USER GUIDE

RCP-STAT CONTROL PANEL

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Publication: 81-9059-0313-0, Rev. E

Revision History:

08/15/94	Manual Released for Initial Printing as Rev A.
02/28/01	Rev. B Not Released – Agile Conversion
02/28/01	Rev. C Synchronized Revision Level with Agile per ECO CE00126.
03-02-01	Rev. D: Deleted Printing Specification per ECO CE00113.
02/13/12	Rev. E Reformatted Cover, Updated Company Information and Logo. No change to text.

Attention:

All equipment items manufactured by or sold by PESA Switching Systems, Inc. should be serviced by qualified service personnel or by qualified service technicians only.

Note:

PESA reserves the right to change any information contained in this manual without notice.

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1.1 Manual Overview

This manual provides detailed instructions for installing and operating the PESA RCP–STAT Display Panels. This manual is divided into seven sections as shown.

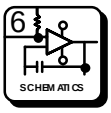
Section 1, **INTRODUCTION**, summarizes the manual, describes both types of the RCP-STAT Display Panels (RCP-STAT1 and RCP-STAT2), presents a list of terms, and provides the panel specifications.

Section 2, **INSTALLATION**, provides installation and setup instructions.

Section 3, **OPERATION**, describes operation procedures.

Section 4, **FUNCTIONAL DESCRIPTIONS**, presents an in-depth description of each RCP–STAT component.

Section 5, **MAINTENANCE**, explains procedures for maintenance.



Section 6, **SCHEMATICS**, gives a complete package of technical documents such as schematics, and assembly drawings.

Section 7, **PARTS LIST**, provides a detailed list of system parts and components.

1.2 General Description

Offered in either a single eight character model (RCP-STAT1) or a dual eight character model (RCP-STAT2), PESA's Display Panels provide a cost effective means of labeling monitor walls, control rooms, and remote control stations. With a character height of 0.75 inches, the red LED displays on both models are clearly readable from across a room.

Both the RCP-STAT1 and the RCP-STAT2 connect to the standard PESA RS485 Communications Bus on the RC5500 System Controller. This arrangement allows the individual display panels to be located up to 4000 feet from the system controller.

Each RCP-STAT Display Panel can be configured to display various types of system status information. The RCP-STAT Display Panels also feature the ability to display static messages allowing a wide variety of labeling configurations.

Both models of the RCP-STAT Display Panel come packaged in a standard 19 inch, one rack unit (1RU) chassis requiring only 1 1/2 inches of depth, making them suitable for use in tight locations. Each display unit is powered by a 7.5 VDC Plug-in-the-Wall type power pack.

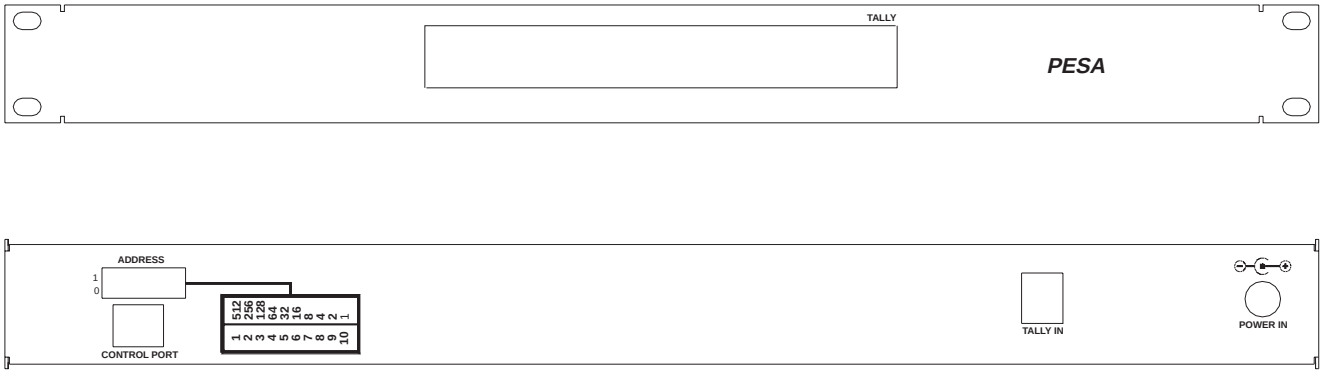


Figure 1-1 RCP-STAT 1 Front and Rear Views

1.2 General Description Continued:

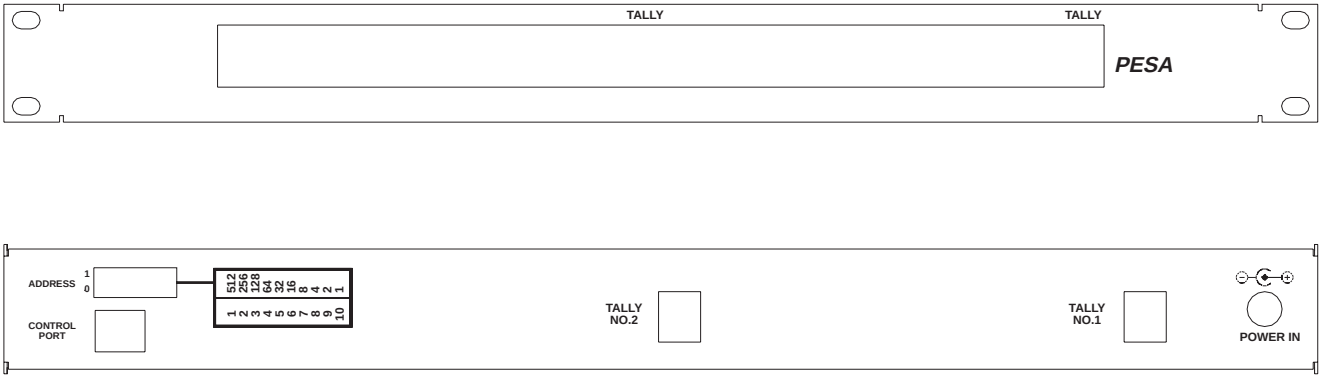


Figure 1-2 RCP-STAT2 Front and Rear Views

1.3 Specifications

RCP-STAT - Monitor Status Display Models

RCP-STAT1	Single Display
RCP-STAT2	Dual Display

CONTROL INTERFACE CHARACTERISTICS

Connector Type	3 Pin, 2 Part Detachable
Control Interface	RS485
Protocol	PESA Proprietary
Tally Interface	3 Pin, 2 part Detachable
Address	10 Position DIP Switch

MECHANICAL

One Rack Unit	19"W x 1 1/2"D x 1 3/4"H (482.6mmx38.1mmx44.45mm) (See Note 1)

POWER

Voltage Requirements	+7.5 VDC @ 800 mA

ENVIRONMENTAL

Temperature	0°C to 40°C
Humidity	20% to 90% Non-Condensing

DISPLAY

8 HP (HDSP-L203), 5X7 Dot Matrix, Red LED Displays
0.75" Character Height X 0.40" Character Width

NOTE 1: The depth specified does not include cabling and external connectors on mating cables.

2.1 Introduction

This section details RCP-STAT installation procedures. The following topics are discussed:

- Receipt Inspection
- Location and Mounting
- Polling Address
- Display Panel/Controller Interconnection
- Tally Connections
- Power Connections

2.2 Receipt Inspection

The RCP-STAT Display Panel was inspected and tested prior to leaving the PESA factory. Upon receipt, please inspect the unit for shipping damage. If damage is detected, notify the carrier immediately and hold all packing material for inspection. If assistance is required, please contact PESA Customer Service at the telephone number listed in the front of this manual.

After unpacking, compare all parts received against the packing list. If the unit is undamaged and all components have been received, proceed with installation.

2.3 Location and Mounting

The RCP-STAT has been designed to fit in a standard E.I.A. 19" equipment rack and uses 1 rack unit of space (1 3/4"). An area should be selected where temperature does not exceed 40°C inside the equipment rack, and where air can circulate freely. The unit should be mounted in an area convenient to control and power connections. Sufficient space must be provided behind the rack to allow for the control and power cables. All mounting holes should be utilized and hardware tightened securely. All cables should be strained relieved and secured to racks or other supporting structures. Failure to provide adequate cable support can result in cables separating from connectors. If cable runs are to be stored under an elevated floor, they should be tied to the racks as a guide. If cables are run along the floor, do not allow them to lay in the work area behind the racks. Stepping or tripping on the cables may result in connections being pulled free or wire breakage inside the insulation.

Location and Mounting Continued:

Figure 2–1 illustrates chassis installation.

To install the RCP-STAT chassis follow these steps:

1. Align the chassis with the slotted opening in the rack.
2. Install the bottom screws first.
3. Install the two top screws
4. Tighten all four screws securely.

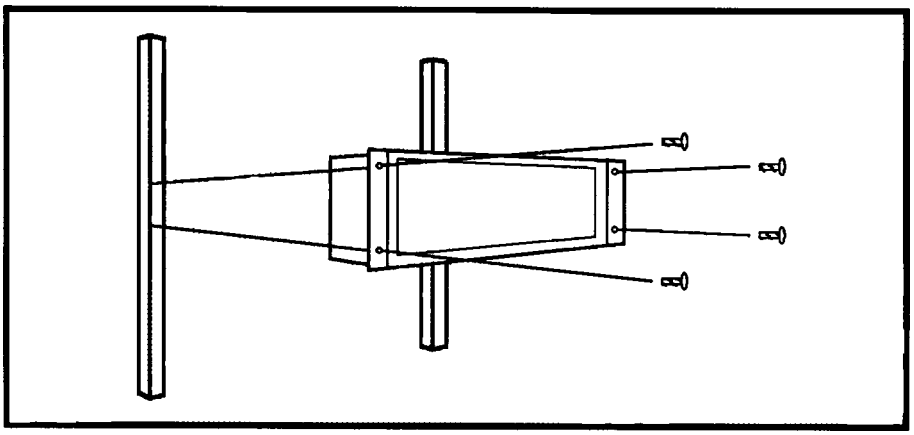


Figure 2–1 RCP-STAT Chassis Installation

2.4 Polling Address

For the controller to identify a particular control panel, a specific device number or polling address must be assigned to each panel. Valid polling addresses are in the range of 1 to 255. The appropriate binary number is entered into the control panel by setting a 10-position DIP switch to the binary number. The DIP switch is located on the Display Board and is accessible from the rear of the unit. The panel address is normally assigned and entered at the factory if the panel is purchased as part of a system and a design guide has been completed by the user. If the panel is purchased separately, the user may be required to set the panel address.

Example: To select polling address 21, set switches 6,8, and 10 in the "ON" or "1" position. See Figure 2–2.

2.4 Polling Address (Device Number) Continued:

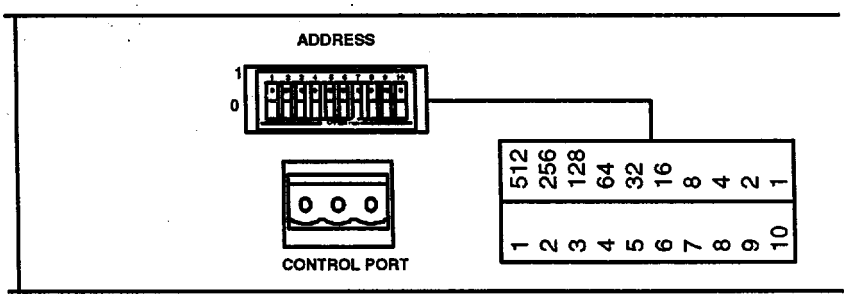


Figure 2–2 DIP Switch Location

2.5 Display Panel/Controller Interconnection

Each RCP-STAT Display Panel has a single 3-pin MTA connector located on the rear panel (labeled CONTROL PORT) that is used for connection to the System Controller. Display panels are daisy chained to a port on the rear of the Controller. Use shielded twisted pair cable. See Figure 2-3.

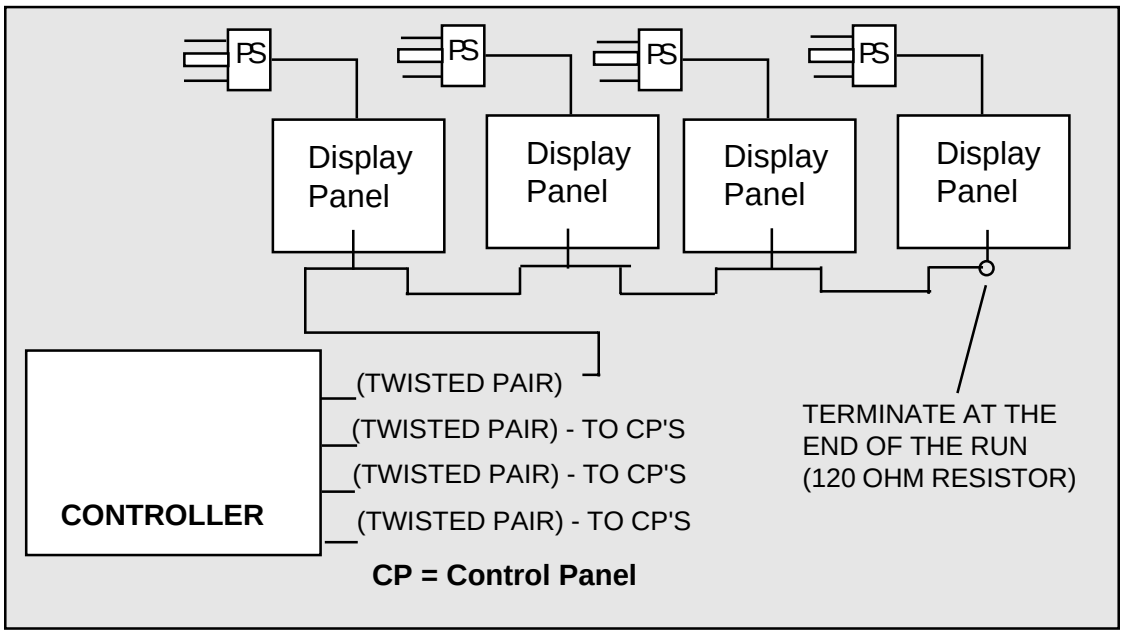


Figure 2–3 Typical Display Panel Controller Interconnection

2.6 Display Panel/Tally Connection

Each display panel has one (RCP-STAT1) or two (RCP-STAT2) 3-pin MTA connectors used for inputting tally information (labeled TALLY IN). The TALLY IN Connector should be connected to the tally source/switch using a twisted pair cable. No termination resistor is necessary. The use of the TALLY IN Connector(s) is optional.

2.7 Wiring the Display Panel Connectors

Should an additional display panel be added to your system, it will be necessary to wire the connectors using shielded twisted pair cable and a 3-pin MTA connector. See Figure 2–4.

1. Remove approximately 1 1/2" of insulating jacket from each of the two wires.
2. Remove approximately 1/2" of wire insulation from the black and red wires.
3. Twist together and insert the two black wire ends into position 1. Crimp down using a screw driver.
4. Twist together and insert the two shield wires into position 2. Crimp down using a screwdriver.
5. Twist together and insert the two red wire ends into position 3. Crimp down using a screwdriver.

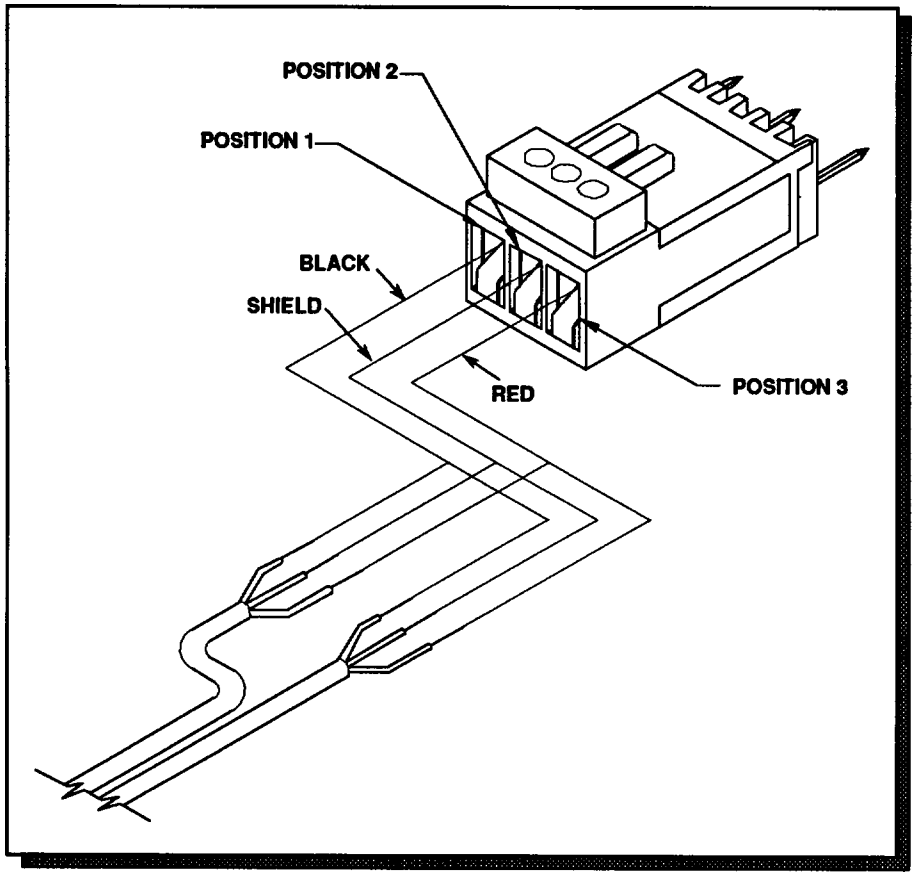


Figure 2–4 Wiring the Display Panel Connectors

2.8 Terminating System Controller Cable Runs

Each cable run to the system controller should be terminated at the end of the run with a 120 ohm, 1/4 watt 5% resistor. The cable is terminated internally at the controller. See Figure 2–5.

1. Un-crimp the black and red leads in position 1 and 3.
2. Insert the resistor ends into position 1 and position 3 along with the black and red leads.
3. Crimp down using a screwdriver.
4. The shield wire remains in position 2.

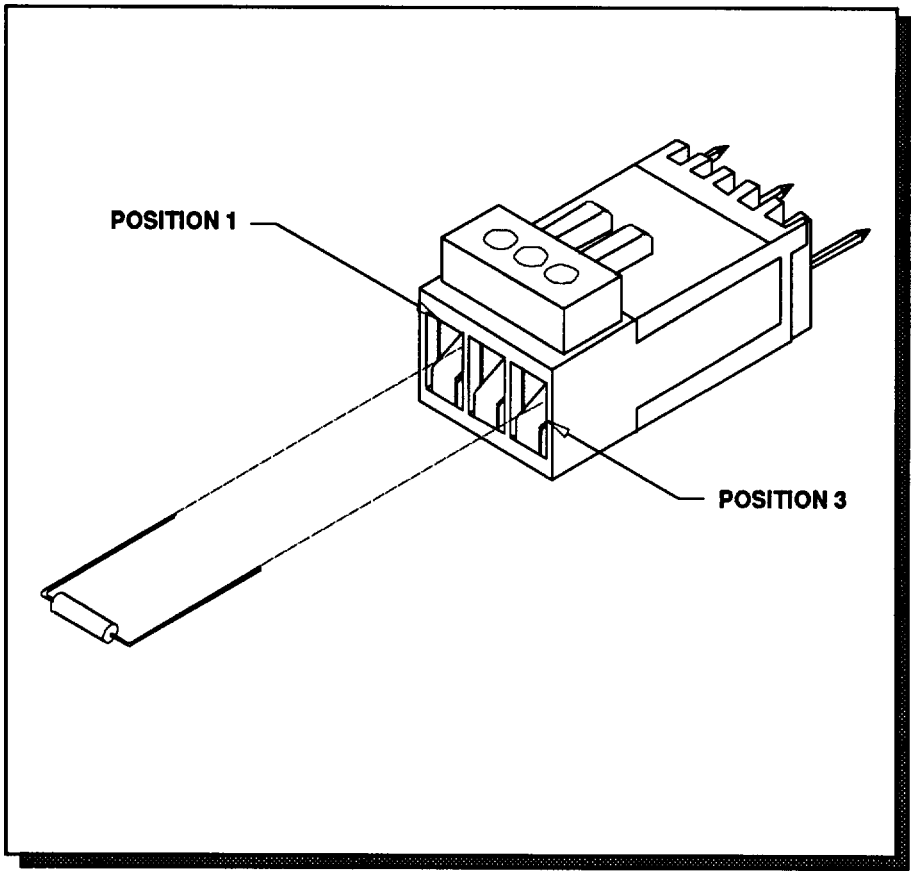


Figure 2–5 Terminating System Controller Cable Runs

2.8 Power Connections

Power for the RCP-STAT is supplied by an external 7.5 VDC, 800 mA power supply.

Remove the Power Supply from the box it was shipped in and check to insure that no damage has occurred in shipping. Verify that the Power Supply is rated for the proper AC voltage (i.e. 115 VAC or 230 VAC) before connection to the AC voltage. The power connector can now be plugged into the **POWER IN** position on the RCP-STAT. The Power Pack will immediately power the unit upon connections to AC Voltage. See Figure 2–6.

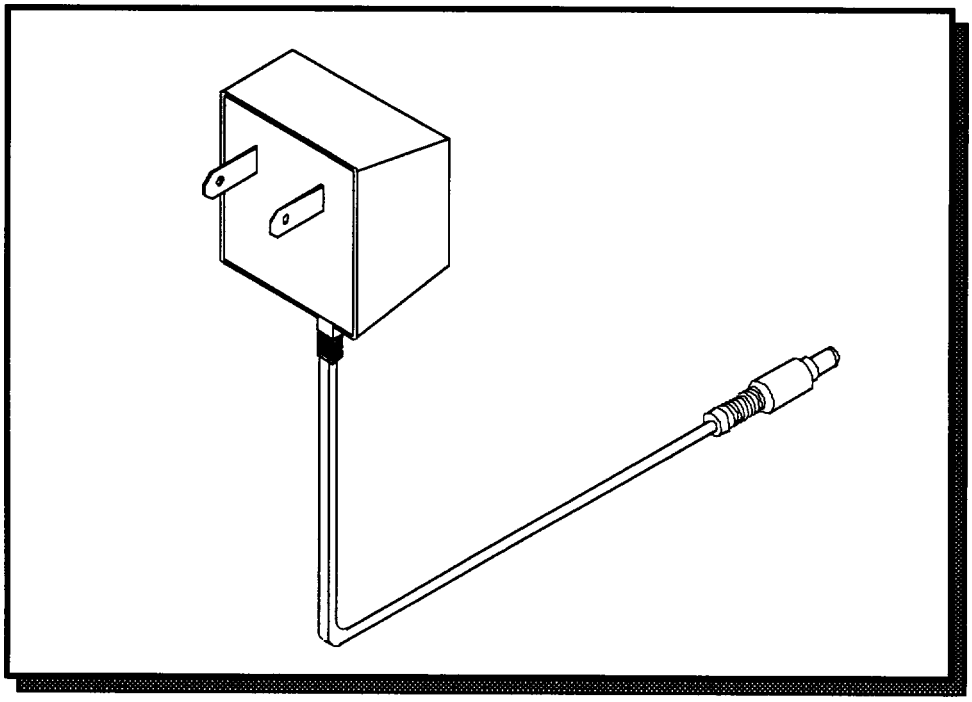


Figure 2–6 Typical Panel Power Supply

3.1 Operations of the RCP-STAT

Introduction

The RCP-STAT Display Panels are controlled by the RC5500 System Controller. Operations of the RCP-STAT Display Panels require that they be configured at the system controller and have the appropriate polling address assigned. Connections and power up procedures should be performed on each panel controlled.

Please refer to the RC5500 System Controller User's Manual for a sample setup of a RCP-STAT Display Panel.

General

All RCP-STAT Display Panels in a routing switcher system are custom configured at the factory prior to shipment. The information needed to configure the panels comes from the System Design Guide filled out by the customer.

4.1 Introduction

The RCP-STAT Display Panels internal circuitry consists of one printed circuit board, the Display Board. The Display Board's electronic circuits contain all components necessary for the operation of the Display Panel including a microprocessor that controls the panel's operation and communicates with the control system. The RCP-STAT1 Display Board contains the circuitry necessary to drive eight characters of display and the RCP-STAT2 Display Board contains the circuitry necessary to drive sixteen characters of display. The following is a detailed description of each of these types of Display Boards.

4.2 RCP-STAT1 Display Board

The STAT1 Display Board contains all circuitry necessary to communicate with the system controller and to drive eight single character displays. The circuitry on the STAT1 Display Board may be divided into the following sections: Power Supply, Microprocessor, Clock, Reset, Display, RS-485 Communications, and Tally. The following paragraphs explain each section in detail.

Power Supply

The power supply circuit on the display board consists of two 7805 +5V regulators and filter capacitors. Unregulated DC voltage (7.5 to 9 VDC) is supplied by an external power supply via J1. The voltage regulators U7 and U8 reduce the voltage to 5.0 VDC. The output voltage (+5VDC) from U7 provides power to U1-U6 and all related circuits. The output voltage (VLED) from U8 provides power to DSP1-DSP8. C1, C2, and C3 provide filtering for the input of the regulators. Bypass capacitors (.1 uF) are scattered about the board to provide power supply bypassing for individual chips.

Microprocessor

The heart of the display board is the Motorola 68HC11 microprocessor (U1). This IC contains the microprocessor and peripheral circuitry used to operate the panel. In addition, the 68HC11 contains a PROM containing the software used to operate the panel. The 68HC11 is operated in single chip mode, where the address and data busses are never brought external to the microprocessor. In this mode, most of the pins on the IC package are used to provide discrete inputs and/or outputs between the microprocessor and the peripheral circuitry. These pins are under software control of the microprocessor.

4.2 RCP-STAT1 Display Board Continued:

Clock

The master system clock is provided by oscillator U3 pin 8. SYSCLK is available to the processor (U1 pin 7). The frequency of SYSCLK is 7.3728 MHz. This value was chosen to provide an appropriate frequency for the baud rate generator inside the 68HC11. The 68HC11 internally divides SYSCLK by four to derive the bus operating frequency. The frequency of E clock (bus operating frequency) is 1.8432 MHz (SYSCLK/4).

Reset

As with all microprocessors, the 68HC11 requires initialization during power-up. The 68HC11 requires that the RESET pin (U1 pin 17) be held low for 4064 cycles of E clock (2.2 mS @ 1.8432 MHz E clock). In addition the RESET pin must be held low while VDD is below legal limits to protect internal EEPROM register contents. A Maxim MAX690 chip (U2) performs the reset function for the 68HC11. The MAX690 monitors the supply voltage and asserts RESET (U2 pin 7) whenever VCC falls below 4.5 VDC. The RESET signal is guaranteed to be asserted for a minimum of 50 mS after VCC rises above 4.75 VDC. This is more than adequate to meet the 2.2 mS requirement of the 68HC11.

Display

The input signals to the eight character display are provide by U1 working in conjunction with U5, a three to eight line decoder. U1, the microprocessor, places a seven bit ASCII character on signals PC0-PC6 (U1 pins 9-15). U1 then drives the signals DSP0-DSP3 (U1 pins 42-39) with the address of the display of interest. As a final step, U1 pulses DSP_SEL (U1 pin 38) low to latch the data on PC0-PC6 into the selected display chip. The translation of the control signals DSP0-DSP3 and DSP_SEL into individual display select signals is performed by U5. The four character address signals DSP0-DSP3 provide sixteen individual character addresses (binary 0000, 0001, 0010, ..., 1111). The STAT1 display board uses only the lower eight of these addresses. Signals DSP0-DSP2 drive the decoder inputs (U5 pins 1-3). DSP3 drives a low-active enable input on the decoder (U5 pin 4). DSP_SEL drives a second low-active enable input (U5 pin 5). With this arrangement, both DSP3 and DSP_SEL must be low for any decoder output to be active. DSP3 is only low for character addresses 0-7 (binary 0000 - 0111). When both DSP3 and DSP_SEL are low, the output associated with the address presented on DSP0-DSP2 will be driven low (U5 pins 7, 9-15). The outputs of U5 are used to latch the data on PC0-PC6 into one of the eight display chips. The individual displays contain the decoding and drive circuitry necessary to translate the ASCII character code into LED segment drive signals.

4.2 RCP-STAT1 Display Board Continued:

Display Continued:

Two jumpers are associated with the display circuitry. JP1 provides a means for increasing the intensity of the display. NAND gate U6 pins 4, 5, and 6 is used as an inverter. When JP1 is open the inputs to the gate are pulled high by RP2 pins 1 and 8. This forces the NAND output to be driven low. If a jumper is installed in JP1, then the gate inputs are pulled to ground through JP1. This forces the NAND output to be driven high. The input and the output of the NAND gate are used to drive the BL0 and BL1 brightness control signals on the display chips. As shipped from the factory, JP1 is open. This presents a high to BL0 and a low to BL1. This combination provides an intensity level that is compatible with most low-light conditions found in control rooms. To accommodate an installation where the ambient light level is higher, the user may install a jumper in JP1. This will present a low to BL0 and a high to BL1. This combination provides increased display intensity.

The second jumper JP2 provides a method of testing the display LEDs. When JP2 is installed, the Lamp Test (LT) signal of all of the displays is brought low. This forces the displays to drive all LEDs at a low intensity. This allows a user to verify that all of the LEDs within the display are working properly.

RS-485 Communications

Communication between the panel and the system controller is accomplished by the 68HC11 internal Serial Communication Interface (SCI). The SCI is an asynchronous receiver/transmitter, sometimes referred to as a UART. The RS-485 standard is used for the electrical interface between panels and the system controller. A 75ALS176 (U4) chip is used to convert between RS-485 and the levels required by the SCI. Transmit data (TXD) is presented by the SCI on U1 pin 21. This signal drives the input to the RS-485 transceiver on U4 pin 4. Data received from the system controller is converted to the appropriate levels by the RS-485 transceiver and presented on U4 pin 1. This received data (RXD) signal is then fed to the SCI receiver at U1 pin 20. Since the RS-485 interface requires the transmitter to be tri-stated when not in use, a third signal is required to enable/disable the RS-485 transmitter. The processor provides the TX_ENABLE signal under software control at U1 pin 25. This signal is connected to the RS-485 transceiver at U4 pin 3. When TX_ENABLE is asserted (high), U4 drives the RS-485 bus (U4 pins 6 and 7 to J4 pins 1 and 3). When TX_ENABLE is negated (low), U4 ceases driving the bus and allows other devices to drive the bus. During reset, the TX_ENABLE signal from the processor is initialized to an input and is not driven to a

4.2 RCP-STAT1 Display Board Continued:

RS-485 Communications Continued:

particular state. A pull-down resistor R2 has been added to ensure that U4 does not drive the RS-485 bus during power-up or other reset conditions. A shield connection is provided for the RS-485 bus on J4 pin 2. The shield is connected to ground through R1.

Tally

The tally circuitry consists of input J3, one of the NAND gates of U6, Q1, CR1, and related resistors. The microprocessor (U1) and the NAND Schmitt Trigger provide the interpretation of the input signal on J3. The external tally input is conditioned by NAND Schmitt Trigger U6 pins 1, 2, and 3. J3 pin 1 drives U6 pin 1. D1 is used to make the NAND output work as an open-collector driver. When the microprocessor drives the TAL_SEL signal (U1 pin 36) high, the state of the external tally signal is inverted and presented to the output of the NAND gate (U6 pin 3). If the NAND output is low, then D1 is forward biased, pulling PC0 low. If the NAND output is high, then D1 is reverse biased and RP2 pins 1 and 4 pull PC0 high. The normal state of TAL_SEL is low. This forces the NAND output high, thereby reverse biasing D1. This allows the microprocessor to drive PC0 when reading the state of the tally signal.

A tally indicator is also provided on the front of the RCP-STAT1 panel. This visual indicator is provided by LED CR1 and is under software control from the microprocessor. The state of the LED is determined by the LED0 signal from the microprocessor (U1 pin 30). This signal drives the base of Q1 through R5. When LED0 is low Q1 turns off, allowing no current flow through CR1. When LED0 is high, Q1 saturates, allowing current flow through CR1. R6 provide current limit for CR1.

4.3 RCP-STAT2 Display Board

The STAT2 Display Board contains all circuitry necessary to communicate with the system controller and to drive sixteen single character displays. The circuitry on the STAT2 Display Board may be divided into the following sections: Power Supply, Microprocessor, Clock, Reset, Display, RS-485 Communications, and Tally. The following paragraphs explain each section in detail.

Power Supply

The power supply circuit on the display board consists of two 7805 +5V regulators and filter capacitors. Unregulated DC voltage (7.5 to 9 VDC) is supplied by an external power supply via J1. The voltage regulators U7 and U8 reduce the voltage to 5.0 VDC. The output voltage (+5VDC) from U7 provides power to U1-U6, DSP9-DSP16 and all related circuits. The output voltage (VLED) from U8 provides power to DSP1-DSP8. C1, C2, and C3 provide filtering for the input of the regulators. Bypass capacitors (.1 uF) are scattered about the board to provide power supply bypassing for individual chips.

Microprocessor

The heart of the display board is the Motorola 68HC11 microprocessor (U1). This IC contains the microprocessor and peripheral circuitry used to operate the panel. In addition, the 68HC11 contains a PROM containing the software used to operate the panel. The 68HC11 is operated in single chip mode, where the address and data busses are never brought external to the microprocessor. In this mode, most of the pins on the IC package are used to provide discrete inputs and/or outputs between the microprocessor and the peripheral circuitry. These pins are under software control of the microprocessor.

Clock

The master system clock is provided by oscillator U3 pin 8. SYSCLK is available to the processor (U1 pin 7). The frequency of SYSCLK is 7.3728 MHz. This value was chosen to provide an appropriate frequency for the baud rate generator inside the 68HC11. The 68HC11 internally divides SYSCLK by four to derive the bus operating frequency. The frequency of E clock (bus operating frequency) is 1.8432 MHz (SYSCLK/4).

4.3 RCP-STAT2 Display Board Continued:

Reset

As with all microprocessors, the 68HC11 requires initialization during power-up. The 68HC11 requires that the RESET pin (U1 pin 17) be held low for 4064 cycles of E clock (2.2 mS @ 1.8432 MHz E clock). In addition the RESET pin must be held low while VDD is below legal limits to protect internal EEPROM register contents. A Maxim MAX690 chip (U2) performs the reset function for the 68HC11. The MAX690 monitors the supply voltage and asserts RESET (U2 pin 7) whenever VCC falls below 4.5 VDC. The RESET signal is guaranteed to be asserted for a minimum of 50 mS after VCC rises above 4.75 VDC. This is more than adequate to meet the 2.2 mS requirement of the 68HC11.

Display

The input signals to the two eight character displays are provide by U1 working in conjunction with U5 and U9, three to eight line decoders. U1, the microprocessor, places a seven bit ASCII character on signals PC0-PC6 (U1 pins 9-15). U10 provides additional drive current enabling U1 to drive a total of sixteen single character displays divided into two groups of eight. U1 then drives the signals DSP0-DSP3 (U1 pins 42-39) with the address of the display of interest. As a final step, U1 pulses DSP_SEL (U1 pin 38) low to latch the data on PC0-PC6 into the selected display chip. The translation of the control signals DSP0-DSP3 and DSP_SEL into individual display select signals is performed by U5 and U9. The four character address signals DSP0-DSP3 provide sixteen individual character addresses (binary 0000, 0001, 0010, ..., 1111). The STAT2 display board uses all sixteen of these addresses. Signals DSP0-DSP2 drive the decoder inputs (U5 pins 1-3 and U9 pins 1-3). DSP3 drives a low-active enable input on one decoder (U5 pin 4) and a high-active enable input on the other decoder (U9 pin 6). DSP_SEL drives a second low-active enable input on both decoders (U5 and U9 pin 5). When DSP_SEL and DSP3 are both low, one of the eight outputs of decoder U5 (pins 7, 9-15) is driven low. When DSP_SEL is low and DSP3 is high, one of the eight outputs of decoder U9 (pins 7, 9-15) is driven low. DSP3 is low for character addresses 0-7 (binary 0000 - 0111) and high for character addresses 8-15 (binary 1000 - 1111). The outputs of U5 and U9 are used to latch the data on D0-D6 into one of the sixteen display chips. The individual displays contain the decoding and drive circuitry necessary to translate the ASCII character code into LED segment drive signals.

4.3 RCP-STAT2 Display Board Continued:

Display Continued:

Two jumpers are associated with the display circuitry. JP1 provides a means for increasing the intensity of the display. NAND gate U6 pins 4, 5, and 6 are used as an inverter. When JP1 is open the inputs to the gate are pulled high by RP2 pins 1 and 8. This forces the NAND output to be driven low. If a jumper is installed in JP1, then the gate inputs are pulled to ground through JP1. This forces the NAND output to be driven high. The input and the output of the NAND gate are used to drive the BL0 and BL1 brightness control signals on the display chips. As shipped from the factory, JP1 is open. This presents a high to BL0 and a low to BL1. This combination provides an intensity level that is compatible with most low-light conditions found in control rooms. To accommodate an installation where the ambient light level is higher, the user may install a jumper in JP1. This will present a low to BL0 and a high to BL1. This combination provides increased display intensity.

The second jumper JP2 provides a method of testing the display LEDs. When JP2 is installed, the Lamp Test (LT) signal of all of the displays is brought low. This forces the displays to drive all LEDs at a low intensity. This allows a user to verify that all of the LEDs within the display are working properly.

RS-485 Communications

Communication between the panel and the system controller is accomplished by the 68HC11 internal Serial Communication Interface (SCI). The SCI is an asynchronous receiver/transmitter, sometimes referred to as a UART. The RS-485 standard is used for the electrical interface between panels and the system controller. A 75ALS176 (U4) chip is used to convert between RS-485 and the levels required by the SCI. Transmit data (TXD) is presented by the SCI on U1 pin 21. This signal drives the input to the RS-485 transceiver on U4 pin 4. Data received from the system controller is converted to the appropriate levels by the RS-485 transceiver and presented on U4 pin 1. This received data (RXD) signal is then fed to the SCI receiver at U1 pin 20. Since the RS-485 interface requires the transmitter to be tri-stated when not in use, a third signal is required to enable/disable the RS-485 transmitter. The processor provides the TX_ENABLE signal under software control at U1 pin 25. This signal is connected to the RS-485 transceiver at U4 pin 3. When TX_ENABLE is asserted (high), U4 drives the RS-485 bus (U4 pins 6 and 7 to J4 pins 1 and 3). When TX_ENABLE is negated (low), U4 ceases driving the bus

4.3 RCP-STAT2 Display Board Continued:

RS-485 Communications Continued:

and allows other devices to drive the bus. During reset, the TX_ENABLE signal from the processor is initialized to an input and is not driven to a particular state. A pull-down resistor R2 has been added to ensure that U4 does not drive the RS-485 bus during power-up or other reset conditions. A shield connection is provided for the RS-485 bus on J4 pin 2. The shield is connected to ground through R1.

Tally

There are two tally circuits present on the STAT2 Display Board. The tally circuitry for LED1 consists of input J3, one of the NAND gates of U6, Q1, CR1, and related resistors. The microprocessor (U1) and the NAND Schmitt Trigger provide the interpretation of the input signal on J3. The external tally input is conditioned by NAND Schmitt Trigger U6 pins 1, 2, and 3. J3 pin 1 drives U6 pin 1. D1 is used to make the NAND output work as an open-collector driver. When the microprocessor drives the TAL_SEL signal (U1 pin 36) high, the state of the external tally signal is inverted and presented to the output of the NAND gate (U6 pin 3). If the NAND output is low, then D1 is forward biased, pulling PC0 low. If the NAND output is high, then D1 is reverse biased and RP2 pins 1 and 4 pull PC0 high. The normal state of TAL_SEL is low. This forces the NAND output high, thereby reverse biasing D1. This allows the microprocessor to drive PC0 when reading the state of the tally signal. In a similar manner, a second tally may be read by the microprocessor through J4, U6 pins 11, 12, and 13, D2 to signal PC1.

Two tally indicators are also provided on the front of the RCP-STAT2 panel. The visual indicators are provided by LEDs CR1 and CR2. These indicators are both are under software control from the microprocessor. The state of the LED CR1 is determined by the LED0 signal from the microprocessor (U1 pin 30) and the state of LED CR2 is determined by the LED1 signal from microprocessor (U1 pin 29). The LED0 signal drives the base of Q1 through R5. When LED0 is low Q1 turns off, allowing no current flow through CR1. When LED0 is high, Q1 saturates, allowing current flow through CR1. R6 provides current limiting for CR1. Similarly, the LED1 signal drives the base of Q2 through R7. When LED1 is low Q2 turns off, allowing no current flow through CR2. When LED1 is high, Q2 saturates, allowing current flow through CR2. R8 provides current limiting for CR2.

5.1 General

The RCP-STAT Display Panels are solid state electro-mechanical devices designed to give long, trouble free service with minimum maintenance requirements. If problems do occur, follow the troubleshooting procedure provided. If additional technical assistance is required, refer to the General Assistance and Service information in the front of the manual.

5.2 Preventive Maintenance

There is little need for preventive maintenance on the RCP-STAT Panels other than the normal care which should be given to any quality electronic equipment.

5.3 Test Equipment

The test equipment recommended for servicing the RCP-STAT Display Panels is listed below. Equivalent test equipment may be used.

EQUIPMENT	FUNCTION
Oscilloscope - 20 MHz or higher	Waveform Monitoring and Tracing
VOM - 20,000 Ohm per volt or higher	Voltage and Resistance Measurements

5.4 Corrective Maintenance

The following paragraphs provide information to assist the servicing technician in maintenance of the RCP-STAT Display Panels. The functional description (Section 4) contains board/circuit level information to help identifying specific problems.

5.4 Corrective Maintenance Continued:

Factory Repair Service

If desired, equipment or boards may be returned to the factory (transportation prepaid) for repair. Refer to the General Assistance and Service information sheet in the front of this manual.

⇒ Pack the equipment securely and label with the correct address. Proper packaging saves money. The small amount of extra care and time it takes to cushion a part or unit properly may prevent costly damage while in transit. Make certain that the address is both legible and complete. Failure to do so often results in delay or even loss.

NOTE: Contact PESA Switching Systems' Service Department (listed on the General Assistance and Service information sheet in the front of this manual) for a RMA# prior to shipping.

Adjustment/Alignment

The RCP-STAT Display Panels have no external adjustments.

Troubleshooting

Troubleshooting the RCP-STAT Display Panels require the routing switcher system to be used as a test fixture. The display panels do not function except as part of the system. The only troubleshooting which can be accomplished without opening the display panels is to check input power (from plug-in power module).

To open a display panel for troubleshooting, remove the front cover and disassemble the unit as far as required to gain access to the display board. Place the disassembled panel on a nonconducting surface and arrange the parts so the unit can be operated. You must be able to observe the display(s) and tally indicator(s). You must also have sufficient access to the display board to measure voltage or observe waveforms.

Procedure: Make sure the RCP-STAT Display Panel is properly setup at the System Controller and that a status message is being sent to the panel. Also refer to Section 3.

5.4 Corrective Maintenance Continued:

Troubleshooting Continued:

If the Panel is nonresponsive, there may be a power problem or the CPU is not operating.

1. Refer to the relevant POWER discussion in Section 4. Refer to the relevant MICROPROCESSOR functional description in Section 4.

2. If power is functioning properly, the microprocessor is not operating. The microprocessor requires a clock, a power-up reset, and communications from the System Controller. Refer to the relevant MICROPROCESSOR functional description in Section 4.

For partial failures:

1. Displays fail to light. Refer to the relevant DISPLAY discussion in the functional description section.

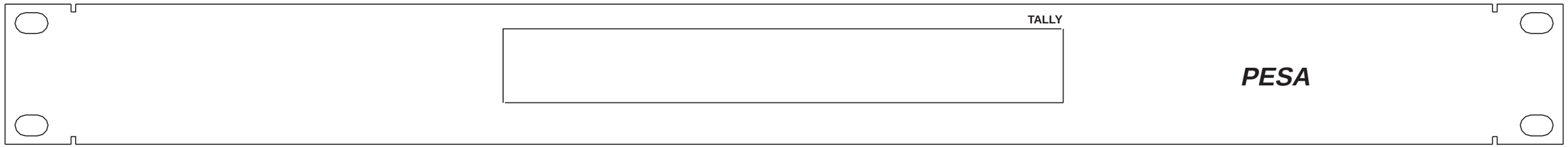
2. Tally indicator(s) fail to light. Refer to the relevant TALLY discussion in the functional description section.

⇒ If a source input fails to function it may be a blocked input. Check the system configuration at the controller.

6.0 Schematics

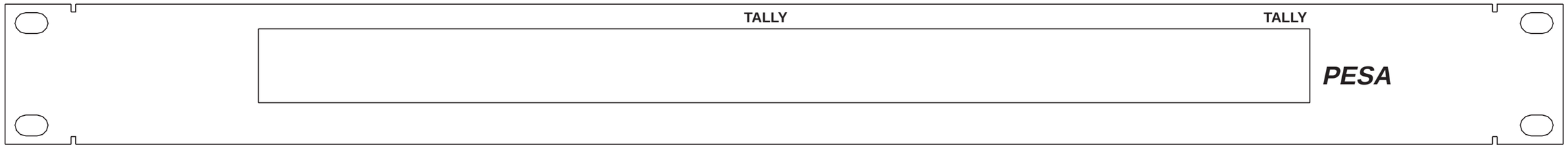
General

This section contains the schematic diagrams and parts location diagrams for the RCP–STAT Display Panels. Refer to this section when trouble-shooting the equipment or replacing defective parts.

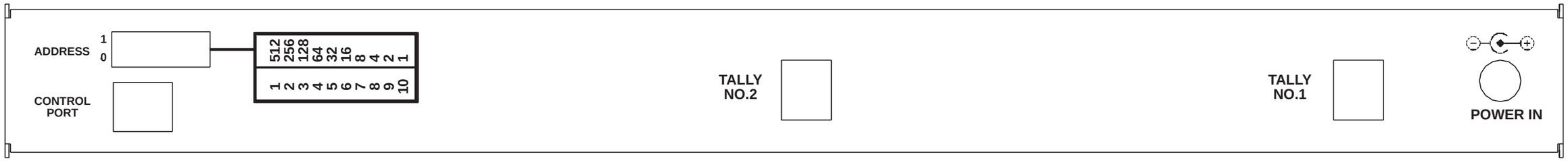


RCP-STAT1 Front View

RCP-STAT1 Rear View

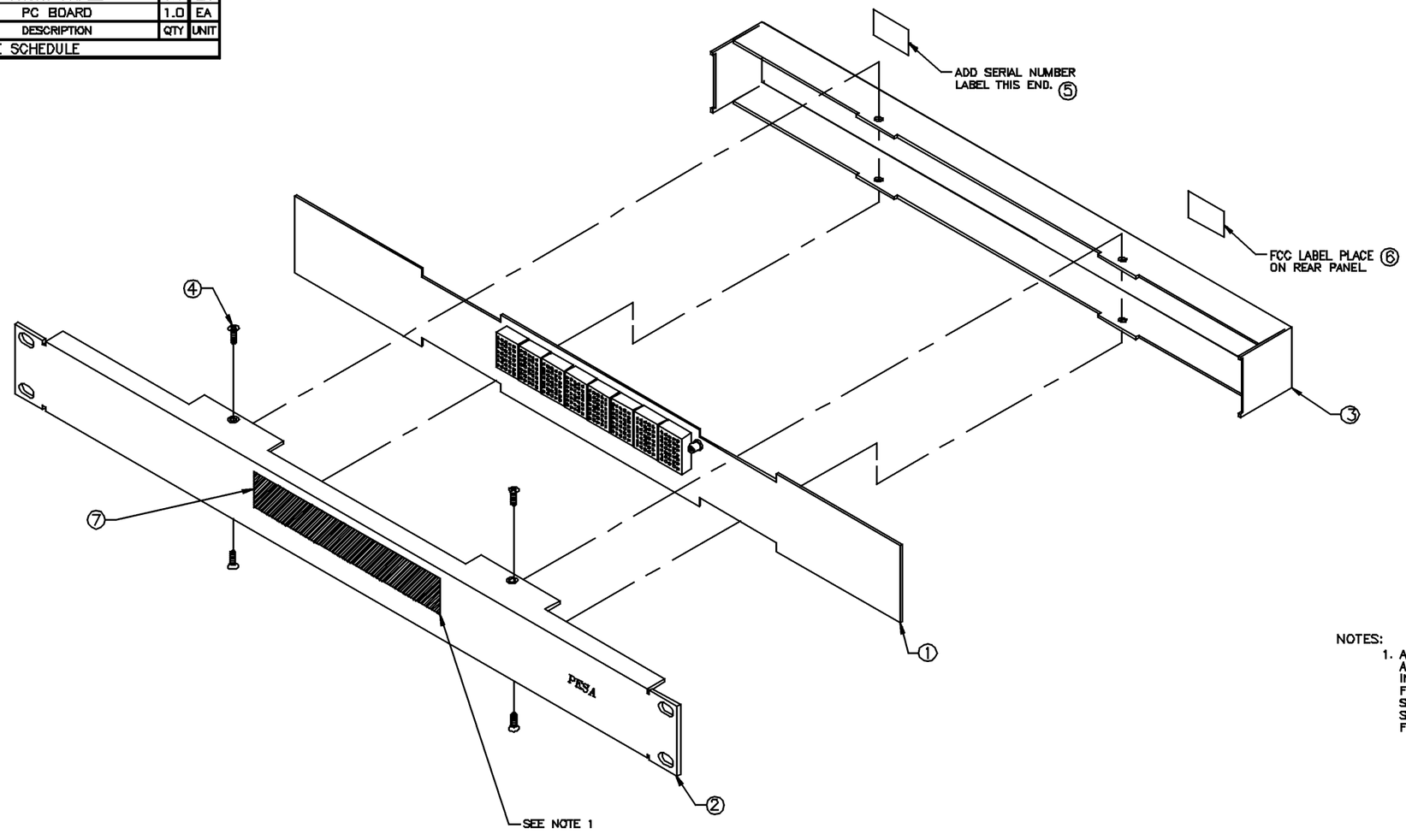


RCP-STAT2 Front View



RCP-STAT2 Rear View

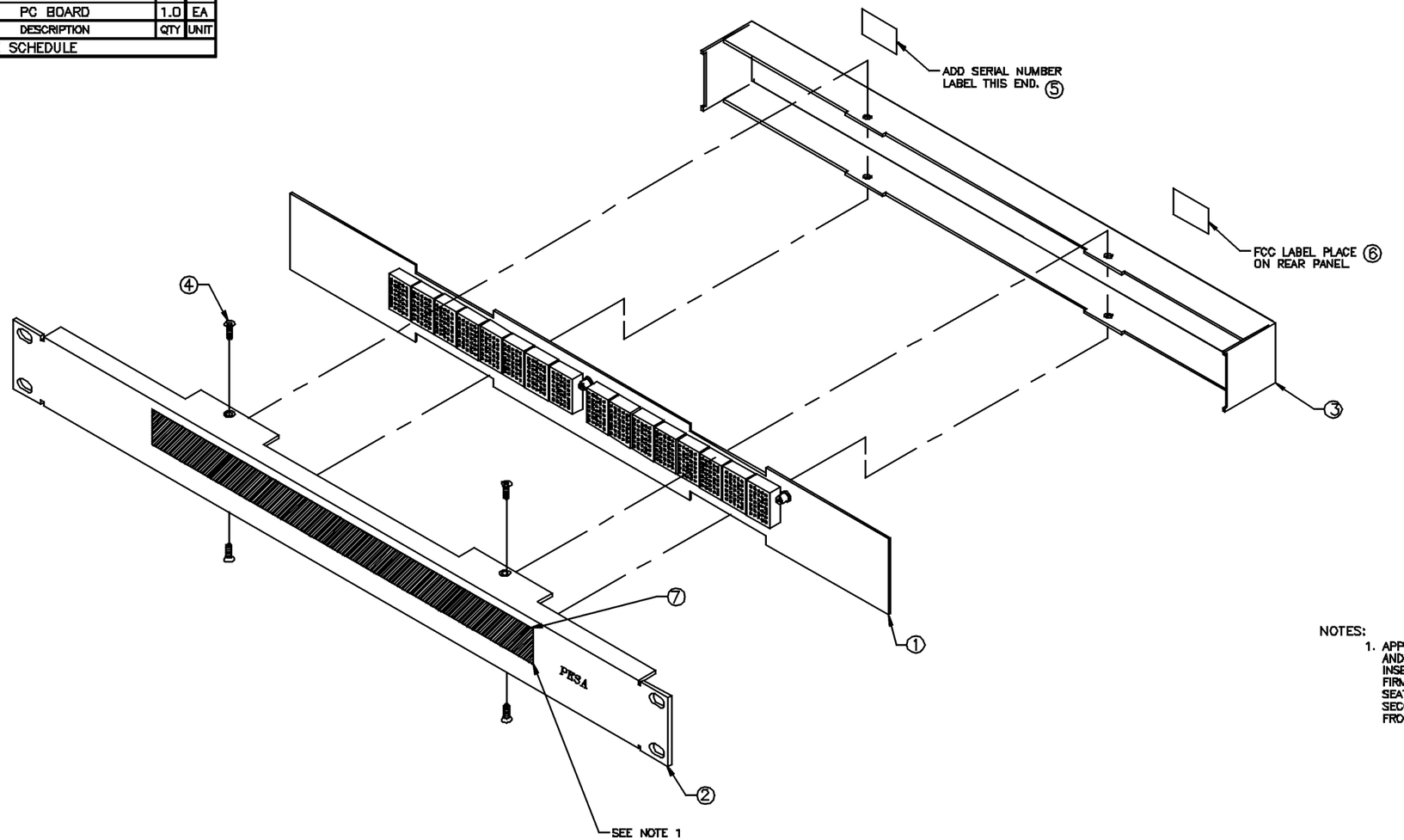
7	81903463370	DISPLAY COVER	1.0	EA
6	81902101500	FCC – NON – COMPLIANT	1.0	EA
5	81902101468	SERIAL LABEL	1.0	EA
4	81902201433	3/16 X 4–40 FLAT HD	4.0	EA
3	81903463380	REAR PANEL	1.0	EA
2	81903463390	FRONT PANEL	1.0	EA
1	81906516850	PC BOARD	1.0	EA
NO	PART NUMBER	DESCRIPTION	QTY	UNIT
HARDWARE SCHEDULE				



NOTES:
1. APPLY SILICON ADHESIVE TO TOP AND BOTTOM OF DISPLAY WINDOW AND INSERT INSIDE METAL OPENING, PRESS FIRMLY IN PLACE INSURING PROPER SEATING AND HOLD TIGHT FOR THIRTY SECONDS. REMOVE ANY EXCESS SILICON FROM DISPLAY WINDOW IMMEDIATELY.

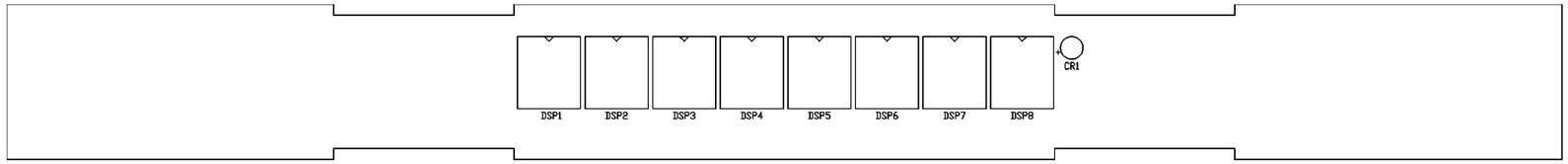
Configuration Drawing • RCP-STAT1 Mainframe Assembly • CD63-0743

7	81903463490	DISPLAY COVER	1.0	EA
6	81902101500	FCC – NON – COMPLIANT	1.0	EA
5	81902101468	SERIAL LABEL	1.0	EA
4	81902201433	3/16 X 4–40 FLAT HD	4.0	EA
3	81903463480	REAR PANEL	1.0	EA
2	81903463470	FRONT PANEL	1.0	EA
1	81906516900	PC BOARD	1.0	EA
NO	PART NUMBER	DESCRIPTION	QTY	UNIT
HARDWARE SCHEDULE				

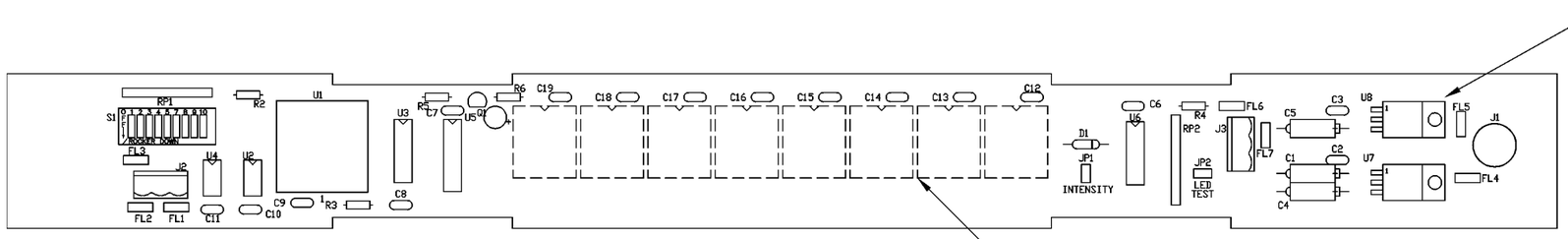


NOTES:
1. APPLY SILICON ADHESIVE TO TOP AND BOTTOM OF DISPLAY WINDOW AND INSERT INSIDE METAL OPENING, PRESS FIRMLY IN PLACE INSURING PROPER SEATING AND HOLD TIGHT FOR THIRTY SECONDS. REMOVE ANY EXCESS SILICON FROM DISPLAY WINDOW IMMEDIATELY.

Configuration Drawing • RCP-STAT2 Mainframe Assembly • CD63-0745



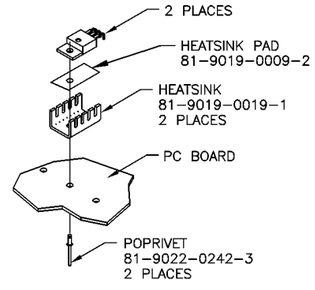
FRONT VIEW (LAYER 1)



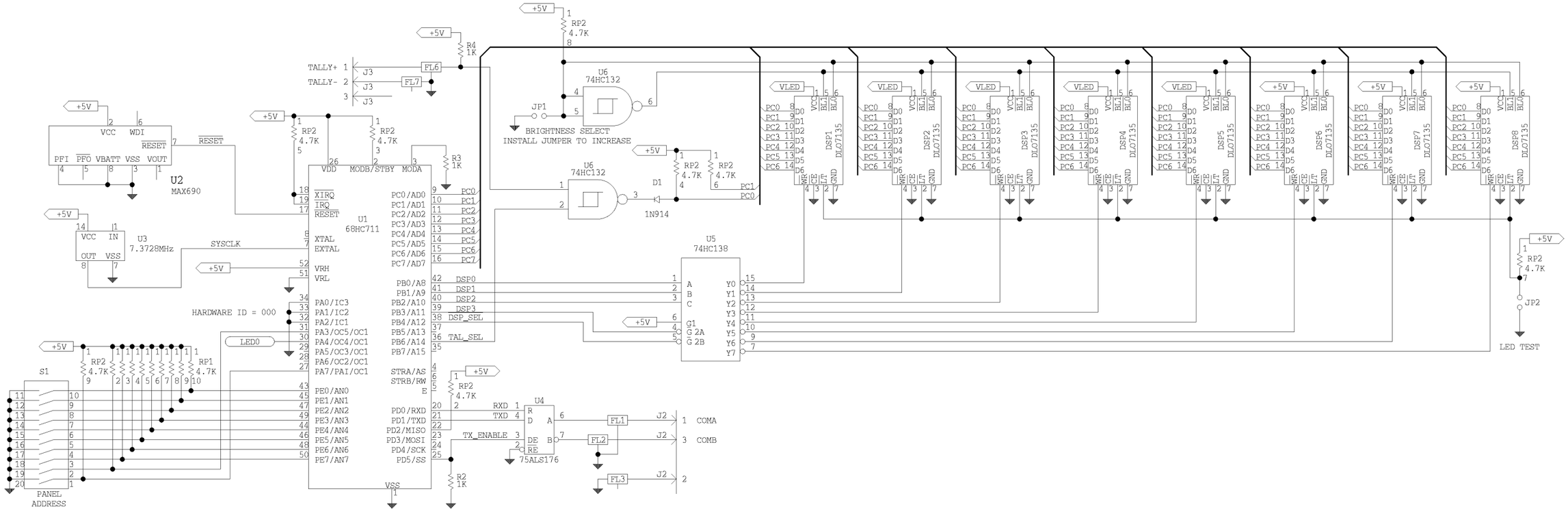
REAR VIEW (LAYER 2)

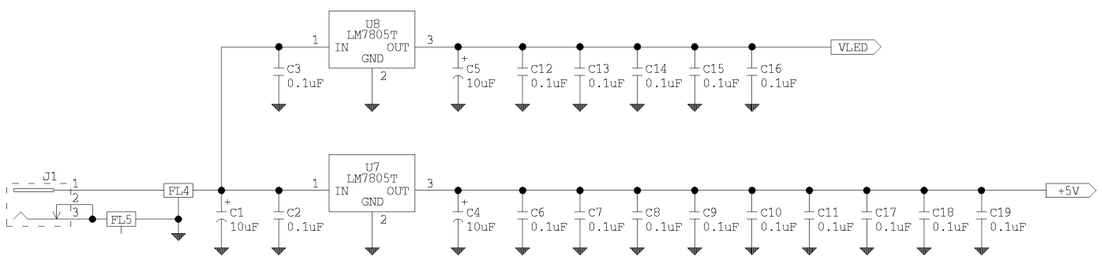
NOTES:

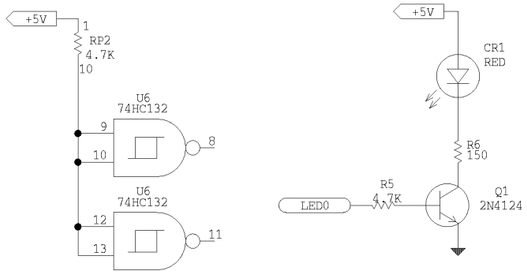
1. DASHED LINES INDICATE PARTS INSTALLED ON THE OPPOSITE SIDE OF BOARD – SEE FRONT VIEW.
2. LED CR1 TO BE INSTALLED TO APPROX. HEIGHT OF DSP1–DSP8



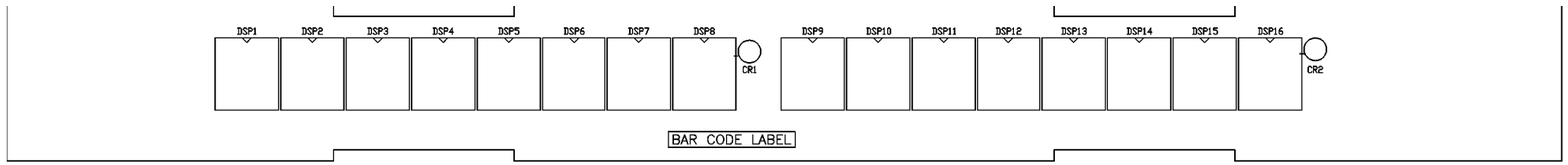
DETAIL A







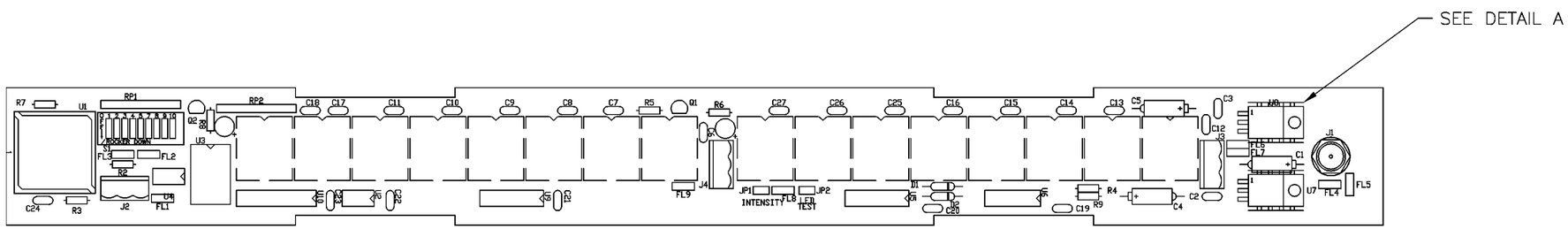
Schematic • RCP-STAT1 Display Assembly • SC33-1249



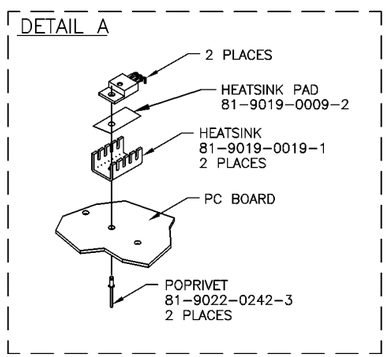
FRONT VIEW (LAYER 1)

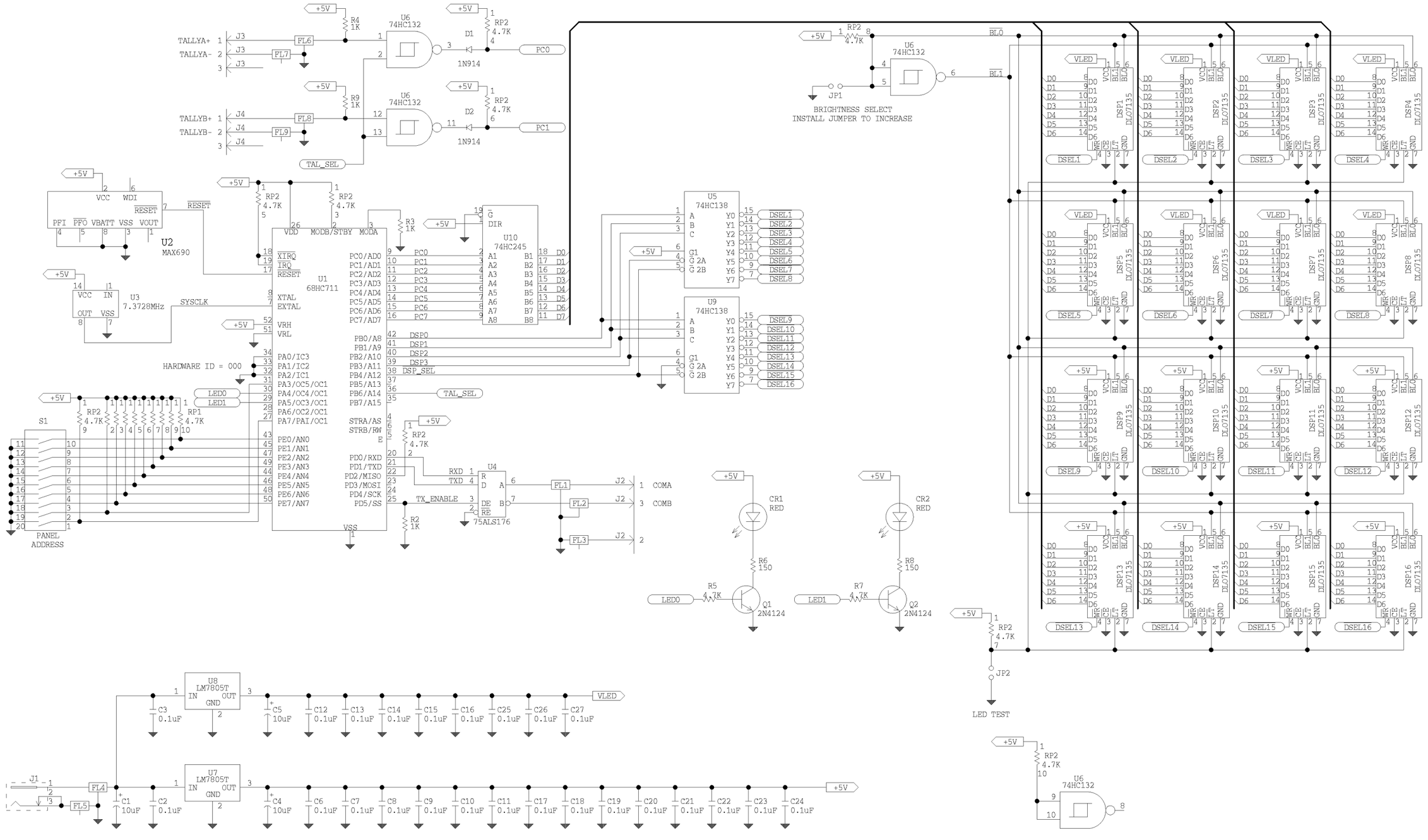
NOTES:

1. DASHED LINES INDICATE PARTS INSTALLED ON THE OPPOSITE SIDE OF BOARD – SEE FRONT VIDE.
2. LED CR1 AND CR2 TO BE INSTALLED TO APPROX. HEIGHT OF DSP1–DSP16



REAR VIEW (LAYER 2)





Schematic • RCP-STAT2 Display Assembly • SC33-1253

7.0 Parts List

General

The Parts List in this section have been grouped according to each assembly associated with the RCP-STAT Display Panels. Refer to each list by name of card, board, or section of the equipment requiring replacement parts.

RCP-STAT1 Mainframe Assembly – 81906516810

81902101468	LABEL, SERIALIZATION	1	EA
81902101500	LABEL, FCC WARNING	1	EA
81902105050	LABEL, BARCODE	1	EA
81902201433	SCREW, 4-40 X 3/16 FLAT HEAD PHILLIPS	4	EA
81902907800	CONNECTOR, 3 PIN PLUG	2	EA
81903463370	DISPLAY COVER, RCP-STAT1	1	EA
81903463380	REAR PANEL, RCP-STAT1	1	EA
81903463390	FRONT PANEL, RCP-STAT1	1	EA
81906516850	RCP-STAT1 DISPLAY BOARD ASSEMBLY	1	EA
PK65-1681	MANUFACTURING PACKET	REF	

RCP-STAT1 Display Assembly – 81906516850

81900200460	RESISTOR 150 OHM 5% 1/4W	R6	1	EA
81900200688	RESISTOR 1K 5% 1/4W	R2-R4	3	EA
81900200825	RESISTOR 4.7K 5% 1/4W	R5	1	EA
81900300427	RESISTOR 100 OHM 5% 1/4W	R1	1	EA
81900600958	SIP 4.7K 10-PIN 9 RESISTOR	RP1, RP2	2	EA
81900700055	CAP 0.1UF 50V CERAMIC RADIAL	C2, C3, C6-C19	16	EA
81900900291	CAP 10UF 20V TANTALUM AXIAL	C1, C4, C5	3	EA
81900140051	TRANS 2N4124 NPN TO-92	Q1	1	EA
81901500017	DIODE IN914 500MW	D1	1	EA
81901601187	REG MC7805C +5V 1A TO-220	U7, U8	2	EA
81901604827	IC 74HC138 1 OF 8 DECODER	U5	1	EA
81901606061	IC MAX690 P/S MONITOR	U2	1	EA
81901606830	IC 7.3728 MHZ OSCILLATOR	U3	1	EA
81901606860	IC 74HC132 QUAD NAND SCHMIDT TRIGGER	U6	1	EA
81901606880	IC 75ALS176 RS485 TRANSCEIVER	U4	1	EA
81901900092	HEATSINK PAD, TO-220	(U7, U8)	2	EA
81901900191	HEATSINK, TO-220 HORIZONTAL	(U7, U8)	2	EA
81902105050	LABEL, BARCODE		1	EA
81902202423	POP RIVET	(U7, U8)	2	EA
81902412490	PCB, RCP-STAT1 DISPLAY BOARD		1	EA
81902600543	SWITCH, 10 POSITION DIP	S1	1	EA
81902905991	SOCKET, 52 PIN PLCC	(U1)	1	EA
81902906353	CONN 3 POS MALE POLARIZED	J2, J3	2	EA
81902907460	CONN POWER JACK PCB MOUNTED	J1	1	EA
81903200020	LED RED LARGE STANDARD	CR1	1	EA
81903200426	DISPLAY 5X7 DOT MATRIX RED	DSP1-DSP8	8	EA
81906516860	SOFTWARE ASSEMBLY, SINGLE-CHIP BIOS	U1	1	EA
PK65-1685	MANUFACTURING PACKET		REF	

RCP-STAT2 Mainframe Assembly – 81906516820

81902101468	LABEL, SERIALIZATION	1	EA
81902101500	LABEL, FCC WARNING	1	EA
81902105050	LABEL, BARCODE	1	EA
81902201433	SCREW, 4-40 X 3/16 FLAT HEAD PHILLIPS	4	EA
81902907800	CONNECTOR, 3 PIN PLUG	2	EA
81903463470	FRONT PANEL, RCP-STAT2	1	EA
81903463480	REAR PANEL, RCP-STAT2	1	EA
81903463490	FRONT PANEL, RCP-STAT2	1	EA
81906516900	RCP-STAT2 DISPLAY BOARD ASSEMBLY	1	EA
PK65-1682	MANUFACTURING PACKET	REF	

RCP-STAT2 Display Assembly – 81906516900

81900200460	RESISTOR 150 OHM 5% 1/4W	R6, R8	2	EA
81900200688	RESISTOR 1K 5% 1/4W	R2-R4, R9	4	EA
81900200825	RESISTOR 4.7K 5% 1/4W	R5, R7	2	EA
81900300427	RESISTOR 100 OHM 5% 1/4W	R1	1	EA
81900600958	SIP 4.7K 10-PIN 9 RESISTOR	RP1, RP2	2	EA
81900700055	CAP 0.1UF 50V CERAMIC RADIAL	C2, C3, C6-C27	24	EA
81900900291	CAP 10UF 20V TANTALUM AXIAL	C1, C4, C5	3	EA
81900140051	TRANS 2N4124 NPN TO-92	Q1, Q2	2	EA
81901500017	DIODE IN914 500MW	D1, D2	2	EA
81901601187	REG MC7805C +5V 1A TO-220	U7, U8	2	EA
81901604314	IC 74HC245 CMOS BUS TRANSCEIVER	U10	1	EA
81901604827	IC 74HC138 1 OF 8 DECODER	U5, U9	2	EA
81901606061	IC MAX690 P/S MONITOR	U2	1	EA
81901606830	IC 7.3728 MHZ OSCILLATOR	U3	1	EA
81901606860	IC 74HC132 QUAD NAND SCHMIDT TRIGGER	U6	1	EA
81901606880	IC 75ALS176 RS485 TRANSCEIVER	U4	1	EA
81901900092	HEATSINK PAD, TO-220	(U7, U8)	2	EA
81901900191	HEATSINK, TO-220 HORIZONTAL	(U7, U8)	2	EA
81902105050	LABEL, BARCODE		1	EA
81902202423	POP RIVET	(U7, U8)	2	EA
81902412530	PCB, RCP-STAT2 DISPLAY BOARD		1	EA
81902600543	SWITCH, 10 POSITION DIP	S1	1	EA
81902905991	SOCKET, 52 PIN PLCC	(U1)	1	EA
81902906353	CONN 3 POS MALE POLARIZED	J2-J4	3	EA
81902907460	CONN POWER JACK PCB MOUNTED	J1	1	EA
81903200020	LED RED LARGE STANDARD	CR1, CR2	2	EA
81903200426	DISPLAY 5X7 DOT MATRIX RED	DSP1-DSP16	16	EA
81906516860	SOFTWARE ASSEMBLY, SINGLE-CHIP BIOS	U1	1	EA
PK65-1690	MANUFACTURING PACKET		REF	