USER GUIDE

RCP-GIO CONTROL PANEL

SERVICE AND ORDERING ASSISTANCE
PESA Switching Systems, Inc.
103 Quality Circle, Suite 210
Huntsville AL 35806 USA
www.pesa.com

MAIN OFFICE
Tel: 256.726.9200
Fax: 256.726.9271

SERVICE DEPARTMENT
Tel: 256.726.9222 (24/7)
Toll Free: 800.323.7372
Fax: 256.726.9268
Email: service@pesa.com

Publication: 81-9059-0386-0, Rev. C

Revision History:

10/31/96	Manual Released for Initial Printing
03/05/01	Rev. B Deleted Printing Specification per ECO CE00113
02/13/12	Rev. C 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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1.2 General Description

The RCP-GPIO Control Panel is a specialized control panel that can take electrical switch closure inputs and generate electrical switch closure outputs for use in interfacing with external electronic equipment.

The RCP-GPIO Control Panel can be configured to operate in a variety of selection modes. The RCP-GPIO Control Panel offers 32 inputs and outputs that can be configured to generate switches on the PESA router as well as generate tally.

The RCP-GPIO Control Panel comes packaged in a standard 19'' two rack unit chassis requiring 3'' of depth. Power is supplied to the control panel through a plug-in-the-wall type power pack.

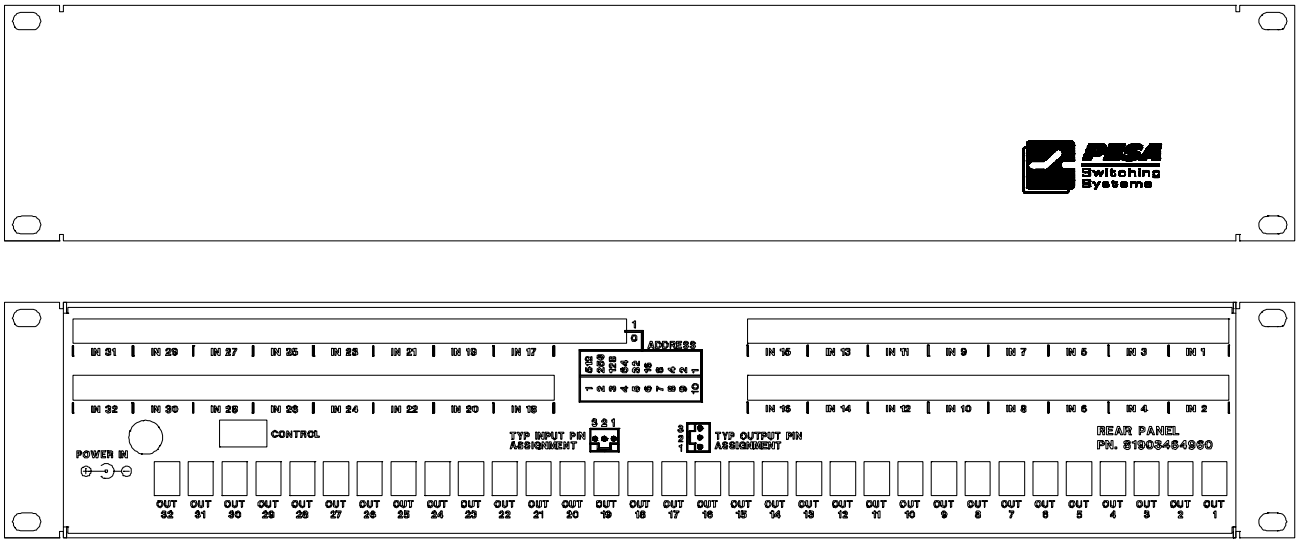


Figure 1-1 RCP-GPIO Control Panel (Front and Rear Views)

2.1 Introduction

This section details the RCP-GPIO Control Panel installation procedures. The following topics are discussed:

- Receipt Inspection
- Location and Mounting
- Polling Address
- Control Panel and Controller Interconnection
- Wiring the Control Panel Connector
- Terminating Cable Runs
- Power Connections

2.2 Receipt Inspection

The RCP-GPIO Control Panel is inspected and tested prior to shipment from 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-GPIO Control Panel has been designed to fit in a standard E.I.A. 19'' equipment rack and use two rack units of space (3.5''). An area should be selected where the ambient temperature will not exceed 40°C inside the equipment rack, and where air can circulate freely. The control panel should be mounted in an area convenient to control and power connections. Sufficient space must be provided behind the equipment rack to allow for the control and power cables. When the RCP-GPIO Control Panel is supplied as part of a system including interconnecting cables, rack layout drawings are usually provided. While adherence to the rack layout drawings is not required, it will ensure that the interconnection cables are the proper lengths. All mounting holes should be utilized and the hardware be securely tightened.

2.3 Location and Mounting Continued:

All interconnection cables should be strain relieved and secured to the equipment racks or other supporting structures. Failure to provide adequate cable support may result in cables separating from connectors. If cables are to be run under elevated flooring, they should be laid out in cable racks if possible and tied to the cable racks as a guide. If cables are run along the floor, do not allow then 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. Figure 2-1 illustrates the chassis installation.

To install the RCP-GPIO Control Panel take the following steps:

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

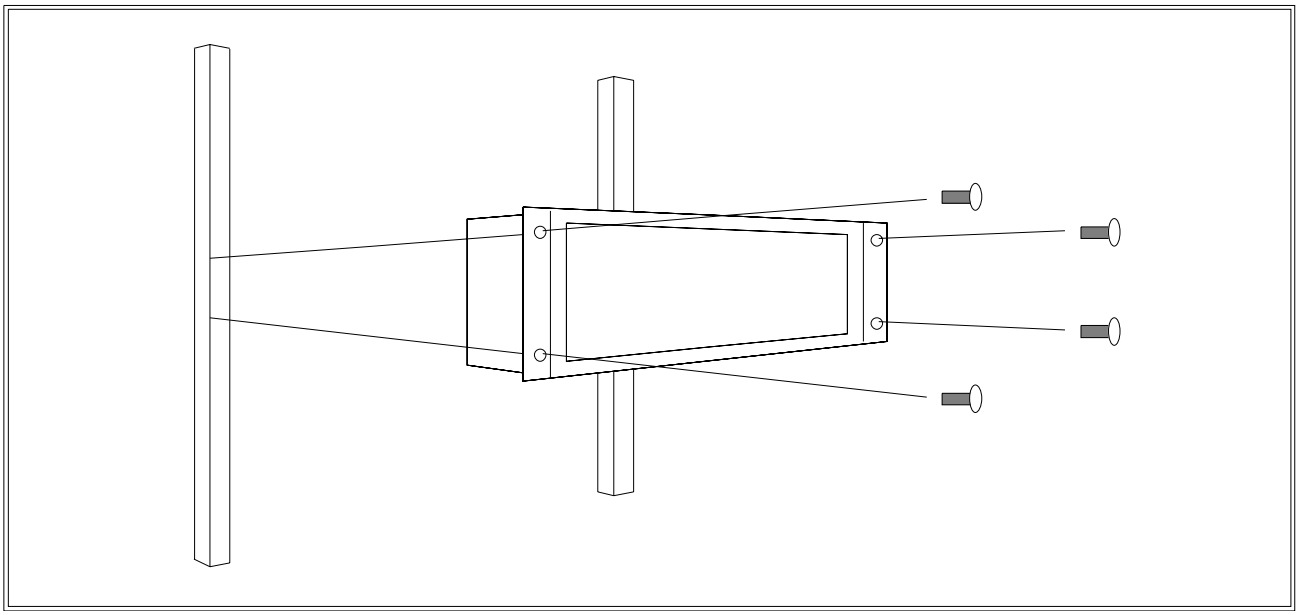


Figure 2-1 RCP-GPIO Chassis Installation

2.4 Polling Address

For the system controller to identify a particular control panel, a specific device number or polling address must be assigned to each panel. Sequential binary numbers (1 thorough 1023) are used for this purpose. The appropriate binary number is entered into the control panel by setting an internal 10-position DIP switch to the selected binary number. The DIP switch is located on the Remote CPU 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 10, 8, and 6 to the "ON" or "1" position. See Figure 2-2.

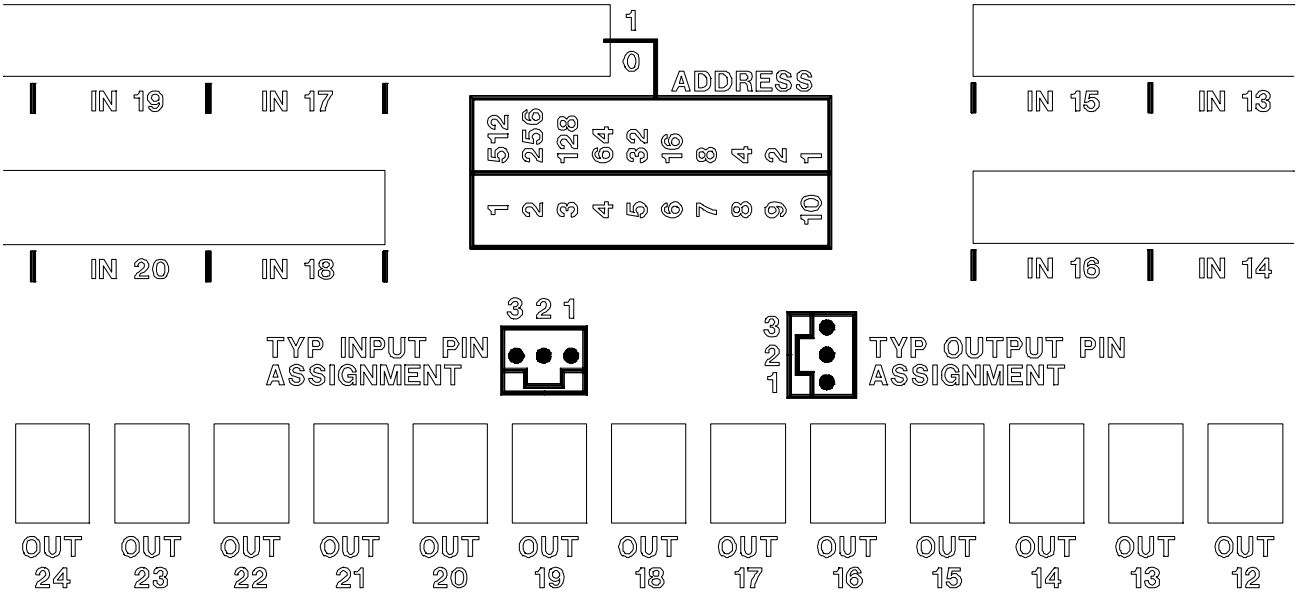
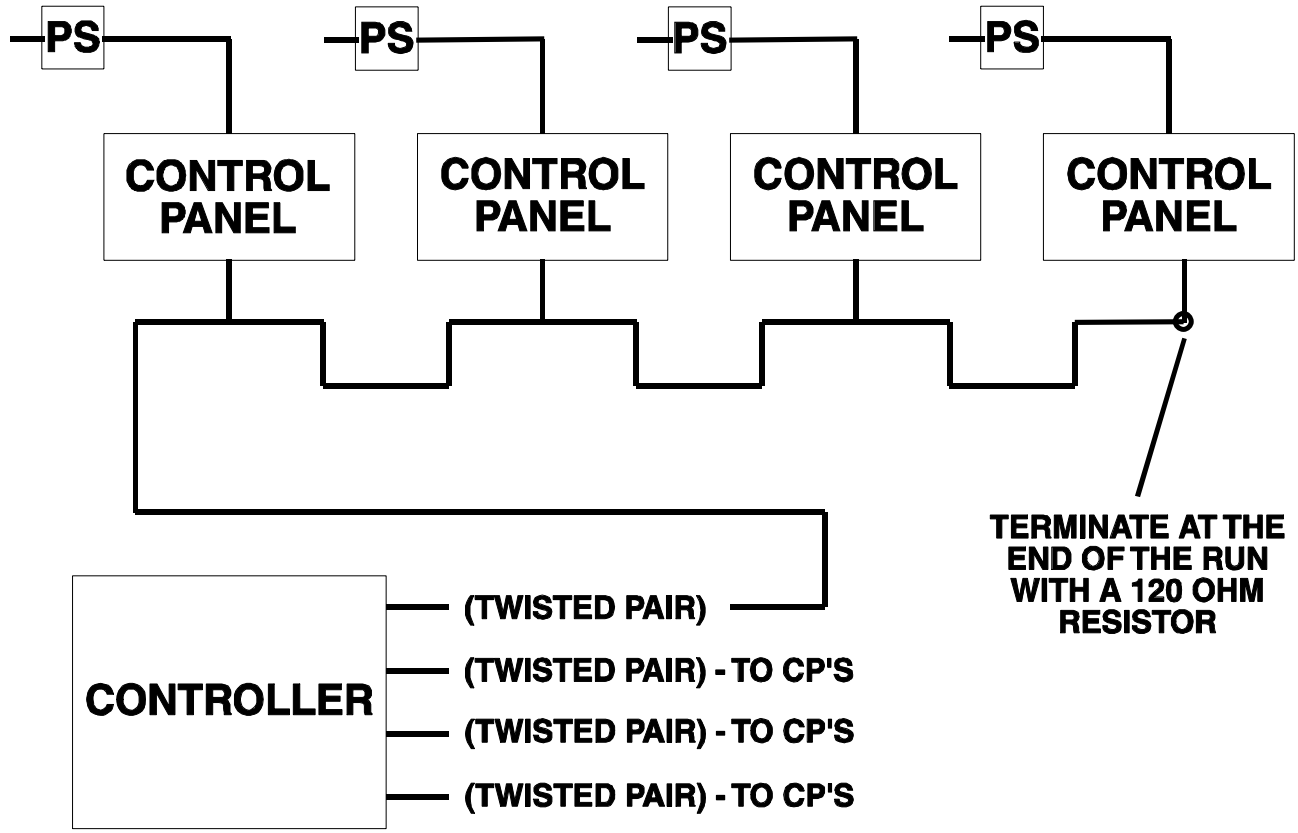


Figure 2-2 DIP Switch Setting

2.5 Control Panel/Controller Interconnection

Each control panel has a single 3-pin MTA connector located on its rear panel which is utilized for system communications to and from the controller. Control panels are daisy-chained to a communications port on the rear panel of the system controller or to a communications port on the rear panel of the routing switcher containing the system controller. Use shielded twisted pair cable for all control panel communication port connections. See Figure 2-3.



CP = CONTROL PANEL

Figure 2-3 Typical Control Panel Controller Interconnection

2.6 Wiring the Control Connector

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

1. Remove approximately 1.5'' of insulation from each of the two cables.

2. Remove approximately 0.5'' of insulation from the black and red wires.

3. Twist together and insert the two black wire into position one. Crimp down using a screwdriver.

4. Twist together and insert the two shield wires into position two. Crimp down using a screwdriver.

5. Twist together and insert the two red wires into position three. Crimp down using a screwdriver.

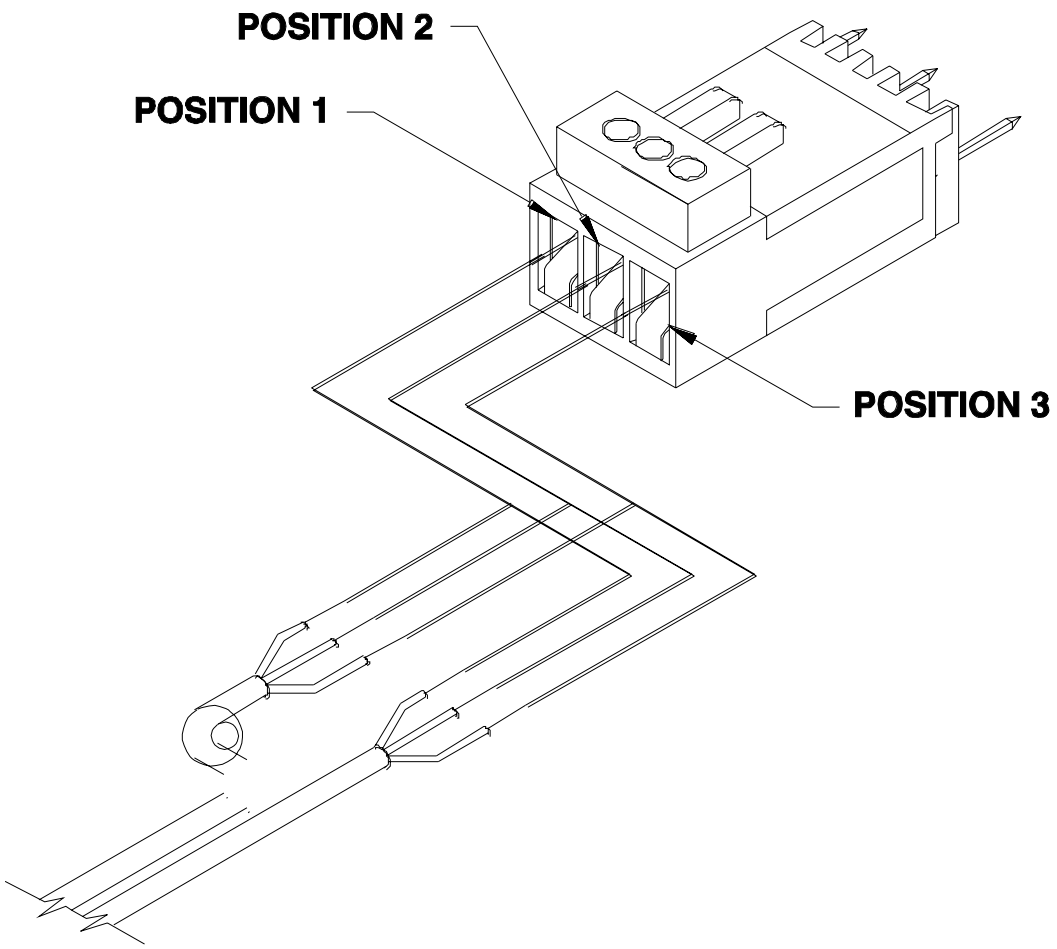


Figure 2-4 Wiring the Control Connector

2.7 Terminating Control Cable Runs

Each cable run should be terminated 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 positions one and three.
2. Insert the resistor leads into positions one and three along with the black and red leads.
3. Crimp down using a screwdriver.
4. The shield wire remains in position two.

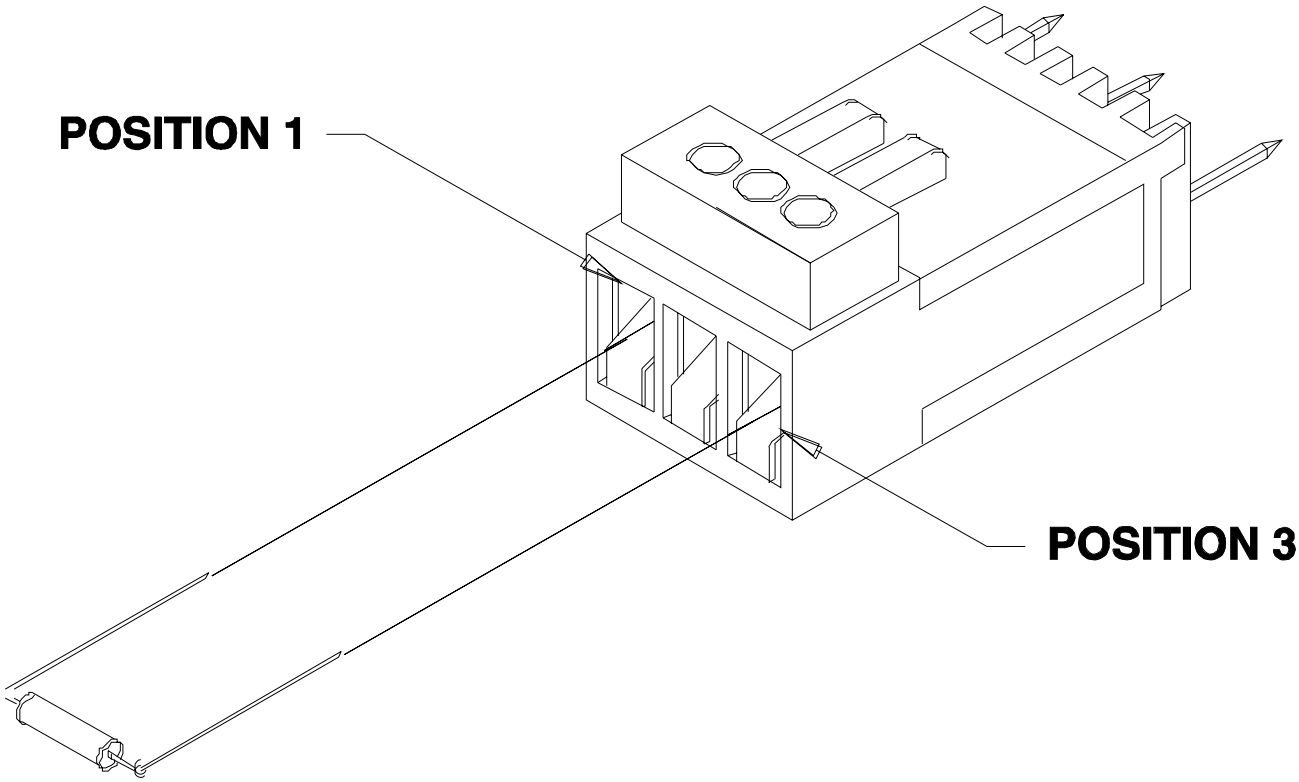


Figure 2-5 Terminating Control Cable Runs

2.8 Input Connection

The RCP-GPIO Control Panel provides 32 opto-isolated inputs. Each control panel input utilizes two 3-pin Weco input connectors (Figures 2-6 and 2-7). The two 3-pin input connectors allow the user to utilize internal power and an internal 390 ohm pull-up resistor which can be connected to the anode of the opto-isolator by connecting pins 1 and 2 of Input Connector One together. Input Connector Two provides the user with an open collector connection on pin 2 to be utilized as a contact closure by user supplied equipment. A GND connection is provided on pin 3 of Input Connector Two for utilization by user supplied equipment. Alternatively, an external current limit resistor can be installed between pins 2 and 3 on Input Connector Two and user supplied power to pin 2 on Input Connector One to activate the corresponding output. The input opto-diode is rated for a maximum forward current of 60 milli-amps.

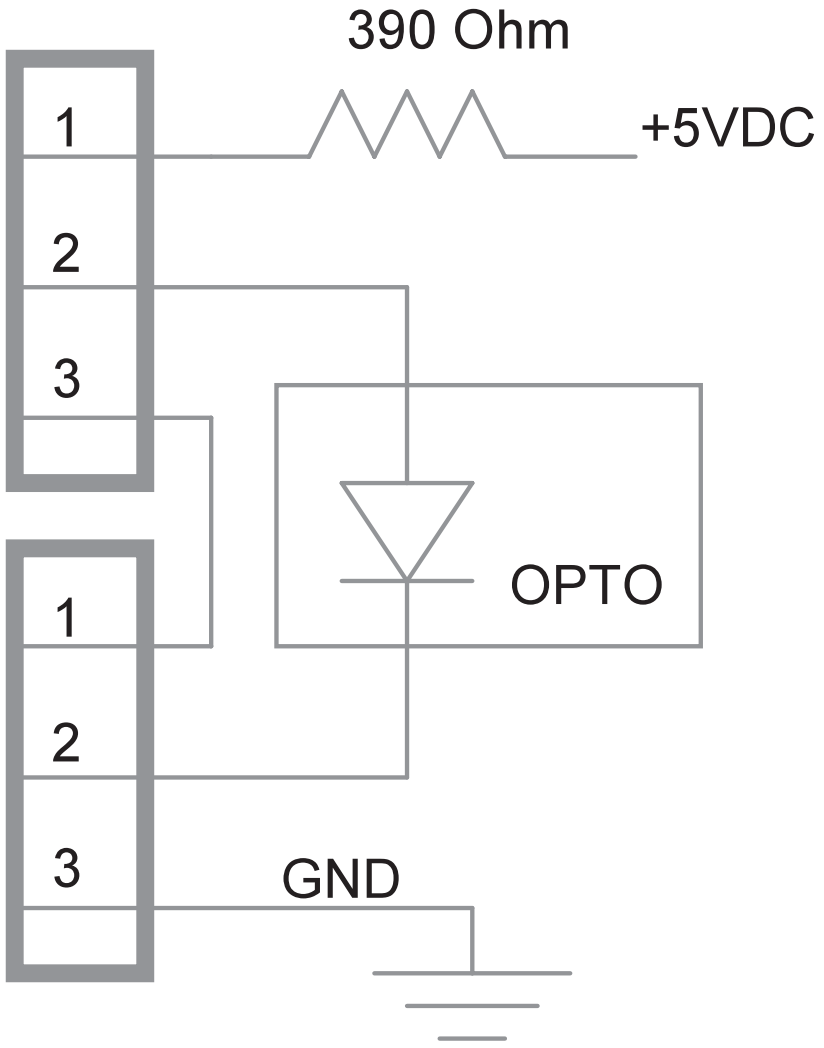


Figure 2-6 Typical Input (View One)

2.8 Input Connection Continued:

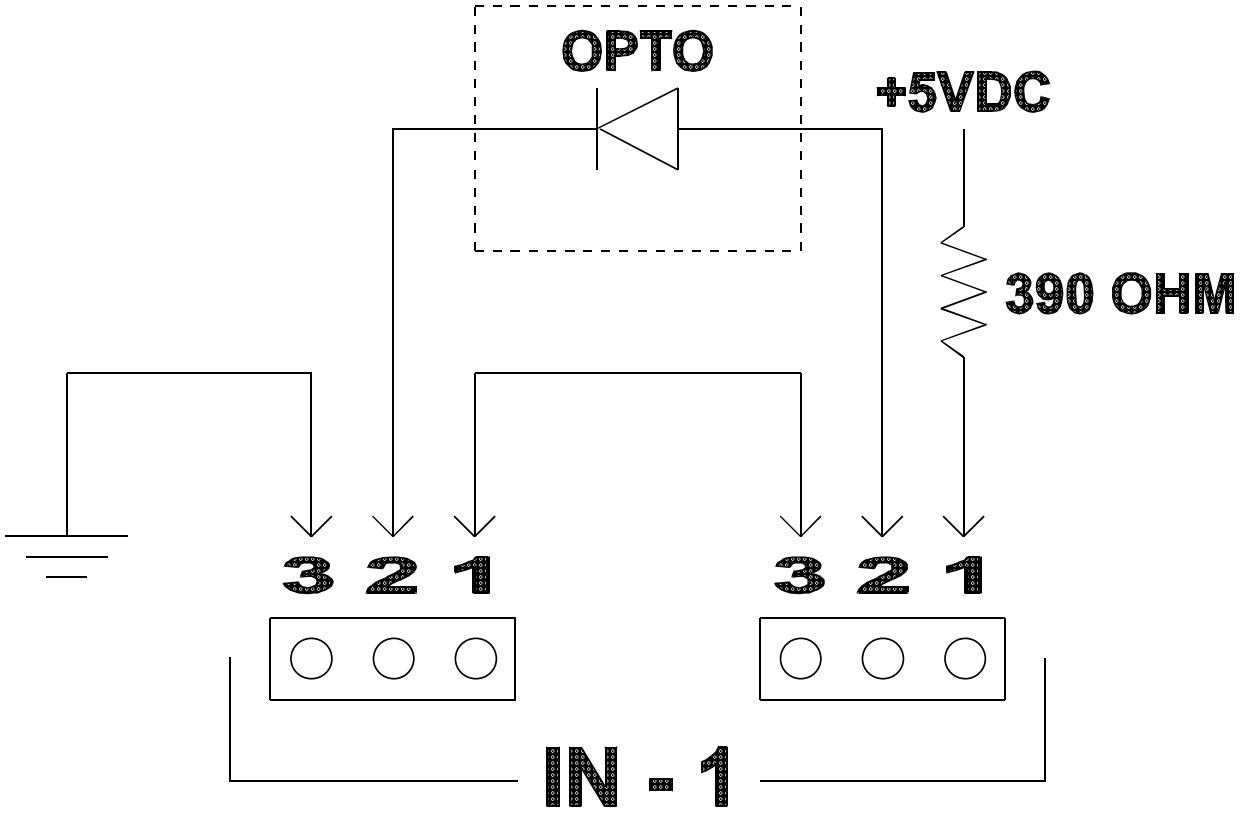


Figure 2-7 Typical Input (View Two)

2.9 Output Connection

The RCP-GPIO Control Panel provides 32 form "A" relay outputs (Figure 2-8). Each control panel output utilizes one 3-pin Weco connector . Each 3-pin output connector provides; a signal ground connection (pin 3), a relay wiper connection (pin 2), and a relay normally open connection (pin 1). The maximum voltage rating of the output relay contacts is 100VDC or 100V Peak to Peak AC. The maximum current rating of the output relay contacts is 1A continuous or 0.5A switched.

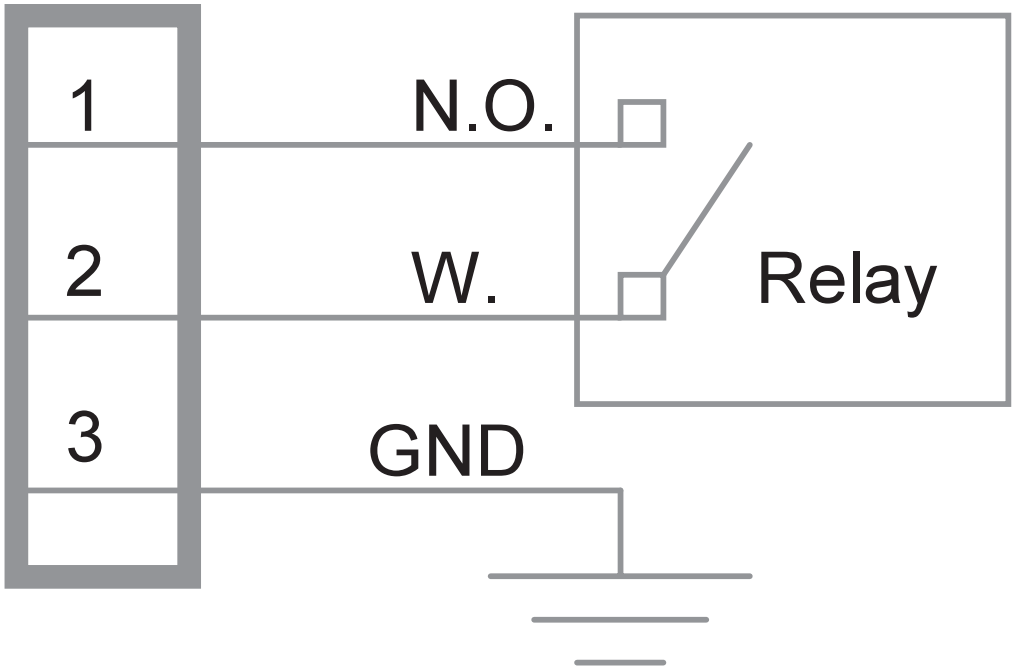


Figure 2-8 Typical Output

2.10 Power Connections

Power for the RCP-GPIO Control Panel 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 line voltage. The power connector can now be plugged into the **POWER IN** connector on the rear of the control panel. The power supply will immediately power the unit upon connection to the AC line voltage. See Figure 2-9.

2.10 Power Connections Continued:

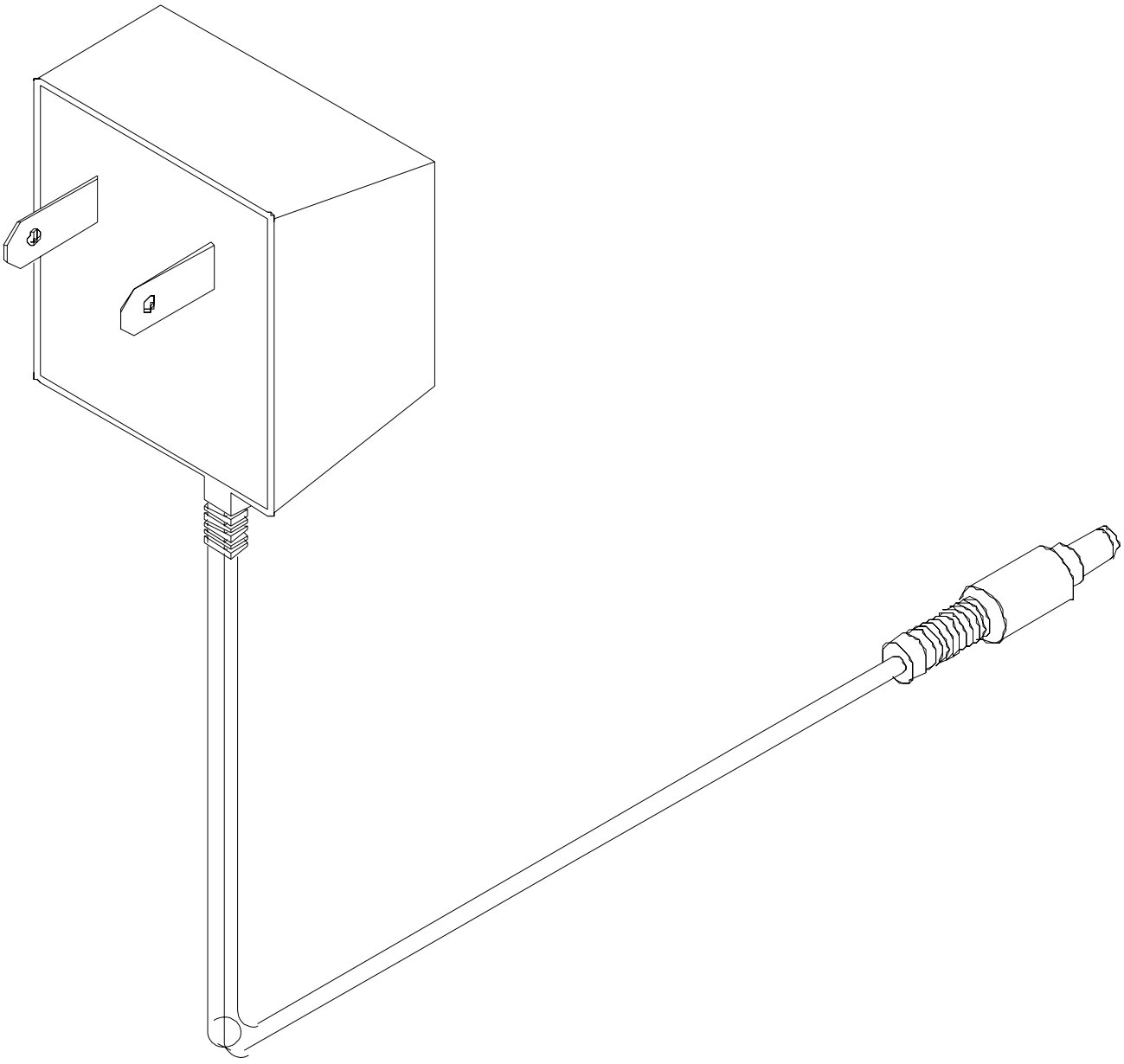


Figure 2-9 Typical Control Panel Power Supply

3.1 Introduction

The RCP-GPIO Control Panel is designed to be controlled by the 3300 Controller. Operations of the RCP-GPIO Control Panel require that it be configured at the system controller utilizing the Win3300 Control System. The RCP-GPIO is configured as an RCP-MLDT panel using the first 32 of the data keys to define its behavior.

General

All RCP-GPIO Control Panels in a system are custom configured at the factory prior to shipment. The information needed to configure the control panels comes from the System Design Guide filled out by the customer. However, if the system configuration changes, the RCP-GPIO Control Panels can be re-configured on site using the control system configuration software.

3.2 General Purpose Inputs

The RCP-GPIO panel is equipped with 32 general purpose inputs. The input circuit to the GPIO panel consist of an opto-isolated input. The circuit requires that the LED input be driven with sufficient current to trigger the opto-coupled transistor and be read by the panel. The input is optically isolated from the input LED to electrically isolate the panel's circuits from the input interface. The input connectors provide a current source and ground so that an isolated switch closure (such as a relay) can be used to activate the inputs as well.

The RCP-GPIO inputs are treated by the panel the same as a user activating a data key on an RCP-MLDT panel. When an input is activated on the GPIO panel, the 3300 reads the event as if it were a key press. As a key press, the panel can act to take a switch or change the destination being controlled by the panel. Given the manner in which the keys are configured, the activation of the input may do a number of actions.

The most common instance of operation is assigning a source to a data key on the panel. When the input associated with the data key is activated, the panel switches the source to the destination that the panel is currently controlling.

3.3 General Purpose Outputs

The RCP-GPIO panel is equipped with 32 general purpose outputs. The output circuit of the GPIO panel consists of a relay output closure. When activated, the panel activates the relay coil causing the relay switch to close.

The GPIO panel outputs appear as MLDT panel LED's to the 3300 control system. When the panel lights an LED, the GPIO panel activates the associated output. These LED's are lit when the source assigned to the key is switched to the panel's current destination. In this manner, tally can be generated when a source is connected to a certain destination.

3.4 Panel Configuration

The RCP-GPIO panel is configured in the system as a RCP-MLDT panel. The manner in which the panel is configured determines how the panel inputs and outputs will function.

Address: Decimal number from 1 to 1023 which is used to distinguish each panel on the panel communications bus. Address must match the DIP switch settings on the rear of the panel.

Panel Name: Any eight alphanumeric characters. Currently used only by the controller configuration program to provide a user friendly method of referring to each panel.

Requester Code: A number from 1 to 65535, this value is used by panels that need to share locks and protects. This is usually set to the same value as the panel address.

Priority: Priorities are used when a panel attempts to set or clear a destination protect or lock. Since the RCP-GPIO does not lock or unlock its destination, this field does not have any real application. A master priority of 0 is sufficient for this panel.

Status Method: The utilization of the default status is required by the RCP-GPIO Control Panel.

Default Status Level: Level to be statused by the GPIO panel. This level is important since it is used in the determination of which general purpose output is activated for tally.

3.4 Panel Configuration Continued:

Default Destination Group: Destination group to be controlled by the panel when first powered up.

Level List: List of levels to controlled by the panel. Any level not assigned in the Level List will not be accessible to or affected by panel operations.

Include Source List: List of all source groups accessible by the panel. Not applicable to the RCP-GPIO panel.

Include Destination List: List of all destination groups controllable by the panel. Not applicable to the RCP-GPIO panel.

Salvo List: List of all salvoes the panel can execute. Not applicable to the RCP-GPIO panel.

Data Key Assignment List: List containing the assignment of all data keys as configured by you. Though the RCP-MLDT allows 72 data keys, the RCP-GPIO is only functional for the first 32 of those keys.

The RCP-GPIO panel uses only two of the data key types: Source and Destination. Though the RCP-MLDT supports many other types of key options, the other types should be avoided unless you have a very good understanding of the RCP-MLDT and RCP-GPIO panels.

Salvo Key Assignment List: Since salvos are not accessible from the RCP-GPIO panel, this list is not applicable and may be left blank.

Soft Keys: Since soft keys are not accessible from the RCP-GPIO panel, this item is not applicable and may be left blank.

The following is an example of configuring the RCP-GPIO for two different types of applications.

3.4 Panel Configuration Continued:

Configuring All Actions to be Taken on a Single Destination

If all actions initiated by the panel are to be taken on a single destination, then the following is required for configuring the panel.

1. Enter a panel name. This is an optional name for your benefit that allows you to identify the function of the panel.

2. Enter the address for which the panel is coded. This address matches the binary encoded value on the DIP switch on the back of the panel.

3. Enter a requester code. Usually this is the same as the panel address. Requester codes are used when locks and protects need to be shared among a number of panels.

4. Enter the lock priority. Since this panel performs no lock actions, a value of 0 (super user) is adequate.

5. Enter the status level. This is the level of control that is of most interest to the panel. It is the level of control that will determine the tally that activates the GPIO panel outputs.

6. Enter the status method. The selection should be the default (DEF).

7. Enter the default destination. The selected destination is the destination on which all panel actions are taken.

8. Levels of control list determines which levels of control the panel will take switches on. Selection of the ALL list will insure that actions are taken on all levels of control.

9. Source, destination, and salvo include lists do not have any impact on the operation of the panel. Selection of the ALL list is adequate for these panels.

10. The data key list is the list that determines what switches will be taken when a particular input is activated as well as what outputs are activated when a certain switch status occurs. Data key associations to inputs/outputs are 1-to-1 so that data key #1 is associated with input and output #1 on the GPIO panel, etc. In this configuration, data keys are assigned desired sources (Source Key Type) that correspond to each input/output that will be activated.

3.4 Panel Configuration Continued:

Configuring All Actions to be Taken on a Single Destination Cont:

Given a configuration that has the source VTR 1 associated to data key #3, when input #3 is activated on the panel, VTR 1 is taken to the destination controlled by the panel. The output associated with the source VTR1 becomes active.

If the same source is used more than once on a panel (i.e. assigned to more than one data key) and is used for GPIO panel output activation, the user will need to "OR" the switch closures together. The panel does not guarantee which output will activate when the source is switched to the panel's destination.

The data key list only needs the first 32 data keys configured. Keys 33-72 need not be configured.

11. Salvo key and soft keys are not used by this configuration. They do not need to be configured on the panel.

Configuring Actions to be Taken on Different Destinations

The RCP-GPIO panel may be configured to initiate switches on different destinations. Doing so has some limitations in that each input event must go to two separate inputs. In addition, the use of the general purpose outputs is limited as the panel only provides tally for one destination at any one time.

1. Enter a panel name. This is an optional name for your benefit that allows you to identify the function of the panel.

2. Enter the address for which the panel is coded. This address is coded on the DIP switch on the back of the panel.

3. Enter a requester code. Usually this is the same as the panel address. Requester codes are used when locks and protects need to be shared among a number of panels.

4. Enter the lock priority. Since this panel performs no lock actions, a value of 0 (super user) is adequate.

5. Enter the status level. This is the level of control that is of most interest to the panel. It is the level of control that will determine the tally that activates the GPIO panel outputs.

3.4 Panel Configuration Continued:

Configuring Actions to be Taken on Different Destinations Cont:

6. Enter the status method. The selection should be the default (DEF).

7. Enter the default destination. The selected destination is the destination that the panel controls coming out of reset. This will be used for status until an input is activated on the panel.

8. Levels of control list determines which levels of control the panel will take switches on. Selection of the ALL list will insure that actions are taken on all levels of control.

9. Source, destination, and salvo include lists do not have any impact on the operation of the panel. Selection of the ALL list is adequate for these panels.

10. The data key list is the list that determines what switches will be taken to a which destinations when a particular input is activated. When configuring for this scenario, two successive data keys must be assigned for each input. The first key (lower number) is assigned the destination (Destination Key) that will be switched. The second key is assigned the source (Source Key) that is to be switched to the destination. (Note that the destination key must be the lower number key as the panel reacts to lower key inputs before higher key inputs. Failure to do this will cause the switch to be taken before the proper destination is selected.)

Given a configuration that has source VTR 1 to be taken to MONITOR 1 on an input event, MONITOR 1 is the destination assigned to key #1 and VTR 1 is the source assigned to key #2. The input circuits to inputs #1 and #2 are paralleled. When the input is activated, the panel switches control to the destination MONITOR 1 and then switches the source VTR 1 to MONITOR 1.

The data key list only need the first 32 data keys configured for 16 switching events. Keys 33-72 need not be configured.

11. Salvo key and soft keys are not used by this configuration. They do not need to be configured on the panel.

4.1 Introduction

The RCP-GPIO Control Panel contains one printed circuit board assembly; the GPIO Interface Card. The GPIO Interface Card contains a microprocessor that controls the panel's operation and communicates with the routing switching system controller. The GPIO Interface Card also contains the interface connections used by the external relays to the control the routing switcher system. The following manual section contain a detailed description of the GPIO Interface Card.

4.2 GPIO Interface Card

The GPIO Interface Card contains all of the circuitry necessary to communicate with the system controller and to interface with 32 inputs and 32 outputs. The circuitry on the GPIO Interface Card may be divided into the following sections: Power Supply, Microprocessor, Clock, Reset, and RS485 Communications. The GPIO Interface Card also contains circuitry which scans the inputs and activates the corresponding output relays. The following paragraphs explain each section in detail.

Power Supply

The power supply circuit on the GPIO Interface Card consists of a 7805 +5V regulator and filter capacitors. Unregulated DC voltage (7.5 to 9 VDC) is supplied by an external power supply via J65. The voltage regulator (U39) reduces the voltage to 5.0 VDC. C10 and C9 provide filtering for the input and output of the regulator. Bypass capacitors (0.1 uF) are scattered about the assembly to provide power supply bypassing for the individual integrated circuits (ICs). Unregulated voltage (Vext) is also provided to the output relay circuits.

Microprocessor

The heart of the GPIO Interface Card is the Motorola 68HC11 microprocessor (U35). This IC contains the microprocessor and peripheral circuitry used to operate the control panel. In addition, the 68HC11 contains a PROM loaded with the software used to operate the control panel. The 68HC11 is operated in the multiplexed mode. In this mode port B (U35 pin 35-42) provides the address byte (A0-A2). Port C (U35 pins 9-16) provides the data byte (D0-D7).

4.2 GPIO Interface Card Continued:

Microprocessor Continued:

During the first half of the bus cycle, port C presents the lower address byte (A0-A2). This information is presented to U38 and remains stable until the beginning of the next bus cycle when KBD_SEL is driven high by the processor. During the last half of the bus cycle port C presents data during write cycles and accepts data during read cycles.

Clock

The master system clock is provided by oscillator U6 pin 8. SYSCLK is available to the processor (U35 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.

Reset

As with all microprocessors, the 68HC11 requires initialization during power-up. The 68HC11 requires that the RESET pin (U35 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 the internal EPROM register contents. A Maxim MAX690 chip (U34) performs the reset function for the 68HC11. The MAX690 monitors the supply voltage and asserts RESET (U34 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.

RS485 Communications

Communication between the panel and the system controller is accomplished by the 68HC11 internal serial communications interface (SCI). The SCI is an asynchronous receiver/transmitter, sometimes referred to as a UART. The RS485 standard is used for the electrical interface between control panels and the system controller. A 75ALS176 (U37) chip is used convert between RS485 and the levels required by the SCI. Transmit data (TXD) is presented by the SCI on U35 pin 21. This signal drives the input to the RS485 transceiver on U37 pin 4. Data received from the system controller is converted to the appropriate levels by the RS485 transceiver and is presented on U37 pin 1. This received data (RXD) signal is then fed to the SCI receiver at U35 pin 20. Since the RS485 interface requires the transmitter to be tri-stated when not is use, a third signal is required to enable/disable the RS485 transmitter.

4.2 GPIO Interface Card Continued:

RS485 Communications Continued:

The processor provides the TX_ENABLE signal under software control at U35 pin 25. This signal is connected to the RS485 transceiver at U37 pin 3. When TX_ENABLE is asserted (high), U37 drives the RS485 bus (U37 pins 6 and 7 to J4 pins 1 and 3). When TX_ENABLE is negated (low), U37 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 particular state. A pull-down resistor (R35) has been added to ensure that U37 does not drive the RS485 bus during power-up or other reset conditions. A shield connection is provided for the RS485 bus on J66 pin 2.

LED Driver Support

The 68HC11 processor uses the internal synchronous peripheral interface (SPI) under software control to drive the GPIO Interface Card's LED circuitry. LDATA is presented as serial bit stream on U36 pin 25. LCLK is presented on U36 pin 24. U36 accepts LDATA on the rising edge of LCK. The data stream generated is compatible with that required by National MM5450 LED driver chips.

Inputs Scan

The GPIO Interface Card contains circuitry capable of scanning up to 64 inputs. The scan circuit is arranged as an eight row by eight column array. While the scan circuitry is capable of serving 64 push-buttons, the GPIO Interface Card has circuitry for 32 inputs. To scan the inputs, the microprocessor performs read cycles that enable KRD_SEL. This occurs for the address range of 800h to FFFh. KRD_SEL provides an active low chip select for the bus transceiver (U1 pin 19). The three least significant address bits (A0-A2) are connected to the input of the decoders (U38 pins 1, 2, and 3). One of the eight active low outputs of the decoders is selected by placing the appropriate address on the input of the decoders. Since partial decoding is used, the keyboard circuitry is mapped to several addresses within the KRD_SEL address range. The software in the microprocessor only uses the lowest available addresses to access the keyboard.

4.2 GPIO Interface Card Continued:

Inputs Scan Continued:

Although the GPIO Interface Card only uses rows 0-3, the microprocessor still scans all 16 rows. Each row of push-buttons contains up to eight individual switches. **Example:** KB_ROW0 will simultaneously enable inputs 1-8. If any of these inputs are activated, the active low signal will be passed through the input jumpers to one of the eight column signals (KB_COL0 through KB_COL7). If the input is not activated the column signal will be pulled high by resistor pack RP1. The KRD_SEL signal also enables U1 to place the KB_COL signals on the data bus. Thus, by performing a read cycle at address 800h, the microprocessor can determine the state of inputs 1-8 by looking at the state of data bits D0-D7. If input 1 is activated, then D0 will be low. Likewise, if input 2 is activated, D1 will be low. The status of the entire input array may be determined by performing successive reads of each row of the array.

Output Relay Activation

While the GPIO Interface Card contains circuitry capable of activating up to 34 output relays, the GPIO only uses 32 of the output relay driver circuits (one per output). The drive for the output relay circuits is provided by U36 (MM5450V LED Driver). The microprocessor sends a serial data stream to the MM5450V LED driver using the LDATA (pin 25 of LED driver chip) and LCLK (pin 24 of the LED driver chip) signals. The enable signal (pin 26 of the LED driver chip) is always asserted (active low). The output current used drive each LED is enabled by the brightness pin of the LED driver (pin 21). Resistor R323 sets the current flow through the output relays. The LDATA line is latched into the LED driver chip on the rising edge of LCLK.

5.1 General

The RCP-GPIO Control Panel is a solid state electro-mechanical device 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 this manual.

NOTICE

THIS EQUIPMENT CONTAINS STATIC SENSITIVE DEVICES. IT IS RECOMMENDED THAT A GROUNDED WRIST STRAP AND MAT BE USED WHILE MAKING REPAIRS.

5.2 Preventive Maintenance

There is little need for performing preventive maintenance on the RCP-GPIO Control Panel other than the normal care which should be given to any high quality electronic equipment.

5.3 Test Equipment

The test equipment recommended for servicing the RCP-GPIO Control Panel is listed in Table 5-1. Equivalent test equipment may be used.

Table 5-1 Test Equipment Table

EQUIPMENT	FUNCTION
Oscilloscope - 20MHz 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 the maintenance of the RCP-GPIO Control Panel. The functional description (Section 4) contains assembly and circuit level information to help identify specific problems.

5.4 Corrective Maintenance Continued:

Factory Repair Service

If desired, equipment items or assemblies may be returned to the PESA factory (transportation prepaid) for repair. Refer to the General Assistance and Service Information Sheet found in the front of this manual. Call the PESA Service Department (the phone number is listed on Service Information Sheet) for a RMA number prior to shipping an equipment item to the PESA factory for repair.

NOTE

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.

Troubleshooting

Troubleshooting the RCP-GPIO Control Panel requires the routing switcher system to be used as a test fixture. The RCP-GPIO Control Panel will not function except as part of routing switcher system. The only troubleshooting which can be accomplished without opening the control panels is to check input power (from plug-in power supply).

To open a control panel for troubleshooting, remove the front cover and disassemble the unit as far as required to gain access to the component side of the circuit assemblies. Place the disassembled panel on a nonconductive surface and arrange the parts so the unit can be operated. You must be able to check the operation of the inputs and outputs while observe the resulting status. You must also have sufficient access to the circuit assemblies to measure voltage or observe waveforms.

Procedure: Put the RCP-GPIO Control Panel through the operating sequence as described in operation section of this manual. Refer to Section 3.

If the control panel is unresponsive, there may be a power problem or the microprocessor on the GPIO Interface Card is not operating.

5.4 Corrective Maintenance Continued:

Troubleshooting Continued:

1. Refer to the **Power Distribution** discussion in Section 4. Refer to the **Remote CPU Assembly Schematic** in Section 6 if it is necessary to make voltage checks at the chip or component level.

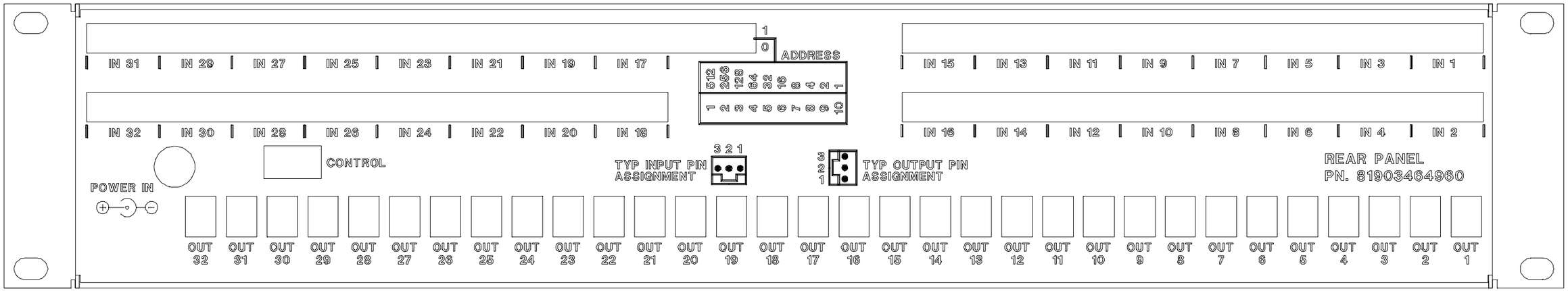
2. If the power is functioning properly, the microprocessor is not functioning. The microprocessor requires a clock, a power-up reset, and communications from the system controller. Refer to the GPIO Interface Card functional description in Section 4.

6.1 Schematics

General

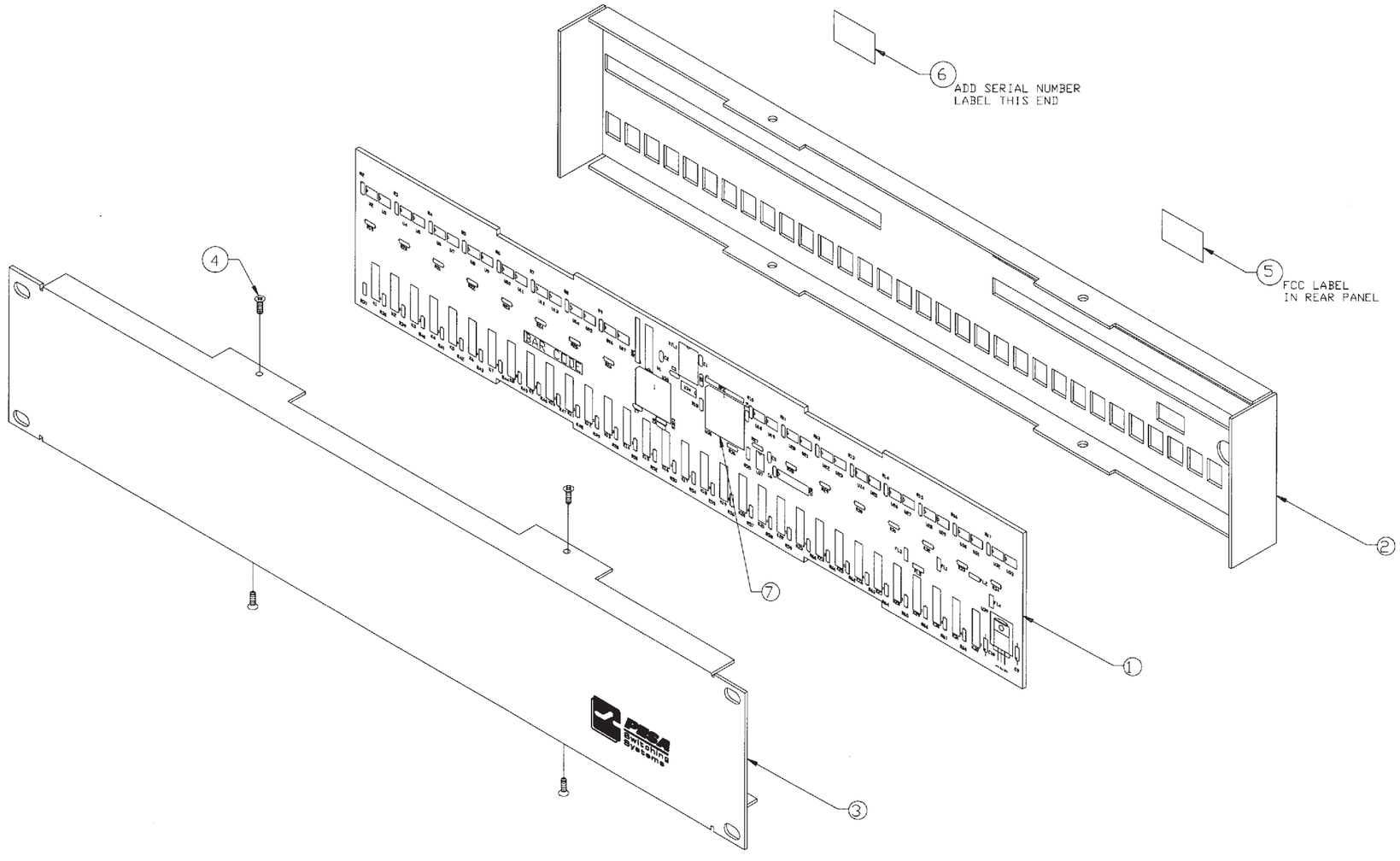
This section contains the schematic diagrams and parts location diagrams for the RCP-GPIO Control Panel. Please refer to this section when troubleshooting the equipment or replacing defective parts.

RCP-GPIO Control Panel Front View

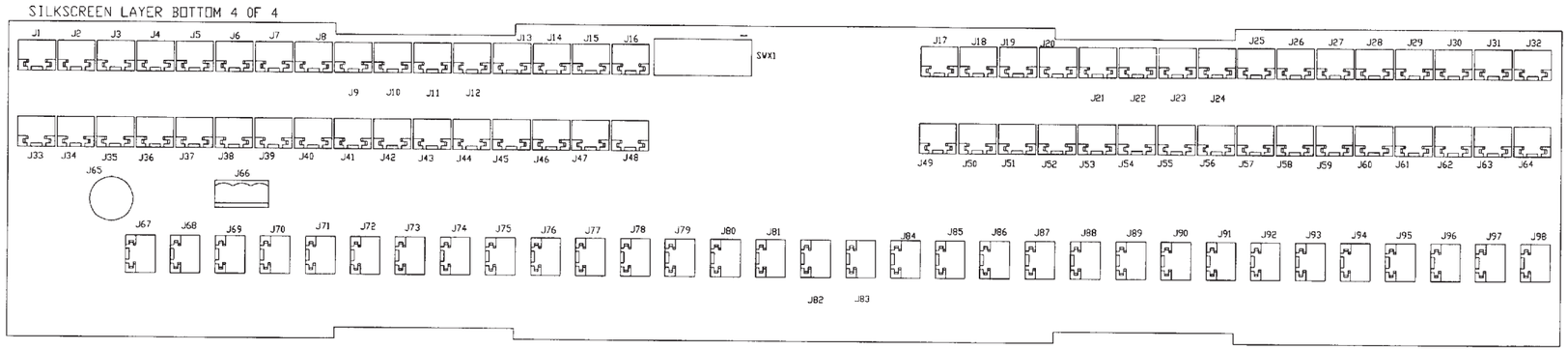


RCP-GPIO Control Panel Rear View

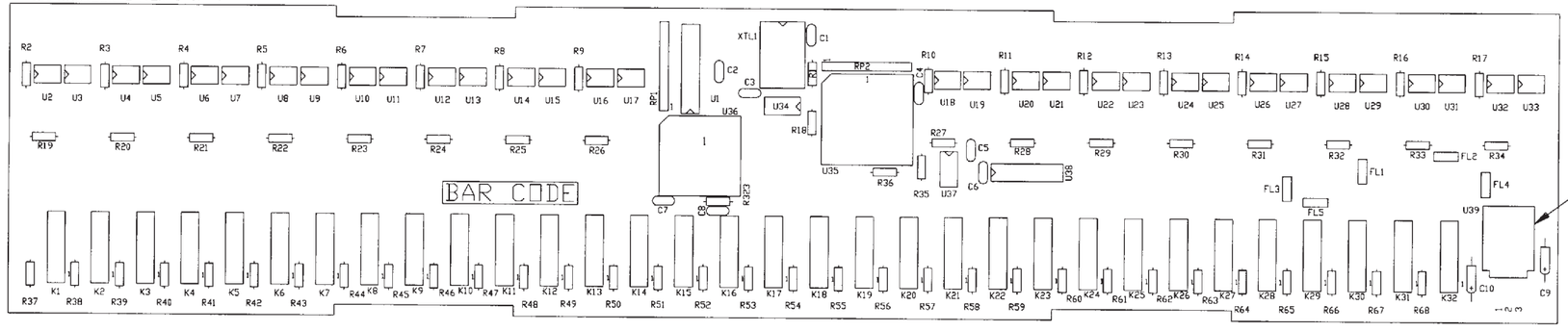
NO	PART NUMBER	DESCRIPTION	QTY	UNIT
HARDWARE SCHEDULE				
7	81906519330	SOFT ASSY GPIO PANEL	1.0	EA
6	81902101468	LABEL EQUIP SERIAL	1.0	EA
5	81902101500	LABEL WARNING FCC-EMI	1.0	EA
4	81902201433	SCREW	4.0	EA
3	8190346495	FRONT PANEL	1.0	EA
2	81903464960	REAR PANEL	1.0	EA
1	81906519260	INTERFACE CARD	1.0	EA



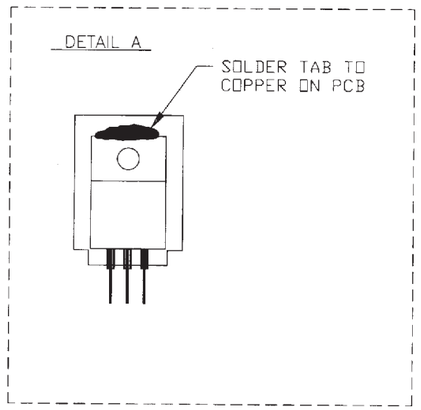
Configuration Drawing • RCP-GPIO Control Panel Assembly • CD63-0784

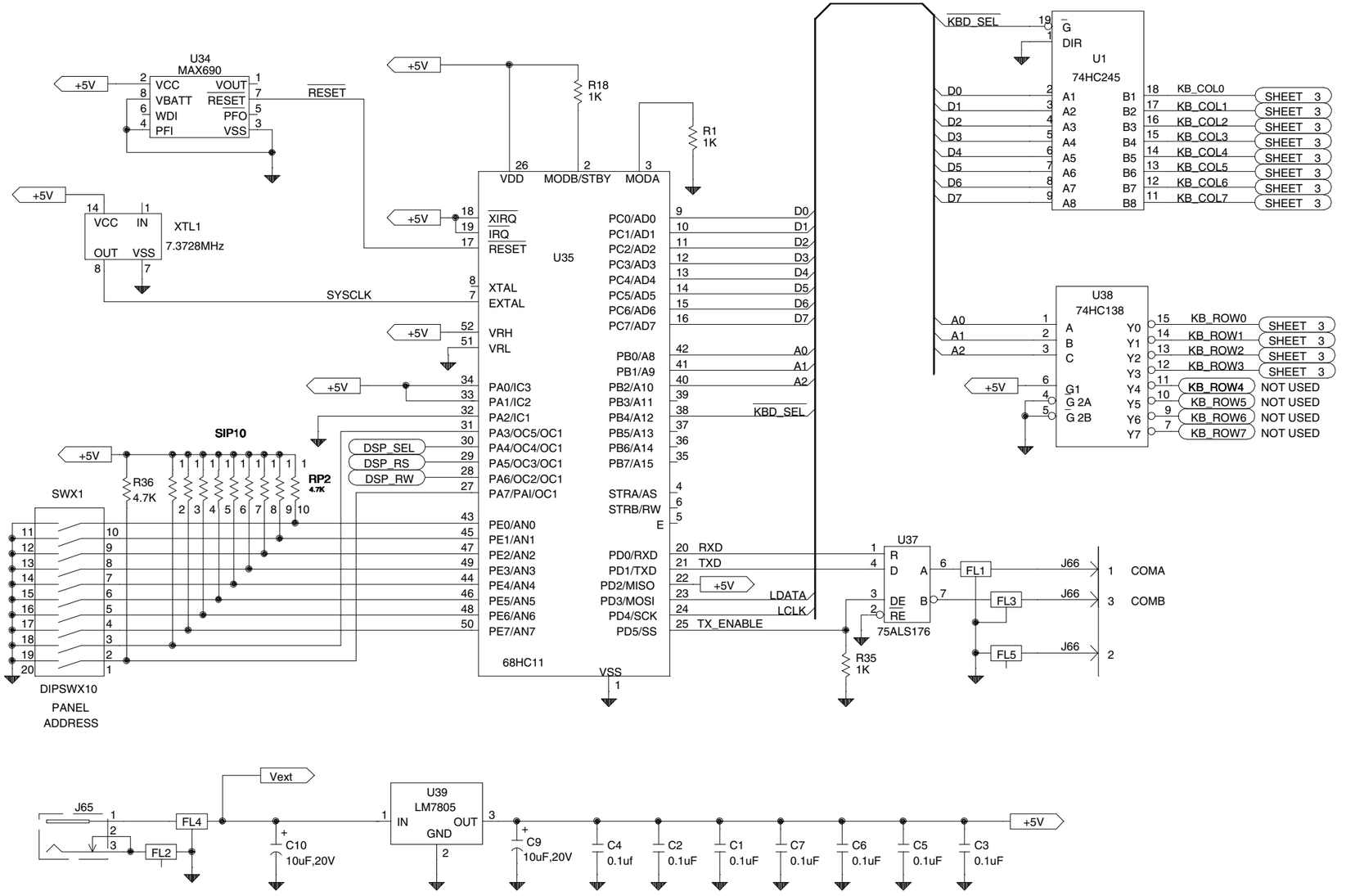


REAR (LAYER 4 OF 4)



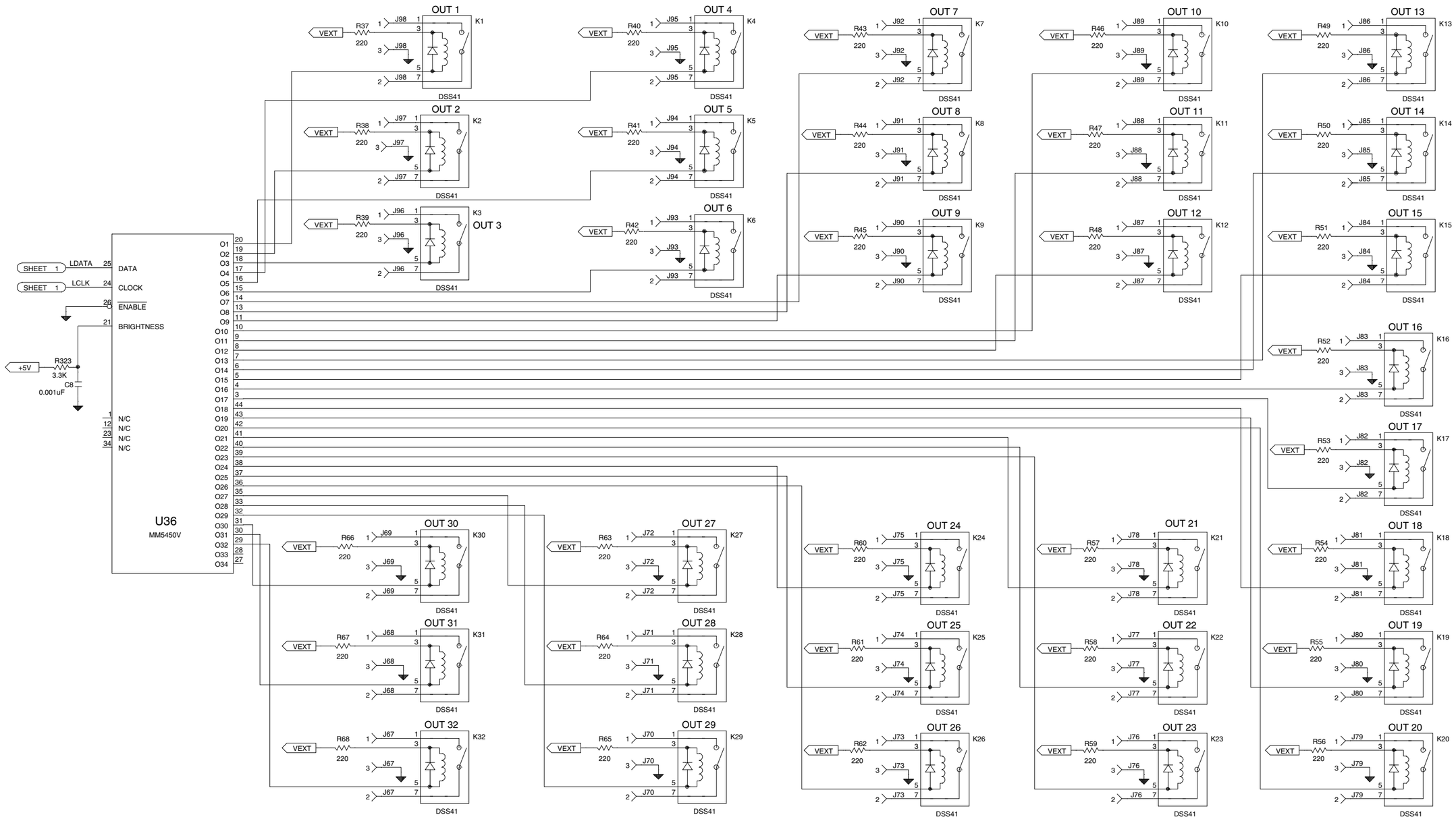
FRONT (LAYER 1 OF 4)



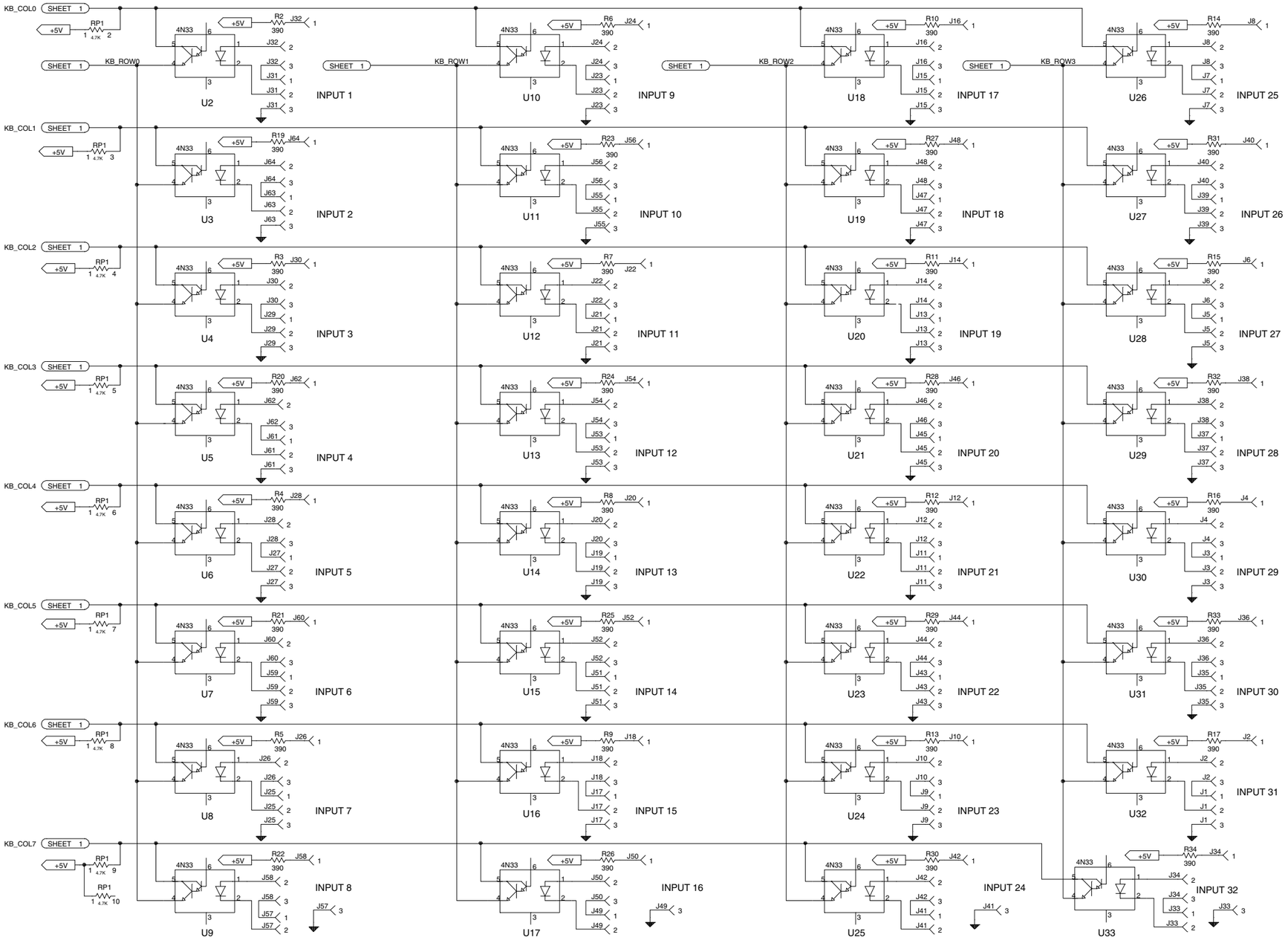


* BOARD ID CODE : 3 PA0 = 1
PA1 = 1
PA2 = 0

Schematic (Sheet 1 of 3) • RCP-GPIO Interface Card • SC33-1376



Schematic (Sheet 2 of 3) • RCP-GPIO Interface Card • SC33-1376



Schematic (Sheet 3 of 3) • RCP-GPIO Interface Card • SC33-1376

7.1 Parts List

General

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

RCP-GPIO Control Panel Assembly - 81906519250

81902101468	LABEL EQUIPMENT SERIALIZATION	1	EA
81902101500	LABEL WARNING FCC-EMI	1	EA
81902201433	SCREW 4-40X3/16 FLAT HEAD PHIL	4	EA
81902907800	CONN 3-POS W/STRAIN RELIEF	1	EA
81902908110	CONN 3-PIN F STRAIN RELIEF	96	EA
81903464950	RCP-GPIO FRONT PANEL	1	EA
81903464960	RCP-GPIO REAR PANEL	1	EA
81906519260	RCP-GPIO INTERFACE CARD	1	EA
81906519330	SOFT ASSY RCP-GPIO PANEL	1	EA
CD63-0784	DOC RCP-GPIO CONFIGURATION	REF	

RCP-GPIO Interface Card - 81906519260

81900200502	RESISTOR 220 OHM 5% 1/4W	R37-R68	32	EA
81900200569	RESISTOR 390 OHM 5% 1/4W	R2-R17 R19-R34	32	EA
81900200668	RESISTOR 1K 5% 1/4W	R1 R18 R35	3	EA
81900200783	RESISTOR 3.3K 5% 1/4W	R323	1	EA
81900200825	RESISTOR 4.7K 5% 1/4W	R36	1	EA
81900600958	SIP 4.7K 10-PIN 9 RESISTOR	RP1 RP2	2	EA
81900700055	CAP 0.1MF 50V CERAMIC RADIAL	C1-C7	7	EA
81900700238	CAP 0.001MF 1000V CERAMIC	C8	1	EA
81900900291	CAP 10MF 20V TANTLM AXIAL	C9 C10	2	EA
81901601187	REG MC7805C +5V 1A TO-220	U39	1	EA
81901602318	IC 4N33 OPTO DARLINGTON OUT	U2-U33	32	EA
81901604314	IC 74HC245 CMOS BUS TRANSV	U1	1	EA
81901604827	IC 1 OF 8 DECODER/MULTIPLXR	U38	1	EA
81901606061	IC MAX690CPA PWR SUP MON	U34	1	EA
81901606830	IC 7.3728 MHZ OSCILLATOR	XTL1	1	EA
81901606870	IC 5450 34 SEG LED DRIVER	U36	1	EA
81901606880	IC 74ALS176 RS485 TRANSCV	U37	1	EA
81901800200	RELAY SIP 5VDC	K1-K32	32	EA
81902105050	LABEL BARCODE 1.5"X0.25"		1	EA
81902413760	RCP-GPIO INTERFACE CARD		1	EA
81902600543	SWITCH 10-POS DIP PC-MT	SWX1	1	EA
81902905991	SOCKET 52-PIN PLCC PC-MT	REF: U35	1	EA
81902906353	CONN 3-POS MALE POLAR STR	J66	1	EA
81902907400	CONN SOCKET PLCC 44-PIN	REF: U36	1	EA
81902907460	CONN POWER JACK PCB MOUNT	J65	1	EA
81902908100	CONN 3-PIN PC-MT VERTICAL	J1-J64 J67-J98	96	EA
81903900740	FILTER EMI SUPPRESSION	FL1-FL5	5	EA
CA25-1376	DOC RCP-GPIO INTERFACE CARD		REF	
DD52-1376	DOC RCP-GPIO INTERFACE CARD		REF	
SC33-1376	DOC RCP-GPIO INTERFACE CARD		REF	

RCP-GPIO Software Assembly - 81906519330

81901606730	IC 68HC11E9 SINGLE CHIP	1	EA
81902104930	LABEL WHITE 1/2"X3/4" REC	1	EA
81905603520	SOFT BIOS RCP-GPIO	REF	
81906203230	DOC PROGRAMMING EPROMS	REF	