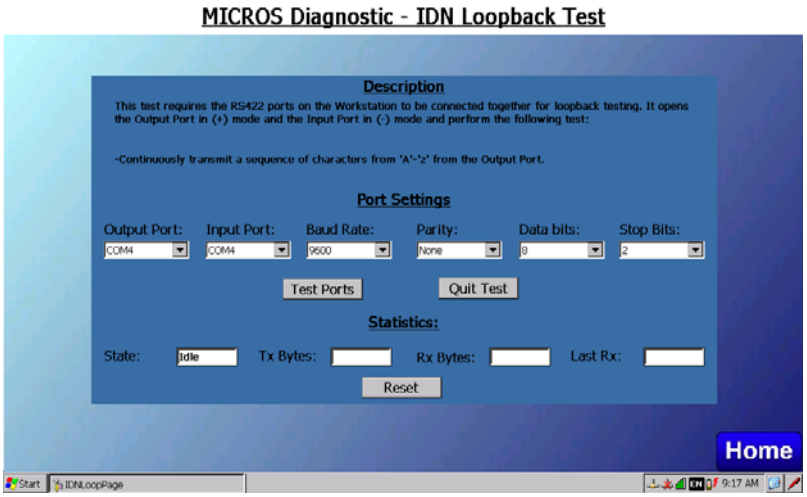


Figure 4-20: IDN Loopback Test

IDN Print

The IDN Print test prints directly to an Epson printer with an IDN Module.

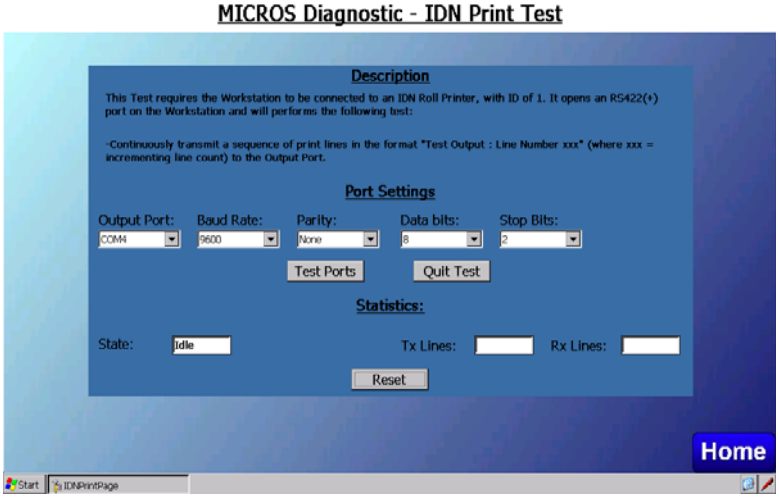


Figure 4-21: IDN Print Test

mStation MCU API

From this screen, you can determine or set the COM2 port (DSUB) voltage, check the optional battery, and enable/disable mStation USB ports.

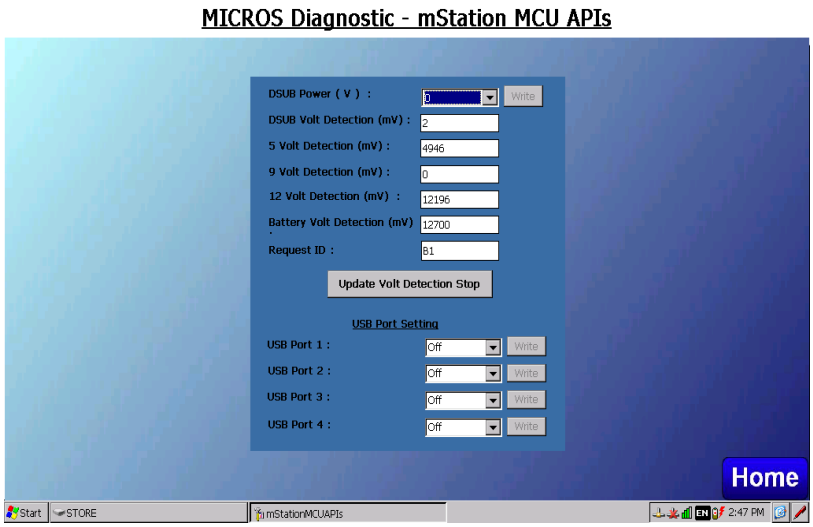


Figure 4-22: mStation Hardware Monitor

To select the COM1 voltage, tap the pull down and select the desired voltage (5V, 9V, or 12V), then tap the [Write] button. COM2 is fixed at 12V to support the MICROS Integrated Mini Printer.

mStation MCU Battery Status

Provides status information on the mStation optional battery pack.

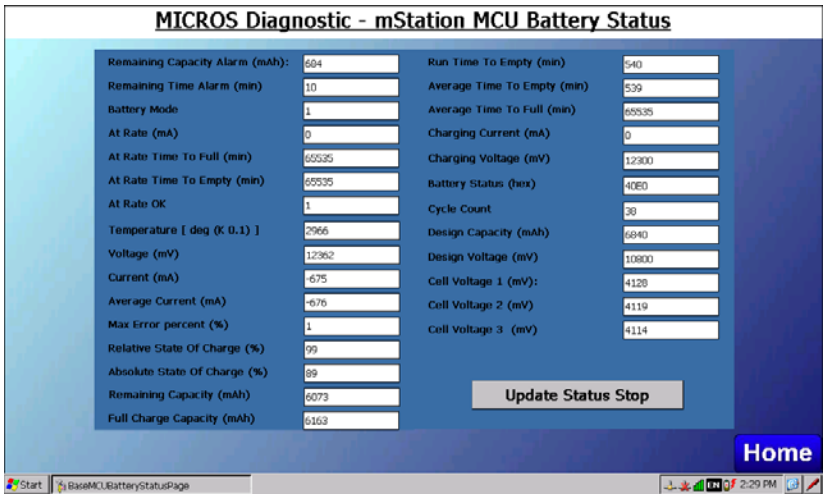


Figure 4-23: mStation MCU Battery Status

Customer Display 2x20

This selection tests the Integrated mStation 2x20 LCD Customer Display by sending two pre-defined lines of text.

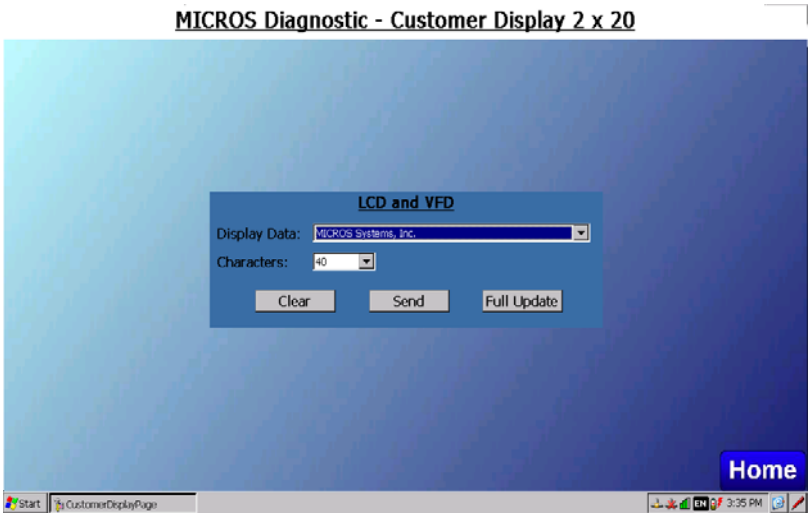


Figure 4-24: 2x20 Character LCD Customer Display

Testing the mTablet Touch Screen

While not part of the Diagnostics Utility, mTablet is supplied with a utility for testing and calibrating the touch screen.

- To perform touch screen testing, tap My Device - Windows Folder - CETouchView.exe.
- Tap [Yes] to get by the 'CETouchFilter is not loaded' message.
  - CE touch test screen appears. White background - gray bar across upper half reports, [Options] button in the lower left corner.
- Draw vertical or horizontal lines across the screen to check linearity at the top and sides of the display.
- To Exit, tap the [Options] button, then [Exit].

Devices

The Devices selection adds support for testing the MICROS Integrated Mini Printer, mStation Scanner, and a future scanner such as the MSR/Imager/NFC-RFID module. Platform Version 1.3 or later is required to support mStation Integrated Mini Printer, mStation Scanner and future similar devices. The Device screen is divided into sections for each device.

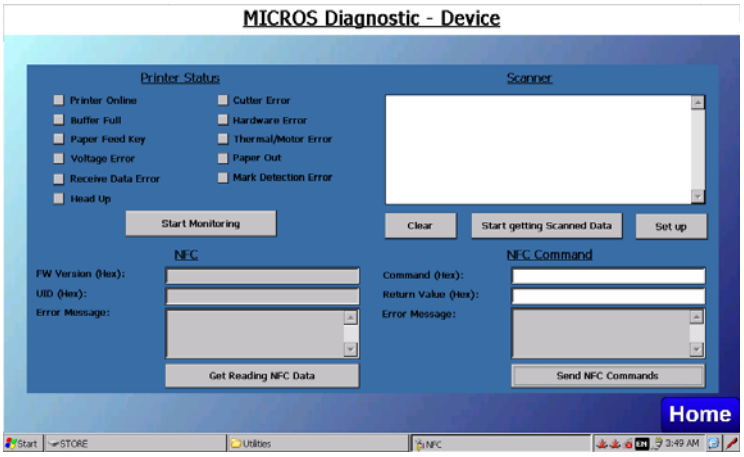


Figure 4-25: mStation Devices Menu

Printer Status

Note: The Printer Status Test is intended for the MICROS Integrated Mini Printer connected to COM2 with 12V available.

The Printer Status consists of a group of ‘boxes’ each representing an electrical or mechanical test of the printer.

To test the Mini Printer Status, make sure it is connected to COM2, loaded with paper and powered-up. Press the [Start Monitoring] button. All boxes should show Green.

With the Printer Status test running, open the Mini Printer door and observe the display. In the Figure below, the ‘Printer Online’, ‘Head Up’, and ‘Paper Out’ boxes show Red.

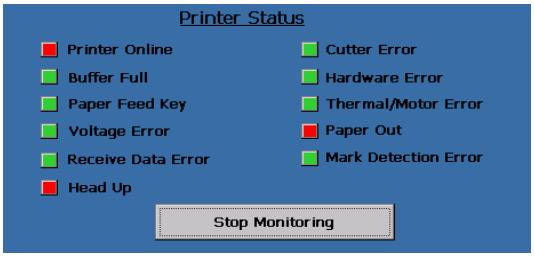


Figure 4-26: Monitoring the Mini Printer Status - Door Open Error

Scanner

The Scanner selection can test the mStation Wireless Scanner using Presentation or Trigger mode.

To use the scanner test, the Scanner and Dock must be paired as described in the installation MD or Chapter 4. The Wireless Scanner Dock must be connected to a IO Panel USB input.

With the Wireless Scanner and Dock connected to mStation, tap the [Start getting Scanned Data] button. Scan a UPC barcode and the bar code number appears in the window along with a Carriage Return and Line Feed.

- If the COM Port Error occurs when you tap the [Start getting Scanned Data] button, check the USB interface cable to ensure it is connected to the IO Panel.

NFC and NFC Command

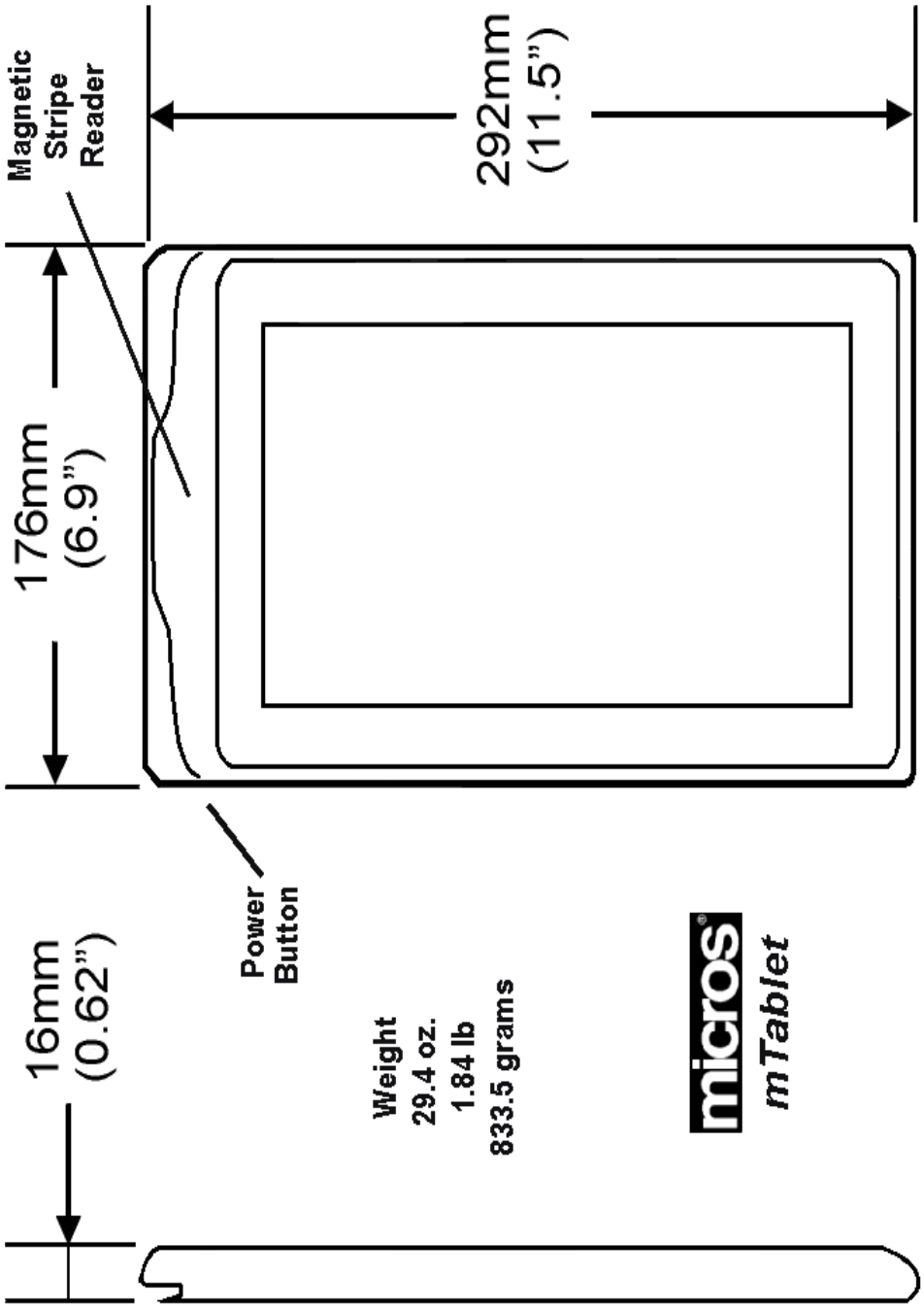
This selection provides a basic functional test of a future optional NFC-RFID Reader.

Appendix A

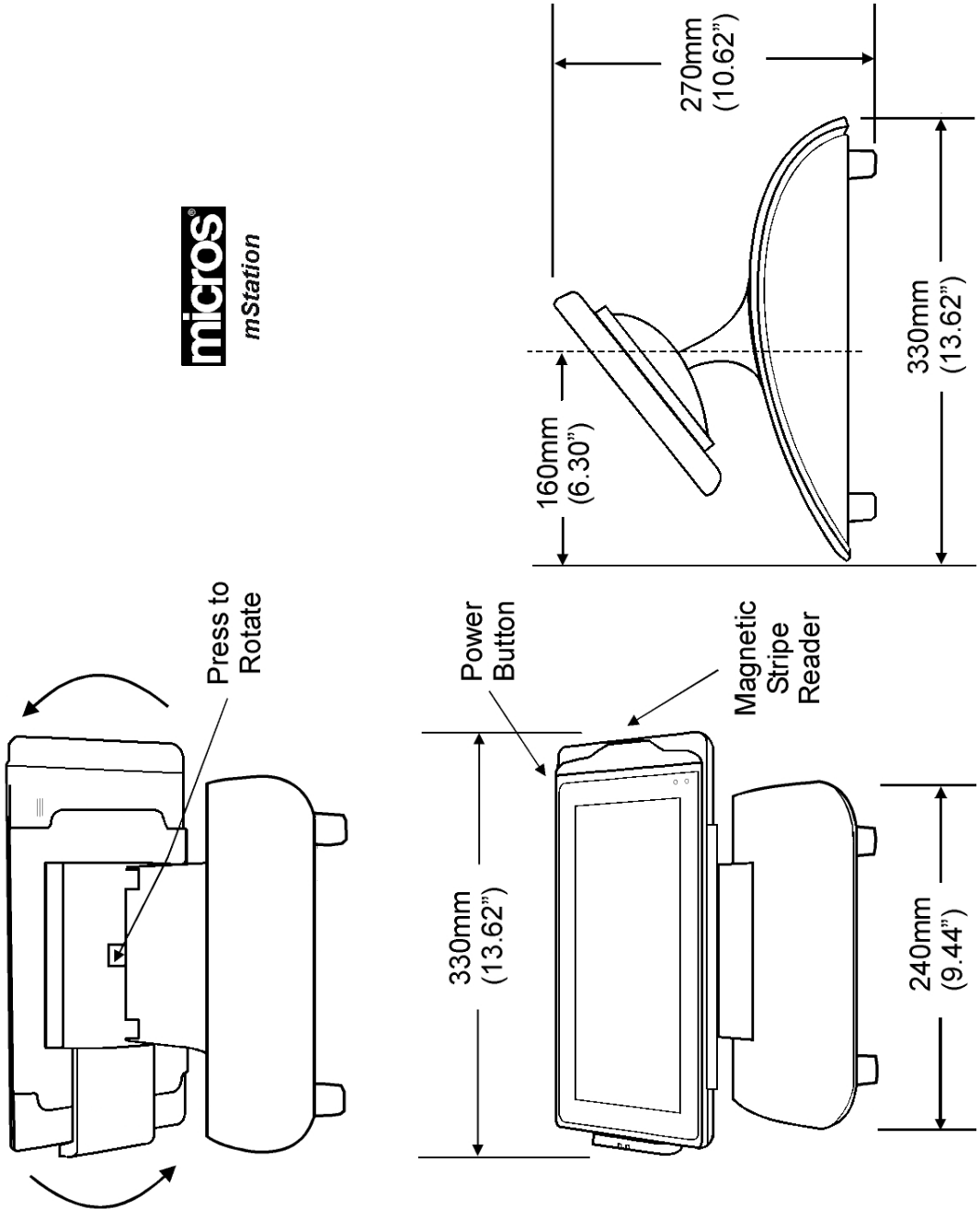
Equipment Dimensions

Contains mTablet, mStation and peripheral dimensional drawings.

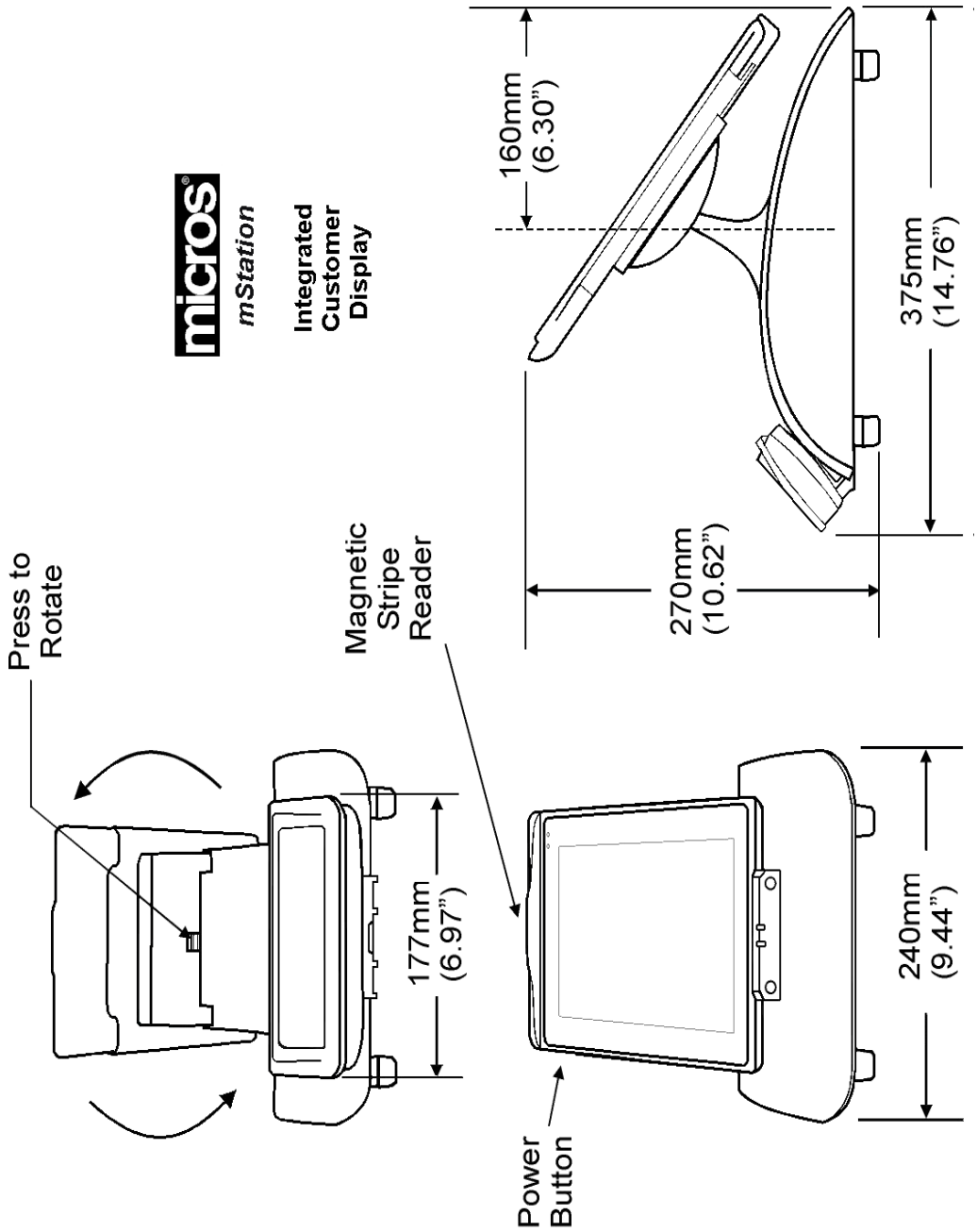
mTablet


Magnetic Stripe Reader
292mm (11.5”)
176mm (6.9”)
16mm (0.62”)
Power Button
Weight
29.4 oz.
1.84 lb
833.5 grams
micros
mTablet

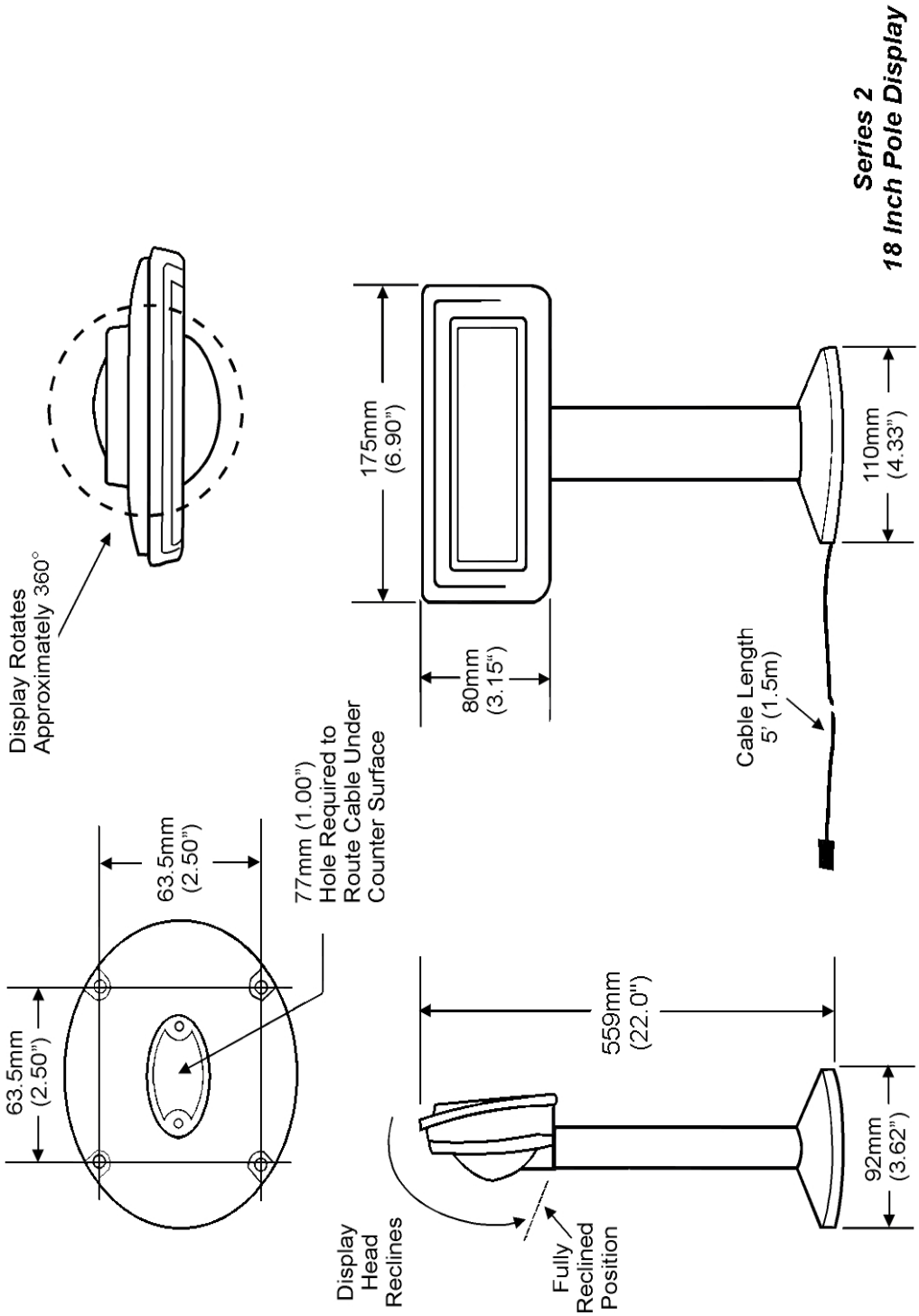
mStation


micros
mStation
270mm
(10.62")
330mm
(13.62")
160mm
(6.30")
Press to
Rotate
Power
Button
Magnetic
Stripe
Reader
330mm
(13.62")
240mm
(9.44")

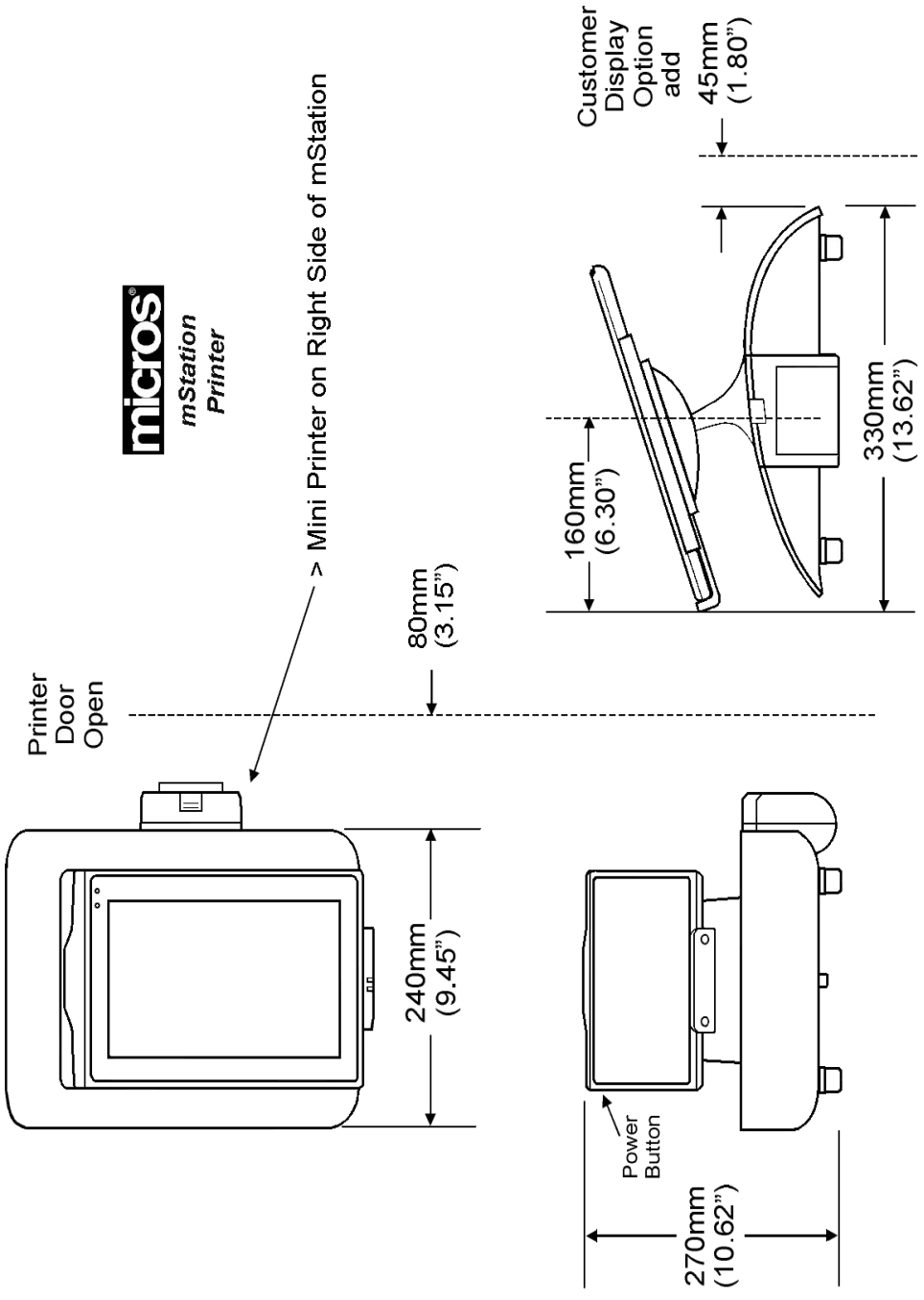
mStation /w Integrated LCD Customer Display



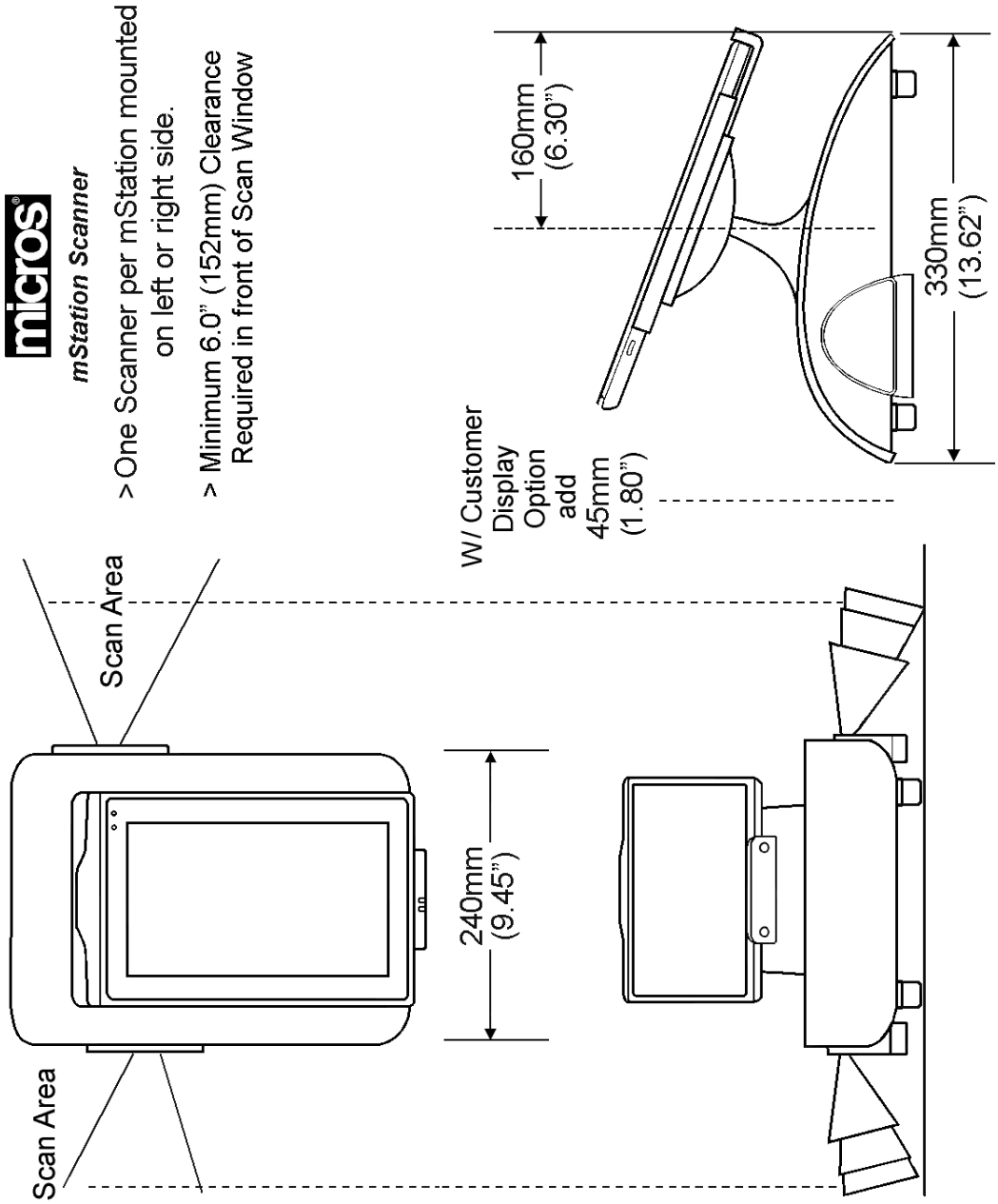
mStation LCD Customer Pole Display



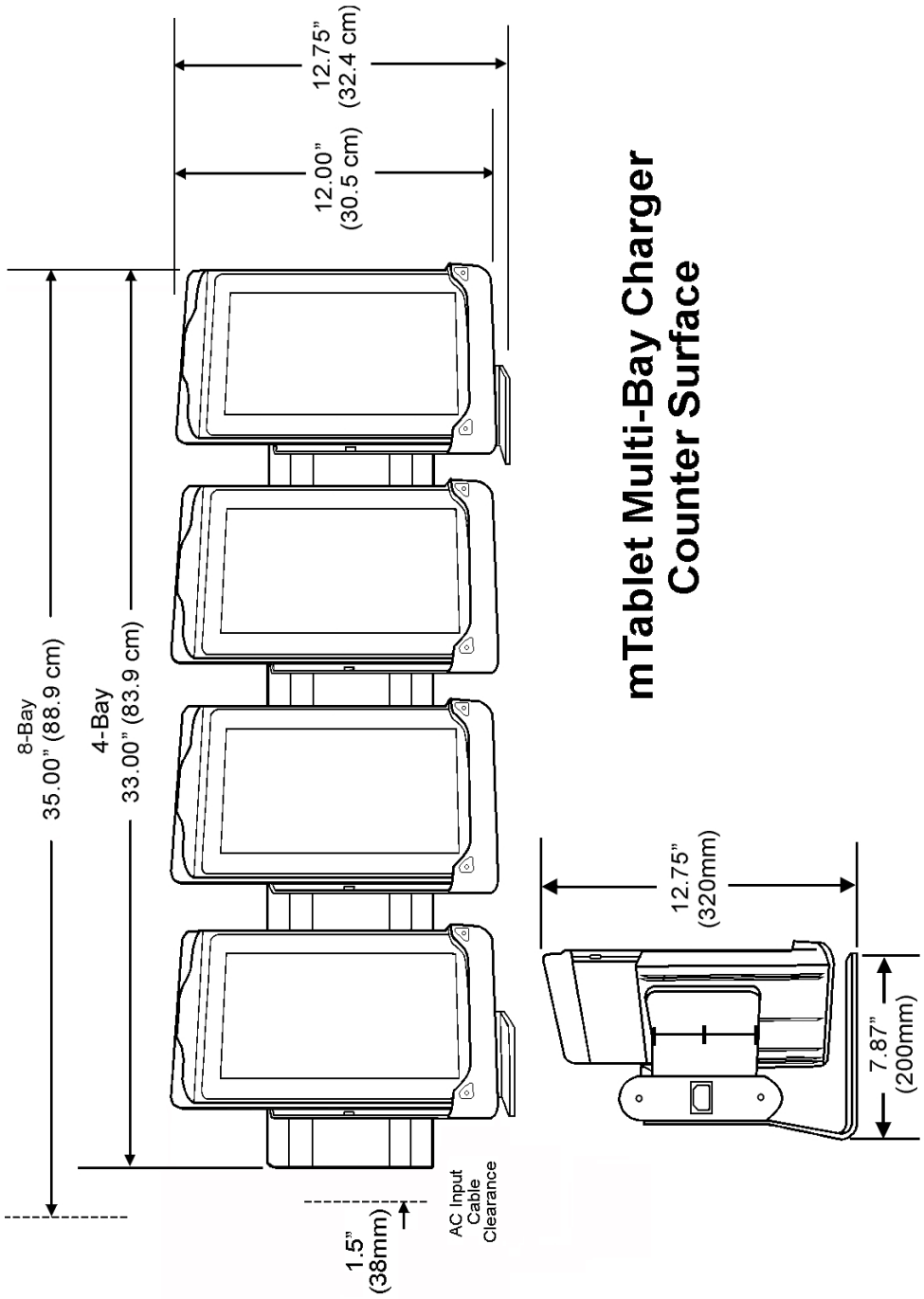
mStation Integrated Mini Printer



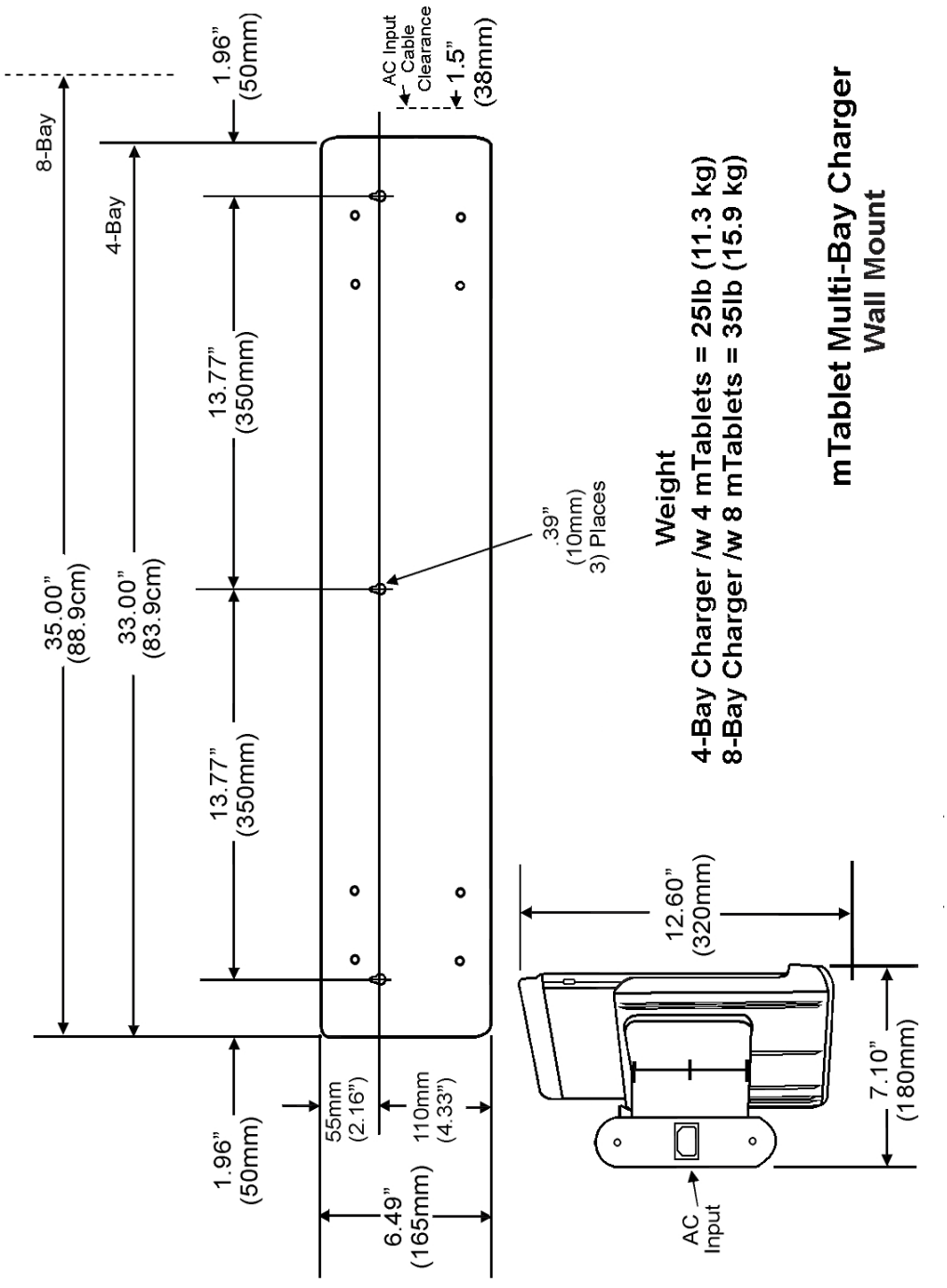
mStation Scanner



mTablet Multi-Bay Charger - Counter Surface



mTablet Multi-Bay Charger - Wall Mount



Appendix B

Connector and Cable Diagrams

In this appendix

IO Panel Connectors

The following connectors are located on the mStation IO Panel.

IDN Port

The IDN connector is a combination RS422/RS232 port assigned to COM4. This port is functionally equivalent to the RS422-A and RS422-B ports on the WS4/WS4 LX/KWS4 and the IDN port on all current MICROS workstations. Two configurations are detailed in the following pages, configured through the POS application.

WARNING:

Do not insert a 6-Pin modular plug into the 8-Pin IDN Port. The 6-Pin plug can push pins 1 and 8 of the connector out of position. These pins are used by the RS232 Interface. Should you wish to use the RS232 Interface at a later time, it may not function. Always use an 8-Pin modular plug to connect an IDN printer to the workstation. Use P/N 300319-036 (3ft) or 300319-120 (10ft).

IDN Port - Driving MICROS IDN Printers

The most popular configuration of the IDN Port is for printing to printers with IDN Modules. Also known as IDN(+), Figure B-1 shows the pin-out for this configuration.

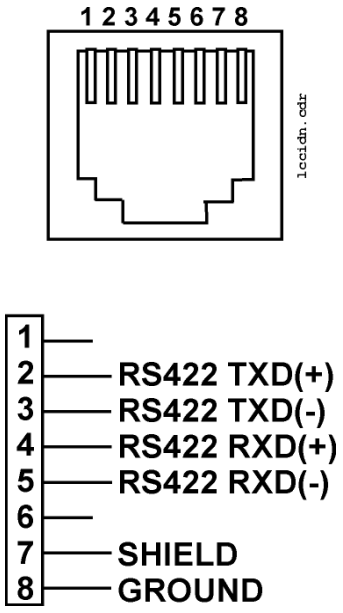


Figure B-1: IDN Connector Configured for IDN Devices

IDN Port - RS232 Peripheral

Figure B-2 shows the IDN port configured as a two wire RS232 interface. Use cable P/N 300319-102 to convert this port to a DB9 connector.

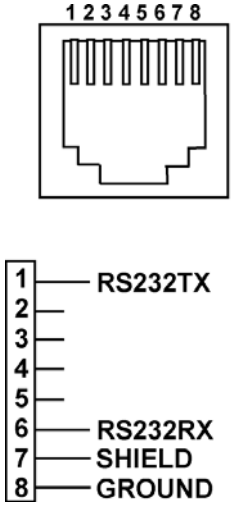


Figure B-2: IDN Port Configured for RS232

RS232 COM 5

mStation includes one full-featured modular COM port, assigned to COM5. Similar to COM5 on the original Workstation 5, 5A, and the PCWS Series including 2010 and 2015. Use cable P/N 300319-103 to convert this port to a DB9 connector.

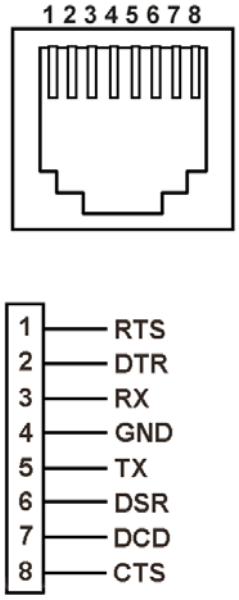


Figure B-3: COM5 Modular RS232 Connector

RS232 COM1 and COM2

The mStation IO Panel includes two powered RS232 Ports, COM1 and COM2. The pin-outs are shown in Figure B-4 below. Fixed or selectable voltages appear on Pin-9, the Ring Indicator pin of each connector.

COM1 supports one of three voltages - 0V, 5V, 9V, or 12V selectable through the mTablet Diagnostics Utility.

COM2 supports a fixed 12V. This port is targeted for use with the MICROS Integrated Mini Printer, a compact thermal printer that receives power and data directly from mStation.

Refer to the Specifications section of Chapter 1 for more information about the power available at each port.

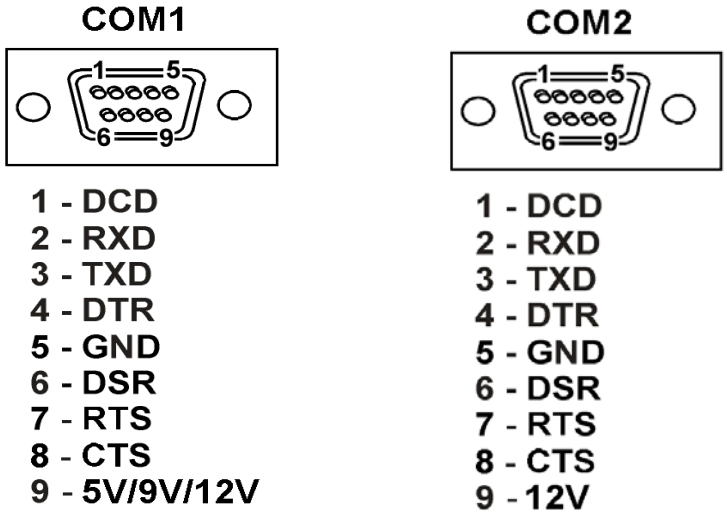


Figure B-4: COM1 and COM2 DB9 Port Diagrams

Cash Drawer 1 and 2 Connectors

The Figure below shows the next generation Cash Drawer connector on the mStation, designed for a future smart cash drawer from APC. The connectors are 8-Pin Mini-DIN and listed in the Figure below. To use MICROS Cash Drawers with traditional 4-pin DIN connectors, use cable P/N 300290-020.

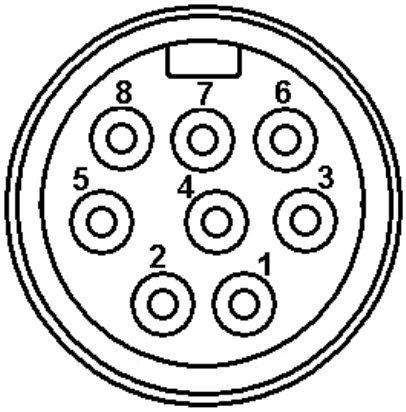


Figure B-5: mStation Series 2 Cash Drawer Connector Diagram

Pin Number	Signal Name	Description
1	VCC12 or VCC24	Cash Drawer Power
2	CD_OPEN	Open Drawer
3,7,8	Ground	Signal Grounds
4	CD_ST	Input Status from Cash Drawer
5	MCU_TX_5V	Tx data to Cash Drawer
6	MCU_RX	Rx data from Cash Drawer

Figure B-6: Series 2 Cash Drawer Connector and Signals