bioMérieux

VITEK•2® Smart Carrier Station
Service Manual

510740-1
REV 0599

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Updates are made periodically to this document. Software revisions and other changes will be included in subsequent versions.

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PREFACE

This manual is for use by bioMérieux Field Service Engineers and factory trained Biomedical Engineers to assist in the troubleshooting and repair of the ***VITEK•2®*** Smart Carrier Station. Every effort has been made to ensure that the information contained in this manual is complete and accurate. All calibration and adjustment procedures used in this manual are adapted directly from current Engineering documentation.

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Chapter One: **Organization of the Manual**

Introduction

This Service Manual contains information on the operation, installation, maintenance, and repair of the ***VITEK•2®*** Smart Carrier Station. This information is intended to provide an understanding of how this instrument performs, possible causes of malfunctions, and how to isolate and correct performance problems.

This chapter explains how the manual is organized, and how to use the manual.

The Table of Contents lists all the chapters in this manual. Each chapter is subdivided into heading levels corresponding to a procedure or description.

Organization of the Manual

The information in the manual is organized among six chapters. They are arranged so that the information you need first is in the beginning of the manual. Information required for maintenance after the system is operating is found in later chapters. The following is a brief outline of what you will find:

- Chapter One: Organization of the Manual - This chapter explains how the manual is organized and how to use the manual.

- Chapter Two: System Overview - This chapter is a complete guide for the installation and setup of the ***VITEK•2®*** Smart Carrier Station. It begins with the unboxing of the instrument and proceeds through its power-up and configuration.

  This chapter also contains environmental, spatial, and electrical requirements.

- Chapter Three: System Operation - This chapter introduces the ***VITEK•2®*** Smart Carrier Station hardware and describes the basic parts of the software system.

- Chapter Four: System Components - This chapter describes the components of the system and their operation. It contains the descriptions of the boards and the major subassemblies.

- Chapter Five: Component Installation - This chapter describes how to remove and install subassemblies that may be encountered during repair of the ***VITEK•2®*** Smart Carrier Station.

- Chapter Six: Troubleshooting - This chapter describes troubleshooting methods for the ***VITEK•2®*** Smart Carrier Station.

Following these chapters are appendices containing procedures, drawings, schematics, and a glossary of terms.

After completing this service manual, you should be able to do the following:

- Identify the ***VITEK•2®*** Smart Carrier Station and major components
- Troubleshoot errors in the ***VITEK•2®*** Smart Carrier Station.

After completing the various chapters in this manual, you should be able to complete the items listed under each chapter:

Chapter One

- You will be able to recognize the various typographic conventions used throughout the manual.

Chapter Two

- You will be able to describe how to unpack the ***VITEK•2®*** Smart Carrier Station and prepare it for use.
- You will be able to identify, all of the ***VITEK•2®*** Smart Carrier Station specifications.

Chapter Three

- You will be able to state the general operating theory of the ***VITEK•2®*** Smart Carrier Station.
- You will be able to describe the purpose of each of the following ***VITEK•2®*** Smart Carrier Station components:
  - Base Unit
  - Display Screen
  - Bar code wand
  - Keyboard

Chapter Four

- You will be able to identify the various internal components of the ***VITEK•2®*** Smart Carrier Station.

Chapter Five

- You will be able to remove and install various components of the ***VITEK•2®*** Smart Carrier Station.

Chapter Six

- You will be able to identify a malfunction and the action required to fix it.

Typographic Conventions

Following are the terms and visual cues used in this manual to aid in your understanding of the procedures.

NOTE: Symbol calls attention to especially useful information or instructions.

WARNING! The information or instructions following is critical to the safe operation of the instrument. ***Please read this information carefully!***

The following data entry instructions are used throughout this manual:

- **↵ key**. An instruction to use this key **ALWAYS** takes the form:

  press **ENTER (↵)**.

  NOTE: On some keyboards, this key may be labeled **RETURN or ENTER**.

- **Function keys**. Function keys include all control keys and the **SHIFT** key **(a ↔ A)**. They are capitalized and appear as:

  press **SHIFT U**.

- **Data Entry.** Data entered into the system via the keyboard is ALWAYS shown in **bold**. Instructions for making a data entry begin with "type" and conclude with "press **ENTER**."

- An operation involving a selection always begins with "Select."

- Single-key entries may not require pressing **ENTER**. Such entries begin with "press," such as:

  press **Q**.

Chapter Two: **System Overview**

Preparations For Unpacking the *VITEK•2®* Smart Carrier Station

Figure 2-1 shows a ***VITEK•2®*** Smart Carrier Station.

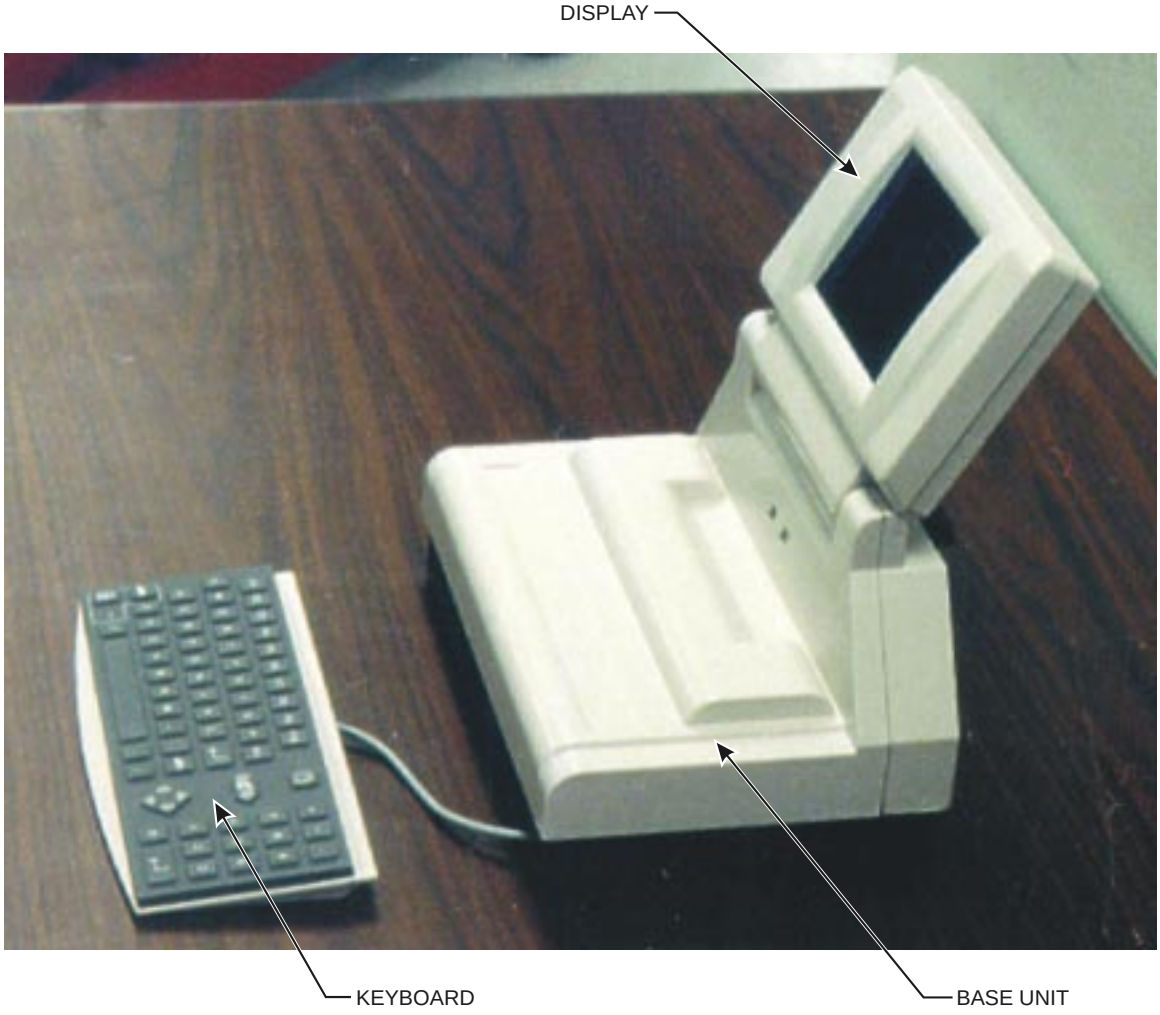


Figure 2-1 Smart Carrier Station

Inspect the shipping container for external damage. If damage to the shipping container has occurred, verify that the ***VITEK•2®*** Smart Carrier Station has not been damaged. If damage to the ***VITEK•2®*** Smart Carrier Station has occurred, file a claim with the shipper and notify bioMérieux, Inc.

Check the packing list and verify that all required items are included in the shipment.

NOTE: The packaging materials and shipping container should be retained for future transportation needs, if necessary.

Unpacking Procedure

The recommended procedure for removing the ***VITEK•2®*** Smart Carrier Station from its shipping container is to:

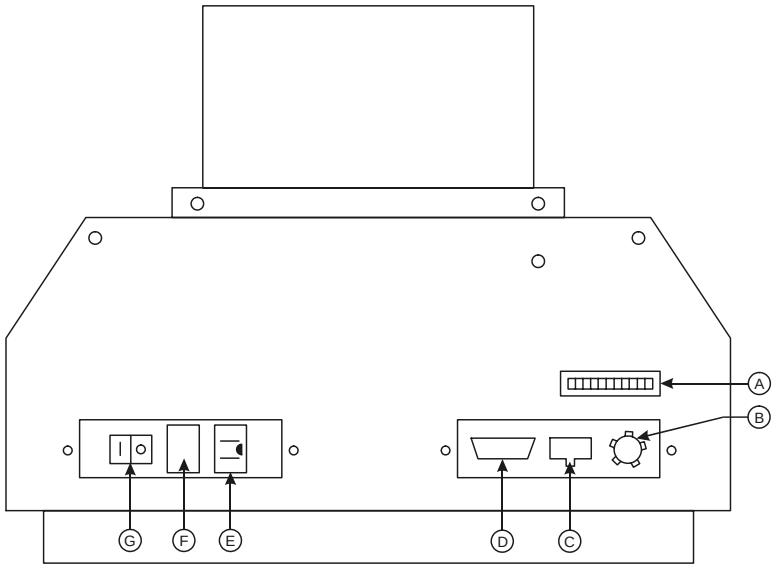
1. Open the shipping carton and remove the unit from the carton.

2. Carefully remove the unit from the packing material, be sure to remove all parts and literature from the carton.

3. Remove the remaining packing materials from the ***VITEK•2®*** Smart Carrier Station and store with the shipping container.

Installation Procedure

After completing the unpacking procedure, the ***VITEK•2®*** Smart Carrier Station (SCS) is ready to be placed in its permanent location. The ***VITEK•2®*** Smart Carrier Station is intended for use on any normal, flat bench top commonly found in a microbiology lab. Some cables must be connected to the unit. Figure 2-2 shows the cable connections points on the back of the unit.



Ⓐ SCREEN CONTRAST ADJUSTMENT
Ⓑ KEYBOARD CONNECTION PORT
Ⓒ BAR CODE WAND CONNECTION PORT (RJ45)
Ⓓ 9-PIN SERVICE / UPDATE PORT
* Ⓔ 110/220V SUPPLY RECEPTACLE (AC)
Ⓕ FUSE HOLDER
Ⓖ ON/OFF SWITCH FOR SMART CARRIER

* Unit accepts either 110V or 220V supply voltages. Smart Carrier will sense and determine value of supplied voltage and automatically adjust voltage value internally within the power supply.

Figure 2-2 SCS – Cable Connections

The following should be performed in preparing the ***VITEK•2®*** Smart Carrier Station for use:

1. Place the ***VITEK•2®*** Smart Carrier Station in its permanent location.

   - Position the instrument to meet the minimum clearance of 50 mm (2 in.) on all sides for ventilation and 30.5 cm (12 in.) above the instrument to provide access for placing cassettes onto the unit.

2. Properly connect all cables, plugs, etc. Refer to figure 2-2 for the cabling connections.

3. Turn ON the power. (***VITEK•2®*** SCS power switch is located on the back of the unit.)

4. The bioMérieux logo or the configuration screen will be displayed within a few minutes. If the screen is not displayed try adjusting the contrast adjustment so the screen display is visible. If there still is no display, turn OFF the power and re-start at step 2.

5. If the configuration screen is displayed, set the desired configuration settings. For details on these settings refer to the ***VITEK•2®*** User's Manual.

6. If problems are encountered in setting up the unit, refer to chapter six of this manual for troubleshooting information

System Physical and Electrical Requirements

PHYSICAL CHARACTERISTICS:

Dimensions;

- Height - 28.26 cm (11.1 inches)
- Width - 27.15 cm (10.7 inches)
- Depth - 17.78 cm (7 inches)

Clearance;

- 5 cm (2 in) on all sides

Weight;

- ≈2.6 kg. (5.85 lbs.)

ELECTRICAL REQUIREMENTS:

Voltage Selection;

- 100/120 or 200/240 VAC internally detected by power supply circuitry

Input voltages/currents;

- 100/120 VAC @ 2 amps max. (.2 amps nominal)
- 200/240 VAC @ 2 amps max. (.1 amps nominal)
- 50/60 Hz

Power;

- 10 watts (nominal)

Heat;

- 34 BTU/HR (nominal)

ENVIRONMENTAL OPERATING REQUIREMENTS:

Ambient Temperature;

- 15°C - 30°C

Humidity;

- 10% - 80% (Non-Condensing)

Chapter Three: **System Operation**

Unit Description

The ***VITEK•2®*** Smart Carrier Station is a dedicated purpose, PC type computer. It is used by laboratory technicians to enter test card and specimen information into the "button" memory of the cassette for transfer to the ***VITEK•2®*** instrument. The unit consists of :

- Base Unit
- Bar code wand
- Keyboard
- Display Screen

Figure 3-1 shows the ***VITEK•2®*** Smart Carrier Station, without the bar code wand.

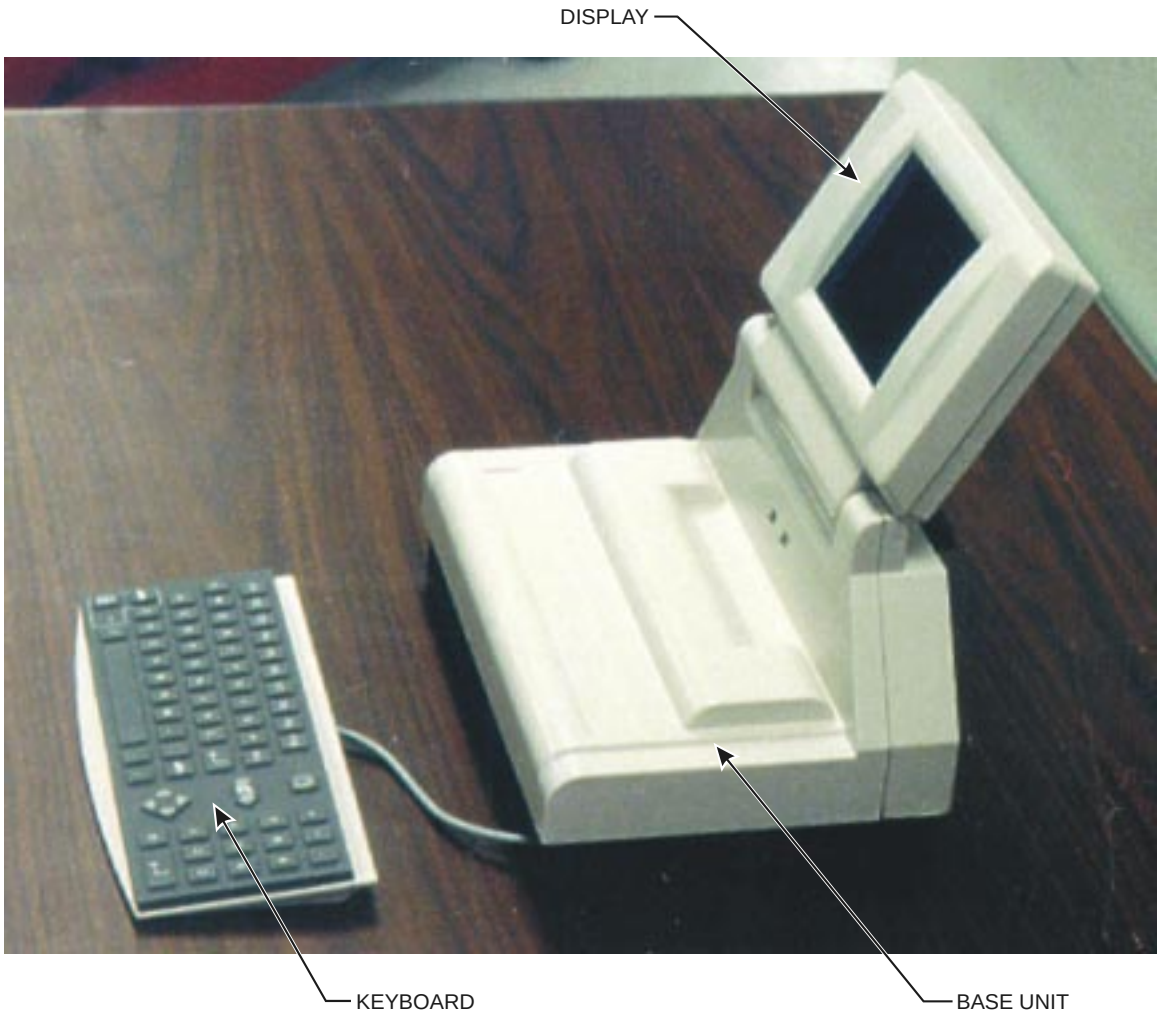


Figure 3-1 ***VITEK•2®*** Smart Carrier Station

Cassette

The cassette holds up to 15 test cards with the associated specimen test tubes. A cassette is shown in figure 3-2. The button memory device is located in the bottom of the cassette as shown in figure 3-3. Although the cassette has 3 sockets for memory buttons, only one is needed. The button memory device is programmed by the SCS via two contacts on the base unit which connect electrically to the memory when the cassette is placed on the base unit.

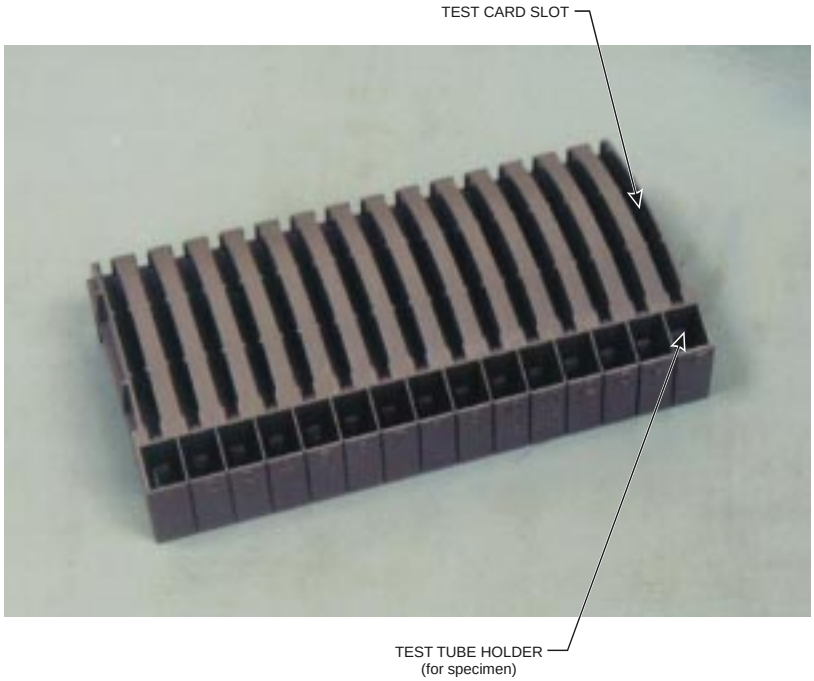


Figure 3-2 Cassette – Top View

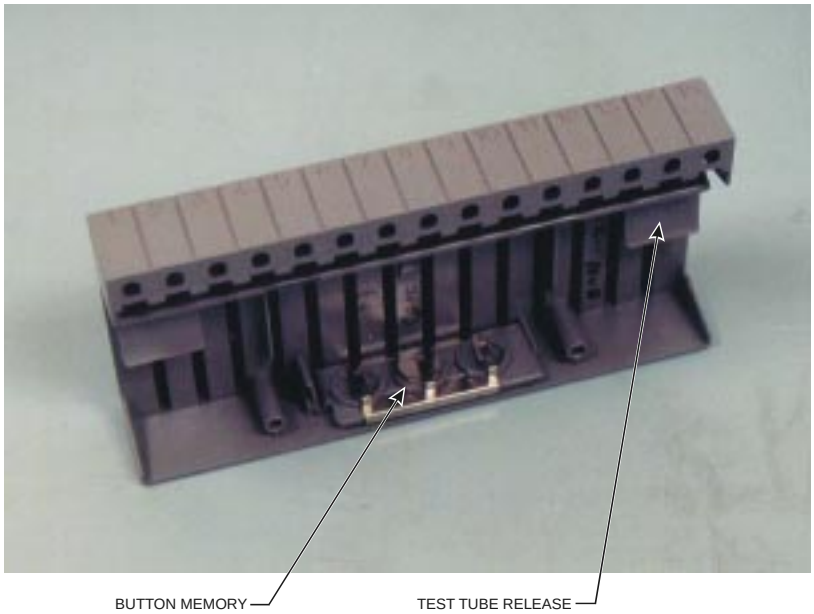


Figure 3-3 Cassette –Bottom View

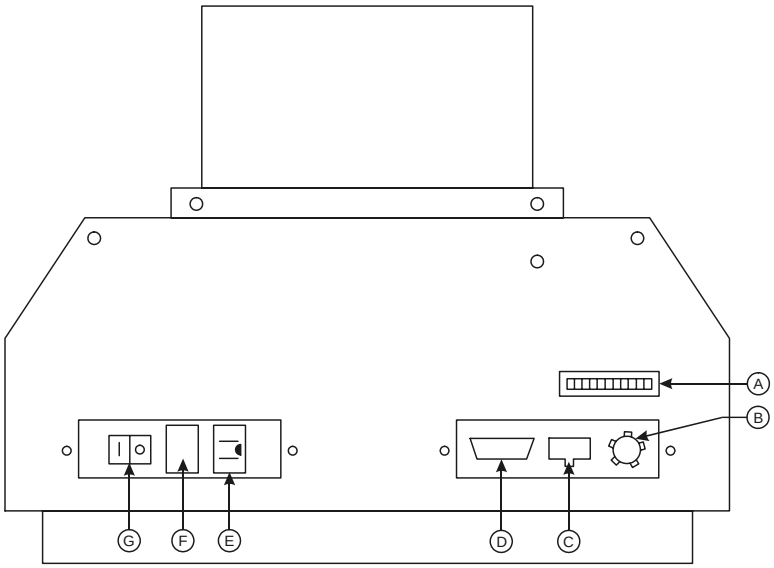
The cassette is placed in the ***VITEK•2®*** for card processing, incubation, and analysis. If the ***VITEK•2®*** was previously set-up in Smart Carrier Mode and the button memory device instrument was programmed at the Smart Carrier Station, the Cassette Scan Station will read the memory. This non-volatile memory contains the patient, test, and carrier specific information for the system. After the data has been read by the ***VITEK•2®***, it tags it as "read" in preparation for the next use of the cassette.

☞ **NOTE**: The data remains on the button memory device until it is erased by the SCS. If necessary, that data can be read by the ***VITEK•2®*** for diagnostics purposes after it has been tagged as "read."

Base Unit

The base unit contains the computer electronics such as the power supply, CPU, memory, disk storage, and video controller. It also contains connection points for the power cord, serial communication link, the bar code wand, and the keyboard. Figure 3-4 shows a photograph of the back of the base unit. Figure 3-5 is a drawing showing the location of each of the connection points.

Figure 3-4 SCS – Back View



Ⓐ SCREEN CONTRAST ADJUSTMENT
Ⓑ KEYBOARD CONNECTION PORT
Ⓒ BAR CODE WAND CONNECTION PORT (RJ45)
Ⓓ 9-PIN SERVICE / UPDATE PORT
* Ⓔ 110/220V SUPPLY RECEPTACLE (AC)
Ⓕ FUSE HOLDER
Ⓖ ON/OFF SWITCH FOR SMART CARRIER

* Unit accepts either 110V or 220V supply voltages. Smart Carrier will sense and determine value of supplied voltage and automatically adjust voltage value internally within the power supply.

Figure 3-5 SCS – Back View

Bar Code Wand

The bar code wand allows the lab technician to enter information into the SCS by scanning the bar codes printed on the test cards, or from the SCS Job Aid card. If the laboratory uses bar codes for accession numbering specimens, this information can also be entered via the scanner. Scanned data automatically appears in the appropriate field on the display screen after each successful scan. The scanner can be used with an optional holder (passing the bar codes by the scanner), or it can be held by the technician (and aimed at the bar codes).

The bar code wand can read the following industrial symbology: CODABAR, CODE39, INTERLEAVED 2 of 5, CODE 2 of 5, MATRIX 2 of 5, CODE 11, CODE 93, and CODE 128.

Keyboard

The SCS is equipped with a small keyboard. The keyboard provides an alternative method of data entry and is also used to configure, maintain and troubleshoot the SCS. It is a standard keyboard, with function keys and two unique keys. The unique keys are located between the alphabetic keys and the numeric keypad, as shown in figure 3-6.

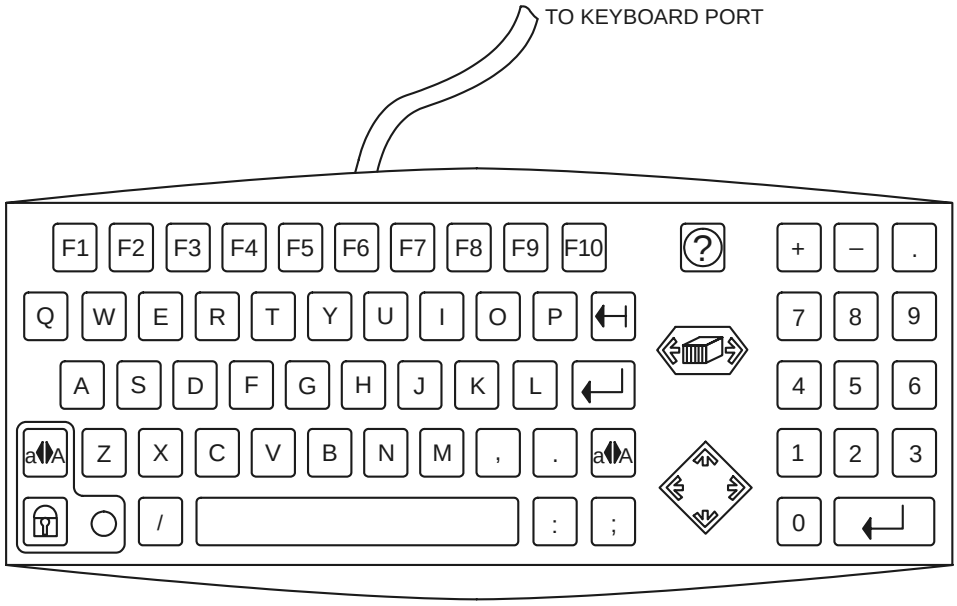


Figure 3-6 Keyboard

The special keys are, from the top; the **HELP** key and the **PREVIOUS/NEXT SLOT** key. The **HELP** key is used to display context-sensitive help that describes the current functions that are available. (See Vitek 2 User's Manual for additional information.)

Display Screen

The SCS display is a backlit, black and white LCD screen, which is 320 pixels and 240 pixels high. Several different screens are programmed into the SCS for configuration and operation. Figure 3-7 shows the data entry screen used during the data entry operation of the SCS.

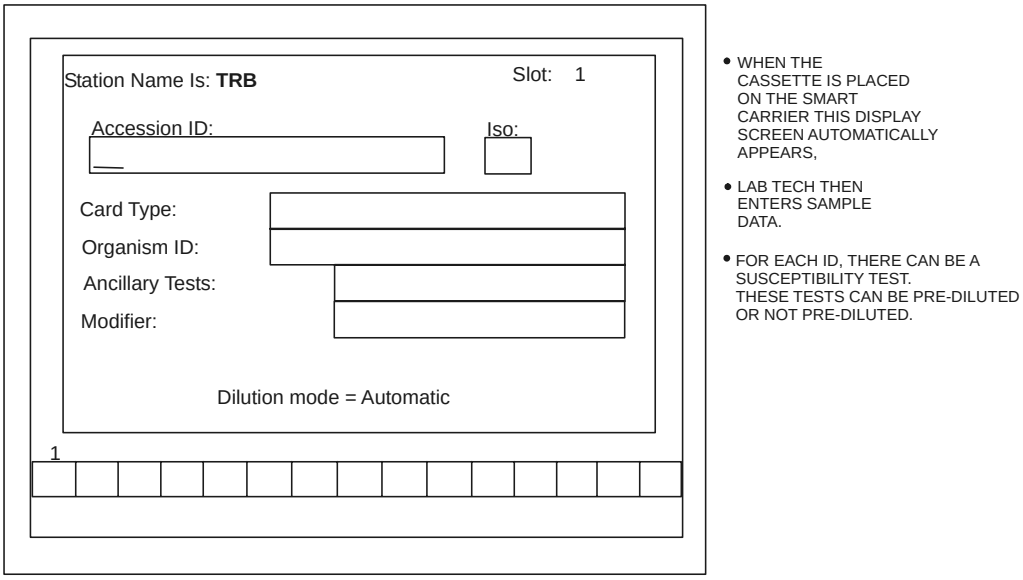


Figure 3-7 Data Entry Screen

Unit Operation

Data entry can be accomplished by manual key-in using the keyboard, or using the bar code wand. The process is:

1. Place the cassette (with button memory device installed) onto the SCS base unit. Ensure the cassette rests against the metal contacts on the base unit.

2. The data entry screen should automatically be displayed.

3. The lab tech enters the data by either:

    a. Entering data in each field on the keyboard, pressing ***Enter*** after each entry. The data is transferred to the button memory device when the ***Enter*** key is pressed.

    b. Scanning data from bar code labels. Pressing ***Enter*** is not necessary. The data is transferred to the button memory device when each successful scan is made.

4. Enter data for the card in the next slot.

5. After all information has been entered, remove the cassette from the SCS and put it into the ***VITEK•2***® instrument for processing.

Chapter Four: **System Components**

Chapter Four familiarizes the user with the system components of the ***VITEK•2***® Smart Carrier Station. In this chapter, we provide more detailed descriptions of the individual component parts of each system and their functions.

The ***VITEK•2***® Smart Carrier Station is made up of the following components:

- Keyboard Assembly
- Bar code wand
- Computer Electronics
  - Display Assembly
  - Power Supply
  - SCS I/O Board Assembly/which includes
    - CPU/Disk Board
    - Video Board
    - General Purpose I/O Board

Keyboard

The SCS keyboard users the PC-XT Synchronous Communication. Two keys are unique to the SCS and are described in the previous chapter. The keyboard can be slipped into a recess beneath the SCS base unit when it is not in use. The keyboard connects to the SCS base unit via a plug-in DIN type RJ-45 connector on the back of the base unit. Attached to the cord is a ferrite core for reducing emissions. The keyboard controller is contained in the SCS I/O board assembly.

Bar Code Wand

The bar code wand connects to the SCS base unit via a plug-in DIN type RJ-45 connector on the back of the base unit. It also has a ferrite core attached.

Computer Electronics

All the computer electronics are contained within the SCS base unit, as shown in figure 4-1. The display screen and power supply are separate assemblies. The I/O board assembly contains the general purpose I/O board, the CPU/disk/memory, and the video board.

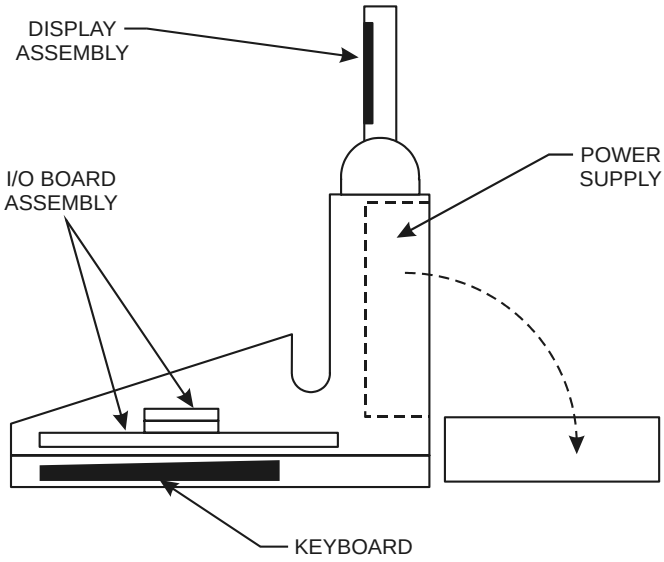


Figure 4-1 Electronic Component Locations

Display Screen

The display assembly is a backlit LCD unit. The display area is 320 pixels wide and 240 pixels high. The screen is located in a hinged housing which permits the user to tilt the display to the best viewing angle. Screen contrast is adjusted by a thumbwheel at the back of the base unit. The housing, backlight power cable, flex cable, ground cables and housing hinges are shown in figures 4-2 and 4-3.

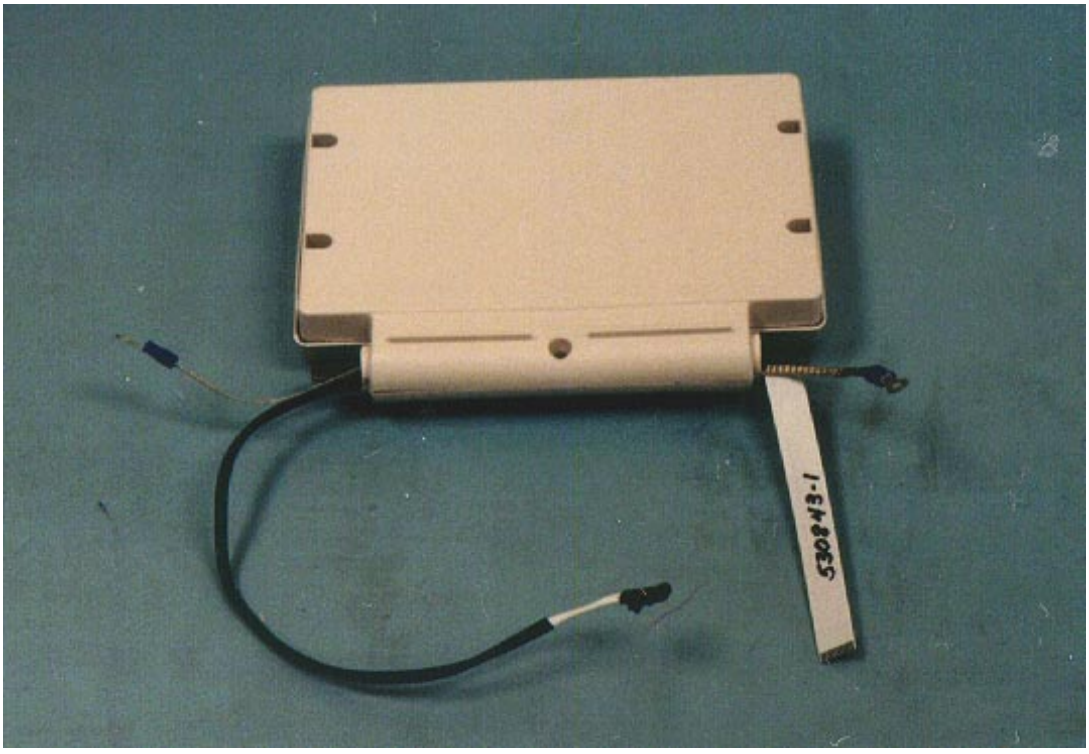


Figure 4-2 Display Screen Housing

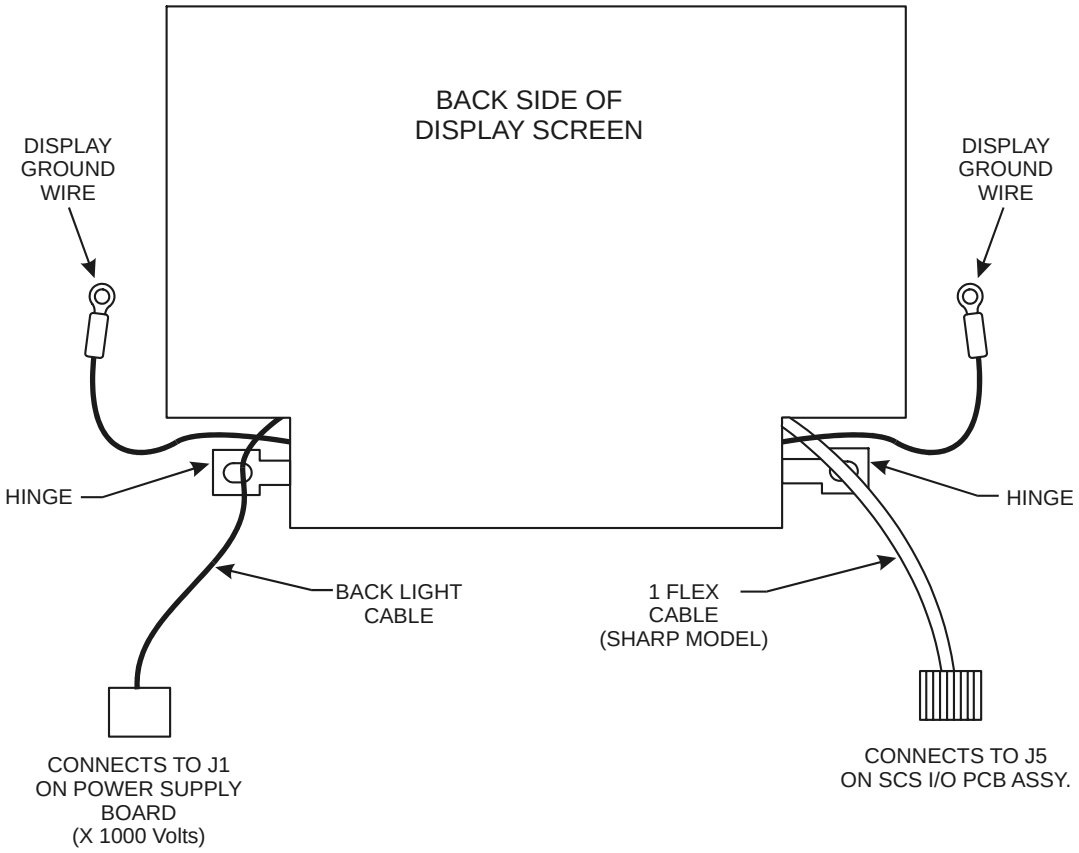


Figure 4-3 Display Screen Housing

The backlight power cable supplies a high voltage (~250-1000 VAC) from an inverter on the power supply board to the screen backlight. The backlight provides the display illumination. The LCD portion of the screen actually darkens the screen to block the backlighting to produce the displayed characters. The LCD display is controlled from a video board, which is part of the SCS I/O board assembly. Table 4-1 summarizes the display type requirements.

Table 4-1 Display Type Requirements

Type	**Sharp**
Inverter supply voltage	-20VDC
JP3 setting	pins 1 and 2
Controller cables	one
Controller cable connections	J5

Figures 4-4 shows the Sharp screen controller cable connections. The settings for the supply voltage to the display electronics are made on the SCS I/O board using JP3.

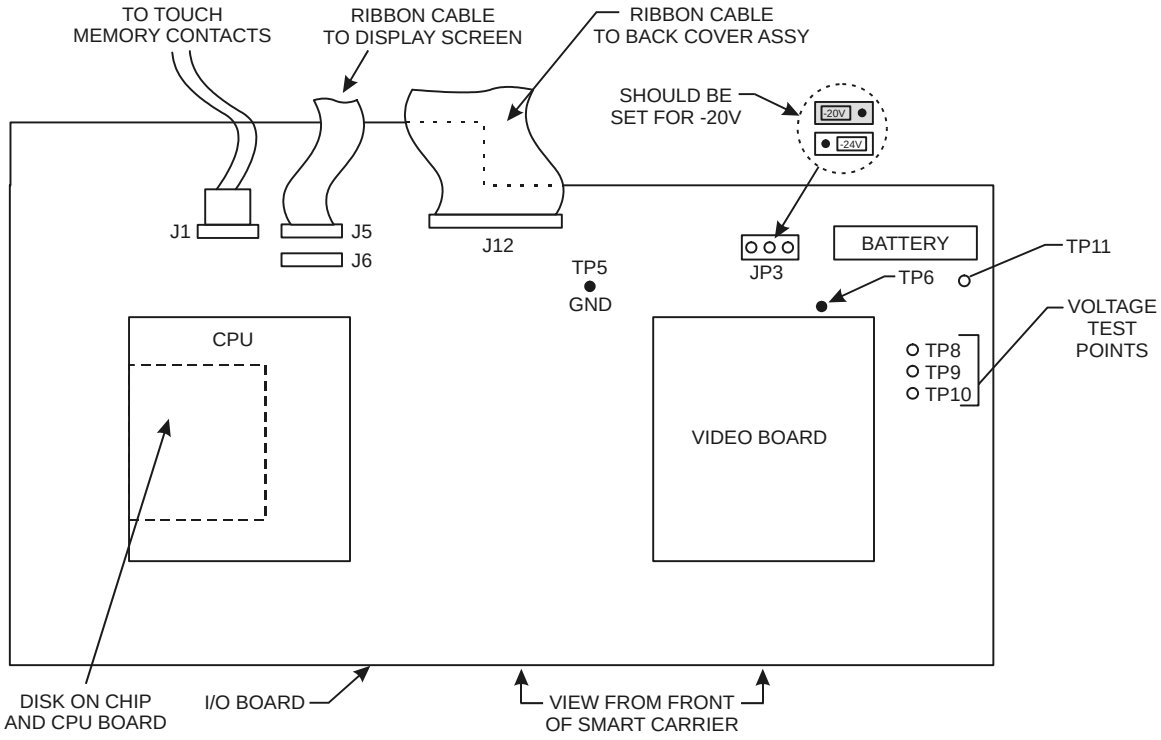


Figure 4-4 Sharp Screen Connection

Power Supply

The power supply is located in the SCS back cover assembly at the back of the SCS base unit. Figure 4-5 shows the power supply (and back cover) partially detached from the base unit. In this view the wires and cables attached to the power supply are visible.

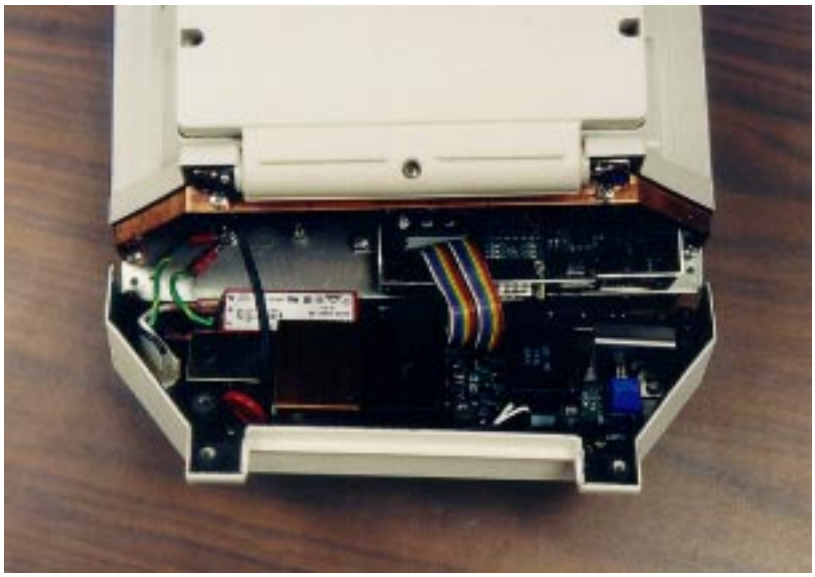


Figure 4-5 Power Supply – Partially Detached

The power supply is shown in figure 4-6 and 4-7. The power supply board accepts either 110 volt, 60 Hz, or 220 volt 50 Hz input power. The voltage regulator circuitry detects the input power voltage level and automatically adjusts its operation. The power supply develops +12 VDC, -12 VDC, and +5 VDC. The +5 VDC voltage is regulated. The +5 VDC is the only directly adjustable voltage. The adjustment is made on a potentiometer on the power supply, shown in figure 4-7. When the +5 VDC is adjusted the other voltages will be affected by a proportional amount.

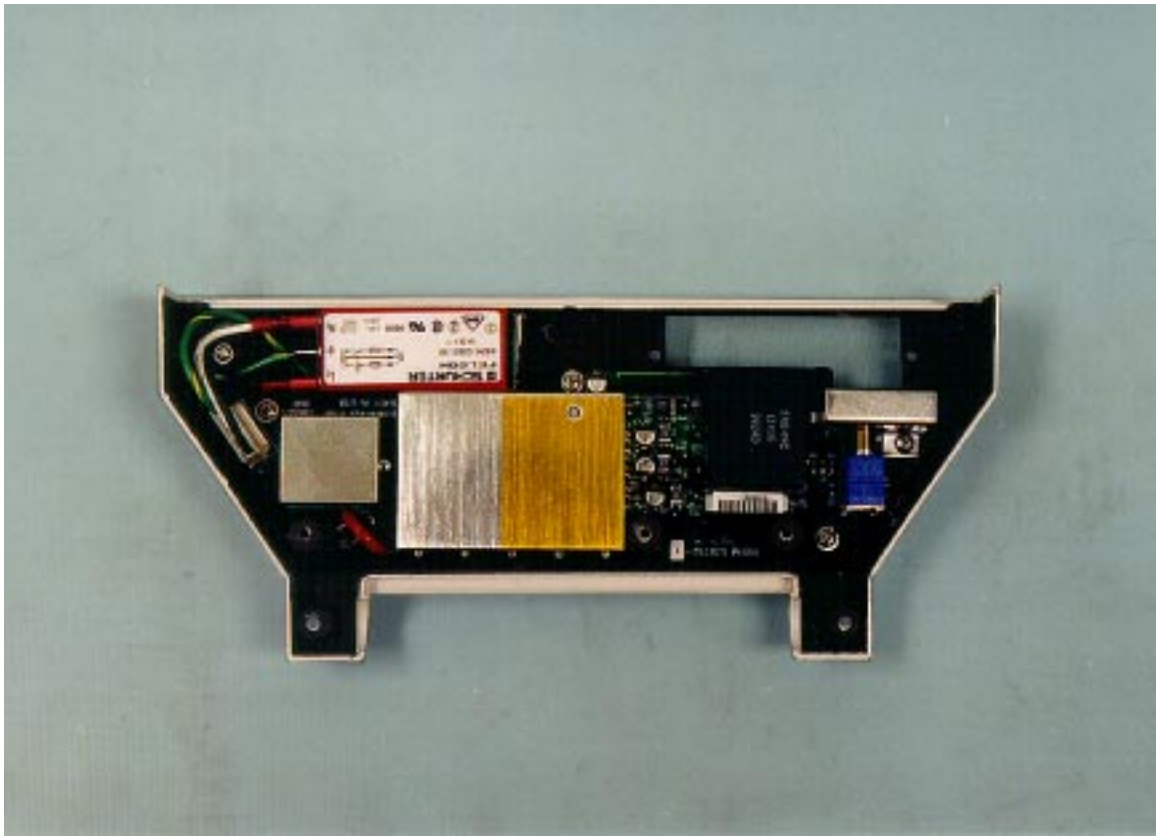


Figure 4-6 Power Supply

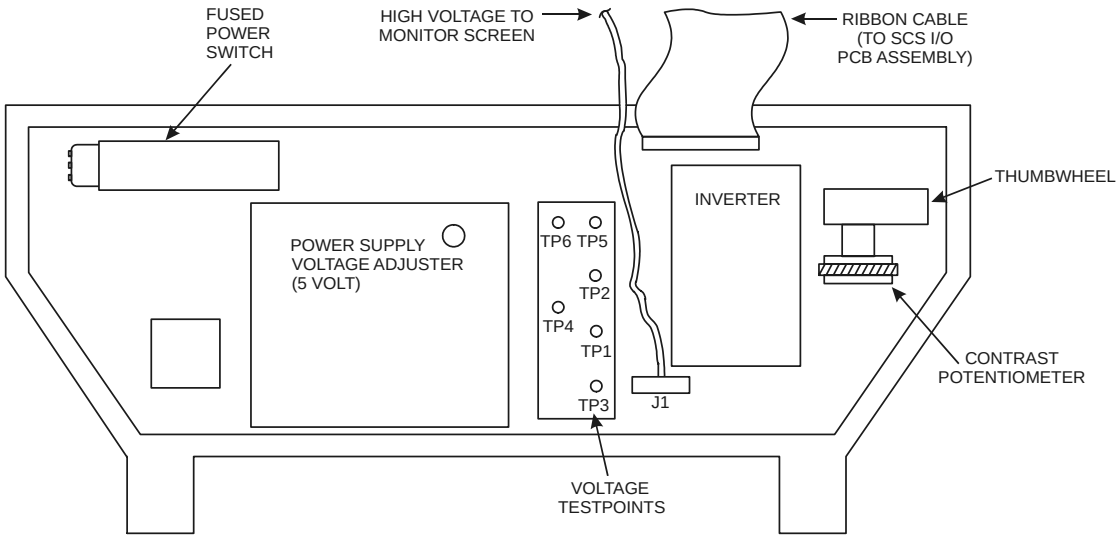


Figure 4-7 Power Supply

The inverter develops the high voltage (~250-1000 VAC) for the display screen backlight.

The fused power switch and the power supply board are grounded at a post in the base unit. The ground post is shown in figure 4-8.

WARNING! Per safety requirements, the ground wire to the power switch block must always be connected directly to the chassis! It must be the first lug connected to the post with only a star washer beneath it!

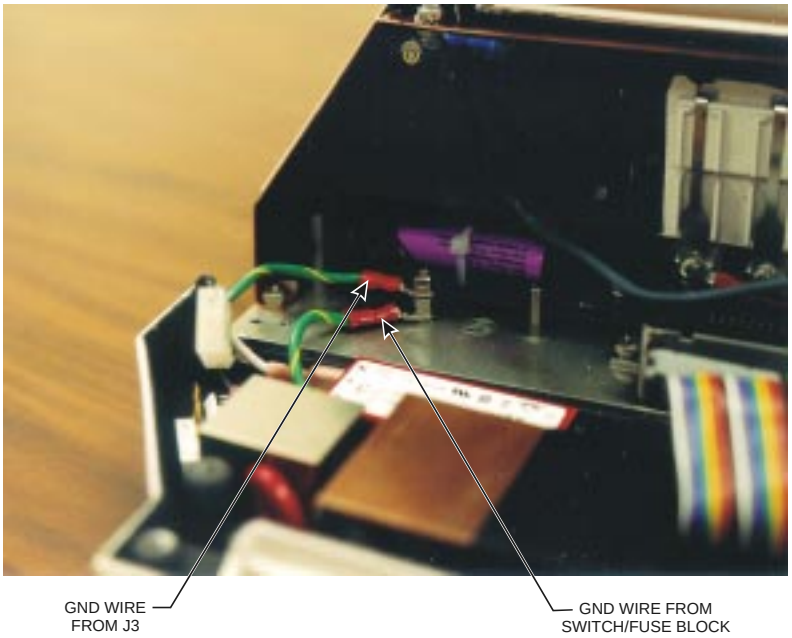


Figure 4-8 Ground Connections

SCS I/O Board Assembly

The I/O board assembly contains the general purpose I/O board, the CPU/disk/memory, and the video board. (Figures 4-9 and 4-10)

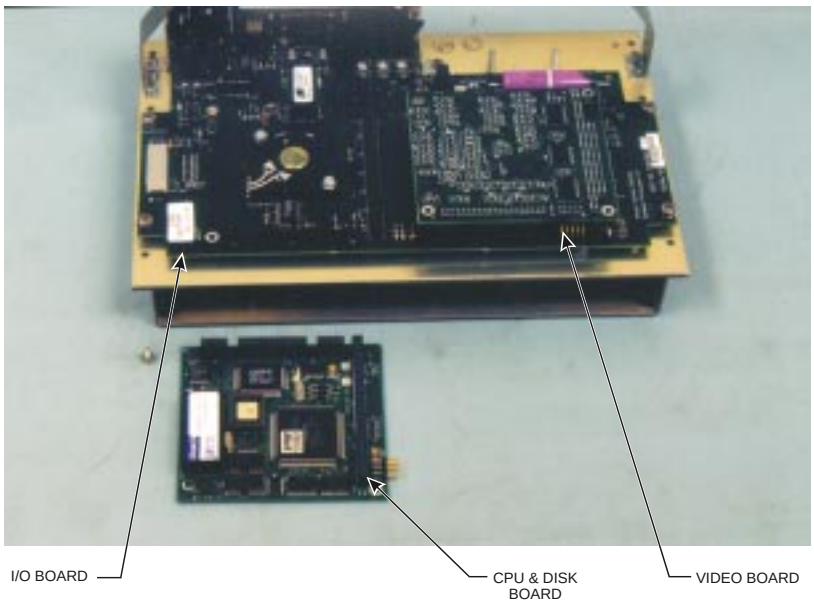


Figure 4-9 SCS I/O Board Assembly

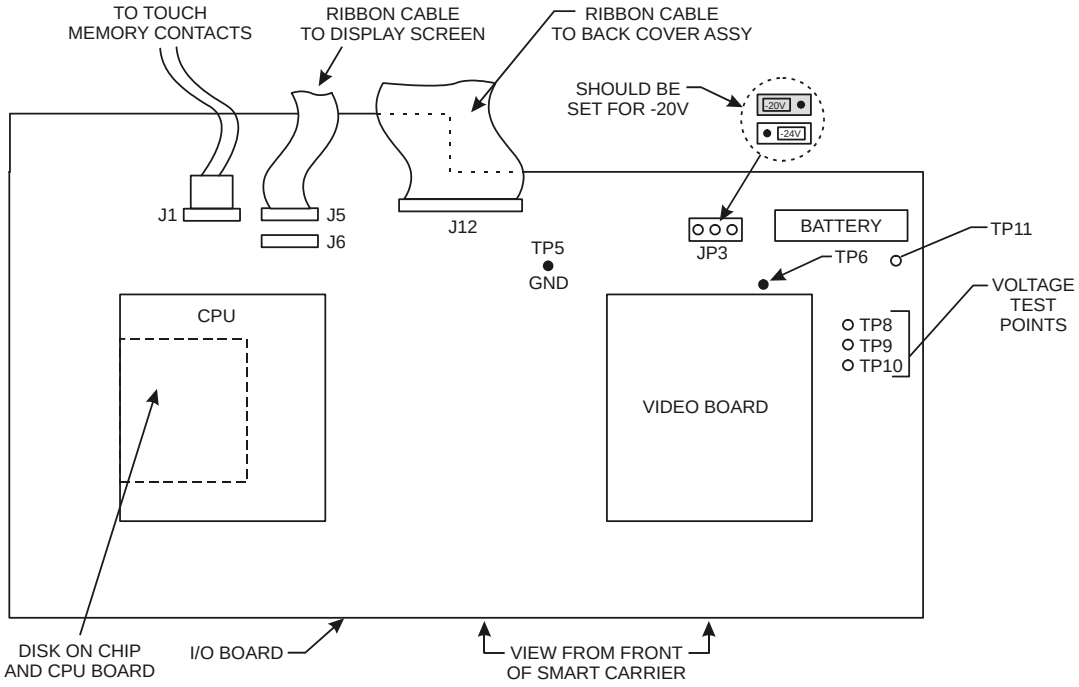


Figure 4-10 SCS I/O Board Assembly

NOTE: Only the SCS I/O Board assembly is stocked as a spare. The CPU disk board and video boards are not field replacement items. Under no circumstances should the assembly be disassembled or parts swapped.

CPU/Disk Board

The CPU/Disk board contains the CPU, solid state disk (DiskOnChip) storage, RAM memory, and the general computer chip set. The board is attached to the SCS I/O board assembly, component side down, by several square pin connectors and held down by a single screw. The board is shown in figure 4-11.

Figure 4-11 CPU and Disk Board

WARNING! If the CPU/Disk board is removed from the SCS I/O board, the CMOS setup must be reconfigured. (See Appendix C)

NOTE: There are two different type of solid state "DiskOnChip" varieties used with the SCS; a 28 pin chip version, and a 32 pin chip version. Each version requires a different jumper setting on the CPU/Disk board. Figure 4-12 and 4-13 shows a 28 pin chip, and figures 4-14 and 4-15 shows a 32 pin chip.

Figure 4-12 28 Pin Disk Chip

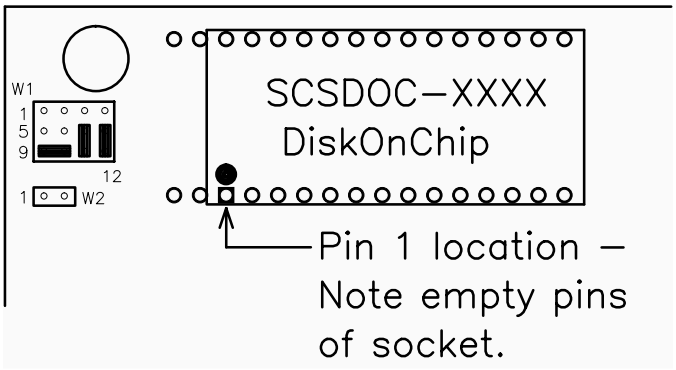


Figure 4-13 28 Pin Disk Chip Jumper Settings

☞ **NOTE**: Jumper W2 and W4 (not shown) remain open.

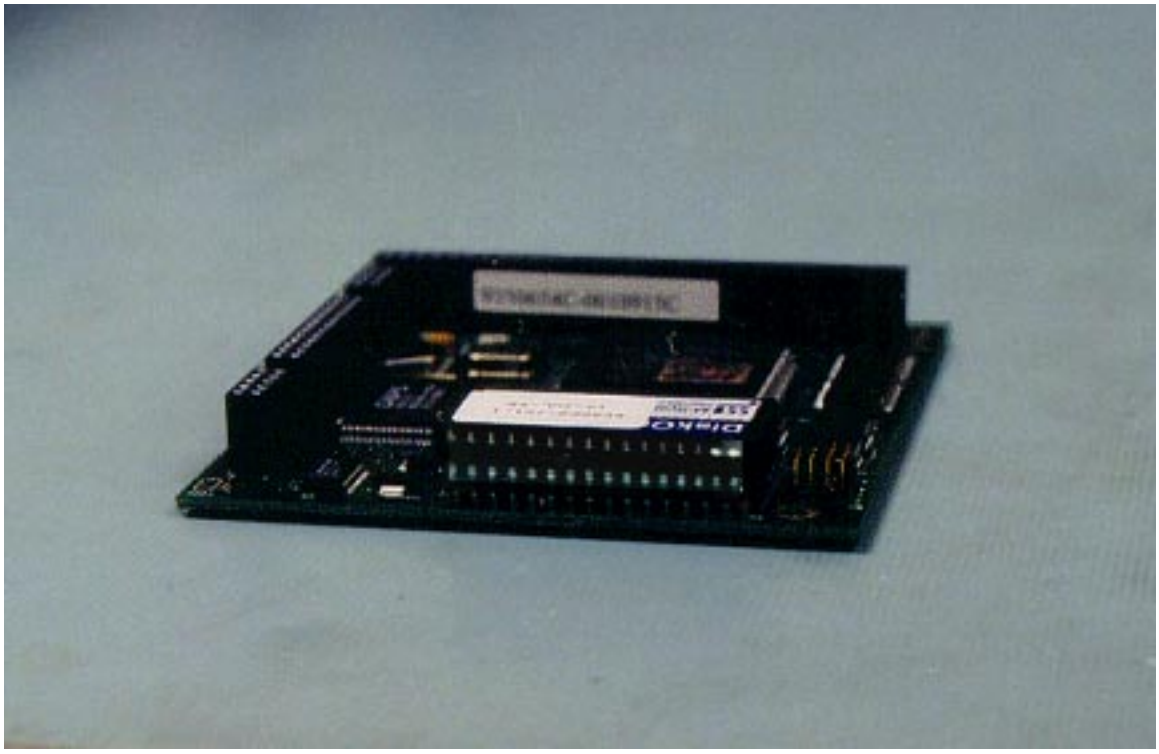


Figure 4-14 32 Pin Disk Chip

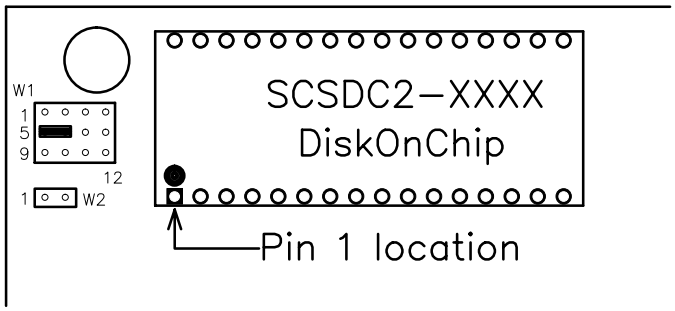


Figure 4-15 32 Pin Disk Chip Jumper Settings

NOTE: Jumper W2 and W4 (not shown) remain open.

Video Board

The video board drives the LCD display. The board can also drive a VGA monitor from connector J7 on the side of the board. The VGA monitor is used for troubleshooting, and during CMOS configuration.

The board is attached to the SCS I/O board assembly, component side down, by several square pin connectors and held down by a single screw. The board is shown in Figure 4-16. The jumper settings for the board are shown in figure 4-17.

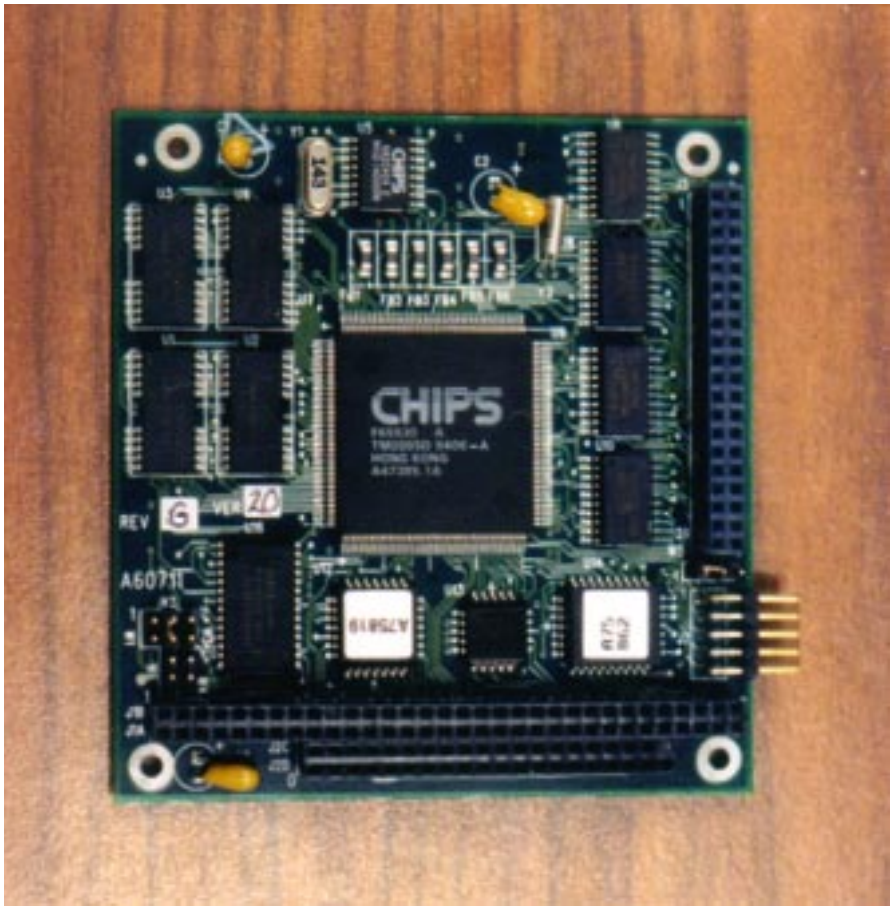


Figure 4-16 Video Controller Board

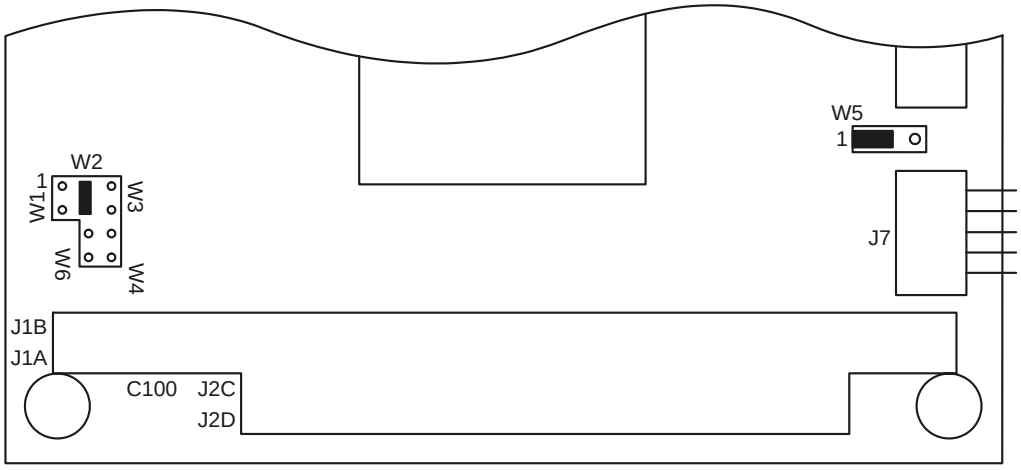


Figure 4-17 Video Controller Board Jumper Settings

Chapter Five: **Component Installation**

This chapter contains the common field repair procedures for gaining access to the internal components and replacing various defective components of the ***VITEK•2®*** Smart Carrier Station. Before performing any of these procedures, be sure you have used the troubleshooting procedures in Chapter Six of this manual to properly isolate the instrument's problems.

Ensure you *read* and *understand* the following warning information prior to performing any maintenance or entry into the device.

WARNING! Only Authorized ***VITEK•2®*** device service technicians should attempt to perform any component installation or servicing of this instrument beyond normal operational and routine maintenance tasks. Contact bioMérieux for any additional information or procedural direction.

Repair Notes

NOTE: Before removing any circuit cards or internal components, place the main AC power switch off and disconnect the AC power cable from its power source.

NOTE: The circuit boards for the instrument are sensitive to static electricity. Wear a static wrist strap when handling circuit boards or electronic components. After removal of any circuit board, wrap it in anti-static material for storage or shipment.

Voltage Test Points

Supplied voltages, shown in table 5-1, should be tested at the listed test points for each of the circuit boards as indicated. To access the power supply board, the back cover must be removed. To access the I/O board, the back and top cover must removed.

Table 5-1 Voltage Test Points

CIRCUIT BOARD TEST POINT DATA			
Test Point	**Signal**	**Voltage**	**Comments**
SCS Power Supply Board			
TP1	-12V	-12V±.5VDC	
TP2	GND	0V	
TP3	+12V	+12V±.5VDC	
TP4	VCC	+5V±.10VDC	
TP5		+4.80 - +5.10VDC	
TP6	Backlight Enabled	0-5VDC	TTL High = Backlight OFF TTL Low = Backlight ON
SCS I/O Board Assy			
TP5	GND	0V	
TP6	Display Screen Power (VEE)	-20V	Set by JP3
TP8	-5V	-5V	Not Used
TP9	-12V	-12V ± .5V	
TP10	+12V	+12V ± .5V	
TP11	+5V	+5V ± .10VDC	

Cover Removal and Replacements

This section lists the procedure steps for removing and replacing the front, back and display screen covers. The covers must be removed for access during troubleshooting and when performing component and/or circuit board removal or replacement.

WARNING! Power supply board contains an inverter (U1) for the display backlight (J1) which develops high voltage (~250-1000VAC). Precautions should be taken.

Back Cover

Removal

1. Turn the power switch to the **OFF** position and unplug the power cord.
2. Unplug the bar code wand and the keyboard from the base unit.
3. Remove the two screws and lockwashers (A) from the bottom of the back cover. (See figure 5-1.)
4. Remove the two screws (B) and lockwashers from the display screen hinges.
5. Remove the three screws (C) and lockwashers from the top of the back cover.
6. Remove the two small flathead screws (D) from each side of the accessories plugs.
7. Remove the small flathead screw (E) from the power switch/fuse assembly.
8. Carefully pull the back cover straight away from the base unit. After the back has been pulled away about a half an inch, it may be tilted back to gain access to the cable.
9. Only perform steps 10 through 12 if you will be completely removing the back cover. If you will be troubleshooting electrically, skip these steps.
10. Unplug the backlight (high voltage) cable from J1 on the power supply board.
11. Unplug the ribbon cable from J2 on the power supply board.
12. Remove the nuts, lockwashers, star washers, and ground connections from the ground post in the base unit.

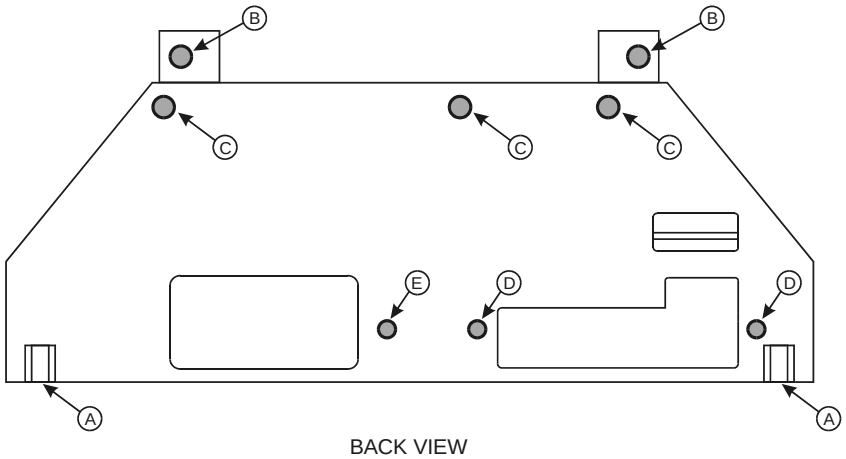


Figure 5-1 Back Cover Removal

Replacement

1. Only perform steps 2 through 4 if the electrical wires and cables have been removed.
2. Reconnect the ground lug from the power entry assy and the ground lug from the AC harness (J3) (see figure 4-8) to the ground post in the base unit. The hardware is attached in the following order:
   - Star washer
   - Power entry assy ground wire lug
   - Flat washer
   - Nut
   - Star washer
   - AC harness ground wire lug
   - Flat washer
   - Lockwasher
   - Nut

WARNING! Per safety requirements, the ground wire to the switch/fuse block must always be connected directly to the chassis! It must be the first lug connected to the post with only a star washer beneath it!

3. Reconnect the backlight (high voltage) cable to J1 on the power supply board.
4. Reconnect the ribbon cable to J2 on the power supply board.
5. Reposition the back cover, taking care that cables will not be caught under one of the mounting bosses.
6. Attach the two screws (A) to the bottom of the back cover. (See figure 5-1.)
7. Attach the two screws and lockwashers (B) and lockwashers to the display screen hinges.
8. Attach the three screws (C) and lockwashers to the top of the back cover.
9. Attach the two small flathead screws (D) to each side of the accessories plugs.
10. Attach the small screw (E) to the power switch/fuse assembly.
11. Plug the bar code wand and the keyboard into the base unit.
12. Plug the power cord into the base unit
13. If the unit is to be immediately returned to service, turn the power switch to the **ON** position.

Top Cover

Removal

1. Turn the power switch to the **OFF** position and unplug the power cord. Perform back cover removal first, steps 2-8.
2. Remove the four screws (A) from the bottom of the base unit. (See figure 5-2.)
3. Disconnect the J1 connector for the touch memory device and J5 connector for the display flex cable from the SCS I/O Board.
4. Disconnect J1 from the backlight power from the power supply.

5. Remove the display's braided grounding wires and corresponding hardware from the grounding antenna. (**NOTE:** It is very important to replace the hardware exactly as originally assembled.) (See figure 5-3).
6. Lift the top cover and remove it from the base unit.

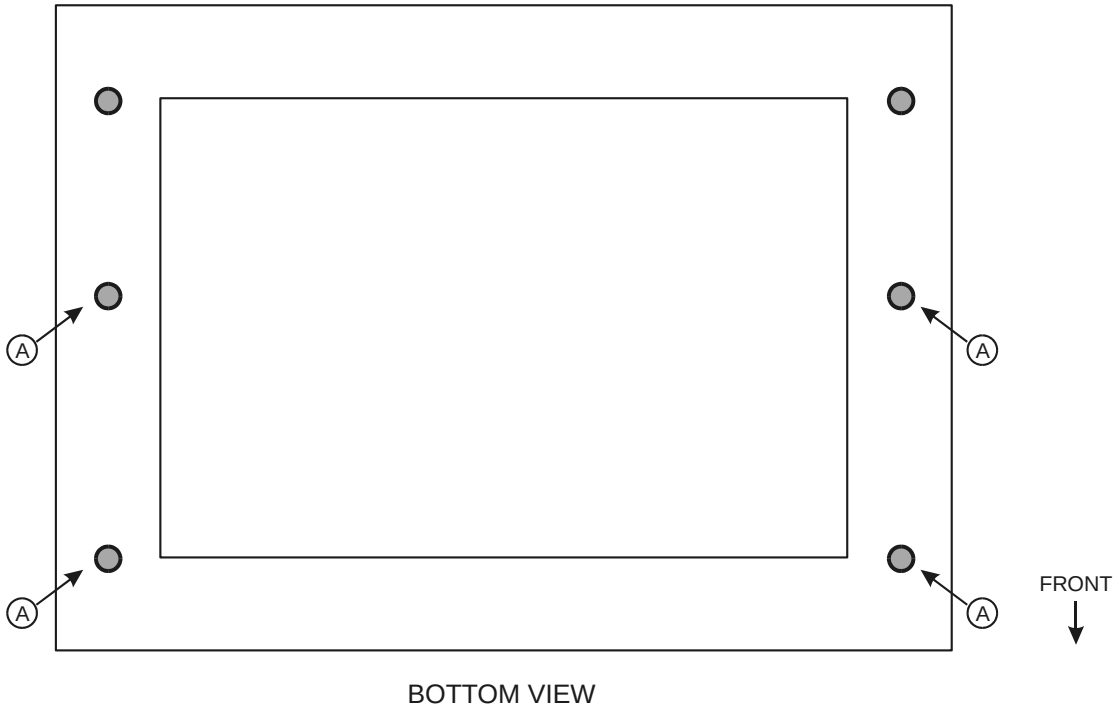


Figure 5-2 Top Cover Removal

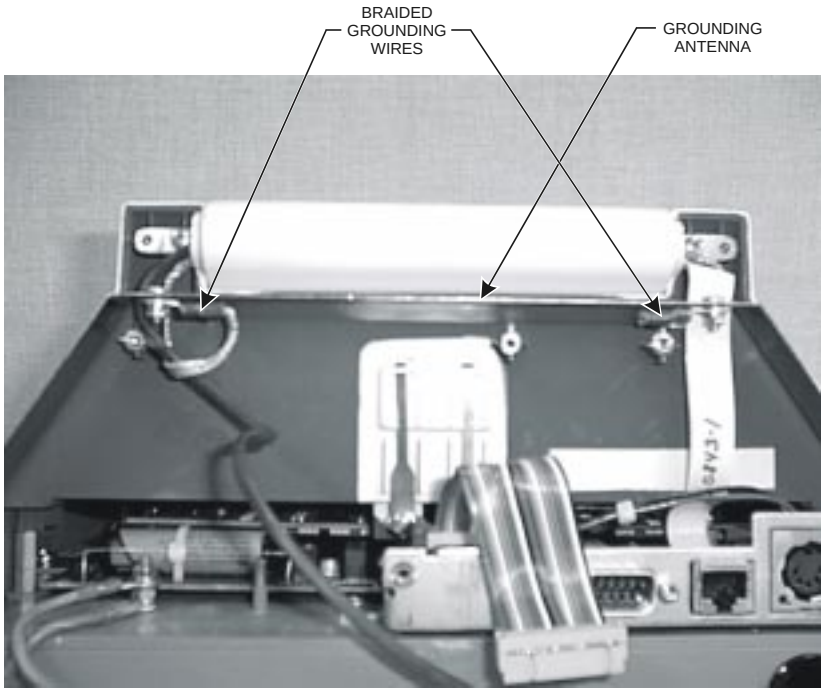


Figure 5-3 Braided Grounding Wire and Grounding Antenna Location

Replacement

1. Place the top cover on the base unit
2. Reattach the display's braided ground wires to the grounding antenna. (See figure 5-3.)
3. Connect the wires from the touch memory device contacts to J1 and connect the display flex cable to J5 on the SCS I/O board.
4. Connect the backlight power cable to J1 of the power supply.
5. Attach the four screws (A) through the bottom of the base unit. (See figure 5-2.)
6. Perform back cover replacement steps 5-11.
7. Plug the power cord into the base unit
8. If the unit is to be immediately returned to service, turn the power switch to the **ON** position.

Display Assembly Replacement

WARNING! Power supply board contains an inverter (U1) for display backlight (J1) which develops high voltages (~250-1000VAC). Precautions should be taken.

Removal

1. If the back cover has not been removed, perform steps 1 through 8 of the back cover removal procedure in this chapter. The electrical connections need not be disturbed.
2. Disconnect the backlight (high voltage) cable from J1 on the power supply board.
3. Disconnect the ribbon cable from J5 on the SCS I/O board.
4. Remove the display's braided grounded wires and corresponding hardware from the grounding antenna. (Prior to disassembly, note the hardware location because it is very important to replace the hardware exactly as originally assembled.) (See figure 5-3.)
5. Remove the two hinge attaching screws (A). (See figure 5-4.)
6. Remove the housing from the base unit, use care in threading the cables out of the base unit.

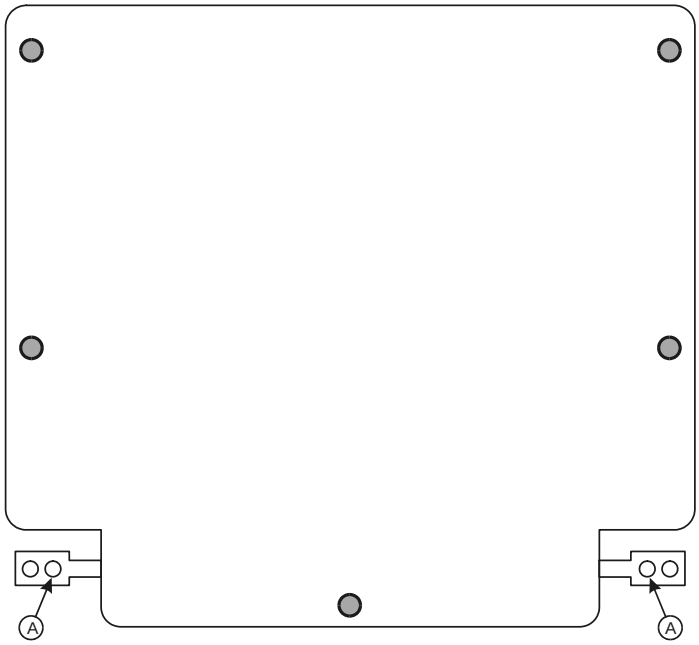


Figure 5-4 Display Screen Cover Removal

Replacement

1. Put the housing into place against the hinge mounting point on the base unit, thread the cables into the base unit.
2. Attach the two hinge attaching screws (A). (See figure 5-4.)
3. Attach the display's braided ground as previously noted for EMI purposes.
4. Reconnect the backlight (high voltage) cable to J1 on the power supply board.
5. Reconnect the ribbon cable to J5 on the SCS I/O board.
6. Replace the back cover per back cover replacement steps 5-11.
7. Plug the power cord into the base unit.
8. If the unit is to be immediately returned to service, turn the power switch to the **ON** position.

Electrical Component and Circuit Board Replacements

This section gives the locations of the electrical and circuit board component parts and lists the recommended removal and installation procedure to use when performing component and/or circuit board removal or replacement.

Power Supply Board Replacement

Removal

1. Remove the back cover per the procedure in this chapter. (Figure 5-5 shows the back cover open with the power supply wiring attached.)
2. Disconnect the AC harness from J3 of the power supply board.
3. Remove the five screws (A) securing the power supply board to the back cover. (See figure 5-6.)

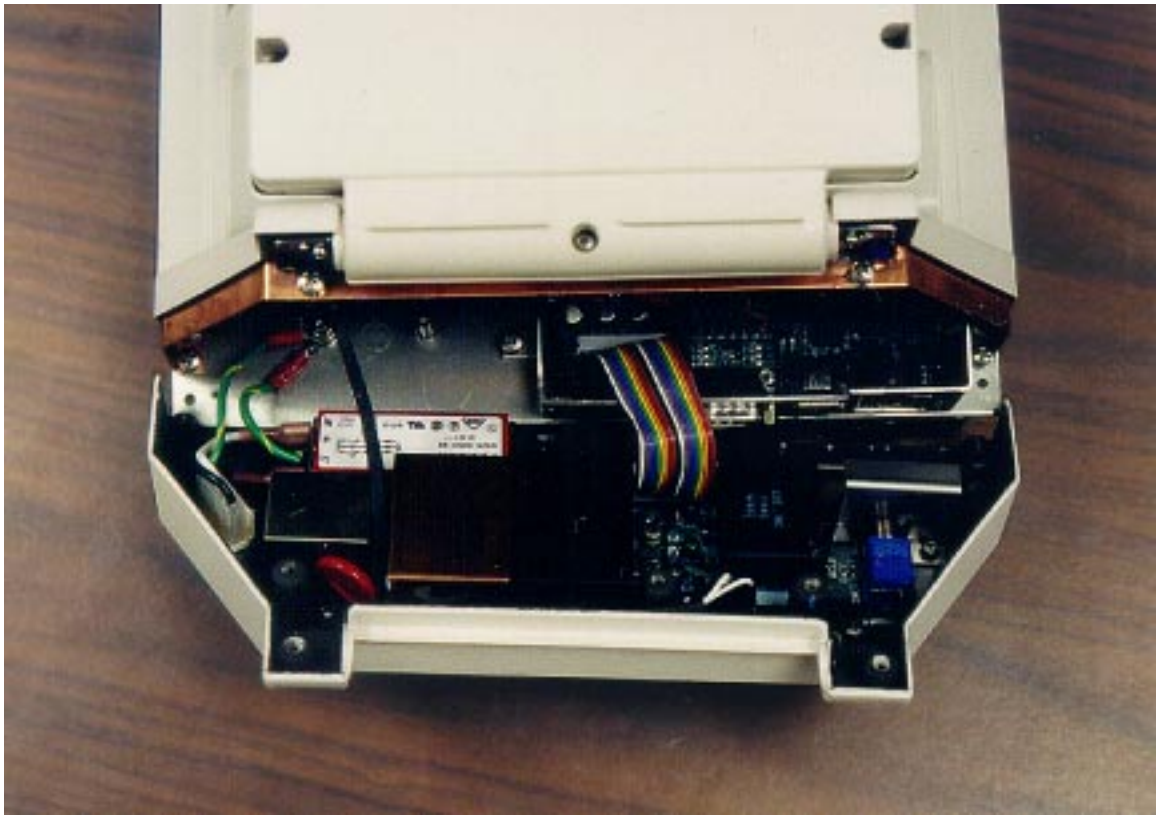


Figure 5-5 Power Supply Removal – Wiring

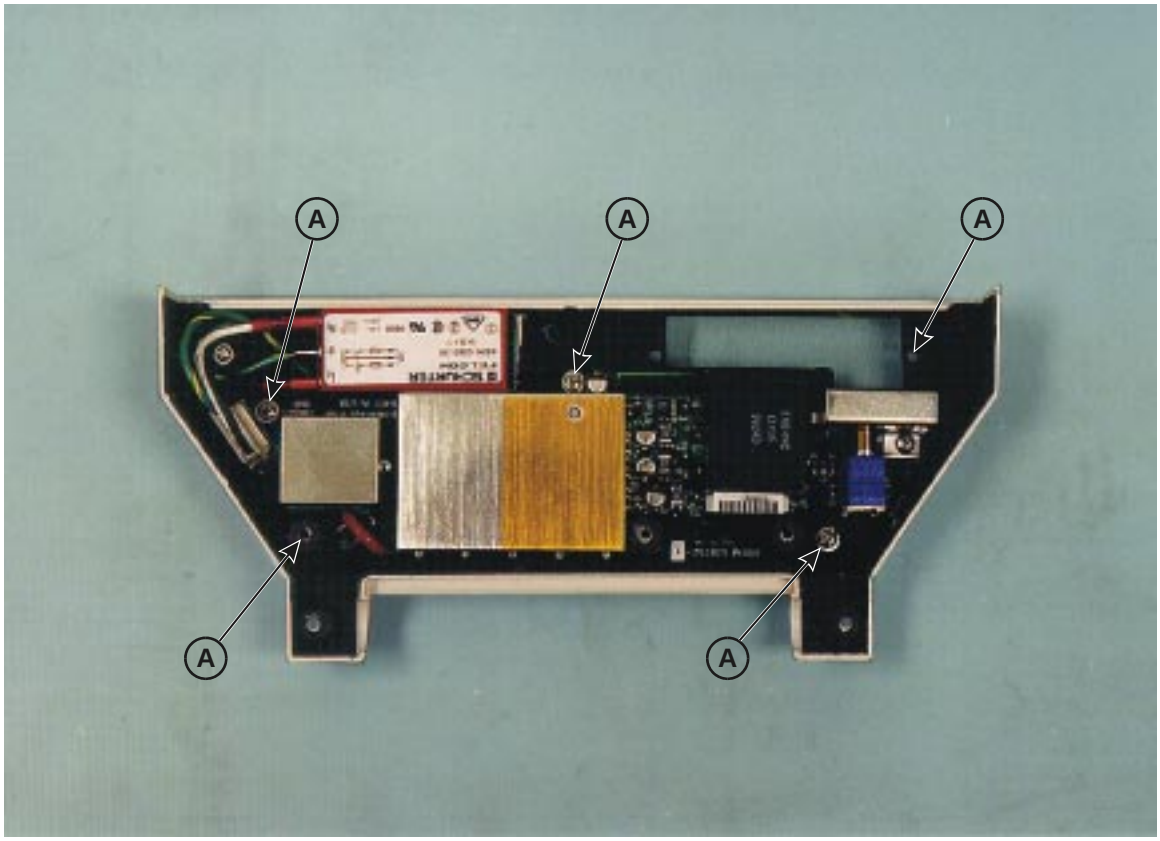


Figure 5-6 Power Supply Removal – Screws

Installation

1. Place the power supply board within the back cover and attach the five screws (A) (See figure 5-6.)
2. Fully insert the AC harness into J3 on the power supply board.
3. Reconnect the ground lug from the power entry assy and the ground lug from the AC harness (J3) (see figure 4-8) to the ground post in the base unit. The hardware is attached in the following order:
   - Star washer
   - Power entry assy ground wire lug
   - Flat washer
   - Lockwasher
   - Nut
   - Star washer
   - AC harness ground wire lug
   - Flat washer
   - Lockwasher
   - Nut

WARNING! Per safety requirements, the ground wire to the power entry assy must always be connected directly to the chassis. It must be the first lug connected to the post with only a star washer beneath it.

4. Reconnect the backlight (high voltage) cable to J1 on the power supply board.
5. Reconnect the ribbon cable to J2 on the power supply board.
6. If installing a new or repaired unit adjust the power supply for a reading of 5.1 VDC at TP4, under loaded (SCS powered up) conditions. Check that the voltage is also 5.1 VDC at TP11 on the SCS I/O board, under loaded conditions.
7. Replace the back cover per the procedure in this chapter

SCS I/O PC Board Assembly Replacement

NOTE: The SCS I/O PC Board Assembly includes the video board and the CPU board (with the disk on chip.)

Removal

1. Remove the top cover as per the procedure in this chapter.
2. Remove the five screws and star washers that hold the SCS I/O PC board assembly to the SCS base unit.
3. Lift the I/O board assembly out of the base unit.

Installation

1. Place the board assembly into the base unit, and align the screw holes with the mounting points.
2. Attach the five screws and star washers that hold the SCS I/O board assembly to the SCS base unit.
3. Replace the top cover per the procedure in this chapter.

Flex Cable Replacement

Removal

1. Perform the back cover removal.
2. Remove the 5 screws (A) holding the cover to the display housing, and remove the cover. (See figure 5-7.)
3. Remove the four screws (B) and star washers holding the copper EMI shield to the screen assembly. The lower screws also hold the screen grounding wires (C) to the assembly.
4. Gently peel back the copper tape and then remove the flex cable from the display and disconnect it from J5 of the I/O PC Board Assy.

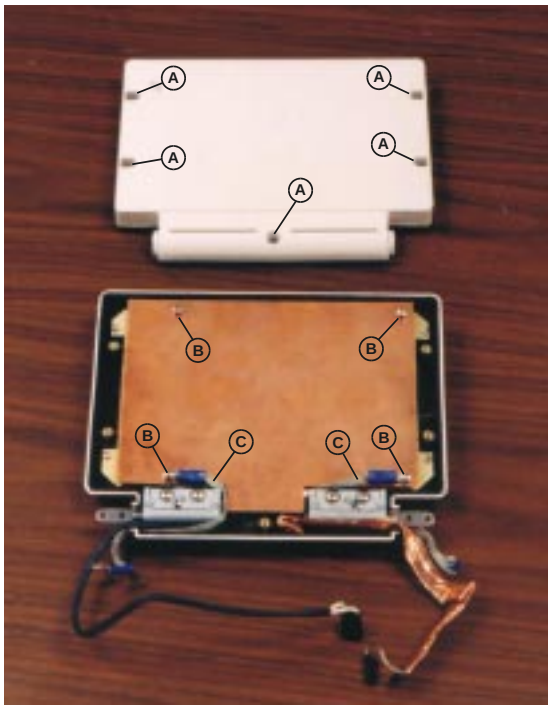


Figure 5-7 Display Cover Removal

Figure 5-8 Flex Cable Replacement

Installation

1. Insert the cable into the display connector and secure it by pressing the securing tabs. Carefully route the flex cable as shown in figure 5-8 and connect to J5 of I/O board.
2. Reapply the copper tape to its original location.
3. Place the copper EMI shield over the screen assembly and fasten the shield with the four screws (B) and star washers.
4. Place the cover on the screen housing, then check that the various wires are safely routed out of the housing.
5. Attach the five screws (A) holding the cover to the housing.
6. Perform the back cover replacement.

Firmware Update Options

The SCS software can be updated to enhance its functions and to provide it with information about new test cards. These updates are performed by connecting the SCS to a computer workstation using a cable (part number 186132-10). Since you may need to update only a portion of the SCS software, the Program Updates options allow you to select the software you need.

You receive periodic program updates from bioMerieux. The update package includes instructions to update the computer workstation, the ***VITEK•2***®, and the SCS. Prior to updating the SCS, attach the cable 186132-10 from the workstation (tty0) to the SCS.

1. Press the **F4** key to access the Smart Carrier Configuration screen.

2. Press the ***NEXT SCREEN*** key once to display the Firmware Update Options screen.

3. Press the ***DOWN ARROW*** key to move the cursor to the option specified in the update instructions (either **"Update all SCS files and data"** or **"Request specific file"**).

4. Press the ***ENTER*** key to select the option. The following message appears:

   Press F1 to start selected function
   any other key to cancel

5. Press the ***F1*** key.

6. *(Update Specific File only).* Enter the ***file name*** specified in the update instructions. The following message appears:

   Press F1 to start transfer

7. Press the ***F1*** key to begin the update.

Chapter Six: **Troubleshooting**

This chapter contains troubleshooting information to be utilized ONLY by an authorized ***VITEK•2®*** instrument service representative. All safety and hazard information must be clearly understood and the appropriate safeguards must be exercised anytime the instrument is serviced.

This chapter is separated into six sections:

- 6.1 General Troubleshooting Information
- 6.2 Data Transfer Troubleshooting Information
- 6.3 Power Supply Troubleshooting Information
- 6.4 Bar code wand Troubleshooting Information
- 6.5 Keyboard Troubleshooting Information
- 6.6 Display Troubleshooting Information

6.1 General Troubleshooting Information

Table 6-1 General Troubleshooting Information

Malfunction	General Troubleshooting Actions
1. SCS will not start	Verify AC power switch is in the "ON" position Verify the AC line cord is properly connected to a powered receptacle Verify proper voltages at the power source Check AC power switch fuses Refer to section 6.3 Power Supply Troubleshooting Information
2. No display	See item 1 of this table Refer to section 6.6 Display Troubleshooting Information
3. Cannot enter data from keyboard	Check the keyboard is correctly connected to the base unit Refer to section 6.5 Keyboard Troubleshooting Information
4. Cannot enter data from bar code wand	Refer to section 6.4 Bar Code Wand Troubleshooting Information
5. Data will not transfer to the cassette button memory device	Refer to section 6.2 Data Transfer Troubleshooting Information

6.2 Data Transfer Troubleshooting Information

The Data Entry Screen should automatically appear when a cassette (equipped with button memory device) is placed on the SCS base unit against the data bus contacts. After the **ENTER** key is pressed at the end of a keyboard entry or the scan is successfully made, the data is transferred to the button memory device. If any problem occurs, a message is displayed on the SCS screen.

Data transfer problems can be indicated by the absence of the Data Entry screen, or by explicit error messages displayed in windows on the SCS Screen.

No Data Entry Screen

Checkpoints:

- Check that a button memory device is in the cassette
- Check cassette is positioned against the data bus contacts
- Check cleanliness and positioning of the contact "prongs" on the cassette
- Try a known-to-be-good cassette or replace the button memory device instrument
- Clean the data bus contacts:
  - Alcohol will remove most deposits
  - Rubbing the contacts with a pencil eraser will remove oxidation.
- Remove back cover and check the connections and wires between the SCS cassette contacts and J1 on the SCS I/O board

Error Messages

The data transfer error messages are listed in table 6-2, along with a brief description of the condition causing the message and suggested remedial actions.

Table 6-2 Data Transfer Error Messages

Message	Cause	Action
ERROR - No cassette memory	Cassette removed or moved during data transfer	Reposition cassette against contacts and repeat data entry
Cassette Data BUS Malfunction		Check 5, +/-12 VDC @ power supply (see sect. 6.3), if +/-12VDC is good replace SCS I/O board
Bad CRC from Cassette data transfer (eternal loop of message)	Bad button memory device	Replace button memory device if it cannot be erased
Undefined Cassette Status	All other errors	Call bioMérieux, Inc.

6.3 Power Supply Troubleshooting Information

The power supply develops +12 VDC, -12 VDC, +5 VDC. The +5 VDC voltage is regulated. The +5 VDC is the only directly adjustable voltage. The adjustment is made on a potentiometer on the power supply. When the +5 VDC is adjusted the other voltages will be affected by a proportional amount.

WARNING! Power supply contains an inverter (U1) for display backlight (J1) which develops high voltages (~250-1000VAC). Precautions should be taken.

Checkpoints

- Is the power cord plugged into a powered receptacle?
- Check the power switch fuse (mounted in the same block as the switch)
- Check supply voltage on both sides of the switch.
- Check voltage testpoints on the power supply card
  - ◊ If all voltages are absent the power supply is probably bad and in need of replacement
- If the 5 VDC and +/-12VDC voltages are present but at improper levels, adjust the power supply for a reading of 5V ± .10 VDC at TP4, under loaded (SCS powered up) conditions. Check that the voltage is also 5V ± .10 VDC at TP11 on the SCS I/O board, under loaded conditions.
  - ◊ If all voltages return to acceptable levels, resume operation
  - ◊ If any voltage is still at an unacceptable level the power supply board must be replaced

Table 6-3, Voltage Test Points, is provided for general reference.

Table 6-3 Voltage Test Points

CIRCUIT BOARD TEST POINT DATA			
Test Point	**Signal**	**Voltage**	**Comments**
SCS Power Supply Board			
TP1	-12V	-12V±.5VDC	
TP2	GND	0V	
TP3	+12V	+12V±.5VDC	
TP4	VCC	+5V±.10VDC	
TP5		+4.80-+5.10VDC	
TP6	Backlight Enabled	0-+5VDC	TTL Low = Backlight ON TTL High = Backlight OFF
SCS General Purpose I/O Board			
TP5	GND	0V	
TP6	Display Screen (VEE) Power	-20V	Set by JP3
TP8	-5V	-5V	Not Used
TP9	-12V	-12V ± .5V	
TP10	+12V	+12V ± .5V	
TP11	+5V	+5V ± .10VDC	

6.4 Bar Code Wand Troubleshooting Information

If the bar code wand is defective, data will not appear on the display screen when a scan is attempted. Normally, a successful scan is indicated by a beep from the bar code wand, and the scanned data appears in the appropriate field of the Data Entry screen. If the scanner is defective, the data can still be entered manually with the keyboard by unplugging the bar code wand and cycling power. If the data can be entered via the keyboard, the problem is isolated to the bar code wand.

Checkpoints:

- Check that the scanner is properly plugged into the back of the base unit
- Cycle power to SCS
- Attempt to enter data via the keyboard
- Reprogram Bar Code wand by scanning barcodes in figure 6-1
- Turn SCS “OFF”, substitute another scanner, turn SCS “ON”, and retry the scan

FACTORY DEFAULT SETTINGS (SCAN FIRST)

IBM PC XT AND COMPATIBLES INTERFACE (SCAN SECOND)

BIM170\SC-047

Figure 6-1 Reprogram Bar Codes

6.5 Keyboard Troubleshooting Information

Keyboard problems will either center on the keyboard or the keyboard controller portion of the SCS I/O board.

Checkpoints:

- Check that the keyboard is properly plugged into the back of the base unit
- Cycle power to SCS
- With a cassettes on the SCS, test type each key and see if the character displays on the Data Entry screen. Do not test the function keys in this manner as unexpected results may occur.
- Turn SCS "OFF", substitute a known-to-be-good keyboard, turn SCS "ON" and retry data entry
- If the SCS does not work with the "good" keyboard, the SCS I/O board is at fault and the SCS I/O board assembly must be replaced.

6.6 Display Troubleshooting Information

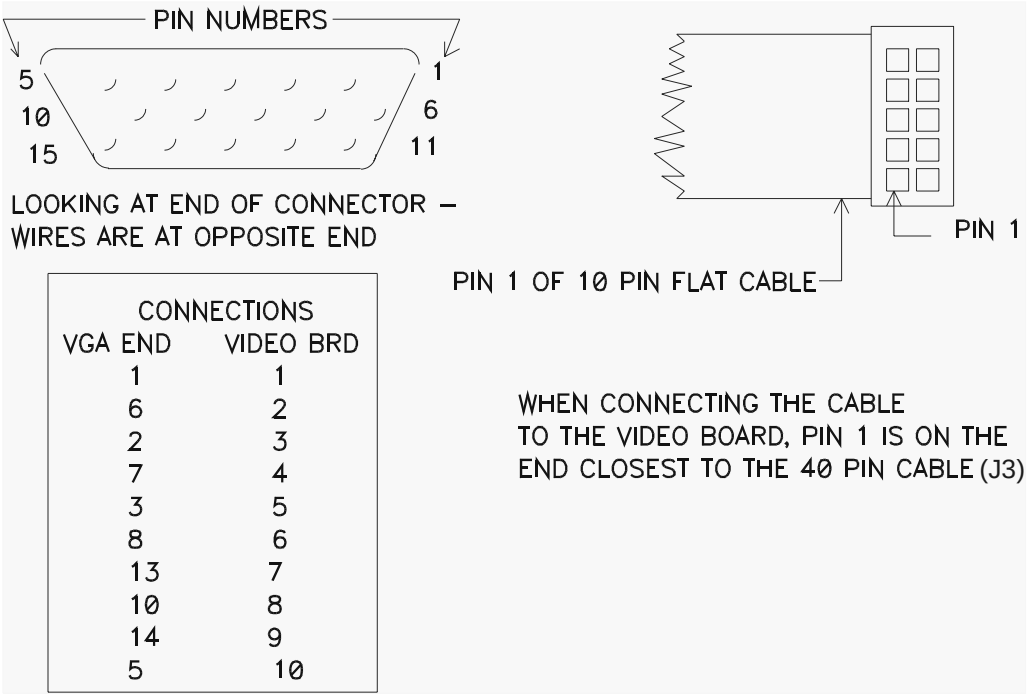
Three types of display problems are likely; problems with the display backlight, failure of the display assembly or problems with the video board. If there is a video board problem, the entire I/O PC Board Assy must be replaced. Two different troubleshooting paths should be followed depending on whether or not a screen backlight is visible. If no characters are displayed on the screen *at all*, go to No Display - Backlight OK. If the display is dimly lit and characters show *faintly* go to No Display - No Backlight.

No Display - Backlight OK

Checkpoints:

- Check/adjust the contrast thumbwheel on the back of the base unit.
- Verify flex cable from the display assembly to J5 of the I/O PC Board is not damaged (pinched, kinked, broken) and the connector is fully seated on both ends.
- Check -20VDC (TP6) and 5VDC (TP11) on the SCS I/O board
  - If the TP6 voltage is incorrect, verify Jumper setting of JP3 across 1 and 2.
  - If the TP6 voltage is still incorrect, disconnect the flex cable from J5 and the measure the voltage (a defective flex cable (open/short) may be affecting the circuits)
- If the 5VDC, -20VDC, and JP3 are reading/set properly, the problem is most likely the video controller or a bad display assembly.
- The video controller board can be checked by connecting a VGA monitor to J7 on the video board. Note there is a slight chance that the VGA monitor connection may work while the portions of the board associated with the SCS display are still faulty.
  - Using a video display interface cable, plug the PC Monitor into the PC104 video board 10 pin header. Be sure to position pin 1 of the 10 pin video adapter connector facing connector J3. (See figure 6-2 for pin configuration of display interface cable.)

◊ If the monitor check reveals a bad video board, replace the entire SCS I/O board assembly.
◊ If the monitor check indicates the video board is working, replace the display assembly.



CONNECTIONS	
VGA END	VIDEO BRD
1	1
6	2
2	3
7	4
3	5
8	6
13	7
10	8
14	9
5	10

Figure 6-2 Video Display Interface Cable

No Display - No Backlight

The source of this problem would be either the backlight (high voltage) cable, or the inverter on the power supply board.

Checkpoints:

- Check that the backlight (high voltage) cable from J1 of the power supply is undamaged, and firmly seated in the connector.

- Check the inverter as follows:

WARNING! The normal voltage across pins 3 and 4 of U1 (inverter) and the normal voltage across pins 1 and 2 of the J1 connector on the power supply board is ~250-1000 VAC!

  - ◊ Remove the ribbon connector from J2 of the power supply board
  - ◊ Connect a jumper wire from TP6 to TP2 (ground) – this forces an "enable" signal to U1
  - ◊ Read the voltage from TP5 to TP2 (Gnd). The value should be 5 VDC. The backlight should be lit, and there should be ~250-1000 VAC between pins 3 and 4 of U1 and between pins 1 and 2 of the J1 connector. If not, the inverter is faulty and the power supply board must be replaced.
  - ◊ If the inverter is OK, then the display assembly is probably faulty and it must be replaced.
  - ◊ Remove jumper from TP6 to TP2.

Appendix A: **Schematics and Diagrams**

DiskOnChip 2000 Jumper Settings (32 Pin Instrument)

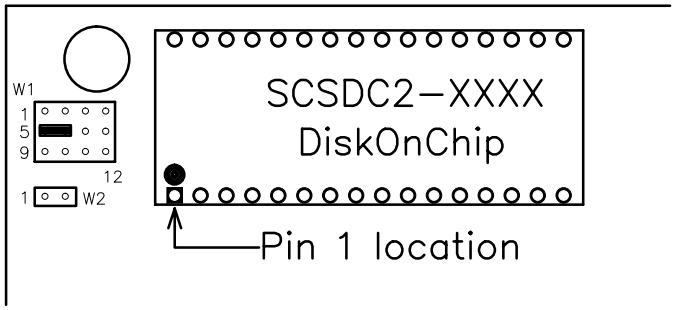


Figure 1

NOTE: Jumper W2 and W4 (not shown) remain open.

DiskOnChip 1000 Jumper Settings (28 Pin Instrument)

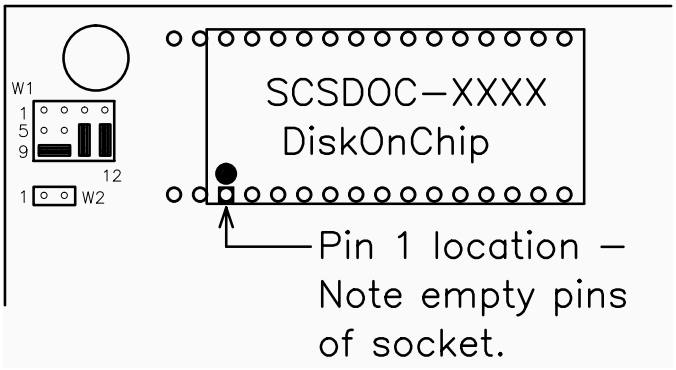


Figure 2

NOTE: Jumper W2 and W4 (not shown) remain open.

Video Board Jumper Settings

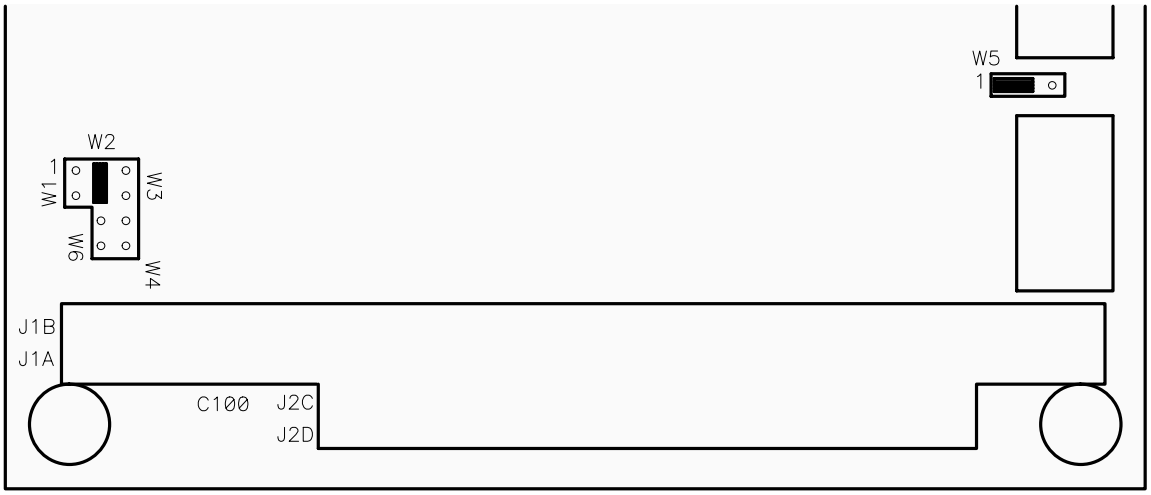
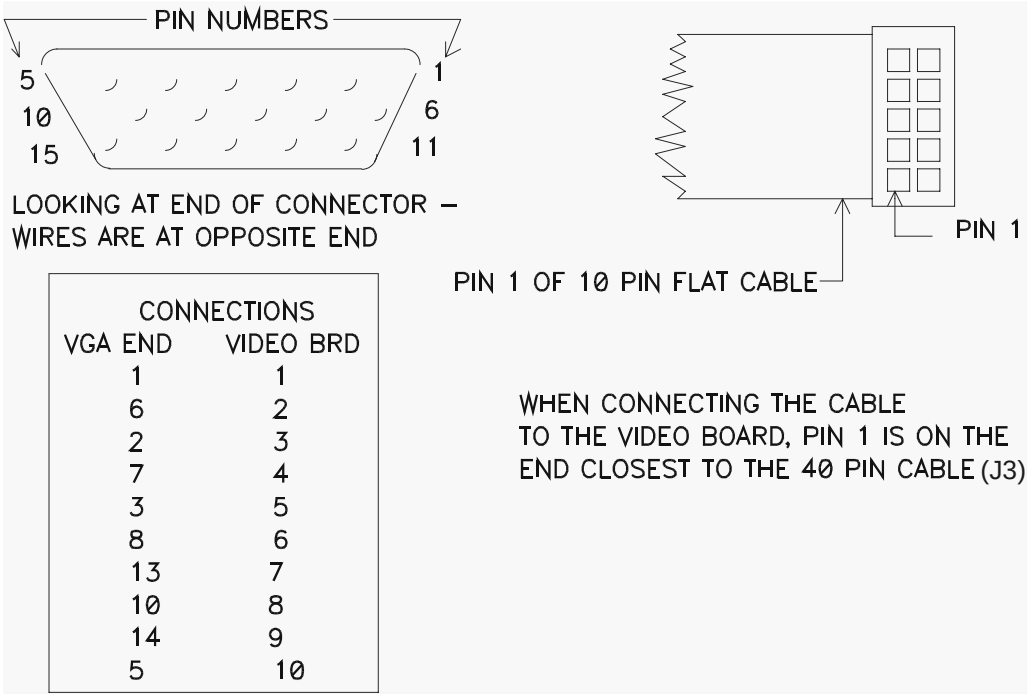


Figure 3

Video Display Interface Cable



CONNECTIONS

VGA END	VIDEO BRD
1	1
6	2
2	3
7	4
3	5
8	6
13	7
10	8
14	9
5	10

Figure 4

Appendix B: **Glossary**

Non-Volatile	Memory location that does not rely on external power to maintain information.
CPU	Central Processing Unit
LCD	Liquid Crystal Display

Appendix C: **CMOS Configuration for the SCS**

Connect a standard VGA monitor to J7 of the video interface board of the SCS using a VGA display interface cable. (See figure 6-2).

Connect a XT keyboard to the SCS keyboard connection port.

Turn the SCS power on and observe the output on the monitor. When prompted, press the <**CTRL**><**ALT**><**ESC**> keys to enter the BIOS setup utility. There are three screens of BIOS settings. Verify or change all settings as needed to agree with the following setups.

> (You will need to press <**ENTER**> after typing in the time and date. The left and right arrow keys are used to make the other changes. Follow the instructions displayed at the bottom of the screen as required to complete the configuration process.)

First CMOS Setup Screen

CM/PC Setup

Date (mm/dd/yy)	Set correct date
Time (hh:mm:ss)	Set correct time
1st Floppy	None
2nd Floppy	None
Video Type	EGA/VGA
Video State	Enabled
Serial Port	Enabled
Parallel Port	Enabled
Byte wide socket	64K @ D0000
Socket Status	Enabled
System POST	Fast
Watch Dog Timer	Disabled
Serial Boot Loader	Disabled
Hot Key Setup	Enabled
Enhanced BIOS	Enabled

Second CMOS Setup Screen

SCSI and IDE Disk Setup

SCSI/IDE Disk Service	Disabled
SCSI IN ID	7
SCSI Retries	15
Default Boot Drive	Hard Drive

MM/FI Ide Disk

IDE Disk 1	Disabled
IDE Disk 2	Disabled

SCSI Disk Map	**Physical Device**
SCSI Disk 1	ID 0 LUN 0
SCSI Disk 2	Not Active
SCSI Disk 3	Not Active
SCSI Disk 4	Not Active

DOS Disk Map	**Physical Disk**
1st Hard Drive	XT Disk 1
2nd Hard Drive	Not Active
3rd Hard Drive	Not Active
4th Hard Drive	Not Active

Third CMOS Setup Screen

Extended Serial Console Configuration

Console Output Device	Video
Console Input Device	Keyboard
Serial Console Output Setup	
Data Length	<Leave Blank>
Stop Bits	<Leave Blank>
Parity	<Leave Blank>
Baud	<Leave Blank>
Console Output Handshake	<Leave Blank>
Serial Console Input Setup	
Data Length	<Leave Blank>
Stop Bits	<Leave Blank>
Parity	<Leave Blank>
Baud	<Leave Blank>

When finished making all changes, use the page up key to return to the first CMOS setup screen and press the "S" key to save the changes. The unit will save the entered settings into CMOS memory and reboot with the new settings.

Verify that the unit reboots successfully.