

FLEX CONTROLLER



USER'S MANUAL: M73101XXX

Version: 1.0

Product specifications: www.mccain-inc.com

Customer support: support@mccain-inc.com

Product Inquiries: 888-2-McCain (888-262-2246)



This page was intentionally left blank

REVISIONS			
Rev	By	Date	Comments
1.0	A. Sanchez	Apr/20/2017	Initial release

DISCLAIMERS

User Responsibility

This document is subject to revision. Users of this document are responsible for verifying the current version status before using this document and or discarding all older revisions.

McCain Inc. shall not be liable for errors contained herein or for incidental or consequential damages in connection with furnishing, performance or use of this material. MCCAIN MAKES NO WARRANTY OF ANY KIND WITH REGARD TO THIS MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

This document contains proprietary and confidential information and is the sole property of McCain. No part of this document may be photo copied, reproduced, or translated to another language without the prior written consent of McCain.

This manual is copyright © 2017 by McCain Inc. All rights reserved.

McCain Inc. // 2365 Oak Ridge Way // Vista, CA 92081
PH 760-727-8100

Product Specifications: www.mccain-inc.com
Customer Support: support@mccain-inc.com
Product Inquiries: 888-2-McCain (888-262-2246)

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Benefits	1
1.2	Controller features.....	1
2	GENERAL FEATURES	2
2.1	Overview	2
2.2	Controller Operating System.....	3
2.3	Enclosure	3
2.4	Hardware Interfaces.....	4
2.4.1	Hardware Interface Front Panel	4
2.4.2	Hardware Interface Back Panel.....	5
2.4.3	LCD with Backlight	6
2.4.4	Auto Contrast.....	6
2.4.5	Keypad	6
2.4.6	Ethernet Ports.....	6
2.4.7	USB Port.....	6
2.4.8	SP4, Terminal PC or General Purpose port.....	7
2.4.9	SP1 Port	7
2.4.10	SP2 Port.....	7
2.4.11	SDLC Port, SP3	7
2.4.12	SP5 Port.....	7
2.4.13	Fuse and Switch.....	8
2.4.14	Active LED	8
2.4.15	Aux Switch	8
2.5	Internal Construction / Sub-Assemblies:.....	8
2.5.1	Front Panel Module	8
2.5.2	Back Panel Module.....	11
2.5.3	Bottom Panel Module	11
2.5.4	Internal Wiring.	13
2.6	Physical and Environmental Details:.....	14
3	CONTROLLER BOOT-UP.....	16
3.1	Controller Follows Up the Next Boot Sequence:.....	16
4	MAINTENANCE, ADJUSTMENTS AND TROUBLESHOOTING	21
4.1	Preventive Maintenance.....	21
4.2	Control Signals Board Adjustment	21

4.3	Trouble Shooting Analysis	21
4.3.1	DAT.....	21
APPENDIX		22
APPENDIX A: ASSEMBLY DRAWINGS.....		23
APPENDIX B: BILL OF MATERIALS.....		51
APPENDIX C: CONNECTOR'S DETAIL		52
APPENDIX D: UPDATING KERNEL AND UBOOT.....		56

TABLE OF FIGURES

Figure 1: FleX Controller Models. 2

Figure 2: Hardware Interfaces on the Front Panel of FleX Shelf Mount Controller. 4

Figure 3: Hardware Interfaces on the Front Panel of FleX Rack Mount Controller. 4

Figure 4: Hardware Interfaces on Back Panel of FleX Shelf Mount Controller..... 5

Figure 5: Hardware Interfaces on Back Panel of FleX Rack Mount Controller..... 5

Figure 6: Auxiliary Switch codes. 8

Figure 7: Bottom Module..... 12

Figure 8: FleX Shelf Mount Controller dimensions. 14

Figure 9: FleX Rack Mount Controller dimensions. 15

1 INTRODUCTION

The McCain's Flex Controller is an advanced, multi-application controller that simultaneously supports multiple software applications through a single platform. The Flex Controller features a wide variety of communications options, including serial and Ethernet for connectivity in any kind of environment.

Quick data transfers, firmware upgrades, and log retrievals can be done via USB.

The controller's Linux operating system provides a robust, Flexible, open-architecture platform that can support third party applications.

1.1 Benefits

- The controller can be used in ATC and NEMA Cabinets.
- Simultaneously supports multiple transportation software applications.
- Multi-tasking ability minimizes the amount of hardware required at intersections.

1.2 Controller features

Operating system: Linux.

Microprocessor: Freescale MPC8360 PowerQuicc II Pro microprocessor running at 400MHz.

Memory:

- 16MB NOR Flash Memory.
- 256MB NAND Flash Memory.
- 256MB DDR2.
- 2MB Non-volatile SRAM.

Backup real-time clock (RTC).

CONTROLLERS' INTERFACES:

- 1 SDLC port.
- 1 Serial (asynchronous) port.
- 2 Serial (asynchronous) ports.
- ENET 1: 100 Base-T Ethernet switch, with two RJ-45 connectors.
- ENET 2: 100 Base-T Ethernet switch, with three RJ-45 connectors.
- 2 USB ports
- SP3 and SP5: Supported on C12S connector.
- 1 Wi-Fi Interface.
- 1 SD card receptacle.
- 1 Datakey receptacle.

FRONT PANEL INTERFACE

- Display: 16 lines x 40 characters.
- Keyboard: 7 x 4 keypad (28 key).

2 GENERAL FEATURES

2.1 Overview

The Flex Controller is available in eight models; four models for shelf mounting and four models for rack mounting described in the table of the Figure 1.

PART NUMBER	DESCRIPTION	FEATURES		
		FIO	WIFI	SERIAL INTERFACE
SHELF MOUNTING CONTROLLERS				
M73101S	FLEX SHELF MOUNT CONTROLLER			✓
M73101SA	FLEX SHELF MOUNT CONTROLLER, CALTRANS	✓		✓
M73101SW	FLEX SHELF MOUNT CONTROLLER, WIFI		✓	✓
M73101SWA	FLEX SHELF MOUNT CONTROLLER, WIFI, CALTRANS	✓	✓	✓
RACK MOUNTING CONTROLLERS				
M73101R	FLEX RACK MOUNT CONTROLLER			✓
M73101RA	FLEX RACK MOUNT CONTROLLER, CALTRANS	✓		✓
M73101RW	FLEX RACK MOUNT CONTROLLER, WIFI		✓	✓
M73101RWA	FLEX RACK MOUNT CONTROLLER, WIFI, CALTRANS	✓	✓	✓

Figure 1: Flex Controller Models.

The Flex Controller units use an engine board based on ATC 6.24 standard and TEES 2009 ERRATA 2; with the MPC8360 core at 400MHz, 256MB DRAM, 16MB NOR FLASH, 256MB NAND FLASH and 2MB SRAM.

The unit has three RS-232 asynchronous serial communication ports with software selectable speed from 1.2Kbps to 115.2Kbps, these ports (SP1, SP2 and SP4) are available over DB-9 female connectors. SP1 and SP2 ports are located on the back panel and SP4 port is located on front panel, this port is used primarily for connecting a terminal computer or as a general purpose.

Two SDLC ports are designated to synchronous communications to cabinet's serial bus, they are RS-485 serial communication port with software selectable speed from 19.2Kbps to 614Kbps available over a DB-15 female connector for a NEMA Cabinet (SDLC SP3) or over a DB-25 female connector for ATC Cabinet (C12S, SP3/SP5) both on the back panel.

The unit also has 2 high speed USB ports to download and upload databases. These ports are connected to a USB hub which is routed to the ATC Engine. One USB port is located on the front panel and the second port is located on the back panel of the controller.

Five 100MBPS Ethernet ports are provided for communicating with a central, connecting to peripheral devices, and also for operating as a remote terminal to download/upload files, updates, log files, etc. Two of them are installed in the front panel, the other two Ethernet ports are installed in the back panel and one is located inside of the controller, in the hostboard PCB assembly.



The interface for the user is an LCD with backlight and a 28-keys keypad to enter/retrieve all information about the status of the controller's or traffic application.

ACTIVE LED shows the status of the controller's traffic application.

A rocker switch is used for turning ON and OFF the controller and AC line fuse holder for a 2A fuse with front access.

The functionality of the several modules/sub-assemblies which conform the controller unit is described in the below sections.

2.2 Controller Operating System

The Operating system is Linux with kernel version 2.6.39.4 or newest with the /atc directory mounted into a NAND memory.

After boot-up the ATC Linux OS is available to run applications and for accessing to the low level drivers (block, character and network) provided by the kernel. The OS is stored into a FLASH memory; this can be updated by using the Linux console or Ethernet Ports. A Linux console is configured at power up to a speed of 115.2Kbps, no parity, 8 bits and one stop bit.

2.3 Enclosure

The FleX Controller is divided in two model lines according of the mounting style (shelf and rack mounting); both model lines have the same electronics characteristics but different physical dimensions. The FleX Controller has a modular design composed by a front module, back module, bottom module and a top cover; the rack version of the FleX Controller also includes two brackets in order to install the controller onto a rack.

The top cover of the FleX controller is closed and free of any vent or openings to avoid dirt, dust, water or other debris entering from the top of the unit. Ventilation holes are provided on the sides of the unit in order to cool the electronics; the design is such that foreign debris and water cannot easily enter case under normal operation and handling.

The controller is constructed so that it can be shipped easily via common carrier, such as the postal service, UPS, or Federal Express, without damage and without disassemble or removal of internal components or sub-assemblies.

2.4 Hardware Interfaces

The Flex Controller's interfaces to the cabinet, to other external devices, or to the user are accessible from the front panel and back panel.

2.4.1 Hardware Interface Front Panel

The front module contains the hardware used by the user to interact with the controller. The hardware interfaces located at the front panel on both model lines are the following (Figure 2, Figure 3) : power switch, fuse holder, auxiliary switch, SP4 serial port, 2 Ethernet ports, USB connector, datakey receptacle, SD card receptacle, switch to activate / deactivate Wi-Fi communication network with a status led (this feature is included depending of the model), LCD display, keypad and an ACTIVE LED indicator.

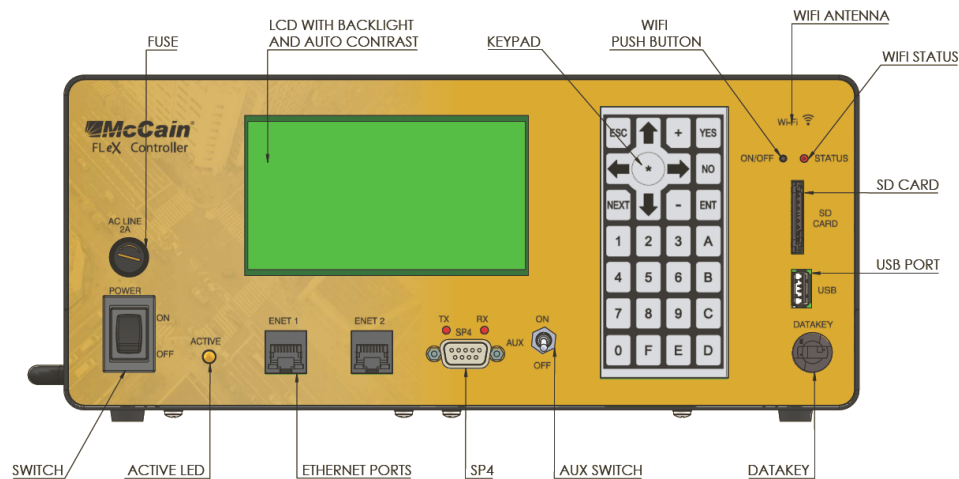


Figure 2: Hardware Interfaces on the Front Panel of Flex Shelf Mount Controller.

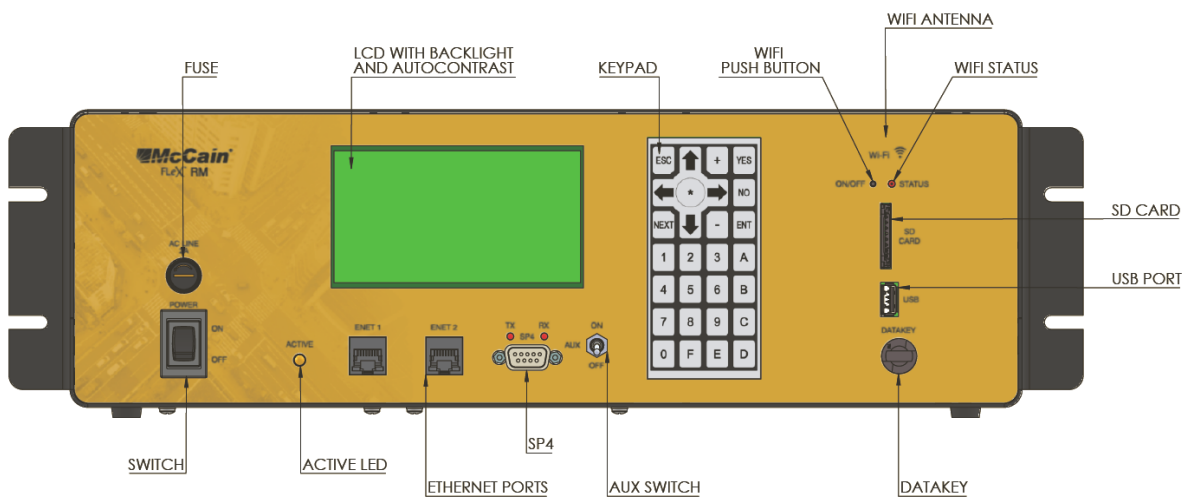


Figure 3: Hardware Interfaces on the Front Panel of Flex Rack Mount Controller.

2.4.2 Hardware Interface Back Panel

The hardware interfaces located at the back panel on both model lines are the following (Figure 4, Figure 5) : 1 USB connector, 2 Ethernet ports, two asynchronous ports over DB-9 female connectors, two synchronous ports over a DB-15 and a DB-25 female connectors, 64 input ports and 64 output ports distributed in the C1S and C11S connectors (this feature is included depending of the model).

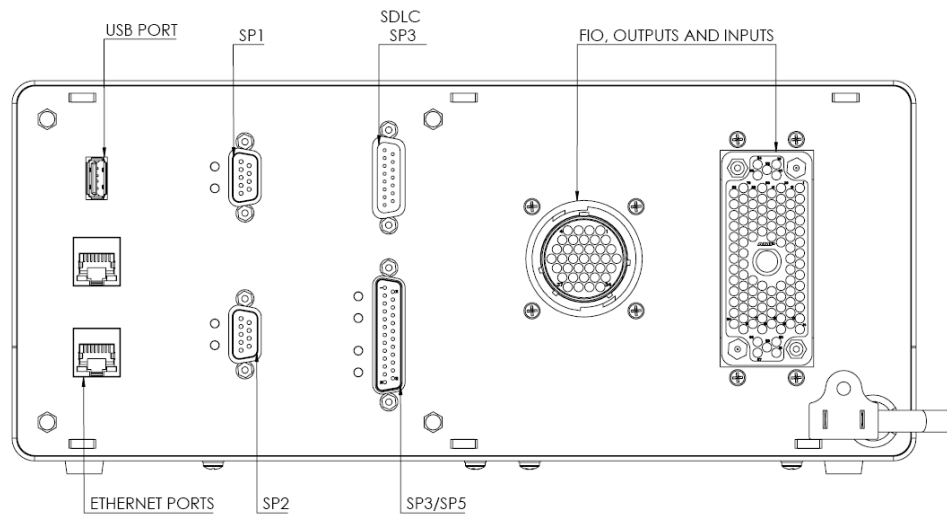


Figure 4: Hardware Interfaces on Back Panel of Flex Shelf Mount Controller.

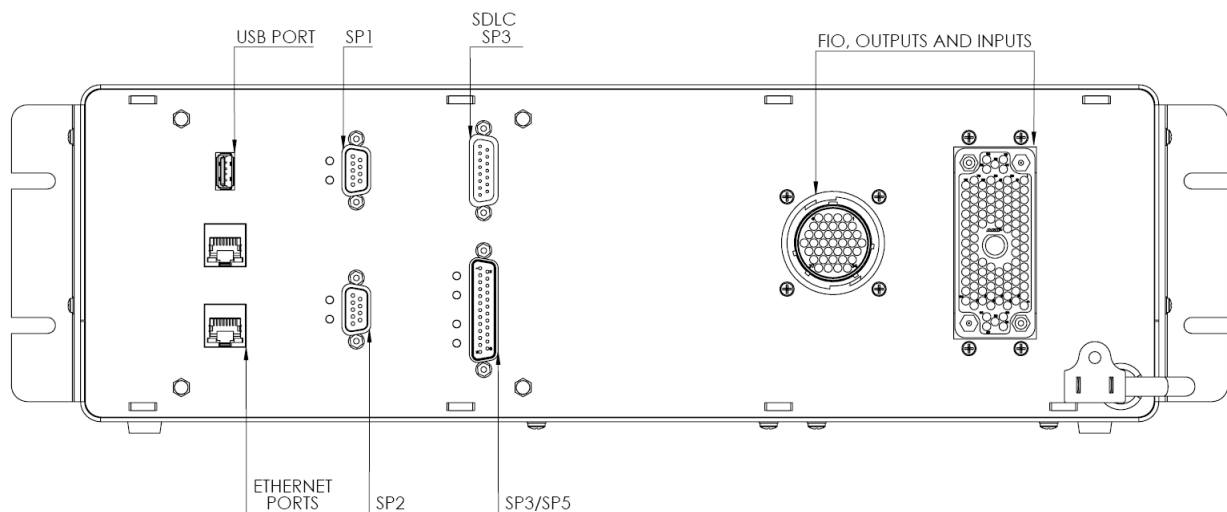


Figure 5: Hardware Interfaces on Back Panel of Flex Rack Mount Controller.

The following will describe each interface from front panel and back panel.

2.4.3 LCD with Backlight

The controller unit has a 16 lines X 40 Columns LCD display with LED backlight. This is the visual interface of the user with the controller unit; through the different menus of the traffic application, it displays current status, entered values and functions of the traffic application and other useful information for the operation of the controller unit.

The LCD backlight is turned on when any key from keypad is depressed and it extinguishes after 60 seconds, this time can be programmed to be from 0 to 630 seconds.

The LCD operating range is from -20°C to $+70^{\circ}\text{C}$.

2.4.4 Auto Contrast

The auto CONTRAST adjusts the LCD display contrast for user's optimum viewing.

2.4.5 Keypad

The controller unit includes a 28 keys keypad to allow user for navigating and entering values to the contents of the LCD menus.

The keys are identified as: ESC (escape), NEXT, ENT (enter), YES, NO, ARROW DOWN, ARROW UP, ARROW RIGHT, ARROW LEFT; numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 0; and letters A, B, C, D, E and F.

These keys allow the user to navigate thru the content of the LCD menus, confirm status, modify timing parameters, setting date and time, configuring serial ports and all other interaction with the traffic application.

2.4.6 Ethernet Ports

There are five Ethernet ports available: two ports on the front panel, two ports on the back panel and one port inside the controller.

ETH1 is a 10/100 Base-T Ethernet switch with two RJ-45 jack connectors, one connector is located on the front panel which is used for accessing to the controller's operating system and the other connector is located on the back panel and can be used to handle traffic applications needs, such as configuration, databases, etc. They are labeled as "ENET 1".

ETH2 is a 10/100 Base-T Ethernet port with three RJ-45 jack connectors; the first connector is located on the front panel, the second connector is located on the back panel and the third connector is inside the controller which is mounted on the hostboard assembly. These Ethernet ports are used to handle traffic applications needs. They are labeled as "ENET 2".

Each jack has two LED indicators to show the LINK ACT and 10-100 TX status.

2.4.7 USB Port

Two hot-swappable USB connectors are installed on the Flex controller, one in the front panel and another USB connector in the back panel in order to allow the controller support the use of USB memory

devices for transferring data files from and to the controller; these data files can be firmware upgrades, databases, etc. They are labeled as “USB”.

2.4.8 SP4, Terminal PC or General Purpose port

SP4 is a general purpose port but it is primarily used for connecting a terminal and to perform data transfer between the controller and an external computer. It is located on front panel on a DB-9 female connector with jackscrews and two indicator leds (Tx and Rx). It is labeled as “SP4”. RTS, CTS and DCD lines are not available on this port.

This port uses RS-232 asynchronous serial communications with a software selectable speed from 1.2Kbps to 115.2Kbps, with a default speed of 115.2Kbps.

2.4.9 SP1 Port

SP1 Port is a general purpose port; it is located on the back panel on a DB-9 female connector with jackscrews and two indicator leds (Tx and Rx). It is labeled as “SP1”. This port uses RS-232 asynchronous serial communications with software selectable speed from 1.2Kbps to 115.2Kbps, with a default speed of 9.6Kbps.

2.4.10 SP2 Port

SP2 Port is a general purpose port; it is located on the back panel on a DB-9 female connector with jackscrews and two indicator leds (Tx and Rx). It is labeled as “SP2”. This port uses RS-232 asynchronous serial communications with software selectable speed from 1.2Kbps to 115.2Kbps, with a default speed of 9.6Kbps.

2.4.11 SDLC Port, SP3

SP3 port is located on back panel as a DB-15 female connector with jackscrews and two indicator leds (Tx and Rx). It is labeled as “SDLC SP3”, it is also available throw the DB-25 female connector labeled as “C12S SP3/SP5”.

This port uses a SDLC communication protocol and four (Tx, Rx, TxClk and RxClk) EIA-485 differential serial communications interfaces with a default speed of 153.6 Kbps in order to meet NEMA TS2-1998 specification. The port has a software selectable speed of 19.2Kbps, 38.4Kbps, 57.6Kbps, 76.8Kbps, 115.2Kbps, 153.6Kbps and 614.4Kbps.

The pin 10 of this port is dedicated to disable all port communication when desirable; this is accomplished by connecting 0 VDC to this pin. The following pins has 0 VDC: 2, 4, 6 and 8.

This port is primarily dedicated to synchronous communications in a TS2 NEMA cabinet (BIU's, MMU). This port is connected to cabinet's serial bus NEMA cabinet. The connection to the cabinet is thru a SDLC communications cable connected to the SDLC port at one end and to the termination board on the other end.

2.4.12 SP5 Port

SP5 Port is located on back panel on a DB-25 female connector with jackscrews and two indicator leds (Tx and Rx). It is labeled as “C12S SP3/SP5”.

This port uses four (Tx, Rx, TxClk and RxClk) EIA-485 differential serial communications interfaces. The port has a software selectable speed of 19.2Kbps, 38.4Kbps, 57.6Kbps, 76.8Kbps, 115.2Kbps, 153.6Kbps and 614.4Kbps. The default speed is 614.4Kbps.

2.4.13 Fuse and Switch

There is a fuse holder with a 2 AMP fuse (3AG type) for the AC line located on the front panel which is easily removed without using any tools. Also there is a rocker switch used to power on and off the controller unit.

2.4.14 Active LED

This LED is used to indicate the status of the controller as defined for the application running into the controller.

2.4.15 Aux Switch

When the AUX Switch is toggled, the appropriate AUX Switch code is transmitted to the CPU.

AUX SWITCH CODES		
SWITCH POSITION	ASCII DATA (TEXT)	ASCII DATA (HEX)
ON	ESC O T	1B 4F 54
OFF	ESC O U	1B 4F 55

Figure 6: Auxiliary Switch codes.

2.5 Internal Construction / Sub-Assemblies:

This section briefly describes the construction and operation of each sub-assembly of the Flex controller, indicating the interface connectors on each board and the relationship to the other boards.

For a more detailed understanding of a specific module or sub-assembly please refer to the proper appendices.

Appendix A Contains the assembly drawings.

Appendix B Contains the bills of materials.

2.5.1 Front Panel Module

The sub-assemblies installed onto the front panel are described below:

2.5.1.1 Host Board Sub-Assembly (M58570A).

This sub-assembly supports almost all of the circuitry and physical connections of the communication interfaces, as the name indicates, it is the host which supports the engine board, so it contains all the necessary circuitry to receive all communication channels, control lines from the engine board and all the necessary I/O interfaces to the external world.

Below are briefly described the circuits and interfaces included onto the host board:

- Two 50pos receptacle connectors to allow the Engine board to be plugged (P1 and P2).
- The +5VDC backup circuit.
- An ACTIVE LED driver circuit.
- A 8 position connector (P3) to receive DC voltages and control signals.
- One D-sub 9 positions connector (SP4) with indicator leds (Tx and Rx).
- Two Ethernet switches and three Ethernet jack connectors (RJ1, RJ2, RJ3).
- A USB switch.
- An SPI EEPROM with factory set configuration parameters.
- A twenty positions header (P8) for attaching the LCD display.
- A fourteen positions header (P7) for plugging the keypad.
- A buzzer (BZZ1) as an audible interface to the user.
- An auxiliary switch.
- Four box shrouded headers (SERIAL 1, SERIAL 2, FIO and WIFI) to connect and communicate with the sub-assemblies installed on the controller.

2.5.1.2 Engine Board Sub-Assembly (M52284A).

This module is the brain of the Flex Controller; all computational functions are concentrated here; it contains the CPU, memory devices, and serial interface devices providing synchronous and asynchronous serial communications channels, Ethernet interfaces, USB interface, RTC, and a SPI bus. It uses Linux operating system.

The board hardware features are:

- CPU, it is a Freescale microprocessor is a MPC8360 at 400MHz
 - NOR FLASH, 16MB are provided for storing the operating system and the applications programs.
 - NAND FLASH, 256MB are provided for storing the operating system and the applications programs.
 - SRAM, 2MB are provided for non-volatile parameter storage.
 - DDR2, 256MB are provided for application and OS program execution.
 - RTC.
 - Seven serial communication channels (SP1, SP2, SP3, SP4, SP5, SP6 and SP8).
- SP1 and SP2 designated for asynchronous communication located on back panel.

SP3 for synchronous communication channel, it is the SDLC port on controller's back panel and also available on the "C12S SP3/SP5".

SP4 for a terminal and general purpose port on controller's front panel.

SP5 for a general purpose port (C12S SP3/SP5) on controller's back panel.

SP6 for handling the LCD's and keyboard information.

- Two Ethernet interfaces (ETH1 and ETH2) with five jack connectors. These interfaces go to the Ethernet switches on the host board.
- Two USB interfaces that goes to the USB switch on host board.
- One SPI bus that handles the communication to the Field I/O board installed on the back panel.
- Two 50 positions plug connectors to be attached to a host board.

2.5.1.3 Wi-Fi Board Sub-Assembly (M58572A).

This sub-assembly is mounted onto the host board by using two brackets and its connectors are accessible through the front panel. This sub-assembly is installed only if the controller's model requires it.

The board hardware features are:

- A Wi-Fi 802.11 Module.
- SD card receptacle.
- Data key receptacle.
- One USB interface that goes to the USB switch on host board.
- A switch to activate/deactivate the Wi-Fi function with a status led.
- A harness (WIFI) to connect the board to the host board (M58570A).

2.5.1.4 SD Card/USB/DK Board Sub-Assembly (M73097A).

This sub-assembly is mounted onto the host board by using two brackets and its connectors are accessible through the front panel. This sub-assembly is installed only if the controller's model requires it; the only difference with the M58572A sub-assembly is that this sub-assembly (M73097A) does not contain the Wi-Fi feature.

The board hardware features are:

- SD card receptacle.
- Data key receptacle.
- One USB interface that goes to the USB switch on host board.
- A harness (WIFI) to connect the board to the host board (M58570A).

2.5.2 Back Panel Module

The sub-assemblies installed onto the back panel are described below:

2.5.2.1 Serial Interface Board Sub-Assembly (M58571A).

This serial communications interface board is used to interface with devices that are part of ITS and NEMA cabinets. The LINESYNC, POWERDOWN and POWERUP signals are available on this board.

Below are briefly described the circuits and interfaces included onto the serial interface board:

- Two Ethernet jack connectors (RJ1, RJ2).
- One USB interface that goes to the USB switch on host board.
- Two asynchronous communication ports (SP1 and SP2) over DB-9 female connectors.
- SP3 for synchronous communication channel, it is available on “SDLC SP3” and “C12S SP3/SP5”.
- SP5 for synchronous communication channel, it is only available on the “C12S SP3/SP5”.
- Two harnesses (SERIAL 1 and SERIAL 2) to connect the board with the host board (M58570A) and receive the voltage power.
- Indicator leds for Tx and Rx status for the communication ports.
- Circuitry to provide 5V isolated.

2.5.2.2 Field I/O Board Sub-Assembly (M58573A).

This sub-assembly provide input and output ports to interact to the external world. The LINESYNC, POWERDOWN and POWERUP signals are available on this board.

This sub-assembly contains the below circuits and connectors:

- 64 parallel input ports and 64 parallel output ports supported on the C1S and C11S connectors.
- One harness (FIO) to connect the Field I/O board with the host board (M58570A).
- A three positions header for receiving the voltage power from the control signal board (M58574A).
- Circuitry to provide +5 and +12 isolated voltages.
- A two positions header to configure the watch dog function.

2.5.3 Bottom Panel Module

The bottom module (Figure 7) is composed by one main bottom panel provided with openings to cool the electronic components; on this panel is installed another panel used to support the power supply and the control signals assembly used to supply the necessary lines to the Hostboard assembly. The bottom module is also provided with a RTC (Real Time Clock) backup capacitor and four bumpers foot in order to place the controller upon a shelf.

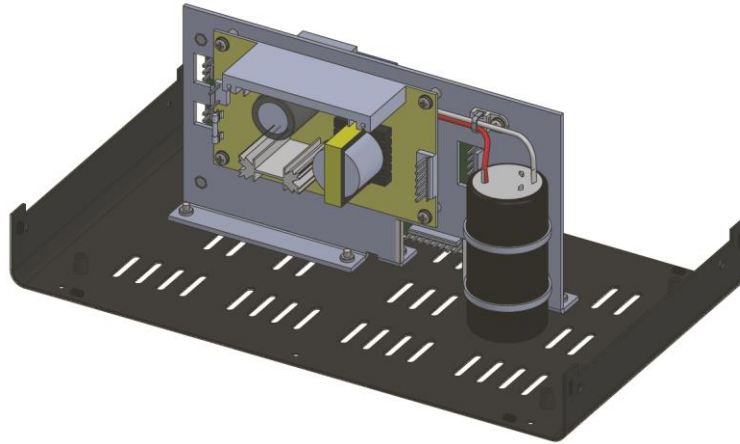


Figure 7: Bottom Module.

The sub-assemblies installed onto the bottom panel are described below:

2.5.3.1 Power Supply Sub-Assembly (M45891).

This sub-assembly consists of a switching power supply module with a large can back up capacitor. It provides the DC voltages to the Control Signals board (M58574A) and receives the AC power from such board. The DC voltages provided are +24VDC, +12VDC and +5VDC.

2.5.3.2 Control Signals Board Sub-Assembly (M58574A).

This board generates the POWERDOWN, POWERUP and LINESYNC signals and along with the DC voltages received from the power supply assembly. It also sends the signals and voltages to the other sub-assemblies through the corresponding harness.

The board also has a circuit to define the trip and recover window for the AC power input; this is a factory set adjustment and should not be changed. The default is: 85VAC for power down and 90VAC for power up.

This sub-assembly contains the below circuits and connectors:

- A five positions header (AC INPUT) for receiving the AC power input.
- A two positions header (FUSE/SWITCH) for connecting the AC+ line to the fuse and switch located on the front panel.
- A three positions header (AC OUTPUT) for providing the AC power to the power supply sub-assembly (M45891).
- A five positions header (DC INPUT) for receiving the DC power from the power supply sub-assembly (M45891).
- An eight positions header (DC FOR HOST) for providing the +5VDC power, POWERDOWN, POWERUP and LINESYNC signals to the hostboard (M58570A).
- A three positions header (DC FOR FIO) for providing the +5VDC and +12VDC power to the Field I/O board (M58573A).

- A three positions header (DC FOR EXT. DEVICE) for providing the +5VDC and +12VDC power to a future external device.
- An AC filter circuit at the AC power input.
- A zero-crossing detector.
- An AC hysteresis trip/recover adjustment (POT1).
- Circuitry for generating the POWERDOWN, POWERUP and LINESYNC signals.

2.5.4 Internal Wiring.

A set of harnesses is provided for interconnecting the internal sub-assemblies of the Flex controller. Below are described the labels on the plug connectors and the connector headers where they belong.

Harnesses:

Harness HOSTBOARD - CTRL SGNLS:

Connect "HOSTBOARD" housing into "P3" header on Host Board (M58570A), connect "CTRL SGNLS" housing into "DC FOR HOST" header on Control Signals board (M58574A).

Harness FIO - C. S (Only applies to the models that possess the feature of the FIO):

Connect "FIO" housing into "P1" header on Field I/O board (M58573A), connect "C.S." housing into "DC FOR FIO" header on Control Signals board (M58574A).

Harness CN1 – AC OUT:

Connect "CN1" housing into "CN1" header on Power Supply Assembly (M45891), connect "AC OUT" housing into "AC OUTPUT" header on Control Signals board (M58574A).

Harness CN2 – DC IN:

Connect "CN2" housing into "CN2" header on Power Supply Assembly (M45891), connect "DC IN" housing into "DC INPUT" header on Control Signals board (M58574A).

Harness AC CORD – AC IN:

AC cord is installed on the back panel, connect "AC IN" housing into "AC INPUT" header on Control Signals board (M58574A).

Harness Fuse and Switch:

The fuse and switch are mounted on front panel, connect "F/S" housing into "SWITCH/FUSE" header on Control Signals board (M58574A).

2.6 Physical and Environmental Details:

FLEX SHELF MOUNT CONTROLLER.

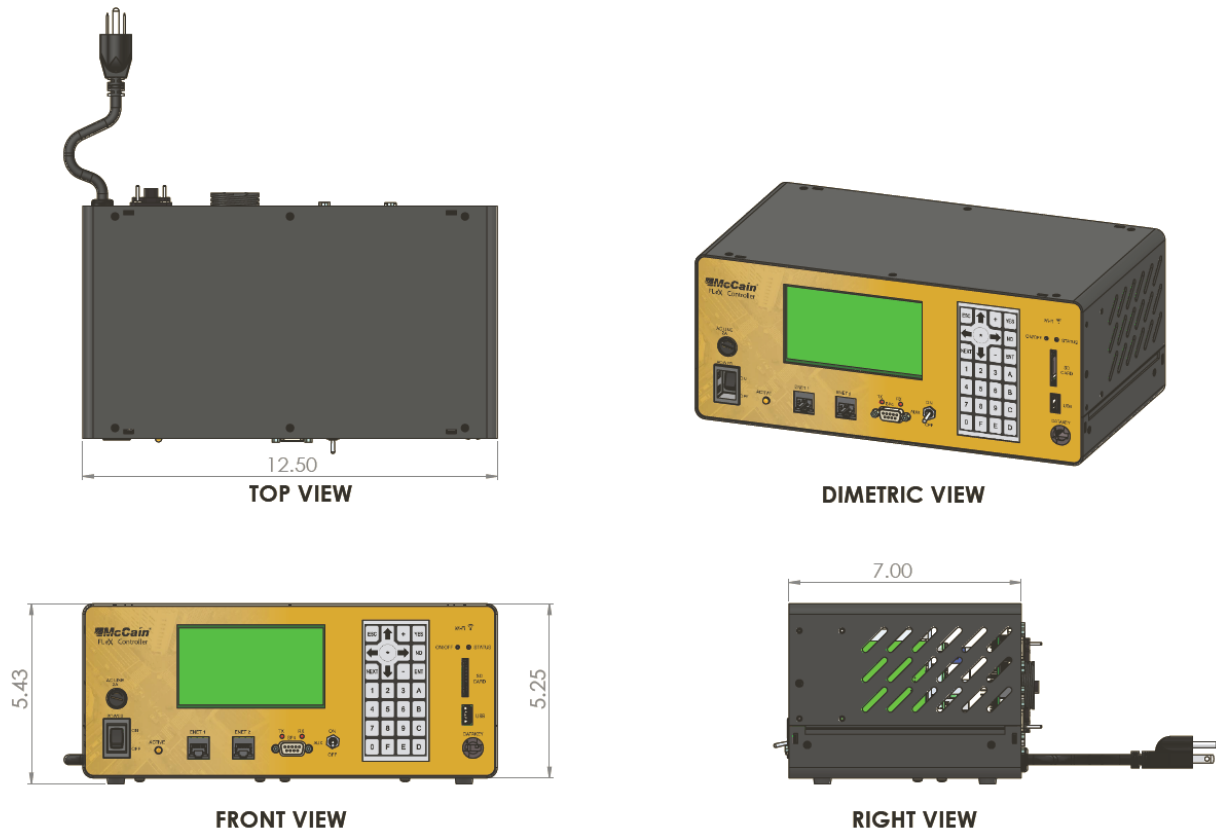
Input voltage: 85 to 135 VAC at 60Hz $\pm$ 3Hz.

Temperature range: -37C to +74C (-34F to 165F).

Relative humidity: 0 to 95% (non-condensing).

Dimensions: 5.25" H x 12.5" W x 7" D.

Mounting method: Shelf mounted.



Note: All dimensions shown in inches.

Figure 8: Flex Shelf Mount Controller dimensions.

FLEX RACK MOUNT CONTROLLER.

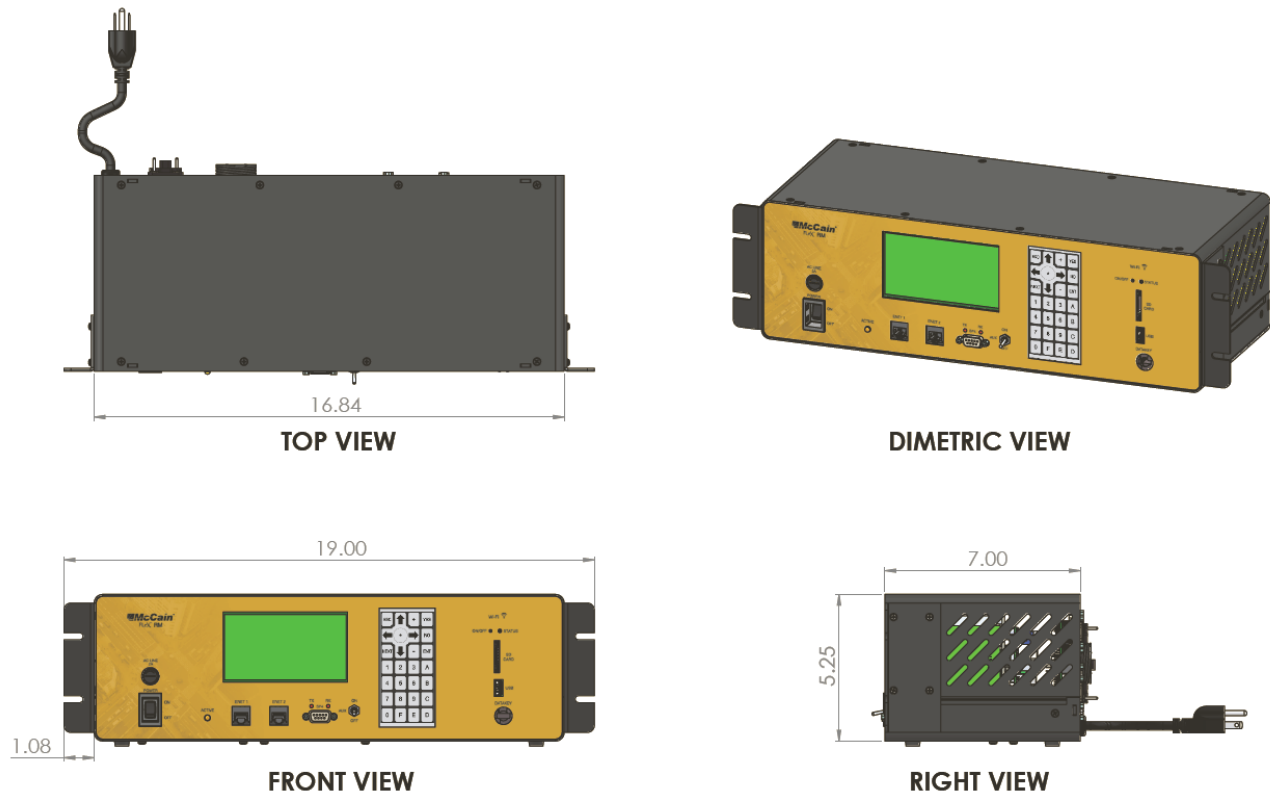
Input voltage: 85 to 135 VAC at 60Hz $\pm$ 3Hz.

Temperature range: -37C to +74C (-34F to 165F).

Relative humidity: 0 to 95% (non-condensing).

Dimensions: 5.25" H x 19" W x 7" D.

Mounting method: Rack mounted.



Note: All dimensions shown in inches.

Figure 9: Flex Rack Mount Controller dimensions.

3 CONTROLLER BOOT-UP

Controller Linux Kernel version is 2.6.39.4.

3.1 Controller Follows Up the Next Boot Sequence:

- Decompresses the Linux Kernel on system memory
- Prepares the system memory and the interrupt controller to run the Kernel
- Initialize drivers (Such USB Mass Storage Device drivers, Flash driver, Serial ports, RTC and Ethernet)
- Mount controller filesystem and drives (such root filesystem, /atc, /sram, /dev/shm)
- Configures the Ethernet with default parameters:

Eth0:

IP Address: 192.168.2.234

Netmask: 255.255.254.0

Gateway: 192.168.2.1

Eth1:

IP Address: 192.168.2.235

Netmask: 255.255.254.0

Gateway: 192.168.2.1

- Executes SysGo, this program runs in the background, loads the rest of the controller drivers (communication, I/O, Linesync and Powerdown), forks the /atc/atcstart script (if exists) and updates the RTC with the system Clock each hour.
- Opens the login prompt.

The default login information is:

User: root

Password: root



A normal boot up sequence is as follows:

U-Boot 1.3.0-rc2 (Aug 19 2016 - 11:08:28) McCainEngineBoard

Reset Status: Software Hard, External/Internal Soft, External/Internal Hard

CPU: e300c1, MPC8360E, Rev: 21 at 399.999 MHz, CSB: 266 MHz

Unit: McCain Engine Board III

testing for ATCeX2, ATCeXRM and 2070-1C

I2C: ready

DRAM: 256 MB

FLASH: 16 MB

NAND: 256 MiB

In: serial

Out: serial

Err: serial

Net: UEC: PHY is Generic MII (0)

UEC: PHY is Generic MII (0)

FSL UEC0, FSL UEC1

Hit any key to stop autoboot: 0

Booting image at fel00000 ...

Image Name: mgr Image

Image Type: PowerPC Linux Kernel Image (uncompressed)

Data Size: 5717472 Bytes = 5.5 MB

Load Address: 00000000

Entry Point: 00010000

OK

Booting using the fdt at 0xfe0f0000

Loading Device Tree to 007fc000, end 007fefff ... OK

Using MPC836x MDS machine description

Linux version 2.6.39.4mau (mguerrero@MGUERRERO) (gcc version 4.1.2 (Sourcery G++ Lite 4.1-69)) #81 Wed Feb 8 11:48:40 PST 2017

bootconsole [udbg0] enabled

setup_arch: bootmem

mpc836x_mds_setup_arch()

arch: exit

Zone PFN ranges:

DMA 0x00000000 -> 0x00010000

Normal empty

Movable zone start PFN for each node

early_node_map[1] active PFN ranges

0: 0x00000000 -> 0x00010000

Built 1 zonelists in Zone order, mobility grouping on. Total pages: 65024

Kernel command line: root=/dev/mtdblock4 rootfstype=jffs2 rw console=ttyS0,115200

PID hash table entries: 1024 (order: 0, 4096 bytes)

Dentry cache hash table entries: 32768 (order: 5, 131072 bytes)

Inode-cache hash table entries: 16384 (order: 4, 65536 bytes)

Memory: 254212k/262144k available (4168k kernel code, 7932k reserved, 176k data, 1251k bss, 184k init)

Kernel virtual memory layout:

* 0xffffdf000..0xffffffff000 : fixmap

* 0xfdef1000..0xfe000000 : early ioremap

* 0xd1000000..0xfdef1000 : vmalloc & ioremap

NR_IRQS:512

IPIC (128 IRQ sources) at d1000700

clocksource: timebase mult[3c00001] shift[22] registered

Flex Controller – User Manual

Version 1.0

```

pid_max: default: 32768 minimum: 301
Mount-cache hash table entries: 512
NET: Registered protocol family 16

PCI: Probing PCI hardware
bio: create slab <bio-0> at 0
SCSI subsystem initialized
usbcore: registered new interface driver usbfs
usbcore: registered new interface driver hub
usbcore: registered new device driver usb
Switching to clocksource timebase
NET: Registered protocol family 2
IP route cache hash table entries: 2048 (order: 1, 8192 bytes)
TCP established hash table entries: 8192 (order: 4, 65536 bytes)
TCP bind hash table entries: 8192 (order: 3, 32768 bytes)
TCP: Hash tables configured (established 8192 bind 8192)
TCP reno registered
UDP hash table entries: 256 (order: 0, 4096 bytes)
UDP-Lite hash table entries: 256 (order: 0, 4096 bytes)
NET: Registered protocol family 1
RPC: Registered udp transport module.
RPC: Registered tcp transport module.
RPC: Registered tcp NFSv4.1 backchannel transport module.
WDT driver for MPC8xxx initialized. mode:reset timeout=65535 (16 seconds)
NTFS driver 2.1.30 [Flags: R/O].
JFFS2 version 2.2. (NAND) © 2001-2006 Red Hat, Inc.
msgmni has been set to 498
io scheduler noop registered
io scheduler deadline registered
io scheduler cfq registered (default)
Serial: 8250/16550 driver, 4 ports, IRQ sharing disabled
serial8250.0: ttyS0 at MMIO 0xe0004500 (irq = 20) is a 16550A
console [ttyS0] enabled, bootconsole disabled
console [ttyS0] enabled, bootconsole disabled
serial8250.0: ttyS1 at MMIO 0xe0004600 (irq = 21) is a 16550A
nbd: registered device at major 43
McCain Engine flash0 device: 800000 at fe000000 Partition number 4
McCain Engine FLASH #0 Map Info: Found 1 x16 devices at 0x0 in 16-bit bank.
Manufacturer ID 0x000020 Chip ID 0x0022fd
Amd/Fujitsu Extended Query Table at 0x0040
  Amd/Fujitsu Extended Query version 1.3.
number of CFI chips: 1
Creating 4 MTD partitions on "McCain Engine FLASH #0 Map Info":
0x0000000000000-0x00000000e0000 : "Bios"
0x00000000e0000-0x00000000f0000 : "FactorySetup"
0x00000000f0000-0x0000000100000 : "dtb"
0x0000000100000-0x0000000800000 : "kernel"
McCain Engine flash0 device (McCain Engine FLASH #0 Map Info) initialized
McCain Engine flash1 device: 800000 at fe800000 Partition number 1
McCain Engine FLASH #1 Map Info: Found 1 x16 devices at 0x0 in 16-bit bank.
Manufacturer ID 0x000020 Chip ID 0x0022fd
Amd/Fujitsu Extended Query Table at 0x0040
  Amd/Fujitsu Extended Query version 1.3.
number of CFI chips: 1
Creating 1 MTD partitions on "McCain Engine FLASH #1 Map Info":
0x0000000000000-0x0000000800000 : "rootfs"

```



```
McCain Engine flash1 device (McCain Engine FLASH #1 Map Info) initialized
McCain Engine sram device: 200000 at ff000000 Partition number 1
Creating 1 MTD partitions on "McCain Engine SRAM Map Info":
0x0000000000000-0x000000200000 : "ram"
McCain Engine sram device (McCain Engine SRAM Map Info) initialized
Generic platform RAM MTD, (c) 2004 Simtec Electronics
ONFI flash detected
ONFI param page 0 valid
NAND device: Manufacturer ID: 0x2c, Chip ID: 0xda (Micron MT29F2G08ABAEAWP)
NAND_ECC_NONE selected by board driver. This is not recommended !!
Scanning device for bad blocks
Creating 1 MTD partitions on "MT29F2G08ABAEAWP":
0x0000000000000-0x000010000000 : "atc"
ucc_geth: QE UCC Gigabit Ethernet Controller
ucc_geth: UCC1 at 0xe0102000 (irq = 25)
ucc_geth: UCC2 at 0xe0103000 (irq = 26)
Freescale PowerQUICC MII Bus: probed
fsl,usb-fhci e01006c0.usb: at 0xd18926c0, irq 24
fsl,usb-fhci e01006c0.usb: FHCI HOST Controller
fsl,usb-fhci e01006c0.usb: new USB bus registered, assigned bus number 1
fsl,usb-fhci e01006c0.usb: irq 24, io mem 0x00000000
hub 1-0:1.0: USB hub found
hub 1-0:1.0: 1 port detected
usbcore: registered new interface driver uas
Initializing USB Mass Storage driver...
usbcore: registered new interface driver usb-storage
USB Mass Storage support registered.
NONE Host Was Detected, by default is a 2070_1C Type
hw-rtc hw-rtc.0: rtc core: registered hw-rtc as rtc0
linesync 2070
acfail 2070
TCP cubic registered
Initializing XFRM netlink socket
NET: Registered protocol family 17
Registering the dns_resolver key type
hw-rtc hw-rtc.0: setting system clock to 2001-01-17 07:41:28 UTC (979717288)
usb 1-1: new full speed USB device number 2 using fsl,usb-fhci
VFS: Mounted root (jffs2 filesystem) on device 31:4.
Freeing unused kernel memory: 184k init
hub 1-1:1.0: USB hub found
hub 1-1:1.0: 4 ports detected
Setting the hostname to McCainEBIII
Mounting filesystems
Running sysctl
Setting up networking on loopback device:
Setting up networking on eth0:
Adding static route for default gateway to 192.168.3.1:
Setting nameserver to 192.168.3.84 in /etc/resolv.conf:
Setting up networking on eth1:
Adding static route for default gateway to 192.168.3.1:
Setting nameserver to 192.168.3.84 in /etc/resolv.conf:
Starting inetd:
Starting the port mapper:
Starting the dropbear ssh server:
EXT3-fs: barriers not enabled
kjournald starting. Commit interval 5 seconds
```



```
EXT3-fs (mtdblock5): warning: maximal mount count reached, running e2fsck is
recommended
EXT3-fs (mtdblock5): using internal journal
EXT3-fs (mtdblock5): recovery complete
EXT3-fs (mtdblock5): mounted filesystem with writeback data mode
Empty flash at 0x031a4118 ends at 0x031a4800
Empty flash at 0x031a507c ends at 0x031a5800
```

Welcome to McCain EB III Embedded Linux Environment

!!!!!! WARNING !!!!!!!

The default password for the root account is: root
please change this password using the 'passwd' command
and then edit this message (/etc/issue) to remove this message

McCainEBIII login: PHY: mdio@e0102120:01 - Link is Up - 100/Full
PHY: mdio@e0102120:09 - Link is Up - 100/Full

4 MAINTENANCE, ADJUSTMENTS AND TROUBLESHOOTING

This section is intended to indicate the way to perform regular maintenance on the Flex controller like cleaning and servicing when malfunctions occur. It also describes the adjustments of the controller and the troubleshooting procedures, precautions that need to be taken before servicing the unit, a list of test equipment needed for trouble shooting. A basic knowledge of electronics is needed when servicing this unit.

4.1 Preventive Maintenance

Always make sure to be in an antistatic environment before handling the controller for any type of maintenance, also the power source must be disconnected before any cleaning, visual inspection of the enclosure, sub-assemblies, connectors and cables.

Remove dust out of the unit.

Check the wiring, terminals and connectors, replace them if necessary.

Check all mounting hardware, tighten them if necessary.

The preventive maintenance should be based on the install and environmental conditions.

4.2 Control Signals Board Adjustment

Only the Control Signals Board (M58574A) is adjusted in order to set the AC input hysteresis between power failure and power restoration; this is a factory set parameter and should never need further maintenance.

4.3 Trouble Shooting Analysis

A visual inspection is recommended as a first step on the diagnostics; most problems are related to the harnesses used for interconnecting the sub-assemblies (broken wires or worn connections on headers and receptacles connectors).

The trouble analysis should be made by using all available information about the controller's failure and all related documentation (assembly drawings, schematics, DAT, etc.) in order to isolate and define the cause; the deep of such analysis depends on the complexity of the failure and the intended solution (repair, interchange a module, reconfigure, software change, etc.).

4.3.1 DAT

The DAT (McCain Diagnostic and Acceptance Test) is a set of test programs already loaded into the controller; it also can be stored into a USB memory stick.

The DAT is used for testing and validating the hardware of the McCain Flex controller units, and it is a useful tool when troubleshooting the controller.

It includes separated tests menus for the CPU, I/O, Serial Ports and Front Panel. Also includes a Continuous Test menu for serial ports and I/O.

Error logging report is available to user for troubleshooting purposes.

APPENDIX

APPENDIX A: ASSEMBLY DRAWINGS

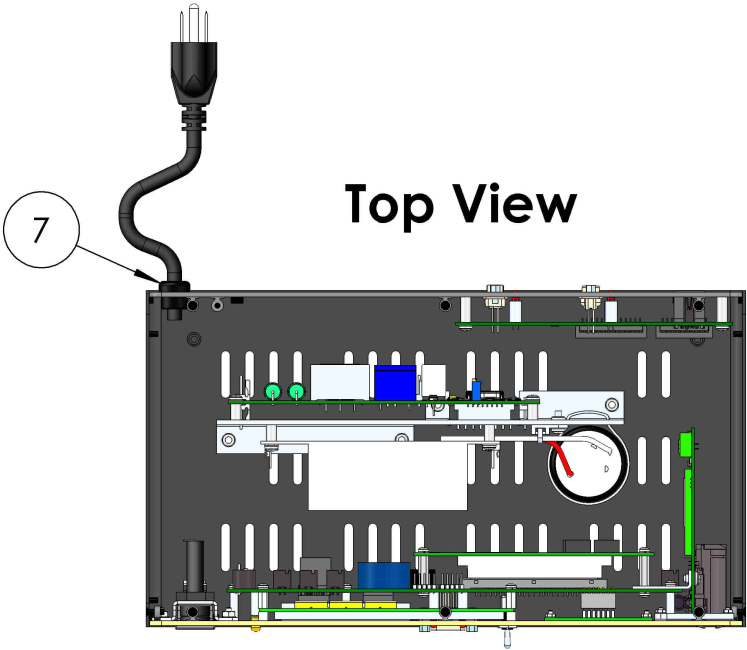
CONTROLLERS	
DRAWING	TITLE
M73101S	FLEX SHELF MOUNT CONTROLLER
M73101SA	FLEX SHELF MOUNT CONTROLLER, CALTRANS
M73101SW	FLEX SHELF MOUNT CONTROLLER, WIFI
M73101SWA	FLEX SHELF MOUNT CONTROLLER, WIFI, CALTRANS
M73101R	FLEX RACK MOUNT CONTROLLER
M73101RA	FLEX RACK MOUNT CONTROLLER, CALTRANS
M73101RW	FLEX RACK MOUNT CONTROLLER, WIFI
M73101RWA	FLEX RACK MOUNT CONTROLLER, WIFI, CALTRANS

DRAWING	TITLE
M73101S	FLEX SHELF MOUNT CONTROLLER

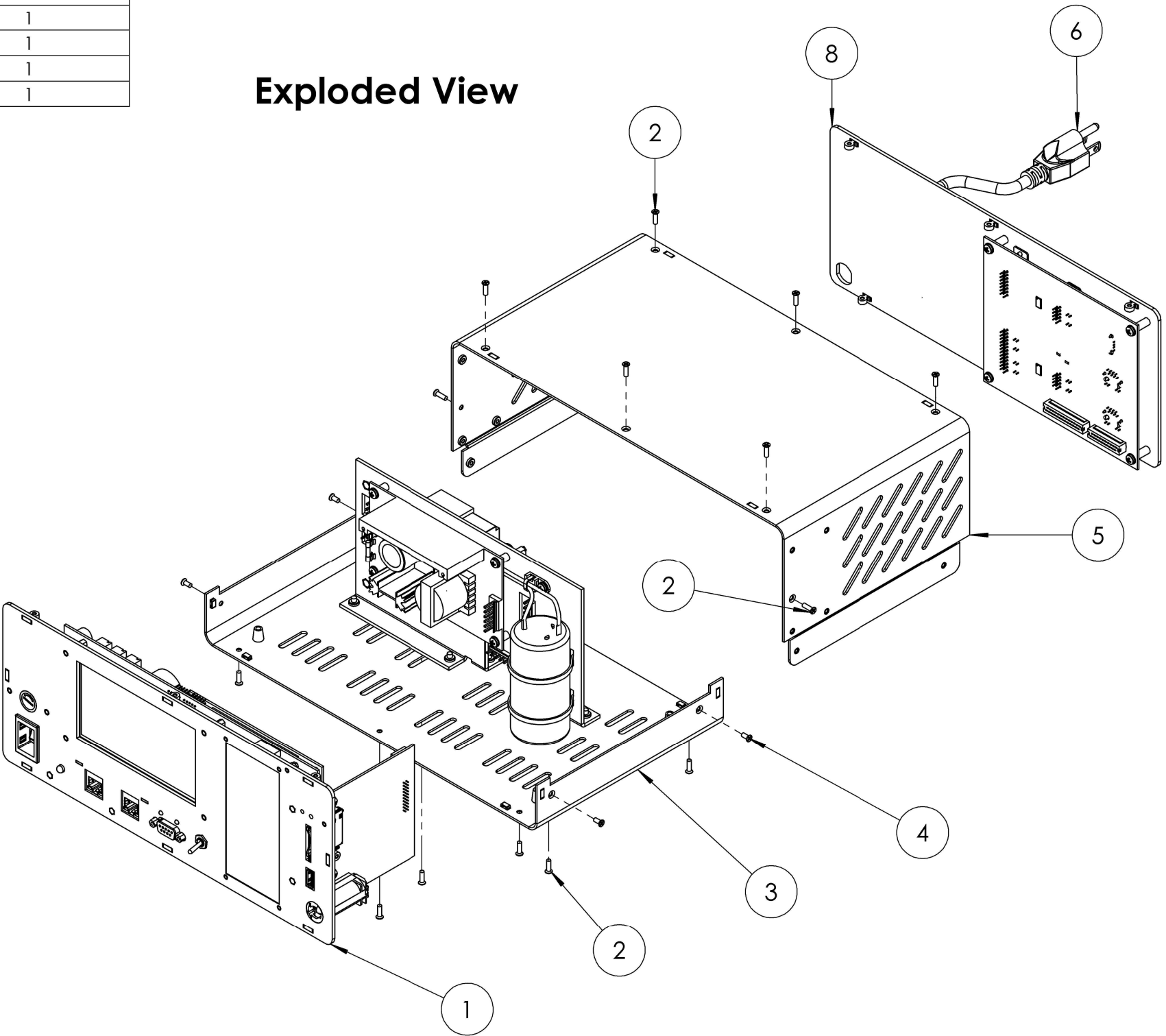
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M73122	MODULE, FRONT PANEL, FLEX CONTROLLER	1
2	M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK	14
3	M59415	MODULE, BOTTOM PANEL, FLEX CONTROLLER	1
4	M58586	SCREW,4-40 X 1/4,PH,FH,SS, 100 DEG, BLACK	4
5	M58993	TOP PANEL, FLEX CONTROLLER	1
6	M59912	HARN, SET, FLEX CONTROLLER W/OUT FIO	1
7	M14691	BUSHING, STRAIN RELIEF-HEYCO #HEY1210	1
8	M59890	MODULE, BACK PANEL, FLEX CONTROLLER	1

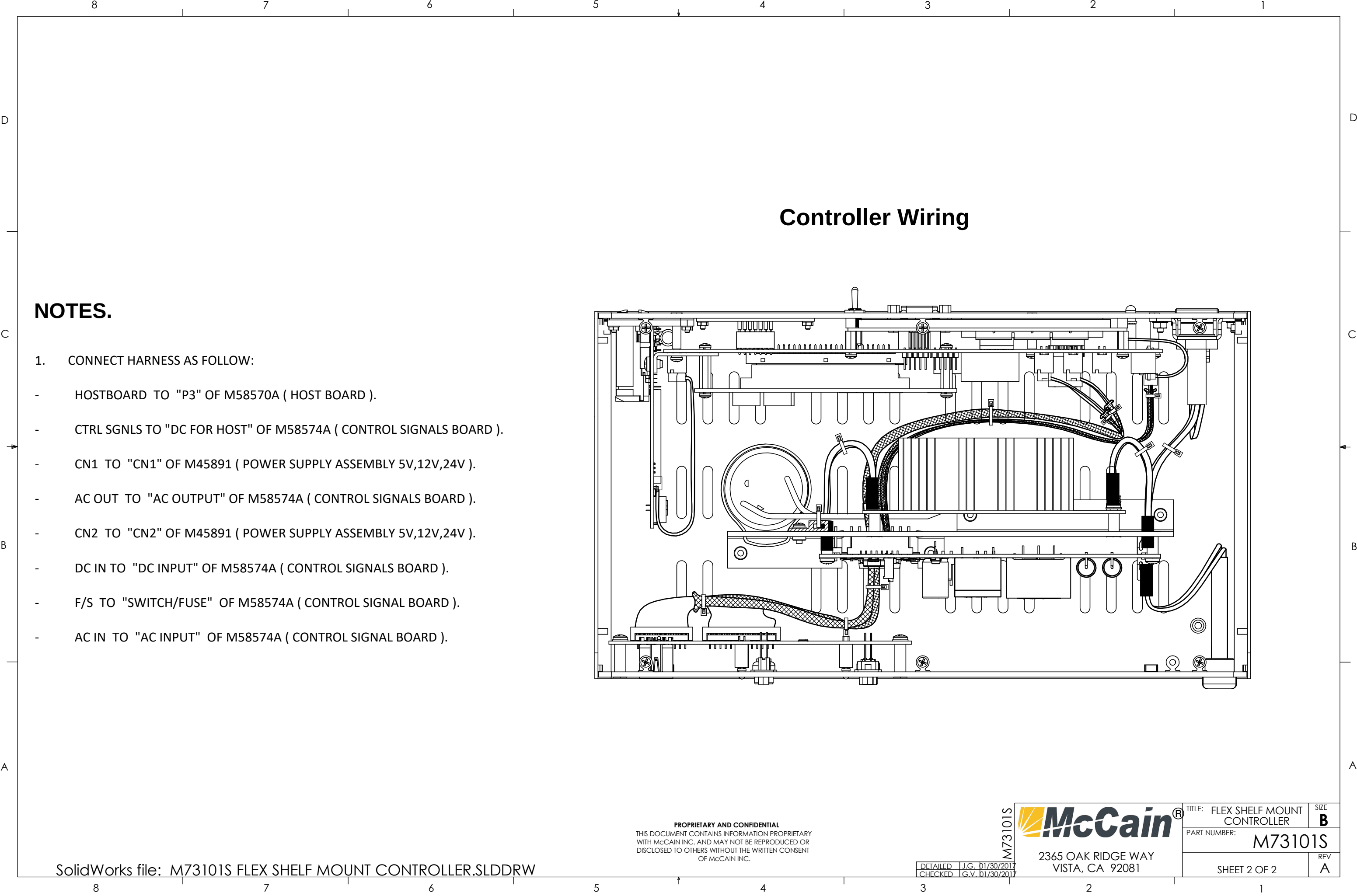
REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160048	INITIAL RELEASE	JANUARY 30, 2017	J.G.

Exploded View



Dimetric View





Controller Wiring

NOTES.

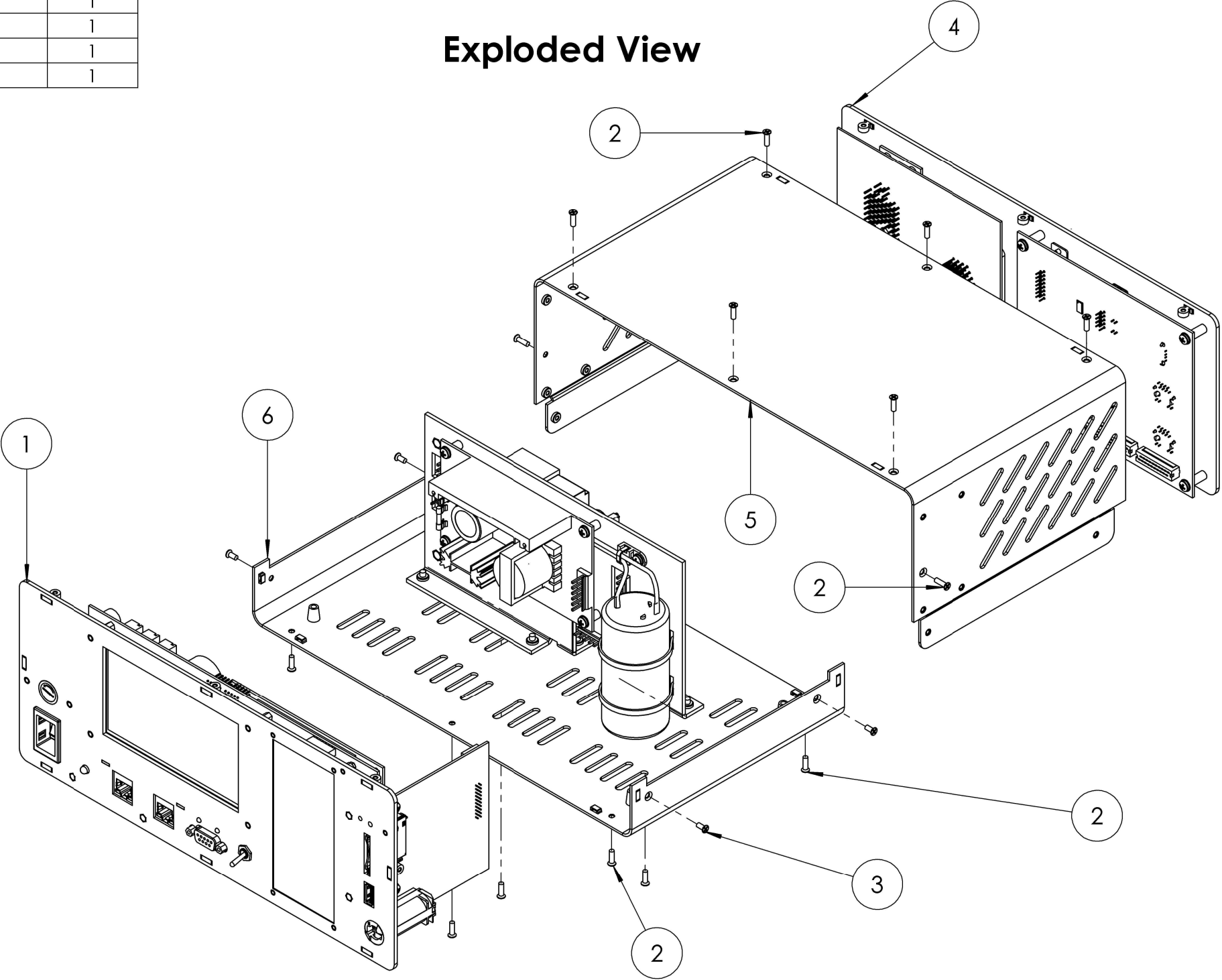
1. CONNECT HARNESS AS FOLLOW:
- HOSTBOARD TO "P3" OF M58570A (HOST BOARD).
 - CTRL SGNLS TO "DC FOR HOST" OF M58574A (CONTROL SIGNALS BOARD).
 - CN1 TO "CN1" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - AC OUT TO "AC OUTPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - CN2 TO "CN2" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - DC IN TO "DC INPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - F/S TO "SWITCH/FUSE" OF M58574A (CONTROL SIGNAL BOARD).
 - AC IN TO "AC INPUT" OF M58574A (CONTROL SIGNAL BOARD).

DRAWING	TITLE
M73101SA	FLEX SHELF MOUNT CONTROLLER, CALTRANS

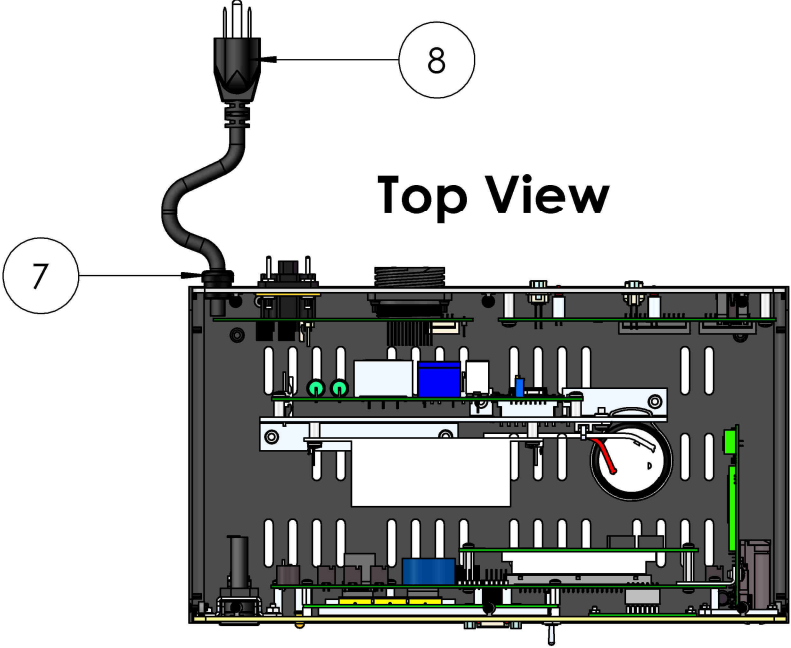
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M73122	MODULE, FRONT PANEL, FLEX CONTROLLER	1
2	M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK	14
3	M58586	SCREW,4-40 X 1/4,PH,FH,SS, 100 DEG, BLACK	4
4	M59381	MODULE, BACK PANEL, FLEX CONTROLLER, FIO	1
5	M58993	TOP PANEL, FLEX CONTROLLER	1
6	M59415	MODULE, BOTTOM PANEL, FLEX CONTROLLER	1
7	M14691	BUSHING, STRAIN RELIEF-HEYCO #HEY1210	1
8	M59320	HARN, SET, FLEX CONTROLLER	1

REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160050	INITIAL RELEASE	JANUARY 27, 2017	J.G.

Exploded View



Top View



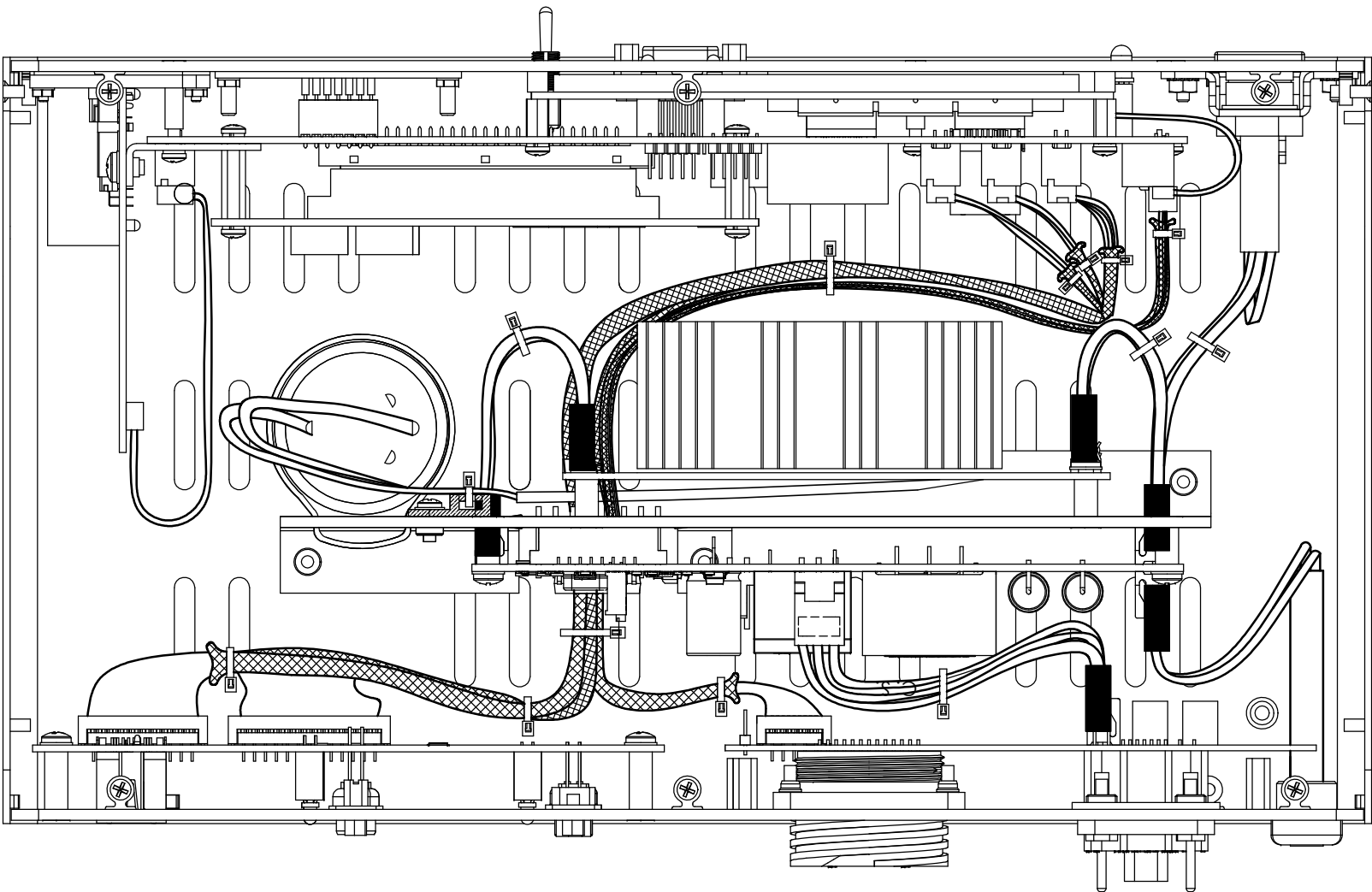
Dimetric View



Controller Wiring

NOTES.

1. CONNECT HARNESS AS FOLLOW :
- HOSTBOARD TO "P3" OF M58570A (HOST BOARD).
 - CTRL SGNLS TO "DC FOR HOST" OF M58574A (CONTROL SIGNALS BOARD).
 - FIO TO "P1" ON M58573A (FIELD I/O BOARD).
 - C.S. TO "DC FOR FIO" OF M58574A (CONTROL SIGNALS BOARD).
 - CN1 TO "CN1" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - AC OUT TO "AC OUTPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - CN2 TO "CN2" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - DC IN TO "DC INPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - F/S TO "SWITCH/FUSE" OF M58574A (CONTROL SIGNAL BOARD).
 - AC IN TO "AC INPUT" OF M58574A (CONTROL SIGNAL BOARD).

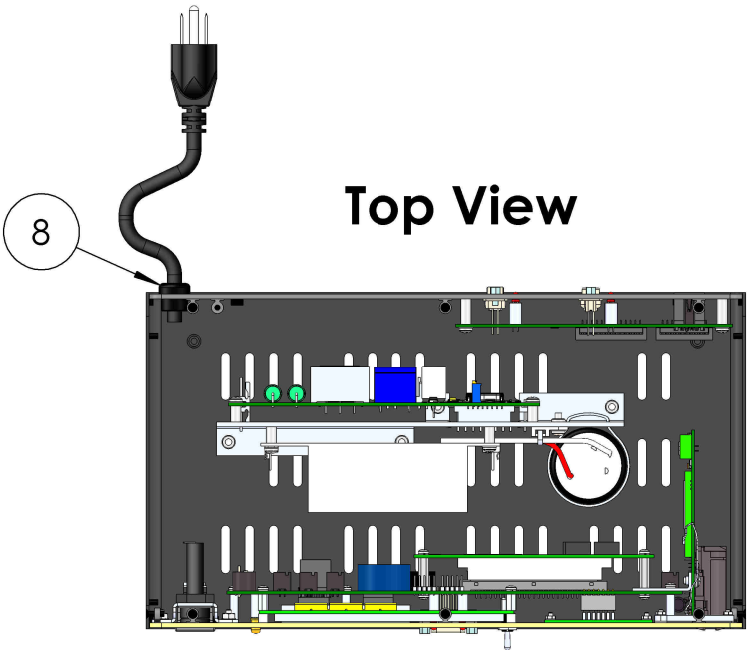


DRAWING	TITLE
M73101SW	FLEX SHELF MOUNT CONTROLLER, WIFI

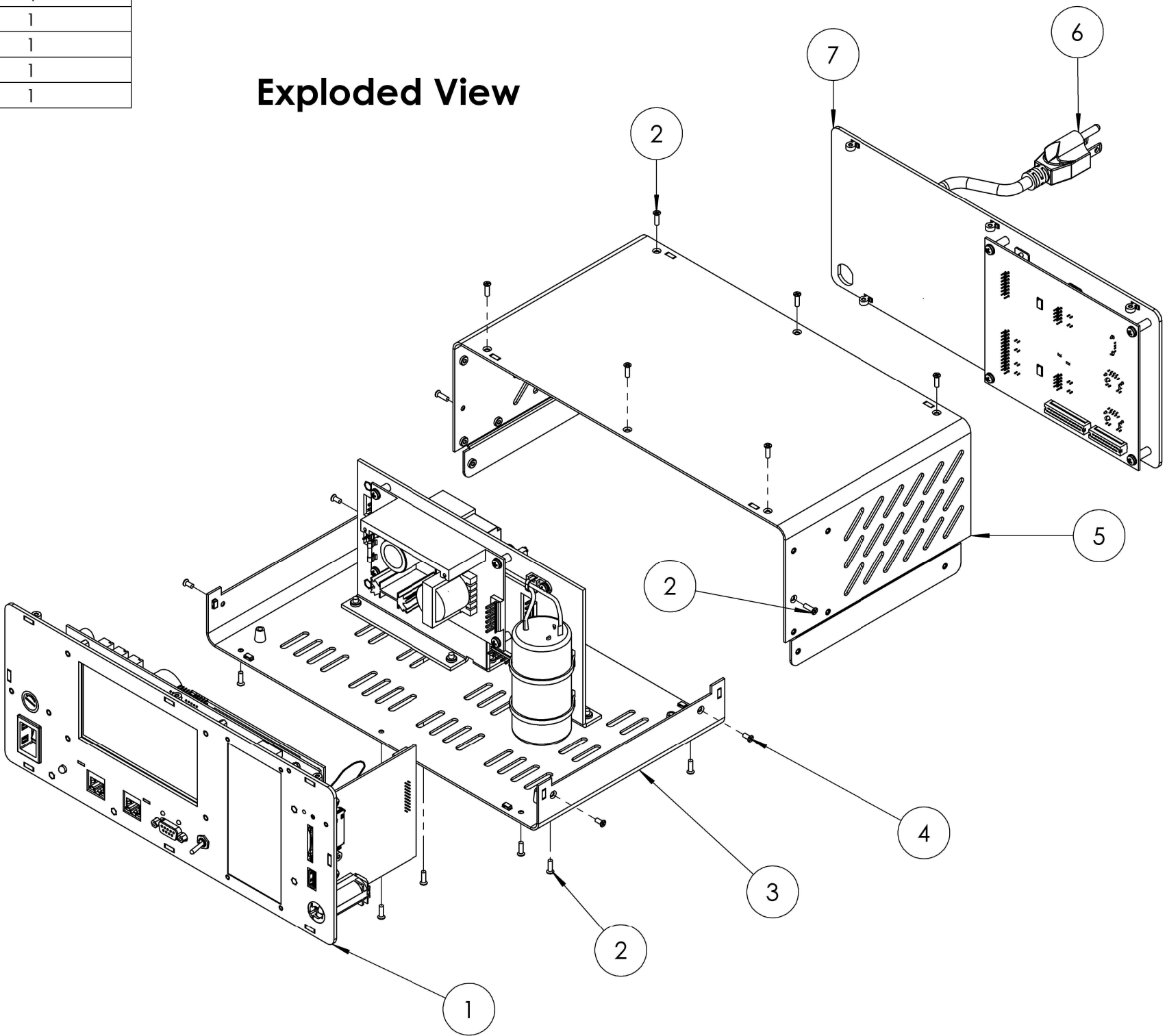
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M58997	MODULE, FRONT PANEL, FLEX CONTROLLER, WIFI	1
2	M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK	14
3	M59415	MODULE, BOTTOM PANEL, FLEX CONTROLLER	1
4	M58586	SCREW,4-40 X 1/4,PH,FH,SS, 100 DEG, BLACK	4
5	M58993	TOP PANEL, FLEX CONTROLLER	1
6	M59912	HARN, SET, FLEX CONTROLLER W/OUT FIO	1
7	M59890	MODULE, BACK PANEL, FLEX CONTROLLER	1
8	M14691	BUSHING, STRAIN RELIEF-HEYCO #HEY1210	1

REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160025	INITIAL RELEASE	JANUARY 30, 2017	J.G.

Exploded View

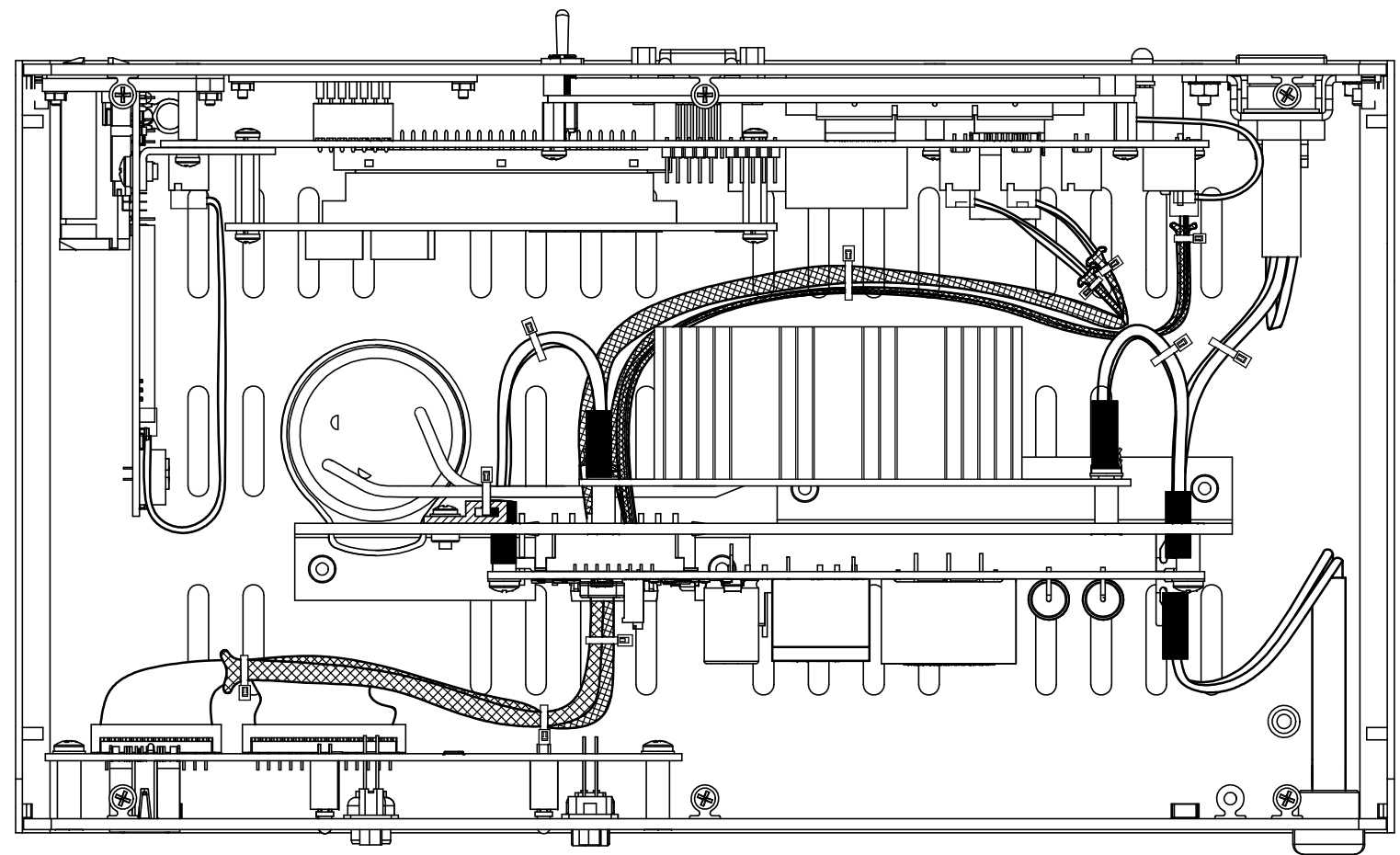


Dimetric View



NOTES.

1. CONNECT HARNESS AS FOLLOW:
- HOSTBOARD TO "P3" OF M58570A (HOST BOARD).
 - CTRL SGNLS TO "DC FOR HOST" OF M58574A (CONTROL SIGNALS BOARD).
 - CN1 TO "CN1" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - AC OUT TO "AC OUTPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - CN2 TO "CN2" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - DC IN TO "DC INPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - F/S TO "SWITCH/FUSE" OF M58574A (CONTROL SIGNAL BOARD).
 - AC IN TO "AC INPUT" OF M58574A (CONTROL SIGNAL BOARD).



PROPRIETARY AND CONFIDENTIAL
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY
WITH MCCAIN INC. AND MAY NOT BE REPRODUCED OR
DISCLOSED TO OTHERS WITHOUT THE WRITTEN CONSENT
OF MCCAIN INC.

DETAILED J.G. 01/27/2017
CHECKED G.V. 01/27/2017

M73101SW

McCain[®]
2365 OAK RIDGE WAY
VISTA, CA 92081

TITLE: FLEX SHELF MOUNT CONTROLLER, WIFI		SIZE B
PART NUMBER: M73101SW		REV A
SHEET 2 OF 2		

DRAWING	TITLE
M73101SWA	FLEX SHELF MOUNT CONTROLLER, WIFI, CALTRANS

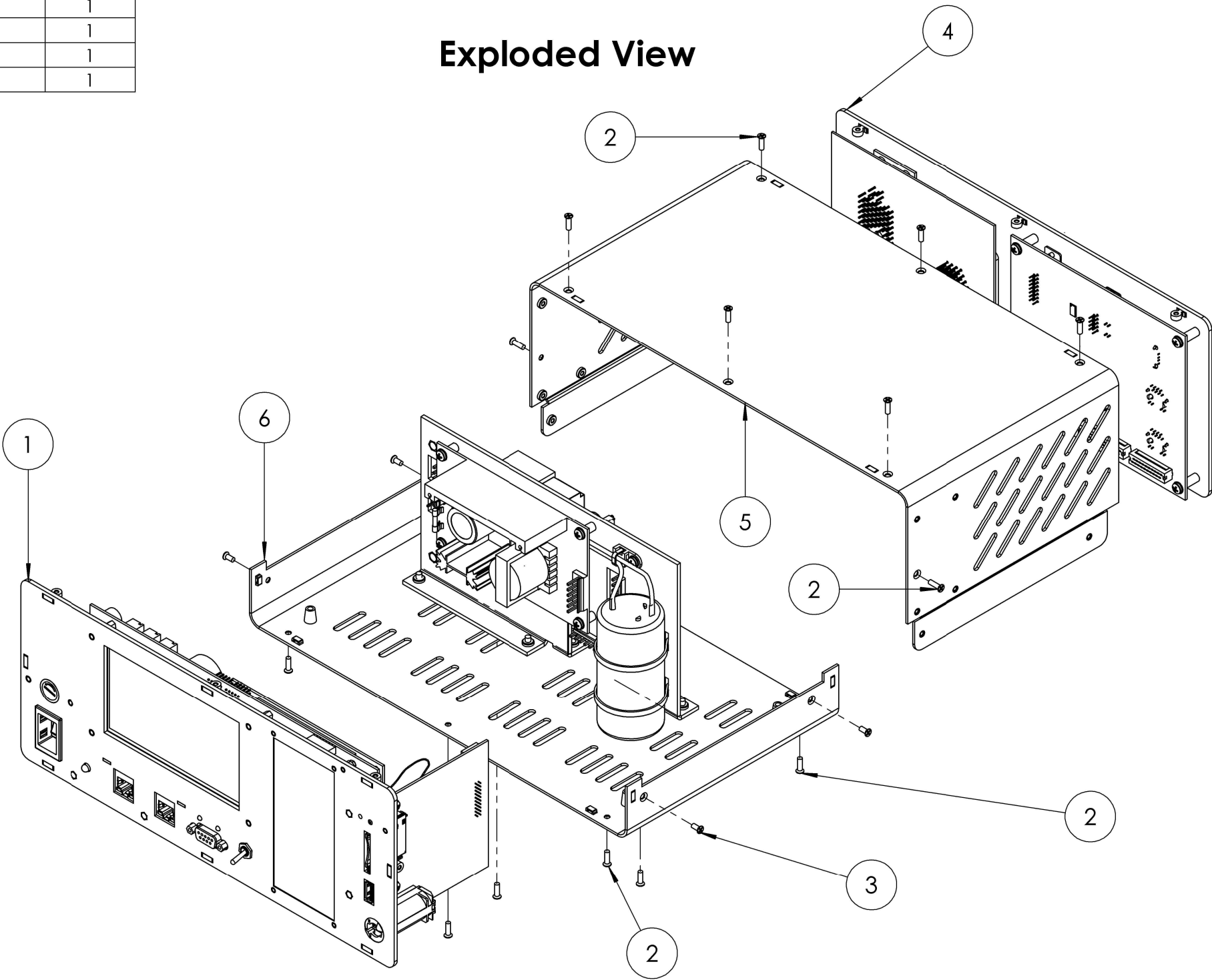
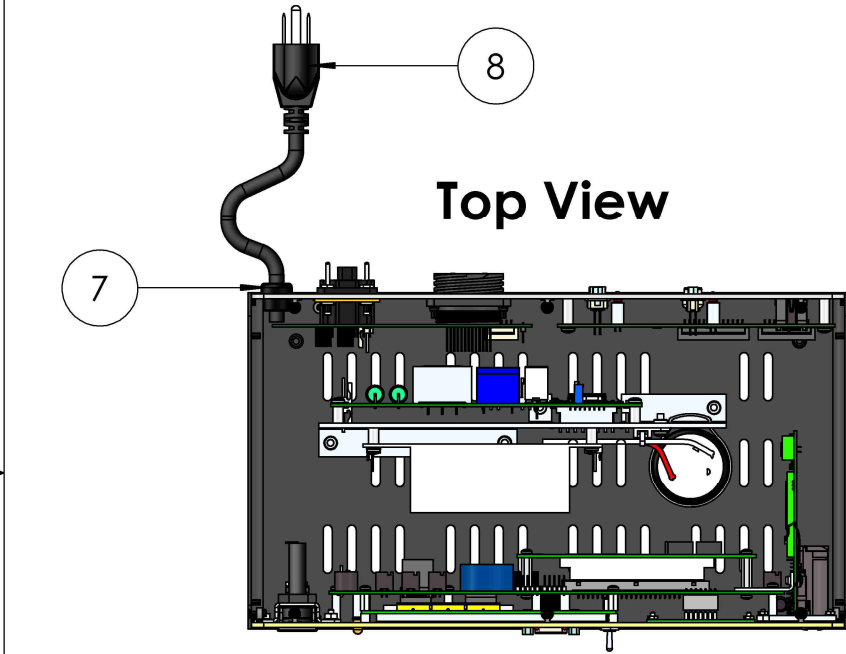
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M58997	MODULE, FRONT PANEL, FLEX CONTROLLER, WIFI	1
2	M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK	14
3	M58586	SCREW,4-40 X 1/4,PH,FH,SS, 100 DEG, BLACK	4
4	M59381	MODULE, BACK PANEL, FLEX CONTROLLER, FIO	1
5	M58993	TOP PANEL, FLEX CONTROLLER	1
6	M59415	MODULE, BOTTOM PANEL, FLEX CONTROLLER	1
7	M14691	BUSHING, STRAIN RELIEF-HEYCO #HEY1210	1
8	M59320	HARN, SET, FLEX CONTROLLER	1

REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160033	INITIAL RELEASE	JANUARY 27, 2017	J.G.

Exploded View

Top View

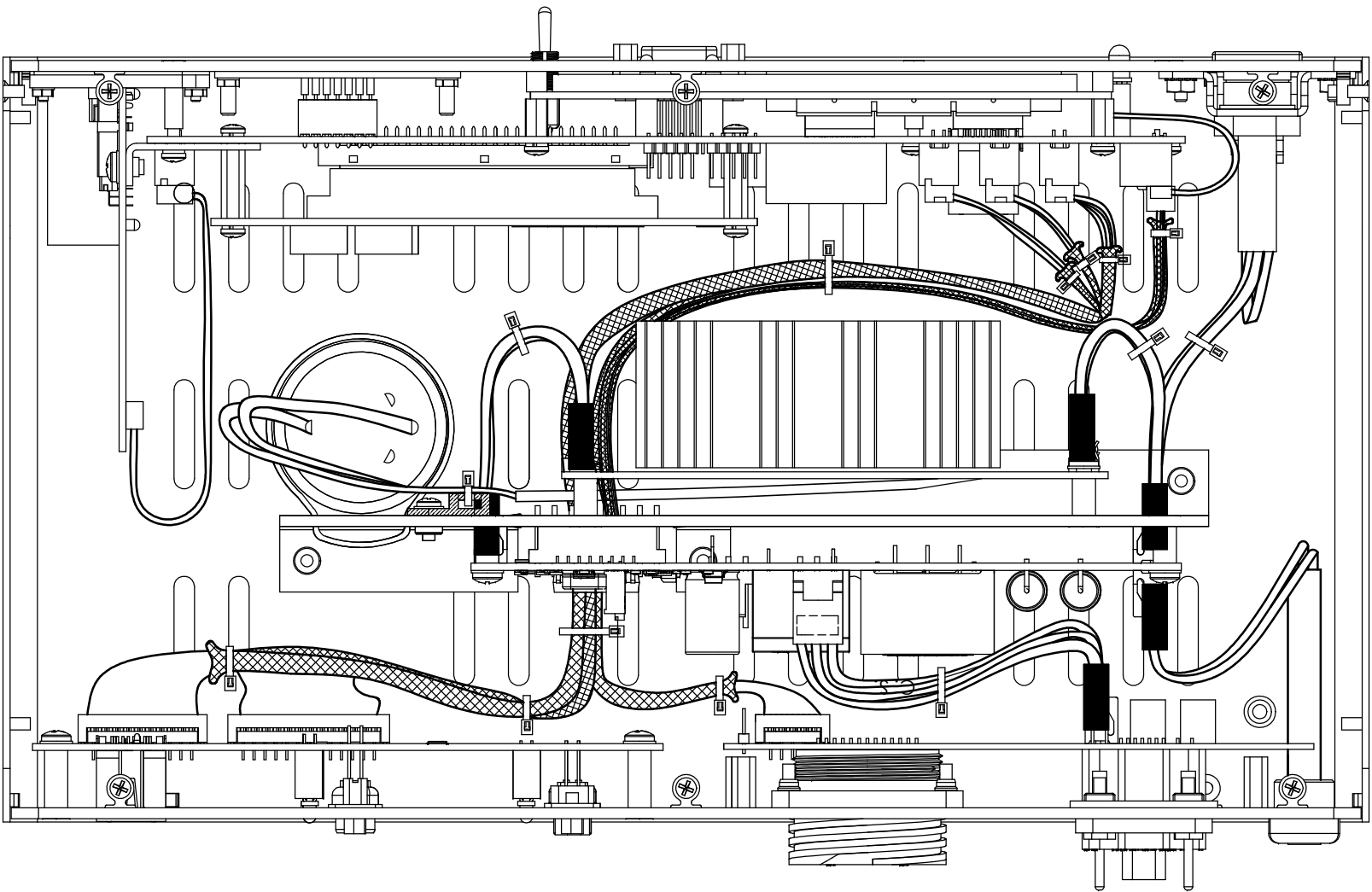
Dimetric View



Controller Wiring

NOTES.

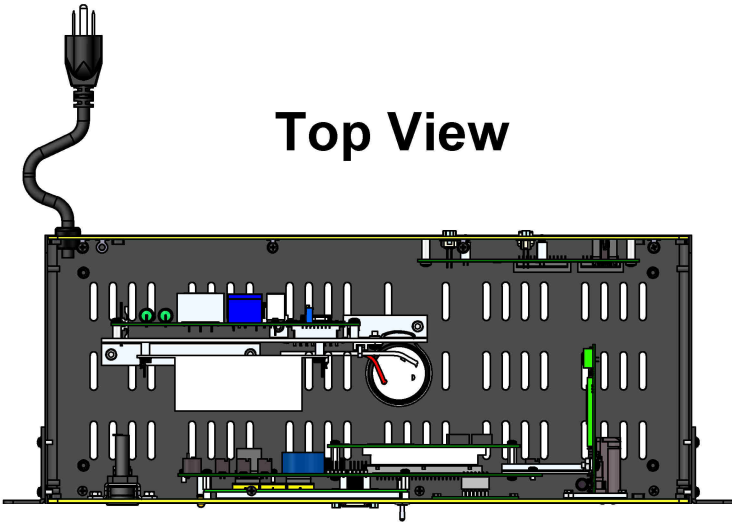
1. CONNECT HARNESS AS FOLLOW :
- HOSTBOARD TO "P3" OF M58570A (HOST BOARD).
 - CTRL SGNLS TO "DC FOR HOST" OF M58574A (CONTROL SIGNALS BOARD).
 - FIO TO "P1" ON M58573A (FIELD I/O BOARD).
 - C.S. TO "DC FOR FIO" OF M58574A (CONTROL SIGNALS BOARD).
 - CN1 TO "CN1" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - AC OUT TO "AC OUTPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - CN2 TO "CN2" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - DC IN TO "DC INPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - F/S TO "SWITCH/FUSE" OF M58574A (CONTROL SIGNAL BOARD).
 - AC IN TO "AC INPUT" OF M58574A (CONTROL SIGNAL BOARD).



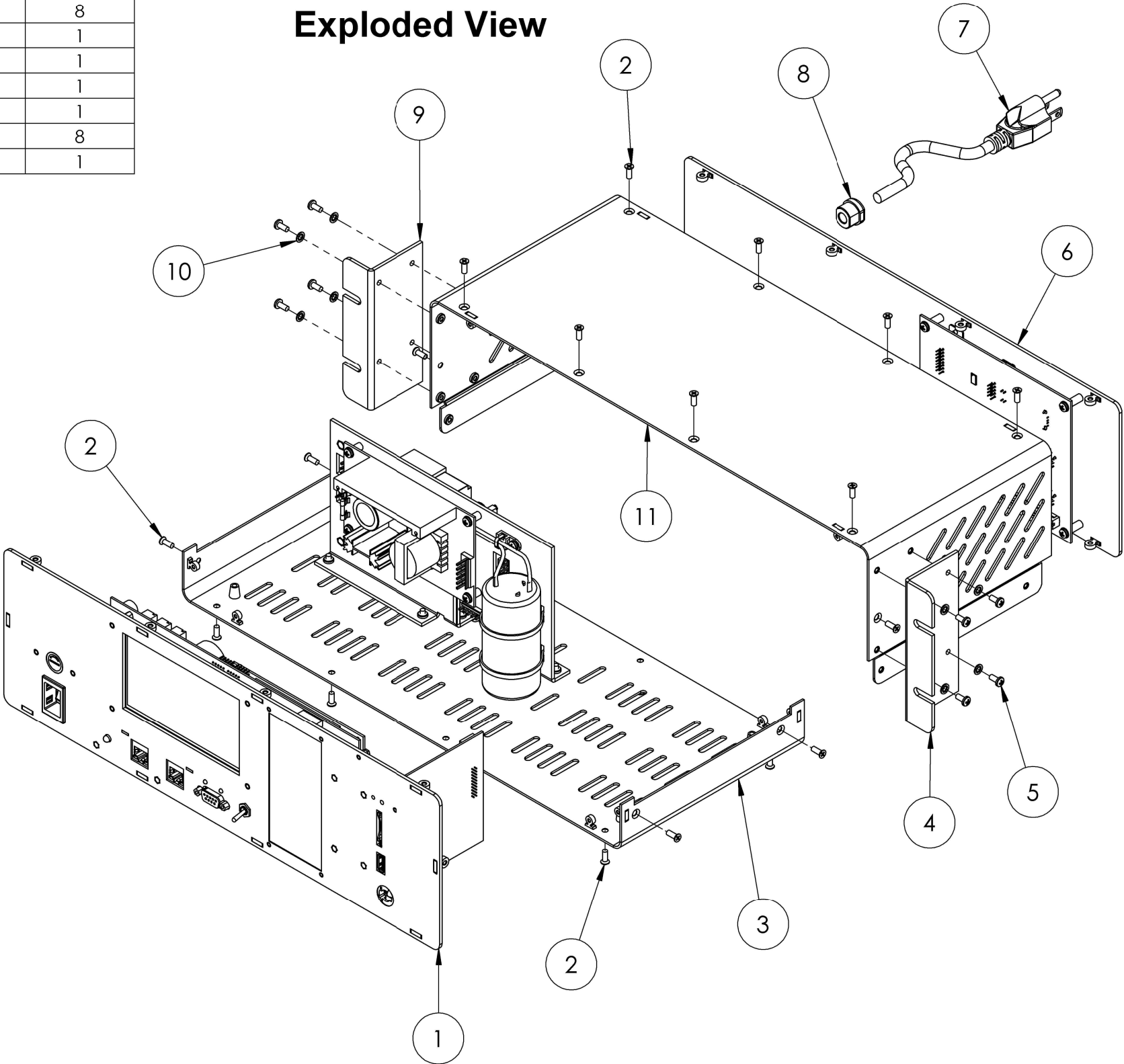
DRAWING	TITLE
M73101R	FLEX RACK MOUNT CONTROLLER

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M73123	MODULE, FRONT PANEL, FLEX RM CONTROLLER	1
2	M58960	SCREW,6-32 X 3/8,PH,FH,SS, 100 DEG,BLACK	22
3	M59666	MODULE, BOTTOM PANEL, FLEX RM CONTROLLER	1
4	M59659	BRACKET 3U, RIGHT SIDE, FLEX RM CONTROLLER	1
5	M40047	SCREW,6-32 X 5/16,PH,PN, SS	8
6	M59925	MODULE, BACK PANEL, FLEX RM CONTROLLER	1
7	M59912	HARN SET, FLEX CONTROLLER W/OUT FIO	1
8	M14691	BUSHING, STRAIN RELIEF-HEYCO #HEY1210	1
9	M59668	BRACKET 3U, LEFT SIDE, FLEX RM CONTROLLER	1
10	M11706	WASHER, #6, INT. TOOTH, SS	8
11	M59665	TOP PANEL, FLEX RM CONTROLLER	1

REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-170006	INITIAL RELEASE	JANUARY 30, 2017	J.G.



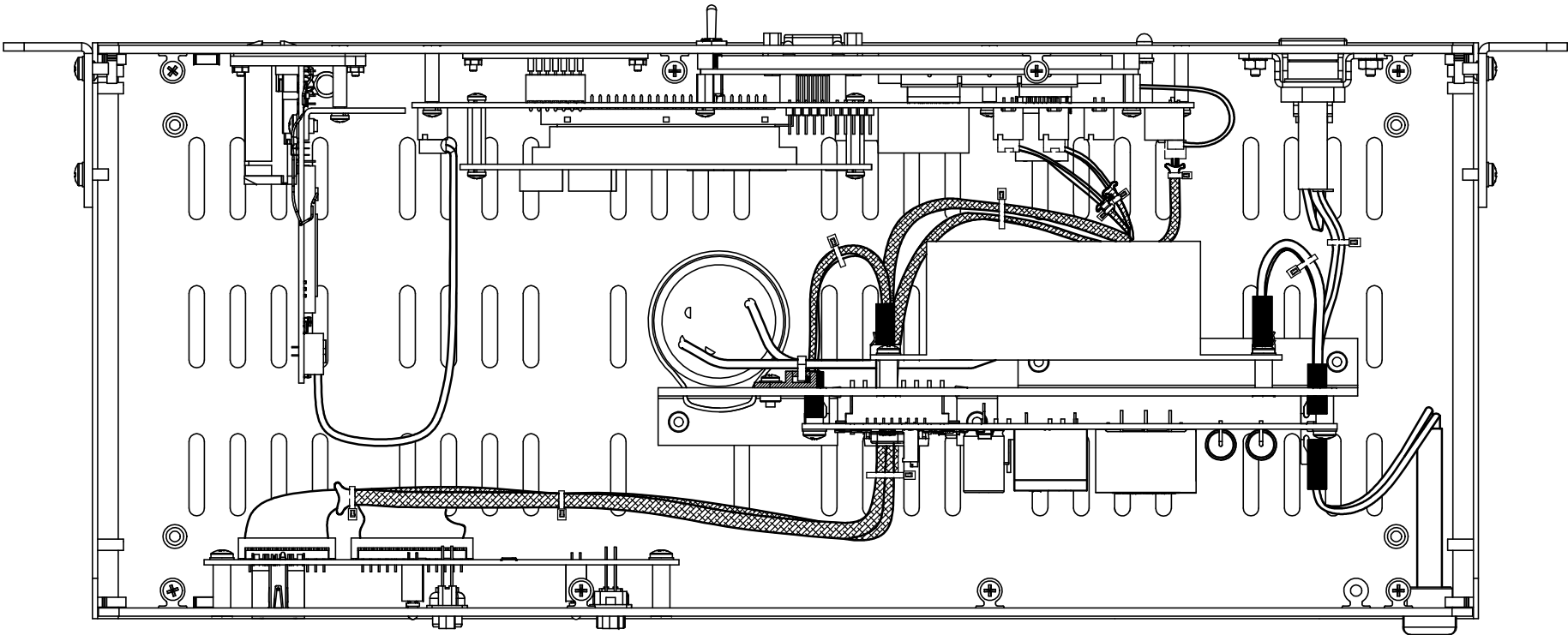
Dimetric View



Controller Wiring

NOTES.

1. CONNECT 1. HARNESS AS FOLLOW:
- HOSTBOARD TO "P3" OF M58570A (HOST BOARD).
- CTRL SGNLS TO "DC FOR HOST" OF M58574A (CONTROL SIGNALS BOARD).
- CN1 TO "CN1" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
- AC OUT TO "AC OUTPUT" OF M58574A (CONTROL SIGNALS BOARD).
- CN2 TO "CN2" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
- DC IN TO "DC INPUT" OF M58574A (CONTROL SIGNALS BOARD).
- F/S TO "SWITCH/FUSE" OF M58574A (CONTROL SIGNAL BOARD).
- AC IN TO "AC INPUT" OF M58574A (CONTROL SIGNAL BOARD).



PROPRIETARY AND CONFIDENTIAL
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY
WITH MCCAIN INC. AND MAY NOT BE REPRODUCED OR
DISCLOSED TO OTHERS WITHOUT THE WRITTEN CONSENT
OF MCCAIN INC.

DETAILED	J.G. 01/30/2017
CHECKED	G.V. 01/30/2017

M73101R



2365 OAK RIDGE WAY
VISTA, CA 92081

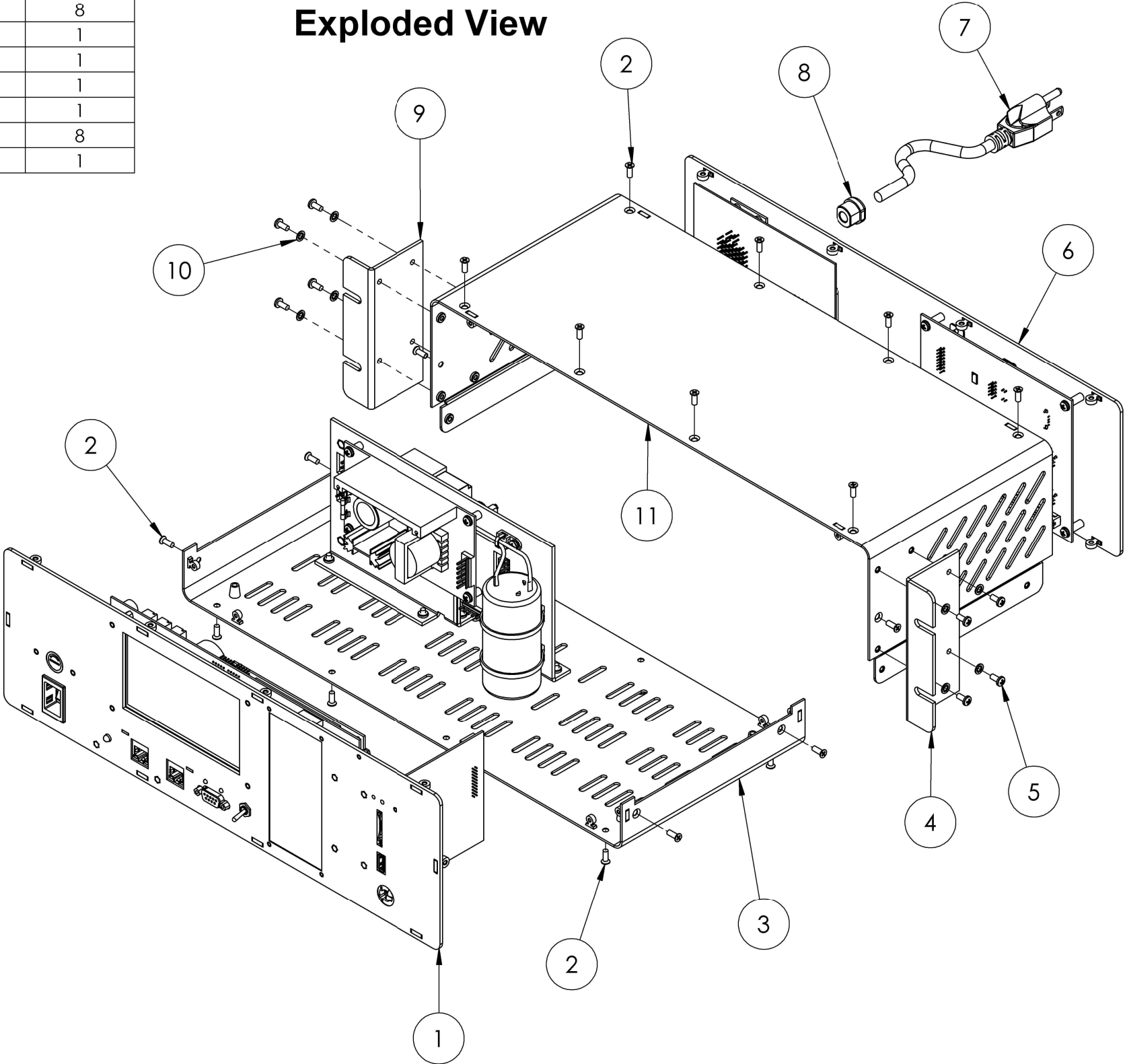
TITLE: FLEX RACK MOUNT CONTROLLER	SIZE B
PART NUMBER: M73101R	
SHEET 2 OF 2	
REV A	

DRAWING	TITLE
M73101RA	FLEX RACK MOUNT CONTROLLER, CALTRANS

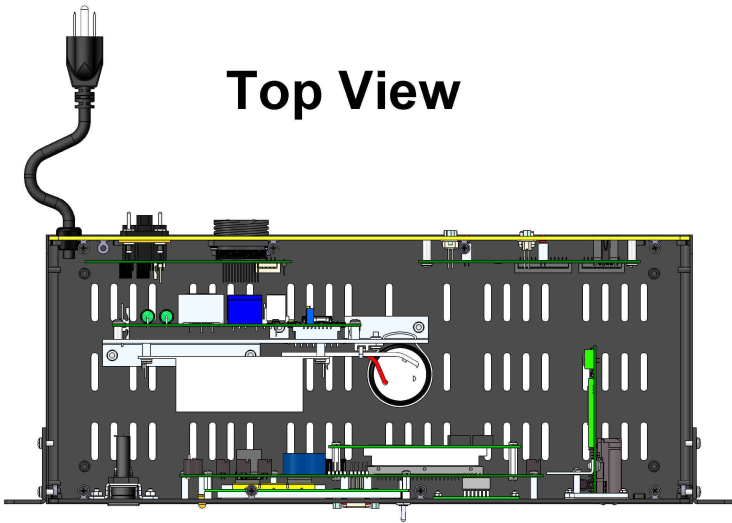
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M73123	MODULE, FRONT PANEL, FLEX RM CONTROLLER	1
2	M58960	SCREW,6-32 X 3/8,PH,FH,SS, 100 DEG,BLACK	22
3	M59666	MODULE, BOTTOM PANEL, FLEX RM CONTROLLER	1
4	M59659	BRACKET 3U, RIGHT SIDE, FLEX RM CONTROLLER	1
5	M40047	SCREW,6-32 X 5/16,PH,PN, SS	8
6	M59663	MODULE, BACK PANEL, FLEX RM CONTROLLER, FIO	1
7	M59320	HARN SET, FLEX CONTROLLER	1
8	M14691	BUSHING, STRAIN RELIEF-HEYCO #HEY1210	1
9	M59668	BRACKET 3U, LEFT SIDE, FLEX RM CONTROLLER	1
10	M11706	WASHER, #6, INT. TOOTH, SS	8
11	M59665	TOP PANEL, FLEX RM CONTROLLER	1

REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-170004	INITIAL RELEASE	JANUARY 30, 2017	J.G.

Exploded View

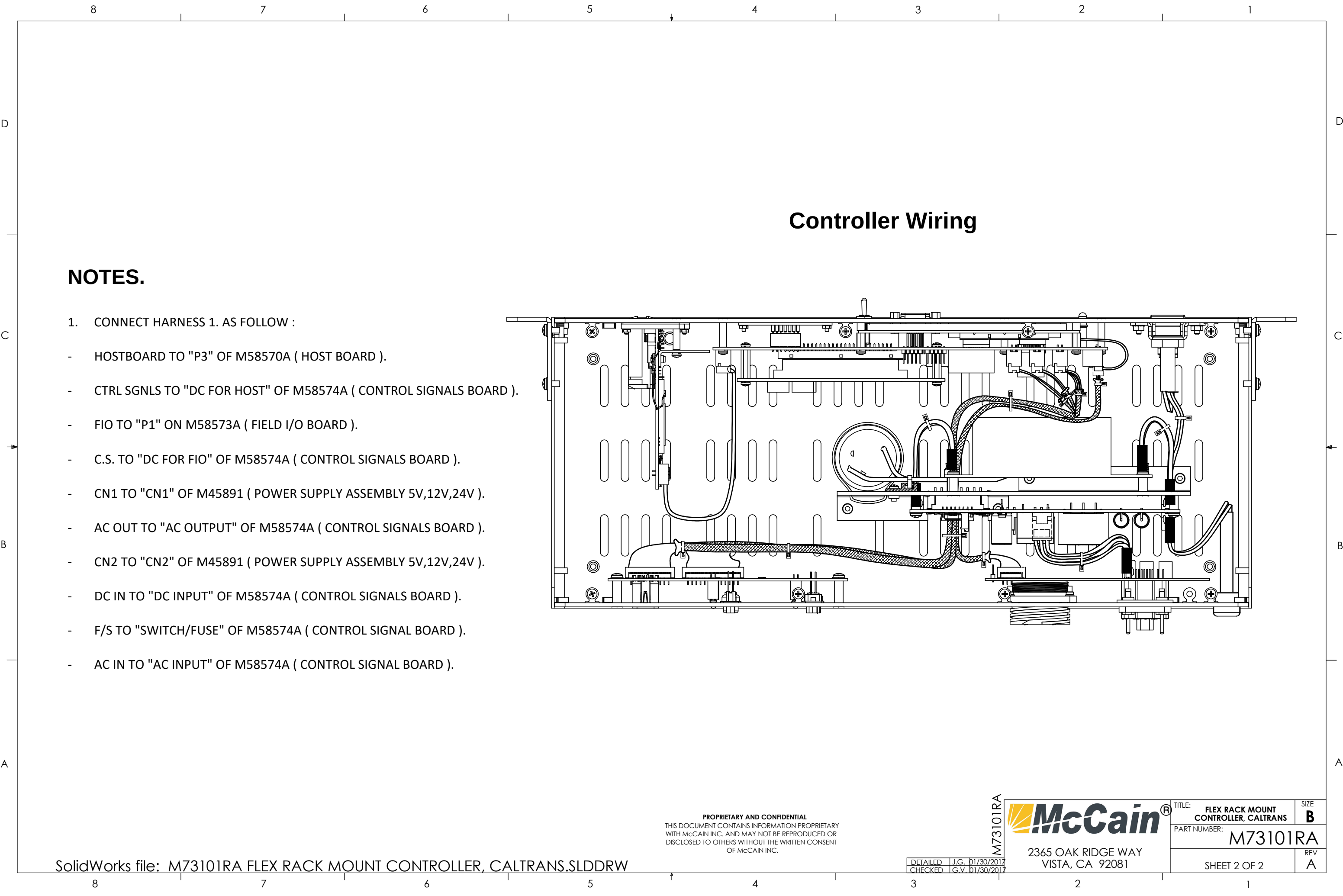


Top View



Dimetric View





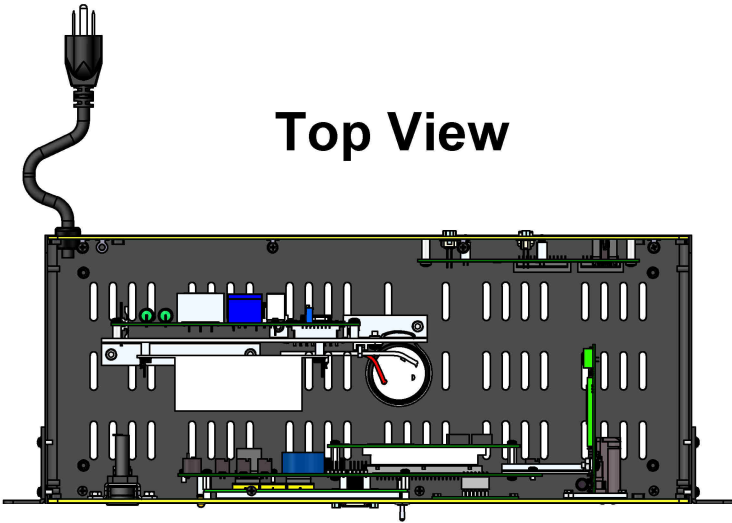
NOTES.

1. CONNECT HARNESS 1. AS FOLLOW :
- HOSTBOARD TO "P3" OF M58570A (HOST BOARD).
 - CTRL SGNLS TO "DC FOR HOST" OF M58574A (CONTROL SIGNALS BOARD).
 - FIO TO "P1" ON M58573A (FIELD I/O BOARD).
 - C.S. TO "DC FOR FIO" OF M58574A (CONTROL SIGNALS BOARD).
 - CN1 TO "CN1" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - AC OUT TO "AC OUTPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - CN2 TO "CN2" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - DC IN TO "DC INPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - F/S TO "SWITCH/FUSE" OF M58574A (CONTROL SIGNAL BOARD).
 - AC IN TO "AC INPUT" OF M58574A (CONTROL SIGNAL BOARD).

DRAWING	TITLE
M73101RW	FLEX RACK MOUNT CONTROLLER, WIFI

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M59661	MODULE, FRONT PANEL, FLEX RM CONTROLLER, WIFI	1
2	M58960	SCREW,6-32 X 3/8,PH,FH,SS, 100 DEG,BLACK	22
3	M59666	MODULE, BOTTOM PANEL, FLEX RM CONTROLLER	1
4	M59659	BRACKET 3U, RIGHT SIDE, FLEX RM CONTROLLER	1
5	M40047	SCREW,6-32 X 5/16,PH,PN, SS	8
6	M59925	MODULE, BACK PANEL, FLEX RM CONTROLLER	1
7	M59912	HARN SET, FLEX CONTROLLER W/OUT FIO	1
8	M14691	BUSHING, STRAIN RELIEF-HEYCO #HEY1210	1
9	M59668	BRACKET 3U, LEFT SIDE, FLEX RM CONTROLLER	1
10	M11706	WASHER, #6, INT. TOOTH, SS	8
11	M59665	TOP PANEL, FLEX RM CONTROLLER	1

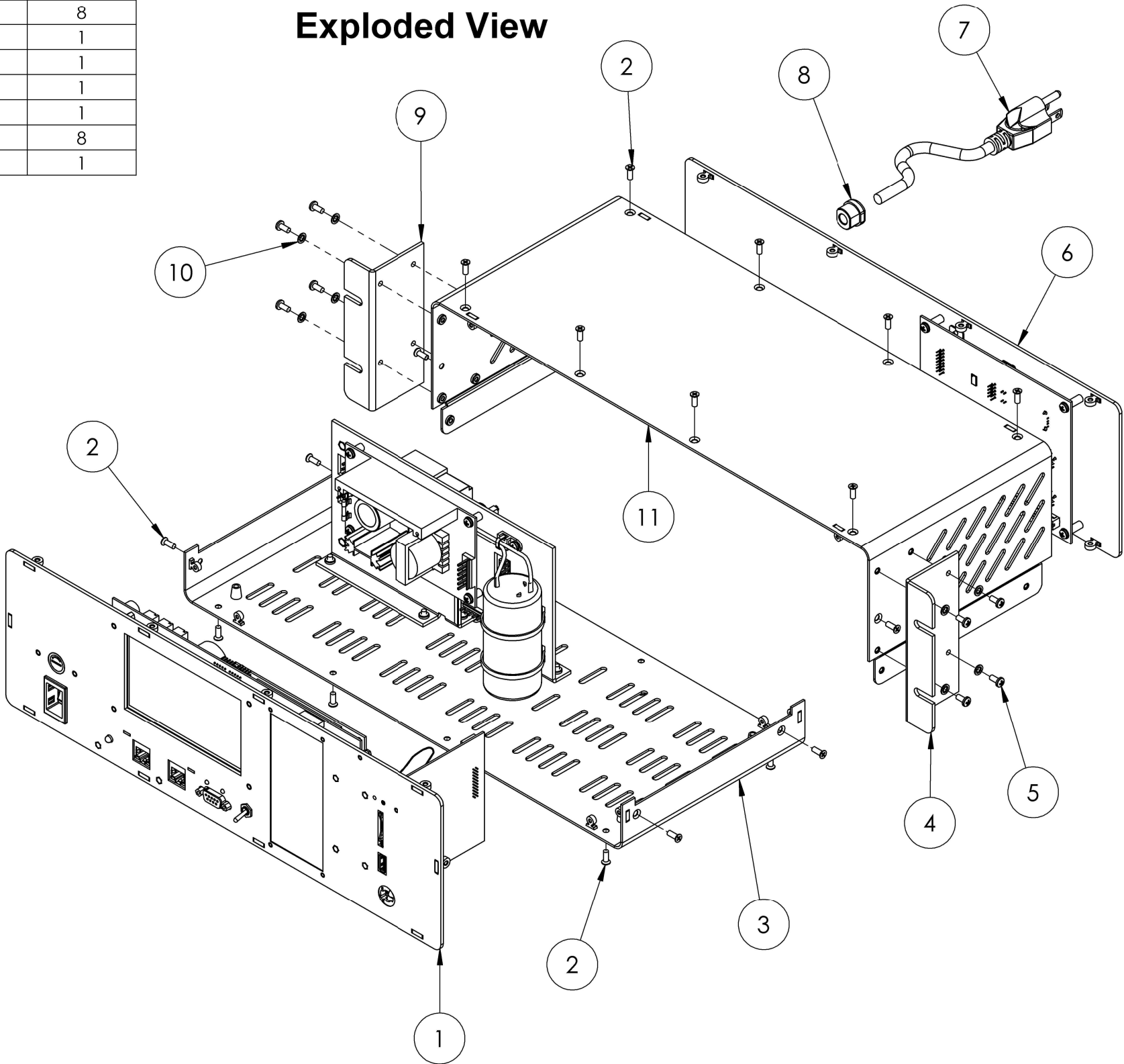
REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160038	INITIAL RELEASE	JANUARY 30, 2017	J.G.

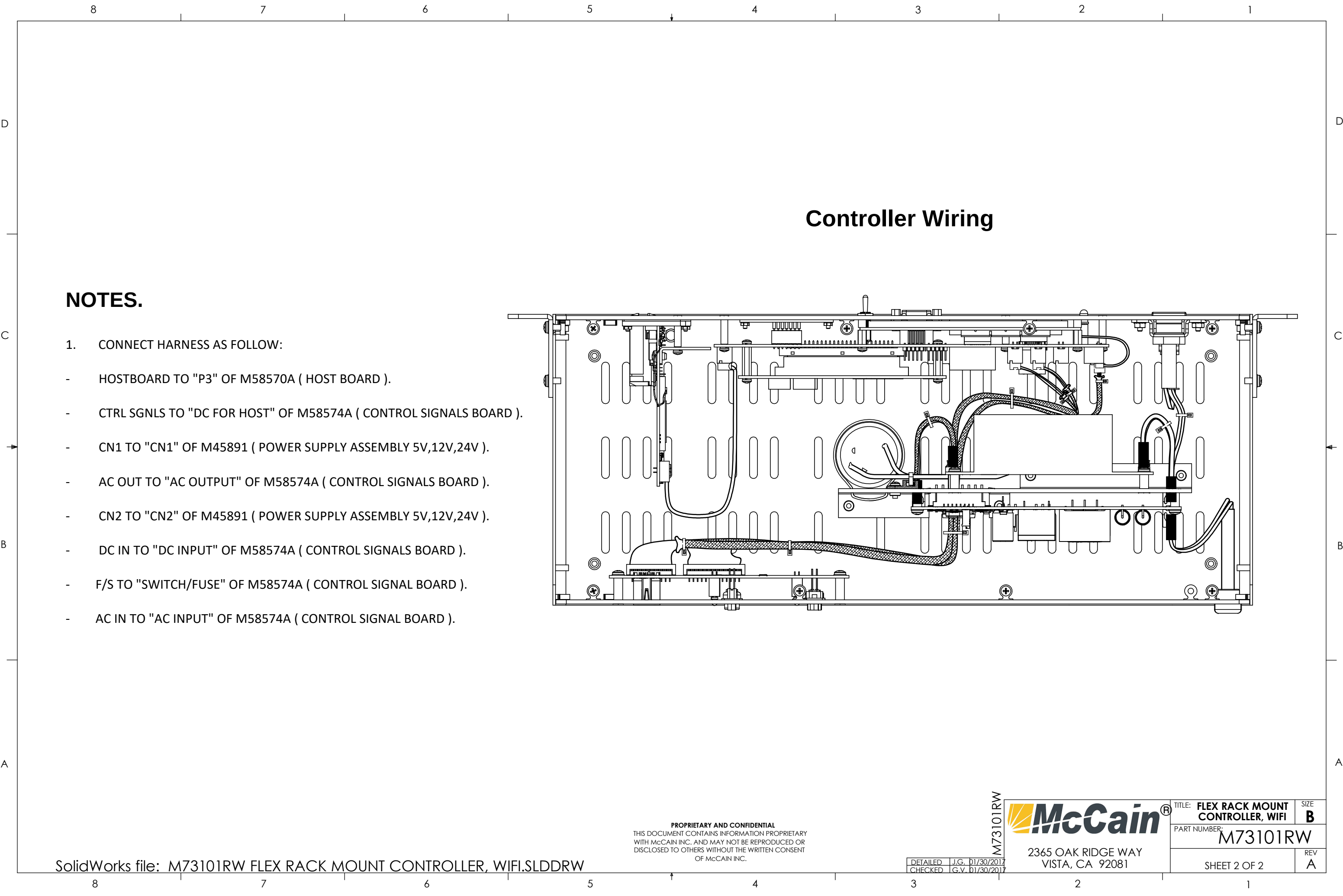


Dimetric View



Exploded View





NOTES.

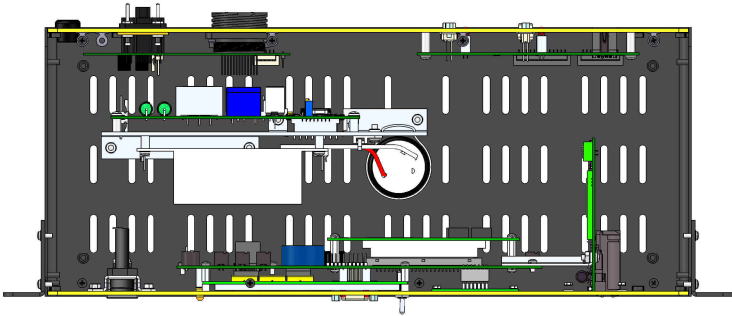
1. CONNECT HARNESS AS FOLLOW:
- HOSTBOARD TO "P3" OF M58570A (HOST BOARD).
 - CTRL SGNLS TO "DC FOR HOST" OF M58574A (CONTROL SIGNALS BOARD).
 - CN1 TO "CN1" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - AC OUT TO "AC OUTPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - CN2 TO "CN2" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - DC IN TO "DC INPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - F/S TO "SWITCH/FUSE" OF M58574A (CONTROL SIGNAL BOARD).
 - AC IN TO "AC INPUT" OF M58574A (CONTROL SIGNAL BOARD).

DRAWING	TITLE
M73101RWA	FLEX RACK MOUNT CONTROLLER, WIFI, CALTRANS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M59661	MODULE, FRONT PANEL, FLEX RM CONTROLLER, WIFI	1
2	M58960	SCREW,6-32 X 3/8,PH,FH,SS, 100 DEG,BLACK	22
3	M59666	MODULE, BOTTOM PANEL, FLEX RM CONTROLLER	1
4	M59659	BRACKET 3U, RIGHT SIDE, FLEX RM CONTROLLER	1
5	M40047	SCREW,6-32 X 5/16,PH,PN, SS	8
6	M11706	WASHER, #6, INT. TOOTH, SS	8
7	M59663	MODULE, BACK PANEL, FLEX RM CONTROLLER, FIO	1
8	M59912	HARN SET, FLEX CONTROLLER W/OUT FIO	1
9	M14691	BUSHING, STRAIN RELIEF-HEYCO #HEY1210	1
10	M59668	BRACKET 3U, LEFT SIDE, FLEX RM CONTROLLER	1
11	M59665	TOP PANEL, FLEX RM CONTROLLER	1

REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160036	INITIAL RELEASE	JANUARY 27, 2017	J.G.

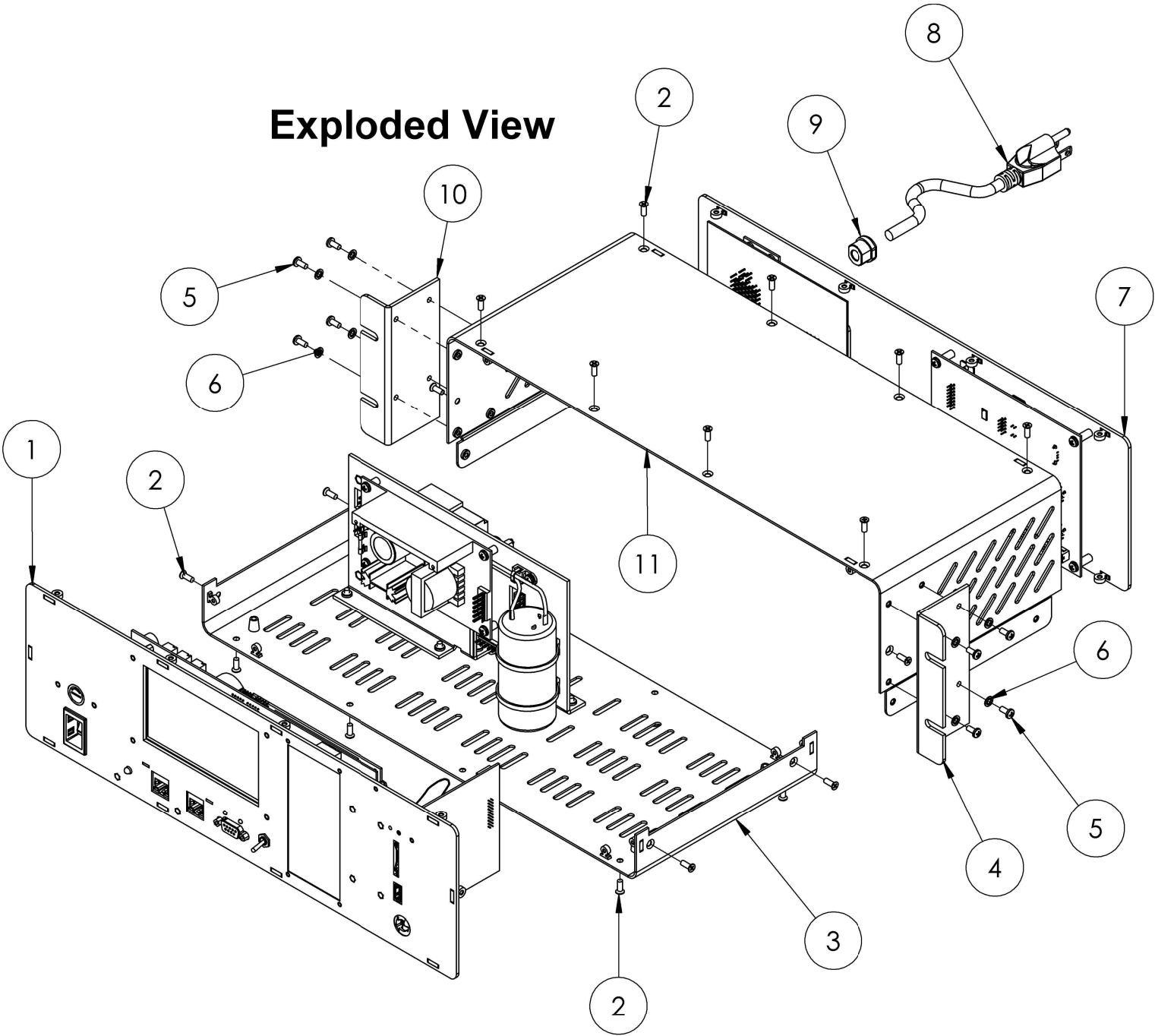
Top View



Dimetric View



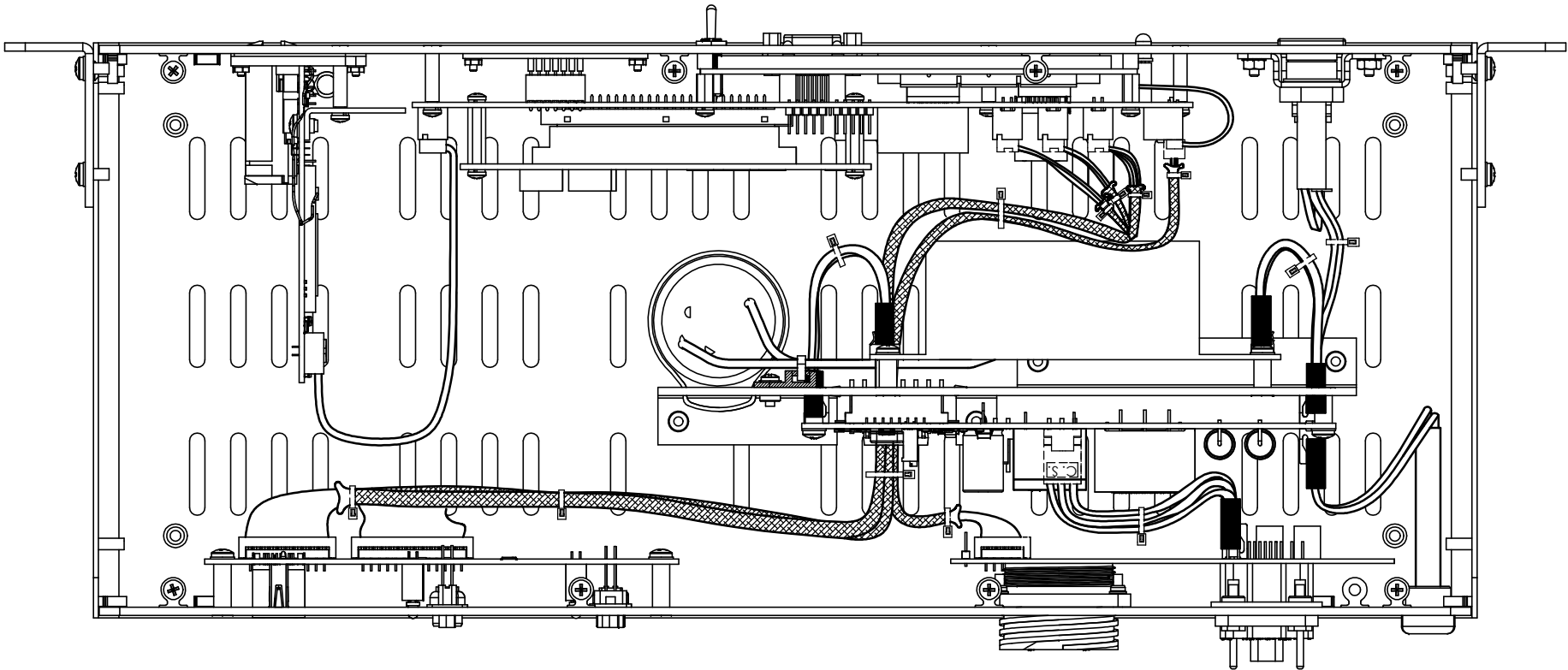
Exploded View



Controller Wiring

NOTES.

1. CONNECT HARNESS AS FOLLOW :
- HOSTBOARD TO "P3" OF M58570A (HOST BOARD).
 - CTRL SGNLS TO "DC FOR HOST" OF M58574A (CONTROL SIGNALS BOARD).
 - FIO TO "P1" ON M58573A (FIELD I/O BOARD).
 - C.S. TO "DC FOR FIO" OF M58574A (CONTROL SIGNALS BOARD).
 - CN1 TO "CN1" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - AC OUT TO "AC OUTPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - CN2 TO "CN2" OF M45891 (POWER SUPPLY ASSEMBLY 5V,12V,24V).
 - DC IN TO "DC INPUT" OF M58574A (CONTROL SIGNALS BOARD).
 - F/S TO "SWITCH/FUSE" OF M58574A (CONTROL SIGNAL BOARD).
 - AC IN TO "AC INPUT" OF M58574A (CONTROL SIGNAL BOARD).



PROPRIETARY AND CONFIDENTIAL
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY
WITH MCCAIN INC. AND MAY NOT BE REPRODUCED OR
DISCLOSED TO OTHERS WITHOUT THE WRITTEN CONSENT
OF MCCAIN INC.

DETAILED	J.G. 01/27/2017
CHECKED	G.V. 01/27/2017

M73101RWA

McCain[®]

2365 OAK RIDGE WAY
VISTA, CA 92081

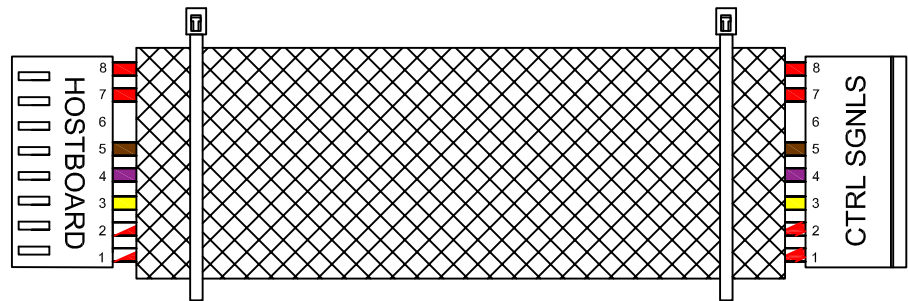
TITLE: FLEX RACK MOUNT CONTROLLER, WIFI, CALTRANS		SIZE B
PART NUMBER: M73101RWA		REV A
SHEET 2 OF 2		

HARNESSES	
DRAWING	TITLE
M59320	HARN, SET, FLEX CONTROLLER
M59912	HARN, SET, FLEX CONTROLLER W/OUT FIO
M59322	HARN, LCD, 20 COND RIBBON CABLE, FLEX
M59323	HARN, 10POS, FIO TO HOSTBOARD, FLEX
M59324	HARN, 20POS, SERIAL TO HOSTBOARD, FLEX
M59325	HARN, 26POS, SERIAL TO HOSTBOARD, FLEX
M59326	HARN, 20POS, WIFI TO HOSTBOARD, FLEX

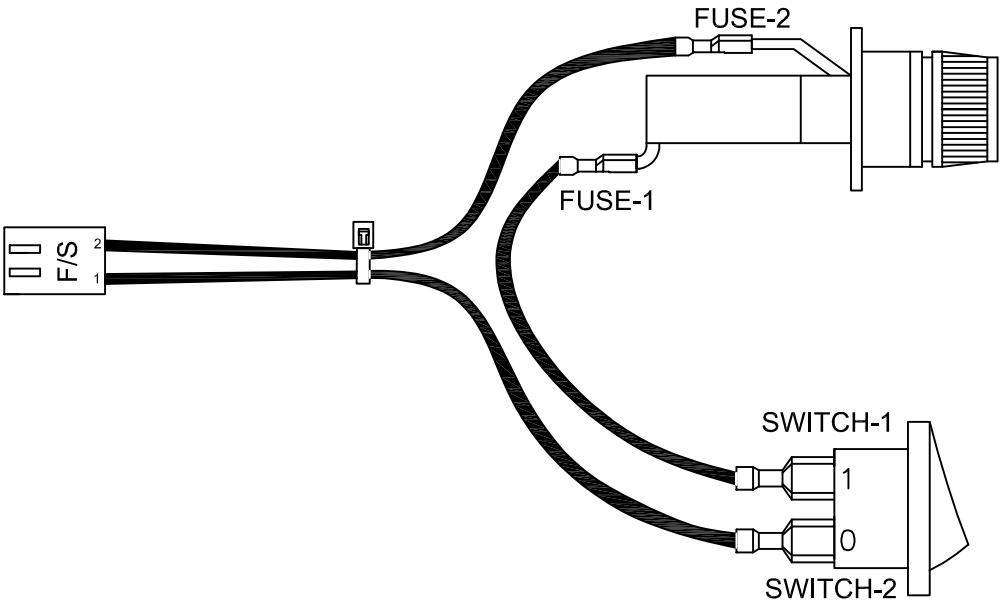
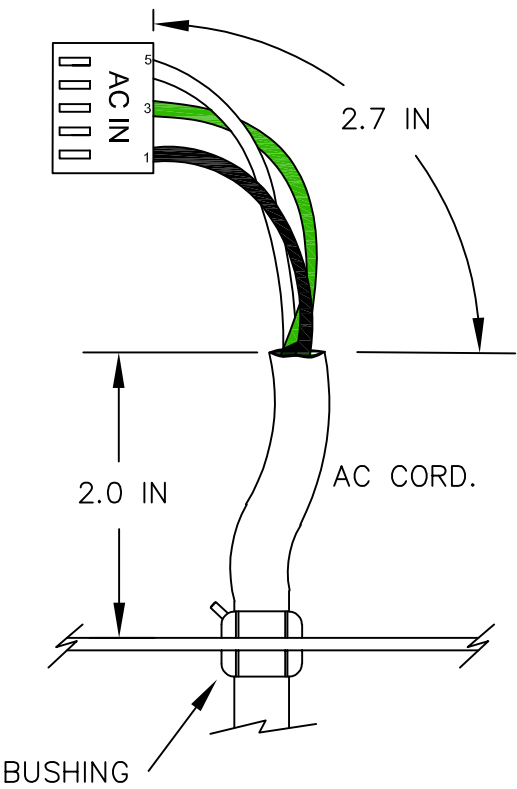
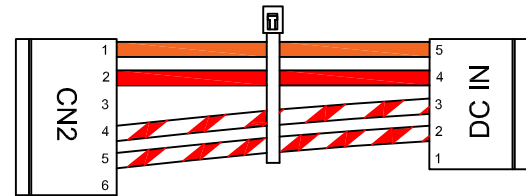
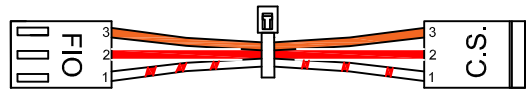
DRAWING	TITLE
M59320	HARN, SET, FLEX CONTROLLER

REVISIONS					
REV	ECN	DESCRIPTION	DWN	DATE	APPR
A	EC-160033	INITIAL RELEASE	G.V.	DEC/13/2016	M.G.

INSTALLING HARNESS M59320 ON FLEX CONTROLLER



* INSTALL EXPANDO BRAID M13921 (10"), TUCK 1" BOTH SIDES.



- * PREFORM THE FUSE TO PLUG TERMINALS, A LARGE CONTACT SURFACE IS REQUIRED.
- * ONCE FUSE AND SWITCH ARE INSTALLED ON PANEL ARRANGE THE WIRES AS SHOWN.
- * ASSURE THAT TERMINALS ARE PROPERLY INSTALLED.

* LABEL EACH CONNECTOR AS SHOWN.

McGAIN 2365 OAK RIDGE WAY VISTA, CALIFORNIA 92081			TITLE HARN SET, FLEX CONTROLLER		
APPROVALS		DATE			
DRAWN	G.V.	12/13/16			
CHECKED	A.S.	12/13/16			
APPR					
ENGR					
		PN	M59320	DWG NO.	M59320
		SCALE	NONE	SIZE	B
				SHEET	1 OF 1

WIRE LIST

PART # M59320

REV A

OLD PART #

1 = M24773

DESCRIPTION: HARN, SET, FLEX CONTROLLER

2 = M46903

No.	Type	Color	P/N	Length	From	Label	Finish	To	Label	Finish
HOSTBOARD TO CONTROL SIGNALS										
1	20 GA 19 STR	RED/WHT	M13891	8.5	HOST - 1	GND	1	CTRL SIGNALS - 1		1
2	20 GA 19 STR	RED/WHT	M13891	8.5	HOST - 2	GND	1	CTRL SIGNALS - 2		1
3	20 GA 19 STR	YELLOW	M13945	8.5	HOST - 3	PWR/UP	1	CTRL SIGNALS - 3		1
4	20 GA 19 STR	PURPLE	M40010	8.5	HOST - 4	PWR/DWN	1	CTRL SIGNALS - 4		1
5	20 GA 19 STR	BROWN	M40009	8.5	HOST - 5	LINESYNC	1	CTRL SIGNALS - 5		1
6	20 GA 19 STR	RED	M13892	8.5	HOST - 7	5 VDC	1	CTRL SIGNALS - 7		1
7	20 GA 19 STR	RED	M13892	8.5	HOST - 8	5 VDC	1	CTRL SIGNALS - 8		1
FIO TO CONTROL SIGNALS										
8	20 GA 19 STR	RED/WHT	M13891	3.5	FIO - 1	GND	1	C. S. - 1		1
9	20 GA 19 STR	RED	M13892	3.5	FIO - 2	5 VDC	1	C. S. - 2		1
10	20 GA 19 STR	ORANGE	M13906	3.5	FIO - 3	12 VDC	1	C. S. - 3		1
PS AC TO CONTROL SIGNALS BOARD										
11	20 GA, 19STR	BLACK	M13846	3.5	CN1-3	AC+	1	AC OUT-1		1
12	20 GA, 19STR	WHITE	M13890	3.5	CN1-1	AC-	1	AC OUT-3		1
PS DC TO CONTROL SIGNALS BOARD										
13	20 GA, 19STR	ORANGE	M13906	3.5	CN2-1	12VDC	1	DC IN -5		1
14	20 GA, 19STR	RED	M13892	3.5	CN2-2	5VDC	1	DC IN-4		1
15	20 GA, 19STR	RED/WHT	M13891	3.5	CN2-4	GND	1	DC IN-3		1
16	20 GA, 19STR	RED/WHT	M13891	3.5	CN2-5	GND	1	DC IN-2		1
FUSE AND SWITCH										
17	20 GA, 19STR	BLACK	M13846	5.0	F/S-2	AC+	1	FUSE-2		2
18	20 GA, 19STR	BLACK	M13846	5.0	F/S-1	AC+	1	SWITCH-2		2
19	20 GA, 19STR	BLACK	M13846	3.0	FUSE-1	AC+	2	SWITCH-1		2
AC CORD										
*20	~	BLACK	M17371	1.5	AC INPUT - 1	AC+	1			----
		GREEN		1.5	AC INPUT - 3	CHASSIS	1			----
		WHITE		1.5	AC INPUT - 5	AC-	1			----

* M17371 WILL BE FIRST INSTALLED ON PANEL AND THEN INSERTED INTO AC IN HOUSING.

USE WIRE TIE M11960 X 6 EA TO ROUTE HARNESSSES.

CONNECTORS:

F/S=	M24665	HOUSING,2POS,SL-156,W/LK	1 EA
AC OUT=			
CN1=	M24666	HOUSING,3POS,SL-156,W/LK	4 EA
FIO=			
C.S.=			
DC IN=	M34262	HOUSING,5POS,SL-156,W/LK	2 EA
AC IN=			
CN2 =	M24669	HOUSING,6POS,SL-156,W/LK	1 EA
HOST=	M24670	HOUSING,8POS,SL-156,W/LK	2 EA
CTRL SIGN.=			

BRAIDS:

M13921	EXPANDO BRAID, 1/4", BLACK	0.84 ft (10")
--------	----------------------------	---------------

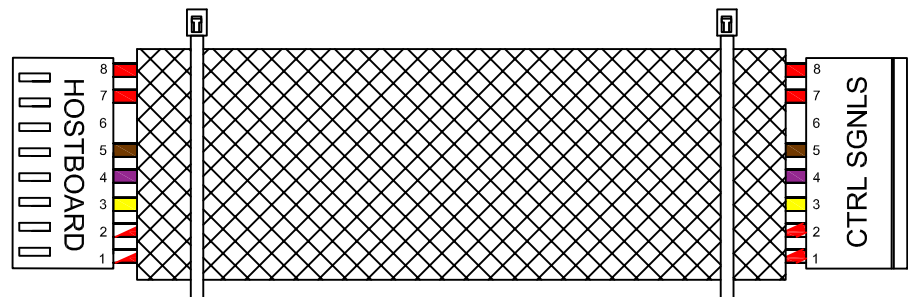
Note: Label each connector with its designator by using P-Touch labels.

DATE	APP.	REV.	ECN#
Nov. 29, 2016	G. V.	A	EC-160033

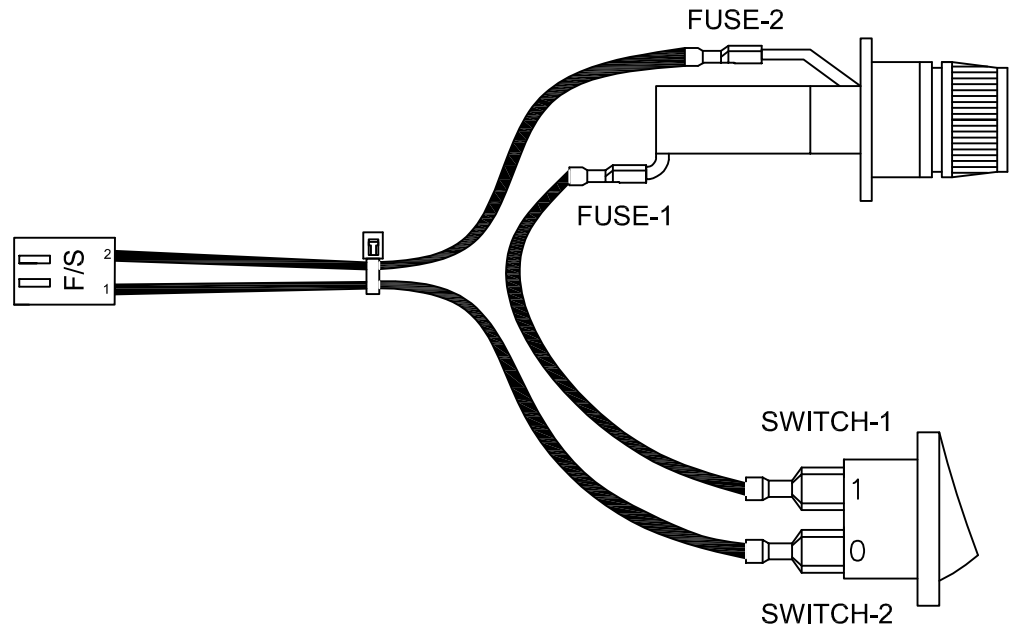
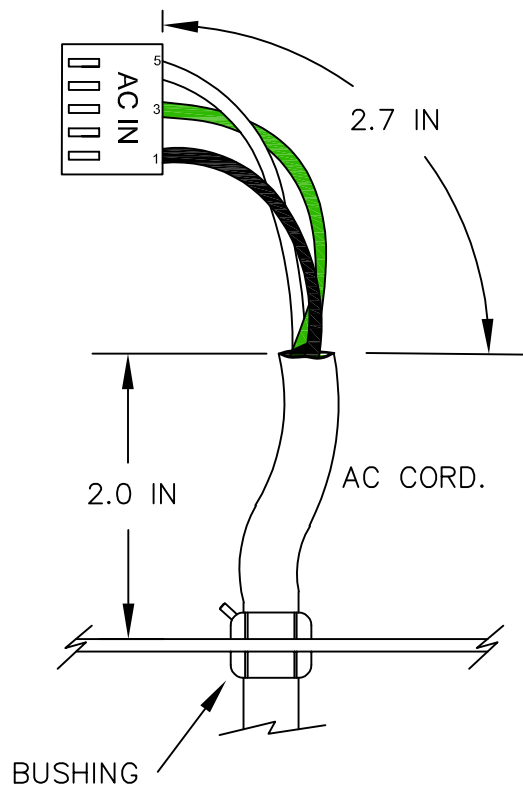
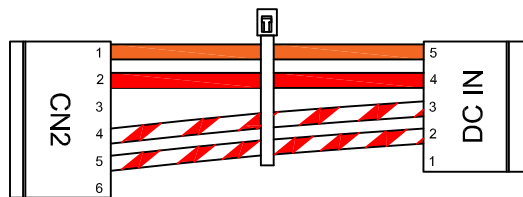
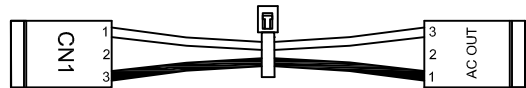
DRAWING	TITLE
M59912	HARN, SET, FLEX CONTROLLER W/OUT FIO

REVISIONS					
REV	ECN	DESCRIPTION	DWN	DATE	APPR
A	EC-160025	INITIAL RELEASE	G.V.	DEC/13/2016	M.G.

INSTALLING HARNESS M59912 ON FLEX CONTROLLER



* INSTALL EXPANDO BRAID M13921 (10"), TUCK 1" BOTH SIDES.



- * PREFORM THE FUSE TO PLUG TERMINALS, A LARGE CONTACT SURFACE IS REQUIRED.
- * ONCE FUSE AND SWITCH ARE INSTALLED ON PANEL ARRANGE THE WIRES AS SHOWN.
- * ASSURE THAT TERMINALS ARE PROPERLY INSTALLED.

* LABEL EACH CONNECTOR AS SHOWN.

McCain 2365 OAK RIDGE WAY VISTA, CALIFORNIA 92081			TITLE HARN, SET, FLEX CONTROLLER W/OUT FIO		
APPROVALS		DATE			
DRAWN	G.V.	12/13/16			
CHECKED	A.S.	12/13/16			
APPR					
ENGR					
PN M59912		DWG NO. M59912	REV A		
SCALE NONE		SIZE B	SHEET 1 OF 1		

WIRE LIST

PART # M59912

REV A

OLD PART #

1 = M24773

DESCRIPTION: HARN, SET, FLEX CONTROLLER W/OUT FIO

2 = M46903

No.	Type	Color	P/N	Length	From	Label	Finish	To	Label	Finish
HOSTBOARD TO CONTROL SIGNALS										
1	20 GA 19 STR	RED/WHT	M13891	8.5	HOST - 1	GND	1	CTRL SIGNALS - 1		1
2	20 GA 19 STR	RED/WHT	M13891	8.5	HOST - 2	GND	1	CTRL SIGNALS - 2		1
3	20 GA 19 STR	YELLOW	M13945	8.5	HOST - 3	PWR/UP	1	CTRL SIGNALS - 3		1
4	20 GA 19 STR	PURPLE	M40010	8.5	HOST - 4	PWR/DWN	1	CTRL SIGNALS - 4		1
5	20 GA 19 STR	BROWN	M40009	8.5	HOST - 5	LINESYNC	1	CTRL SIGNALS - 5		1
6	20 GA 19 STR	RED	M13892	8.5	HOST - 7	5 VDC	1	CTRL SIGNALS - 7		1
7	20 GA 19 STR	RED	M13892	8.5	HOST - 8	5 VDC	1	CTRL SIGNALS - 8		1
PS AC TO CONTROL SIGNALS BOARD										
8	20 GA, 19STR	BLACK	M13846	3.5	CN1-3	AC+	1	AC OUT-1		1
9	20 GA, 19STR	WHITE	M13890	3.5	CN1-1	AC-	1	AC OUT-3		1
PS DC TO CONTROL SIGNALS BOARD										
10	20 GA, 19STR	ORANGE	M13906	3.5	CN2-1	12VDC	1	DC IN -5		1
11	20 GA, 19STR	RED	M13892	3.5	CN2-2	5VDC	1	DC IN-4		1
12	20 GA, 19STR	RED/WHT	M13891	3.5	CN2-4	GND	1	DC IN-3		1
13	20 GA, 19STR	RED/WHT	M13891	3.5	CN2-5	GND	1	DC IN-2		1
FUSE AND SWITCH										
14	20 GA, 19STR	BLACK	M13846	5.0	F/S-2	AC+	1	FUSE-2		2
15	20 GA, 19STR	BLACK	M13846	5.0	F/S-1	AC+	1	SWITCH-2		2
16	20 GA, 19STR	BLACK	M13846	3.0	FUSE-1	AC+	2	SWITCH-1		2
AC CORD										
*17	~	BLACK	M17371	1.5	AC INPUT - 1	AC+	1			----
		GREEN		1.5	AC INPUT - 3	CHASSIS	1			----
		WHITE		1.5	AC INPUT - 5	AC-	1			----

* M17371 WILL BE FIRST INSTALLED ON PANEL AND THEN INSERTED INTO "AC IN" HOUSING.
USE WIRE TIE M11960 X 5 EA TO ROUTE HARNESSSES.

CONNECTORS:

F/S=	M24665	HOUSING,2POS,SL-156,W/LK	1 EA
AC OUT=	M24666	HOUSING,3POS,SL-156,W/LK	2 EA
CN1=			
DC IN=	M34262	HOUSING,5POS,SL-156,W/LK	2 EA
AC IN=			
CN2 =	M24669	HOUSING,6POS,SL-156,W/LK	1 EA
HOST=	M24670	HOUSING,8POS,SL-156,W/LK	2 EA
CTRL SIGN.=			

BRAIDS:

M13921	EXPANDO BRAID, 1/4", BLACK	0.84 ft (10")
--------	----------------------------	---------------

Note: Label each connector with its designator by using P-Touch labels.

DATE	APP.	REV.	ECN#
Nov. 30, 2016	A. S.	A	EC-160025

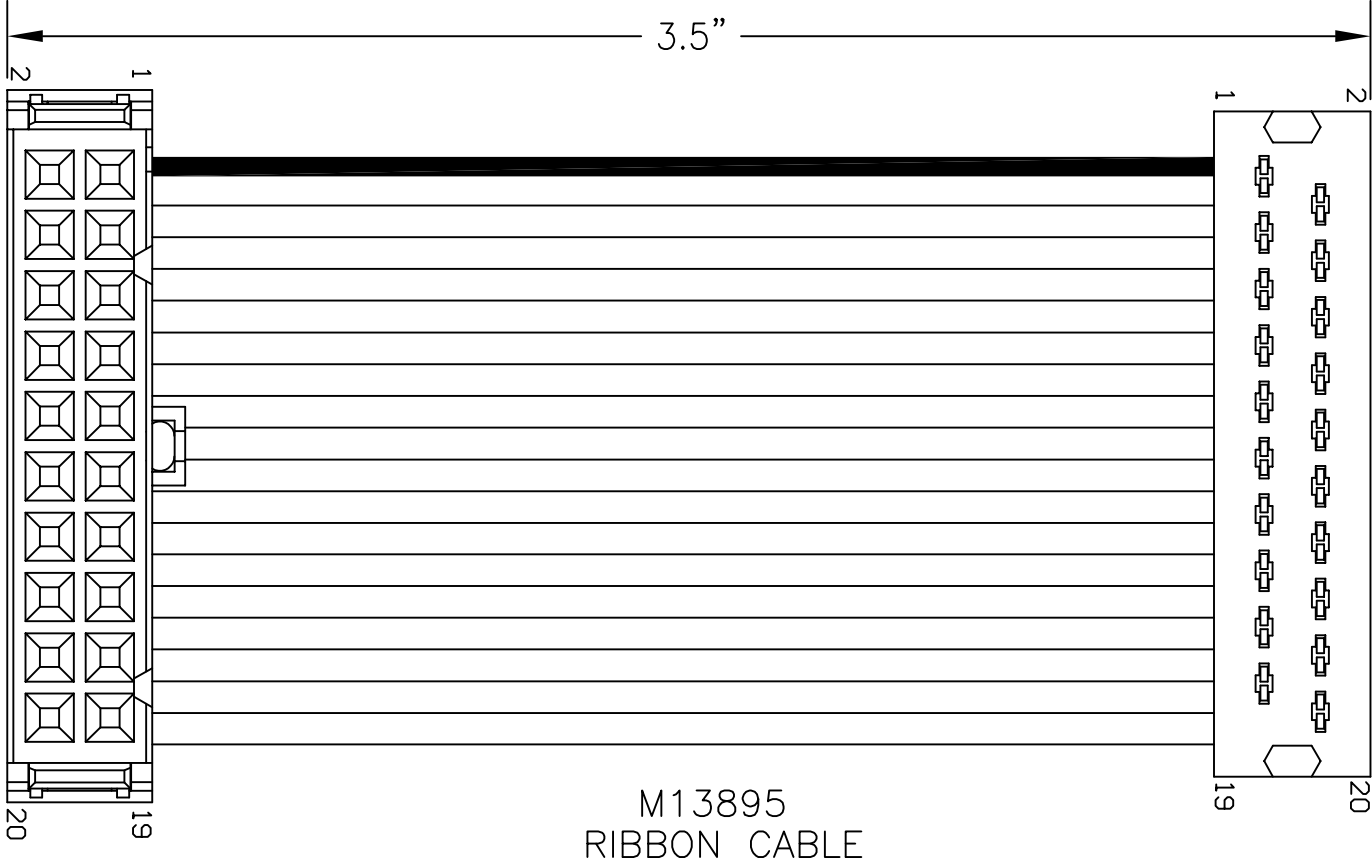
DRAWING	TITLE
M59322	HARN, LCD, 20 COND RIBBON CABLE, FLEX

REVISIONS					
REV	ECN	DESCRIPTION		DWN	DATE
A	EC-160033	INITIAL RELEASE		A.S.	11/15/16
				APPR	M.G.

TOP VIEW

M24750
CONN, 20POS, RIBBON
CABLE RECEPTACLE

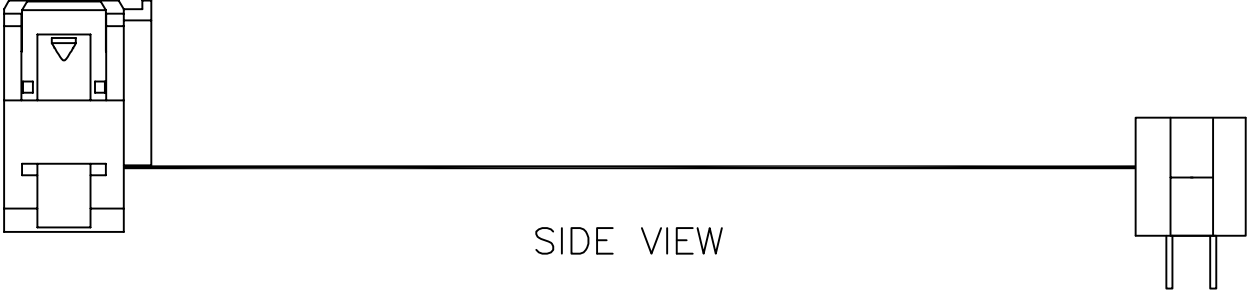
1



M24756
CONN, 20 COND
RIBBON DIP

1

SIDE VIEW



- NOTES:
- 1. INSTALL THE RIBBON CABLE IN M24750 AND M24756 CONNECTORS AS SHOWN.
 - 2. OBSERVE CORRECT POLARITY.
 - 3. NO CUTS OR EXPOSED WIRES.

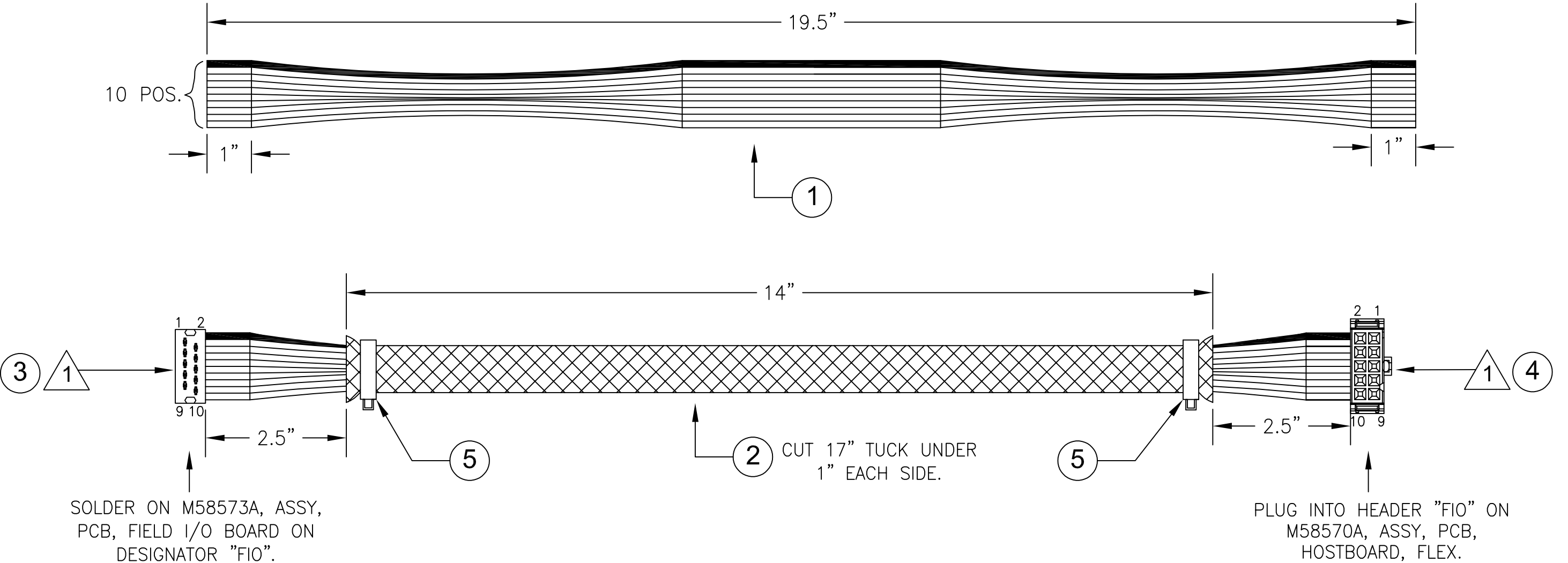
McGAIN 2365 OAK RIDGE WAY VISTA, CALIFORNIA 92081	TITLE		
	HARN, LCD, 20 COND RIBBON CABLE, FLEX CONTROLLER		
APPROVALS	DATE		
DRAWN	A.S.	Nov/15/16	
CHECKED	G.V.	Nov/15/16	
APPR			
ENGR			
PN		M59322	REV A
SCALE		NONE	SIZE B
		SHEET 1	OF 1

DRAWING	TITLE
M59323	HARN, 10POS, FIO TO HOSTBOARD, FLEX

8		7		6		5		4		3		2		1		
ITEM	QTY.	PART NUMBER	DESCRIPTION	REVISIONS												
				REV	ECN	DESCRIPTION		DWN	DATE	APPR						
1	2 EA	M35343	CABLE, 28 AWG, TWIST.	A	EC-160033	INITIAL RELEASE		A.S.	Feb/10/17	M.G.						
2	1.42 Ft	M13921	EXPANDO BRAID ¼".													
3	1 EA	M69058	CONN, 10POS, RIBBON DIP.													
4	1 EA	M66201	CONN, 10POS, RECEPTACLE.													
5	2 EA	M11960	WIRE TIE, 4" NATURAL.													

TOP VIEW

TOP VIEW



NOTES:

- 1. INSTALL THE CABLE TWIST IN M69058 AND M66201 CONNECTORS AS SHOWN.
- 2. OBSERVE CORRECT POLARITY.
- 3. NO CUTS OR EXPOSED WIRES.

McGAIN
2365 OAK RIDGE WAY
VISTA, CALIFORNIA 92081

APPROVALS		DATE
DRAWN	A.S.	Feb/10/17
CHECKED	G.V.	Feb/10/17
APPR		
ENGR		

TITLE
HARN, 10POS, FIO TO
HOSTBOARD, FLEX
CONTROLLER

PN M59323 DWG NO. M59323 REV A

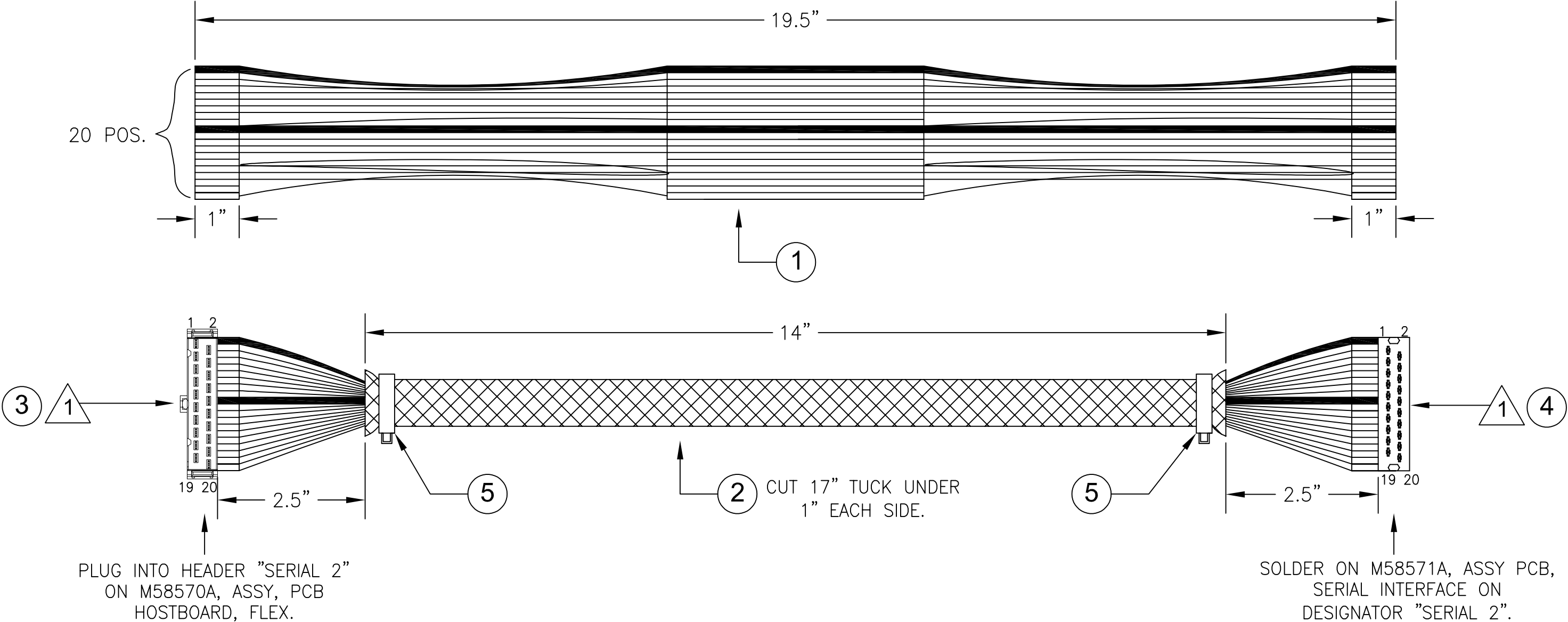
SCALE NONE SIZE B SHEET 1 OF 1

DRAWING	TITLE
M59324	HARN, 20POS, SERIAL TO HOSTBOARD, FLEX

ITEM	QTY.	PART NUMBER	DESCRIPTION
1	2 EA	M35343	CABLE, 28 AWG, TWIST.
2	1.42 Ft	M13921	EXPANDO BRAID $\frac{1}{4}$ ".
3	1 EA	M24750	CONN, 20POS, RECEPTACLE.
4	1 EA	M24756	CONN, 20COND RIBBON PLUG.
5	2 EA	M11960	WIRE TIE, 4" NATURAL.

REVISIONS					
REV	ECN	DESCRIPTION		DWN	DATE
A	EC-160033	INITIAL RELEASE		A.S.	Feb/10/17

TOP VIEW



NOTES:

- 1. INSTALL THE CABLE TWIST IN M24750 AND M24756 CONNECTORS AS SHOWN.
- 2. OBSERVE CORRECT POLARITY.
- 3. NO CUTS OR EXPOSED WIRES.

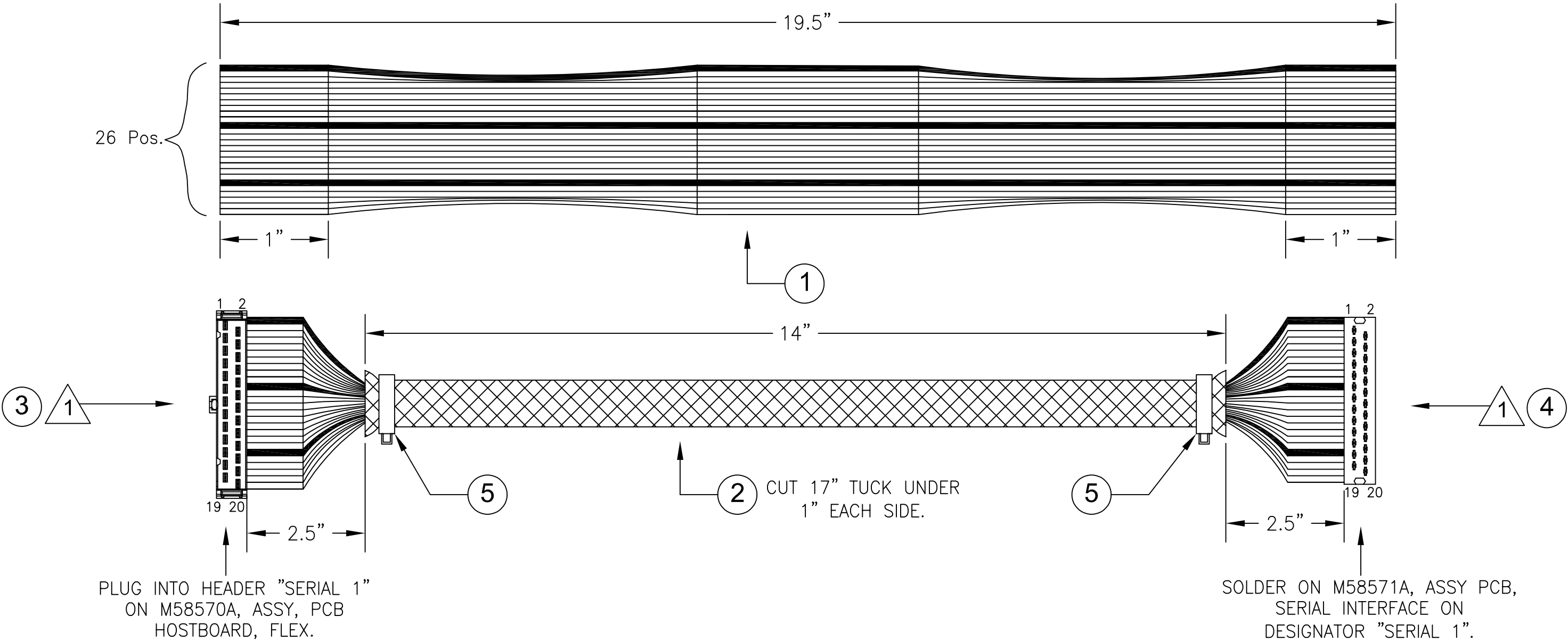
McCain 2365 OAK RIDGE WAY VISTA, CALIFORNIA 92081			TITLE HARN, 20POS, SERIAL TO HOSTBOARD, FLEX CONTROLLER		
APPROVALS			DATE		
DRAWN	A.S.	Feb/10/17			
CHECKED	G.V.	Feb/10/17			
APPR					
ENGR					
PN M59324			DWG NO. M59324		
SCALE NONE			REV A		
SIZE B			SHEET 1 OF 1		

DRAWING	TITLE
M59325	HARN, 26POS, SERIAL TO HOSTBOARD, FLEX

ITEM	QTY.	PART NUMBER	DESCRIPTION
1	2 EA	M35343	CABLE, 28 AWG, TWIST.
2	1.42 Ft	M13921	EXPANDO BRAID $\frac{1}{4}$ ".
3	1 EA	M24751	CONN, 26POS, RIBBON CABLE.
4	1 EA	M24757	CONN, 26COND RIBBON PLUG.
5	2 EA	M11960	WIRE TIE, 4" NATURAL.

REVISIONS					
REV	ECN	DESCRIPTION		DWN	DATE
A	EC-160033	INITIAL RELEASE		A.S.	Feb/10/17

TOP VIEW



NOTES:

- 1. INSTALL THE CABLE TWIST IN M24751 AND M24757 CONNECTORS AS SHOWN.
- 2. OBSERVE CORRECT POLARITY.
- 3. NO CUTS OR EXPOSED WIRES.

McCain 2365 OAK RIDGE WAY VISTA, CALIFORNIA 92081			TITLE HARN, 26POS, SERIAL TO HOSTBOARD, FLEX CONTROLLER		
APPROVALS			DATE		
DRAWN	A.S.	Feb/10/17			
CHECKED	G.V.	Feb/10/17			
APPR					
ENGR					
DWG NO. M59325			REV A		
SCALE NONE			SHEET 1 OF 1		

DRAWING	TITLE
M59326	HARN, 20POS, WIFI TO HOSTBOARD, FLEX

REVISIONS					
REV	ECN	DESCRIPTION		DWN	DATE
A	EC-160033	INITIAL RELEASE		A.S.	Nov/23/16
				M.G.	

TOP VIEW

M24750
CONN, 20POS, RIBBON
CABLE RECEPTACLE

M24756
CONN, 20 COND
RIBBON DIP

M13895
RIBBON CABLE

SOLDER ON M58572A, ASSY PCB,
WIFI ON DESIGNATOR "WIFI".

SIDE VIEW

NOTES:

1. INSTALL THE RIBBON CABLE IN M24750 AND M24756 CONNECTORS AS SHOWN.
2. OBSERVE CORRECT POLARITY.
3. NO CUTS OR EXPOSED WIRES.

McCain

2365 OAK RIDGE WAY
VISTA, CALIFORNIA 92081

APPROVALS		DATE
DRAWN	A.S.	Nov/23/16
CHECKED	G.V.	Nov/23/16
APPR		
ENGR		

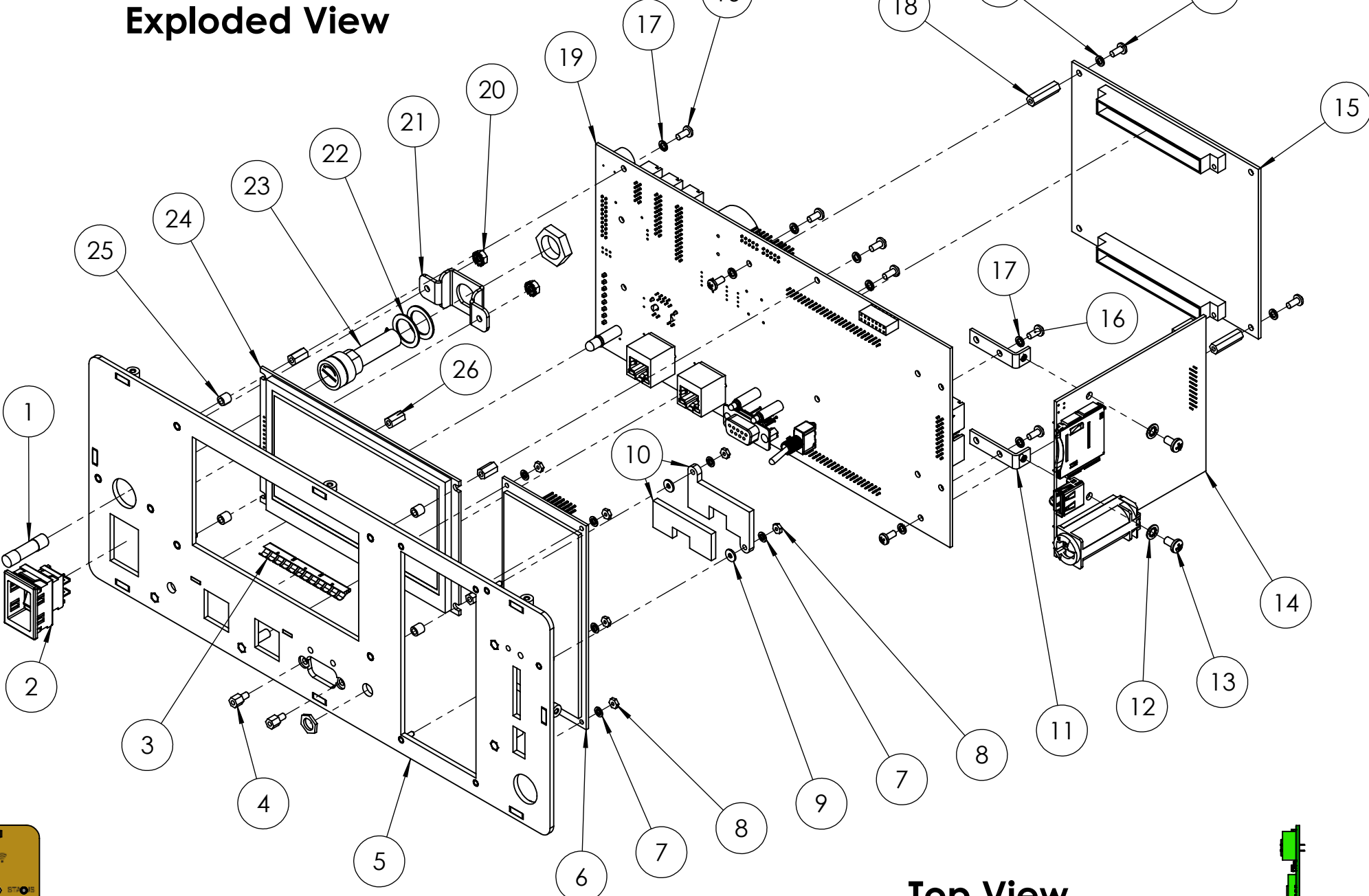
TITLE
HARN, 20POS, WIFI TO
HOSTBOARD, FLEX
CONTROLLER

PN	M59326	DWG NO.	M59326	REV	A
SCALE	NONE	SIZE	B	SHEET	1 OF 1

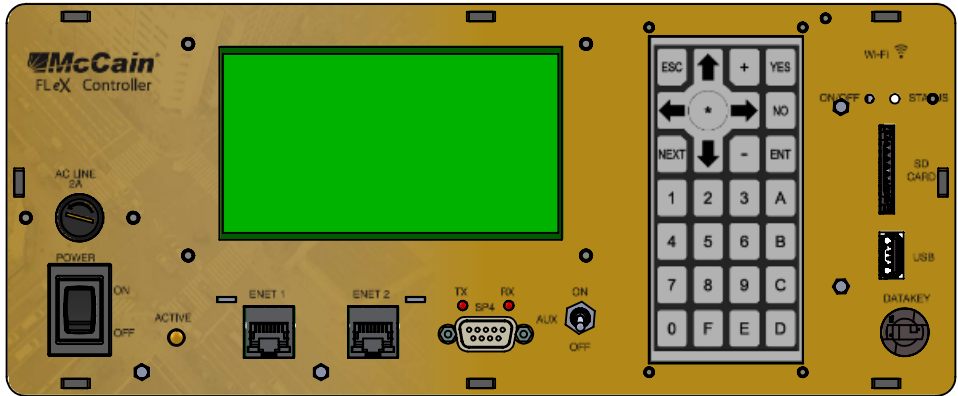
MODULES	
DRAWING	TITLE
SHELF MOUNTING CONTROLLERS MODULES	
M73122	MODULE, FRONT PANEL, FLEX CONTROLLER
M58997	MODULE, FRONT PANEL, FLEX CONTROLLER, WIFI
M59890	MODULE, BACK PANEL, FLEX CONTROLLER
M59381	MODULE, BACK PANEL, FLEX CONTROLLER, FIO
M59415	MODULE, BOTTOM PANEL, FLEX CONTROLLER
RACK MOUNTING CONTROLLERS MODULES	
M73123	MODULE, FRONT PANEL, FLEX RM CONTROLLER
M59661	MODULE, FRONT PANEL, FLEX RM CONTROLLER, WIFI
M59925	MODULE, BACK PANEL, FLEX RM CONTROLLER
M59663	MODULE, BACK PANEL, FLEX RM CONTROLLER, FIO
M59666	MODULE, BOTTOM PANEL, FLEX RM CONTROLLER

DRAWING	TITLE
M73122	MODULE, FRONT PANEL, FLEX CONTROLLER

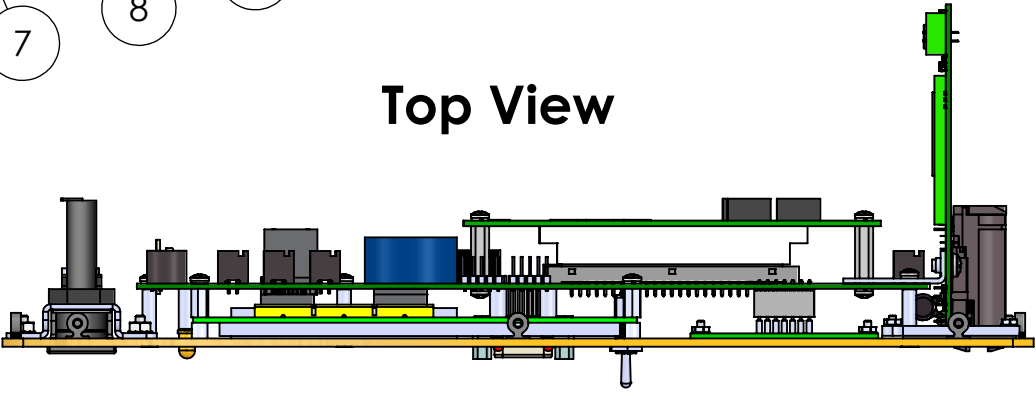
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M14838	FUSE,2A,250V,SLO BLO BUSSMAN	1
2	M59352	SWITCH,ROCKER,SPST, 4A 125VAC	1
3	M46871	CLIP ON MOUNTING	1
4	M11671	JACKSCREW, 4-40 X 1/4 M/F	2
5	M59148	FRONT PANEL, FLEX CONTROLLER	1
6	M66261	KEYPAD,7ROWX4COL,W/14POS	1
7	M11745	WASHER,#2,INT. TOOTH,SS	6
8	M41113	NUT 2-56 HEX, SS	6
9	M11750	WASHER, #2, FLAT, NYLON	2
10	M58995	WIFI, ANTENNA SUPPORT, FLEX	1PR
11	M59351	BRACKET, L, PCB MOUNT, 6-32 STEEL	2
12	M11706	WASHER, #6, INT. TOOTH, SS	2
13	M11622	SCREW, 6-32 X 1/4, PH PN SS	2
14	M73097A	ASSY, PCB, SD CARD, USB AND DK, FLEX CONTROLLER, TH	1
15	M52284A	ASSY, PCB, 2070-1C, ENGINE	1
16	M11625	SCREW, 4-40 X 1/4, PH PN SS	10
17	M11717	WASHER #4 SPLIT SLOCK	10
18	M66392	STANDOFF,4-40 X3/16, 11/16, HEX, F/F, AL	2
19	M58570A	ASSY, PCB, HOSTBOARD, FLEX, TH	1
20	M11783	KEPNUT, 4-40 SS	2
21	M57131	BRACKET, FUSE HOLDER, SUPPORT	1
22	M61389	WASHER, NYLON, 1/2" X 11/16" X .031thk	2
23	M57118	FUSE HOLDER,PANEL MT,1/4	1
24	M59321	ASSY, LCD/HARN, FLEX CONTROLLER	1
25	M54808	SPACER,#4,3/16L,NYLON	4
26	M56523	STANDOFF, 4-40 X 11/32", 1/4" Hex, F/F	4



Front View



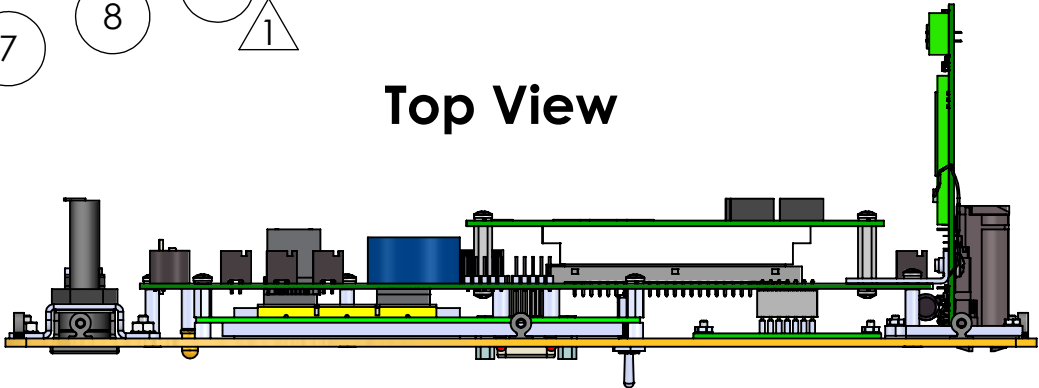
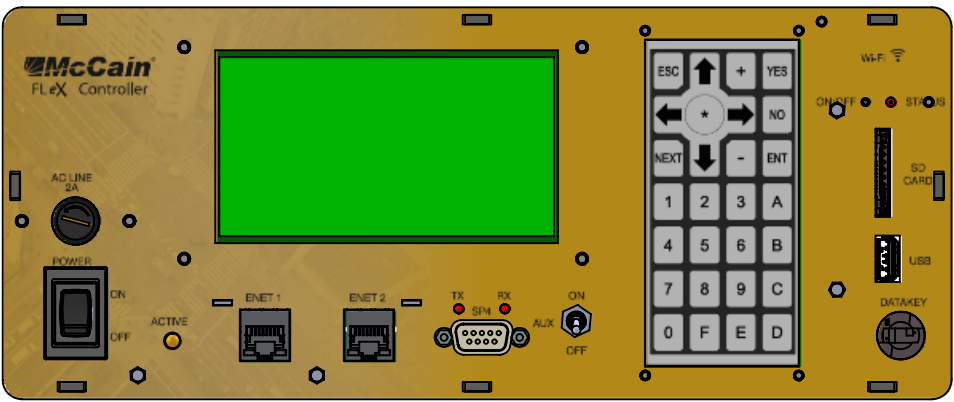
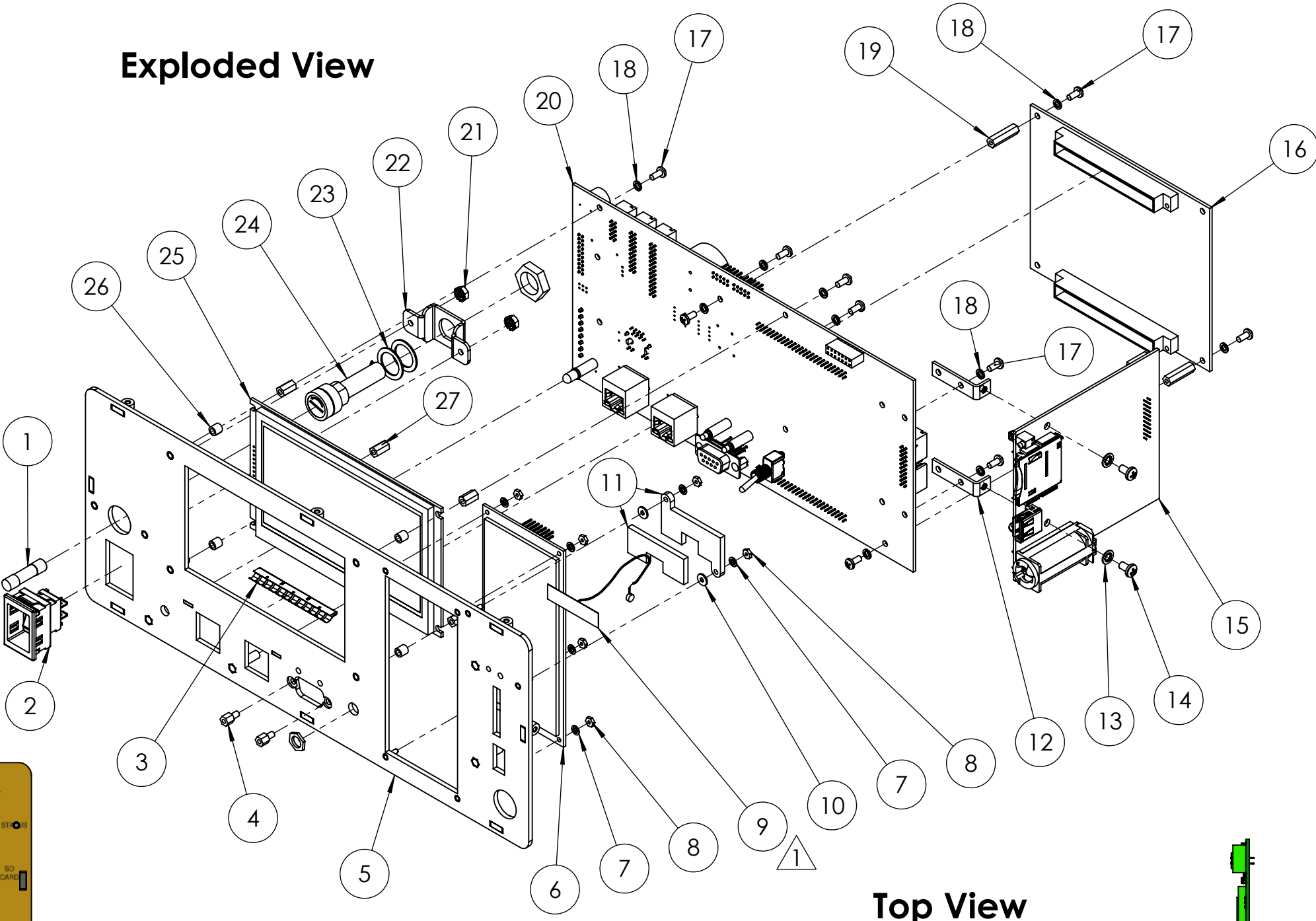
Top View



REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160048	INITIAL RELEASE	JANUARY 31, 2017	J.G.

DRAWING	TITLE
M58997	MODULE, FRONT PANEL, FLEX CONTROLLER, WIFI

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M14838	FUSE,2A,250V,SLO BLO BUSSMAN	1
2	M59352	SWITCH,ROCKER,SPST, 4A 125VAC	1
3	M46871	CLIP ON MOUNTING	1
4	M11671	JACKSCREW, 4-40 X 1/4 M/F	2
5	M59148	FRONT PANEL, FLEX CONTROLLER	1
6	M66261	KEYPAD,7ROWX4COL,W/14POS	1
7	M11745	WASHER,#2,INT. TOOTH,SS	6
8	M41113	NUT 2-56 HEX, SS	6
9	M59893	WIFI ANTENNA, 2.4GHz, CABLE 100mm	1
10	M11750	WASHER, #2, FLAT, NYLON	2
11	M58995	WIFI, ANTENNA SUPPORT, FLEX	1PR
12	M59351	BRACKET, L, PCB MOUNT, 6-32 STEEL	2
13	M11706	WASHER, #6, INT. TOOTH, SS	2
14	M11622	SCREW, 6-32 X 1/4, PH PN SS	2
15	M58572A	ASSY, PCB, WIFI, FLEX, TH	1
16	M52284A	ASSY, PCB, 2070-1C, ENGINE	1
17	M11625	SCREW, 4-40 X 1/4, PH PN SS	10
18	M11717	WASHER #4 SPLIT SLOCK	10
19	M66392	STANDOFF,4-40 X3/16, 11/16, HEX, F/F, AL	2
20	M58570A	ASSY, PCB, HOSTBOARD, FLEX, TH	1
21	M11783	KEPNUT, 4-40 SS	2
22	M57131	BRACKET, FUSE HOLDER, SUPPORT	1
23	M61389	WASHER, NYLON, 1/2" X 11/16" X .031thk	2
24	M57118	FUSE HOLDER,PANEL MT,1/4	1
25	M59321	ASSY, LCD/HARN, FLEX CONTROLLER	1
26	M54808	SPACER,#4,3/16L,NYLON	4
27	M56523	STANDOFF, 4-40 X 11/32", 1/4" Hex, F/F	4



NOTES:

- 1

STICK THE ANTENNA ON THE LABEL. THE ANTENNA MUST BE CENTERED INSIDE OF FRONT PANEL HOLE
- 2

PLUG ANTENNA CONNECTOR ON WIFI MODULE CAREFULLY

REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160033	INITIAL RELEASE	NOVEMBER 9, 2016	J.G.

M58997

McCain

2365 OAK RIDGE WAY
VISTA, CA 92081

TITLE: MODULE, FRONT PANEL, FLEX CONTROLLER, WIFI

PART NUMBER: **M58997**

SHEET 1 OF 1

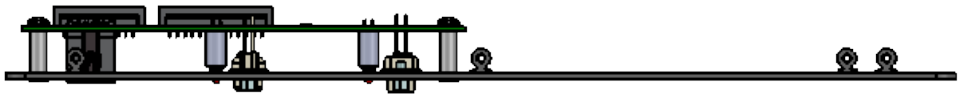
SIZE **B**

REV **A**

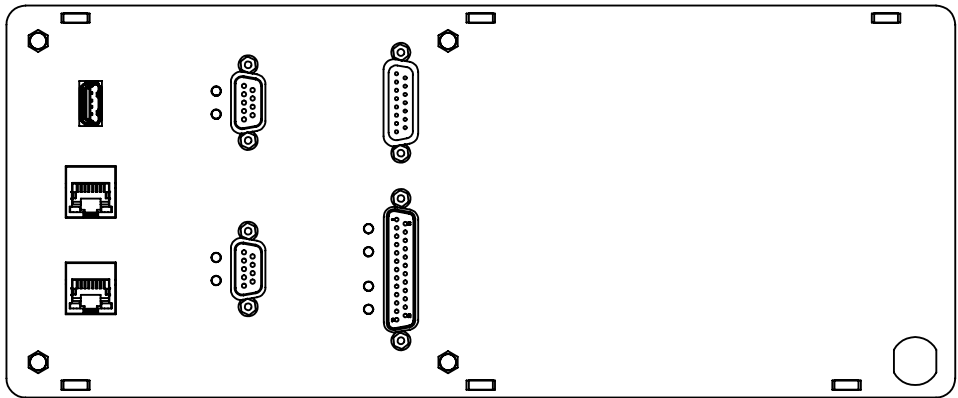
DRAWING	TITLE
M59890	MODULE, BACK PANEL, FLEX CONTROLLER

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M59840	BACK PANEL, FLEX CONTROLLER W/OUT FIO	1
2	M11671	JACKSCREW, 4-40 X 1/4 M/F	8
3	M11706	WASHER, #6, INT. TOOTH, SS	4
4	M11622	SCREW, 6-32 X 1/4, PH PN SS	4
5	M58571A	ASSY, PCB, SERIAL INTERFACE, FLEX, TH	1

Top View

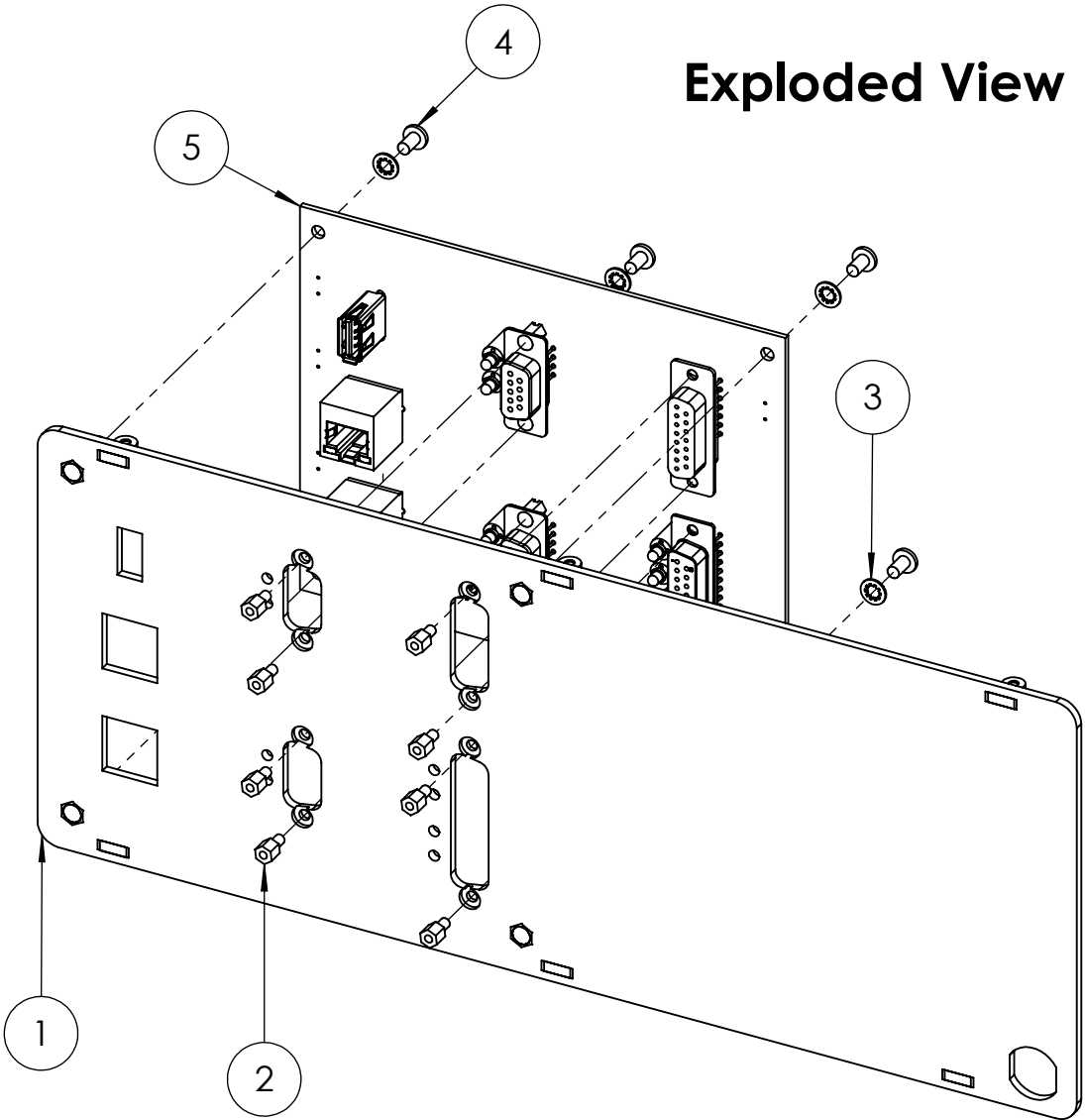


Front View



REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160025	INITIAL RELEASE	JANUARY 31, 2017	J.G.

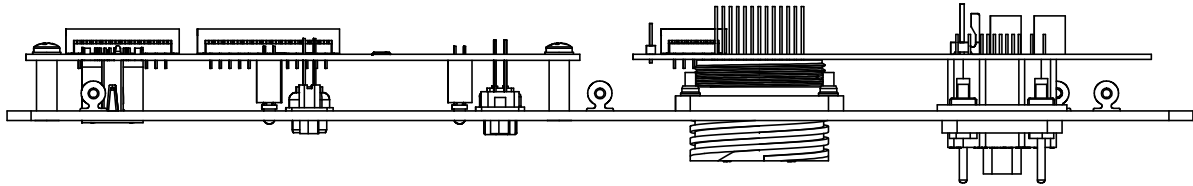
Exploded View



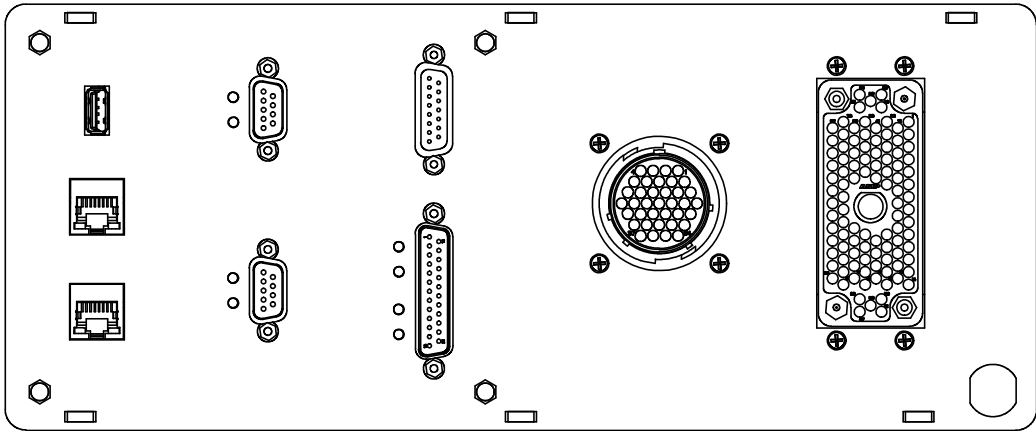
DRAWING	TITLE
M59381	MODULE, BACK PANEL, FLEX CONTROLLER, FIO

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M58994	BACK PANEL, FLEX CONTROLLER	1
2	M11671	JACKSCREW, 4-40 X 1/4 M/F	8
3	M59899	SCREW,4-40 X 1/2,PH,FH,SS, 100 DEG, BLACK	4
4	M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK	4
5	M64054	C1 BRACKET, 2070-2 FIELD I/O 2070	2
6	M58573A	ASSY, PCB, FIELD I/O BOARD, FLEX	1
7	M11622	SCREW, 6-32 X 1/4, PH PN SS	4
8	M11706	WASHER, #6, INT. TOOTH, SS	4
9	M58571A	ASSY, PCB, SERIAL INTERFACE, FLEX, TH	1

Top View

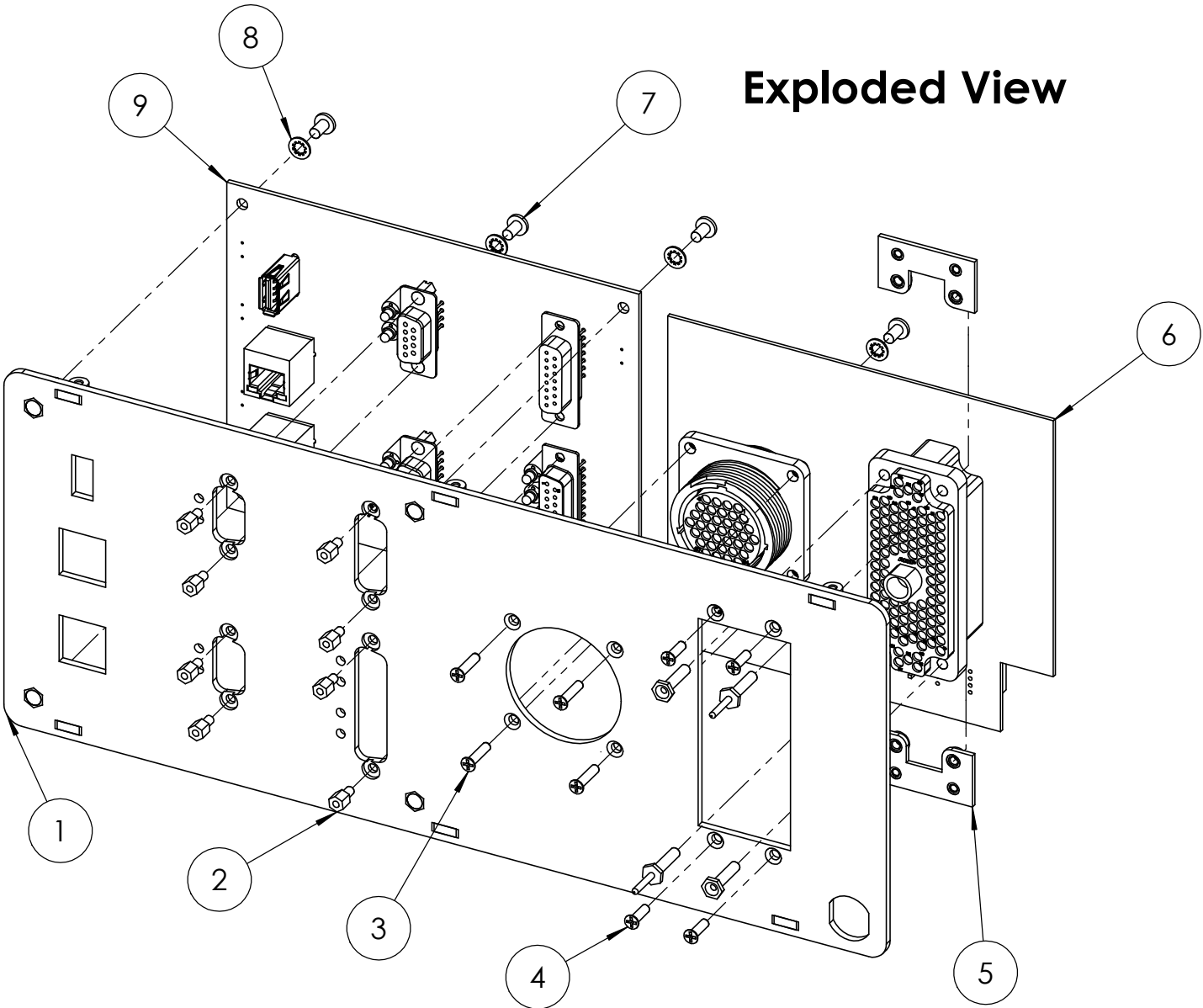


Front View



REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160033	INITIAL RELEASE	FEBRUARY 1, 2017	J.G.

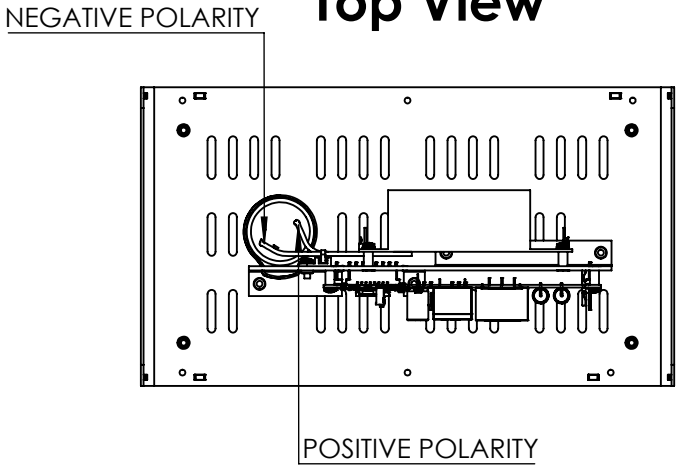
Exploded View



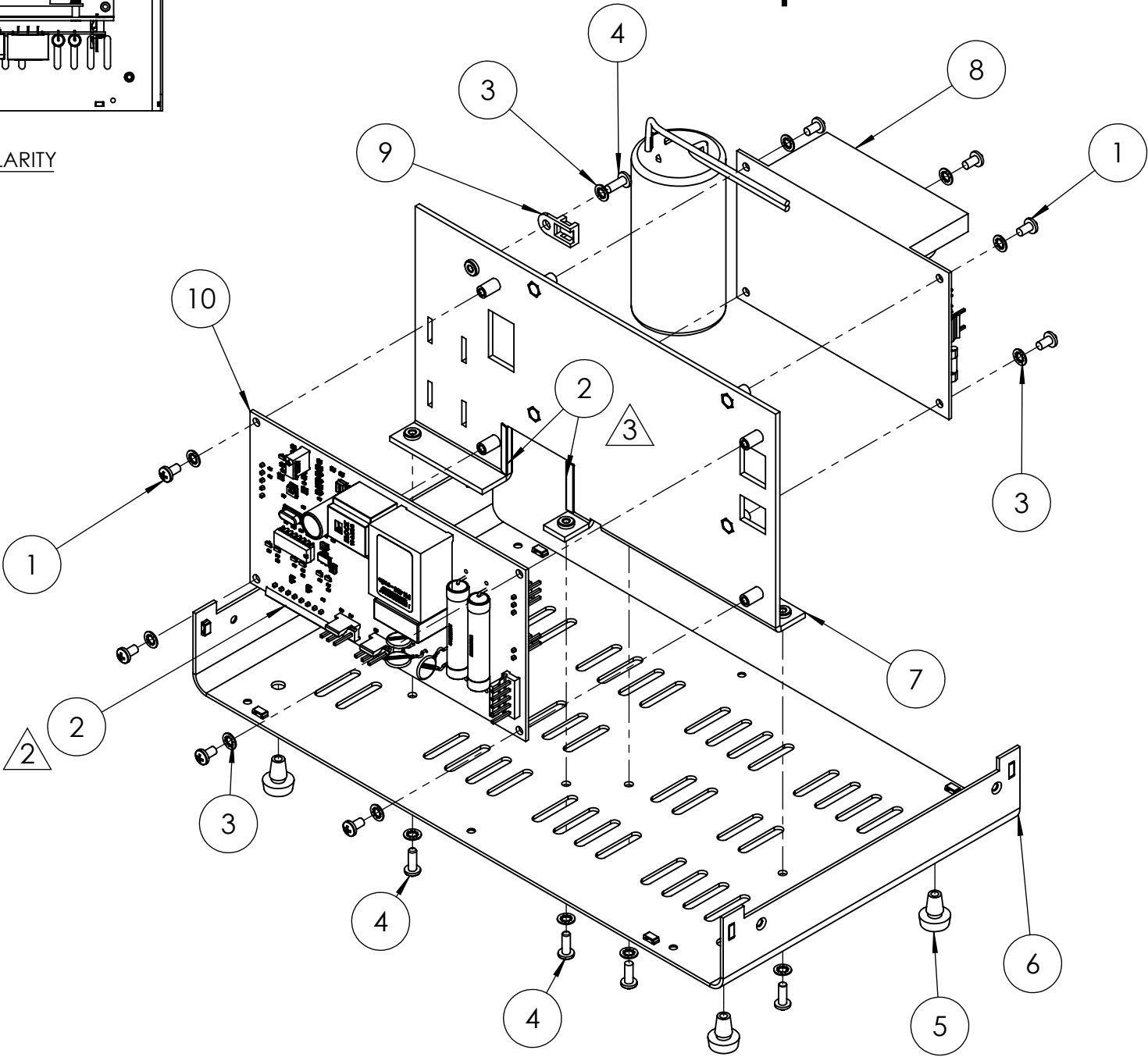
DRAWING	TITLE
M59415	MODULE, BOTTOM PANEL, FLEX CONTROLLER

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M11622	SCREW, 6-32 X 1/4, PH PN SS	8
2	M14679	GROMMET,EDGE .036-.062 C PANDUIT #GES62F-C	.283ft
3	M11706	WASHER, #6, INT. TOOTH, SS	13
4	M11611	SCREW, 6-32 X 3/8, PH PN SS	5
5	M59669	BUMPER, PUSH FIT, FOOT	4
6	M58992	BOTTOM PANEL, FLEX CONTROLLER	1
7	M58996	PANEL, PWR SUP & CONTROL SIGNALS, FLEX	1
8	M45891	ASSY, PWR SUP, W/BACKUP CAPACITOR	1
9	M11966	MT CABLE TIE,SCREW DOWN THOMAS & BETTS TC828TB	1
10	M58574A	ASSY, PCB, CONTROL SIGNALS, FLEX	1
11	M11967	WIRE TIE,8,NATURAL, TYTON	2
12	M11960	WIRE TIE,4",NATURAL TYTON	1

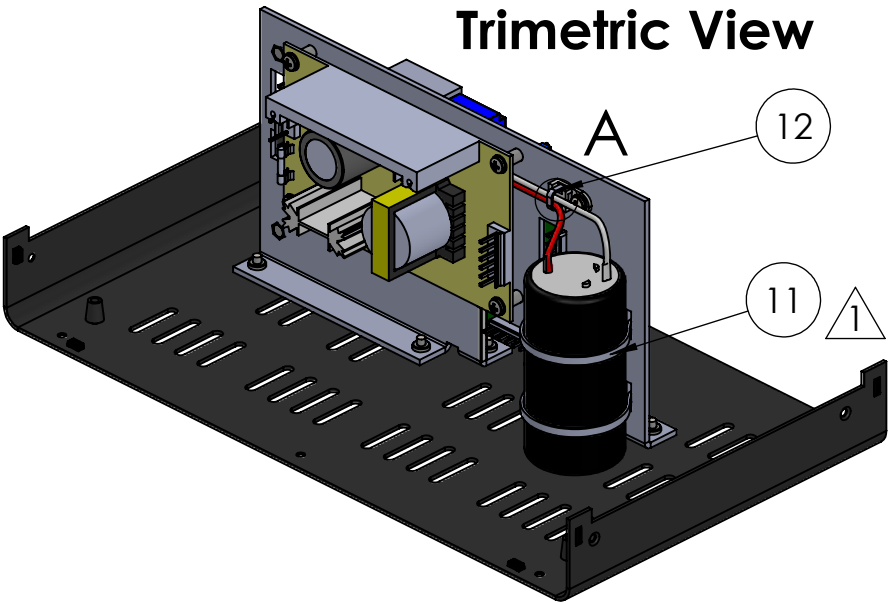
Top View



Exploded View

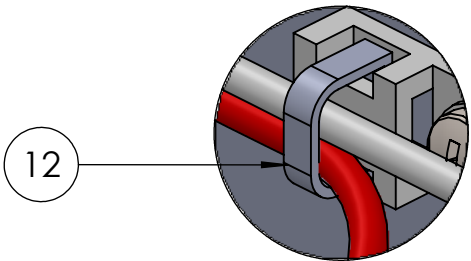


Trimetric View



NOTES:

- 1 TIGHT THE CAPACITOR PASSING THE WIRE TIES THRU THE HOLES ON M58996. DO NOT STRESS WIRES
- 2 CUT 1.5 INCH AND INSTALL ON PCB AS SHOWN
- 3 CUT TWO GROMMET LINES OF .95 INCH AND INSTALL ON PANEL AS SHOWN



DETAIL A
SCALE 2 : 1

REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A1	EC-160033	INITIAL RELEASE	JANUARY 16, 2017	J.G.

M59415

McCain

2365 OAK RIDGE WAY
VISTA, CA 92081

TITLE: MODULE, BOTTOM PANEL,
FLEX CONTROLLER

PART NUMBER: M59415

SHEET 1 OF 1

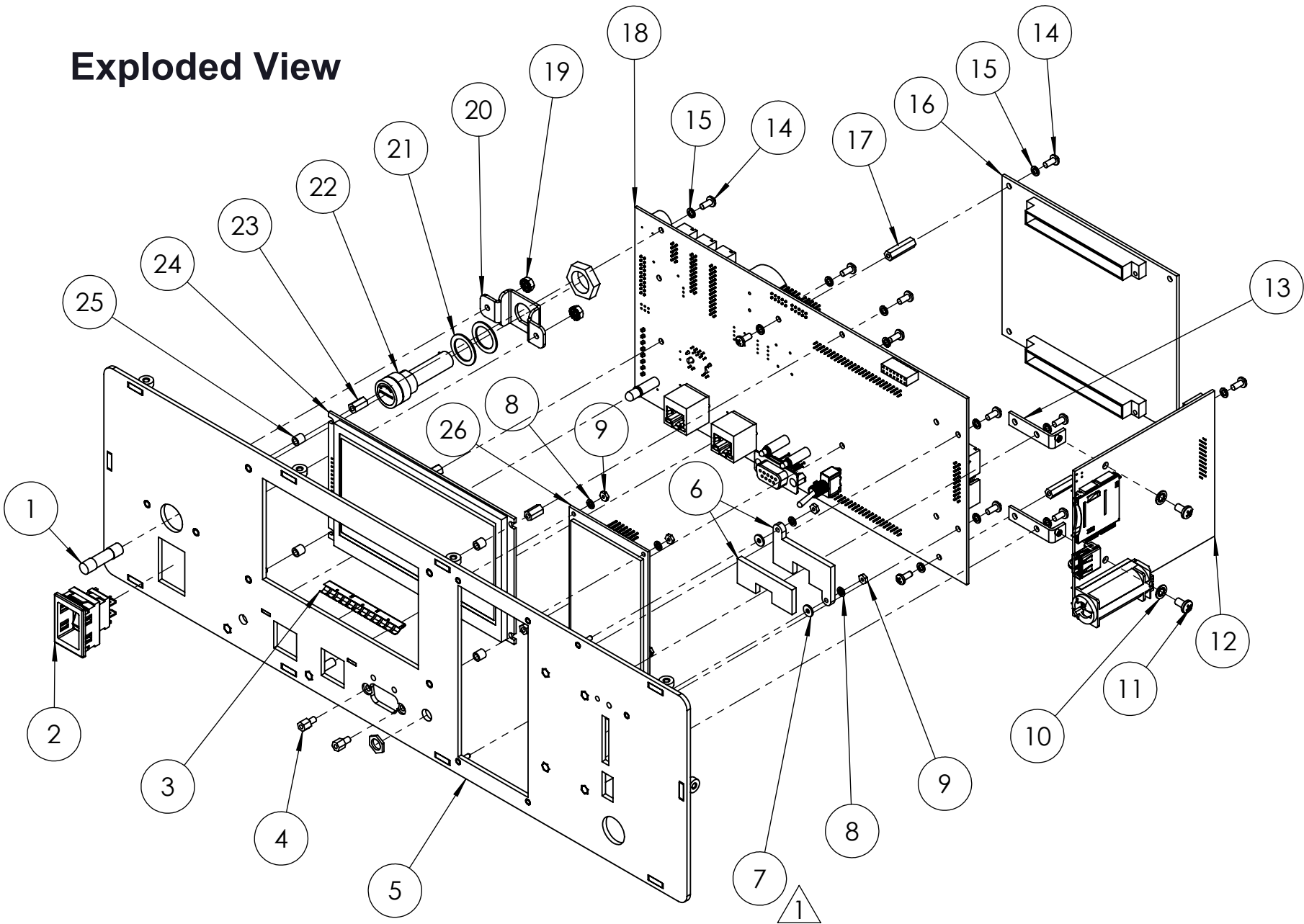
SIZE B

REV A1

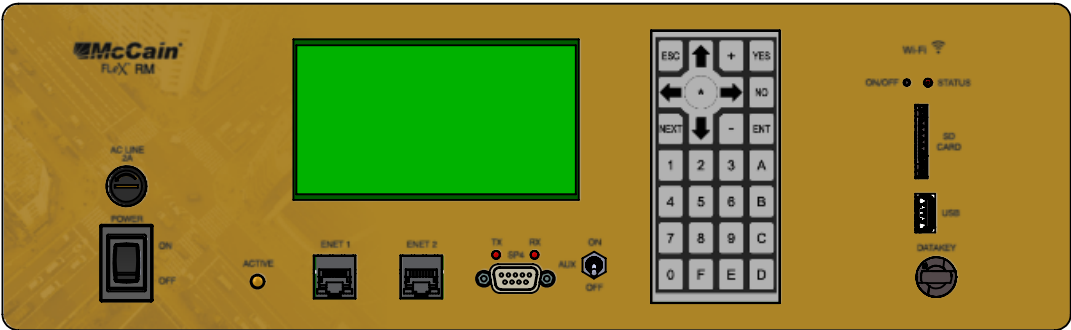
DRAWING	TITLE
M73123	MODULE, FRONT PANEL, FLEX RM CONTROLLER

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M14838	FUSE,2A,250V,SLO BLO BUSSMAN	1
2	M59352	SWITCH,ROCKER, SPST, 4A 125VAC	1
3	M46871	CLIP ON MOUNTING	1
4	M11671	JACKSCREW, 4-40 X 1/4 M/F	2
5	M59662	FRONT PANEL, FLEX RM CONTROLLER	1
6	M58995	WIFI, ANTENNA SUPPORT, FLEX	1PR
7	M11750	WASHER, #2, FLAT, NYLON	2
8	M11745	WASHER,#2,INT. TOOTH,SS	6
9	M41113	NUT 2-56 HEX, SS	6
10	M11706	WASHER, #6, INT. TOOTH, SS	2
11	M11622	SCREW, 6-32 X 1/4, PH PN SS	2
12	M73097A	ASSY, PCB, SD CARD, USB AND DK, FLEX CONTROLLER, TH	1
13	M59351	BRACKET, L, PCB MOUNT, 6-32 STEEL	2
14	M11625	SCREW, 4-40 X 1/4, PH PN SS	12
15	M11717	WASHER #4 SPLIT SLOCK	12
16	M52284A	ASSY, PCB, 2070-1C, ENGINE	1
17	M66392	STANDOFF,4-40 X3/16, 11/16, HEX, F/F, AL	2
18	M58570A	ASSY, PCB, HOSTBOARD, FLEX. TH	1
19	M11783	KEPNUT, 4-40 SS	2
20	M57131	BRACKET, FUSE HOLDER, SUPPORT	1
21	M61389	WASHER, NYLON, 1/2" X 11/16" X .031thk	2
22	M57118	FUSE HOLDER,PANEL MT,1/4	1
23	M56523	STANDOFF, 4-40 X 11/32", 1/4" Hex, F/F, AL	4
24	M59321	ASSY, LCD/HARN, FLEX CONTROLLER	1
25	M54808	SPACER,#4,3/16L,NYLON	4
26	M66261	KEYPAD,7ROWX4COL,W/14POS	1

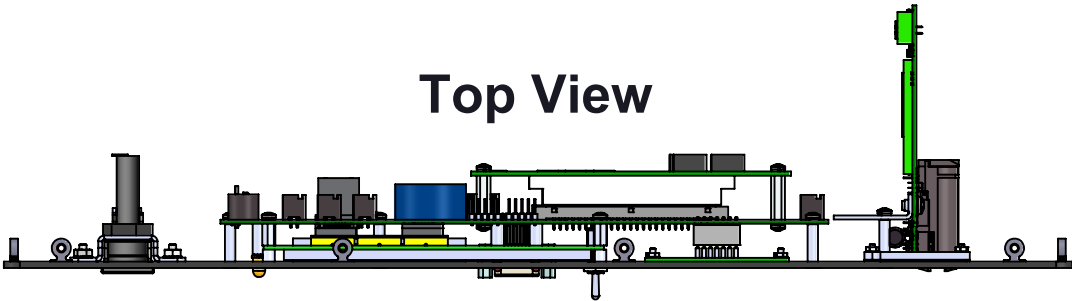
Exploded View



Front View

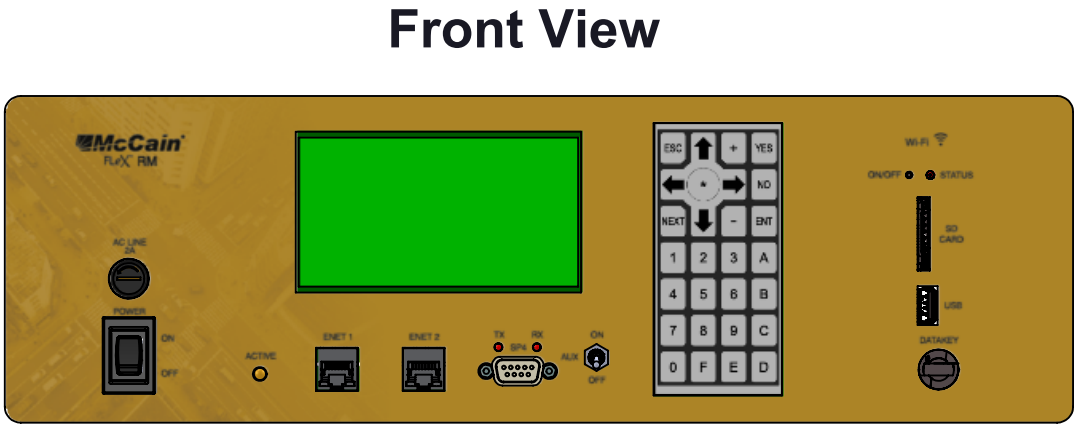


Top View

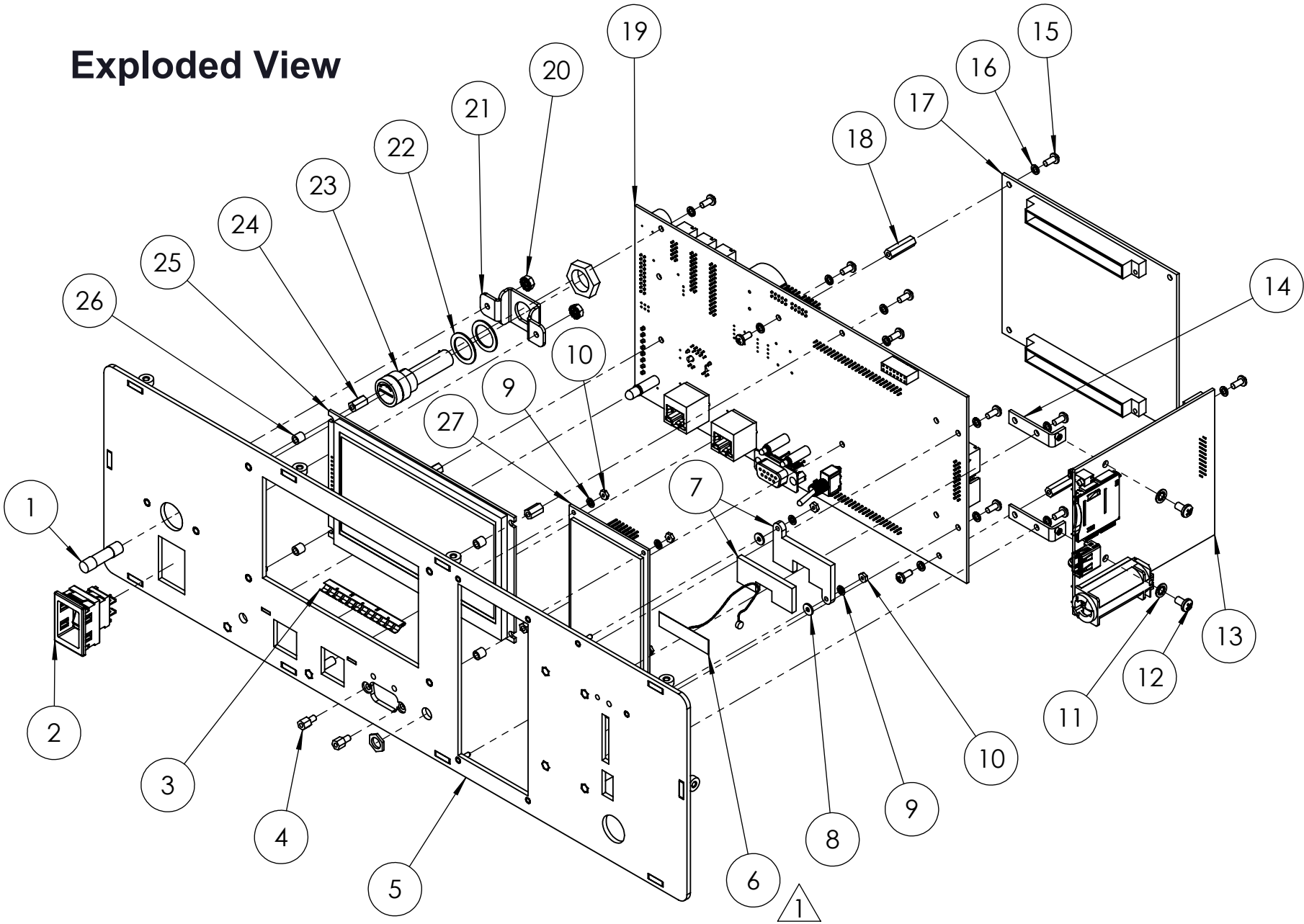


DRAWING	TITLE
M59661	MODULE, FRONT PANEL, FLEX RM CONTROLLER, WIFI

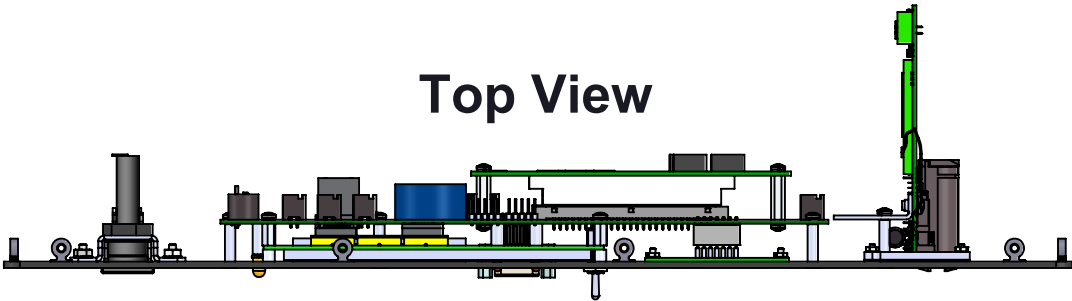
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M14838	FUSE,2A,250V,SLO BLO BUSSMAN	1
2	M59352	SWITCH, ROCKER, SPST, 4A 125VAC	1
3	M46871	CLIP ON MOUNTING	1
4	M11671	JACKSCREW, 4-40 X 1/4 M/F	2
5	M59662	FRONT PANEL, FLEX RM CONTROLLER	1
6	M59893	WIFI ANTENNA, 2.4GHz, CABLE 100mm	1
7	M58995	WIFI, ANTENNA SUPPORT, FLEX	1PR
8	M11750	WASHER, #2, FLAT, NYLON	2
9	M11745	WASHER,#2,INT. TOOTH,SS	6
10	M41113	NUT 2-56 HEX, SS	6
11	M11706	WASHER, #6, INT. TOOTH, SS	2
12	M11622	SCREW, 6-32 X 1/4, PH PN SS	2
13	M58572A	ASSY, PCB, WIFI, FLEX, TH	1
14	M59351	BRACKET, L, PCB MOUNT, 6-32 STEEL	2
15	M11625	SCREW, 4-40 X 1/4, PH PN SS	12
16	M11717	WASHER #4 SPLIT SLOCK	12
17	M52284A	ASSY, PCB, 2070-1C, ENGINE	1
18	M66392	STANDOFF,4-40 X3/16, 11/16, HEX, F/F, AL	2
19	M58570A	ASSY, PCB, HOSTBOARD, FLEX. TH	1
20	M11783	KEPNUT, 4-40 SS	2
21	M57131	BRACKET, FUSE HOLDER, SUPPORT	1
22	M61389	WASHER, NYLON, 1/2" X 11/16" X .031thk	2
23	M57118	FUSE HOLDER,PANEL MT,1/4	1
24	M56523	STANDOFF, 4-40 X 11/32", 1/4" Hex, F/F, AL	4
25	M59321	ASSY, LCD/HARN, FLEX CONTROLLER	1
26	M54808	SPACER,#4,3/16L,NYLON	4
27	M66261	KEYPAD,7ROWX4COL,W/14POS	1



Exploded View



Top View



NOTES:

1 STICK THE ANTENNA ON THE LABEL.
THE ANTENNA MUST BE CENTERED
INSIDE OF FRONT PANEL HOLE

2 PLUG ANTENNA CONNECTOR ON WIFI MODULE
CAREFULLY

DRAWING	TITLE
M59925	MODULE, BACK PANEL, FLEX RM CONTROLLER

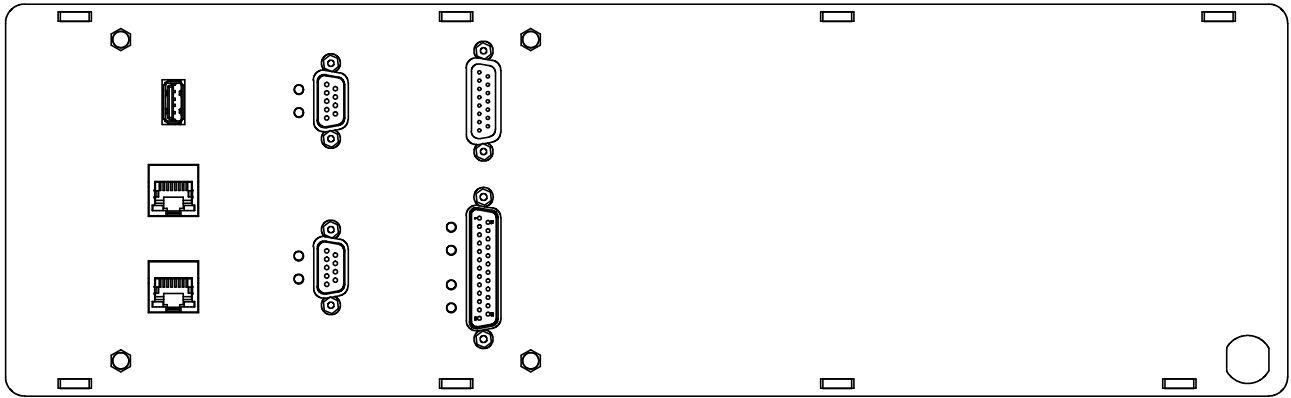
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M59926	BACK PANEL, FLEX RM CONTROLLER W/OUT FIO	1
2	M11671	JACKSCREW, 4-40 X 1/4 M/F	8
3	M11706	WASHER, #6, INT. TOOTH, SS	4
4	M58571A	ASSY, PCB, SERIAL INTERFACE, FLEX, TH	1
5	M11622	SCREW, 6-32 X 1/4, PH PN SS	4

REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160038	INITIAL RELEASE	DECEMBER 22, 2016	J.G.

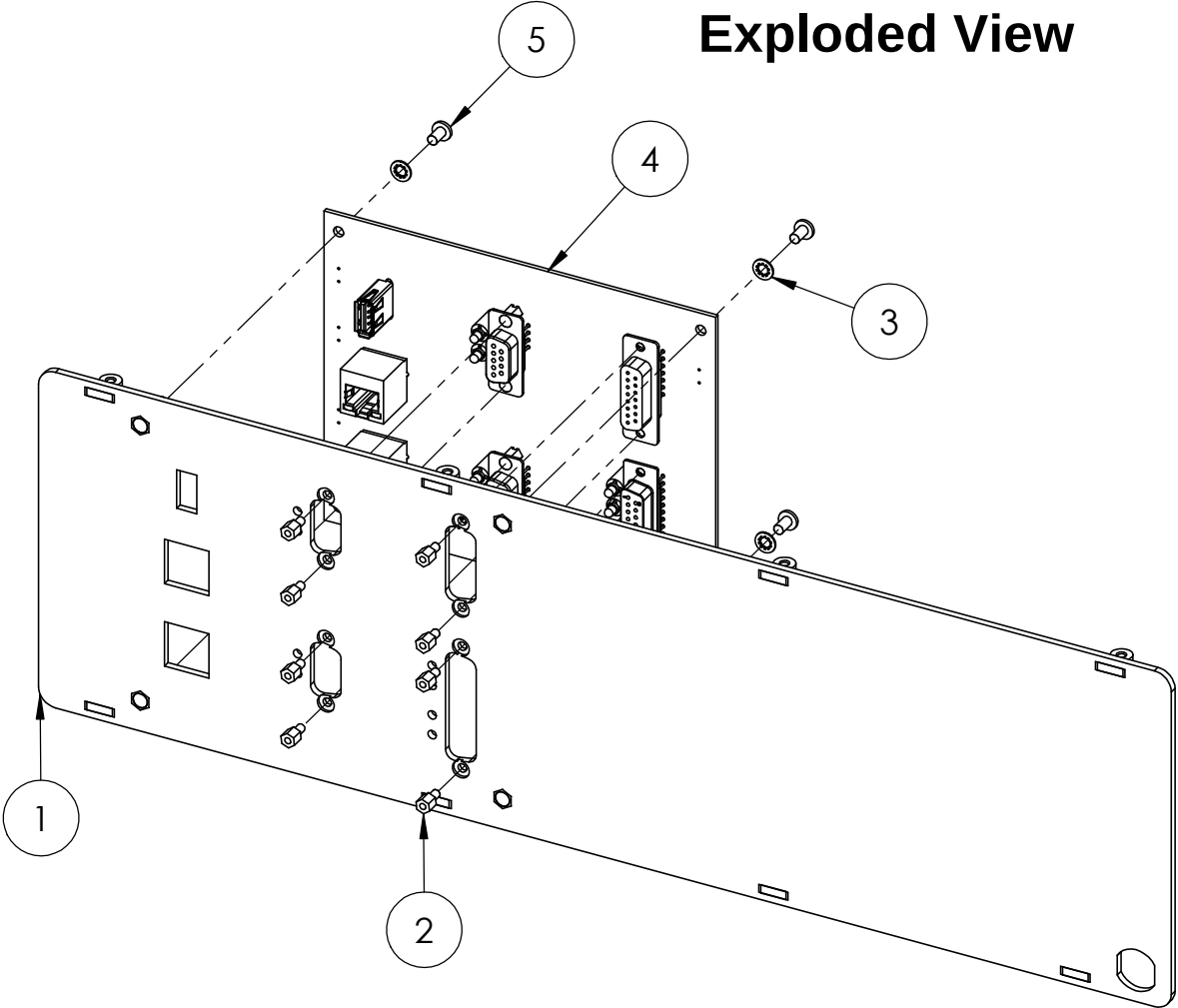
Top View



Front View



Exploded View



DRAWING	TITLE
M59663	MODULE, BACK PANEL, FLEX RM CONTROLLER, FIO

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M59664	BACK PANEL, FLEX RM CONTROLLER	1
2	M11671	JACKSCREW, 4-40 X 1/4 M/F	8
3	M59899	SCREW,4-40 X 1/2,PH,FH,SS, 100 DEG, BLACK	4
4	M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK	4
5	M64054	C1 BRACKET, 2070-2 FIELD I/O 2070	2
6	M58573A	ASSY, PCB, FIELD I/O BOARD, FLEX	1
7	M11622	SCREW, 6-32 X 1/4, PH PN SS	4
8	M11706	WASHER, #6, INT. TOOTH, SS	4
9	M58571A	ASSY, PCB, SERIAL INTERFACE, FLEX, TH	1

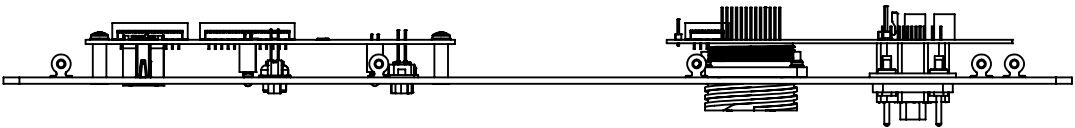
D

C

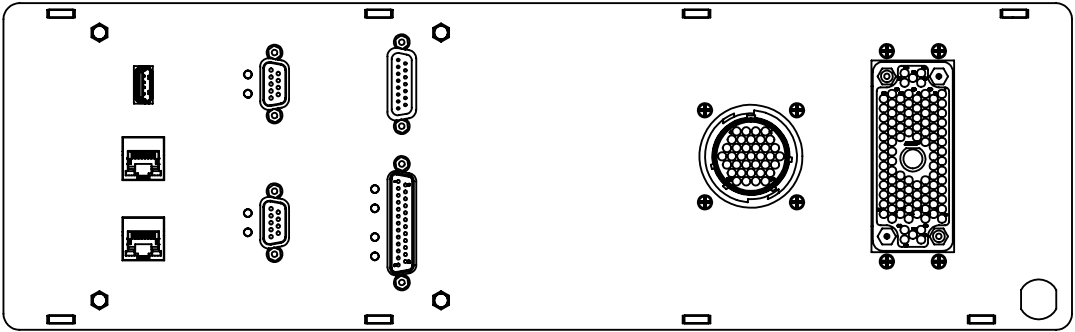
B

A

Top View



Front View



SolidWorks file: M59663 MODULE, BACK PANEL, FLEX RM CONTROLLER, FIO.SLDDRW

REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A	EC-160036	INITIAL RELEASE	DECEMBER 22, 2016	J.G.

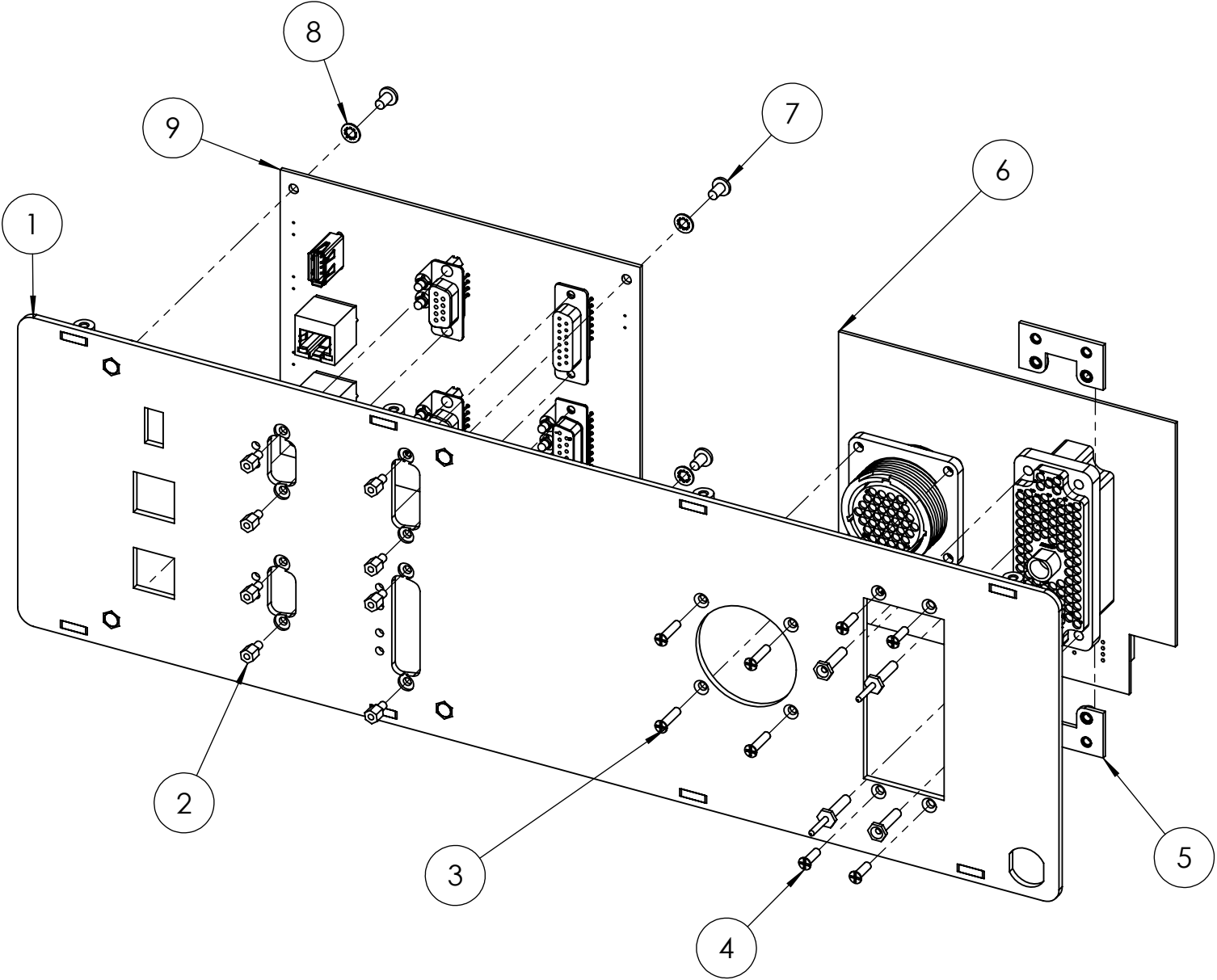
4

3

2

1

Exploded View



D

C

B

A

M59663



2365 OAK RIDGE WAY
VISTA, CA 92081

TITLE: MODULE, BACK PANEL, FLEX RM CONTROLLER, FIO		SIZE B
PART NUMBER: M59663		REV A
SHEET 1 OF 1		

DETAILED
CHECKED J.G., 12/22/2016
G.V., 12/22/2016

8

7

6

5

4

3

2

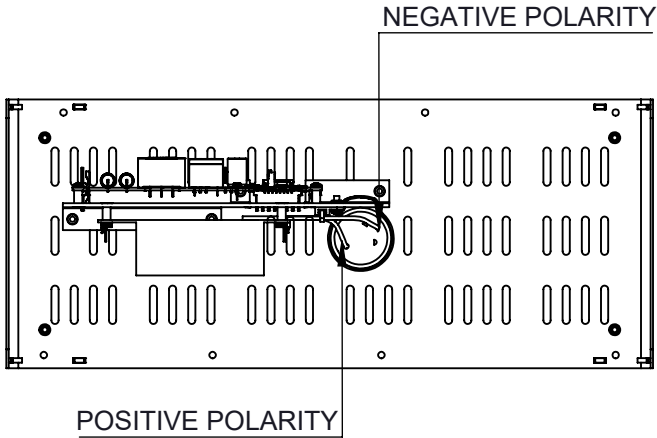
1

DRAWING	TITLE
M59666	MODULE, BOTTOM PANEL, FLEX RM CONTROLLER

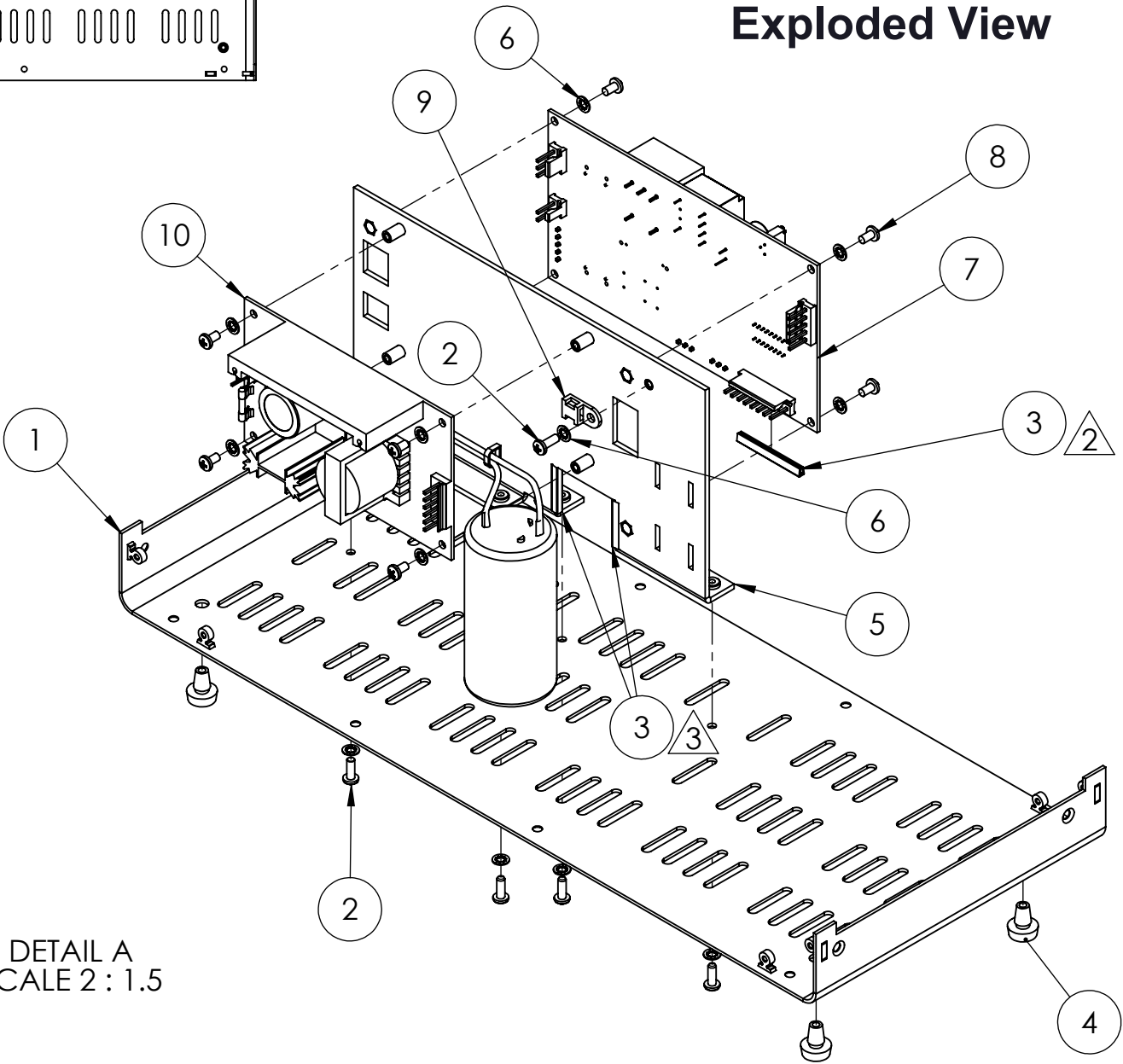
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	M59667	BOTTOM PANEL, FLEX RM CONTROLLER	1
2	M11611	SCREW,6-32 X 3/8,PH,PN,SS	5
3	M14679	GROMMET,EDGE .036-.062 C PANDUIT #GES62F-C	.283ft
4	M59669	BUMPER, PUSH FIT, FOOT	4
5	M58996	PANEL, PWR SUP & CONTROL SIGNALS, FLEX	1
6	M11706	WASHER, #6, INT. TOOTH, SS	13
7	M58574A	ASSY, PCB, CONTROL SIGNALS, FLEX	1
8	M11622	SCREW, 6-32 X 1/4, PH PN SS	8
9	M11966	MT CABLE TIE,SCREW DOWN THOMAS & BETTS TC828TB	1
10	M45891	ASSY, PWR SUP W/BACKUP HARN	1
11	M11960	WIRE TIE,4",NATURAL TYTON	1
12	M11967	WIRE TIE,8,NATURAL, TYTON	2

REVISIONS				
REV.	ECN	DESCRIPTION	DATE	DWN
A1	EC-160036	INITIAL RELEASE	DECEMBER 22, 2016	J.G.

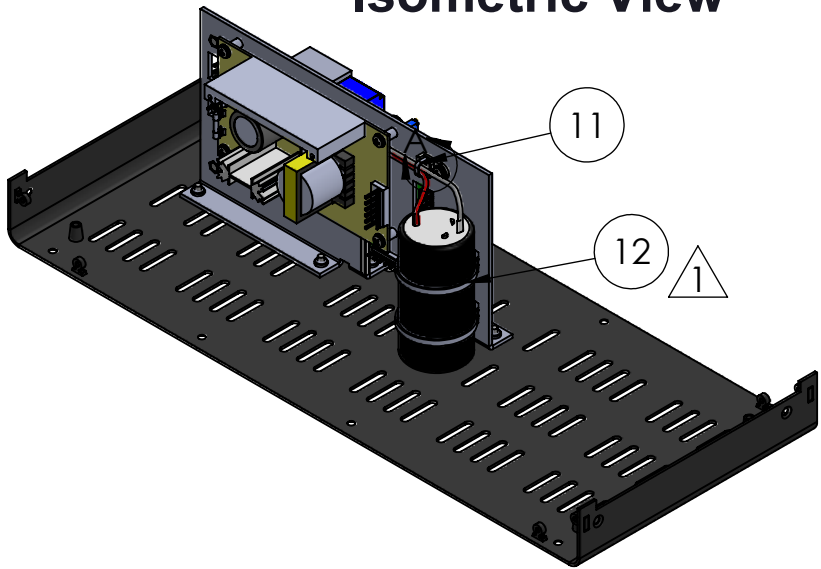
Top View



Exploded View



Isometric View



NOTES:



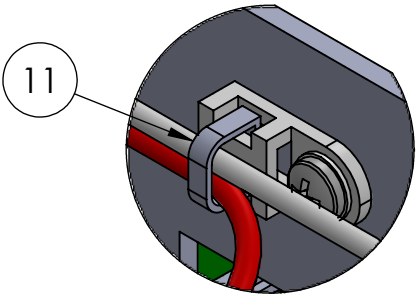
TIGHT THE CAPACITOR PASSING THE WIRE TIES THRU THE HOLES ON M58996. DO NOT STRESS WIRES.



CUT 1.5 INCH AND INSTALL ON PCB BELOW "DC FOR HOST" HEADER AS SHOWN.



CUT TWO GROMMET LINES OF .95 INCH AND INSTALL ON PANEL AS SHOWN.



DETAIL A
SCALE 2 : 1.5

APPENDIX B: BILL OF MATERIALS.

This section contains the Flex Shelf Mount Controllers parts list.

“Level 0” means the highest level for an assembly; it is built of parts and/or sub-assemblies that belong to “Level 1”, at the same time such sub-assemblies could be formed by “Level 2” parts/sub-assemblies and so on, increasing the complexity of the assembly. Assy “A” means that the part number is a sub-assembly.

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
0	A	M73101S	FLEX SHELF MOUNT CONTROLLER	A	1.00	EA		
1		M14691	BUSHING,STRAIN RELIEF - HEYCO #HEY1210		1.00	EA	HEYCO	HEY1210
							MOUSER	561MP6P4SPC SRR-10
1		M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK		14.00	EA		
1		M58586	SCREW,4-40 X 1/4,PH,FH,SS, 100 DEG, BLACK		4.00	EA		
1	A	M58993	TOP PANEL, FLEX CONTROLLER	A	1.00	EA		
1	A	M59415	MODULE, BOTTOM PANEL, FLEX CONTROLLER	A1	1.00	EA		
1	A	M59890	MODULE, BACK PANEL, FLEX CONTROLLER W/OUT FIO	A	1.00	EA		
1	A	M59912	HARN, SET, FLEX CONTROLLER W/OUT FIO	A	1.00	EA		
1	A	M73122	MODULE, FRONT PANEL, FLEX CONTROLLER	A	1.00	EA		
2		M11622	SCREW,6-32 X 1/4,PH,PN,SS		2.00	EA		
2		M11625	SCREW,4-40 X 1/4,PH,PN,SS		10.00	EA		
2		M11671	JACKSCREW,4-40 X 1/4,M/F TAP FOR D CONN		2.00	EA	KEystone	7228
2		M11706	WASHER, #6, INT. TOOTH, SS		2.00	EA		
2		M11717	WASHER, #4, SPLIT LOCK, SS		10.00	EA		
2		M11745	WASHER, #2, INT. TOOTH, SS		6.00	EA		
2		M11750	WASHER, #2, FLAT, NYLON .098 ID X.250 OD X.032THK		2.00	EA	KEystone	3347
2		M11783	NUT, HEX, 4-40, KEPNUT, SS		2.00	EA		
2		M14838	FUSE,2A,250V,SLO BLO BUSSMAN #MDL2		1.00	EA	BUSSMAN	BK/MDL-2-R
							BUSSMAN	MDL-2/BK
							BUSSMAN	MDL2
							LITTLEFUSE	313002
2		M41113	NUT, 2-56, HEX,SS		6.00	EA		
2		M46871	CLIP-ON MOUNTING, CLEAN AND BRIGHT FINISH		1.00	EA	TECH-ETCH	182RF9C070L-2.18-02
2	A	M52284A	ASSY, PCB, 2070-1C, ENGINE	A	1.00	EA		
2		M54808	SPACER,#4,3/16L,NYLON		4.00	EA	RAF ELECTRONIC HARDWARE	1108-4-N
2		M56523	STANDOFF, 4-40 X 11/32", 1/4" Hex, F/F, AL		4.00	EA	RAF ELECTRONIC HARDWARE	2101T-440-AL

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
							RAF ELECTRONIC HARDWARE	2101T-440-AL-7
2		M57118	FUSE HOLDER,PANEL MT,1/4 SCREWDRIVER		1.00	EA	EATON BUSSMANN	BK-HTB-521-R
2	A	M57131	BRACKET, FUSE HOLDER, SUPPORT	A	1.00	EA		
2	A	M58570A	ASSY, PCB, HOSTBOARD, FLEX, TH	A	1.00	EA		
2	A	M58995	WIFI, ANTENNA SUPPORT, FLEX	A	1.00	EA		
2	A	M59148	FRONT PANEL, FLEX CONTROLLER	A	1.00	EA		
2	A	M59321	ASSY, LCD/HARN, FLEX CONTROLLER	A	1.00	EA		
2		M59351	BRACKET, L, PCB MOUNT, 6-32 STEEL		2.00	EA	KEystone	708
2		M59352	SWITCH, ROCKER, SPST, FAST TERMINAL, W/GUARD, 4A 125VAC		1.00	EA	C&K COMPONENTS	D102J12B215PQA
2		M61389	WASHER,NYLON,1/2"ID X 11/16"OD X .031 THK, NY (NYLON)		2.00	EA		
2		M66261	KEYPAD,7ROWX4COL,W/14POS HEADER BOX		1.00	EA	INPLAY TECHNOLOGIES	CUSTOM MADE FOR MCCAIN
2		M66392	STANDOFF, 4-40 X 3/16", 11/16" HEX, F/F, AL, MOUSER		2.00	EA	FASCOMP	FC2060-440-A
2	A	M73097A	ASSY, PCB, SD CARD, USB AND DK, FLEX CONTROLLER, TH	A	1.00	EA		
		M16787	VARISTOR,MO 18V;		1.00	EA	HARRIS	V22ZA05
			MOV1				PANASONIC	ERZ-V05D180
		M17441	RECEPTACLE FOR DATAKEY, PCB MNT, #KC4210PCB		1.00	EA	DATAKEY	KC4210PCB
			DK					
		M59326	HARN, 20POS, WIFI TO HOSTBOARD, FLEX	A	1.00	EA		
			WIFI					
		M13895	RIBBON CABLE,20COND,28AWG .050" PITCH,GRAY		0.42	FT	BELDEN/VOLEX	9L28020
							HITACHI	A2807-1-20T
							MIL-SPEC, INC	MG20
							T&B	171-20
							WHITMORE	A2807-1-20T
		M24750	CONN,20POS,RIBBON CABLE RECEPTACLE,NOVO,30 GOLD		1.00	EA	TYCO INCORPORATED	1658622-4
							TYCO INCORPORATED	746288-4
		M24756	CONN,20 COND RIBBON DIP PLUG .1X.1 CENTER		1.00	EA	TYCO INCORPORATED	1-746610-5
							TYCO INCORPORATED	746610-4
		M65427	RECEPTACLE, USB TYPE A, R/A, TH		1.00	EA	TYCO	6364372-2
			USB					

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M73097S	ASSY, PCB, SD CARD, USB AND DK, FLEX CONTROLLER, SMT	A	1.00	EA		
		M34624	IC,FERRITE CHIP 100 OHM 4A, SMD 0805, 4K/REEL		3.00	EA	TDK	MPZ2012S101A
			FB2, FB3, FB4				TDK	MPZ2012S101AT000
		M34640	CAP,.1MF,25V,10%, SMD 0603,4K/REEL		7.00	EA	MURATA	GRM188R71E104KA01D
			C2, C3, C4, C5, C6, C7, C8				PANASONIC	ECJ-1VB1E104K
		M34641	RES,2.2K,1/10W,5%,0603 SM RESISTOR CHIP		2.00	EA	PANASONIC	ERJ-3GEYJ222V
			R13, R26					
		M34642	RES,4.7K,1/10W,5%,SMD 0603,5K/REEL		1.00	EA	PANASONIC	ERJ-3GEYJ472V
			R24					
		M34645	RES,10K,1/10W,5%,SMD 0603,5K/REEL		4.00	EA	DALE	CRCW060310K0JNEA
			R12, R15, R23, R25				PANASONIC	ERJ-3GEYJ103V
		M34651	IC,SN74LV125APW,QUAD BUS BUFF,TSSOP-14, 2K REEL		1.00	EA	TEXAS INSTRUMENTS	SN74LV125APWR
			U4				TEXAS INSTRUMENTS	SN74LV125APWT
		M34653	RES,100 OHM 1/8W 5% SM 0805 RESISTOR CHIP		8.00	EA	PANASONIC	ERJ-6GEYJ101V
			R14, R16, R17, R18, R19, R20, R21, R22					
		M34661	TRANSISTOR, PNP, BC807-25LT1, SOT-23		2.00	EA	ON SEMICONDUCTOR	BC807-25LT1
			Q1, Q2				ON SEMICONDUCTOR	BC807-25LT1G
		M34668	REGULATOR,LDO,3.3V,800MA,SOT-223		1.00	EA	NATIONAL SEMICONDUCTOR	LM1117IMP-3.3
			LR1				NATIONAL SEMICONDUCTOR	LM1117IMPX-3.3
							TEXAS INSTRUMENTS	LM1117IMP-3.3/NOPB
							TEXAS INSTRUMENTS	LM1117IMPX-3.3/NOPB
		M58572	PCB, WIFI, FLEX CONTROLLER, REV A		1.00	EA		
		M65400	CAP,.001MF, 2KV, 10%, SM 1206 (1000pF),4K/REEL		1.00	EA	AVX	1206GC102KAT1A
			C21					
		M66353	FILTER, DLW31S, COMMON MODE, SMD 1206, 90 OHMS 100 MHZ		1.00	EA	MURATA	DLW31SN900SQ2B
			T1				MURATA	DLW31SN900SQ2L
		M66356	DIODE,PRTR5V0U2X, ESD PROTECTION, SMD SOT143B		1.00	EA	NXP	PRTR5V0U2X
			D3				NXP	PRTR5V0U2X-215
		M66890	CAP,10MF,20V,20%,TANT,SMD B,2K/REEL		3.00	EA	AVX	TAJB106K020RNJ
			C1, C10, C9				KEMET	T491B106M020AT
		M69601	IC,SN74LVC125APW, QUAD BUS BUFFER 3SO, TSSOP-14		2.00	EA	TEXAS INSTRUMENTS	SN74LVC125APWR
			U5, U6				TEXAS INSTRUMENTS	SN74LVC125APWT

		M73077	CONN, SD CARD, SMT		1.00	EA	TE CONNECTIVITY	2041021-4
			SD				WURTH ELECTRONICS INC	693063010911

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
0	A	M73101SA	FLEX SHELF MOUNT CONTROLLER, CALTRANS	A	1.00	EA		
1		M14691	BUSHING,STRAIN RELIEF - HEYCO #HEY1210		1.00	EA	HEYCO	HEY1210
							MOUSER	561MP6P4SPC SRR-10
1		M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK		14.00	EA		
1		M58586	SCREW,4-40 X 1/4,PH,FH,SS, 100 DEG, BLACK		4.00	EA		
1	A	M58993	TOP PANEL, FLEX CONTROLLER	A	1.00	EA		
1	A	M59320	HARN, SET, FLEX CONTROLLER	A	1.00	EA		
1	A	M59381	MODULE, BACK PANEL, FLEX CONTROLLER	A	1.00	EA		
1	A	M59415	MODULE, BOTTOM PANEL, FLEX CONTROLLER	A1	1.00	EA		
1	A	M73122	MODULE, FRONT PANEL, FLEX CONTROLLER	A	1.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
0	A	M73101SW	FLEX SHELF MOUNT CONTROLLER, WIFI	A	1.00	EA		
1		M14691	BUSHING,STRAIN RELIEF - HEYCO #HEY1210		1.00	EA	HEYCO	HEY1210
							MOUSER	561MP6P4SPC SRR-10
1		M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK		14.00	EA		
1		M58586	SCREW,4-40 X 1/4,PH,FH,SS, 100 DEG, BLACK		4.00	EA		
1	A	M58993	TOP PANEL, FLEX CONTROLLER	A	1.00	EA		
1	A	M58997	MODULE, FRONT PANEL, FLEX CONTROLLER, WIFI	A	1.00	EA		
1	A	M59415	MODULE, BOTTOM PANEL, FLEX CONTROLLER	A1	1.00	EA		
1	A	M59890	MODULE, BACK PANEL, FLEX CONTROLLER W/OUT FIO	A	1.00	EA		
2		M11622	SCREW,6-32 X 1/4,PH,PN,SS		4.00	EA		
2		M11671	JACKSCREW,4-40 X 1/4,M/F TAP FOR D CONN		8.00	EA	KEYSTONE	7228
2		M11706	WASHER, #6, INT. TOOTH, SS		4.00	EA		
2	A	M58571A	ASSY, PCB, SERIAL INTERFACE, FLEX, TH	A	1.00	EA		
2	A	M59840	BACK PANEL, FLEX CONTROLLER W/OUT FIO	A	1.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
3		M11944	STANDOFF, PEM BSOS-632-20		4.00	EA		
3		M42547	AL; SHT, 5052, .100X48X120, (1.397 LBS/SQFT)		0.93	LB		
3		M57363	NUT, SELF CLINCH, PEM RAS-440-9-4ZI, RIGHT ANGLE		6.00	EA	DB ROBERTS	RAS440-9-4ZI
3		M65624	POWDER, DARK GRAY FINE TEXTURE, RAL 7016, 89/71480		0.04	LB	TIGER DRYLAC	RAL 7016
1	A	M59912	HARN, SET, FLEX CONTROLLER W/OUT FIO	A	1.00	EA		
2		M11960	WIRE TIE,4",NATURAL TYTON #T18R9M4		5.00	EA	PANDUIT CORP.	PLT1M-M
							TYTON	T18R9M4NAT
2		M13846	WIRE,20,BLK,19STR MIL-W-16878/2		1.40	FT	NATIONAL WIRE & CABLE COR	NC1932U-0
2		M13890	WIRE,20,WHT,19STR NC1932U-9		0.30	FT	NATIONAL WIRE & CABLE COR	NC1932U-9
2		M13891	WIRE,20,WHT/RD,19STR MIL-W-16878/2		2.00	FT	NATIONAL WIRE & CABLE COR	MIL-W-16878/2
2		M13892	WIRE,20,RD,19STR NB1932N-2		1.71	FT	NATIONAL WIRE & CABLE COR	NB1932N-2
2		M13906	WIRE,20,ORG,19STR		0.30	FT	NATIONAL WIRE & CABLE COR	MIL-W-16878/2-3
2		M13921	EXPANDO BRAID,1/4",BLACK		0.84	FT	ALTA TECHNOLOGIES INC.	95120250
							WESTERN FILAMENT	WF_PT0250BK
2		M13945	WIRE,20,YEL,19STR		0.71	FT	NATIONAL WIRE & CABLE COR	NB1932N4
2		M17371	POWER CORD,6',3 CONDUCTOR		1.00	EA	ALPHA	502F
							BELDEN/VOLEX	17405-B8
							UNICABLE	4800-06F-GG
							UNICABLE POWER CORDS	4800-06F-GG
							VOLEX	17405 8 B1
							WEBER	CL60015
2		M24665	HOUSING,2POS,SL-156,W/LK RAMP		1.00	EA	TYCO INCORPORATED	640250-2
2		M24666	HOUSING,3POS,SL-156,W/LK RAMP;NO TAB		2.00	EA	TYCO INCORPORATED	640250-3
2		M24669	HOUSING,6POS,SL-156,W/LK RAMP		1.00	EA	TYCO INCORPORATED	640250-6
2		M24670	HOUSING,8POS,SL-156,W/LK RAMP		2.00	EA	TYCO INCORPORATED	TAMP640250-8
2		M24773	CONTACT,CRIMP FOR MTA SL GOLD PLATED,STRIP		31.00	EA	TYCO INCORPORATED	770476-2

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
2		M34262	HOUSING,5POS,SL-156,W/LK RAMP		2.00	EA	TYCO INCORPORATED	640250-5
2		M40009	WIRE,20,BRN,19STR		0.71	FT		
2		M40010	WIRE,20,PUR,19STR		0.71	FT	NATIONAL WIRE	NB1932N-7
2		M46903	TERM,FAST,RECEPT,RED TRANS,22-18AWG.250,FULL INSL		4.00	EA	TE CONNECTIVITY	2-521406-2

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
0	A	M73101SWA	FLEX SHELF MOUNT CONTROLLER, WIFI, CALTRANS	A	1.00	EA		
1		M14691	BUSHING,STRAIN RELIEF - HEYCO #HEY1210		1.00	EA	HEYCO	HEY1210
							MOUSER	561MP6P4SPC SRR-10
1		M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK		14.00	EA		
1		M58586	SCREW,4-40 X 1/4,PH,FH,SS, 100 DEG, BLACK		4.00	EA		
1	A	M58993	TOP PANEL, FLEX CONTROLLER	A	1.00	EA		
2		M11913	NUT, SELF CLINCH, PEM CLS-440-2 SS		12.00	EA		
2		M19332	AL; SHT, 5052, .063X48X120, (0.880 LBS/SQFT)		1.47	LB		
2		M54711	CABLE TIE MOUNT, PEM TD-40-4 ZI		4.00	EA		
2		M65624	POWDER, DARK GRAY FINE TEXTURE, RAL 7016, 89/71480		0.07	LB	TIGER DRYLAC	RAL 7016
1	A	M58997	MODULE, FRONT PANEL, FLEX CONTROLLER, WIFI	A	1.00	EA		
2		M11622	SCREW,6-32 X 1/4,PH,PN,SS		2.00	EA		
2		M11625	SCREW,4-40 X 1/4,PH,PN,SS		10.00	EA		
2		M11671	JACKSCREW,4-40 X 1/4,M/F TAP FOR D CONN		2.00	EA	KEYSTONE	7228
2		M11706	WASHER, #6, INT. TOOTH, SS		2.00	EA		
2		M11717	WASHER, #4, SPLIT LOCK, SS		10.00	EA		
2		M11745	WASHER, #2, INT. TOOTH, SS		6.00	EA		
2		M11750	WASHER, #2, FLAT, NYLON .098 ID X.250 OD X.032THK		2.00	EA	KEYSTONE	3347
2		M11783	NUT, HEX, 4-40, KEPNUT, SS		2.00	EA		
2		M14838	FUSE,2A,250V,SLO BLO BUSSMAN #MDL2		1.00	EA	BUSSMAN	BK/MDL-2-R
							BUSSMAN	MDL-2/BK
							BUSSMAN	MDL2
							LITTLEFUSE	313002
2		M41113	NUT, 2-56, HEX,SS		6.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
2		M46871	CLIP-ON MOUNTING, CLEAN AND BRIGHT FINISH		1.00	EA	TECH-ETCH	182RF9C070L-2.18-02
2	A	M52284A	ASSY, PCB, 2070-1C, ENGINE	A	1.00	EA		
		M27914	HEADER,8/16,,1C,VER,BKWAY .025 SQUARE POST		1.00	EA	TYCO ELECTRONICS	5-146256-8
			J2				TYCO INCORPORATED	103186-8
		M44530	IC, ENGINE CONFIG PROGRAM	A	1.00	EA		
			U29					
		M15603	LABEL,BLANK,1/4" X 3/4" ROLL OF 10,000		1.00	EA	TYCO INCORPORATED	WP-229064-10-9
		M66130	IC,AT24C256B-PU,256K EEPROM,SERIAL,DIP-8		1.00	EA	ATMEL	AT24C256B-PU
							MICROCHIP	24LC256-I/P
		M52284S	ASSY, PCB, ATC 6.10, ENGINE, SMT	A	1.00	EA		
		M30323	TRANSISTOR,FET SWITCHING, 2N7002,SM SOT-23		2.00	EA	DIODES INC.	2N7002-7-F
			Q1, Q2				ON SEMICONDUCTOR	2N7002LT1G
							PHILIPS	2N7002 T/R
							VISHAY	2N7002-T1
							ZETEX	2N7002TA
		M34624	IC,FERRITE CHIP 100 OHM 4A, SMD 0805, 4K/REEL		2.00	EA	TDK	MPZ2012S101A
			FB2, FB3				TDK	MPZ2012S101AT000
		M34633	IC,SN74LVC08APW, QUAD 2-IN AND, TSSOP-14		2.00	EA	NXP	74LVC08APW,118
			U21, U30				TEXAS INSTRUMENTS	SN74LVC08APWR
							TEXAS INSTRUMENTS	SN74LVC08APWT
		M34636	IC,CY62167DV30LL-55ZXI,SRAM 3V 1MX16,TSOP1-48		1.00	EA	CYPRESS	CY62167DV30LL-55ZXI
			SRAM1				HITACHI	HM62851ALFP-7
							NANO-AMP	N16L163WC2CT1
							TOSHIBA	TC55VCM416BTGN40
		M34639	RES,1K,1/10W,5%,0603 SM RESISTOR CHIP		10.00	EA	PANASONIC	ERJ-3GEYJ102V
			R118, R120, R122, R123, R127, R17, R194, R24, R26, R29					
		M34640	CAP,,1MF,25V,10%, SMD 0603,4K/REEL		192.00	EA	MURATA	GRM188R71E104KA01D
			C10, C113, C114, C115, C116, C117, C118, C119, C12, C120, C121, C122, C123, C124, C125, C126, C127, C128, C129, C130, C131, C132, C133, C134, C135, C136, C137, C138, C139, C14, C140, C141, C142, C143, C144, C145, C146, C147, C148, C149, C15, C150, C151, C152, C153, C154, C155, C156, C157, C158, C159, C160, C162, C165, C171, C172, C173, C174, C175, C176, C177, C178, C179, C180, C182, C183, C184, C185, C186, C187, C188, C189, C190,				PANASONIC	ECJ-1VB1E104K

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
			C191, C192, C193, C194, C195, C196, C197, C198, C199, C2, C200, C201, C202, C203, C204, C205, C206, C207, C208, C209, C210, C211, C212, C213, C214, C215, C216, C217, C218, C219, C220, C221, C222, C223, C224, C225, C226, C227, C228, C229, C230, C231, C232, C233, C234, C235, C236, C237, C238, C239, C240, C241, C242, C243, C244, C245, C246, C247, C248, C249, C250, C251, C252, C253, C254, C255, C256, C257, C258, C259, C260, C261, C262, C263, C264, C265, C266, C267, C268, C275, C277 , C278, C279, C280, C281, C282, C283, C284, C287, C293, C294, C295, C296, C297, C298, C299, C3, C300, C303, C304, C305, C306, C307, C308, C319, C325, C340, C341, C342, C343, C346, C4, C5, C51, C53, C6, C7, C8, C9					
		M34641	RES,2.2K,1/10W,5%,0603 SM RESISTOR CHIP		1.00	EA	PANASONIC	ERJ-3GEYJ222V
			R232					
		M34642	RES,4.7K,1/10W,5%,SMD 0603,5K/REEL		6.00	EA	PANASONIC	ERJ-3GEYJ472V
			R142, R144, R157, R158, R20, R90					
		M34645	RES,10K,1/10W,5%,SMD 0603,5K/REEL		67.00	EA	DALE	CRCW060310K0JNEA
			R1, R116, R117, R119, R121, R124, R125, R129, R131, R137, R138, R139, R140, R145, R146, R148, R149, R15, R150, R151, R152, R153, R154, R155, R156, R159, R161, R162, R163, R164, R195, R2, R200, R201, R202, R203, R204, R205, R206, R207, R208, R209, R210, R211, R212, R213, R214, R215, R216, R217, R225, R226, R25, R27, R28, R3, R30, R32, R33, R34, R35, R48, R5, R59, R6, R63, R8				PANASONIC	ERJ-3GEYJ103V
		M34646	CAP,.01MF,50V,10% CER SM 0603 10000PF CERAMIC		90.00	EA	PANASONIC	ECJ-1VB1H103K
			C1, C100, C101, C102, C103, C104, C105, C106, C107, C108, C109, C110, C111, C112, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C309, C31, C32, C327, C329, C33, C331, C34, C344, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C52, C54, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99				VISHAY DALE	VJ0603Y103KXACW1BC
							WALSIN	0603B103K500CT
		M34652	RES,100 OHM,1/4W, 5% SM 1206 RESISTOR CHIP		4.00	EA	PANASONIC	ERJ-8GEYJ101V
			R167, R169, R179, R182					
		M34655	RES,150 OHM,1/4W, 5% SM 1206 RESISTOR CHIP		1.00	EA	DALE	CRCW1206150RJNEA

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
			R238				PANASONIC	ERJ-8GEYJ151V
		M34657	RES,330 OHM, 1/8W, 5%, SMD 0805,5K/REEL		8.00	EA	PANASONIC	ERJ-6GEYJ331V
			R69, R70, R71, R72, R94, R95, R96, R97					
		M34660	DIODE,DUAL SW 75V,SM 350MW SOT-23		1.00	EA	DIODES INC	BAV70-7
			D3				DIODES INC	BAV70-7F
		M34668	REGULATOR,LDO,3.3V,800MA,SOT-223		1.00	EA	NATIONAL SEMICONDUCTOR	LM1117IMP-3.3
			LR2				NATIONAL SEMICONDUCTOR	LM1117IMPX-3.3
							TEXAS INSTRUMENTS	LM1117IMP-3.3/NOPB
							TEXAS INSTRUMENTS	LM1117IMPX-3.3/NOPB
		M34676	OSCILLATOR,CRYS 32.768KHZ SM, MC-306		1.00	EA	EPSON	SE2417CT-ND
			Y5				EPSON AM	MC-306 32.768K-E3
							EPSON AM	MC-306 32.768K-E3:ROHS
		M45116	CAP,1UF,25V,10%,SMD 0603,4K/REEL		7.00	EA	MURATA	GRM188R71E105KA12D
			C311, C312, C318, C332, C337, C347,C348					
		M46521	RES, 0.0 OHM 1/10 W, SMD 0603,5K/REEL		4.00	EA	PANASONIC	ERJ-3GEY0R00V
			R13, R14, R227, R234, R234					
		M47988	IC, REG LDO, 3V 250MA SOT23-3		1.00	EA	MICROCHIP	MCP1700T-3002E/TT
			LR3					
		M52284	PCB, ENGINE BOARD, 2070-1C, REV A		1.00	EA		
		M52285	IC, SN74LV02APWR, QUAD 2-INPUT POS-NOR, TSSOP-14		1.00	EA	TEXAS INSTRUMENTS	SN74LV02APWR
			U27					
		M52286	IC, NAND FLASH MEMORY, 2Gbit (256M X 8), TSOP-48		1.00	EA	MICRON TECHNOLOGY INC	MT29F2G08ABAEAWP-IT:E
			U35					
		M55098	IC, PROGRAM, U-BOOT, 2070-1C	A	2.00	EA		
		M34637	IC,FLASH MEMORY,64Mbit,TSOP-48, 3V, BOOT BLOCK		2.00	EA	MICRON	M29W640FB70N6E
			FLASH MEM 1, FLASH MEM 2				NUMONIX	M29W640FB70N6E
							NUMONIX	M29W640GB70NA6E
							SGS	M29W640FB70N6E

[illegible]

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M65428	OSCILLATOR,CRYST, 25MHZ ,SMD,1K/REEL		2.00	EA	ECS	ECS-250-18-5P-DN-TR
			Y3, Y4				ECS	ECS-250-18-5PXD-TR
							ECS	ECS-250-20-5P-DN
							ECS	ECS-250-20-5PXD-TR
		M65436	RES,15K,1/8W,1%,0805 SMT		2.00	EA	PANASONIC	ERJ6ENF1502V
			R126, 133					
		M65479	IC,DS1390,REAL TIME CLOCK, TSOP-10, 3K/REEL		1.00	EA	MAXIM	DS1390U-33+T&R
			U28					
		M65498	RES, 10 OHMS, 1/8W, 1%, SMD 0805		1.00	EA	DALE	CRCW080510R0FKTA
			R128				PANASONIC	ERJ-6ENF10R0V
		M65632	RES,100 OHM 1/10 W 5%,SMD 0603,5K/REEL		7.00	EA	PANASONIC	ERJ-3GEYJ101V
			R39, R4, R40, R41, R42, R47, R7					
		M66100	RES,24.3 OHMS,1/8W, 1%, SMD 0603		2.00	EA	DIGI KEY	P24.3HTR-ND
			R130, R132				PANASONIC	ERJ3EKF24R3V
		M66102	RES,2.0 OHM,1/8W,1%,SMD 0805		1.00	EA	PANASONIC	ERJ6RQF2R0V
			R165				VISHAY / DALE	CRCW08052R00FKEA
		M66103	IC,MIC6315-29D2UY, uP RESET CIRCUIT, 4-PIN SOT143,3K/REEL		1.00	EA	MICREL	MIC6315-29D2UY
			U12					
		M66104	RES,3.57K,1/8W,1%,0805 SMT		1.00	EA	PANASONIC	ERJ6ENF3571V
			R173					
		M66113	CAP, .18MF,25V,0805 SMT		1.00	EA	AVX	08053C184KAT2A
			C323				VISHAY	VJ0805Y184KXXA
							VISHAY	VJ0805Y184KXXMT
		M66114	CAP, .47MF,25V,0603 SMT		1.00	EA	MURATA	GRM188R71E474KA12D
			C316					
		M66115	CAP,2.2MF,10V,0603 SMT		12.00	EA	MURATA	GRM188R71A225KE15D
			C349, C350, C351, C352, C58, C59, C60, C61, C62, C63, C64, C65					
		M66116	CAP,4.7MF,16V,0805 SMT		1.00	EA	MURATA	GRM21BR71C475KA73L
			C338					
		M66117	CAP, .000056MF,50V,0603 SMT		1.00	EA	KEMET	C0603C560K5GACTU
			C326				VISHAY	VJ0603A560KXAA
		M66118	CAP,470MF,4V,D3L SMT		1.00	EA	SANYO	4TPE470MFL
			C321					

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M66120	CAP,330MF,6.3V,20%,10mOhm,D4,SMT		3.00	EA	PANASONIC	6TPE330MAA
			C314, C324, C339				SANYO	6TPD330M
		M66121	CAP,22MF,8V,B1 SMT		1.00	EA	PANASONIC	8TPC22M
			C315				SANYO	8TPC22M
		M66123	INDUCTOR, 1.5 uH, 13A, 2.9mOHMS, SM		1.00	EA	COOPER BUSSMAN	DR125-1R5
			L4				COOPER BUSSMAN	DR125-1R5-R
		M66126	OSCILLATOR,33.333MHZ,		1.00	EA	ABRACON	ASFL1-33.333MHZ-L-K-T
			OSC1				ABRACON	ASFL1-33.333MHZ-LC-T
		M66127	IC,LM5642MH, High Voltage, Dual Sync Buck Converter, TSSOP-28, 2.5K REEL		1.00	EA	NATIONAL SEMICONDUCT	LM5642MHX/NOPB
			U31				NATIONAL SEMICONDUCTOR	LM5642MHX
		M66128	IC,MPC8360ECVVAJDGA,CPU 32BITS,500MHZ,266MHZ,400MHZ		1.00	EA	FREESCALE	MPC8360ECVVAJDGA
			U1					
		M66129	IC,USB1T11AMTCX, UNIVERSAL SERIAL BUS TRANSCEIVER		1.00	EA	FAIRCHILD	USB1T11AMTCX
			U26					
		M66132	IC,SN74LVC74APW, DUAL D-TYPE FLIP-FLOP, TSSOP-14		1.00	EA	TEXAS INSTRUMENTS	SN74LVC74APWR
			U11				TEXAS INSTRUMENTS	SN74LVC74APWT
		M66133	LED,R,1.6X0.8MM,SMD, KINGSBRIGHT APHK1608SURCK		8.00	EA	KINGSBRIGHT	APHK1608SURCK
			COL1, COL2, DUP1, DUP2, LNK1, LNK2, SPD1, SPD2					
		M66134	RES,10 OHM,1/10W,1%,SMD 0603,5K/REEL		16.00	EA	PANASONIC	ERJ3EKF10R0V
			R10, R11, R12, R239, R240, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R9					
		M66135	RES,1.5K,1/10W,5%,SMD 0603		2.00	EA	PANASONIC	ERJ3GEYJ152V
			R141, R143					
		M66136	RES,18.2 OHMS ,1/10W,1%,0603 SM		2.00	EA	PANASONIC	ERJ3EKF18R2V
			R44, R46					
		M66411	IC,SN74HC21PW, DUAL 4-IN POS-AND GATE, TSSOP-14		1.00	EA	TEXAS INSTRUMENTS	SN74HC21PWR
			U20				TEXAS INSTRUMENTS	SN74HC21PWT
		M66412	RES,4.7 OHM,1/4W,1%,1206 SMT		2.00	EA	VISHAY DALE	CRCW12064R70FNEA
			R181, R187					
		M66413	RES,8.25K,1/4W,1%,SMT 1206		1.00	EA	VISHAY DALE	CRCW12068K25FKEA
			R183					

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M66862	IC, MAX795TESA, SUPERVISORY CIRCUIT, SOIC-8, 2.5K/REEL		1.00	EA	MAXIM	MAX795TESA+T
			U33					
		M66890	CAP,10MF,20V,20%,TANT,SMD B,2K/REEL		8.00	EA	AVX	TAJB106K020RNJ
			C289, C291, C313, C320, C333, C55, C56, C57				KEMET	T491B106M020AT
		M69597	IC,SN74LVTH245APW, QUAD BUS TRANSCEIVER 3SO, TSSOP-20		2.00	EA	TEXAS INSTRUMENTS	SN74LVTH245APWR
			U14, U16					
		M69598	IC,SN74LVTH573PW, OCTAL TRANSPARENT D-TYPE LATCH 3SO, TSSOP-20		3.00	EA	TEXAS INSTRUMENTS	SN74LVTH573PWR
			U17, U18, U19					
		M69600	IC,SN74LV541ATPW, OCTAL BUFFER/DRIVER 3SO, TSSOP-20		3.00	EA	TEXAS INSTRUMENTS	SN74LV541ATPWR
			U3, U5, U8				TEXAS INSTRUMENTS	SN74LV541ATPWT
		M69601	IC,SN74LVC125APW, QUAD BUS BUFFER 3SO, TSSOP-14		2.00	EA	TEXAS INSTRUMENTS	SN74LVC125APWR
			U34, U9				TEXAS INSTRUMENTS	SN74LVC125APWT
		M69602	CAP,.0022MF,50V,10%,CER, SM 0603 (2200PF)		1.00	EA	PANASONIC	ECJ1VB1H222K
			C322					
		M69604	RES,12K,1/4W,5%,SM 1206		1.00	EA	PANASONIC	ERJ8GEYJ123V
			R166					
		M69605	RES,0.01 OHM, 1W,1%,SM 2512		2.00	EA	PANASONIC	ERJM1WSF10MU
			R168, R180					
		M69606	RES,1.78K,1/8W,1%,0805 SMT		1.00	EA	PANASONIC	ERJ6ENF1781V
			R170					
		M69607	RES,10K,1/8W,1%,0805 SMT		1.00	EA	PANASONIC	ERJ6ENF1002V
			R171					
		M69608	RES,2.26K,1/4W,1%,SM 1206		1.00	EA	PANASONIC	ERJ8ENF2261V
			R172					
		M69610	RES,220K,1/4W,5%,SM 1206		1.00	EA	PANASONIC	ERJ8GEYJ224V
			R174					
		M69611	RES,4.99K,1/4W,1%,SMD 1206		2.00	EA	PANASONIC	ERJ8ENF4991V
			R175, R186					
		M69612	RES,22.6K,1/8W,1%,SM 0805		1.00	EA	PANASONIC	ERJ6ENF2262V
			R176					
		M69613	RES,20K,1/8W,1%,0805 SMT		1.00	EA	PANASONIC	ERJ6ENF2002V

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
			R177					
		M69614	RES,6.8K,1/4W,5%,SM 1206		1.00	EA	PANASONIC	ERJ8GEYJ682V
			R178					
		M69615	RES,8.45K,1/4W,1%,SM 1206		1.00	EA	PANASONIC	ERJ8ENF8451V
			R184					
		M69616	RES,13.7K,1/4W,1%,SM 1206		1.00	EA	PANASONIC	ERJ8ENF1372V
			R185					
		M69677	OSCILLATOR, 48MHZ ,SMD		1.00	EA	ABRACON CORP	ASFL1-48.000MHZ-LC-T
			OSC2				ABRACON CORP	ASFL1-48.000MHZ-LCS-T
							ECS	ECS-3963-480-BN-TR
		M69679	IC,SN74LVC04APW, HEX INVERTER, TSSOP-14		1.00	EA	TEXAS INSTRUMENTS	SN74LVC04APWR
			U10				TEXAS INSTRUMENTS	SN74LVC04APWT
		M69954	IC,LM3743MM-300,DC-DC VOLTAGE MODE PWM BUCK CONTROLLER		1.00	EA	NATIONAL SEMICONDUCTOR	LM3743MM-300
			U32				NATIONAL SEMICONDUCTOR	LM3743MM-300/NOPB
							TI	LM3743MM-300/NOPB
		M69956	IC,DDR2, MEMORY, 32Mx16, FBGA-84		5.00	EA	MICRON	MT47H32M16HR-25E IT:G TR
			DDR1, DDR2, DDR3, DDR4, DDR5				WINBOND	W9751G6KB25I TR
		M69975	CAP,.015MF,25V,0603 SMT		1.00	EA	PANASONIC	ECJ1VB1E153K
			C336					
		M69976	CAP,.0015MF,50V,0603 SMT		1.00	EA	PANASONIC	ECJ1VB1H152K
			C328					
		M69977	CAP,.0082MF,50V,0603 SMT		1.00	EA	PANASONIC	ECJ1VB1H822K
			C335					
		M69987	INDUCTOR, 4.2 uH, 10A, 7mOHMS		1.00	EA	TDK	RLF12560T-4R2N100
			L5					
		M69988	INDUCTOR, 10 uH, 5.1A, 12mOHMS, SM		1.00	EA	TDK	RLF12545T-100M5R1-PF
			L6					
		M69989	DIODE,MBR0520LT1, SCHOTTKY,SM		1.00	EA	ON SEMICONDUCTORS	MBR0520LT1G
			D1				ON SEMICONDUCTORS	MBR052LT1
							SCHOTTKY	MBR0520LT1
		M69990	DIODE,BAT54A, SCHOTTKY, SMT		1.00	EA	FAIRCHILD	BAT54A
			D2				SCHOTTKY	BAT54A

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M69991	TRANSISTOR,MOSFET,N-CHANNEL POWER, Si4850EY, SM		2.00	EA	VISHAY	SI4850EY-T1-E3
			Q5, Q8					
		M69992	TRANSISTOR,MOSFET,N-CHANNEL POWER,SM		2.00	EA	VISHAY	SI4840BDY-T1-GE3
			Q7, Q9				VISHAY	SI4840DY-T1-E3
							VISHAY	SI4840DY-T1-GE3
		M69993	TRANSISTOR,MOSFET,N-CHANNEL POWER, Si7882DP		2.00	EA	VISHAY	SI7882DP
			Q4, Q6				VISHAY	SI7882DP-TI-E3
		M69994	RES,4.75K,1/8W,1%,0805 SMT		2.00	EA	PANASONIC	ERJ6ENF4751V
			R43, R4					
		M52287	CAP, SUPER CAP, 1F, 5.5V, RADIAL		1.00	EA	COOPER BUSSMANN	KW-5R5C105-R
			C345					
		M69166	LABEL, MAC ADDRESS (ASK ENG. FOR PRINT)	A	0.00	EA		
		M69617	HEADER,50POS,2R,STRAIGHT, TYPE		2.00	EA	HIROSE	PCN10-50P-2.54DSA
			P1, P2				HIROSE	PCN10-50P-2.54DSA(72)
2		M54808	SPACER,#4,3/16L,NYLON		4.00	EA	RAF ELECTRONIC HARDWARE	1108-4-N
2		M56523	STANDOFF, 4-40 X 11/32", 1/4" Hex, F/F, AL		4.00	EA	RAF ELECTRONIC HARDWARE	2101T-440-AL
							RAF ELECTRONIC HARDWARE	2101T-440-AL-7
2		M57118	FUSE HOLDER,PANEL MT,1/4 SCREWDRIVER		1.00	EA	EATON BUSSMANN	BK-HTB-521-R
2	A	M57131	BRACKET, FUSE HOLDER, SUPPORT	A	1.00	EA		
3		M19332	AL; SHT, 5052, .063X48X120, (0.880 LBS/SQFT)		0.04	LB		
2	A	M58570A	ASSY, PCB, HOSTBOARD, FLEX, TH	A	1.00	EA		
		M10100	LED,R;644;.29-.75CDL;30 DEG		1.00	EA	BIVAR	BVU-5G1RD4
			ACT				EVERLIGHT	MV8102
							FAIRCHILD SEMICONDUCTOR	MV8102
							KINGBRIGHT	L53SRCU
							MOUSER ELECTRONICS	351-5100
							SUNLED CORPORATION	LMR53WD
		M10197	RES,10 OHM,2W,5%,CF,AXIAL		1.00	EA	RSF200JB-10R	YAGEO
			R99					
		M11635	SCREW,4-40 X 3/8,PH,PN,SS		1.00	EA		
		M11783	NUT, HEX, 4-40, KEPNUT, SS		1.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M11941	STANDOFF, LED, .197 X .157 X 0.44 BIVAR ELM 1-11mm		1.00	EA	ELM1-11MM	BIVAR
							ELM1-11MM-8	RG ALLEN
		M16423	DIODE,1N4001,1A,50V SILICON		2.00	EA	1N4001	DIODES INC/ FAIRCHILD
			D22, D25				1N4001	MOTOROLA
		M16661	RES,240 OHM,1/4W,5%,CF		1.00	EA	CF 1/4 240R 5% TR	SEI
			R102					
		M16787	VARISTOR,MO 18V;		3.00	EA	V22ZA05	HARRIS
			MOV1, MOV2, MOV3				ERZ-V05D180	PANASONIC
		M17123	SW,TOG,SPDT,ON-NONE-ON		1.00	EA	MTM106DPC	ALCOSWITCH
			SW1				7101SYCBE	C&K
							7101SYCGE	C&K
		M24686	HEADER,8POS,MTA.156C,.045 SQ POST,VERT,FRICT-LOCK		1.00	EA	640445-8	TYCO
			P3					
		M30367	TRANSISTOR,MOSFET P CHANN,60V-12A, TO-220		1.00	EA	MTP23P06V	ON SEMI
			Q2				MTP23P06VG	ON SEMI
							NTP2955G	ON SEMI
		M30703	HEADER,10/20,.100C,BRKWY, .025 SQ POST		1.00	EA	1-103783-0	TYCO
			P8				6-146261-0	TYCO
		M31030	HEADER,12POS,100C,2R		1.00	Unit	10-89-1121	MOLEX
			P6				10-89-7122	MOLEX
							10-96-7126	MOLEX
		M33163	BUZZER, 4-7 VDC		1.00	EA	PB-12N23P-05	MALLORY SONALERTS
			BZZ1				PB-12N23P-05Q	MALLORY SONALERTS
		M34027	HEADER,13/26,2R,.1C,BOX SHROUDED		1.00	EA	5103308-6	TYCO
			SERIAL 1				103308-6	TYCO INCORPORATED
		M34253	HEADER,5/10,2R,.1C,BOX SHROUDED		1.00	EA	103308-1	TYCO INCORPORATED
			FIO				5103308-1	TYCO INCORPORATED
		M34258	LED,R;3MM;34DEG;CLEAR KINGSBRIGHT L7104EC		2.00	EA	L7104EC	KINGBRIGHT
			SP4_RX, SP4_TX				WP710A10EC	KINGBRIGHT
							W7104EC	KINGSBRIGHT USA CORP.
		M34635	CAP,SUPER CAP 2.2F 5.5V		1.00	EA	FT0H225Z	NEC
			C13				FT0H225ZF	NEC

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M41077	LED SPACER "T1" KEYSTONE 7373		2.00	EA	7373	KEYSTONE
		M46519	IC, EEPROM 2KBIT 400KHZ 8DIP, M24C02		2.00	EA	M24C02-WBN6P	ST MICROELECTRONICS
			U11, U13					
		M57114	CONN, DB9, FEMALE, WIRE WRAP TIN		1.00	EA	172-009-242R011	NORCOMP INC
			SP4				172-009-242R021	NORCOMP INC
		M57207	DC TO DC CONVERTER, 5V INPUT, 5V OUTPUT, 3W		1.00	EA	MEE3S0505SC	MURATA
			DC1					
		M58570S	ASSY, PCB, HOSTBOARD, FLEX, SMT	A	1.00	EA	LL4148	DIODES INC
		M27849	DIODE,1N4148,100V,SMT DL-35 PKG(LL4148)		35.00	EA	FDLL4148	FAIRCHILD SEMICONDUCTOR
			D10, D11, D12, D13, D14, D15, D16, D17, D18, D19, D20, D21, D23, D24, D29, D30, D31, D32, D33, D34, D35, D36, D37, D38, D39, D4, D40, D41, D42, D47, D5, D6, D7, D8, D9				1N4148SM	MOTOROLA
		M30294	CAP, .001MF, 50V, 10%, SMD 0805, (1000PF), 4K/REEL		1.00	EA	GRM2165C1H102JA01D	MURATA
			C151				ECJ2VC1H102J	PANASONIC
							ECU-V1H102JCX	PANASONIC
		M30323	TRANSISTOR, FET SWITCHING, 2N7002, SM SOT-23		1.00	EA	2N7002-7-F	DIODES INC.
			Q1				2N7002LT1G	ON SEMICONDUCTOR
							2N7002 T/R	PHILIPS
							2N7002-T1	VISHAY
							2N7002TA	ZETEX
		M34624	IC, FERRITE CHIP 100 OHM 4A, SMD 0805, 4K/REEL		15.00	EA	MPZ2012S101A	TDK
			FB1, FB10, FB11, FB12, FB13, FB14, FB15, FB2, FB3, FB4, FB5, FB6, FB7, FB8, FB9				MPZ2012S101AT000	TDK
		M34639	RES, 1K, 1/10W, 5%, 0603 SM RESISTOR CHIP		8.00	EA	ERJ-3GEYJ102V	PANASONIC
	A		R113, R116, R40, R42, R43, R5, R7, R8					
		M34640	CAP, .1MF, 25V, 10%, SMD 0603, 4K/REEL		103.00	EA	GRM188R71E104KA01D	MURATA
			C1, C100, C101, C102, C103, C104, C105, C106, C107, C108, C109, C11, C111, C113, C114, C115, C117, C118, C119, C120, C122, C123, C127, C133, C134, C135, C136, C137, C138, C139, C140, C141, C142, C144, C149, C150, C152, C153, C156, C157, C158, C170, C171, C177, C178, C180, C182, C183, C184, C185, C186, C187, C188, C189, C190, C192, C2, C27, C3, C31, C35, C36, C37, C4, C42, C45, C47, C48, C49, C5, C51, C52, C53, C54, C55, C56, C57, C58, C59, C6,				ECJ-1VB1E104K	PANASONIC

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
			C60, C61, C62, C63, C67, C68, C69, C7, C71, C72, C73, C74, C75, C77, C78, C87, C92, C93, C94, C96, C97, C98, C99					
		M34641	RES,2.2K,1/10W,5%,0603 SM RESISTOR CHIP		2.00	EA	ERJ-3GEYJ222V	PANASONIC
			R121, R98					
		M34642	RES,4.7K,1/10W,5%,SMD 0603,5K/REEL		7.00	EA	ERJ-3GEYJ472V	PANASONIC
			R32, R33, R34, R69, R70, R71, R93					
		M34645	RES,10K,1/10W,5%,SMD 0603,5K/REEL		13.00	EA	CRCW060310K0JNEA	DALE
			R122, R2, R39, R4, R78, R84, R86, R88, R91, R92, R94, R96, R97				ERJ-3GEYJ103V	PANASONIC
		M34646	CAP,.01MF,50V,10% CER SM 0603 10000PF CERAMIC		2.00	EA	ECJ-1VB1H103K	PANASONIC
			C43, C88				VJ0603Y103KXACW1BC	VISHAY DALE
							0603B103K500CT	WALSIN
		M34654	RES,100K,1/10W,5% 0603 SM RESISTOR CHIP		6.00	EA	ERJ-3GEYJ104V	PANASONIC
			R77, R82, R83, R85, R89, R90					
		M34655	RES,150 OHM,1/4W, 5% SM 1206 RESISTOR CHIP		1.00	EA	CRCW1206150RJNEA	DALE
			R1				ERJ-8GEYJ151V	PANASONIC
		M34657	RES,330 OHM, 1/8W, 5%, SMD 0805,5K/REEL		10.00	EA	ERJ-6GEYJ331V	PANASONIC
			R103, R104, R108, R109, R29, R30, R64, R65, R66, R67					
		M34659	RES,470 OHM, 1/8W, 5% SM 0805 RESISTOR CHIP		4.00	EA	ERJ-6GEYJ471V	PANASONIC
		M34660	DIODE,DUAL SW 75V,SM 350MW SOT-23		2.00	EA	BAV70-7	DIODES INC
			D28, D3				BAV70-7F	DIODES INC
		M34662	TRANSISTOR,BC847B,NPN,50V 100MA, SOT-23		1.00	EA	BC847B	NXP
			Q3				BC847B	ST MICRO
		M34666	IC,HCPL-0630 OPTOCOUPLER SO-8,1.5K/REEL		2.00	EA	HCPL-0630-500E	AVAGO
			OP1, OP2					
		M34668	REGULATOR,LDO,3.3V,800MA,SOT-223		3.00	EA	LM1117IMP-3.3	NATIONAL SEMICONDUCTOR
			LR3, LR4, LR5				LM1117IMPX-3.3	NATIONAL SEMICONDUCTOR
							LM1117IMP-3.3/NOPB	TEXAS INSTRUMENTS
							LM1117IMPX-3.3/NOPB	TEXAS INSTRUMENTS
		M46516	RES, 3.01K, 1/8 W 1% 0805 SMD		2.00	EA	ERJ-6ENF3011V	PANASONIC
			R41, R6					
		M46517	IC, SWITCH 5-PORT 10/100 128PQFP KSZ8995MAI		2.00	EA	KSZ8995MAI	MICREL

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
			U10, U12					
		M46518	DIODE, TVS ARRAY 2-LINE 2.8V SOT-143		6.00	EA	CD143A-SR2.8	BOURNS
		M46520	IC, REG LDO 1.5A 1.8V, TO-263		1.00	EA	MIC39150-1.8WU TR	MICREL
			LR2					
		M58570	PCB, HOSTBOARD, FLEX CONTROLLER, REV A		1.00	EA		
		M58956	IC, GATE NAND, 1CH 2-INP, SOT-23-5		5.00	EA	SN74LVC1G00DBVR	TEXAS INSTRUMENTS
			U19, U20, U22, U23, U4					
		M58957	IC, SINGLE BUS BUFFER GATE, SOT-23-5		5.00	EA	SN74LVC1G125DBV	TEXAS INSTRUMENTS
			U24, U5, U6, U7, U9					
		M65138	RES,0 OHMS,1/4W,1206 SM		3.00	EA	ERJ-8GEY0R00V	PANASONIC
			R100, R31, R68					
		M65398	CAP,.000018MF, 50V, 5%, SMD 0603,4K/REEL		4.00	EA	VJ0603A180JXACW1BC	BC COMPONENT/VISHAY
			C38, C39, C84, C85				GRM1885C1H180JA01D	MURATA
							C1608C0G1H180J080AA	TDK
		M65400	CAP,.001MF, 2KV, 10%, SM 1206 (1000pF),4K/REEL		9.00	EA	1206GC102KAT1A	AVX
			C125, C126, C173, C174, C175, C176, C191, C80, C81					
		M65403	IC,MAX3387E, RS-232 TRANSCEIVER, TSSOP-24, 2.5K/REEL		1.00	EA	MAX3387EEUG+T	MAXIM
			U21					
		M65414	IC,SP2526-2,USB POWER CONTROL SWITCH,NSOIC-8		2.00	EA	SP2526-2EN	SIPEX
			U15, U17				SP2526-2EN-L	SIPEX
							SP2526A-2EN-L	SIPEX
		M65421	RES, 49.9 OHMS, 1/8W, 1%, SMD 0805,5K/REEL		40.00	EA	ERJ-6ENF49R9V	PANASONIC
			R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R9					
		M65424	RES, 75 OHMS, 1/8W, 1%, SMD 0805,5K/REEL		17.00	EA	ERJ-6ENF75R0V	PANASONIC
			R105, R106, R107, R110, R111, R112, R119, R120, R35, R36, R37, R38, R72, R73, R74, R75, R76					
		M65425	TRANSFORMER,HX1188,SINGLE PORT 10/100BASE-T,TX 1:1,RX 1:1,600/REEL		2.00	EA	HX1188FNLT	PULSE
			XFMR2, XFMR4				HX1188NLT	PULSE
							HX1188T	PULSE
		M65428	OSCILLATOR,CRYS, 25MHZ ,SMD,1K/REEL		2.00	EA	ECS-250-18-5P-DN-TR	ECS
			Y1, Y2				ECS-250-18-5PXDN-TR	ECS

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
							ECS-250-20-5P-DN	ECS
							ECS-250-20-5PX-DN-TR	ECS
		M65436	RES,15K,1/8W,1%,0805 SMT		2.00	EA	ERJ6ENF1502V	PANASONIC
			R79, R87					
		M65481	CAP,.000022MF,50V,5%,CER SM 0603,(22PF)		2.00	EA	ECJ1VC1H220J	PANASONIC
			C154, C155					
		M66121	CAP,22MF,8V,B1 SMT		12.00	EA	8TPC22M	PANASONIC
			C112, C116, C121, C41, C46, C50, C66, C70, C76, C86, C91, C95				8TPC22M	SANYO
		M66133	LED,R,1.6X0.8MM,SMD, KINGSBRIGHT APHK1608SURCK		4.00	EA	APHK1608SURCK	KINGSBRIGHT
			LED1, LED2, LED3, LED4					
		M66352	IC, CY7C65630, USB HUB CONTROLLER, 4 PORTS, QFN-56		1.00	EA	CY7C65630-56LFXC	CYPRESS
			U14				CY7C65630-56LTXC	CYPRESS
		M66353	FILTER, DLW31S, COMMON MODE, SMD 1206, 90 OHMS 100 MHZ		1.00	EA	DLW31SN900SQ2B	MURATA
			T1				DLW31SN900SQ2L	MURATA
		M66354	TRANSFORMER,HX1234,QUAD PORT,10/100 BASE-T, TX 1:1,RX 1:1		2.00	EA	HX1234	PULSE
			XFMR1, XFMR3				HX1234NL	PULSE
							HX1234NLT	PULSE
		M66356	DIODE,PRTR5V0U2X, ESD PROTECTION, SMD SOT143B		2.00	EA	PRTR5V0U2X	NXP
			D1, D2				PRTR5V0U2X-215	NXP
		M66357	CAP,2.2MF,35V, 20%, ELEC, SMD		2.00	EA	EEE-FC1V2R2AR	PANASONIC
			C129, C181				EEV-FC1V2R2R	PANASONIC
		M66358	CAP,.000056MF,2kv,5%, SMD 1206, (56PF)		2.00	EA	1206GA560JAT1A	AVX
			C124, C79					
		M66359	RES,680 OHM, .1W, 5%, SMD 0603		2.00	EA	ERJ-3GEYJ681V	PANASONIC
			R80, R81					
		M66360	CAP,100MF, 10V,20 %, ELEC, SMD		3.00	EA	EEE-FC1A101P	PANASONIC
			C128, C145, C146				EEV-FC1A101P	PANASONIC
		M66377	OSCILLATOR,CRYS, 24MHZ ,SMD		1.00	EA	ECS-240-20-5PDN	ECS
			Y3				ECS-240-20-5PDN-TR	ECS
		M66378	CAP,.0000012MF,50V,5%, SMD 0603, 12PF CERAMIC		2.00	EA	ECJ-1VC1H120J	PANASONIC
			C130, C131					

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M66540	CRYSTAL,29.4912MHZ, SMD		1.00	EA	ABLS2-29.4912MHZ-D4YF-T	ABRACON CORP
			Y4					
		M66541	RES,15M,1/10W, 10+/-, 0603		1.00	EA	ERJ3GEYK156V	PANASONIC
			R95					
		M66732	IC, AT25020AN, 2K 2.7V, SERIAL EEPROM, SOIC-8		1.00	EA	AT25020AN-10SU-2.7	ATMEL
			U1					
		M66890	CAP,10MF,20V,20%,TANT,SMD B,2K/REEL		15.00	EA	TAJB106K020RNJ	AVX
			C110, C12, C143, C147, C148, C179, C30, C34, C40, C44, C64, C65, C83, C89, C90				T491B106M020AT	KEMET
		M69678	IC,SN74LV138ATPW, DECODER/DEMUX 3 TO 8,TSSOP-16		2.00	EA	SN74LV138ATPWR	TEXAS INSTRUMENTS
			U2, U3				SN74LV138ATPWT	TEXAS INSTRUMENTS
		M73096	IC, FRONT PANEL, FLEX, REV. B	B	1.00	EA		
		M15603	LABEL,BLANK,1/4" X 3/4" ROLL OF 10,000		1.00	EA	WP-229064-10-9	TYCO INCORPORATED
		M65041	IC,MC9S12E64CFU,MCU, SMT, (FREESCALE SEMICONDUCTOR)		1.00	EA	MC9S12E64CFU	MOTOROLA
			U18				MC9S12E64CFUE	MOTOROLA
		M59327	HEADER, 10/20,2R,.1C,BOX SHROUDED		2.00	EA	5103308-5	TYCO INCORPORATED
			SERIAL 2, WIFI					
		M59640	CONN, 7/14, 2 ROW, .1C, REC, .290" HEIGHT		1.00	EA	BCS-107-L-D-TE	SAMTEC
			P7					
		M66287	CONN,RJ45, VERT, SINGLE, WITH LEDS		3.00	EA	1734577-1	TYCO
			RJ1, RJ2, RJ3				1734577-3	TYCO
		M66691	RECEPTACLE, 50 POS,2 ROW,STRAIGHT,DIN TYPE B, PCN10		2.00	EA	PCN10C-50S-2.54DSA(72)	HIROSE
			P1, P2					
2	A	M58572A	ASSY, PCB, WIFI, FLEX CONTROLLER, TH	X1	1.00	EA		
		M16787	VARISTOR,MO 18V;		1.00	EA	HARRIS	V22ZA05
			MOV1				PANASONIC	ERZ-V05D180
		M17441	RECEPTACLE FOR DATAKEY, PCB MNT, #KC4210PCB		1.00	EA	DATAKEY	KC4210PCB
			DK					
		M44421	LED HOLDER,R/A, 0.200 CENTER L,NYLON,BLACK		1.00	EA	BIVAR	H-101C
			LD5					
		M55484	LED, GREEN, 3MM, 20MCD, 40DEG, DIFFUSED		1.00	EA	KINGBRIGHT	WP710A10GD
			LD5					

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M58572S	ASSY, PCB, WIFI, FLEX, SMT	A	1.00	EA		
		M34624	IC,FERRITE CHIP 100 OHM 4A, SMD 0805, 4K/REEL		4.00	EA	TDK	MPZ2012S101A
			FB1, FB2, FB3, FB4				TDK	MPZ2012S101AT000
		M34627	SWITCH,6 X 3.5 100GF SM LT TOUCH		2.00	EA	PANASONIC	EVQ-PJS04K
			DEFAULT, WAKE UP					
		M34640	CAP,.1MF,25V,10%, SMD 0603,4K/REEL		14.00	EA	MURATA	GRM188R71E104KA01D
			C11, C12, C14, C15, C16, C17, C18, C2, C3, C4, C5, C6, C7, C8				PANASONIC	ECJ-1VB1E104K
		M34641	RES,2.2K,1/10W,5%,0603 SM RESISTOR CHIP		2.00	EA	PANASONIC	ERJ-3GEYJ222V
			R13, R26					
		M34642	RES,4.7K,1/10W,5%,SMD 0603,5K/REEL		1.00	EA	PANASONIC	ERJ-3GEYJ472V
			R24					
		M34645	RES,10K,1/10W,5%,SMD 0603,5K/REEL		9.00	EA	DALE	CRCW060310K0JNEA
			R10, R11, R12, R15, R23, R25, R7, R8, R9				PANASONIC	ERJ-3GEYJ103V
		M34651	IC,SN74LV125APW,QUAD BUS BUFF,TSSOP-14, 2K REEL		1.00	EA	TEXAS INSTRUMENTS	SN74LV125APWR
			U4				TEXAS INSTRUMENTS	SN74LV125APWT
		M34653	RES,100 OHM 1/8W 5% SM 0805 RESISTOR CHIP		8.00	EA	PANASONIC	ERJ-6GEYJ101V
			R14, R16, R17, R18, R19, R20, R21, R22					
		M34656	RES,220 OHM,1/8W, 5% SM 0805 RESISTOR CHIP		2.00	EA	PANASONIC	ERJ-6GEYJ221V
			R1, R2				VISHAY	CRCW0805220RJNEA
		M34657	RES,330 OHM, 1/8W, 5%, SMD 0805,5K/REEL		2.00	EA	PANASONIC	ERJ-6GEYJ331V
			R29, R30					
		M34659	RES,470 OHM, 1/8W, 5% SM 0805 RESISTOR CHIP		1.00	EA	PANASONIC	ERJ-6GEYJ471V
			R31					
		M34661	TRANSISTOR, PNP, BC807-25LT1, SOT-23		2.00	EA	ON SEMICONDUCTOR	BC807-25LT1
			Q1, Q2				ON SEMICONDUCTOR	BC807-25LT1G
		M34668	REGULATOR,LDO,3.3V,800MA,SOT-223		1.00	EA	NATIONAL SEMICONDUCTOR	LM1117IMP-3.3
			LR1				NATIONAL SEMICONDUCTOR	LM1117IMPX-3.3
							TEXAS INSTRUMENTS	LM1117IMP-3.3/NOPB
							TEXAS INSTRUMENTS	LM1117IMPX-3.3/NOPB
		M46518	DIODE, TVS ARRAY 2-LINE 2.8V SOT-143		2.00	EA	BOURNS	CD143A-SR2.8

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
			D1, D2					
		M58572	PCB, WIFI, FLEX CONTROLLER, REV A		1.00	EA		
		M58957	IC, SINGLE BUS BUFFER GATE, SOT-23-5		2.00	EA	TEXAS INSTRUMENTS	SN74LVC1G125DBV
			U7, U8					
		M59350	SW, PUSH BUTTON, RA, SURFACE MOUNT		1.00	EA	ALPS	SKRTLAE010
			ON/OFF					
		M65400	CAP,.001MF, 2KV, 10%, SM 1206 (1000pF),4K/REEL		1.00	EA	AVX	1206GC102KAT1A
			C21					
		M65424	RES, 75 OHMS, 1/8W, 1%, SMD 0805,5K/REEL		2.00	EA	PANASONIC	ERJ-6ENF75R0V
			R3, R4					
		M65425	TRANSFORMER,HX1188,SINGLE PORT 10/100BASE-T,TX 1:1,RX 1:1,600/REEL		1.00	EA	PULSE	HX1188FNLT
			XFMR1				PULSE	HX1188NLT
							PULSE	HX1188T
		M66103	IC,MIC6315-29D2UY, uP RESET CIRCUIT, 4-PIN SOT143,3K/REEL		1.00	EA	MICREL	MIC6315-29D2UY
			U2					
		M66132	IC,SN74LVC74APW, DUAL D-TYPE FLIP-FLOP, TSSOP-14		1.00	EA	TEXAS INSTRUMENTS	SN74LVC74APWR
			U3				TEXAS INSTRUMENTS	SN74LVC74APWT
		M66133	LED,R,1.6X0.8MM,SMD, KINGSBRIGHT APHK1608SURCK		2.00	EA	KINGSBRIGHT	APHK1608SURCK
			LAN, LNK					
		M66353	FILTER, DLW31S, COMMON MODE, SMD 1206, 90 OHMS 100 MHZ		1.00	EA	MURATA	DLW31SN900SQ2B
			T1				MURATA	DLW31SN900SQ2L
		M66356	DIODE,PRTR5V0U2X, ESD PROTECTION, SMD SOT143B		1.00	EA	NXP	PRTR5V0U2X
			D3				NXP	PRTR5V0U2X-215
		M66358	CAP,.000056MF,2kv,5%, SMD 1206, (56PF)		1.00	EA	AVX	1206GA560JAT1A
			C19					
		M66890	CAP,10MF,20V,20%,TANT,SMD B,2K/REEL		4.00	EA	AVX	TAJB106K020RNJ
			C1, C10, C13, C9				KEMET	T491B106M020AT
		M69601	IC,SN74LVC125APW, QUAD BUS BUFFER 3SO, TSSOP-14		2.00	EA	TEXAS INSTRUMENTS	SN74LVC125APWR
			U5, U6				TEXAS INSTRUMENTS	SN74LVC125APWT
		M73077	CONN, SD CARD, SMT		1.00	EA	TE CONNECTIVITY	2041021-4

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
			SD				WURTH ELECTRONICS INC	693063010911
		M59326	HARN, 20POS, WIFI TO HOSTBOARD, FLEX	A	1.00	EA		
			WIFI					
		M13895	RIBBON CABLE,20COND,28AWG .050" PITCH,GRAY		0.42	FT	BELDEN/VOLEX	9L28020
							HITACHI	A2807-1-20T
							MIL-SPEC, INC	MG20
							T&B	171-20
							WHITMORE	A2807-1-20T
		M24750	CONN,20POS,RIBBON CABLE RECEPTACLE,NOVO,30 GOLD		1.00	EA	TYCO INCORPORATED	1658622-4
							TYCO INCORPORATED	746288-4
		M24756	CONN,20 COND RIBBON DIP PLUG .1X.1 CENTER		1.00	EA	TYCO INCORPORATED	1-746610-5
							TYCO INCORPORATED	746610-4
		M65427	RECEPTACLE, USB TYPE A, R/A, TH		1.00	EA	TYCO	6364372-2
			USB					
		M73095	WIFI 802.11 MODULE TH		1.00	EA	LANTRONIX	PW205030001B
			U1					
2	A	M58995	WIFI, ANTENNA SUPPORT, FLEX	A	1.00	EA		
3		M62920	LEXAN,CLEAR,.118, 52" X 100", SG308, CLEAR MATTE		0.01	SH		
2	A	M59148	FRONT PANEL, FLEX CONTROLLER	A	1.00	EA		
3		M11958	STUD, SELF CLINCH, PEM FHS-440-8 ST		4.00	EA		
3		M19620	POWDER, BLACK, MCCAIN TRAFFIC BLACK PPG # PCTT90169		0.04	LB	ROHM AND HAAS	R&H#30-7808
							SPRAYLAT	PPL4975D
3		M42547	AL; SHT, 5052, .100X48X120, (1.397 LBS/SQFT)		0.87	LB		
3		M57363	NUT, SELF CLINCH, PEM RAS-440-9-4ZI, RIGHT ANGLE		8.00	EA	DB ROBERTS	RAS440-9-4ZI
3		M59128	STUD, SELF CLINCH, PEM FHS-256-5		4.00	EA	PENNENGINEERING	PEM FHS-256-5
3		M59316	STANDOFF, PEM BSOS-440-22		4.00	EA	PENNENGINEERING	BSOS-440-22
3	A	M59339	BRACKET CLIP ON SUPPORT, FLEX	A	1.00	EA		
4		M19332	AL; SHT, 5052, .063X48X120, (0.880 LBS/SQFT)		0.10	LB		
3		M59917	LABEL, FRONT PANEL, FLEX CONTROLLER, CUSTOM MADE		1.00	EA	MAVERICK LABEL	MX163-150-027
3		M61888	STUD, SELF CLINCH, PEM FHS-440-6 ST		2.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
3		M69437	STUD, SELF CLINCH, PEM FHS-256-6		2.00	EA		
2	A	M59321	ASSY, LCD/HARN, FLEX CONTROLLER	X1	1.00	EA		
3		M57661	LCD, 240X128DOTS, WHITE BKL T SIDE, HIGH CONTRAST, AZ DISPLAY		1.00	EA	AZ DISPLAYS	ATM2412BG-FLW-FFW
3	A	M59322	HARN, LCD, 20 COND RIBBON CABLE, FLEX	X1	1.00	EA		
4		M13895	RIBBON CABLE,20COND,28AWG .050" PITCH,GRAY		0.30	FT	BELDEN/VOLEX	9L28020
							HITACHI	A2807-1-20T
							MIL-SPEC, INC	MG20
							T&B	171-20
							WHITMORE	A2807-1-20T
4		M24750	CONN,20POS,RIBBON CABLE RECEPTACLE,NOVO,30 GOLD		1.00	EA	TYCO INCORPORATED	1658622-4
							TYCO INCORPORATED	746288-4
4		M24756	CONN,20 COND RIBBON DIP PLUG .1X.1 CENTER		1.00	EA	TYCO INCORPORATED	1-746610-5
							TYCO INCORPORATED	746610-4
2		M59351	BRACKET, L, PCB MOUNT, 6-32 STEEL		2.00	EA	KEYSTONE	708
2		M59352	SWITCH, ROCKER, SPST, FAST TERMINAL, W/GUARD, 4A 125VAC		1.00	EA	C&K COMPONENTS	D102J12B215PQA
2		M59893	WIFI ANTENNA, 2.4GHz, CABLE 100mm, SMT MALE ADHESIVE		1.00	EA	MOLEX, LLC	0479500001
2		M61389	WASHER,NYLON,1/2"ID X 11/16"OD X .031 THK, NY (NYLON)		2.00	EA		
2		M66261	KEYPAD,7ROWX4COL,W/14POS HEADER BOX		1.00	EA	INPLAY TECHNOLOGIES	CUSTOM MADE FOR MCCAIN
2		M66392	STANDOFF, 4-40 X 3/16", 11/16" HEX, F/F, AL, MOUSER		2.00	EA	FASCOMP	FC2060-440-A
1	A	M59320	HARN, SET, FLEX CONTROLLER	X1	1.00	EA		
2		M11960	WIRE TIE,4",NATURAL TYTON #T18R9M4		6.00	EA	PANDUIT CORP.	PLT1M-M
							TYTON	T18R9M4NAT
2		M13846	WIRE,20,BLK,19STR MIL-W-16878/2		1.40	FT	NATIONAL WIRE & CABLE COR	NC1932U-0
2		M13890	WIRE,20,WHT,19STR NC1932U-9		0.30	FT	NATIONAL WIRE & CABLE COR	NC1932U-9
2		M13891	WIRE,20,WHT/RD,19STR MIL-W-16878/2		2.30	FT	NATIONAL WIRE & CABLE COR	MIL-W-16878/2
2		M13892	WIRE,20,RD,19STR NB1932N-2		2.00	FT	NATIONAL WIRE & CABLE COR	NB1932N-2
2		M13906	WIRE,20,ORG,19STR		0.59	FT	NATIONAL WIRE & CABLE COR	MIL-W-16878/2-3

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
2		M13921	EXPANDO BRAID,1/4",BLACK		0.84	FT	ALTA TECHNOLOGIES INC.	95120250
							WESTERN FILAMENT	WF_PT0250BK
2		M13945	WIRE,20,YEL,19STR		0.71	FT	NATIONAL WIRE & CABLE COR	NB1932N4
2		M17371	POWER CORD,6',3 CONDUCTOR		1.00	EA	ALPHA	502F
							BELDEN/VOLEX	17405-B8
							UNICABLE	4800-06F-GG
							UNICABLE POWER CORDS	4800-06F-GG
							VOLEX	17405 8 B1
							WEBER	CL60015
2		M24665	HOUSING,2POS,SL-156,W/LK RAMP		1.00	EA	TYCO INCORPORATED	640250-2
2		M24666	HOUSING,3POS,SL-156,W/LK RAMP;NO TAB		4.00	EA	TYCO INCORPORATED	640250-3
2		M24669	HOUSING,6POS,SL-156,W/LK RAMP		1.00	EA	TYCO INCORPORATED	640250-6
2		M24670	HOUSING,8POS,SL-156,W/LK RAMP		2.00	EA	TYCO INCORPORATED	TAMP640250-8
2		M24773	CONTACT,CRIMP FOR MTA SL GOLD PLATED,STRIP		37.00	EA	TYCO INCORPORATED	770476-2
2		M34262	HOUSING,5POS,SL-156,W/LK RAMP		2.00	EA	TYCO INCORPORATED	640250-5
2		M40009	WIRE,20,BRN,19STR		0.71	FT		
2		M40010	WIRE,20,PUR,19STR		0.71	FT	NATIONAL WIRE	NB1932N-7
2		M46903	TERM,FAST,RECEPT,RED TRANS,22-18AWG.250,FULL INSL		4.00	EA	TE CONNECTIVITY	2-521406-2
1	A	M59381	MODULE, BACK PANEL, FLEX CONTROLLER	A	1.00	EA		
2		M11622	SCREW,6-32 X 1/4,PH,PN,SS		4.00	EA		
2		M11671	JACKSCREW,4-40 X 1/4,M/F TAP FOR D CONN		8.00	EA	KEystone	7228
2		M11706	WASHER, #6, INT. TOOTH, SS		4.00	EA		
2		M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK		4.00	EA		
2	A	M58571A	ASSY, PCB, SERIAL INTERFACE, FLEX, TH	A	1.00	EA		
		M11941	STANDOFF, LED, .197 X .157 X 0.44 BIVAR ELM 1-11mm		8.00	EA	BIVAR	ELM1-11MM
							RG ALLEN	ELM1-11MM-8
		M16787	VARISTOR,MO 18V;		5.00	EA	HARRIS	V22ZA05
			MOV1, MOV2, MOV3, MOV4, MOV5				PANASONIC	ERZ-V05D180
		M34258	LED,R;3MM;34DEG;CLEAR KINGSBRIGHT L7104EC		8.00	EA	KINGBRIGHT	L7104EC
			SP1_RX, SP1_TX, SP2_RX, SP2_TX, SP3_RX, SP3_TX, SP5_RX, SP5_TX				KINGBRIGHT	WP710A10EC

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
							KINGSBRIGHT USA CORP.	W7104EC
		M57113	CONN, DB25, FEMALE, WIRE WRAP TIN		1.00	EA	NORCOMP INC	172-025-242R011
			C12S				NORCOMP INC	172-025-242R021
		M57114	CONN, DB9, FEMALE, WIRE WRAP TIN		2.00	EA	NORCOMP INC	172-009-242R011
			SP1, SP2				NORCOMP INC	172-009-242R021
		M57207	DC TO DC CONVERTER, 5V INPUT, 5V OUTPUT, 3W		1.00	EA	MURATA	MEE3S0505SC
			DC1					
		M58571S	ASSY, PCB, SERIAL INTERFACE, FLEX, SMT	A	1.00	EA	DIODES INC	LL4148
		M27849	DIODE,1N4148,100V,SMT DL-35 PKG(LL4148)		2.00	EA	FAIRCHILD SEMICONDUCTOR	FDLL4148
			D1, D2				MOTOROLA	1N4148SM
		M34624	IC,FERRITE CHIP 100 OHM 4A, SMD 0805, 4K/REEL		2.00	EA	TDK	MPZ2012S101A
			FB1, FB2				TDK	MPZ2012S101AT000
		M34639	RES,1K,1/10W,5%,0603 SM RESISTOR CHIP		22.00	EA	PANASONIC	ERJ-3GEYJ102V
			R15, R16, R17, R18, R23, R24, R25, R26, R27, R28, R29, R34, R46, R47, R52, R53, R54, R55, R60, R61, R62, R63					
		M34640	CAP, .1MF, 25V, 10%, SMD 0603, 4K/REEL		47.00	EA	MURATA	GRM188R71E104KA01D
			C1, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C3, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C5, C50, C51, C52, C53, C54, C55, C56, C57, C58, C6, C7, C8, C9				PANASONIC	ECJ-1VB1E104K
		M34645	RES,10K,1/10W,5%,SMD 0603,5K/REEL		3.00	EA	DALE	CRCW060310K0JNEA
			R10, R12, R35				PANASONIC	ERJ-3GEYJ103V
		M34652	RES,100 OHM,1/4W, 5% SM 1206 RESISTOR CHIP		4.00	EA	PANASONIC	ERJ-8GEYJ101V
			R30, R31, R32, R33					
		M34657	RES,330 OHM, 1/8W, 5%, SMD 0805,5K/REEL		4.00	EA	PANASONIC	ERJ-6GEYJ331V
			R36, R37, R38, R39					
		M34659	RES,470 OHM, 1/8W, 5% SM 0805 RESISTOR CHIP		30.00	EA	PANASONIC	ERJ-6GEYJ471V
			R1, R11, R13, R14, R19, R2, R20, R21, R22, R3, R4, R48, R49, R5, R50, R51, R56, R57, R58, R59, R6, R64, R65, R67, R68, R69, R7, R70, R8, R9					
		M34666	IC,HCPL-0630 OPTOCOUPLER SO-8,1.5K/REEL		11.00	EA	AVAGO	HCPL-0630-500E
			OP1, OP10, OP11, OP2, OP3, OP4, OP5, OP6, OP7, OP8, OP9					
		M46518	DIODE, TVS ARRAY 2-LINE 2.8V SOT-143		4.00	EA	BOURNS	CD143A-SR2.8

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
			D28, D29, D30, D31					
		M58571	PCB, SERIAL INTERFACE, FLEX CONTROLLER, REV A		1.00	EA		
		M58956	IC, GATE NAND, 1CH 2-INP, SOT-23-5		20.00	EA	TEXAS INSTRUMENTS	SN74LVC1G00DBVR
			U1, U10, U11, U12, U13, U14, U15, U16, U17, U18, U19, U2, U20, U3, U4, U5, U6, U7, U8, U9					
		M65138	RES,0 OHMS,1/4W,1206 SM		1.00	EA	PANASONIC	ERJ-8GEY0R00V
			R66					
		M65400	CAP,.001MF, 2KV, 10%, SM 1206 (1000pF),4K/REEL		6.00	EA	AVX	1206GC102KAT1A
			C26, C27, C28, C29, C30, C31					
		M65403	IC,MAX3387E, RS-232 TRANSCEIVER, TSSOP-24, 2.5K/REEL		2.00	EA	MAXIM	MAX3387EEUG+T
			U21, U22					
		M65424	RES, 75 OHMS, 1/8W, 1%, SMD 0805,5K/REEL		6.00	EA	PANASONIC	ERJ-6ENF75R0V
			R40, R41, R42, R43, R44, R45					
		M65880	IC,SN65LBC175AD,QUAD RS485,DIFF LINE RECEIVER,SOIC-16, 2.5K/REEL		1.00	EA	TEXAS INSTRUMENTS	SN65LBC175ADR
			DV2					
		M66353	FILTER, DLW31S, COMMON MODE, SMD 1206, 90 OHMS 100 MHZ		1.00	EA	MURATA	DLW31SN900SQ2B
			T1				MURATA	DLW31SN900SQ2L
		M66356	DIODE,PRTR5V0U2X, ESD PROTECTION, SMD SOT143B		16.00	EA	NXP	PRTR5V0U2X
			D13, D14, D15, D16, D17, D18, D19, D20, D21, D22, D23, D24, D25, D26, D27, D32				NXP	PRTR5V0U2X-215
		M66357	CAP,2.2MF,35V, 20%, ELEC, SMD		1.00	EA	PANASONIC	EEE-FC1V2R2AR
			C4				PANASONIC	EEV-FC1V2R2R
		M66544	IC,SN65LBC174A16DW,QUAD RS485 DIFF LINE DRIVERS, SOIC-16, 2K/REEL		2.00	EA	TEXAS INSTRUMENTS	SN65LBC174A16DWR
			DV1, DV3				TEXAS INSTRUMENTS	SN65LBC174A16DWRG4
		M66890	CAP,10MF,20V,20%,TANT,SMD B,2K/REEL		2.00	EA	AVX	TAJB106K020RNJ
			C2, C34				KEMET	T491B106M020AT
		M59324	HARN, 20POS, SERIAL TO HOSTBOARD, FLEX	A	1.00	EA	PANDUIT CORP.	PLT1M-M
			SERIAL 2					
		M11960	WIRE TIE,4",NATURAL TYTON #T18R9M4		2.00	EA	TYTON	T18R9M4NAT
		M13921	EXPANDO BRAID,1/4",BLACK		1.42	FT	ALTA TECHNOLOGIES INC.	95120250
							WESTERN FILAMENT	WF_PT0250BK

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M24750	CONN,20POS,RIBBON CABLE RECEPTACLE,NOVO,30 GOLD		1.00	EA	TYCO INCORPORATED	1658622-4
							TYCO INCORPORATED	746288-4
		M24756	CONN,20 COND RIBBON DIP PLUG .1X.1 CENTER		1.00	EA	TYCO INCORPORATED	1-746610-5
							TYCO INCORPORATED	746610-4
		M35343	CABLE, 28AWG, 13PR, FLAT-N-TWIST (AMPHENOL SPECTRA-STRIP 432-2898-049)		2.00	EA	AMPHENOL SPECTRA	432-2898-049
		M59325	HARN, 26POS, SERIAL TO HOSTBOARD, FLEX	A	1.00	EA		
			SERIAL 1					
		M11960	WIRE TIE,4",NATURAL TYTON #T18R9M4		2.00	EA	PANDUIT CORP.	PLT1M-M
							TYTON	T18R9M4NAT
		M13921	EXPANDO BRAID,1/4",BLACK		1.42	FT	ALTA TECHNOLOGIES INC.	95120250
							WESTERN FILAMENT	WF_PT0250BK
		M24751	CONN,26POS,RIBBON CABLE IDC NOVO,CTR & MIL		1.00	EA	TYCO	1658622-6
							TYCO INCORPORATED	746288-6
		M24757	CONN,26 COND,RIBBON DIP PLUG, .1X.1 C		1.00	EA	TYCO INCORPORATED	TAMP746610-6
		M35343	CABLE, 28AWG, 13PR, FLAT-N-TWIST (AMPHENOL SPECTRA-STRIP 432-2898-049)		2.00	EA	AMPHENOL SPECTRA	432-2898-049
		M66287	CONN,RJ45, VERT, SINGLE, WITH LEDS		2.00	EA	TYCO	1734577-1
			RJ1, RJ2				TYCO	1734577-3
		M66288	CONN,USB,VERT, SINGLE		1.00	EA	TYCO	1734366-1
			USB1					
		M66537	CONN, DB15, FEMALE, WIRE WRAP TIN		1.00	EA	NORTCOMP INC	172-015-242R011
			SP3					
2	A	M58573A	ASSY, PCB, FIELD I/O BOARD, FLEX	X1	1.00	EA		
		M17097	CONN,104 CF;INCLUDE GUIDE		1.00	EA	"POSITRONIC INDUSTRIES	SK2628
			C1S				TYCO	205720-9
							TYCO INCORPORATED	205720-1/202173-8/202174-5
		M24466	HEADER,2POS,.100C,BRKWY SQUARE POST UNSHROUDED		1.00	EA	TYCO INCORPORATED	103747-2
			WDG					
		M24682	HEADER,3POS,MTA.156C,.045 SQ POST,VERT,FRICT-LOCK		1.00	EA	TYCO INCORPORATED	640445-3
			P1					
		M58573S	ASSY, PCB, FIELD I/O BOARD, FLEX, SMT	A	1.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M27849	DIODE,1N4148,100V,SMT DL-35 PKG(LL4148)		9.00	EA	DIODES INC	LL4148
			D1, D2, D3, D4, D5, D6, D7, D8, D9				FAIRCHILD SEMICONDUCTOR	FDLL4148
							MOTOROLA	1N4148SM
		M34639	RES,1K,1/10W,5%,0603 SM RESISTOR CHIP		9.00	EA	PANASONIC	ERJ-3GEYJ102V
			R66, R67, R70, R71, R74, R77, R78, R79, R81					
		M34640	CAP.,1MF,25V,10%, SMD 0603,4K/REEL		42.00	EA	MURATA	GRM188R71E104KA01D
			C1, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C2, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C3, C30, C31, C4, C41, C42, C43, C44, C45, C46, C48, C5, C50, C52, C56, C58, C6, C7, C8, C9				PANASONIC	ECJ-1VB1E104K
		M34641	RES,2.2K,1/10W,5%,0603 SM RESISTOR CHIP		1.00	EA	PANASONIC	ERJ-3GEYJ222V
			R82					
		M34659	RES,470 OHM, 1/8W, 5% SM 0805 RESISTOR CHIP		9.00	EA	PANASONIC	ERJ-6GEYJ471V
			R64, R65, R68, R69, R72, R73, R75, R76, R80					
		M34666	IC,HCPL-0630 OPTOCOUPLER SO-8,1.5K/REEL		5.00	EA	AVAGO	HCPL-0630-500E
			OP1, OP2, OP3, OP4, OP5					
		M44241	RES,150K,0.063W,5%,ARRAY 10 TERM,8 RESISTORS		8.00	EA	PANASONIC	EXBA10P154J
			SIP11, SIP13, SIP15, SIP2, SIP4, SIP6, SIP8, SIP9					
		M45023	RES,10K,1/10W,1%,0603 SMT		64.00	EA	PANASONIC	ERJ3EKF1002V
			R0, R1, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R2, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R3, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R4, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R5, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R6, R60, R61, R62, R63, R7, R8, R9					
		M46815	RES, 220K, ARRAY, 2506, 5%, 16TERM, 8 RESISTORS		8.00	EA	CTS RESISTOR PRODUCTS	742C163224JPTR
			RP1, RP2, P3, RP4, RP5, RP6, RP7, RP8					
		M56732	IC, TPIC6596DW, POWER LOGIC 8-BIT REGISTER, SOIC-20		8.00	EA	TEXAS INSTRUMENTS	TPIC6596DWG4
			U1, U2, U3, U4, U5, U6, U7, U8					
		M58573	PCB, FIELD I/O BOARD, FLEX CONTROLLER, REV A		1.00	EA		
		M58956	IC, GATE NAND, 1CH 2-INP, SOT-23-5		11.00	EA	TEXAS INSTRUMENTS	SN74LVC1G00DBVR
			U19, U22, U23, U24, U25, U26, U27, U28, U29, U30, U31					
		M58957	IC, SINGLE BUS BUFFER GATE, SOT-23-5		2.00	EA	TEXAS INSTRUMENTS	SN74LVC1G125DBV
			U18, U20					

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M65035	TRANSISTOR MMBT2222A, SMT NPN, SMALL SIGNAL, M22		1.00	EA	NXP	MMBT2222A,215
			Q1				ST MICRO	MMBT2222A
		M65036	RES,10K,0.063W,5%,ARRAY 10 TERM,8 RESISTORS		8.00	EA	CTS	745C101103J
			SIP1, SIP10, SIP12, SIP14, SIP16, SIP3, SIP5, SIP7				CTS	745C101103J
							PANASONIC	EXBA10P103J
		M66357	CAP,2.2MF,35V, 20%, ELEC, SMD		2.00	EA	PANASONIC	EEE-FC1V2R2AR
			C49, C53				PANASONIC	EEV-FC1V2R2R
		M66526	IC,SN74HC165QPWR, 8-BIT PARALLEL LOAD REGISTER, 16 TSSOP		9.00	EA	TEXAS INSTRUMENTS	SN74HC165QPWR
			U10, U11, U12, U13, U14, U15, U16, U17, U9				TEXAS INSTRUMENTS	SN74HC165QPWREP
		M66890	CAP,10MF,20V,20%,TANT,SMD B,2K/REEL		4.00	EA	AVX	TAJB106K020RNJ
			C47, C51, C55, C57				KEMET	T491B106M020AT
		M58958	DC TO DC CONVERTER ISO, 12V INPUT, 12V OUTPUT, 3W		1.00	EA	MURATA	MEE3S1212SC
			DC2					
		M58959	DC TO DC CONVERTER ISO, 12V INPUT, 5V OUTPUT, 2W		1.00	EA	MURATA	NML1205SC
			DC1					
		M59323	HARN, 10POS, FIO TO HOSTBOARD, FLEX	A	1.00	EA		
			FIO					
		M11960	WIRE TIE,4",NATURAL TYTON #T18R9M4		2.00	EA	PANDUIT CORP.	PLT1M-M
							TYTON	T18R9M4NAT
		M13921	EXPANDO BRAID,1/4",BLACK		1.42	FT	ALTA TECHNOLOGIES INC.	95120250
							WESTERN FILAMENT	WF_PT0250BK
		M35343	CABLE, 28AWG, 13PR, FLAT-N-TWIST (AMPHENOL SPECTRA-STRIP 432-2898-049)		2.00	EA	AMPHENOL SPECTRA	432-2898-049
		M66201	RECEPTACLE, 10 POS DUAL ROW		1.00	EA	TYCO	1658622-1
		M69058	CONN,10POS,RIBBON DIP PLUG, .1X.1 C		1.00	EA	TYCO	746610-1
		M59888	CONNECTOR, FLEX FIELD, I/O MODULE	A	1.00	EA		
			C11S					
		M31481	CONN,CPC 23-37 SQ FLANGE TYCO 208224-1;PCB MNT		1.00	EA	TYCO	2-208224-1
							TYCO INCORPORATED	208224-1
		M64057	NUT, NYLON, SELF LOCK, CFN-440-1ZI		4.00	EA		
		M59894	IC, FIO FLEX, VM/FM PGM, REV A	A	1.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
		M15603	LABEL,BLANK,1/4" X 3/4" ROLL OF 10,000		1.00	EA	TYCO INCORPORATED	WP-229064-10-9
		M34264	IC,MC68HC908QT2CP,MCU 1.5K FLASH W/ADC, 8-DIP		1.00	EA	FREESCALE	MC68HC908QT2CPE
			U21				MOTOROLA	MC68HC908QT2CP
							MOTOROLA	MC68HC908QT2CPE
		M65050	SOCKET,IC,8PIN,DIP,OPEN LADDER, GOLD/GOLD		1.00	EA	AUGAT	808-AG10D
							TYCO INCORPORATED	0-1437537-5
2	A	M58994	BACK PANEL, FLEX CONTROLLER	A	1.00	EA		
3		M11944	STANDOFF, PEM BSOS-632-20		4.00	EA		
3		M42547	AL; SHT, 5052, .100X48X120, (1.397 LBS/SQFT)		0.93	LB		
3		M57363	NUT, SELF CLINCH, PEM RAS-440-9-4ZI, RIGHT ANGLE		6.00	EA	DB ROBERTS	RAS440-9-4ZI
3		M65624	POWDER, DARK GRAY FINE TEXTURE, RAL 7016, 89/71480		0.04	LB	TIGER DRYLAC	RAL 7016
2		M59899	SCREW, 4-40 X 1/2,PH,FH,SS 100 DEGREE, BLACK		4.00	EA	FASTENERSUPERSTORE	305796
2	A	M64054	C1 BRKT,2070-2 FIELD I/O 2070 CONTROLLER	A	2.00	EA		
3		M11892	NUT, SELF CLINCH, PEM CLS-632-2 SS		4.00	EA		
3		M11913	NUT, SELF CLINCH, PEM CLS-440-2 SS		4.00	EA		
3		M19332	AL; SHT, 5052, .063X48X120, (0.880 LBS/SQFT)		0.02	LB		
1	A	M59415	MODULE, BOTTOM PANEL, FLEX CONTROLLER	A1	1.00	EA		
2		M11611	SCREW,6-32 X 3/8,PH,PN,SS		5.00	EA		
2		M11622	SCREW,6-32 X 1/4,PH,PN,SS		8.00	EA		
2		M11706	WASHER, #6, INT. TOOTH, SS		13.00	EA		
2		M11960	WIRE TIE,4",NATURAL TYTON #T18R9M4		1.00	EA	PANDUIT CORP.	PLT1M-M
							TYTON	T18R9M4NAT
2		M11966	MT CABLE TIE,SCREW DOWN THOMAS & BETTS TC828TB		1.00	EA	THOMAS & BETTS	TC828TB
2		M11967	WIRE TIE,8",NATURAL, TYTON #T50R9M4		2.00	EA		
2		M14679	GROMMET,EDGE .036-.062 C PANDUIT #GES62F-C		0.28	FT	PANDUIT CORP.	GES62F-C
2	A	M45891	ASSY, PWR SUP, W/BACKUP CAPACITOR	B	1.00	EA		
3		M22875	HEAT SHRINK,3/16",BLACK		0.29	FT		
3		M25070	HEAT SHRINK,1/8",BLACK		0.67	FT		
3		M45724	CAP,1200uf, 400V, 20%, SNAP-IN, ELECTROLYTIC.		1.00	EA	CORNELL DUBILIER	383LX122M400N082
							PANASONIC	ECET2GA122FA
							RUBYCON	400MXG1200MMCDNB40X80
3	P	M45996	HARN, PWR SUP W/ BKP CAPACITOR, ATC NEMA	B	1.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
4		M13891	WIRE,20,WHT/RD,19STR MIL-W-16878/2		0.58	FT	NATIONAL WIRE & CABLE COR	MIL-W-16878/2
4		M13892	WIRE,20,RD,19STR NB1932N-2		0.67	FT	NATIONAL WIRE & CABLE COR	NB1932N-2
3		M66514	POWER SUPPLY, DC: 24V, 12V, 5V		1.00	EA	MEANWELL	PT-65D
2	A	M58574A	ASSY, PCB, CONTROL SIGNALS, FLEX	X1	1.00	EA		
		M13762	RES,0.5 OHM,10W,1%,WW		2.00	EA	"RIEDON	UT-10 .5 OHM 1%
			R1, R2				VISHAY DALE	RS-10-0.5-1%
							VISHAY DALE	RS010R5000FE12
							VISHAY DALE	RS010R5000FE73
							VISHAY DALE	RS010R5000FS73
		M13765	VARISTOR,MO,150VAC,LA20		3.00	EA	AVX	VE24M00151K
			MOV1, MOV2, MOV3				LITTELFUSE	V150LA20AP
							MAIDA DEVELOPMENT CO.	D6521ZOV151RA20
		M16914	CAP,470MF,50V,20%,ALEL RADIAL		1.00	EA	CDE	226H471P050SP
			C4				NIC COMPONENTS CORP	NRWA471M50V12.5X20F
							NICHICON	UVZ1H471MHD
							NIPPON	NRWA471M50V12.5X20F
							THOMPSON	KMR471M1HJ21
							UNITED CHEMICON	EKMG630ELL471MK20S
							UNITED CHEMICON	KME50VB471M12X20LL
		M17012	SOCKET,IC,16PIN,.3C OPEN LADDER;4 FINGER CONT		1.00	EA	AUGAT	816-AG-11DES
			U1				MILL-MAX	1109331641001000
							TYCO	2-1437539-8
							TYCO	4-1571552-4
		M17188	RES,POT,50K,3/8" TOP ADJUST,20 TURNS		1.00	EA	BECKMAN	67YR50K
			POT1				BECKMAN	67YR50KLF
		M17439	LINE FILTER,PC MOUNT SHAFFNER #FN405-3/02		1.00	EA	SHAFFNER	FN405-3/02
			FL1					
		M24681	HEADER,2POS,MTA.156C,.045 SQ POST,VERT,FRICT-LOCK		1.00	EA	TYCO INCORPORATED	TAMP640445-2
			SWITCH/FUSE					
		M24682	HEADER,3POS,MTA.156C,.045 SQ POST,VERT,FRICT-LOCK		3.00	EA	TYCO INCORPORATED	640445-3

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
			AC OUTPUT, DC FOR EXT DEVICE, DC FOR FIO					
		M24684	HEADER,5POS,MTA.156C,.045 SQ POST,VERT,FRICT-LOCK		2.00	EA	TYCO INCORPORATED	640445-5
			AC INPUT, DC INPUT					
		M24686	HEADER,8POS,MTA.156C,.045 SQ POST,VERT,FRICT-LOCK		1.00	EA	TYCO	640445-8
			DC FOR HOST					
		M33927	CAP,.68MF,275/250VAC,20%, METALLIZED POLYESTER,RAD		1.00	EA	CORNELL DUBILIER	158X684
			C1				MALLORY	158X684
		M58574S	ASSY, PCB, CONTROL SIGNALS, FLEX, SMT	A	1.00	EA		
		M27851	RES,220K,.1W,5%,SM0805		1.00	EA	PANASONIC	ERJ-6GEYJ224V
			R10					
		M30323	TRANSISTOR,FET SWITCHING, 2N7002,SM SOT-23		7.00	EA	DIODES INC.	2N7002-7-F
			Q1, Q2, Q3, Q4, Q5, Q6, Q7				ON SEMICONDUCTOR	2N7002LT1G
							PHILIPS	2N7002 T/R
							VISHAY	2N7002-T1
							ZETEX	2N7002TA
		M34577	DIODE BRIDGE,HDO4-T,FW,SM .8A		1.00	EA	DIODES INC	HD04-T
			DB1					
		M34632	IC,SN74LV74APW, DUAL D-TYPE FLIP FLOP, TSSOP-14		1.00	EA	TEXAS INSTRUMENTS	SN74LV74APWR
			U3				TEXAS INSTRUMENTS	SN74LV74APWT
		M34639	RES,1K,1/10W,5%,0603 SM RESISTOR CHIP		3.00	EA	PANASONIC	ERJ-3GEYJ102V
			R19, R22, R25					
		M34640	CAP,.1MF,25V,10%, SMD 0603,4K/REEL		10.00	EA	MURATA	GRM188R71E104KA01D
			C14, C15, C16, C18, C19, C21, C22, C23, C5, C6				PANASONIC	ECJ-1VB1E104K
		M34645	RES,10K,1/10W,5%,SMD 0603,5K/REEL		9.00	EA	DALE	CRCW060310K0JNEA
			R11, R14, R15, R17, R18, R20, R21, R23, R24				PANASONIC	ERJ-3GEYJ103V
		M34653	RES,100 OHM 1/8W 5% SM 0805 RESISTOR CHIP		1.00	EA	PANASONIC	ERJ-6GEYJ101V
			R16					
		M34666	IC,HCPL-0630 OPTOCOUPLER SO-8,1.5K/REEL		1.00	EA	AVAGO	HCPL-0630-500E
			OP1					
		M34668	REGULATOR,LDO,3.3V,800MA,SOT-223		1.00	EA	NATIONAL SEMICONDUCTOR	LM1117IMP-3.3
			LR1				NATIONAL SEMICONDUCTOR	LM1117IMPX-3.3

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
							TEXAS INSTRUMENTS	LM1117IMP-3.3/NOPB
							TEXAS INSTRUMENTS	LM1117IMPX-3.3/NOPB
		M46608	RES,182K,1%,SM 0805		1.00	EA	PANASONIC	ERJ-6ENF1823V
			R9					
		M46610	RES,255K,1%,SM 0805		2.00	EA	PANASONIC	ERJ-6ENF2553V
			R3, R4					
		M46611	RES,499K,1%,SM 0805		2.00	EA	PANASONIC	ERJ-6ENF4993V
			R5, R6					
		M46612	RES,511K,1%,SM 0805		1.00	EA	PANASONIC	ERJ-6ENF5113V
			R7					
		M46613	RES,2.2K,5%,SM 1210		2.00	EA	PANASONIC	ERJ-14YJ222U
			R12, R13					
		M46614	DIODE,ZENER,6V 500MV,SOD-123		3.00	EA	DIODES INC.	MMSZ5233B-7-F
			ZD1, ZD2, ZD3					
		M46615	CRYSTAL,15.36MHZ,SMT		1.00	EA	ABRACON	ABLSG-15.360MHZ-D-2-Y-T
			Y1					
		M46616	IC,MC33161,VOLTAGE MONITOR, 2CH, SOIC-8		1.00	EA	ON SEMICONDUCTOR	MC33161DR2
			U2				ON SEMICONDUCTOR	MC33161DR2G
		M58574	PCB, CONTROL SIGNALS, FLEX CONTROLLER, REV A		1.00	EA		
		M65398	CAP,.000018MF, 50V, 5%, SMD 0603,4K/REEL		2.00	EA	BC COMPONENT/VISHAY	VJ0603A180JXACW1BC
			C12, C13				MURATA	GRM1885C1H180JA01D
							TDK	C1608C0G1H180J080AA
		M65400	CAP,.001MF, 2KV, 10%, SM 1206 (1000pF),4K/REEL		2.00	EA	AVX	1206GC102KAT1A
			C2 C3					
		M65418	RES,1.5M,1/8W,1%,SMD 0805		1.00	EA	PANASONIC	ERJ-6ENF1504V
			RF					
		M65436	RES,15K,1/8W,1%,0805 SMT		1.00	EA	PANASONIC	ERJ6ENF1502V
			R8					
		M66356	DIODE,PRTR5V0U2X, ESD PROTECTION, SMD SOT143B		2.00	EA	NXP	PRTR5V0U2X
			D1, D2				NXP	PRTR5V0U2X-215
		M66890	CAP,10MF,20V,20%,TANT,SMD B,2K/REEL		2.00	EA	AVX	TAJB106K020RNJ
			C10, C11				KEMET	T491B106M020AT
		M59639	IC, CONTROL SIGNALS, FLEX, PGM	A	1.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
			U1					
		M15603	LABEL,BLANK,1/4" X 3/4" ROLL OF 10,000		1.00	EA	TYCO INCORPORATED	WP-229064-10-9
		M69114	IC,MC9S08QG8CPBE, MCU, DIP-16		1.00	EA	FREESCALE	MC9S08QG8CPBE
		M65101	TRANSFORMER,2 X 6VAC/42MA		1.00	EA	HAHN	BV 202 0160
			T1				PULSE	020-5376.0
2	A	M58992	BOTTOM PANEL, FLEX CONTROLLER	A1	1.00	EA	TIGER DRYLAC	RAL 7016
3		M19332	AL; SHT, 5052, .063X48X120, (0.880 LBS/SQFT)		0.98	LB		
3		M54711	CABLE TIE MOUNT, PEM TD-40-4 ZI		8.00	EA		
3		M65624	POWDER, DARK GRAY FINE TEXTURE, RAL 7016, 89/71480		0.06	LB		
2	A	M58996	PANEL, PWR SUP & CTRL SIGNALS, FLEX	A2	1.00	EA		
3		M11926	NUT, SELF CLINCH, PEM CLS-632-3 SS		5.00	EA		
3		M12024	STANDOFF, PEM BSOS-632-14		8.00	EA		
3		M42547	AL; SHT, 5052, .100X48X120, (1.397 LBS/SQFT)		0.93	LB		
2		M59669	BUMPER, PUSH FIT, FOOT		4.00	EA	ESSENTRA COMPONENTS	POF-50185

This section contains the Flex Rack Mount Controllers parts list.

“Level 0” means the highest level for an assembly; it is built of parts and/or sub-assemblies that belong to “Level 1”, at the same time such sub-assemblies could be formed by “Level 2” parts/sub-assemblies and so on, increasing the complexity of the assembly. Assy “A” means that the part number is a sub-assembly.

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
0	A	M73101R	FLEX RACK MOUNT CONTROLLER	A	1.00	EA		
1		M11706	WASHER, #6, INT. TOOTH, SS		8.00	EA		
1		M14691	BUSHING, STRAIN RELIEF - HEYCO #HEY1210		1.00	EA	HEYCO	HEY1210
							MOUSER	561MP6P4SPC SRR-10
1		M40047	SCREW, 6-32 X 5/16, PH, PN, SS		8.00	EA		
1		M58960	SCREW, 6-32 X 3/8, PH, FH, SS, 100 DEG, BLACK		22.00	EA		
1	A	M59320	HARN, SET, FLEX CONTROLLER	A	1.00	EA		
1	A	M59659	BRACKET 3U, RIGHT SIDE, FLEX RM CONTROLLER	A	1.00	EA		
1	A	M59665	TOP PANEL, FLEX RM CONTROLLER	A	1.00	EA		
1	A	M59666	MODULE, BOTTOM PANEL, FLEX RM CONTROLLER	A1	1.00	EA		
1	A	M59668	BRACKET 3U, LEFT SIDE, FLEX RM CONTROLLER	A	1.00	EA		
1	A	M59925	MODULE, BACK PANEL, FLEX RM CONTROLLER	A	1.00	EA		
1	A	M73123	MODULE, FRONT PANEL, FLEX RM CONTROLLER	A	1.00	EA		
2		M11622	SCREW, 6-32 X 1/4, PH, PN, SS		2.00	EA		
2		M11625	SCREW, 4-40 X 1/4, PH, PN, SS		12.00	EA		
2		M11671	JACKSCREW, 4-40 X 1/4, M/F TAP FOR D CONN		2.00	EA	KEYSTONE	7228
2		M11706	WASHER, #6, INT. TOOTH, SS		2.00	EA		
2		M11717	WASHER, #4, SPLIT LOCK, SS		12.00	EA		
2		M11745	WASHER, #2, INT. TOOTH, SS		6.00	EA		
2		M11750	WASHER, #2, FLAT, NYLON .098 ID X.250 OD X.032THK		2.00	EA	KEYSTONE	3347
2		M11783	NUT, HEX, 4-40, KEPNUT, SS		2.00	EA		
2		M14838	FUSE, 2A, 250V, SLO BLO BUSSMAN #MDL2		1.00	EA	BUSSMAN	BK/MDL-2-R
							BUSSMAN	MDL-2/BK
							BUSSMAN	MDL2
							LITTLEFUSE	313002
2		M41113	NUT, 2-56, HEX, SS		6.00	EA		
2		M46871	CLIP-ON MOUNTING, CLEAN AND BRIGHT FINISH		1.00	EA	TECH-ETCH	182RF9C070L-2.18-02
2	A	M52284A	ASSY, PCB, 2070-1C, ENGINE	A	1.00	EA		

2		M54808	SPACER,#4,3/16L,NYLON		4.00	EA	RAF ELECTRONIC HARDWARE	1108-4-N
2		M56523	STANDOFF, 4-40 X 11/32", 1/4" Hex, F/F, AL		4.00	EA	RAF ELECTRONIC HARDWARE	2101T-440-AL
							RAF ELECTRONIC HARDWARE	2101T-440-AL-7
2		M57118	FUSE HOLDER,PANEL MT,1/4 SCREWDRIVER		1.00	EA	EATON BUSSMANN	BK-HTB-521-R
2	A	M57131	BRACKET, FUSE HOLDER, SUPPORT	A	1.00	EA		
2	A	M58570A	ASSY, PCB, HOSTBOARD, FLEX, TH	A	1.00	EA		
2	A	M58995	WIFI, ANTENNA SUPPORT, FLEX	A	1.00	EA		
2	A	M59321	ASSY, LCD/HARN, FLEX CONTROLLER	A	1.00	EA		
2		M59351	BRACKET, L, PCB MOUNT, 6-32 STEEL		2.00	EA	KEYSTONE	708
2		M59352	SWITCH, ROCKER, SPST, FAST TERMINAL, W/GUARD, 4A 125VAC		1.00	EA	C&K COMPONENTS	D102J12B215PQA
2	A	M59662	FRONT PANEL, FLEX RM CONTROLLER	A	1.00	EA		
2		M61389	WASHER,NYLON,1/2"ID X 11/16"OD X .031 THK, NY (NYLON)		2.00	EA		
2		M66261	KEYPAD,7ROWX4COL,W/14POS HEADER BOX		1.00	EA	INPLAY TECHNOLOGIES	CUSTOM MADE FOR MCCAIN
2		M66392	STANDOFF, 4-40 X 3/16", 11/16" HEX, F/F, AL, MOUSER		2.00	EA	FASCOMP	FC2060-440-A
2	A	M73097A	ASSY, PCB, SD CARD, USB AND DK, FLEX CONTROLLER, TH	A	1.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
0	A	M73101RA	FLEX RACK MOUNT CONTROLLER, CALTRANS	A	1.00	EA		
1		M11706	WASHER, #6, INT. TOOTH, SS		8.00	EA		
1		M14691	BUSHING,STRAIN RELIEF - HEYCO #HEY1210		1.00	EA	HEYCO	HEY1210
							MOUSER	561MP6P4SPC SRR-10
1		M40047	SCREW,6-32 X 5/16,PH,PN,SS		8.00	EA		
1		M58960	SCREW,6-32 X 3/8,PH,FH,SS, 100 DEG,BLACK		22.00	EA		
1	A	M59320	HARN, SET, FLEX CONTROLLER	A	1.00	EA		
1	A	M59659	BRACKET 3U, RIGHT SIDE, FLEX RM CONTROLLER	A	1.00	EA		
1	A	M59663	MODULE, BACK PANEL, FLEX RM CONTROLLER, FIO	A	1.00	EA		
1	A	M59665	TOP PANEL, FLEX RM CONTROLLER	A	1.00	EA		
1	A	M59666	MODULE, BOTTOM PANEL, FLEX RM CONTROLLER	A1	1.00	EA		
1	A	M59668	BRACKET 3U, LEFT SIDE, FLEX RM CONTROLLER	A	1.00	EA		
1	A	M73123	MODULE, FRONT PANEL, FLEX RM CONTROLLER	A	1.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
0	A	M73101RW	FLEX RACK MOUNT CONTROLLER, WIFI	A	1.00	EA		
1		M11706	WASHER, #6, INT. TOOTH, SS		8.00	EA		
1		M14691	BUSHING,STRAIN RELIEF - HEYCO #HEY1210		1.00	EA	HEYCO	HEY1210
							MOUSER	561MP6P4SPC SRR-10
1		M40047	SCREW,6-32 X 5/16,PH,PN,SS		8.00	EA		
1		M58960	SCREW,6-32 X 3/8,PH,FH,SS, 100 DEG,BLACK		22.00	EA		
1	A	M59320	HARN, SET, FLEX CONTROLLER	A	1.00	EA		
1	A	M59659	BRACKET 3U, RIGHT SIDE, FLEX RM CONTROLLER	A	1.00	EA		
1	A	M59661	MODULE, FRONT PANEL, FLEX RM CONTROLLER, WIFI	A	1.00	EA		
1	A	M59665	TOP PANEL, FLEX RM CONTROLLER	A	1.00	EA		
1	A	M59666	MODULE, BOTTOM PANEL, FLEX RM CONTROLLER	A1	1.00	EA		
1	A	M59668	BRACKET 3U, LEFT SIDE, FLEX RM CONTROLLER	A	1.00	EA		
1	A	M59925	MODULE, BACK PANEL, FLEX RM CONTROLLER	A	1.00	EA		
2		M11622	SCREW,6-32 X 1/4,PH,PN,SS		4.00	EA		
2		M11671	JACKSCREW,4-40 X 1/4,M/F TAP FOR D CONN		8.00	EA	KEYSTONE	7228
2		M11706	WASHER, #6, INT. TOOTH, SS		4.00	EA		
2	A	M58571A	ASSY, PCB, SERIAL INTERFACE, FLEX, TH	A	1.00	EA		
2	A	M59926	BACK PANEL, FLEX RM CONTROLLER W/OUT FIO	A	1.00	EA		
3		M11944	STANDOFF, PEM BSOS-632-20		4.00	EA		
3		M42547	AL; SHT, 5052, .100X48X120, (1.397 LBS/SQFT)		2.33	LB		
3		M58955	NUT, SELF CLINCH, PEM RAS-632-10-4ZI, RIGHT ANGLE		8.00	EA	PENNENGINEERING	RAS632-10-4ZI
3		M65624	POWDER, DARK GRAY FINE TEXTURE, RAL 7016, 89/71480		0.05	LB	TIGER DRYLAC	RAL 7016

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
0	A	M73101RWA	FLEX RACK MOUNT CONTROLLER, WIFI, CALTRANS	A	1.00	EA		
1		M11706	WASHER, #6, INT. TOOTH, SS		8.00	EA		
1		M14691	BUSHING,STRAIN RELIEF - HEYCO #HEY1210		1.00	EA	HEYCO	HEY1210
							MOUSER	561MP6P4SPC SRR-10
1		M40047	SCREW,6-32 X 5/16,PH,PN,SS		8.00	EA		
1		M58960	SCREW,6-32 X 3/8,PH,FH,SS, 100 DEG,BLACK		22.00	EA		
1	A	M59320	HARN, SET, FLEX CONTROLLER	A	1.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
1	A	M59659	BRACKET 3U, RIGHT SIDE, FLEX RM CONTROLLER	A	1.00	EA		
2		M42547	AL; SHT, 5052, .100X48X120, (1.397 LBS/SQFT)		0.47	LB		
2		M65624	POWDER, DARK GRAY FINE TEXTURE, RAL 7016, 89/71480		0.01	LB	TIGER DRYLAC	RAL 7016
1	A	M59661	MODULE, FRONT PANEL, FLEX RM CONTROLLER, WIFI	A	1.00	EA		
2		M11622	SCREW,6-32 X 1/4,PH,PN,SS		2.00	EA		
2		M11625	SCREW,4-40 X 1/4,PH,PN,SS		12.00	EA		
2		M11671	JACKSCREW,4-40 X 1/4,M/F TAP FOR D CONN		2.00	EA	KEYSTONE	7228
2		M11706	WASHER, #6, INT. TOOTH, SS		2.00	EA		
2		M11717	WASHER, #4, SPLIT LOCK, SS		12.00	EA		
2		M11745	WASHER, #2, INT. TOOTH, SS		6.00	EA		
2		M11750	WASHER, #2, FLAT, NYLON .098 ID X.250 OD X.032THK		2.00	EA	KEYSTONE	3347
2		M11783	NUT, HEX, 4-40, KEPNUT, SS		2.00	EA		
2		M14838	FUSE,2A,250V,SLO BLO BUSSMAN #MDL2		1.00	EA	BUSSMAN	BK/MDL-2-R
							BUSSMAN	MDL-2/BK
							BUSSMAN	MDL2
							LITTLEFUSE	313002
2		M41113	NUT, 2-56, HEX,SS		6.00	EA		
2		M46871	CLIP-ON MOUNTING, CLEAN AND BRIGHT FINISH		1.00	EA	TECH-ETCH	182RF9C070L-2.18-02
2	A	M52284A	ASSY, PCB, 2070-1C, ENGINE	A	1.00	EA		
2		M54808	SPACER,#4,3/16L,NYLON		4.00	EA	RAF ELECTRONIC HARDWARE	1108-4-N
2		M56523	STANDOFF, 4-40 X 11/32", 1/4" Hex, F/F, AL		4.00	EA	RAF ELECTRONIC HARDWARE	2101T-440-AL
							RAF ELECTRONIC HARDWARE	2101T-440-AL-7
2		M57118	FUSE HOLDER,PANEL MT,1/4 SCREWDRIVER		1.00	EA	EATON BUSSMANN	BK-HTB-521-R
2	A	M57131	BRACKET, FUSE HOLDER, SUPPORT	A	1.00	EA		
2	A	M58570A	ASSY, PCB, HOSTBOARD, FLEX, TH	A	1.00	EA		
2	A	M58572A	ASSY, PCB, WIFI, FLEX CONTROLLER, TH	A	1.00	EA		
2	A	M58995	WIFI, ANTENNA SUPPORT, FLEX	A	1.00	EA		
2	A	M59321	ASSY, LCD/HARN, FLEX CONTROLLER	A	1.00	EA		
2		M59351	BRACKET, L, PCB MOUNT, 6-32 STEEL		2.00	EA	KEYSTONE	708
2		M59352	SWITCH, ROCKER, SPST, FAST TERMINAL, W/GUARD, 4A 125VAC		1.00	EA	C&K COMPONENTS	D102J12B215PQA
2	A	M59662	FRONT PANEL, FLEX RM CONTROLLER	A	1.00	EA		
3		M11958	STUD, SELF CLINCH, PEM FHS-440-8 ST		4.00	EA		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
3		M12011	STANDOFF, PEM BSOS-440-24		2.00	EA		
3		M19620	POWDER, BLACK, MCCAIN TRAFFIC BLACK PPG # PCTT90169		0.05	LB	ROHM AND HAAS	R&H#30-7808
							SPRAYLAT	PPL4975D
3		M42547	AL; SHT, 5052, .100X48X120, (1.397 LBS/SQFT)		2.33	LB		
3		M58955	NUT, SELF CLINCH, PEM RAS-632-10-4ZI, RIGHT ANGLE		10.00	EA	PENNENGINEERING	RAS632-10-4ZI
3		M59128	STUD, SELF CLINCH, PEM FHS-256-5		4.00	EA	PENNENGINEERING	PEM FHS-256-5
3		M59316	STANDOFF, PEM BSOS-440-22		4.00	EA	PENNENGINEERING	BSOS-440-22
3	A	M59339	BRACKET CLIP ON SUPPORT, FLEX	A	1.00	EA		
3		M59923	LABEL, FRONT PANEL, FLEX RM CONTROLLER, CUSTOM MADE		1.00	EA	MAVERICK LABEL	MX170-100-102
3		M61888	STUD, SELF CLINCH, PEM FHS-440-6 ST		2.00	EA		
3		M69437	STUD, SELF CLINCH, PEM FHS-256-6		2.00	EA		
2		M59893	WIFI ANTENNA, 2.4GHz, CABLE 100mm, SMT MALE ADHESIVE		1.00	EA	MOLEX, LLC	0479500001
2		M61389	WASHER,NYLON,1/2"ID X 11/16"OD X .031 THK, NY (NYLON)		2.00	EA		
2		M66261	KEYPAD,7ROWX4COL,W/14POS HEADER BOX		1.00	EA	INPLAY TECHNOLOGIES	CUSTOM MADE FOR MCCAIN
2		M66392	STANDOFF, 4-40 X 3/16", 11/16" HEX, F/F, AL, MOUSER		2.00	EA	FASCOMP	FC2060-440-A
1	A	M59663	MODULE, BACK PANEL, FLEX RM CONTROLLER, FIO	A	1.00	EA		
2		M11622	SCREW,6-32 X 1/4,PH,PN,SS		4.00	EA		
2		M11671	JACKSCREW,4-40 X 1/4,M/F TAP FOR D CONN		8.00	EA	KEYSTONE	7228
2		M11706	WASHER, #6, INT. TOOTH, SS		4.00	EA		
2		M44730	SCREW,4-40 X 3/8,PH,FH,SS, 100 DEG, BLACK		4.00	EA		
2	A	M58571A	ASSY, PCB, SERIAL INTERFACE, FLEX, TH	A	1.00	EA		
2	A	M58573A	ASSY, PCB, FIELD I/O BOARD, FLEX	A	1.00	EA		
2	A	M59664	BACK PANEL, FLEX RM CONTROLLER	A	1.00	EA		
3		M11944	STANDOFF, PEM BSOS-632-20		4.00	EA		
3		M42547	AL; SHT, 5052, .100X48X120, (1.397 LBS/SQFT)		2.33	LB		
3		M58955	NUT, SELF CLINCH, PEM RAS-632-10-4ZI, RIGHT ANGLE		8.00	EA	PENNENGINEERING	RAS632-10-4ZI
3		M65624	POWDER, DARK GRAY FINE TEXTURE, RAL 7016, 89/71480		0.05	LB	TIGER DRYLAC	RAL 7016
2		M59899	SCREW, 4-40 X 1/2,PH,FH,SS 100 DEGREE, BLACK		4.00	EA	FASTENERSUPERSTORE	305796
2	A	M64054	C1 BRKT,2070-2 FIELD I/O 2070 CONTROLLER	A	2.00	EA		
1	A	M59665	TOP PANEL, FLEX RM CONTROLLER	A	1.00	EA		
2		M11892	NUT, SELF CLINCH, PEM CLS-632-2 SS		12.00	EA		
2		M19332	AL; SHT, 5052, .063X48X120, (0.880 LBS/SQFT)		1.47	LB		

Level	A	Part Number	Description	Rev Level	Quantity	U of M	Manufacturer	Manufacturer's Part Number
2		M57363	NUT, SELF CLINCH, PEM RAS-440-9-4ZI, RIGHT ANGLE		4.00	EA	DB ROBERTS	RAS440-9-4ZI
2		M65624	POWDER, DARK GRAY FINE TEXTURE, RAL 7016, 89/71480		0.10	LB	TIGER DRYLAC	RAL 7016
1	A	M59666	MODULE, BOTTOM PANEL, FLEX RM CONTROLLER	A1	1.00	EA		
2		M11611	SCREW,6-32 X 3/8,PH,PN,SS		5.00	EA		
2		M11622	SCREW,6-32 X 1/4,PH,PN,SS		8.00	EA		
2		M11706	WASHER, #6, INT. TOOTH, SS		13.00	EA		
2		M11960	WIRE TIE,4",NATURAL TYTON #T18R9M4		1.00	EA	PANDUIT CORP.	PLT1M-M
							TYTON	T18R9M4NAT
2		M11966	MT CABLE TIE,SCREW DOWN THOMAS & BETTS TC828TB		1.00	EA	THOMAS & BETTS	TC828TB
2		M11967	WIRE TIE,8",NATURAL, TYTON #T50R9M4		2.00	EA		
2		M14679	GROMMET,EDGE .036-.062 C PANDUIT #GES62F-C		0.28	FT	PANDUIT CORP.	GES62F-C
2	A	M45891	ASSY, PWR SUP, W/BACKUP CAPACITOR	B	1.00	EA		
2	A	M58574A	ASSY, PCB, CONTROL SIGNALS, FLEX	A	1.00	EA		
2	A	M58996	PANEL, PWR SUP & CTRL SIGNALS, FLEX	A2	1.00	EA		
2	A	M59667	BOTTOM PANEL, FLEX RM CONTROLLER	A1	1.00	EA		
3		M19332	AL; SHT, 5052, .063X48X120, (0.880 LBS/SQFT)		1.76	LB		
3		M57363	NUT, SELF CLINCH, PEM RAS-440-9-4ZI, RIGHT ANGLE		8.00	EA	DB ROBERTS	RAS440-9-4ZI
3		M65624	POWDER, DARK GRAY FINE TEXTURE, RAL 7016, 89/71480		0.08	LB	TIGER DRYLAC	RAL 7016
2		M59669	BUMPER, PUSH FIT, FOOT		4.00	EA	ESSENTA COMPONENTS	POF-50185
1	A	M59668	BRACKET 3U, LEFT SIDE, FLEX RM CONTROLLER	A	1.00	EA		
2		M42547	AL; SHT, 5052, .100X48X120, (1.397 LBS/SQFT)		0.47	LB		
2		M65624	POWDER, DARK GRAY FINE TEXTURE, RAL 7016, 89/71480		0.01	LB	TIGER DRYLAC	RAL 7016

APPENDIX C: CONNECTOR'S DETAIL

Pin assignments for the Flex Controller communication ports.

The unit has a DB-25 female connector containing both SP3 and SP5 ports, is labeled as "C12S SP3/SP5" on the Back Panel.

a) Pin assignment of the C12S port (DB-25 position connector).

C12S SP3/SP5, DB-25 pin out	
PIN	SIGNAL
1	SP5 TxD+
2	SP5 RxD+
3	SP5 TxC+
4	SP5 RxC+
5	SP3 TxD+
6	SP3 RxD+
7	SP3 TxC+
8	SP3 RxC+
9	Linesync+
10	NReset+
11	PowerDown+
12	BIAS +5 VDC
13	DCG #2
14	SP5 TxD-
15	SP5 RxD-
16	SP5 TxC-
17	SP5 RxC-
18	SP3 TxD-
19	SP3 RxD-
20	SP3 TxC-
21	SP3 RxC-
22	Linesync-
23	NReset-
24	PowerDown-
25	Equipment Ground

An SDLC port is designated to synchronous communications to cabinet's serial bus, it is a RS-485 serial communication port with software selectable speed from 19.2Kbps to 614Kbps available over a DB-15 female connector.

b) Pin assignment of the SDLC (SP3S) port (DB-15 position connector).

SDLC Port, DB-15 pin out	
PIN	SIGNAL
1	TxD+
2	GND
3	TxCLKO+
4	GND
5	RxD+
6	GND
7	RxCLK+
8	GND
9	TxD-
10	ENABLE/DISABLE
11	TxCLKO-
12	CHASSIS GND
13	RxD-
14	NC
15	RxCLK-

The unit has three RS-232 asynchronous serial communication ports with software selectable speed from 1.2Kbps to 115.2Kbps, these ports are available over DB-9 female connectors. SP4 is used primarily for connecting a terminal computer or as a general purpose port, SP1 and SP2 are general purpose ports.

c) Pin assignment of the SP4 (DB-9 position connector).

SP4, DB-9 pin out	
PIN	SIGNAL
1	NC
2	RxD
3	TxD
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

d) Pin assignment of the SP1 and SP2 Ports (DB-9 position connector).

SP1 and SP2 , DB-9 pin out	
PIN	SIGNAL
1	DCD
2	RxD
3	TxD
4	NC
5	GND
6	NC
7	RTS
8	CTS
9	NC

The unit also has 64 parallel input ports and 64 parallel output ports in the connectors C1S and C11S located on the Back Panel.

e) Pin assignment of the C11S connector.

C11S connector pin out			
PIN	FUNCTION	PIN	FUNCTION
1	O56	19	I52
2	O57	20	I53
3	O58	21	I54
4	O59	22	I55
5	O60	23	I56
6	O61	24	I57
7	O62	25	I58
8	O63	26	I59
9	DGND	27	I60
10	I24	28	I61
11	I25	29	I62
12	I26	30	I63
13	I27	31	DGND
14	DGND	32	N/A
15	I48	33	N/A
16	I49	34	N/A
17	I50	35	N/A
18	I51	36	N/A
		37	DGND

f) Pin assignment of the C1S connector.

C11S connector pin out							
PIN	FUNC	PIN	FUNC	PIN	FUNC	PIN	FUNC
1	DGND	27	O24	53	I14	79	I44
2	O0	28	O25	54	I15	80	I45
3	O1	29	O26	55	I16	81	I46
4	O2	30	O27	56	I17	82	I47
5	O3	31	O28	57	I18	83	O40
6	O4	32	O29	58	I19	84	O41
7	O5	33	O30	59	I20	85	O42
8	O6	34	O31	60	I21	86	O43
9	O7	35	O32	61	I22	87	O44
10	O8	36	O33	62	I23	88	O45
11	O9	37	O34	63	I28	89	O46
12	O10	38	O35	64	I29	90	O47
13	O11	39	I0	65	I30	91	O48
14	DGND	40	I1	66	I31	92	DGND
15	O12	41	I2	67	I32	93	O49
16	O13	42	I3	68	I33	94	O50
17	O14	43	I4	69	I34	95	O51
18	O15	44	I5	70	I35	96	O52
19	O16	45	I6	71	I36	97	O53
20	O17	46	I7	72	I37	98	O54
21	O18	47	I8	73	I38	99	O55
22	O19	48	I9	74	I39	100	O36
23	O20	49	I10	75	I40	101	O37
24	O21	50	I11	76	I41	102	038 DET RES
25	O22	51	I12	77	I42	103	039 WDT
26	O23	52	I13	78	I43	104	DGND

APPENDIX D: UPDATING KERNEL AND UBOOT

Requirements to update the Linux Kernel and U-Boot:

- Latest binary files of Linux Kernel, U-Boot, rootfilesystem and the DTB file.
- A computer with an installed terminal program (Such Hyperterminal for windows or ProComm).
- An installed TFTP program (Such SolarWinds.Net TFTP server for Windows)
- FleX Controller.
- FleX terminal cable (for port 2).

Note: Please perform a controller backup before update.

Warning: performing the following steps incorrectly could cause controller malfunctions or permanent damage.

Follow the next steps to update the FleX controller Linux Kernel and U-Boot:

- Install the computer and the controller together in a Local Area Network.
- Configure the TFTP program to point the folder where the binaries are stored (such c:\latest kernel binaries\).
- Get the IP number of the computer (i.e. 192.168.2.254).
- Connect the terminal cable between the computer and the controller (port 2).
- Turn ON the controller and press any key in the computer to abort kernel boot. You will get a similar output:

```
U-Boot 1.3.0-rc2 (Aug 19 2016 - 11:08:28) McCainEngineBoard
Reset Status: Software Hard, External/Internal Soft, External/Internal Hard
CPU:   e300c1, MPC8360E, Rev: 21 at 399.999 MHz, CSB: 266 MHz
Unit:   McCain Engine Board III
       testing for ATCeX2, ATCeXRM and 2070-1C
I2C:    ready
DRAM:   256 MB
FLASH:  16 MB
NAND:   256 MiB
In:      serial
Out:     serial
Err:     serial
Net:     UEC: PHY is Generic MII (0)
       UEC: PHY is Generic MII (0)
       FSL UEC0, FSL UEC1
Hit any key to stop autoboot:  0
=> █
```

- Setup controller network settings by typing the following:

```
=> set ipaddr 192.168.2.234
=> set ip1addr 192.168.2.235
=> set serverip 192.168.2.254
=> set gatewayip 192.168.2.1
=> set netmask 255.255.254.0
=> █
```

Please note: *ipaddr*, *ip1addr* are the IP addresses for Ethernet Port 1 and Port 2. *serverip* is the computer IP address (where the TFTP server program is), *gatewayip* and *netmask* are part of the network parameters and must be configured.

- Proceed to test the computer and controller connectivity by typing the following:

```
=> ping 192.168.2.254
Using FSL UEC0 device
host 192.168.2.254 is alive
=>
```

Pinging the computer and having a response from it is the best way to test the link.

- Proceed to update the U-Boot (u-bootEBIII.bin). Be careful to not turn OFF the controller or interrupting the network link between the controller and computer. Type the following to update the U-Boot:

```
protect off bank 1

erase 0xFE000000 0xFE0DFFFF

tftp 0x400000 u-bootEBIII.bin

cp.b 0x400000 0xFE000000 $filesize
```

- Proceed to update the kernel (uImage_EBIII) by typing the following:

```
erase 0xFE100000 0xFE7FFFFFFF

tftp 0x400000 uImage_EBIII

cp.b 0x400000 0xFE100000 $filesize
```

- Proceed to update the DTB (atc_EBIII.dtb) by typing the following:

```
erase 0xFE0F0000 0xFE0FFFFFFF

tftp 0x400000 atc_EBIII.dtb

cp.b 0x400000 0xFE0F0000 $filesize
```

- Proceed to update the root file system (rootfs_EBIII) by typing the following:

```
erase 0XfE800000 0xFEFFFFFFF
```

```
tftp 0x1000000 rootfs_EBIII
```

```
cp.b 0x1000000 0Xfe800000 $filesize
```

- Turn OFF and turn ON the controller, the update is complete.